

**583 FRANKLIN AVENUE  
BROOKLYN, NEW YORK**

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# **Remedial Investigation Report**

NYC OER Project Number: 14RHAZ556K

**Prepared for:**

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# REMEDIAL INVESTIGATION REPORT

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## LIST OF ACRONYMS

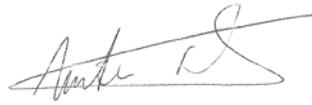
Acronym	Definition
AOC	Area of Concern
CAMP	Community Air Monitoring Plan
COC	Contaminant of Concern
CPP	Citizen Participation Plan
CSM	Conceptual Site Model
DER-10	New York State Department of Environmental Conservation Technical Guide 10
FID	Flame Ionization Detector
GPS	Global Positioning System
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
IRM	Interim Remedial Measure
NAPL	Non-aqueous Phase Liquid
NYC VCP	New York City Voluntary Cleanup Program
NYC DOHMH	New York City Department of Health and Mental Hygiene
NYC OER	New York City Office of Environmental Remediation
NYS DOH ELAP	New York State Department of Health Environmental Laboratory Accreditation Program
OSHA	Occupational Safety and Health Administration
PID	Photoionization Detector
QEP	Qualified Environmental Professional
RI	Remedial Investigation
RIR	Remedial Investigation Report
SCO	Soil Cleanup Objective
SPEED	Searchable Property Environmental Electronic Database

# CERTIFICATION

I, Mike Zouak, am a Qualified Environmental Professional, as defined in RCNY § 43-1402(ar). I have primary direct responsibility for implementation of the Remedial Investigation for the 583 Franklin Avenue Site, (NYC OER Project Number: 14RHAZ556K). I am responsible for the content of this Remedial Investigation Report (RIR), have reviewed its contents and certify that this RIR is accurate to the best of my knowledge and contains all available environmental information and data regarding the property.

Mike S. Zouak, CIH, President

August 13, 2014



Qualified Environmental Professional

Date

Signature

# EXECUTIVE SUMMARY

The Remedial Investigation Report (RIR) provides sufficient information for establishment of remedial action objectives, evaluation of remedial action alternatives, and selection of a remedy pursuant to RCNY§ 43-1407(f). The remedial investigation (RI) described in this document is consistent with applicable guidance.

## **Site Location and Current Usage**

The Site is located at 583 Franklin Avenue in the Crown Heights section of Brooklyn, New York and is identified as Block 1199 and Lot 3 on the New York City Tax Map. The Site comprises of 1,758 square feet of land. Currently, the Site is an unpaved, vacant lot with weedy undergrowth. A chain-link fence with barbed wire lied at the west boundary of the Site. Figure 1 is a Site Location Map.

## **Summary of Proposed Redevelopment Plan**

The proposed use of the Site will consist of developing a new residential building of four-story, four-family multiple dwelling units with a cellar. Cellar will consist of spaces for building's mechanical and maintenance facilities, a laundry room and an open cellar accessory space. The footprint of the cellar will be excavated to 9 feet below grade. The upper four floors will be used as four residential units, one on each floor. The proposed structure will be full 20 feet width of the lot and 50 feet deep with an approximate 37 feet long rear yard. Layout of the proposed site development is presented in Figure 2. The current zoning designation is M1-1, Light Manufacturing District.

## **Summary of Past Uses of Site and Areas of Concern**

The following environmental assessment report was developed for the Site:

*Phase I Environmental Site Assessment*, August 27, 2008, prepared by Environmental Building Solutions, LLC.

Past use of the Site involved a residential dwelling. The Site appears to have been vacant since at least 1991. This Phase I revealed no recognized environmental conditions (RECs).

*NYC Department of Environmental Protection (NYC DEP) Letter*, December 7, 2010.

The letter was addressed to Rory Levy of CEQR Examiner of NYC Board of Standards and Appeals from Gary C. Heath, Director of Bureau Operations and Environmental Analysis. In the letter Mr. Heath indicated that “the 2008 Phase I report revealed that historical on-site and surrounding area land uses consisted of a variety of residential, commercial and light manufacturing use including auto repair facilities, auto repair shops, and other commercial buildings and facilities. The NYSDEC database identified 36 Leaking Storage Tanks and 12 spills within ½ -mile radius and ¼ -mile radius of subject property respectively. Based upon the review of the submitted documents, the NYC DEP requested that a Phase II Environmental Site Assessment Investigation (Phase II) be conducted to [adequately identify/characterize the surface and subsurface soil prior to on-site disturbance for the proposed development. A Phase II Investigative Protocol/Work Plan summarizing the proposed drilling and soil/groundwater sampling activities should be submitted to DEP for review and approval...]”.

### **Summary of the Work Performed under the Remedial Investigation**

1. Installed three soil borings, SB-1, SB-2 and SB-3, at the Site. Collected 7 soil samples from the three soil borings, including a duplicate sample (S-4) from Soil Boring SB-3.
2. Installed two soil vapor monitoring implants, SV-1 and SV-2, at the Site. Collected two soil vapor samples from two monitoring implants.
3. Prepared RIR based upon all investigation results.

Two of the three soil borings were proposed to be converted to temporary groundwater monitoring wells, MW-1 and MW-2. However, no groundwater was encountered in all three soil borings during the remedial investigation due to refusals at 12 feet (ft), 13 ft and 14ft, respectively, below ground surface (bgs).

### **Summary of Environmental Findings**

1. Elevation of the property is around 80 ft.
2. Depth to groundwater is unknown at the Site.
3. Groundwater flow is generally from east to west beneath the Site.
4. Depth to bedrock is approximately over 14 ft bgs at the Site.

5. The stratigraphy, from land surface to approximately 12 ft down for SB-1, 13 ft down for SB-2, and 14 ft down for SB-3, consists of historic fill from zero to 2 ft (concrete fragments and urban fill material). The fill layer is underlain by natural soil to variable depths ranging from 2 to 14 ft (i.e. coarse to fine sand, and silty clay). Bedrock or concrete was encountered between 12 ft and 14 ft bgs during the subsurface investigation.
6. Soil sample results were compared to NYSDEC Part 375-6 Unrestricted Use (Track 1) and Restricted Residential Use (Track 2) Soil Cleanup Objectives (SCOs). Soil samples results showed no PCBs at detectable concentrations. Seven VOCs including 1,2,4-Trimethylbenzene (100 mg/kg), 1,3,5-Trimethylbenzene (36 mg/kg), Acetone (1.4 mg/kg), Ethylbenzene (3.6 mg/kg), n-Propylbenzene (8.2 mg/kg), Naphthalene (20 mg/kg), and Xylene (Total) (20 mg/kg) were detected within one deep sample at concentrations above their Track 1 Unrestricted Use SCOs. 1,2,4-Trimethylbenzene was also detected above its Track 2 Restricted Residential SCO. Six SVOCs, all PAHs compounds, including; benzo(a)anthracene (max of 2.1 mg/kg), benzo(a)pyrene (max of 2 mg/kg), benzo(b)fluoranthene (max of 2.6 mg/kg), and indeno(1,2,3-cd)pyrene (max of 1.1 mg/kg) were detected at concentrations above their Track 2 Restricted Residential SCOs. Benzo(k)fluoranthene (0.91 mg/kg), chrysene (max of 2.3 mg/kg) and naphthalene (max of 19 mg/kg) also exceeded their Track 1 Unrestricted Use SCOs. Metals including arsenic (max of 68 mg/kg), barium (max of 720 mg/kg), copper (max of 790 mg/kg), lead (max of 1,700 mg/kg), manganese (8,700 mg/kg) mercury (max of 0.67 mg/kg), nickel (max of 2,300 mg/kg), zinc (max of 1400 mg/kg) and silver (3.5 mg/kg) were detected above their respective Track 1 Unrestricted Use SCOs in one shallow sample and two deep samples. Of these metals, arsenic, barium, copper, lead, manganese and nickel were detected above their respective Track 2 Restricted Residential SCOs. Three pesticides were detected in four samples at concentrations above their Track 1 Unrestricted Use SCOs but below their Track 2 Restricted Residential SCOs. These pesticides include 4,4'-DDD (max. 0.0516 mg/kg), 4,4'-DDE (0.0501 mg/kg) and 4,4'-DDT (0.0148 mg/kg). Overall, the findings were consistent with observations for other historic fill sites in NYC and during the RI.

7. Due to refusal, no ground water samples were collected during this investigation. If ground water is encountered during excavation, it will be sampled.
8. The soil vapor collected during the RI were compared to the compounds listed in Table 3.1 Air Guideline Values Derived by the NYSDOH located in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion. Soil vapor samples showed that moderate to high concentrations of petroleum related hydrocarbons included BTEX and associated compounds. Total BTEX were detected at a maximum concentration of 130  $\mu\text{g}/\text{m}^3$ . Most compounds were detected at less than 20  $\mu\text{g}/\text{m}^3$  except for acetone (max. of 1040  $\mu\text{g}/\text{m}^3$ ). Chlorinated VOCs including 1,1,1-Trichloroethane (TCA) was detected in one sample at a concentration of 28.7  $\mu\text{g}/\text{m}^3$ . Carbon Tetrachloride was detected in one sample at a concentration of 12.1  $\mu\text{g}/\text{m}^3$ . Trichloroethene and tetrachloroethene were not detected in either sample. The Carbon Tetrachloride concentration is above the monitoring level range established within the State NYS DOH soil vapor guidance matrix.

# REMEDIAL INVESTIGATION REPORT

## 1.0 SITE BACKGROUND

Mr. Moshik Regev of Amsterfarm Holdings, LLC has obtained Airtek Environmental Corp. to investigate and remediate a 1,758 square feet (ft<sup>2</sup>, approximately 0.040 acre) site located at 583 Franklin Avenue in the Crown Heights section of Brooklyn, New York per the request of the NYCDEP in a letter dated December 7, 2010. The letter was addressed to Rory Levy of CEQR Examiner of NYC Board of Standards and Appeals from Gary C. Heath, Director of Bureau Operations and Environmental Analysis. In the letter Mr. Heath indicated that “the 2008 Phase I report revealed that historical on-site and surrounding area land uses consisted of a variety of residential, commercial and light manufacturing use including auto repair facilities, auto repair shops, and other commercial buildings and facilities. The NYSDEC database identified 36 Leaking Storage Tanks and 12 spills within ½ -mile radius and ¼ -mile radius of subject property respectively. Based upon the review of the submitted documents, the NYC DEP requested that a Phase II Environmental Site Assessment Investigation (Phase II) be conducted to [adequately identify/characterize the surface and subsurface soil prior to on-site disturbance for the proposed development. A Phase II Investigative Protocol/Work Plan summarizing the proposed drilling and soil/groundwater sampling activities should be submitted to DEP for review and approval...]”.

Residential use is proposed for the property. The RI work was performed on July 8, 2014. This RIR summarizes the nature and extent of contamination and provides sufficient information for establishment of remedial action objectives, evaluation of remedial action alternatives, and selection of a remedy that is protective of human health and the environment consistent with the use of the property pursuant to RCNY § 43-1407(f).

### 1.1 Site Location and Current Usage

The Site is located at 583 Franklin Avenue in the Crown Heights section of Brooklyn, New York and is identified as Block 1199 1 and Lot 3 on the New York City Tax Map. The Site is 1,758 square feet of land and is bounded by residential structures to the north and south on Franklin Avenue, a residential structure to the east on Pacific Street, Franklin Avenue to the west, and a residential structure west of the roadway. The Site location and its boundaries are

shown in Figure 1. Currently, the Site is an unpaved, vacant lot with weedy undergrowth. A chain-link fence with barbed wire lies at the west boundary of the Site.

## **1.2 Proposed Redevelopment Plan**

The proposed use of the Site will consist of developing a new residential building of four-story, four-family multiple dwelling units with a cellar. Cellar will consist of spaces for building's mechanical and maintenance facilities, a laundry room and an open cellar accessory space. The footprint of the cellar will be excavated to 9 feet below grade. The upper four floors will be used as four residential units, one on each floor. The proposed structure will be full 20 feet width of the lot and 50 feet deep with an approximate 37 feet long rear yard. Layout of the proposed site development is presented in Figure 2. The current zoning designation is M1-1, Light Manufacturing District. The proposed use is inconsistent with existing zoning for the property.

## **1.3 Description of Surrounding Property**

The area surrounding the Site consists of residential properties, each zoned primarily for manufacturing use. The uses and features of adjoining properties are described below.

- North: A four-story residential building at 581 Franklin Avenue.
- East: A four-story residential building at 1153 Pacific Street.
- South: A four-story mixed residential and commercial building at 585 Franklin Avenue.
- West: Franklin Avenue and a two-story residential building west of the roadway at 582 Franklin Avenue.

There are no sensitive receptors, such as schools, hospitals, and day care facilities, located within a 250 to 500-foot radius.

Figure 3 Site Map shows the surrounding land usage.

## **2.0 SITE HISTORY**

### **2.1 Past Uses and Ownership**

Based on a review of the prior Phase I ESA Report, dated August 27, 2008 and prepared by Environmental Building Solutions, LLC., the following Site history was established. Past use of the Site involved a residential dwelling. The Site appears to have been vacant since at least 1991. Amsterfarm Holdings, LLC is the current owner of the Site, according to the Deed dated July 31, 2012.

### **2.2 Previous Investigations**

No previous investigation is known to have been conducted at the Site other than the Phase I ESA performed by Environmental Building Solutions, LLC. in August 2008. This Phase I revealed no recognized environmental conditions (RECs). The previous Phase I report is presented in Appendix A.

### **2.3 Site Inspection**

A Site inspection of the property was performed on July 8, 2014 by Ms. Christine Chen, Sr. Project Manager with Airtek, to identify features of environmental significance that define Areas of Concern (AOC). Areas of Concern generally include areas where existing or former activities are known or suspected to have resulted in generation, manufacture, refinement, transport, storage, handling, treatment, discharge, release and/or disposal. The Site was unpaved, vacant land with construction fragments and grown weeds spread all over the Site. Several used tires, wood board, sheetrock and metal equipment were observed stored at the east end (rear) of the Site. Two oil stained areas were noted at the Site, including one area near northwest corner and the other near central south section. Soil borings SB-1 and SB-2 were installed near these two areas.

### **2.4 Areas of Concern**

The AOCs identified for this site include:

1. New York City Restrictive Declaration (CRFN: 2011000009822) for Block 1199, Lot 3.

2. NYC Department of Environmental Protection (NYC DEP) Letter, December 7, 2010.

The letter was addressed to Rory Levy of CEQR Examiner of NYC Board of Standards and Appeals from Gary C. Heath, Director of Bureau Operations and Environmental Analysis. In the letter Mr. Heath indicated that “the 2008 Phase I report revealed that historical on-site and surrounding area land uses consisted of a variety of residential, commercial and light manufacturing use including auto repair facilities, auto repair shops, and other commercial buildings and facilities. The NYSDEC database identified 36 Leaking Storage Tanks and 12 spills within ½ -mile radius and ¼ -mile radius of subject property respectively. Based upon the review of the submitted documents, the NYC DEP requested that a Phase II Environmental Site Assessment Investigation (Phase II) be conducted to [adequately identify/characterize the surface and subsurface soil prior to on-site disturbance for the proposed development. A Phase II Investigative Protocol/Work Plan summarizing the proposed drilling and soil/groundwater sampling activities should be submitted to DEP for review and approval...].”

## **3.0 PROJECT MANAGEMENT**

### **3.1 Project Organization**

The Qualified Environmental Professional (QEP) responsible for preparation of this RIR is Ms. Christine Chen. The QEP responsible for review of this RIR is Mr. Mike Zouak.

### **3.2 Health and Safety**

All work described in this RIR was performed in full compliance with applicable laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements. The Health and Safety Plan (HASP) is presented in Appendix *B*.

### **3.3 Materials Management**

All material encountered during the RI was managed in accordance with applicable laws and regulations.

## **4.0 REMEDIAL INVESTIGATION ACTIVITIES**

Airtek Environmental Corp., on behalf of Mr. Moshik Regev of Amsterfarm Holdings, LLC, performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed 3 soil borings, SB-1, SB-2 and SB-3, across the entire project Site on July 8, 2014, and collected 7 soil samples, including a duplicate sample (S-4) from Soil Boring SB-3, for chemical analysis from the soil borings to evaluate soil quality;
3. Installed 2 soil vapor probes, SV-1 and SV-2, in the southwest portion and north central portion along the Site perimeter on July 8, 2014 and collected 2 samples for chemical analysis.

Two of the three soil borings were proposed to be converted to temporary groundwater monitoring wells, MW-1 and MW-2. However, no groundwater was encountered in all three soil borings in the RI due to refusals at 12 feet (ft), 13 ft and 14ft, respectively, below ground surface (bgs).

### **4.1 Geophysical Investigation**

The geophysical survey using a Ground Penetrating Radar (GPR) was performed across the entire site to detect possible existence of underground storage tanks (USTs), designated underground conduits/utilities, and investigated proposed boring locations within all accessible portions of the Site. Enviroprobe Services, Inc. was subcontracted to perform the GPR at the Site on July 8, 2014. The GPR survey results indicated that there were underground metallic objects throughout the survey area. They were suspected as scrap metal, reinforced concrete and debris, etc. The Geophysical Investigation Report prepared by Enviroprobe Services is included in Appendix C.

### **4.2 Borings and Monitoring Wells**

#### **Drilling and Soil Logging**

Three soil borings, designated as SB-1, SB-2 and SB-3, were installed and sampled as part of the RI. Soil boring SB-1 was advanced to a depth of 12 ft., SB-2 to a depth of 13 ft., and SB-3 to

a depth of 14 feet, using a direct-push Geoprobe unit, 6620DT. Soil Boring Geologic logs were prepared by a qualified environmental professional (QEP) and are attached in Appendix *D*. A map showing the location of soil borings is shown in Figure 4.

Borings were sampled continuously and soil samples were screened by visual and olfactory means and using a calibrated PID. Presence of odor, vapors, and soil discoloration were noted in the soil samples. Results of soil screening are recorded on the soil boring geologic logs. Boring logs were prepared by a QEP for all soil samples to document subsurface conditions, including a description of the following: soil/fill types; soil screening results from field visual, olfactory and PID; soil characteristics, appearance and mottling; presence of odor, vapors, soil discoloration; and presence of free and/or residual product. A table including the following information for all soil borings, total depth, diameter, screen interval, construction materials (or other reference method) location is shown in Table 1.

### **Groundwater Monitoring Well Construction**

No groundwater was encountered at the refusal depths of 12 ft. to 14 ft bgs in all three soil borings. As a result, no groundwater monitoring wells were installed during the RI.

### **Survey**

Land survey was used to identify the location of all soil borings and monitor wells.

### **Water Level Measurement**

No groundwater was encountered at the refusal depths of 12 ft. to 14 ft bgs in all three soil borings. As a result, no water level measurement was conducted in the RI.

## **4.3 Sample Collection and Chemical Analysis**

Sampling performed as part of the field investigation was conducted for all Areas of Concern and also considered other means for bias of sampling based on professional judgment, area history, discolored soil, stressed vegetation, drainage patterns, field instrument measurements, odor, or other field indicators. All media including soil and soil vapor have been sampled and evaluated in the RIR. Discrete (grab) samples have been used for final delineation of the nature and extent of contamination and to determine the impact of contaminants on public health and the environment. The sampling performed and presented in this RIR provides sufficient basis for

evaluation of remedial action alternatives, establishment of a qualitative human health exposure assessment, and selection of a final remedy.

### **Soil Sampling**

Soil samples from each soil boring were collected utilizing a 5-foot long Macro Core sampler fitted with dedicated acetate liners. The Macro Core allows for the collection of both continuous as well as discrete depth soil samples. The soil was screened and characterized at five foot intervals. All samples were properly handled and placed into the appropriately labeled containers. The samples were placed in a cooler filled with ice. All samples were transmitted under proper chain of custody procedures to a State-certified (ELAP) laboratory for confirmatory laboratory analyses. All holding times were met. The laboratory did not report any irregularities with respect to their internal Quality Assurance/Quality Control.

Soil samples collected during all invasive investigation were screened by visual and olfactory means and using a calibrated PID. All decontamination procedures were performed in an area segregated from any sampling areas. Any rinsate from the decontamination area was contained and removed from the Site. Sampling equipment was decontaminated the following.

- Wipe clean and wash with Alconox®
- Potable water rinse
- Air dry

Seven soil samples were collected from three soil borings for chemical analysis during this RI, including two samples from each boring (i.e. one shallow and one deep) plus a duplicate sample from SB-3. Data on soil sample collection for chemical analyses, including dates of collection and sample depths, is reported in Table 3. Figure 4 shows the location of samples collected in this investigation. Laboratories and analytical methods are shown below.

All soil samples were analyzed for volatile organic compounds (VOCs) via EPA Method 8260C, semi-volatile organic compounds (SVOCs) via EPA Method 8270D, Pesticides and Polychlorinated Biphenyls (PCBs) via EPA Method 8081B/8082A and Target Analyte List (TAL) Metals via EPA Method 6010C.

## **Groundwater Sampling**

No groundwater was encountered at the refusal depths of 12 ft. to 14 ft bgs in all three soil borings. As a result, no groundwater samples were collected in the RI.

## **Soil Vapor Sampling**

The soil vapor sampling implants were installed utilizing similar technology to the soil probes (i.e. direct push). Each soil vapor sampling implant consisted of a stainless steel screen, fitted with dedicated polyethylene tubing.

Soil vapor samples were collected in Summa canisters which have been certified clean by the laboratory and analyzed by using USEPA Method TO-15. The samples were collected over an approximately two-hour sampling period to obtain the sufficient sample volume to utilize US EPA method TO-15. Porous, inert backfill material (e.g., glass beads, washed #1 crushed stone, etc.) were used to create a sampling zone one to two feet in length. Implants were fitted with inert tubing (i.e. e.g., polyethylene, stainless steel, nylon, or Teflon®) of laboratory grade quality to the surface. Soil vapor probes were installed at the depth of 11 feet below grade, which were sealed above the sampling zone with bentonite slurry for a minimum distance of three feet to prevent outdoor air infiltration and the remainder of the borehole backfilled with clean material.

As part of the vapor intrusion evaluation, a tracer gas was used in accordance with NYSDOH protocols to serve as a quality assurance/quality control (QA/QC) device to verify the integrity of the soil vapor probe seal. Helium was used as the tracer gas and a box served to keep it in contact with the probe during testing. A portable monitoring device, Helium Leak Detector, was used to analyze a sample of soil vapor for the tracer prior to sampling.

Two soil vapor implants were installed and two soil vapor samples were collected for chemical analysis during this RI. Soil vapor sampling locations are shown in Figure 4. Soil vapor sample collection data is reported in Table 4. Soil vapor sampling log is included in Appendix E. Methodologies used for soil vapor assessment conform to the *NYS DOH Final Guidance on Soil Vapor Intrusion, October 2006.*

## **Chemical Analysis**

Chemical analytical work presented in this RIR has been performed in the following manner:

<b>Factor</b>	<b>Description</b>
Quality Assurance Officer	The chemical analytical quality assurance is directed by Lisa Westerlind and Christopher Anderson of Alpha Analytical
Chemical Analytical Laboratory	Chemical analytical laboratory(s) used in the RI is NYS ELAP certified and was Alpha Analytical.
Chemical Analytical Methods	<p>Soil analytical methods:</p> <ul style="list-style-type: none"> <li>• TAL Metals by EPA Method 6010C (rev. 2007);</li> <li>• VOCs by EPA Method 8260C (rev. 2006);</li> <li>• SVOCs by EPA Method 8270D (rev. 2007);</li> <li>• Pesticides by EPA Method 8081B (rev. 2000);</li> <li>• PCBs by EPA Method 8082A (rev. 2000);</li> </ul> <p>Soil vapor analytical methods:</p> <ul style="list-style-type: none"> <li>• VOCs by TO-15 VOC parameters.</li> </ul>

### Results of Chemical Analyses

Laboratory data for soil and soil vapor are summarized in Table 3 and Table 4. Laboratory data deliverables for all samples evaluated in this RIR are provided in digital form in Appendix *F* and Appendix *G* respectively.

## **5.0 ENVIRONMENTAL EVALUATION**

### **5.1 Geological and Hydrogeological Conditions**

#### **Stratigraphy**

The stratigraphy, from land surface to approximately 12 feet down for SB-1, 13 feet down for SB-2, and 14 feet down for SB-3, consists of historic fill from zero to 2 feet (concrete fragments and urban fill material). The fill layer is underlain by natural soil to variable depths ranging from 2 to 14 feet (i.e. coarse to fine sand, and silty clay).

Bedrock was not encountered during the installation of the geotechnical or soil borings. As previously discussed the greatest depth of the borings was 14 feet below grade.

#### **Hydrogeology**

No groundwater was encountered during the RI. Groundwater flow in the site area is generally from east to west.

### **5.2 Soil Chemistry**

Seven (7) soil samples were collected for chemical analysis during this RI. All soil samples were analyzed for volatile organic compounds (VOCs) via EPA Method 8260C, semi-volatile organic compounds (SVOCs) via EPA Method 8270D, Pesticides and Polychlorinated Biphenyls (PCBs) via EPA Method 8081B/8082A and Target Analyte List (TAL) Metals via EPA Method 6010C.

Soil/fill samples collected during the RI showed no PCBs at detectable concentrations.

Seven VOCs, 1,2,4-Trimethylbenzene (100 mg/kg), 1,3,5-Trimethylbenzene (36 mg/kg), Acetone (1.4 mg/kg), Ethylbenzene (3.6 mg/kg), n-Propylbenzene (8.2 mg/kg), Naphthalene (20 mg/kg), and Xylene (Total) (20 mg/kg) were detected within the deep sample from SB-2 in the central south portion of the Site at concentrations above their Track 1 Unrestricted Use SCOs.

Six SVOCs (PAHs compounds), Benzo(a)anthracene (1.8 mg/kg), Benzo(a)pyrene (1.7 mg/kg), Benzo(b)fluoranthene (1.9 mg/kg), Chrysene (1.7 mg/kg), Indeno(1,2,3-cd)Pyrene (0.91 mg/kg), and Phenol (0.48 mg/kg) were detected within the deep sample S-1d from SB-1 near the northwest corner of the Site; four SVOCs, Benzo(a)anthracene (2.1 mg/kg), Benzo(a)pyrene (2.0 mg/kg), Benzo(b)fluoranthene (2.6 mg/kg), and Chrysene (2.3 mg/kg) were detected within the

shallow sample S-2s from SB-2; and one SVOC, Naphthalene (19 mg/kg), was detected within the deep sample S-2d from SB-2 at concentrations above their Track 1 Unrestricted Use SCOs. SB-1 and SB-2 are both located within the area of the proposed residential building.

Four metals exceeded Track 1 Unrestricted Use SCOs, i.e. copper (ranging from 230 to 790 mg/kg), lead (ranging from 900 to 1700 mg/kg), mercury (ranging from 0.45 to 0.67 mg/kg), and zinc (ranging from 360 to 1400 mg/kg) in three samples, including two deep samples S-1d, S-2d and one shallow sample S-2s. Arsenic was detected in one shallow sample S-2s (68 mg/kg) and one deep sample, S-2d (21 mg/kg) at concentrations above their Track 1 Unrestricted Use SCOs. Barium was detected in one deep sample S-2d (550 mg/kg) and one shallow sample, S-2s (720 mg/kg) at concentrations above their Track 1 Unrestricted Use SCOs. Manganese was detected in one shallow sample S-2s (8700 mg/kg) and one deep sample, S-2d (1800 mg/kg) at concentrations above their Track 1 Unrestricted Use SCOs. Nickel was detected in one deep sample S-2d (2300 mg/kg) and one shallow sample, S-2s (360 mg/kg) at concentrations above their Track 1 Unrestricted Use SCOs. Silver was detected in one shallow sample S-2d (3.5 mg/kg) at the concentration above its Track 1 Unrestricted Use SCOs.

Pesticides were detected in four samples at concentrations above their Track 1 Unrestricted Use SCOs, including 4,4'-DDD (max. 0.0516 mg/kg) in three samples, S-1s, S-1d and S-2s; 4,4'-DDE (0.0501 mg/kg) in one shallow sample S-1s; and 4,4'-DDT (0.0148 mg/kg) in one deep sample, S-2d. Overall, the findings were consistent with observations for other historic fill sites in NYC and during the RI.

Data collected during the RI is sufficient to delineate the vertical and horizontal distribution of contaminants in soil/fill at the Site. A summary table of data for chemical analyses performed on soil samples is included in Table 3. Figure 5 shows the location and posts the values for soil/fill that exceed the 6NYCRR Part 375-6.8 Track 1 Soil Cleanup Objectives.

### **5.3 Groundwater Chemistry**

No groundwater was encountered at the refusal depths of 12 ft. to 14 ft bgs in all three soil borings. As a result, no groundwater samples were collected in the RI.

## 5.4 Soil Vapor Chemistry

Soil vapor samples collected during the RI showed moderate to high concentrations of petroleum related hydrocarbons included BTEX and associated compounds were detected in both soil vapor samples. Benzene exhibited the level of 79.5 ug/m<sup>3</sup> in Sample SG-1 and 53.7 ug/m<sup>3</sup> in SG-2. Toluene exhibited the level of 42.2 ug/m<sup>3</sup> in Sample SG-1 and 39.2 ug/m<sup>3</sup> in SG-2. Other petroleum hydrocarbons generally identified at concentrations below 21 ug/m<sup>3</sup> were detected in Sample SG-2.

Acetone (at concentrations of 1040 µg/m<sup>3</sup> and 991 µg/m<sup>3</sup>), Freon-113 (at 253 µg/m<sup>3</sup> and 138 µg/m<sup>3</sup>), 2-Butanone (MEK) (at 34.5 µg/m<sup>3</sup> and 39.8 µg/m<sup>3</sup>), n-Hexane (at 173 µg/m<sup>3</sup> and 68.4 µg/m<sup>3</sup>), Cyclohexane (at 423 µg/m<sup>3</sup> and 71.9 µg/m<sup>3</sup>), and Heptane (at 220 µg/m<sup>3</sup> and 57.8 µg/m<sup>3</sup>) were detected in both samples.

Dichlorodifluoromethane (CFC 12) at concentration of 12.1 µg/m<sup>3</sup>, Freon-114 at 7.27 µg/m<sup>3</sup>, Trichlorofluoromethane (CFC 11) at 7.76 µg/m<sup>3</sup>, Methylene Chloride at 8.4 µg/m<sup>3</sup>, Chloroform at 5.18 µg/m<sup>3</sup>, 1,1,1-Trichloroethane (TCA) at 28.7 µg/m<sup>3</sup>, and Carbon Tetrachloride at 12.1 µg/m<sup>3</sup> were detected in Sample SG-2.

A summary table of data for chemical analyses performed on soil vapor samples is included in *Table 4*. *Figure 6* shows the location and posts the values for soil vapor samples with detected concentrations.

## 5.5 Prior Activity

Based on an evaluation of the data and information from the RIR, disposal of significant amounts of hazardous waste is not suspected at this site.

## 5.6 Impediments to Remedial Action

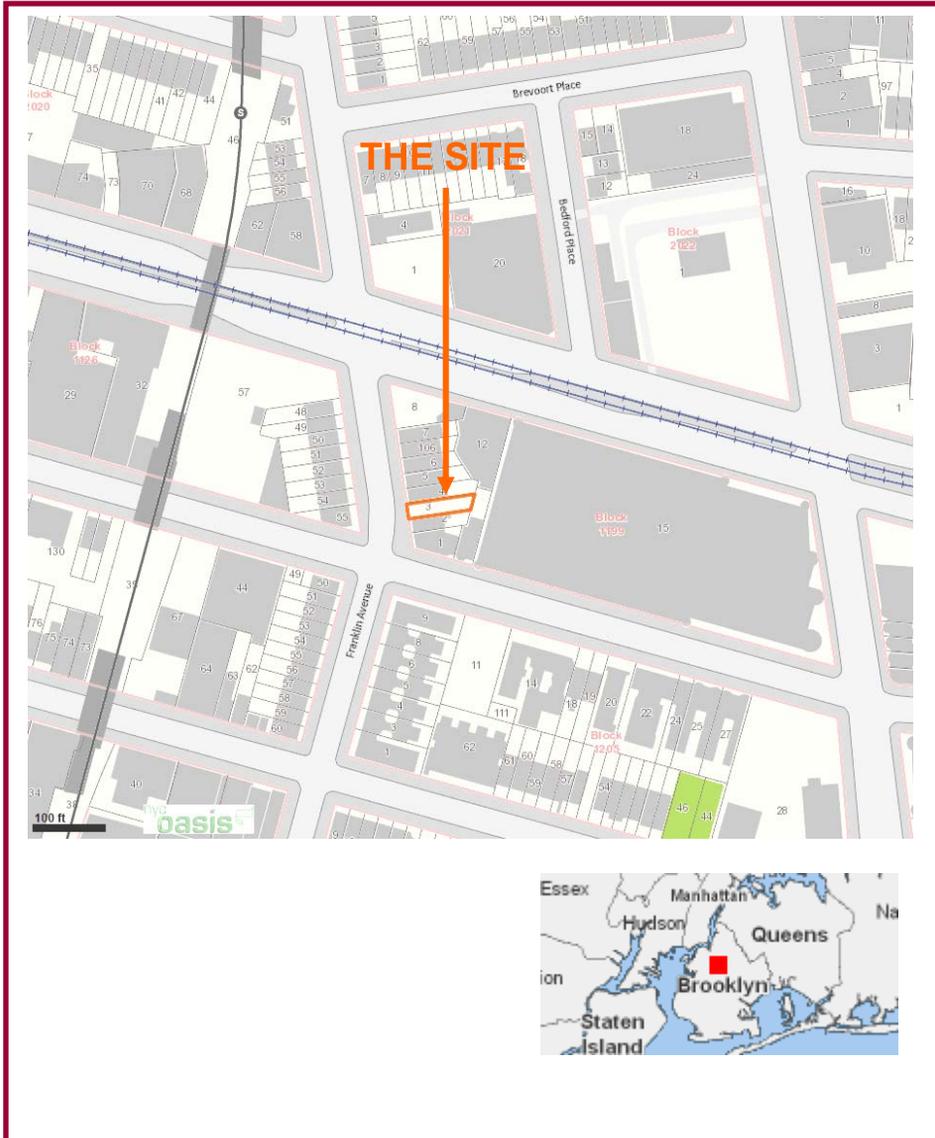
There are no known impediments to remedial action at this property.

# **FIGURES**



## AIRTEK ENVIRONMENTAL CORP.

39 – 37 29<sup>th</sup> Street, Long Island City, New York, 11101  
Phone (718) 937-3720 Fax (718) 937-3721  
www.airtekenv.com



**FIGURE 1: SITE LOCATION MAP**

**Block: 1199**

**Lot: 3**

**Address: 583 Franklin Avenue  
Brooklyn, NY 11238**

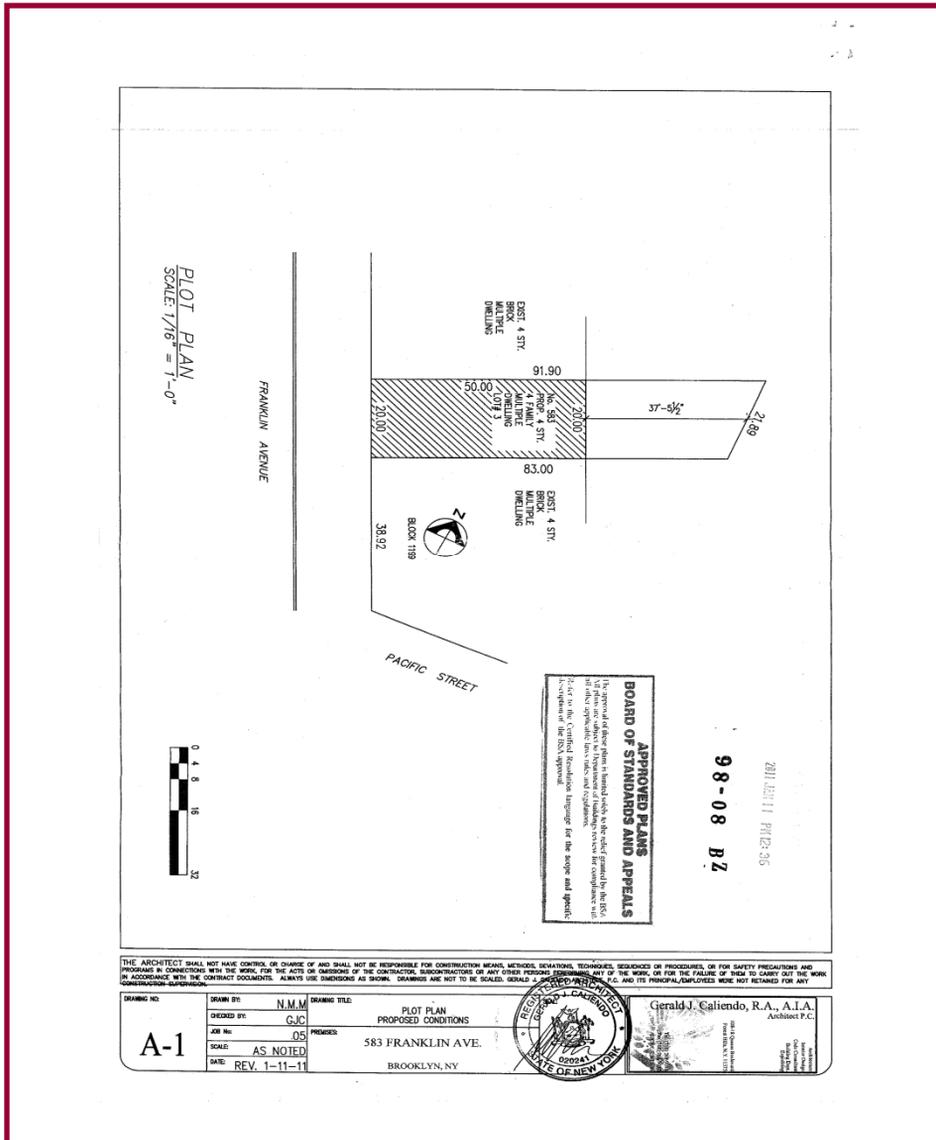
**Airtek Project Number: 14-0526**

**Date: 05-12-2014**



**AIRTEK ENVIRONMENTAL CORP.**

39 – 37 29<sup>th</sup> Street, Long Island City, New York, 11101  
 Phone (718) 937-3720 Fax (718) 937-3721  
 www.airtekenv.com



**FIGURE 2: PROPOSED SITE DEVELOPMENT PLAN**

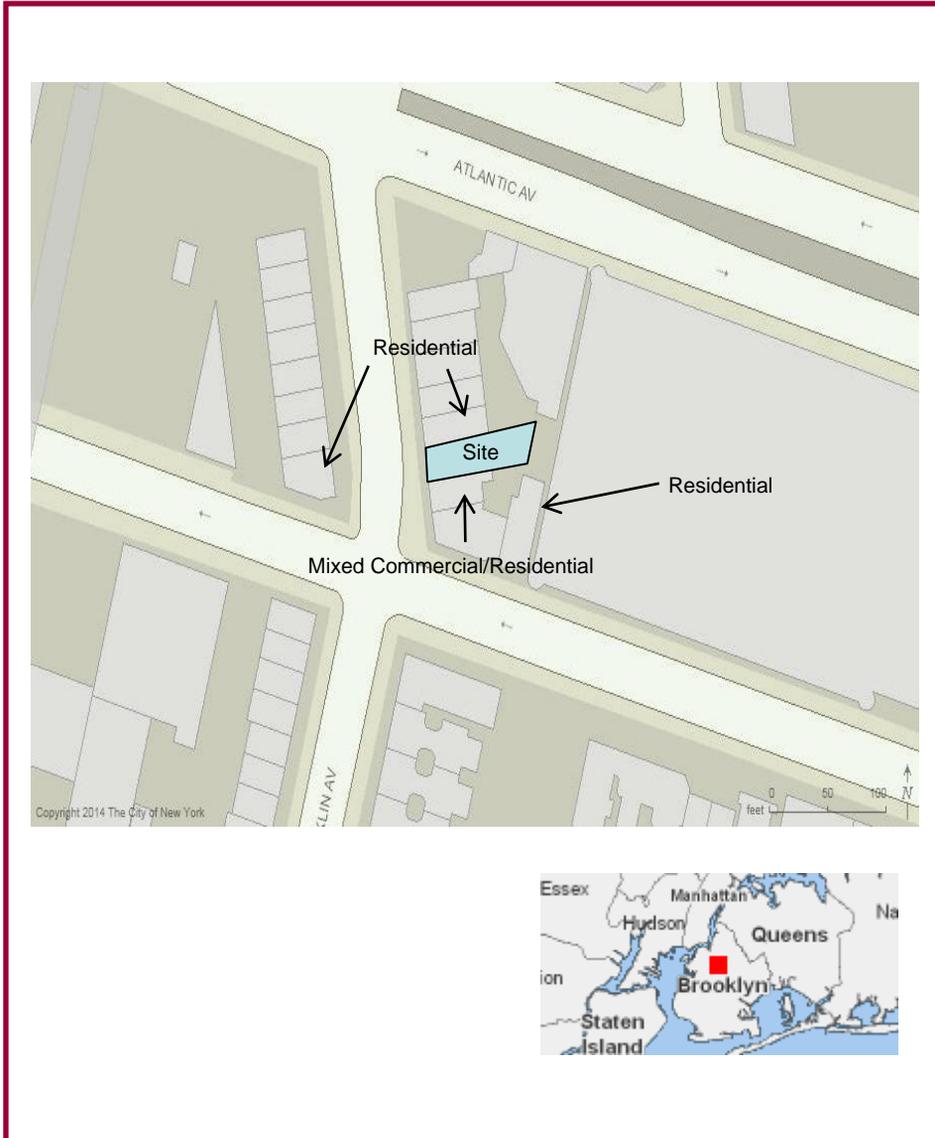
**Block: 1199**

**Lot: 3**

**Address: 583 Franklin Avenue  
 Brooklyn, NY 11238**

**Airtek Project Number: 14-0526**

**Date: 05-12-2014**



**FIGURE 3: SITE MAP**

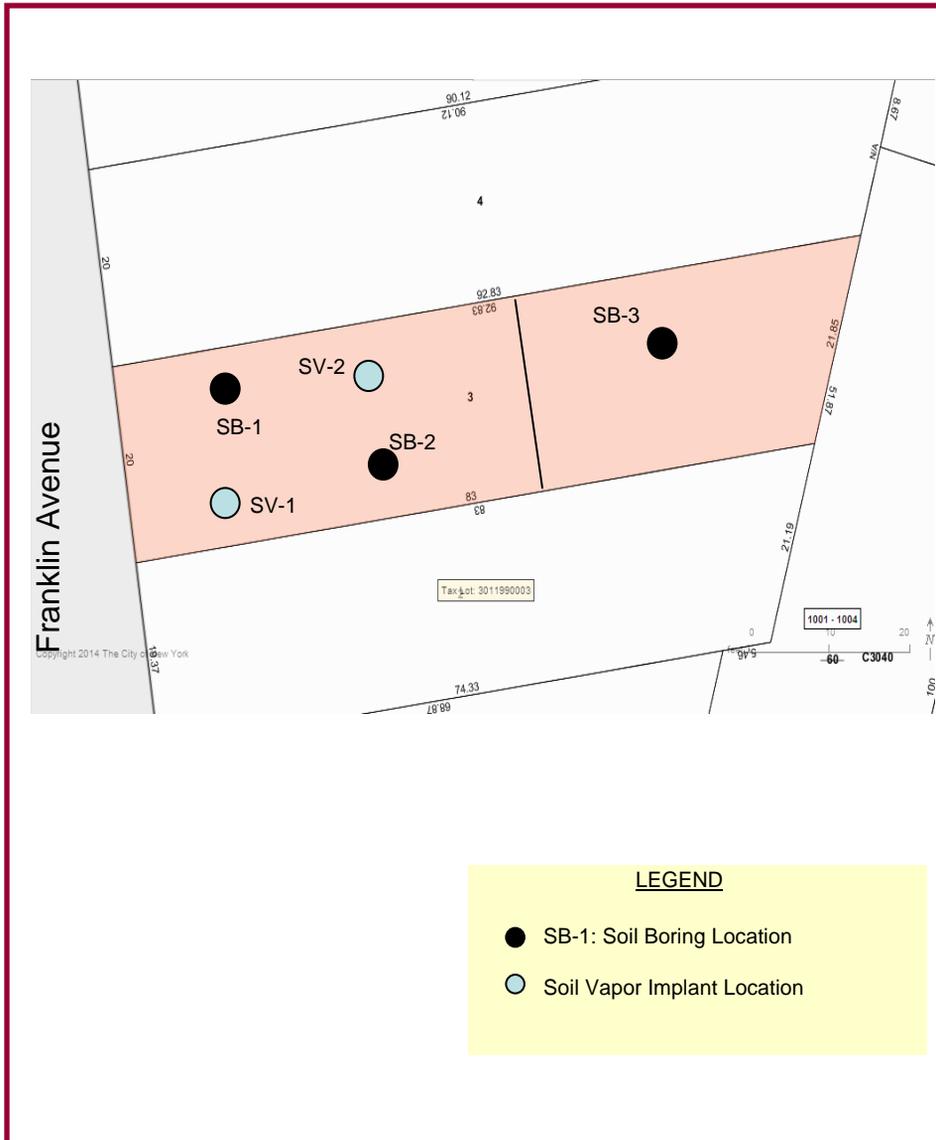
**Block: 1199**

**Lot: 3**

**Address: 583 Franklin Avenue  
 Brooklyn, NY 11238**

**Airtek Project Number: 14-0526**

**Date: 08-11-2014**



**LEGEND**

- SB-1: Soil Boring Location
- Soil Vapor Implant Location

**FIGURE 4: LOCATIONS OF SOIL BORINGS AND SOIL VAPOR IMPLANTS**

**Block: 1199**

**Lot: 3**

**Address: 583 Franklin Avenue  
 Brooklyn, NY 11238**

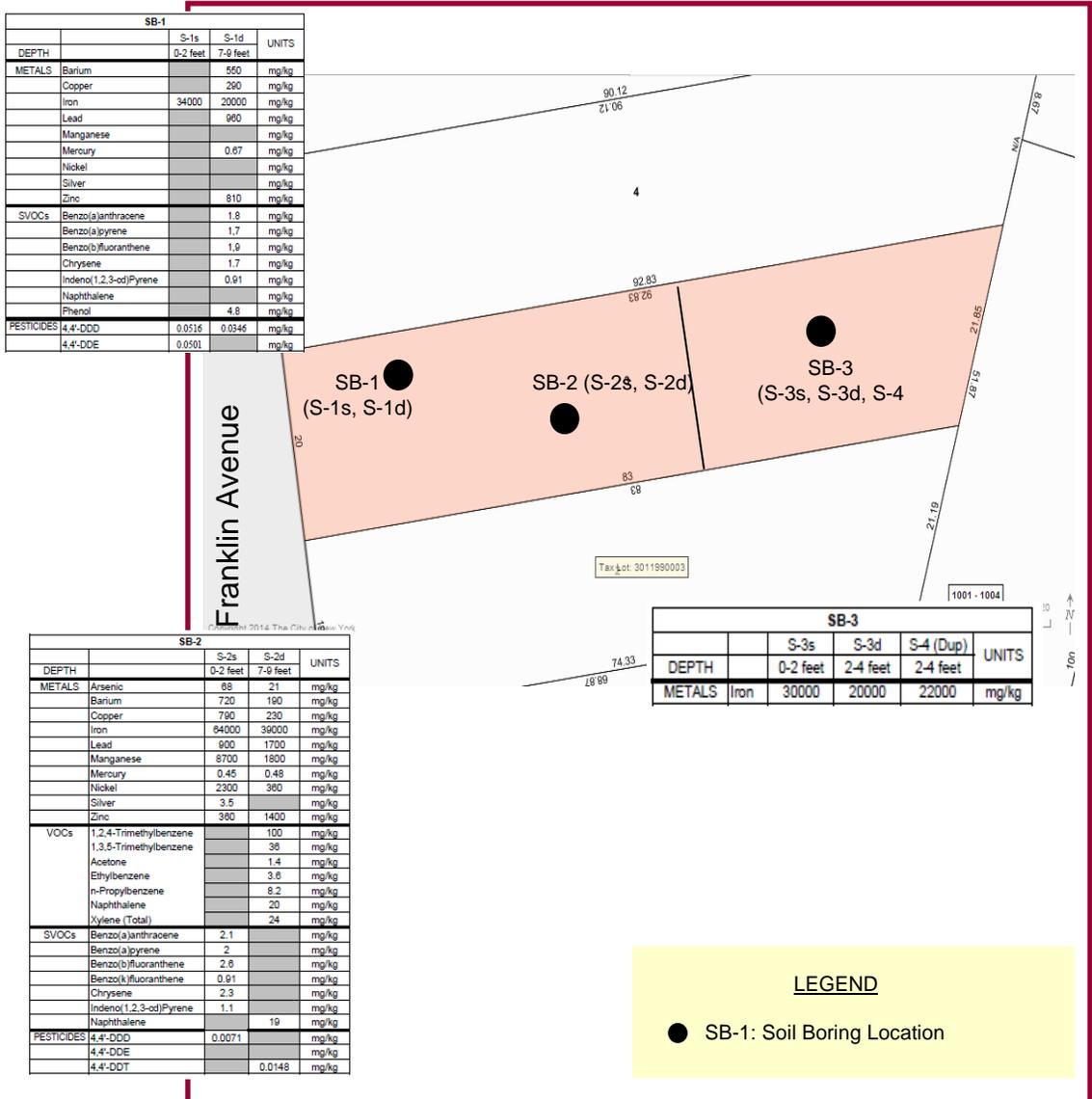
**Airtek Project Number: 14-0526**

**Date: 08-11-2014**



**AIRTEK ENVIRONMENTAL CORP.**

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**FIGURE 5: MAP OF SOIL CHEMISTRY RESULTS**

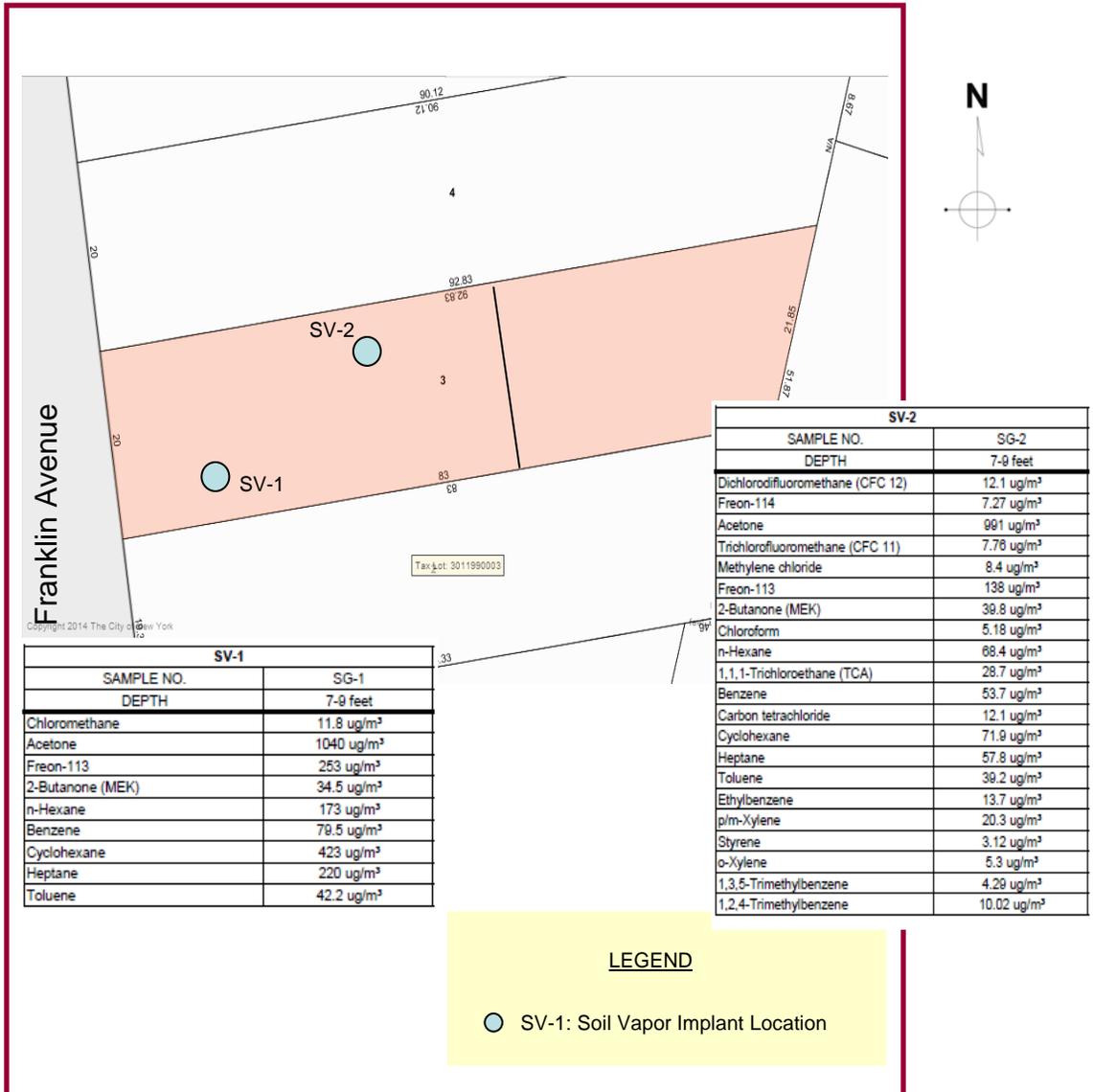
**Block: 1199**

**Lot: 3**

**Address: 583 Franklin Avenue  
 Brooklyn, NY 11238**

**Airtek Project Number: 14-0526**

**Date: 08-11-2014**



**FIGURE 6: MAP OF SOIL VAPOR CHEMISTRY RESULTS**

**Block: 1199**

**Lot: 3**

**Address: 583 Franklin Avenue  
Brooklyn, NY 11238**

**Airtek Project Number: 14-0526**

**Date: 08-11-2014**

# **TABLES**

**Table 1.**

**Construction Details for Soil Borings**

**583 Franklin Avenue, Brooklyn, New York**

	<b>Identification Number</b>	<b>Date of Construction</b>	<b>Total Depth</b>	<b>Diameter</b>	<b>Ground Surface Elevation</b>	<b>Screened Interval (Elevation Range)</b>	<b>Construction Material (PVC, Steel, etc)</b>
Soil Boring	SB-1	7/8/2014	12 ft	2-inch	Surface	n/a	PVC
Soil Boring	SB-2	7/8/2014	13 ft	2-inch	Surface	n/a	PVC
Soil Boring	SB-3	7/8/2014	14 ft	2-inch	Surface	n/a	PVC

**Table 2.**

**Analytical Methods Summary for All Media**

**583 Franklin Avenue, Brooklyn, New York**

<b>Matrix</b>	<b>Number of Samples</b>	<b>Analytical Methods</b>	<b>Number of Duplicate Samples</b>	<b>Date of Collection</b>
Soil	7	TAL Metals by EPA Method 6010C VOCs by EPA Method 8260C SVOCs by EPA Method 8270D Pesticides by EPA Method 8081B PCBs by EPA Method 8082A	1	7/8/2014
Groundwater	0	TAL Metals by EPA Method 6010C VOCs by EPA Method 8260C SVOCs by EPA Method 8270D Pesticides by EPA Method 8081B PCBs by EPA Method 8082A	0	N/A
Soil Vapor	2	VOCs by TO-15 VOC	0	7/8/2014

**Table 3.**

**Summary of Soil Analytical Data**

**583 Franklin Avenue, Brooklyn, New York**

**Table 3a. Soil Analytical Data Summary (with New York Unrestricted Use Criteria).**

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07
	NY-UNRES	Units		Qual	Qual										
<b>General Chemistry - Westborough Lab</b>															
Solids, Total		%	85.5		64.3		82		58.3		88.4		91.1		87.6
<b>Total Metals - Westborough Lab</b>															
Aluminum, Total		mg/kg	8800		9700		18000		18000		7400		5500		5400
Antimony, Total		mg/kg	4.6	U	6.9		6.7		8.9		0.8	J	4.4	U	4.3
Arsenic, Total	13	mg/kg	11		12		68		21		8.7		6		6.8
Barium, Total	350	mg/kg	59		550		720		190		58		41		40
Beryllium, Total	7.2	mg/kg	0.6		0.59	U	24	U	1.6	U	0.51		0.41	J	0.71
Cadmium, Total	2.5	mg/kg	0.92	U	1.9		0.45	J	1.4		0.89	U	0.88	U	0.86
Calcium, Total		mg/kg	1600		110000		30000		81000		2000		770		800
Chromium, Total		mg/kg	32		22		600		110		19		15		16
Cobalt, Total		mg/kg	6.7		6.8		97		21		5.7		4.9		6.8
Copper, Total	50	mg/kg	25		290		790		230		25		19		15
Iron, Total		mg/kg	34000		20000		64000		39000		30000		20000		22000
Lead, Total	63	mg/kg	11		960		900		1700		4.6		5.2		6.1
Magnesium, Total		mg/kg	2100		6200		4400		11000		2800		1600		1600
Manganese, Total	1600	mg/kg	490		610		8700		1800		610		420		320
Mercury, Total	0.18	mg/kg	0.06	J	0.67		0.45		0.48		0.08	U	0.08	U	0.02
Nickel, Total	30	mg/kg	18		26		2300		360		20		11		16
Potassium, Total		mg/kg	1200		860		1300		1700		1100		830		860
Selenium, Total	3.9	mg/kg	1.8	U	0.53	J	1.9	U	2.6	U	1.8	U	1.8	U	1.7
Silver, Total	2	mg/kg	0.92	U	0.68	J	3.5		0.93	J	0.89	U	0.88	U	0.86
Sodium, Total		mg/kg	80	J	440		2100		1800		190		46	J	48
Thallium, Total		mg/kg	1.8	U	2.4	U	1.9	U	2.6	U	1.8	U	1.8	U	1.7
Vanadium, Total		mg/kg	60		250		12000		1200		35		26		30
1,1,1,2-Tetrachloroethane		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011
1,1,1-Trichloroethane	0.68	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011
1,1,2,2-Tetrachloroethane		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011
1,1,2-Trichloroethane		mg/kg	0.0022	U	0.0025	U	0.0021	U	1.8	U	0.0021	U	0.0014	U	0.0016
1,1-Dichloroethane	0.27	mg/kg	0.0022	U	0.0025	U	0.0021	U	1.8	U	0.0021	U	0.0014	U	0.0016
1,1-Dichloroethene	0.33	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011
1,1-Dichloropropene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054
1,2,3-Trichlorobenzene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054
1,2,3-Trichloropropane		mg/kg	0.015	U	0.017	U	0.014	U	1.4	J	0.014	U	0.0096	U	0.011
1,2,4,5-Tetramethylbenzene		mg/kg	0.0058	U	0.0068	U	0.0006	J	21		0.0055	U	0.00043	J	0.0043
1,2,4-Trichlorobenzene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054
1,2,4-Trimethylbenzene	3.6	mg/kg	0.0073	U	0.0084	U	0.0016	J	100		0.0069	U	0.00074	J	0.0054
1,2-Dibromo-3-chloropropane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-UNRES	Units		Qual	Qual											
Zinc, Total	109	mg/kg	41		810		360		1400		71		22		24	
Volatile Organics by 8260/5035 - Westborough Lab																
1,2-Dibromoethane		mg/kg	0.0058	U	0.0068	U	0.0055	U	4.9	U	0.0055	U	0.0038	U	0.0043	U
1,2-Dichlorobenzene	1.1	mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,2-Dichloroethane	0.02	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,2-Dichloroethene (total)		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,2-Dichloropropane		mg/kg	0.0051	U	0.0059	U	0.0048	U	4.2	U	0.0048	U	0.0034	U	0.0038	U
1,3,5-Trimethylbenzene	8.4	mg/kg	0.0073	U	0.0084	U	0.00045	J	36		0.0069	U	0.0048	U	0.0054	U
1,3-Dichlorobenzene	2.4	mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,3-Dichloropropane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,3-Dichloropropene, Total		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,4-Dichlorobenzene	1.8	mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,4-Diethylbenzene		mg/kg	0.0058	U	0.0068	U	0.0013	J	58		0.0055	U	0.00076	J	0.0043	U
1,4-Dioxane	0.1	mg/kg	0.15	U	0.17	U	0.14	U	120	U	0.14	U	0.096	U	0.11	U
2,2-Dichloropropane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
2-Butanone	0.12	mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0016	J	0.011	U
2-Hexanone		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
4-Ethyltoluene		mg/kg	0.0058	U	0.0068	U	0.0005	J	37		0.0055	U	0.0004	J	0.0043	U
4-Methyl-2-pentanone		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Acetone	0.05	mg/kg	0.0037	J	0.017	U	0.014	U	1.4	J	0.014	U	0.0072	J	0.011	U
Acrylonitrile		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Benzene	0.06	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Bromobenzene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Bromochloromethane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Bromodichloromethane		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Bromoform		mg/kg	0.0058	U	0.0068	U	0.0055	U	4.9	U	0.0055	U	0.0038	U	0.0043	U
Bromomethane		mg/kg	0.0029	U	0.0034	U	0.0028	U	2.4	U	0.0028	U	0.0019	U	0.0022	U
Carbon disulfide		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Carbon tetrachloride	0.76	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Chlorobenzene	1.1	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Chloroethane		mg/kg	0.0029	U	0.0034	U	0.0028	U	2.4	U	0.0028	U	0.0019	U	0.0022	U
Chloroform	0.37	mg/kg	0.0022	U	0.0025	U	0.0021	U	1.8	U	0.0021	U	0.0014	U	0.0016	U
Chloromethane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.00035	J	0.0054	U
cis-1,2-Dichloroethene	0.25	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
cis-1,3-Dichloropropene		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Dibromochloromethane		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Dibromomethane		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Dichlorodifluoromethane		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Ethyl ether		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Ethylbenzene	1	mg/kg	0.0015	U	0.0017	U	0.0014	U	3.6		0.0014	U	0.00096	U	0.0011	U
Hexachlorobutadiene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-UNRES	Units		Qual	Qual											
Isopropylbenzene		mg/kg	0.0015	U	0.0017	U	0.0014	U	5.2		0.0014	U	0.00096	U	0.0011	U
Methyl tert butyl ether	0.93	mg/kg	0.0029	U	0.0034	U	0.0028	U	2.4	U	0.0028	U	0.0019	U	0.0022	U
Methylene chloride	0.05	mg/kg	0.0089	J	0.0085	J	0.0059	J	12	U	0.0063	J	0.0036	J	0.0059	J
n-Butylbenzene	12	mg/kg	0.0015	U	0.0017	U	0.0014	U	8.4		0.0014	U	0.00096	U	0.0011	U
n-Propylbenzene	3.9	mg/kg	0.0015	U	0.0017	U	0.0014	U	8.2		0.0014	U	0.00096	U	0.0011	U
Naphthalene	12	mg/kg	0.0073	U	0.0084	U	0.00043	J	20		0.0069	U	0.00057	J	0.0054	U
o-Chlorotoluene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
o-Xylene		mg/kg	0.0029	U	0.0034	U	0.0028	U	15		0.0028	U	0.0019	U	0.0022	U
p-Chlorotoluene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
p-Isopropyltoluene		mg/kg	0.0015	U	0.0017	U	0.0014	U	5.2		0.0014	U	0.00096	U	0.0011	U
p/m-Xylene		mg/kg	0.0029	U	0.0034	U	0.0028	U	9.2		0.0028	U	0.00033	J	0.0022	U
sec-Butylbenzene	11	mg/kg	0.0015	U	0.0017	U	0.0014	U	6.5		0.0014	U	0.00096	U	0.0011	U
Styrene		mg/kg	0.0029	U	0.0034	U	0.0028	U	2.4	U	0.0028	U	0.0019	U	0.0022	U
tert-Butylbenzene	5.9	mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Tetrachloroethene	1.3	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Toluene	0.7	mg/kg	0.0022	U	0.0025	U	0.0021	U	1.8	U	0.0021	U	0.0014	U	0.0016	U
trans-1,2-Dichloroethene	0.19	mg/kg	0.0022	U	0.0025	U	0.0021	U	1.8	U	0.0021	U	0.0014	U	0.0016	U
trans-1,3-Dichloropropene		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
trans-1,4-Dichloro-2-butene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Trichloroethene	0.47	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Trichlorofluoromethane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Vinyl acetate		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Vinyl chloride	0.02	mg/kg	0.0029	U	0.0034	U	0.0028	U	2.4	U	0.0028	U	0.0019	U	0.0022	U
Xylene (Total)	0.26	mg/kg	0.0029	U	0.0034	U	0.0028	U	24		0.0028	U	0.00033	J	0.0022	U
Semivolatile Organics by GC/MS - Westborough Lab																
1,2,4,5-Tetrachlorobenzene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
1,2,4-Trichlorobenzene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
1,2-Dichlorobenzene	1.1	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
1,3-Dichlorobenzene	2.4	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
1,4-Dichlorobenzene	1.8	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2,4,5-Trichlorophenol		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2,4,6-Trichlorophenol		mg/kg	0.12	U	0.15	U	1.2	U	0.84	U	0.11	U	0.11	U	0.11	U
2,4-Dichlorophenol		mg/kg	0.17	U	0.23	U	1.8	U	1.3	U	0.17	U	0.16	U	0.17	U
2,4-Dimethylphenol		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2,4-Dinitrophenol		mg/kg	0.93	U	1.2	U	9.7	U	6.7	U	0.89	U	0.88	U	0.9	U
2,4-Dinitrotoluene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2,6-Dinitrotoluene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2-Chloronaphthalene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2-Chlorophenol		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2-Methylnaphthalene		mg/kg	0.23	U	4.3		2.4	U	40		0.22	U	0.22	U	0.22	U
2-Methylphenol	0.33	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-UNRES	Units		Qual												
2-Nitroaniline		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2-Nitrophenol		mg/kg	0.42	U	0.54	U	4.4	U	3	U	0.4	U	0.39	U	0.4	U
3,3'-Dichlorobenzidine		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
3-Methylphenol/4-Methylphenol	0.33	mg/kg	0.28	U	0.36	U	2.9	U	2	U	0.27	U	0.26	U	0.27	U
3-Nitroaniline		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
4,6-Dinitro-o-cresol		mg/kg	0.5	U	0.65	U	5.2	U	3.6	U	0.48	U	0.47	U	0.48	U
4-Bromophenyl phenyl ether		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
4-Chloroaniline		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
4-Chlorophenyl phenyl ether		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
4-Nitroaniline		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
4-Nitrophenol		mg/kg	0.27	U	0.35	U	2.8	U	2	U	0.26	U	0.26	U	0.26	U
Acenaphthene	20	mg/kg	0.15	U	0.2	U	1.6	U	1.1	U	0.15	U	0.15	U	0.15	U
Acenaphthylene	100	mg/kg	0.15	U	0.37		1.6	U	1.1	U	0.15	U	0.15	U	0.15	U
Acetophenone		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Anthracene	100	mg/kg	0.036	J	0.78		0.36	J	1		0.11	U	0.03	J	0.11	U
Benzo(a)anthracene	1	mg/kg	0.072	J	1.8		2.1		0.38	J	0.11	U	0.1	J	0.11	U
Benzo(a)pyrene	1	mg/kg	0.072	J	1.7		2		1.1	U	0.15	U	0.12	J	0.15	U
Benzo(b)fluoranthene	1	mg/kg	0.079	J	1.9		2.6		0.45	J	0.11	U	0.15		0.11	U
Benzo(ghi)perylene	100	mg/kg	0.066	J	1.1		1.3	J	1.1	U	0.15	U	0.081	J	0.15	U
Benzo(k)fluoranthene	0.8	mg/kg	0.037	J	0.72		0.91	J	0.84	U	0.11	U	0.05	J	0.11	U
Benzoic Acid		mg/kg	0.63	U	0.82	U	6.5	U	4.5	U	0.6	U	0.59	U	0.6	U
Benzyl Alcohol		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Biphenyl		mg/kg	0.44	U	0.64		4.6	U	4.5		0.42	U	0.42	U	0.42	U
Bis(2-chloroethoxy)methane		mg/kg	0.21	U	0.27	U	2.2	U	1.5	U	0.2	U	0.2	U	0.2	U
Bis(2-chloroethyl)ether		mg/kg	0.17	U	0.23	U	1.8	U	1.3	U	0.17	U	0.16	U	0.17	U
Bis(2-chloroisopropyl)ether		mg/kg	0.23	U	0.3	U	2.4	U	1.7	U	0.22	U	0.22	U	0.22	U
Bis(2-Ethylhexyl)phthalate		mg/kg	0.1	J	1.5		2	U	13		0.18	U	0.18	U	0.19	U
Butyl benzyl phthalate		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Carbazole		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Chrysene	1	mg/kg	0.074	J	1.7		2.3		0.54	J	0.11	U	0.12		0.11	U
Di-n-butylphthalate		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Di-n-octylphthalate		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Dibenzo(a,h)anthracene	0.33	mg/kg	0.12	U	0.26		1.2	U	0.84	U	0.11	U	0.11	U	0.11	U
Dibenzofuran	7	mg/kg	0.19	U	0.28		2	U	1.4	U	0.18	U	0.18	U	0.19	U
Diethyl phthalate		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Dimethyl phthalate		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Fluoranthene	100	mg/kg	0.18		3.1		3.6		1.3		0.11	U	0.28		0.11	U
Fluorene	30	mg/kg	0.19	U	0.41		2	U	5.8		0.18	U	0.18	U	0.19	U
Hexachlorobenzene	0.33	mg/kg	0.12	U	0.15	U	1.2	U	0.84	U	0.11	U	0.11	U	0.11	U
Hexachlorobutadiene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Hexachlorocyclopentadiene		mg/kg	0.55	U	0.72	U	5.8	U	4	U	0.53	U	0.52	U	0.54	U
Hexachloroethane		mg/kg	0.15	U	0.2	U	1.6	U	1.1	U	0.15	U	0.15	U	0.15	U

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-UNRES	Units		Qual	Qual											
Indeno(1,2,3-cd)Pyrene	0.5	mg/kg	0.045	J	0.91		1.1	J	1.1	U	0.15	U	0.071	J	0.15	U
Isophorone		mg/kg	0.17	U	0.23	U	1.8	U	1.3	U	0.17	U	0.16	U	0.17	U
n-Nitrosodi-n-propylamine		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Naphthalene	12	mg/kg	0.19	U	3		2	U	19		0.18	U	0.18	U	0.19	U
Nitrobenzene		mg/kg	0.17	U	0.23	U	1.8	U	1.3	U	0.17	U	0.16	U	0.17	U
NitrosoDiPhenylAmine(NDPA)/DPA		mg/kg	0.15	U	0.2	U	1.6	U	1.1	U	0.15	U	0.15	U	0.15	U
P-Chloro-M-Cresol		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Pentachlorophenol	0.8	mg/kg	0.15	U	0.2	U	1.6	U	1.1	U	0.15	U	0.15	U	0.15	U
Phenanthrene	100	mg/kg	0.15		2.8		1.5		8.7		0.11	U	0.17		0.11	U
Phenol	0.33	mg/kg	0.19	U	0.48		2	U	1.4	U	0.18	U	0.18	U	0.19	U
Pyrene	100	mg/kg	0.15		3.2		3.2		2.4		0.11	U	0.25		0.11	U
Polychlorinated Biphenyls by GC - Westborough Lab																
Aroclor 1016	0.1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1221	0.1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1232	0.1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1242	0.1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1248	0.1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1254	0.1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1260	0.1	mg/kg	0.0364	U	0.0517	U	0.0355	J	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1262	0.1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1268	0.1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
PCBs, Total		mg/kg	0.0364	U	0.0517	U	0.0355	J	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Organochlorine Pesticides by GC - Westborough Lab																
4,4'-DDD	0.0033	mg/kg	0.0516		0.0346		0.0071		0.00275		0.00163	U	0.00165	U	0.00182	U
4,4'-DDE	0.0033	mg/kg	0.0501		0.0244	U	0.0019	U	0.00229	J	0.00163	U	0.00165	U	0.00182	U
4,4'-DDT	0.0033	mg/kg	0.0622	U	0.0458	U	0.00355	U	0.0148		0.00305	U	0.00309	U	0.00342	U
Aldrin	0.005	mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Alpha-BHC	0.02	mg/kg	0.0138	U	0.0102	U	0.00079	U	0.00107	U	0.000678	U	0.000686	U	0.00076	U
Beta-BHC	0.036	mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Chlordane		mg/kg	0.27	U	0.198	U	0.0154	U	0.0208	U	0.0132	U	0.0134	U	0.0148	U
cis-Chlordane	0.094	mg/kg	0.0415	U	0.0305	U	0.00237	U	0.0032	U	0.00203	U	0.00206	U	0.00228	U
Delta-BHC	0.04	mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Dieldrin	0.005	mg/kg	0.0207	U	0.0153	U	0.00118	U	0.00197		0.00102	U	0.00103	U	0.00114	U
Endosulfan I	2.4	mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Endosulfan II	2.4	mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Endosulfan sulfate	2.4	mg/kg	0.0138	U	0.0102	U	0.00079	U	0.00107	U	0.000678	U	0.000686	U	0.00076	U
Endrin	0.014	mg/kg	0.0138	U	0.0102	U	0.00079	U	0.00107	U	0.000678	U	0.000686	U	0.00076	U
Endrin ketone		mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Heptachlor	0.042	mg/kg	0.0166	U	0.0122	U	0.000948	U	0.00128	U	0.000813	U	0.000824	U	0.000913	U
Heptachlor epoxide		mg/kg	0.0622	U	0.0458	U	0.00355	U	0.00481	U	0.00305	U	0.00309	U	0.00342	U

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-UNRES	Units		Qual												
Lindane	0.1	mg/kg	0.0138	U	0.0102	U	0.00079	U	0.00107	U	0.000678	U	0.000686	U	0.00076	U
Methoxychlor		mg/kg	0.0622	U	0.0458	U	0.00355	U	0.00481	U	0.00305	U	0.00309	U	0.00342	U
Toxaphene		mg/kg	0.622	U	0.458	U	0.0355	U	0.0481	U	0.0305	U	0.0309	U	0.0342	U
trans-Chlordane		mg/kg	0.0415	U	0.0305	U	0.00237	U	0.0032	U	0.00203	U	0.00206	U	0.00228	U
Alpha Analytical Labs provides this custom reporting format as a convenience to our clients. As such, we cannot be held liable for errors or omissions associated with the regulatory standards listed above and/or the sample results highlighted by comparison with the standards (current as of May, 2006).																
Only compounds detected with reporting limits that exceed the corresponding regulatory standard in at least one sample are included on the summary sheets.																
Refer to the laboratory report in Adobe Acrobat (.PDF) format to check results or read any associated project narrative that may be present. In all cases, the signed, hardcopy Alpha Analytical Labs laboratory report is the official document for reporting laboratory results.																
<b>Notes:</b>																
U = Undetected																
J = Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).																

**Table 3b. Soil Analytical Data Summary (with New York Restricted Use, Residential Criteria).**

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-RESR	Units		Qual												
<b>General Chemistry - Westborough Lab</b>																
Solids, Total		%	85.5		64.3		82		58.3		88.4		91.1		87.6	
<b>Total Metals - Westborough Lab</b>																
Aluminum, Total		mg/kg	8800		9700		18000		18000		7400		5500		5400	
Antimony, Total		mg/kg	4.6	U	6.9		6.7		8.9		0.8	J	4.4	U	4.3	U
Arsenic, Total	16	mg/kg	11		12		68		21		8.7		6		6.8	
Barium, Total	350	mg/kg	59		550		720		190		58		41		40	
Beryllium, Total	14	mg/kg	0.6		0.59	U	24	U	1.6	U	0.51		0.41	J	0.71	
Cadmium, Total	2.5	mg/kg	0.92	U	1.9		0.45	J	1.4		0.89	U	0.88	U	0.86	U
Calcium, Total		mg/kg	1600		110000		30000		81000		2000		770		800	
Chromium, Total		mg/kg	32		22		600		110		19		15		16	
Cobalt, Total	30	mg/kg	6.7		6.8		97		21		5.7		4.9		6.8	
Copper, Total	270	mg/kg	25		290		790		230		25		19		15	
Iron, Total	2000	mg/kg	34000		20000		64000		39000		30000		20000		22000	
Lead, Total	400	mg/kg	11		960		900		1700		4.6		5.2		6.1	
Magnesium, Total		mg/kg	2100		6200		4400		11000		2800		1600		1600	
Manganese, Total	2000	mg/kg	490		610		8700		1800		610		420		320	
Mercury, Total	0.81	mg/kg	0.06	J	0.67		0.45		0.48		0.08	U	0.08	U	0.02	J
Nickel, Total	140	mg/kg	18		26		2300		360		20		11		16	
Potassium, Total		mg/kg	1200		860		1300		1700		1100		830		860	
Selenium, Total	36	mg/kg	1.8	U	0.53	J	1.9	U	2.6	U	1.8	U	1.8	U	1.7	U
Silver, Total	36	mg/kg	0.92	U	0.68	J	3.5		0.93	J	0.89	U	0.88	U	0.86	U
Sodium, Total		mg/kg	80	J	440		2100		1800		190		46	J	48	J
Thallium, Total		mg/kg	1.8	U	2.4	U	1.9	U	2.6	U	1.8	U	1.8	U	1.7	U
Vanadium, Total	100	mg/kg	60		250		12000		1200		35		26		30	
Zinc, Total	2200	mg/kg	41		810		360		1400		71		22		24	
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>																
1,1,1,2-Tetrachloroethane		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,1,1-Trichloroethane	100	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,1,2,2-Tetrachloroethane	35	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,1,2-Trichloroethane		mg/kg	0.0022	U	0.0025	U	0.0021	U	1.8	U	0.0021	U	0.0014	U	0.0016	U
1,1-Dichloroethane	19	mg/kg	0.0022	U	0.0025	U	0.0021	U	1.8	U	0.0021	U	0.0014	U	0.0016	U
1,1-Dichloroethene	100	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,1-Dichloropropene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,2,3-Trichlorobenzene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,2,3-Trichloropropane	80	mg/kg	0.015	U	0.017	U	0.014	U	1.4	J	0.014	U	0.0096	U	0.011	U
1,2,4,5-Tetramethylbenzene		mg/kg	0.0058	U	0.0068	U	0.0006	J	21		0.0055	U	0.00043	J	0.0043	U

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-RESR	Units		Qual												
1,2,4-Trichlorobenzene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,2,4-Trimethylbenzene	47	mg/kg	0.0073	U	0.0084	U	0.0016	J	100		0.0069	U	0.00074	J	0.0054	U
1,2-Dibromo-3-chloropropane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,2-Dibromoethane		mg/kg	0.0058	U	0.0068	U	0.0055	U	4.9	U	0.0055	U	0.0038	U	0.0043	U
1,2-Dichlorobenzene	100	mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,2-Dichloroethane	2.3	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,2-Dichloroethene (total)		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,2-Dichloropropane		mg/kg	0.0051	U	0.0059	U	0.0048	U	4.2	U	0.0048	U	0.0034	U	0.0038	U
1,3,5-Trimethylbenzene	47	mg/kg	0.0073	U	0.0084	U	0.00045	J	36		0.0069	U	0.0048	U	0.0054	U
1,3-Dichlorobenzene	17	mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,3-Dichloropropane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,3-Dichloropropene, Total		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,4-Dichlorobenzene	9.8	mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,4-Diethylbenzene		mg/kg	0.0058	U	0.0068	U	0.0013	J	58		0.0055	U	0.00076	J	0.0043	U
1,4-Dioxane	9.8	mg/kg	0.15	U	0.17	U	0.14	U	120	U	0.14	U	0.096	U	0.11	U
2,2-Dichloropropane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
2-Butanone	100	mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0016	J	0.011	U
2-Hexanone		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
4-Ethyltoluene		mg/kg	0.0058	U	0.0068	U	0.0005	J	37		0.0055	U	0.0004	J	0.0043	U
4-Methyl-2-pentanone		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Acetone	100	mg/kg	0.0037	J	0.017	U	0.014	U	1.4	J	0.014	U	0.0072	J	0.011	U
Acrylonitrile		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Benzene	2.9	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Bromobenzene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Bromochloromethane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Bromodichloromethane		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Bromoform		mg/kg	0.0058	U	0.0068	U	0.0055	U	4.9	U	0.0055	U	0.0038	U	0.0043	U
Bromomethane		mg/kg	0.0029	U	0.0034	U	0.0028	U	2.4	U	0.0028	U	0.0019	U	0.0022	U
Carbon disulfide	100	mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Carbon tetrachloride	1.4	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Chlorobenzene	100	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Chloroethane		mg/kg	0.0029	U	0.0034	U	0.0028	U	2.4	U	0.0028	U	0.0019	U	0.0022	U
Chloroform	10	mg/kg	0.0022	U	0.0025	U	0.0021	U	1.8	U	0.0021	U	0.0014	U	0.0016	U
Chloromethane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.00035	J	0.0054	U
cis-1,2-Dichloroethene	59	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
cis-1,3-Dichloropropene		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Dibromochloromethane		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Dibromomethane		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Dichlorodifluoromethane		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Ethyl ether		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Ethylbenzene	30	mg/kg	0.0015	U	0.0017	U	0.0014	U	3.6		0.0014	U	0.00096	U	0.0011	U
Hexachlorobutadiene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-RESR	Units		Qual												
Isopropylbenzene	100	mg/kg	0.0015	U	0.0017	U	0.0014	U	5.2		0.0014	U	0.00096	U	0.0011	U
Methyl tert butyl ether	62	mg/kg	0.0029	U	0.0034	U	0.0028	U	2.4	U	0.0028	U	0.0019	U	0.0022	U
Methylene chloride	51	mg/kg	0.0089	J	0.0085	J	0.0059	J	12	U	0.0063	J	0.0036	J	0.0059	J
n-Butylbenzene	100	mg/kg	0.0015	U	0.0017	U	0.0014	U	8.4		0.0014	U	0.00096	U	0.0011	U
n-Propylbenzene	100	mg/kg	0.0015	U	0.0017	U	0.0014	U	8.2		0.0014	U	0.00096	U	0.0011	U
Naphthalene	100	mg/kg	0.0073	U	0.0084	U	0.00043	J	20		0.0069	U	0.00057	J	0.0054	U
o-Chlorotoluene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
o-Xylene		mg/kg	0.0029	U	0.0034	U	0.0028	U	15		0.0028	U	0.0019	U	0.0022	U
p-Chlorotoluene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
p-Isopropyltoluene		mg/kg	0.0015	U	0.0017	U	0.0014	U	5.2		0.0014	U	0.00096	U	0.0011	U
p/m-Xylene		mg/kg	0.0029	U	0.0034	U	0.0028	U	9.2		0.0028	U	0.00033	J	0.0022	U
sec-Butylbenzene	100	mg/kg	0.0015	U	0.0017	U	0.0014	U	6.5		0.0014	U	0.00096	U	0.0011	U
Styrene		mg/kg	0.0029	U	0.0034	U	0.0028	U	2.4	U	0.0028	U	0.0019	U	0.0022	U
tert-Butylbenzene	100	mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Tetrachloroethene	5.5	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Toluene	100	mg/kg	0.0022	U	0.0025	U	0.0021	U	1.8	U	0.0021	U	0.0014	U	0.0016	U
trans-1,2-Dichloroethene	100	mg/kg	0.0022	U	0.0025	U	0.0021	U	1.8	U	0.0021	U	0.0014	U	0.0016	U
trans-1,3-Dichloropropene		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
trans-1,4-Dichloro-2-butene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Trichloroethene	10	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Trichlorofluoromethane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Vinyl acetate		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Vinyl chloride	0.21	mg/kg	0.0029	U	0.0034	U	0.0028	U	2.4	U	0.0028	U	0.0019	U	0.0022	U
Xylene (Total)	100	mg/kg	0.0029	U	0.0034	U	0.0028	U	24		0.0028	U	0.00033	J	0.0022	U
Semivolatile Organics by GC/MS - Westborough Lab																
1,2,4,5-Tetrachlorobenzene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
1,2,4-Trichlorobenzene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
1,2-Dichlorobenzene	100	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
1,3-Dichlorobenzene	17	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
1,4-Dichlorobenzene	9.8	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2,4,5-Trichlorophenol	100	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2,4,6-Trichlorophenol		mg/kg	0.12	U	0.15	U	1.2	U	0.84	U	0.11	U	0.11	U	0.11	U
2,4-Dichlorophenol	100	mg/kg	0.17	U	0.23	U	1.8	U	1.3	U	0.17	U	0.16	U	0.17	U
2,4-Dimethylphenol		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2,4-Dinitrophenol	100	mg/kg	0.93	U	1.2	U	9.7	U	6.7	U	0.89	U	0.88	U	0.9	U
2,4-Dinitrotoluene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2,6-Dinitrotoluene	1.03	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2-Chloronaphthalene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2-Chlorophenol	100	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2-Methylnaphthalene	0.41	mg/kg	0.23	U	4.3		2.4	U	40		0.22	U	0.22	U	0.22	U
2-Methylphenol	100	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-RESR	Units		Qual												
2-Nitroaniline		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2-Nitrophenol		mg/kg	0.42	U	0.54	U	4.4	U	3	U	0.4	U	0.39	U	0.4	U
3,3'-Dichlorobenzidine		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
3-Methylphenol/4-Methylphenol	34	mg/kg	0.28	U	0.36	U	2.9	U	2	U	0.27	U	0.26	U	0.27	U
3-Nitroaniline		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
4,6-Dinitro-o-cresol		mg/kg	0.5	U	0.65	U	5.2	U	3.6	U	0.48	U	0.47	U	0.48	U
4-Bromophenyl phenyl ether		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
4-Chloroaniline	100	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
4-Chlorophenyl phenyl ether		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
4-Nitroaniline		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
4-Nitrophenol		mg/kg	0.27	U	0.35	U	2.8	U	2	U	0.26	U	0.26	U	0.26	U
Acenaphthene	100	mg/kg	0.15	U	0.2	U	1.6	U	1.1	U	0.15	U	0.15	U	0.15	U
Acenaphthylene	100	mg/kg	0.15	U	0.37		1.6	U	1.1	U	0.15	U	0.15	U	0.15	U
Acetophenone		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Anthracene	100	mg/kg	0.036	J	0.78		0.36	J	1		0.11	U	0.03	J	0.11	U
Benzo(a)anthracene	1	mg/kg	0.072	J	1.8		2.1		0.38	J	0.11	U	0.1	J	0.11	U
Benzo(a)pyrene	1	mg/kg	0.072	J	1.7		2		1.1	U	0.15	U	0.12	J	0.15	U
Benzo(b)fluoranthene	1	mg/kg	0.079	J	1.9		2.6		0.45	J	0.11	U	0.15		0.11	U
Benzo(ghi)perylene	100	mg/kg	0.066	J	1.1		1.3	J	1.1	U	0.15	U	0.081	J	0.15	U
Benzo(k)fluoranthene	1	mg/kg	0.037	J	0.72		0.91	J	0.84	U	0.11	U	0.05	J	0.11	U
Benzoic Acid	100	mg/kg	0.63	U	0.82	U	6.5	U	4.5	U	0.6	U	0.59	U	0.6	U
Benzyl Alcohol		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Biphenyl		mg/kg	0.44	U	0.64		4.6	U	4.5		0.42	U	0.42	U	0.42	U
Bis(2-chloroethoxy)methane		mg/kg	0.21	U	0.27	U	2.2	U	1.5	U	0.2	U	0.2	U	0.2	U
Bis(2-chloroethyl)ether		mg/kg	0.17	U	0.23	U	1.8	U	1.3	U	0.17	U	0.16	U	0.17	U
Bis(2-chloroisopropyl)ether		mg/kg	0.23	U	0.3	U	2.4	U	1.7	U	0.22	U	0.22	U	0.22	U
Bis(2-Ethylhexyl)phthalate	50	mg/kg	0.1	J	1.5		2	U	13		0.18	U	0.18	U	0.19	U
Butyl benzyl phthalate	100	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Carbazole		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Chrysene	1	mg/kg	0.074	J	1.7		2.3		0.54	J	0.11	U	0.12		0.11	U
Di-n-butylphthalate	100	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Di-n-octylphthalate	100	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Dibenzo(a,h)anthracene	0.33	mg/kg	0.12	U	0.26		1.2	U	0.84	U	0.11	U	0.11	U	0.11	U
Dibenzofuran	14	mg/kg	0.19	U	0.28		2	U	1.4	U	0.18	U	0.18	U	0.19	U
Diethyl phthalate	100	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Dimethyl phthalate	100	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Fluoranthene	100	mg/kg	0.18		3.1		3.6		1.3		0.11	U	0.28		0.11	U
Fluorene	100	mg/kg	0.19	U	0.41		2	U	5.8		0.18	U	0.18	U	0.19	U
Hexachlorobenzene	0.41	mg/kg	0.12	U	0.15	U	1.2	U	0.84	U	0.11	U	0.11	U	0.11	U
Hexachlorobutadiene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Hexachlorocyclopentadiene		mg/kg	0.55	U	0.72	U	5.8	U	4	U	0.53	U	0.52	U	0.54	U
Hexachloroethane		mg/kg	0.15	U	0.2	U	1.6	U	1.1	U	0.15	U	0.15	U	0.15	U

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-RESR	Units		Qual												
Indeno(1,2,3-cd)Pyrene	0.5	mg/kg	0.045	J	0.91		1.1	J	1.1	U	0.15	U	0.071	J	0.15	U
Isophorone	100	mg/kg	0.17	U	0.23	U	1.8	U	1.3	U	0.17	U	0.16	U	0.17	U
n-Nitrosodi-n-propylamine		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Naphthalene	100	mg/kg	0.19	U	3		2	U	19		0.18	U	0.18	U	0.19	U
Nitrobenzene	3.7	mg/kg	0.17	U	0.23	U	1.8	U	1.3	U	0.17	U	0.16	U	0.17	U
NitrosoDiPhenylAmine(NDPA)/DPA		mg/kg	0.15	U	0.2	U	1.6	U	1.1	U	0.15	U	0.15	U	0.15	U
P-Chloro-M-Cresol		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Pentachlorophenol	2.4	mg/kg	0.15	U	0.2	U	1.6	U	1.1	U	0.15	U	0.15	U	0.15	U
Phenanthrene	100	mg/kg	0.15		2.8		1.5		8.7		0.11	U	0.17		0.11	U
Phenol	100	mg/kg	0.19	U	0.48		2	U	1.4	U	0.18	U	0.18	U	0.19	U
Pyrene	100	mg/kg	0.15		3.2		3.2		2.4		0.11	U	0.25		0.11	U
Polychlorinated Biphenyls by GC - Westborough Lab																
Aroclor 1016	1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1221	1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1232	1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1242	1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1248	1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1254	1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1260	1	mg/kg	0.0364	U	0.0517	U	0.0355	J	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1262	1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1268	1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
PCBs, Total		mg/kg	0.0364	U	0.0517	U	0.0355	J	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Organochlorine Pesticides by GC - Westborough Lab																
4,4'-DDD	2.6	mg/kg	0.0516		0.0346		0.0071		0.00275		0.00163	U	0.00165	U	0.00182	U
4,4'-DDE	1.8	mg/kg	0.0501		0.0244	U	0.0019	U	0.00229	J	0.00163	U	0.00165	U	0.00182	U
4,4'-DDT	1.7	mg/kg	0.0622	U	0.0458	U	0.00355	U	0.0148		0.00305	U	0.00309	U	0.00342	U
Aldrin	0.019	mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Alpha-BHC	0.097	mg/kg	0.0138	U	0.0102	U	0.00079	U	0.00107	U	0.000678	U	0.000686	U	0.00076	U
Beta-BHC	0.072	mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Chlordane		mg/kg	0.27	U	0.198	U	0.0154	U	0.0208	U	0.0132	U	0.0134	U	0.0148	U
cis-Chlordane	0.91	mg/kg	0.0415	U	0.0305	U	0.00237	U	0.0032	U	0.00203	U	0.00206	U	0.00228	U
Delta-BHC	100	mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Dieldrin	0.039	mg/kg	0.0207	U	0.0153	U	0.00118	U	0.00197		0.00102	U	0.00103	U	0.00114	U
Endosulfan I	4.8	mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Endosulfan II	4.8	mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Endosulfan sulfate	4.8	mg/kg	0.0138	U	0.0102	U	0.00079	U	0.00107	U	0.000678	U	0.000686	U	0.00076	U
Endrin	2.2	mg/kg	0.0138	U	0.0102	U	0.00079	U	0.00107	U	0.000678	U	0.000686	U	0.00076	U
Endrin ketone		mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Heptachlor	0.42	mg/kg	0.0166	U	0.0122	U	0.000948	U	0.00128	U	0.000813	U	0.000824	U	0.000913	U
Heptachlor epoxide	0.077	mg/kg	0.0622	U	0.0458	U	0.00355	U	0.00481	U	0.00305	U	0.00309	U	0.00342	U
Lindane	0.28	mg/kg	0.0138	U	0.0102	U	0.00079	U	0.00107	U	0.000678	U	0.000686	U	0.00076	U

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-RESR	Units		Qual												
Methoxychlor	100	mg/kg	0.0622	U	0.0458	U	0.00355	U	0.00481	U	0.00305	U	0.00309	U	0.00342	U
Toxaphene		mg/kg	0.622	U	0.458	U	0.0355	U	0.0481	U	0.0305	U	0.0309	U	0.0342	U
trans-Chlordane	0.54	mg/kg	0.0415	U	0.0305	U	0.00237	U	0.0032	U	0.00203	U	0.00206	U	0.00228	U
Alpha Analytical Labs provides this custom reporting format as a convenience to our clients. As such, we cannot be held liable for errors or omissions associated with the regulatory standards listed above and/or the sample results highlighted by comparison with the standards (current as of May, 2006).																
Only compounds detected with reporting limits that exceed the corresponding regulatory standard in at least one sample are included on the summary sheets.																
Refer to the laboratory report in Adobe Acrobat (.PDF) format to check results or read any associated project narrative that may be present. In all cases, the signed, hardcopy Alpha Analytical Labs laboratory report is the official document for reporting laboratory results.																
<b>Notes:</b>																
U = Undetected																
J = Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).																

**Table 3c. Soil Analytical Data Summary (with New York Restricted Use, Restricted-Residential Criteria).**

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-RESRR	Units		Qual												
<b>General Chemistry - Westborough Lab</b>																
Solids, Total		%	85.5		64.3		82		58.3		88.4		91.1		87.6	
<b>Total Metals - Westborough Lab</b>																
Aluminum, Total		mg/kg	8800		9700		18000		18000		7400		5500		5400	
Antimony, Total		mg/kg	4.6	U	6.9		6.7		8.9		0.8	J	4.4	U	4.3	U
Arsenic, Total	16	mg/kg	11		12		68		21		8.7		6		6.8	
Barium, Total	400	mg/kg	59		550		720		190		58		41		40	
Beryllium, Total	72	mg/kg	0.6		0.59	U	24	U	1.6	U	0.51		0.41	J	0.71	
Cadmium, Total	4.3	mg/kg	0.92	U	1.9		0.45	J	1.4		0.89	U	0.88	U	0.86	U
Calcium, Total		mg/kg	1600		110000		30000		81000		2000		770		800	
Chromium, Total		mg/kg	32		22		600		110		19		15		16	
Cobalt, Total		mg/kg	6.7		6.8		97		21		5.7		4.9		6.8	
Copper, Total	270	mg/kg	25		290		790		230		25		19		15	
Iron, Total		mg/kg	34000		20000		64000		39000		30000		20000		22000	
Lead, Total	400	mg/kg	11		960		900		1700		4.6		5.2		6.1	
Magnesium, Total		mg/kg	2100		6200		4400		11000		2800		1600		1600	
Manganese, Total	2000	mg/kg	490		610		8700		1800		610		420		320	
Mercury, Total	0.81	mg/kg	0.06	J	0.67		0.45		0.48		0.08	U	0.08	U	0.02	J
Nickel, Total	310	mg/kg	18		26		2300		360		20		11		16	
Potassium, Total		mg/kg	1200		860		1300		1700		1100		830		860	
Selenium, Total	180	mg/kg	1.8	U	0.53	J	1.9	U	2.6	U	1.8	U	1.8	U	1.7	U
Silver, Total	180	mg/kg	0.92	U	0.68	J	3.5		0.93	J	0.89	U	0.88	U	0.86	U
Sodium, Total		mg/kg	80	J	440		2100		1800		190		46	J	48	J
Thallium, Total		mg/kg	1.8	U	2.4	U	1.9	U	2.6	U	1.8	U	1.8	U	1.7	U
Vanadium, Total		mg/kg	60		250		12000		1200		35		26		30	
Zinc, Total	10000	mg/kg	41		810		360		1400		71		22		24	
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>																
1,1,1,2-Tetrachloroethane		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,1,1-Trichloroethane	100	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,1,2,2-Tetrachloroethane		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,1,2-Trichloroethane		mg/kg	0.0022	U	0.0025	U	0.0021	U	1.8	U	0.0021	U	0.0014	U	0.0016	U
1,1-Dichloroethane	26	mg/kg	0.0022	U	0.0025	U	0.0021	U	1.8	U	0.0021	U	0.0014	U	0.0016	U
1,1-Dichloroethene	100	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,1-Dichloropropene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,2,3-Trichlorobenzene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,2,3-Trichloropropane		mg/kg	0.015	U	0.017	U	0.014	U	1.4	J	0.014	U	0.0096	U	0.011	U
1,2,4,5-Tetramethylbenzene		mg/kg	0.0058	U	0.0068	U	0.0006	J	21		0.0055	U	0.00043	J	0.0043	U

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-RESRR	Units		Qual												
1,2,4-Trichlorobenzene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,2,4-Trimethylbenzene	52	mg/kg	0.0073	U	0.0084	U	0.0016	J	100		0.0069	U	0.00074	J	0.0054	U
1,2-Dibromo-3-chloropropane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,2-Dibromoethane		mg/kg	0.0058	U	0.0068	U	0.0055	U	4.9	U	0.0055	U	0.0038	U	0.0043	U
1,2-Dichlorobenzene	100	mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,2-Dichloroethane	3.1	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,2-Dichloroethene (total)		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,2-Dichloropropane		mg/kg	0.0051	U	0.0059	U	0.0048	U	4.2	U	0.0048	U	0.0034	U	0.0038	U
1,3,5-Trimethylbenzene	52	mg/kg	0.0073	U	0.0084	U	0.00045	J	36		0.0069	U	0.0048	U	0.0054	U
1,3-Dichlorobenzene	49	mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,3-Dichloropropane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,3-Dichloropropene, Total		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
1,4-Dichlorobenzene	13	mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
1,4-Diethylbenzene		mg/kg	0.0058	U	0.0068	U	0.0013	J	58		0.0055	U	0.00076	J	0.0043	U
1,4-Dioxane	13	mg/kg	0.15	U	0.17	U	0.14	U	120	U	0.14	U	0.096	U	0.11	U
2,2-Dichloropropane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
2-Butanone	100	mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0016	J	0.011	U
2-Hexanone		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
4-Ethyltoluene		mg/kg	0.0058	U	0.0068	U	0.0005	J	37		0.0055	U	0.0004	J	0.0043	U
4-Methyl-2-pentanone		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Acetone	100	mg/kg	0.0037	J	0.017	U	0.014	U	1.4	J	0.014	U	0.0072	J	0.011	U
Acrylonitrile		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Benzene	4.8	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Bromobenzene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Bromochloromethane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Bromodichloromethane		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Bromoform		mg/kg	0.0058	U	0.0068	U	0.0055	U	4.9	U	0.0055	U	0.0038	U	0.0043	U
Bromomethane		mg/kg	0.0029	U	0.0034	U	0.0028	U	2.4	U	0.0028	U	0.0019	U	0.0022	U
Carbon disulfide		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Carbon tetrachloride	2.4	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Chlorobenzene	100	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Chloroethane		mg/kg	0.0029	U	0.0034	U	0.0028	U	2.4	U	0.0028	U	0.0019	U	0.0022	U
Chloroform	49	mg/kg	0.0022	U	0.0025	U	0.0021	U	1.8	U	0.0021	U	0.0014	U	0.0016	U
Chloromethane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.00035	J	0.0054	U
cis-1,2-Dichloroethene	100	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
cis-1,3-Dichloropropene		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Dibromochloromethane		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Dibromomethane		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Dichlorodifluoromethane		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Ethyl ether		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Ethylbenzene	41	mg/kg	0.0015	U	0.0017	U	0.0014	U	3.6		0.0014	U	0.00096	U	0.0011	U
Hexachlorobutadiene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-RESRR	Units		Qual												
Isopropylbenzene		mg/kg	0.0015	U	0.0017	U	0.0014	U	5.2		0.0014	U	0.00096	U	0.0011	U
Methyl tert butyl ether	100	mg/kg	0.0029	U	0.0034	U	0.0028	U	2.4	U	0.0028	U	0.0019	U	0.0022	U
Methylene chloride	100	mg/kg	0.0089	J	0.0085	J	0.0059	J	12	U	0.0063	J	0.0036	J	0.0059	J
n-Butylbenzene	100	mg/kg	0.0015	U	0.0017	U	0.0014	U	8.4		0.0014	U	0.00096	U	0.0011	U
n-Propylbenzene	100	mg/kg	0.0015	U	0.0017	U	0.0014	U	8.2		0.0014	U	0.00096	U	0.0011	U
Naphthalene	100	mg/kg	0.0073	U	0.0084	U	0.00043	J	20		0.0069	U	0.00057	J	0.0054	U
o-Chlorotoluene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
o-Xylene		mg/kg	0.0029	U	0.0034	U	0.0028	U	15		0.0028	U	0.0019	U	0.0022	U
p-Chlorotoluene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
p-Isopropyltoluene		mg/kg	0.0015	U	0.0017	U	0.0014	U	5.2		0.0014	U	0.00096	U	0.0011	U
p/m-Xylene		mg/kg	0.0029	U	0.0034	U	0.0028	U	9.2		0.0028	U	0.00033	J	0.0022	U
sec-Butylbenzene	100	mg/kg	0.0015	U	0.0017	U	0.0014	U	6.5		0.0014	U	0.00096	U	0.0011	U
Styrene		mg/kg	0.0029	U	0.0034	U	0.0028	U	2.4	U	0.0028	U	0.0019	U	0.0022	U
tert-Butylbenzene	100	mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Tetrachloroethene	19	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Toluene	100	mg/kg	0.0022	U	0.0025	U	0.0021	U	1.8	U	0.0021	U	0.0014	U	0.0016	U
trans-1,2-Dichloroethene	100	mg/kg	0.0022	U	0.0025	U	0.0021	U	1.8	U	0.0021	U	0.0014	U	0.0016	U
trans-1,3-Dichloropropene		mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
trans-1,4-Dichloro-2-butene		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Trichloroethene	21	mg/kg	0.0015	U	0.0017	U	0.0014	U	1.2	U	0.0014	U	0.00096	U	0.0011	U
Trichlorofluoromethane		mg/kg	0.0073	U	0.0084	U	0.0069	U	6.1	U	0.0069	U	0.0048	U	0.0054	U
Vinyl acetate		mg/kg	0.015	U	0.017	U	0.014	U	12	U	0.014	U	0.0096	U	0.011	U
Vinyl chloride	0.9	mg/kg	0.0029	U	0.0034	U	0.0028	U	2.4	U	0.0028	U	0.0019	U	0.0022	U
Xylene (Total)	100	mg/kg	0.0029	U	0.0034	U	0.0028	U	24		0.0028	U	0.00033	J	0.0022	U
Semivolatile Organics by GC/MS - Westborough Lab																
1,2,4,5-Tetrachlorobenzene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
1,2,4-Trichlorobenzene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
1,2-Dichlorobenzene	100	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
1,3-Dichlorobenzene	49	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
1,4-Dichlorobenzene	13	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2,4,5-Trichlorophenol		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2,4,6-Trichlorophenol		mg/kg	0.12	U	0.15	U	1.2	U	0.84	U	0.11	U	0.11	U	0.11	U
2,4-Dichlorophenol		mg/kg	0.17	U	0.23	U	1.8	U	1.3	U	0.17	U	0.16	U	0.17	U
2,4-Dimethylphenol		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2,4-Dinitrophenol		mg/kg	0.93	U	1.2	U	9.7	U	6.7	U	0.89	U	0.88	U	0.9	U
2,4-Dinitrotoluene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2,6-Dinitrotoluene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2-Chloronaphthalene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2-Chlorophenol		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2-Methylnaphthalene		mg/kg	0.23	U	4.3		2.4	U	40		0.22	U	0.22	U	0.22	U
2-Methylphenol	100	mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-RESRR	Units		Qual												
2-Nitroaniline		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
2-Nitrophenol		mg/kg	0.42	U	0.54	U	4.4	U	3	U	0.4	U	0.39	U	0.4	U
3,3'-Dichlorobenzidine		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
3-Methylphenol/4-Methylphenol	100	mg/kg	0.28	U	0.36	U	2.9	U	2	U	0.27	U	0.26	U	0.27	U
3-Nitroaniline		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
4,6-Dinitro-o-cresol		mg/kg	0.5	U	0.65	U	5.2	U	3.6	U	0.48	U	0.47	U	0.48	U
4-Bromophenyl phenyl ether		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
4-Chloroaniline		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
4-Chlorophenyl phenyl ether		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
4-Nitroaniline		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
4-Nitrophenol		mg/kg	0.27	U	0.35	U	2.8	U	2	U	0.26	U	0.26	U	0.26	U
Acenaphthene	100	mg/kg	0.15	U	0.2	U	1.6	U	1.1	U	0.15	U	0.15	U	0.15	U
Acenaphthylene	100	mg/kg	0.15	U	0.37		1.6	U	1.1	U	0.15	U	0.15	U	0.15	U
Acetophenone		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Anthracene	100	mg/kg	0.036	J	0.78		0.36	J	1		0.11	U	0.03	J	0.11	U
Benzo(a)anthracene	1	mg/kg	0.072	J	1.8		2.1		0.38	J	0.11	U	0.1	J	0.11	U
Benzo(a)pyrene	1	mg/kg	0.072	J	1.7		2		1.1	U	0.15	U	0.12	J	0.15	U
Benzo(b)fluoranthene	1	mg/kg	0.079	J	1.9		2.6		0.45	J	0.11	U	0.15		0.11	U
Benzo(ghi)perylene	100	mg/kg	0.066	J	1.1		1.3	J	1.1	U	0.15	U	0.081	J	0.15	U
Benzo(k)fluoranthene	3.9	mg/kg	0.037	J	0.72		0.91	J	0.84	U	0.11	U	0.05	J	0.11	U
Benzoic Acid		mg/kg	0.63	U	0.82	U	6.5	U	4.5	U	0.6	U	0.59	U	0.6	U
Benzyl Alcohol		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Biphenyl		mg/kg	0.44	U	0.64		4.6	U	4.5		0.42	U	0.42	U	0.42	U
Bis(2-chloroethoxy)methane		mg/kg	0.21	U	0.27	U	2.2	U	1.5	U	0.2	U	0.2	U	0.2	U
Bis(2-chloroethyl)ether		mg/kg	0.17	U	0.23	U	1.8	U	1.3	U	0.17	U	0.16	U	0.17	U
Bis(2-chloroisopropyl)ether		mg/kg	0.23	U	0.3	U	2.4	U	1.7	U	0.22	U	0.22	U	0.22	U
Bis(2-Ethylhexyl)phthalate		mg/kg	0.1	J	1.5		2	U	13		0.18	U	0.18	U	0.19	U
Butyl benzyl phthalate		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Carbazole		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Chrysene	3.9	mg/kg	0.074	J	1.7		2.3		0.54	J	0.11	U	0.12		0.11	U
Di-n-butylphthalate		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Di-n-octylphthalate		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Dibenzo(a,h)anthracene	0.33	mg/kg	0.12	U	0.26		1.2	U	0.84	U	0.11	U	0.11	U	0.11	U
Dibenzofuran	59	mg/kg	0.19	U	0.28		2	U	1.4	U	0.18	U	0.18	U	0.19	U
Diethyl phthalate		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Dimethyl phthalate		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Fluoranthene	100	mg/kg	0.18		3.1		3.6		1.3		0.11	U	0.28		0.11	U
Fluorene	100	mg/kg	0.19	U	0.41		2	U	5.8		0.18	U	0.18	U	0.19	U
Hexachlorobenzene	1.2	mg/kg	0.12	U	0.15	U	1.2	U	0.84	U	0.11	U	0.11	U	0.11	U
Hexachlorobutadiene		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Hexachlorocyclopentadiene		mg/kg	0.55	U	0.72	U	5.8	U	4	U	0.53	U	0.52	U	0.54	U
Hexachloroethane		mg/kg	0.15	U	0.2	U	1.6	U	1.1	U	0.15	U	0.15	U	0.15	U

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-RESRR	Units		Qual												
Indeno(1,2,3-cd)Pyrene	0.5	mg/kg	0.045	J	0.91		1.1	J	1.1	U	0.15	U	0.071	J	0.15	U
Isophorone		mg/kg	0.17	U	0.23	U	1.8	U	1.3	U	0.17	U	0.16	U	0.17	U
n-Nitrosodi-n-propylamine		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Naphthalene	100	mg/kg	0.19	U	3		2	U	19		0.18	U	0.18	U	0.19	U
Nitrobenzene	15	mg/kg	0.17	U	0.23	U	1.8	U	1.3	U	0.17	U	0.16	U	0.17	U
NitrosoDiPhenylAmine(NDPA)/DPA		mg/kg	0.15	U	0.2	U	1.6	U	1.1	U	0.15	U	0.15	U	0.15	U
P-Chloro-M-Cresol		mg/kg	0.19	U	0.25	U	2	U	1.4	U	0.18	U	0.18	U	0.19	U
Pentachlorophenol	6.7	mg/kg	0.15	U	0.2	U	1.6	U	1.1	U	0.15	U	0.15	U	0.15	U
Phenanthrene	100	mg/kg	0.15		2.8		1.5		8.7		0.11	U	0.17		0.11	U
Phenol	100	mg/kg	0.19	U	0.48		2	U	1.4	U	0.18	U	0.18	U	0.19	U
Pyrene	100	mg/kg	0.15		3.2		3.2		2.4		0.11	U	0.25		0.11	U
Polychlorinated Biphenyls by GC - Westborough Lab																
Aroclor 1016	1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1221	1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1232	1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1242	1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1248	1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1254	1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1260	1	mg/kg	0.0364	U	0.0517	U	0.0355	J	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1262	1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Aroclor 1268	1	mg/kg	0.0364	U	0.0517	U	0.0396	U	0.0533	U	0.0342	U	0.0363	U	0.0371	U
PCBs, Total		mg/kg	0.0364	U	0.0517	U	0.0355	J	0.0533	U	0.0342	U	0.0363	U	0.0371	U
Organochlorine Pesticides by GC - Westborough Lab																
4,4'-DDD	13	mg/kg	0.0516		0.0346		0.0071		0.00275		0.00163	U	0.00165	U	0.00182	U
4,4'-DDE	8.9	mg/kg	0.0501		0.0244	U	0.0019	U	0.00229	J	0.00163	U	0.00165	U	0.00182	U
4,4'-DDT	7.9	mg/kg	0.0622	U	0.0458	U	0.00355	U	0.0148		0.00305	U	0.00309	U	0.00342	U
Aldrin	0.097	mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Alpha-BHC	0.48	mg/kg	0.0138	U	0.0102	U	0.00079	U	0.00107	U	0.000678	U	0.000686	U	0.00076	U
Beta-BHC	0.36	mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Chlordane		mg/kg	0.27	U	0.198	U	0.0154	U	0.0208	U	0.0132	U	0.0134	U	0.0148	U
cis-Chlordane	4.2	mg/kg	0.0415	U	0.0305	U	0.00237	U	0.0032	U	0.00203	U	0.00206	U	0.00228	U
Delta-BHC	100	mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Dieldrin	0.2	mg/kg	0.0207	U	0.0153	U	0.00118	U	0.00197		0.00102	U	0.00103	U	0.00114	U
Endosulfan I	24	mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Endosulfan II	24	mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Endosulfan sulfate	24	mg/kg	0.0138	U	0.0102	U	0.00079	U	0.00107	U	0.000678	U	0.000686	U	0.00076	U
Endrin	11	mg/kg	0.0138	U	0.0102	U	0.00079	U	0.00107	U	0.000678	U	0.000686	U	0.00076	U
Endrin ketone		mg/kg	0.0332	U	0.0244	U	0.0019	U	0.00256	U	0.00163	U	0.00165	U	0.00182	U
Heptachlor	2.1	mg/kg	0.0166	U	0.0122	U	0.000948	U	0.00128	U	0.000813	U	0.000824	U	0.000913	U
Heptachlor epoxide		mg/kg	0.0622	U	0.0458	U	0.00355	U	0.00481	U	0.00305	U	0.00309	U	0.00342	U

LOCATION			S-1S		S-1D		S-2S		S-2D		S-3S		S-3D		S-4	
SAMPLING DATE			08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14		08-JUL-14	
LAB SAMPLE ID			L1415006-01		L1415006-02		L1415006-03		L1415006-04		L1415006-05		L1415006-06		L1415006-07	
	NY-RESRR	Units		Qual												
Lindane	1.3	mg/kg	0.0138	U	0.0102	U	0.00079	U	0.00107	U	0.000678	U	0.000686	U	0.00076	U
Methoxychlor		mg/kg	0.0622	U	0.0458	U	0.00355	U	0.00481	U	0.00305	U	0.00309	U	0.00342	U
Toxaphene		mg/kg	0.622	U	0.458	U	0.0355	U	0.0481	U	0.0305	U	0.0309	U	0.0342	U
trans-Chlordane		mg/kg	0.0415	U	0.0305	U	0.00237	U	0.0032	U	0.00203	U	0.00206	U	0.00228	U
Alpha Analytical Labs provides this custom reporting format as a convenience to our clients. As such, we cannot be held liable for errors or omissions associated with the regulatory standards listed above and/or the sample results highlighted by comparison with the standards (current as of May, 2006).																
Only compounds detected with reporting limits that exceed the corresponding regulatory standard in at least one sample are included on the summary sheets.																
Refer to the laboratory report in Adobe Acrobat (.PDF) format to check results or read any associated project narrative that may be present. In all cases, the signed, hardcopy Alpha Analytical Labs laboratory report is the official document for reporting laboratory results.																

**Table 4.**

**Summary of Soil Vapor Analytical Data**

**583 Franklin Avenue, Brooklyn, New York**

**TABLE 4: Soil Vapor Analytical Data Summary**

All results are expressed as micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).

Facility Name: 583 Franklin Avenue, Brooklyn, NY 11238

LOCATION	SV-1		SV-2		NYSDOH Guideline Values		
SAMPLE ID NO.	SG-1		SG-2				
SAMPLING DATE	7/8/2014		7/8/2014		Table C1	Table C1	Table 3.1
LAB SAMPLE ID	L1415064-01		L1415064-02		Indoor Values	Outdoor Values	Sub-slab Values
Analyte Name	Depth at 9'	Qual	Depth at 9'	Qual	UF	UF	
Dichlorodifluoromethane (CFC 12)	ND		<b>12.1</b>		10	10	NP
Chloromethane	<b>11.8</b>		4.21		4.2	4.3	NP
Freon-114	ND		<b>7.27</b>		0.4	0.5	NP
Vinyl chloride	ND		ND		0.4	0.4	NP
1,3-Butadiene	154		41.8		NP	NP	NP
Bromomethane	ND		ND		0.5	0.5	NP
Chloroethane	ND		ND		0.4	0.4	NP
Ethanol	ND		15.8		1300	34	NP
Vinyl bromide	ND		ND		NP	NP	NP
Acetone	<b>1040</b>		<b>991</b>		115	30	NP
Trichlorofluoromethane (CFC 11)	ND		<b>7.76</b>		12	5.1	NP
Isopropanol	ND		4.47		NP	NP	NP
1,1-Dichloroethene	ND		ND		0.4	0.4	NP
Methylene chloride	ND		<b>8.4</b>		16	1.6	NP
3-Chloropropene	ND		12.2		NP	NP	NP
Carbon disulfide	ND		ND		NP	NP	NP
Freon-113	<b>253</b>		<b>138</b>		2.5	2.5	NP
trans-1,2-Dichloroethene	ND		ND		NP	NP	NP
1,1-Dichloroethane (1,1-DCA)	ND		ND		0.4	NC	NP
Methyl tert butyl ether	ND		ND		14	1.9	NP
Vinyl acetate	ND		ND		NP	NP	NP
2-Butanone (MEK)	<b>34.5</b>		<b>39.8</b>		16	5.3	NP
cis-1,2-Dichloroethene	ND		ND		0.4	0.4	NP
Ethyl Acetate	ND		ND		NP	NP	NP
Chloroform	ND		<b>5.18</b>		1.2	0.5	NP
Tetrahydrofuran (THF)	ND		ND		0.8	0.4	NP
1,2-Dichloroethane	ND		ND		0.4	0.4	NP
n-Hexane	<b>173</b>		<b>68.4</b>		14	2	NP
1,1,1-Trichloroethane (TCA)	ND		<b>28.7</b>		2.5	0.6	100
Benzene	<b>79.5</b>		<b>53.7</b>		13	4.8	NP
Carbon tetrachloride	ND		<b>12.1</b>		1.3	1.2	5
Cyclohexane	<b>423</b>		<b>71.9</b>		6.3	0.9	NP
1,2-Dichloropropane	ND		ND		0.4	0.4	NP
Bromodichloromethane	ND		ND		NP	NP	NP
1,4-Dioxane	ND		ND		NP	NP	NP
Trichloroethene (TCE)	ND		ND		0.5	0.4	5
2,2,4-Trimethylpentane	ND		ND		NP	NP	NP
Heptane	<b>220</b>		<b>57.8</b>		18	2.2	NP
cis-1,3-Dichloropropene	ND		ND		0.4	0.4	NP
4-Methyl-2-pentanone	ND		ND		1.9	0.5	NP
trans-1,3-Dichloropropene	ND		ND		NC	NC	NP

LOCATION	SV-1		SV-2		NYSDOH Guideline Values		
SAMPLE ID NO.	SG-1		SG-2				
SAMPLING DATE	7/8/2014		7/8/2014		Table C1	Table C1	Table 3.1
LAB SAMPLE ID	L1415064-01		L1415064-02		Indoor Values	Outdoor Values	Sub-slab Values
Analyte Name	Depth at 9'	Qual	Depth at 9'	Qual	UF	UF	
1,1,2-Trichloroethane	ND		ND		0.4	0.3	NP
Toluene	<b>42.2</b>		<b>39.2</b>		57	5.1	NP
2-Hexanone	ND		ND		NP	NP	NP
Dibromochloromethane	ND		ND		NP	NP	NP
1,2-Dibromoethane	ND		ND		0.4	0.4	NP
Tetrachloroethene (PCE)	ND		ND		2.5	0.7	100
Chlorobenzene	ND		ND		0.4	NC	NP
Ethylbenzene	ND		<b>13.7</b>		6.4	1	NP
p/m-Xylene	ND		<b>20.3</b>		11	1	NP
Bromoform	ND		ND		NP	NP	NP
Styrene	ND		<b>3.12</b>		1.4	0.5	NP
1,1,2,2-Tetrachloroethane	ND		ND		0.4	0.4	NP
o-Xylene	ND		<b>5.3</b>		7.1	1.2	NP
4-Ethyltoluene	ND		ND		NP	NP	NP
1,3,5-Trimethylbenzene	ND		<b>4.29</b>		3.9	0.7	NP
1,2,4-Trimethylbenzene	ND		<b>10.2</b>		9.8	1.9	NP
Benzyl chloride	ND		ND		NP	NP	NP
1,3-Dichlorobenzene	ND		ND		0.5	0.4	NP
1,4-Dichlorobenzene	ND		ND		1.2	0.5	NP
1,2-Dichlorobenzene	ND		ND		0.5	0.4	NP
1,2,4-Trichlorobenzene	ND		ND		0.5	0.4	NP
Hexachlorobutadiene	ND		ND		0.5	0.5	NP

Notes:

Values in italics represent detected contaminant concentrations above the indoor upper fence value.

Values in bold represent detected contaminant concentrations above the outdoor upper fence value.

NC = Upper Fence value not calculated.

NP = no information provided.

UF = Upper Fence

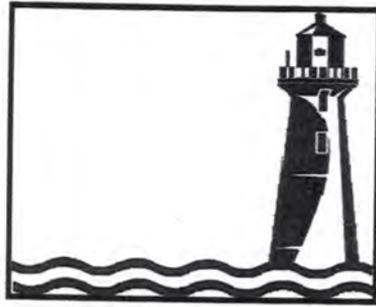
ND = Not detected at the reporting limit (RL) for the sample.

\* This is the report limit value (RL). The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

All NYSDOH values taken from "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," Appendix C and Table 3.1, October 2006

# **APPENDICES**

**Appendix A.**  
**Previous Phase I ESA Report**



**Environmental Building  
Solutions, LLC**

**A Phase I Environmental Site Assessment  
At  
583 Franklin Avenue  
Brooklyn, NY 11238**

Prepared For:

Prop Holdings , LLC  
175-21 88<sup>th</sup> Street  
Jamaica, NY 11432

Project ID: 08-495

Date: August 27, 2008

Environmental Building Solutions, LLC  
295 Madison Avenue, Suite 1826  
New York, NY 10017

## 1.0 Executive Summary

At the request of Prop Holdings, LLC, Environmental Building Solutions, LLC performed a Phase I Environmental Site Assessment per American Society for Testing and Materials (ASTM) Standard E-1527-05 for the property located at 583 Franklin Avenue in Brooklyn, Kings County, New York.

According to representatives from the Prop Holdings, LLC the purpose of the environmental due diligence investigation is for a pending acquisition of the property and to qualify the purchaser for liability protection, to the extent available, under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The purpose of ASTM Standard E 1527-05 is to define good commercial and customary practice in the United States of America for conducting an environmental site assessment of a parcel of commercial real estate, with respect to the range of contaminants within the scope of the Comprehensive Environmental Response, Compensation and Liability Act and petroleum products.

The goal of the Phase I Environmental Site Assessment is to identify *recognized environmental conditions*. The term *recognized environmental condition* means the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water or surface water of the property.

### **Recognized Environmental Conditions**

We have performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-05 of 583 Franklin Avenue, Brooklyn, New York, the property. Any exceptions to, or deletions from, this practice are described in Section 2.3 of this report. This assessment has revealed no evidence of *Recognized Environmental Conditions* in connection with the property.

### **Business Environmental Risk Issues**

A business environmental risk is a risk that can have a material environmental or environmentally driven impact on the business associated with current or planned use of a parcel of commercial real estate. In accordance with the ASTM E 1527-05, Environmental Building Solutions, LLC has revealed no evidence of *Business Environmental Risk Issues* in connection with the property during our assessment.

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## 2.0 Introduction

This report presents the findings, opinions and conclusions of a Phase I Environmental Site Assessment for the property located at 583 Franklin Avenue in Brooklyn, Kings County, New York.

Mr. Moshik Regev of Prop Holdings, LLC authorized Environmental Building Solutions, LLC to perform the Phase I Environmental Site Assessment. The on-site investigation was conducted by Ms. Sharon Dyal of Environmental Building Solutions, LLC on August 08, 2008. At the time of the site inspection it was sunny and the temperature was approximately 80° Fahrenheit.

## 3.0 Purpose

The goal of the Phase I Environmental Site Assessment is to identify *recognized environmental conditions*. The term *recognized environmental condition* means the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water or surface water of the property.

### 3.1 Scope of Work

The ESA was conducted in accordance with ASTM E 1527-05, Standard Practice for Environmental Site Assessments, Phase I Environmental Site Assessment Process. Significant additions or deletions to or deviations from ASTM Practice E 1527 are noted below or in the corresponding sections of this report.

The purpose of a Phase I Environmental Site Assessment is to identify, to the extent feasible pursuant to the processes prescribed herein, recognized environmental conditions in connection with the property. A Phase I Environmental Site Assessment shall have four components, as described as follows:

- Records Review – the purpose of the records review is to obtain and review records that will help identify recognized environmental conditions in connection with the property.
- Site Reconnaissance – the objective of the site reconnaissance is to obtain information indicating the likelihood of identifying recognized environmental conditions in connection with the property.

- Interviews – the objective of interviews is to obtain information indicating recognized environmental conditions in connection with the property.
- Report – the findings, opinions and conclusions in the Phase I Environmental Site Assessment shall be supported by documentation.

In accordance with the ASTM E 1527-05, Environmental Building Solutions, LLC also addressed the following non-scope<sup>1</sup> consideration issues during our assessment:

- Asbestos Containing Material (ACM), which consisted of a visual inspection of the current condition of any suspect or identified ACM.
- Lead Based Paint (LBP), which consisted of a visual inspection of the condition of any suspect LBP.
- Radon, consisting of a review of available county radon data in the vicinity of the subject property.
- Wetlands, consisting of a review of a current National and State Wetlands Inventory map to determine the presence of any wetlands on or in the vicinity of the subject property.

### 3.2 *Assumptions, Limitations and Exceptions*

Environmental Building Solutions, LLC prepared a Phase I Environmental Site Assessment utilizing standards procedures and practices in accordance with American Society of Testing Materials Standard E 1527-05. Environmental Building Solutions, LLC attempted to identify all recognized environmental conditions associated with hazardous substances or petroleum products at the subject property. However, some of the findings within this report are based on information provided by others, including “reasonably ascertainable information” obtained from certain public agencies and other available sources.

ASTM Practice E 1527-05 recognizes inherent limitations for ESA’s, including:

- Uncertainty Not Eliminated – No ESA can wholly eliminate uncertainty regarding the potential for recognized environmental conditions in connection with a Site.
- Not Exhaustive – An ESA is not an exhaustive investigation.
- Past Uses of the Site – Review of standard historical sources at less than five-year intervals is not required.

<sup>1</sup> “Non-scope issues” include certain environmental concerns, which are outside the scope of the Comprehensive Environmental Response, Compensation and Liability Act, but which are considered important in evaluating a site and are therefore included in ASTM E 1527-05.

This report is not definitive and should not be assumed to be a complete or specific definition of all conditions above or below grade. Current subsurface conditions may differ from the conditions implied by surface observations or historical sources and can be most reliably evaluated through intrusive techniques that are beyond the scope of this report. Environmental Building Solutions, LLC makes no representation or warranty that the past or current operations at the Site are, or have been, in compliance with applicable federal, state or local laws, regulations or codes.

Regardless of the findings stated in this report, Environmental Building Solutions, LLC are not responsible for consequences or conditions arising from facts that were not fully disclosed to Environmental Building Solutions, LLC during the assessment.

Environmental Building Solutions, LLC is not a professional title insurance or land surveyor firm and make no guarantee as to any land title records acquired or reviewed. Any physical descriptions or depictions of the Site in this report do not represent a comprehensive definition or precise delineation of Site ownership or boundaries.

Other assumptions, limitations and exceptions that are specific to the scope of this report may be found in corresponding sections.

### ***3.3 Special Terms and Conditions (User Reliance)***

Environmental Building Solutions LLC has prepared a Phase I Environmental Site Assessment for Prop Holdings, LLC for 583 Franklin Avenue, Brooklyn, New York (EBS Project # 08-495 dated August 08, 2008). This report ("Report") is for use and benefit of, and may be relied upon by Prop Holdings, LLC and its affiliates, agents and advisors, including:

Any use or reliance on this report shall be limited by the exceptions and limitations in this report, and with the acknowledgement that actual site conditions may change with time, and that hidden conditions may exist at the Site that were not discovered within the authorized scope of this assessment. No other warranties are made to additional parties, either express or implied.

No reproduction of all or any of this report shall occur without prior written authorization from Environmental Building Solutions, LLC. Additional copies of this report may be purchased from Environmental Building Solutions, LLC.

## **4.0 Site Description**

### ***4.1 Location and Legal Description***

The property is located at 583 Franklin Avenue just south of Atlantic Avenue at approximately 90 feet above sea level. The 1,660 square foot site is approximately rectangular in plan.

The subject property is listed as Tax Block 1199, Lot 3. A Site Overview Map is provided in Appendix I.

### ***4.2 Surrounding Area General Characteristics***

The Site is located within an urban area that is primarily characterized by multi-unit residential buildings.

### ***4.3 Current Use of the Site***

The Site building was constructed in 1888 and currently is a vacant lot.

#### 4.4 Description of Site Improvements

The property is located at 583 Franklin Avenue the block from Atlantic Avenue and Pacific Street at approximately 90 feet above sea level. The 1,660 square foot site is approximately rectangular in plan. A description of the site improvements is presented in the table below:

<b>SITE IMPROVEMENTS</b>	
<b>Latitude (North)</b>	40.678760 - 40° 40' 43.5''
<b>Longitude (West)</b>	73.955580 - 73° 57' 20.1''
<b>General Topography</b>	General Northeast - 90' feet above sea level
<b>Adjoining Access/Egress</b>	Access is provided along North of Pacific Street
<b>Paved or Concrete Areas</b>	Sidewalks
<b>Landscaped Areas</b>	None
<b>Unoccupied Buildings, Spaces and Structures</b>	At the time of the Site inspection there were no unoccupied portions of the parking lot.
<b>Number of Occupied Buildings</b>	0
<b>Number of Floors</b>	0
<b>Number of Elevators</b>	None
<b>Total Square Footage</b>	1,660 ft <sup>2</sup>
<b>Construction Completion Date</b>	None
<b>Interior Finishes</b>	None
<b>Exterior Finishes</b>	None

A summary of the subject property's utility service is provided in the table below:

<b>UTILITIES</b>	
<b>Surface Water</b>	None
<b>Potable Water Source</b>	None
<b>Storm Sewer Utility</b>	None
<b>Sanitary Sewer Utility</b>	None
<b>Electrical Utility</b>	None
<b>Natural Gas Utility</b>	None
<b>Cooling System</b>	None
<b>Heating System</b>	None
<b>Fuel Oil</b>	None
<b>Emergency Power</b>	None

#### **4.5 *Current Uses of Adjoining Properties***

Current uses of the adjoining properties were observed as follows:

**North** – The Site is bordered to the north by grocery & deli (585 Franklin Avenue).

**South** – The Site is bordered to the south by 581 Franklin Avenue.

**East** – The Site is bordered to the east by police station.

**West** – The Site is bordered to the west by 582 Franklin Avenue.

No environmentally sensitive operations associated with properties adjoining the subject property were identified.

## **5.0 User-Provided Information**

The following section summarizes information provided by Prop Holdings, LLC with regard to the ESA.

### ***5.1 Title Record, Environmental Liens or Activity and Use Limitations***

Reasonably ascertainable recorded land title records should be checked to identify environmental liens or activity and use limitations, if any that are currently recorded against the property. Any environmental liens or activity and use limitations so identified shall be reported to the environmental professional conducting a Phase I Environmental Site Assessment.

This practice does not impose on the environmental professional the responsibility to check for recorded environmental liens or activity and use limitations. Rather the user should check or engage a title company or title professional to check reasonably ascertainable recorded land title records for environmental liens or activity and use limitations currently recorded against the property.

Environmental Building Solutions, LLC was not provided any title records in relation to this project.

### ***5.2 Specialized Knowledge***

If the user is aware of any specialized knowledge or experience that is material to recognized environmental conditions in connection with the property, it is the user's responsibility to communicate any information based on such specialized knowledge or experience to the environmental professional. The user should do so before the environmental professional does the site reconnaissance.

The Key Site Manager for this property is Moshik Regev. Access to the Site was provided by the property manager.

The Phase I Environmental Site Assessment Pre-Survey Questionnaire was not completed for this survey.

### ***5.3 Valuation Reduction for Environmental Issues***

If a user has actual knowledge that the purchase price of the property is significantly less than the purchase price of comparable properties in a transaction involving the purchase of a parcel of commercial real estate, the user should try to identify an explanation for the lower price and to make a written record of such explanation.

Among the factors to consider will be the information that becomes known to the user pursuant to the Phase I Environmental Site Assessment. Prop Holdings, LLC did not provide Environmental Building Solutions, LLC with any actual knowledge or information from the user concerning any recognized environmental conditions that would significantly affect the purchase price of the subject property.

### ***5.4 Owner, Property Manager and Occupant Information***

The subject property is currently owned by Prop Holdings, LLC.

### ***5.5 Reason for Performing the Phase I Environmental Site Assessment***

According to representatives from the Prop Holdings, LLC the purpose of the environmental due diligence investigation is for a pending property acquisition and to qualify the owner for liability protection, to the extent available, under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

### ***5.6 Other User-Provided Documents***

Prop Holdings, LLC provided Environmental Building Solutions, LLC with no specialized documents related to the subject property.

## 6.0 Regulatory Records Review

### 6.1 Standard Environmental Records

Environmental Building Solutions, LLC obtained a regulatory agency database report by Environmental Database Resources, Inc. of Milford, Connecticut. The regulatory agency database report was reviewed for information regarding reported releases of hazardous substances and petroleum products on or near the subject property. A copy of the regulatory database report can be found in Appendix VI.

Environmental Building Solutions, LLC also reviewed "orphaned" listings within the database report, cross referencing available address information and facility names. Orphan sites are listings that could not be plotted with accuracy, due to poor or inadequate address information, but which are potentially in the general area of the Site.

### 6.2 Federal Agency Database Findings

SUMMARY OF FEDERAL AGENCY DATABASE FINDINGS			
Regulatory Database	Approximate Minimum Search Distance	Target Property Listed	# of Sites Listed
National Priority List	1.0 mile	No	0
Proposed National Priority List	1.0 mile	No	0
Delisted National Priority List	1.0 mile	No	0
National Priority List Liens	Target Property	No	0
CERCLIS	0.5 mile	No	0
CERC-NFRAP	0.5 mile	No	0
Liens 2	Target Property	No	0
Corrective Action Report	1.0 mile	No	0
RCRA Transport, Storage, Disposal	0.5 mile	No	0
RCRA Large Quantity Generator	0.25 mile	No	1
RCRA Small Quantity Generator	0.25 mile	No	0
RCRA-CE Small Quantity Generator	0.25 mile	No	4
RCRA-NonGen	0.25 mile	No	20
US Engineering Control Sites	0.5 mile	No	0
US Sites with Institutional Controls	0.5 mile	No	0
Emergency Response Notification System	Target Property	No	0
Hazardous Materials Information System	Target Property	No	0
DOT OPS	Target Property	No	0
US CDL	Target Property	No	0
US Brownfields	0.5 mile	No	0
Department of Defense Sites	1.0 mile	No	0
Formerly Used Defense Sites	1.0 mile	No	0
LUCIS	0.5 mile	No	0

SUMMARY OF FEDERAL AGENCY DATABASE FINDINGS			
Regulatory Database	Approximate Minimum Search Distance	Target Property Listed	# of Sites Listed
Consent	1.0 mile	No	0
Records of Decision	1.0 mile	No	0
Uranium Mill Tailings Sites	0.5 mile	No	0
Open Dump Inventory	0.5 mile	No	0
Debris Region 9	0.5 mile	No	0
Mines	0.25 mile	No	0
Toxic Release Inventory System	Target Property	No	0
Toxic Substances Control Act	Target Property	No	0
FTTS	Target Property	No	0
Hist FTTS	Target Property	No	0
Section Tracking System	Target Property	No	0
ICIS	Target Property	No	0
PCB Activity Database System	Target Property	No	0
Material Licensing Tracking System	Target Property	No	0
RADINFO	Target Property	No	0
Facility Index System	Target Property	No	0
RCRA Administrative Action Tracking	Target Property	No	0

The target property was not listed in any of the Federal Databases searched by EDR, Inc.

A review of Federal regulatory databases revealed the following sites located at an elevation higher than, and within one-eighth of a mile, of the subject property:

- One site was listed as RCRA- NonGen – Grade A Collision. The violation status of each property was listed as “No Violations Found”.

Based on the areas assumed topographic/hydrogeologic gradient, the violation status of “No Violations Found”, and the distance of sites listed in databases searched from the subject property, the Federal facilities identified do not represent a *recognized environmental condition* for the subject property.

### 6.3 State Agency Database Findings

SUMMARY OF STATE AGENCY DATABASE FINDINGS			
Regulatory Database	Approximate Minimum Search Distance	Target Property Listed	# of Sites Listed
Hazardous Substance Waste Disposal Sites	0.5 mile	No	0
Substance Hazardous Waste Sites	1.0 mile	No	0
DEL SHWS	1.0 mile	No	0
Solid Waste Facilities/Landfill Sites	0.50 mile	No	3
SWTIRES	0.50 mile	No	0
SWRCY	0.50 mile	No	0
Leaking Underground Storage Tanks	0.50 mile	No	36
Historic Listing of Leaking Storage Tanks	0.50 mile	No	28
UST	0.25 mile	No	17
Chemical Underground Bulk Storage	0.25 mile	No	0
Major Underground Oil Storage Facilities	0.5 mile	No	0
Historic UST	0.25 mile	No	14
AST	0.25 mile	No	16
Historic Aboveground Petroleum Bulk Storage	Target Property	No	0
Chemical Bulk Storage Aboveground	0.25 mile	No	0
MOSF AST	0.50 mile	No	0
MANIFEST	0.25 mile	No	21
NY Spills	0.125 mile	No	12
NY Historic Spills Database	0.125 mile	No	8
Engineering Controls	0.50 mile	No	0
Institutional Controls	0.50 mile	No	0
VCP	0.50 miles	No	0
Drycleaners	0.25 mile	No	3
Brownfields Site List	0.50 mile	No	0
NP Discharge Elimination System	Target Property	No	0
Air Emissions Data	Target Property	No	0
E Designation	0.125 mile	No	2
Major Oil Storage Facilities Database	0.50 mile	No	0
Restrictive Declaration	0.180 mile	No	0
Chemical Bulk Storage Sites	0.25 mile	No	0

The target property was not listed in any of the State databases searched by EDR, Inc.

A review of the majority of state databases searched by EDR, Inc. revealed the following properties at an equal or higher elevation compared to the subject property, and within 1/8 of a mile from the subject site:

- One site was listed in the MANIFEST database, and was listed as “No Violations Found”.
- Two sites were listed in the E Designation database - Lot 44, Tax Block 1142 and Lot 48, Tax Block 1142.

Based on the areas assumed topographic/hydrogeologic gradient and the status of each of the sites listed in databases searched from the subject property, the State facilities identified do not represent a *recognized environmental condition* for the subject property.

#### 6.4 Proprietary Agency Database Findings

SUMMARY OF EDR PROPRIETARY AGENCY DATABASE FINDINGS			
Regulatory Database	Approximate Minimum Search Distance	Target Property Listed	# of Sites Listed
Indian Reservations	1.0 mile	No	0
Indian ODI	0.5 mile	No	0
Indian LUST	0.5 mile	No	0
Indian UST	0.25 mile	No	0
Indian VCP	0.5 mile	No	0
Manufactured Gas Plants	1.0 mile	No	0

A review of proprietary agency database findings revealed that all of the listings are at a lower elevation than the subject property.

Based on this the listings identified do not represent recognized *environmental conditions* for the subject property.

## **6.5 Local Environmental Records**

### *New York City Department of Environmental Protection (NYCDEP)*

The NYCDEP maintains files of certain environmental permits and incidents involving environmentally regulated materials, including air permits, hazardous chemical spills and citizen complaints. A Freedom of Information request (FOIL) was submitted to the NYCDEP requesting any information concerning the subject property. To date, a response from NYCDEP has not been received. Upon receipt, any pertinent information will be reviewed, and if necessary an addendum will be issued revising any findings, conclusions and/or recommendations. A copy of the Freedom Information request can be found in Appendix VII.

### *New York City Department of Health (NYCDOH)*

The NYCDOH maintains files of health related incidents, including medical outbreaks, asbestos related issues, lead based paint violations and citizen complaints. A Freedom of Information request (FOIL) was submitted to the NYCDOH requesting any information concerning the subject property. To date, a response from NYCDOH has not been received. Upon receipt, any pertinent information will be reviewed, and if necessary an addendum will be issued revising any findings, conclusions and/or recommendations. A copy of the Freedom Information request can be found in Appendix VII.

### *New York City Fire Department (FDNY)*

The FDNY maintains files pertaining to petroleum bulk storage tanks. FDNY records include fuel oil permits as well as violations associated with the storage of flammable products. A Fuel Oil Record Search Request and associated filing fee was submitted to the FDNY. To date, a response from FDNY has not been received. Upon receipt, any pertinent information will be reviewed, and if necessary an addendum will be issued revising any findings, conclusions and/or recommendations. A copy of the Fuel Oil Record Search request can be found in Appendix X.

### *New York City Department of City Planning*

The New York City Department of City Planning website was accessed to review the Zoning Map for 583 Franklin Avenue. Zoning Map 17a indicates that the Site is zoned as "M1-1" which designates a manufacturing district. A copy of 17a be found in Appendix XI.

New York City Department of Buildings (NYCDOB)

The New York City Department of Buildings Building Information System was accessed to review the Property Profile Overview for 583 Franklin Avenue. The Property Profile Overview indicates the following:

Tax Block: 1199	Health Area: 2900	Community Board: 308
Tax Lot: 3	Census Tract: 221	Buildings on Lot: 0

Little "E" Restricted: Not Applicable  
Department of Finance Occupancy Code: V1– Vacant Land

Current DOB information indicates no open DOB violations and one (1) open ECB violations.

## **7.0 Physical Setting Sources**

### **7.1 Topography**

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what down gradient site might be impacted. Generally, the area is flat, with gentle slopes.

#### Target Property Topography

USGS Topographic Map: 40073-F8 Brooklyn, NY  
General Topographic Gradient: General East  
Source: USGS 7.5 minute quadrangle index

A copy of the USGS Topographic Map can be found in Appendix I.

### **7.2 Geology/Soils**

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may occur. The US Department of Agriculture's Soil Conservation Service leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States.

A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSO are compiled by generalizing more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATGO data.

#### **Rock Stratigraphic Unit**

Era: Mesozoic  
System: Cretaceous  
Series: Upper Cretaceous  
Code: uK

#### **Geologic Age Identification**

Category: Stratified Sequence

Soil Component Name: **Urban Land**  
Soil Surface Texture: Variable

Urban land refers to soils that have been altered by urban development such as buildings and streets, where at least 85 percent of the surface is covered with asphalt, concrete or other impervious building material. Typically, these soils have been mixed with other materials, such as brick and concrete. Lastly, for the subject property, the entire parcel is covered by building or pavement; there is no exposed earth.

### **7.3 Hydrology**

Hydrogeologic information obtained by the installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what down gradient sites might be impacted.

No site-specific data was available regarding groundwater flow direction, depth to water or the hydrologic gradient at the subject property. Groundwater in the Borough of Brooklyn is not utilized as a source of drinking water.

### **7.4 Flood Plain Map**

According to the Federal Emergency Management Agency (FEMA) map, the subject property is not located in either the 100 or 500 year flood plain.

### **7.5 Wetlands Map**

According to the US Fish and Wildlife Service National Wetlands Inventory and the New York State Department of Environmental Conservation State Wetlands Data, no salt or fresh water wetlands exist on the subject property. Wetland data is depicted on the Overview Map found in Appendix II.

## 8.0 Historical Use Information

The objective of conducting historical sources is to develop a history of the previous uses of the property and surrounding property, in order to help identify the likelihood of past uses having led to recognized environmental conditions in connection with the property.

All obvious uses of the property shall be identified from the present, back to the property's first developed use, or back to 1903, whichever is earlier. Environmental Building Solutions, LLC utilized a variety of resources to research the historical use of the subject and surrounding properties. The following resources were provided by Environmental Data Resources, Inc. of Milford, Connecticut.

- EDR Sanborn Fire Insurance Maps
- EDR City Directory Abstract

A summary of the information obtained from these and other pertinent resources is presented below.

### 8.1 Sanborn Fire Insurance Maps

A search of available Sanborn Fire Insurance Maps was conducted by Environmental Data Resources. Sanborn Maps were reviewed for the following years: 1888, 1908, 1932, 1951, 1962, 1965, 1976, 1978, 1979, 1980, 1982, 1987, 1988, 1991, 1992, 1993, and 1995. Copies of the Sanborn Fire Insurance Maps can be found in Appendix IV.

SANBORN FIRE INSURANCE MAP FINDINGS	
YEAR	FINDINGS
1888	<b>Site:</b> The subject property was depicted as a single use dwelling. <b>Surrounding Area:</b> The surrounding properties were comprised of single family dwellings and L.I.R.R Depot.
1908	<b>Site:</b> The subject property was depicted as a use dwelling. <b>Surrounding Area:</b> The surrounding properties were comprised of single family dwellings and Armory of the 23 <sup>rd</sup> Regiment.
1932	<b>Site:</b> The subject property was depicted as flat. <b>Surrounding Area:</b> The surrounding properties were comprised of single family dwellings, gas station and Armory of the 23 <sup>rd</sup> Regiment N.G.N.Y.
1951-1988	<b>Site:</b> The subject property was depicted as flat. <b>Surrounding Area:</b> The surrounding properties were comprised of single family dwellings, gas station, Armory of the 106 <sup>th</sup> Regiment N.G.N.Y and auto repair shop.
1991-1995	<b>Site:</b> The subject property was depicted as vacant lot. <b>Surrounding Area:</b> The surrounding properties were comprised of parking garages, apartment buildings, Armory of the 106 <sup>th</sup> Regiment N.G.N.Y and auto repair shop and other commercial buildings.

The review of the Sanborn Fire Insurance Maps did not identify past uses of the subject property and/or adjacent properties that indicate a *recognized environmental condition*.

## **8.2 City Directory Abstracts**

Environmental Building Solutions, LLC reviewed historical city directories compiled from various sources including, New York Telephone, R.L. Polk & Co., NYNEX Information Resource Company and Cole Information Services. The City Directory was compiled between 1928 and 2005, at approximate five-year intervals. A copy of the City Directory Abstract can be found in Appendix V.

The subject property was listed with a number of residential tenants during the time period reviewed.

The surrounding properties were listed with a number of commercial tenants during the time period reviewed. Andrew Smith Garage, beauty salons, grocery stores, restaurants and residences were identified during the time period reviewed.

## **8.3 Site Tax Files**

Environmental Building Solutions, LLC reviewed available website tax information from the New York City Department of Finance Office of the City Register for ownership information on the subject property. No information was available from the website.

Environmental Building Solutions, LLC is not a professional title insurance firm and makes no guarantee on any land title records acquired or reviewed. Any depictions of the Site in this report do not represent a comprehensive definition of Site ownership.

## **8.4 Certificate of Occupancy**

Environmental Building Solutions, LLC reviewed a copy of the Certificate of Occupancy, dated August 4, 1954 (CO # 110381). The Certificate of Occupancy indicated that the building is utilized as a Class 'A' multiple dwelling.

## **8.5 Data Gaps**

Environmental Building Solutions, LLC review of historical site and surrounding property records did not identify any data gaps.

## 9.0 Site Reconnaissance

### 9.1 Methodology and Limiting Conditions

Environmental Building Solutions, LLC personnel conducted the on-site environmental inspection on August 08, 2008. At the time of the inspection the temperature was approximately 80° F and overcast.

A visual reconnaissance of all other properties was conducted from the street and from the subject property. Observations and conclusions of this report are strictly limited to matters visually or physically observable in the course of this inspection. A copy of the Site Photographs can be found in Appendix III.

### 9.2 General Site Setting

The property is located at 583 Franklin Avenue at approximately 90 feet above sea level. The 1,660 square foot site is approximately rectangular in plan. A description of the site improvements is presented in the table below:

SITE IMPROVEMENTS	
Latitude (North)	40.678760 - 40° 40' 43.5''
Longitude (West)	73.955580 - 73° 57' 20.1''
General Topography	General Northeast – 90 feet above sea level
Adjoining Access/Egress	Access is provided along north of Pacific Street
Paved or Concrete Areas	Sidewalks
Landscaped Areas	None
Unoccupied Buildings, Spaces and Structures	At the time of the Site inspection there were no unoccupied portions of the building.
Number of Occupied Buildings	None
Number of Floors	None
Number of Elevators	None
Total Square Footage	1,660 ft <sup>2</sup>
Construction Completion Date	None
Interior Finishes	None
Exterior Finishes	None

### **9.3 Exterior Observations**

#### **9.3.1 Stored Wastes**

Environmental Building Solutions, LLC noted stored waste on the subject property during the site inspection (abandoned vehicles and garbage). The waste observed should not materially affect the subject property.

#### **9.3.2 Landfills**

Environmental Building Solutions, LLC personnel noted no signs of landfills on the Property during the site inspection.

#### **9.3.3 Storage Tanks**

In 1983, the New York State Legislature enacted Article 17, Title 10 of the Environmental Conservation Law, entitled "Control of the Bulk Storage of Petroleum." The Law applies both to Underground Storage Tanks (UST's) and Aboveground Storage Tanks (AST's), or groupings of such tanks with a combined storage capacity of more than 1,100 gallons. Under the regulations (6 NYCRR 612-614) promulgated in 1985, owners are required to register storage facilities with the New York State Department of Environmental Conservation by December 27, 1986. Facilities must be re-registered every five years.

Additionally, Environmental Building Solutions, LLC did not identify any oil tanks during the site inspection.

#### **9.3.4 Stressed Vegetation**

Environmental Building Solutions, LLC personnel did not note the presence of any visible signs of stressed vegetation during the site inspection.

#### **9.3.5 Pits**

Environmental Building Solutions, LLC personnel did not note the presence of any pits during the site inspection.

### **9.3.6 Ponds**

Environmental Building Solutions, LLC personnel did not note the presence of any ponds on the Property during the site inspection.

### **9.3.7 Lagoons**

Environmental Building Solutions, LLC personnel did not note the presence of any lagoons on the Property during the site inspection.

### **9.3.8 Pools of Liquid**

Environmental Building Solutions, LLC personnel did not note the presence of any groundwater on the Property during the site inspection.

### **9.3.9 Drains**

Environmental Building Solutions, LLC personnel did not note the presence of any drains on the Property during the site inspection.

### **9.3.10 Septic Systems**

Environmental Building Solutions, LLC personnel noted no septic systems on the Property during the site inspection.

### **9.3.11 Sump Pumps**

Environmental Building Solutions, LLC personnel did not note the presence of any sump pump on the Property during the site inspection.

### **9.3.12 Wells**

Environmental Building Solutions, LLC personnel did not note the presence of any wells during the site inspection.

### **9.3.13 Wastewater Systems**

Environmental Building Solutions, LLC personnel did not note the presence of any wastewater systems during the site inspection.

## **9.4 Interior Observations**

### **9.4.1 Asbestos**

Asbestos is a mineral fiber found in rocks. There are several kinds of asbestos fibers, all of which are fire resistant and extremely durable. These qualities made asbestos very useful in construction and industry. Between approximately 1900 and 1972 asbestos was commonly used in many kinds of buildings. In the 1970s, however, the use of asbestos was first restricted and was gradually phased out of use in building materials.

It was discovered that the inhalation of airborne asbestos fibers could cause various types of cancer, as well as asbestosis (a serious degenerative lung disease). The danger posed by asbestos is through the breathing of asbestos fibers, which most often escape into the air when surfaces coated with "friable" asbestos begin to deteriorate (Asbestos is called "friable" if it crumbles easily when subjected to hand pressure).

Although the dangers associated with the use of asbestos have been evident for quite some time, asbestos' superior fire resisting and insulating abilities practically dictated its use until very recently. Between 1900 and 1980, it has been estimated that more than 30 million tons of asbestos were used in the United States.

Asbestos was commonly used in the following materials: hot water pipe covering, in vinyl floor tiles, rolled linoleum, siding, roofing shingles and felts, spray-on insulation, acoustical ceiling tiles, window putty, fuse boxes, heat reflectors, air duct lining and light fixture insulation.

No presence asbestos containing materials was indentified during the site visited.

### **9.4.2 Lead-Based Paint**

Lead is a pliable, soft metal that is used for pipes, rods and containers. Before 1978, lead was a common ingredient in paint because it added strength, shine and extended the life of the paint. In 1978, the United States banned the use of lead pigments in paints used on interior and exterior residential surfaces.

### **9.4.3 PCBs**

Polychlorinated biphenyls, better known as PCBs, are organic chemicals known as chlorinated hydrocarbons. Nearly all of the PCB in existence is man-made, either by direct manufacture or as a by-product of another process. PCBs exhibit low flammability, a high heat capacity, low electrical conductivity and a favorable dielectric

constant. PCBs were used extensively in electrical equipment such as transformers and capacitors because of these properties.

PCBs are a health concern due to their chemical stability and consequent tendency to bioaccumulate in organisms. PCBs are listed as a hazardous substance under EPA's Superfund regulations and are considered to be carcinogens. PCBs are also regulated under the Toxic Substance Control Act (TSCA). TSCA regulates any transformer with mineral oil containing polychlorinated biphenyls (PCBs) in concentrations greater than 50 ppm. Such transformers are considered PCB contaminated and require appropriate remediation should they be found to be stained or leaking. PCB content in electrical transformers have been grouped into three categories by the US EPA:

< 50 PPM	Non-PCB
50 – 499 ppm	PCB Contaminated
500 ppm and greater	PCB Transformer

Environmental Building Solutions, LLC did not identify any electrical transformers on the subject property. A Freedom of Information Law (FOIL) request has been submitted to the Consolidated Edison of New York requesting information on any transformers on the subject property. To date, a reply has not yet been received. If a written reply is received that requires a change in the recommendations of this report, an addendum will be provided outlining the changes.

Fluorescent lighting is utilized throughout the subject property. The manufacturing of PCB containing fluorescent lighting ballasts was discontinued in 1980. Based on the age of the property the likelihood of PCB-containing fluorescent lighting ballasts is considered be moderate.

#### **9.4.4 Stored Chemicals**

Environmental Building Solutions, LLC personnel did not note the presence of any stored chemicals during the site inspected

#### **9.4.5 Stains**

Environmental Building Solutions, LLC personnel did not note the presence of any stains during the site inspection.

#### **9.4.6 Corrosion**

Environmental Building Solutions, LLC personnel did not note the presence of any signs of corrosion during the site inspection.

#### **9.4.7 Pesticides**

Environmental Building Solutions, LLC did not note the presence of any pesticide use on the subject property during the site inspection.

#### **9.4.8 Radon**

Radon is a naturally occurring radioactive gas produced during the decay of uranium deposits. This odorless, colorless gas can seep through rock and soil and accumulate in areas such as home basements with poor ventilation. Studies have associated long-term radon exposure with a higher incidence of lung cancer.

The current USEPA action level for radon is 4.0 pCi/L. Federal EPA database search results for New York County have revealed average indoor levels of less than 2 pCi/L.

#### **9.4.9 Odors**

Environmental Building Solutions, LLC personnel did not note the presence of any odors on the subject property during the site inspection.

#### **9.4.10 Mold**

Environmental Building Solutions, LLC personnel did not note the presence of mold on the subject property during the site inspection.

## **10.0 Interviews**

### ***10.1 Interview with Owner***

The subject property is currently owned by Prop Holdings, LLC.

### ***10.2 Interview with Key Site Manager***

The Key Site Manager for this property is Moshik Regev.

### ***10.3 Interview with Occupants***

Environmental Building Solutions, LLC did not interview any occupants during the site inspection.

### ***10.4 Interview with Local Government Officials***

Most major cities have building information systems online for use by officials, citizens, builders and design professionals. Additionally environmental agencies, including the New York City Department of Environmental Protection and New York State Department of Environmental Conservation, do not make case managers and/or staff available for interviews.

Permits, violations and/or plans of buildings are available through written Freedom of Information Law (FOIL) requests. Copies of all Freedom of Information requests can be found in Appendix VII.

### ***10.5 Interview with Others***

No additional interviews were conducted.

## 11.0 Findings

At the request of, Environmental Building Solutions, LLC performed a Phase I Environmental Site Assessment per American Society for Testing and Materials (ASTM) Standard E-1527-05 for the property located at 583 Franklin Avenue in Brooklyn, Kings County, New York.

According to representatives from the Prop Holdings, LLC the purpose of the environmental due diligence investigation is for the purchase of the property and to qualify the purchaser, to the extent available, under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The purpose of ASTM Standard E 1527-05 is to define good commercial and customary practice in the United States of America for conducting an environmental site assessment of a parcel of commercial real estate, with respect to the range of contaminants within the scope of the Comprehensive Environmental Response, Compensation and Liability Act and petroleum products.

The goal of the Phase I Environmental Site Assessment is to identify *recognized environmental conditions*. The term *recognized environmental condition* means the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water or surface water of the property.

### **Recognized Environmental Conditions**

We have performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-05 (or the most recent version) of 583 Franklin Avenue, Brooklyn, New York, the property. Any exceptions to, or deletions from, this practice are described in Section 2.3 of this report. This assessment has revealed no evidence of the *Recognized Environmental Conditions* in connection with the property.

### **Business Environmental Risk Issues**

A business environmental risk is a risk that can have a material environmental or environmentally driven impact on the business associated with current or planned use of a parcel of commercial real estate. In accordance with the ASTM E 1527-05, Environmental Building Solutions, LLC has revealed no evidence of the *Business Environmental Risk* issues during our assessment.

## 12.0 Signatures of Environmental Professionals

At the request of Prop Holdings, LLC Environmental Building Solutions, LLC performed a Phase I Environmental Site Assessment per American Society for Testing and Materials (ASTM) Standard E-1527-05 for the property located at 583 Franklin Avenue in Brooklyn, Kings County, New York.

Prepared by:

Environmental Building Solutions, LLC  
295 Madison Avenue, Suite 1826  
New York, New York 10017  
(646) 290-5925 Phone  
(212) 867-9715 Fax

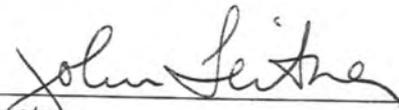
Prepared by:

Michael Borello  
Principal

  
Signature

Reviewed by:

John Leitner  
Principal

  
Signature

**Appendix B.**  
**Health and Safety Plan**

**SITE-SPECIFIC HEALTH & SAFETY PLAN**

**Vacant Lot**

**583 Franklin Avenue**

**Brooklyn, NY 11238**

**Block 1199, Lot 3**

**NYCDEP TRACKING NO: 09DEPTECH181K**

**Submitted To:**

**New York City Office of Environmental Remediation  
E-Designation Program  
100 Gold Street, 2nd Floor  
New York, NY 10038**

**Prepared By:**

**Airtek Environmental Corp.  
39 -37 29<sup>th</sup> Street  
Long Island City, New York 11101**

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**MAY 12, 2014**

**SITE-SPECIFIC HEALTH & SAFETY PLAN**

For 583 Franklin Avenue, Brooklyn, NY 11238

NYCDEP Tracking No.: 09DEPTECH181K

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**SITE-SPECIFIC HEALTH & SAFETY PLAN APPROVALS**

By their signature, the undersigned certify that this Site-Specific Health & Safety Plan (HASP) is approved and will be utilized at 583 Franklin Avenue, Brooklyn, NY 11238, for the disturbance of onsite surface and subsurface for the sampling of soil and groundwater.

\_\_\_\_\_  
SIGNATURE  
NAME and TITLE:

\_\_\_\_\_  
Date

\_\_\_\_\_  
SIGNATURE  
NAME and TITLE:

\_\_\_\_\_  
Date

\_\_\_\_\_  
SIGNATURE  
NAME and TITLE:

\_\_\_\_\_  
Date

**NOTES:**

1. SECTION 14.0 WILL NOT BE UTILIZED IN THIS HASP.

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**SITE-SPECIFIC HEALTH & SAFETY PLAN**

For 583 Franklin Avenue, Brooklyn, NY 11238

NYCDEP Tracking No.: 09DEPTECH181K

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**Attachments**

Attachment A – Analyte Material Safety Data Sheets

**1.0 TITLE PAGE**

**PROJECT:** Airtek Project #14-0526

**NYCDEP Tracking No.:** 09DEPTECH181K

**SITE:** 583 Franklin Avenue  
Brooklyn, NY 1215

**SUBMITTED TO:** New York City Office of Environmental Remediation  
E-Designation Program  
100 Gold Street, 2nd Floor  
New York, NY 10038

**PREPARED BY:** Airtek Environmental Corp.  
39-37 29<sup>th</sup> Street  
Long Island City, New York 11101

**DATE:** May 12, 2014

Through preparation of this Site-Specific Health and Safety Plan (HASP), Airtek Environmental Corp. (Airtek), Mr. Moshik Regev, Amsterfarm Holdings, LLC. (site owner), and all Subcontractors (if any) do not guarantee the health or safety of any person entering this site. Due to the nature of this site and the activities occurring thereon, it is not possible to discover, evaluate and provide protection for all possible hazards that may be encountered. The site owner shall assume the responsibility for implementation of this plan. Only those portions of this HASP that specifically apply to the activities at the site will be enacted by authorized personnel of the site owner and Amsterfarm Holdings, LLC. Strict adherence to the applicable portions of these health and safety guidelines set forth herein will reduce, but not eliminate, the potential for injury at this site. The health and safety guidelines in this plan were prepared specifically for this site and should not be utilized for any other site without prior research and evaluation by trained health and safety specialists and approval by Airtek. The responsibilities of Airtek with regards to site safety procedures shall be limited to the preparation of this Health and Safety Plan, and strict compliance with all plan specifications by all Airtek personnel onsite during site activities.

## **2.0 HEALTH AND SAFETY PLAN**

### **2.1 General**

This HASP has been prepared in conformance with applicable regulations, safe work practices, and the project's requirements. It addresses those activities associated with disturbance of the onsite concrete slab and soil. The site owner has selected a Project Manager (PM) and Site Safety Officer (SSO) to be responsible for site safety during all site activities. The PM, SSO, the site owner and field staff will implement the plan during site work. Compliance with this HASP is required of all persons and third parties who perform fieldwork for this project. Assistance in implementing this HASP can be obtained, upon request and with appropriate compensation, from Airtek. The content of this HASP may change or undergo revision based upon additional information that is made available to health and safety personnel, monitoring results, or changes in the technical scope of work. Any changes proposed must be reviewed by the SSO.

### **2.2 Scope of Work**

The Scope of Work activities may include the following:

- Disturbance of the onsite soil for the sampling of subsurface soil, vapor, and groundwater.

### **2.3 Emergency Numbers**

#### **2.3.1 Emergency Agencies**

The following phone numbers for the following services will be provided:

Bishop Orris G. Walker, Jr. Health Care Center	(718) 613-6800
New York City EMS	911
New York Police Department	911
New York Fire Department	911
National Response Center	800-424-8802
Poison Information Center	800-562-8816
Chemtree	800-424-9555

#### **2.3.2 Project Management/Health and Safety Personnel**

Title	Contact	Phone Number
Project Manager	Ms. Christine Chen	718-937-3720
Site Safety Officer	Ms. Christine Chen	718-937-3720

#### **2.3.3 Directions to Bishop Orris G. Walker, Jr. Health Care Center**

Address: 528 Prospect Place, Brooklyn, NY (0.4 mi SE)

1. Head south on Franklin Avenue toward Pacific Street.
2. Turn right onto Prospect Place. Hospital will be on the left.

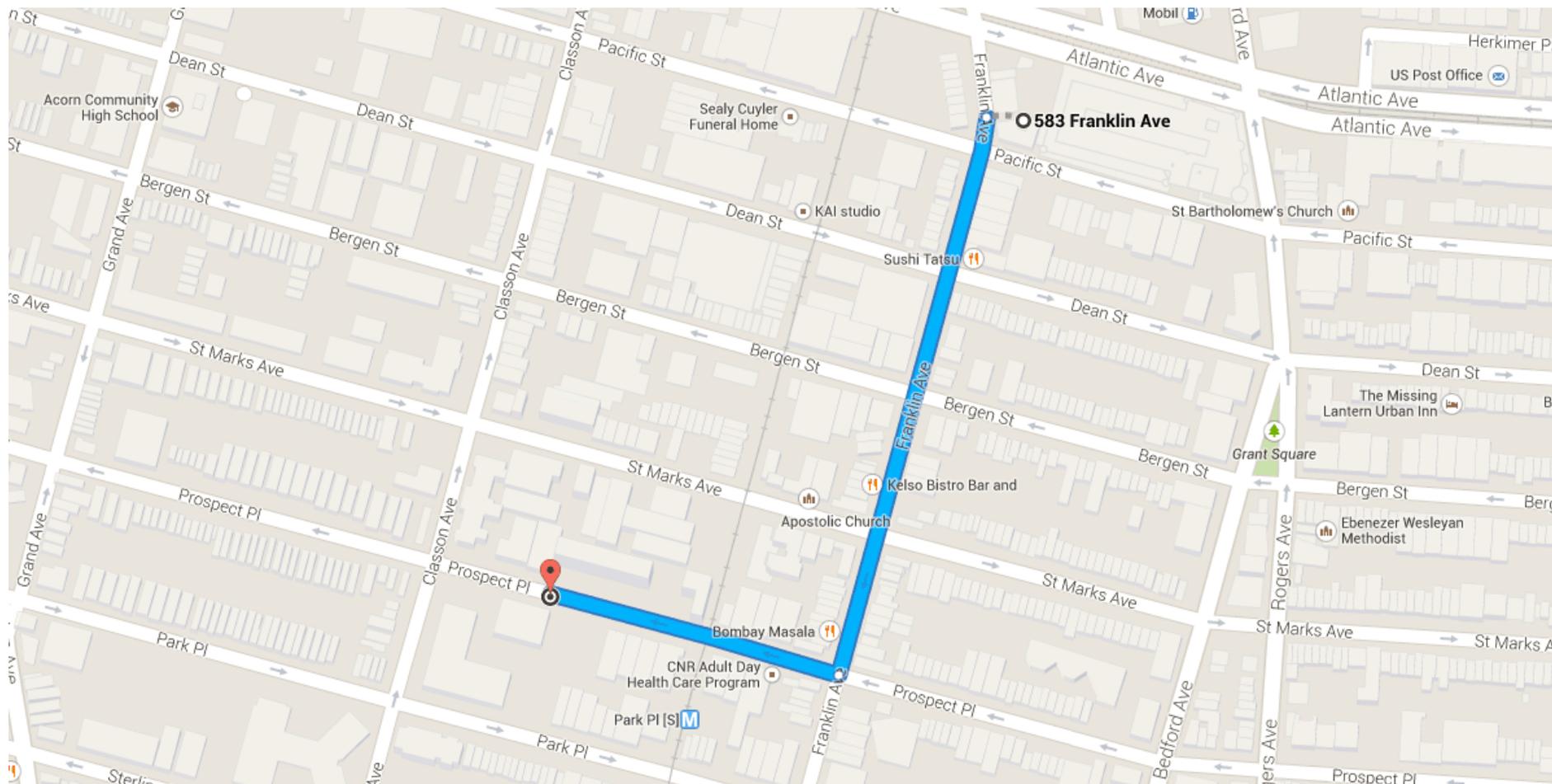
A map from the Site to the hospital is attached.



Bishop Orris G. Walker, Jr. Health Care Center  
528 Prospect Place, Brooklyn, NY 11238  
Tel. No.: (718) 613-6800

Drive 0.4 mi, 1 min

Directions from 583 Franklin Ave to 528 Prospect Pl, Brooklyn, NY 11238



### ○ 583 Franklin Ave

Brooklyn, NY 11238

1. Head south on Franklin Ave toward Pacific St



0.2 mi

2. Turn right onto Prospect Pl (Hospital is on the left).



0.1 mi

## 📍 528 Prospect Pl, Brooklyn, NY 11238

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2014 Google

### **3.0 HEALTH AND SAFETY STAFF**

This section briefly describes the personnel and their health and safety responsibilities for the project:

#### **3.1 Project Manager**

**Ms. Christine Chen, Sr. Project Manager**

- Has the overall responsibility for the health and safety of site personnel
- Ensures that adequate resources are provided to the field health and safety staff to carry out their responsibilities as outlined below.
- Ensures that fieldwork is scheduled with adequate personnel and equipment resources to complete the job safely.
- Ensures that adequate telephone communication between field crews and emergency response personnel is maintained.
- Ensures that field site personnel are adequately trained and qualified to work at the site.

#### **3.2 Site Safety Officer**

**Ms. Christine Chen, Sr. Project Manager**

- Directs and coordinates health and safety monitoring activities.
- Ensures that field teams utilize proper personal protective equipment (PPE).
- Conducts initial on-site, specific training prior to personnel and/or subcontractors proceeding to work.
- Conducts and documents periodic safety briefings; ensures that field team members comply with this HASP.
- Completes and maintains Accident/Incident Report Forms.
- Notifies Contractor of all accidents/incidents.
- Determines upgrade or downgrade of PPE based on site conditions and/or downgrade of PPE based on site conditions and/or real-time monitoring results.
- Ensures that monitoring instruments are calibrated daily or as determined by manufactured suggested instructions.
- Maintains health and safety field log books.
- Develops and ensures implementation of the HASP.
- Approves revised or new safety protocols for field operations.
- Coordinates revisions of this HASP with field personnel and the SSO Division Contracting Officer.
- Responsible for the development of new company safety protocols and procedures and resolution of any outstanding safety issues which may arise during the conduction of site work.
- Reviews personnel and subcontractors current and up-to-date medical examination and acceptability of health and safety training.

#### **3.3 Field Personnel and Subcontractors**

- Report any unsafe or potentially hazardous conditions to the SSO
- Maintain knowledge of the information, instructions, and emergency response actions contained in this HASP.
- Comply with rules, regulations and procedures as set forth in this HASP and any revisions that are instituted.
- Prevent admittance to work sites by unauthorized personnel.

#### **4.0 SITE LOCATION**

The Site consists of the property located at 583 Franklin Avenue, Brooklyn, NY 11238. As of the date of this HASP, the Site was an unpaved vacant lot. The Site can be accessed from Franklin Avenue, which bound the property to the west.

## **5.0 CHEMICAL & WASTE DESCRIPTION/CHARACTERIZATION**

### **5.1 General**

The following information references are presented in order to identify the properties and hazards of the materials that may/will be encountered at the Site.

- Lewis, Richard J. Sr. Sax's Dangerous Properties of Industrial Materials. John Wiley & Sons, 2004.
- Hathaway, Gloria J., and Nick H. Proctor. Proctor and Hughes' Chemical Hazards of the Workplace, 5th Edition. Wiley-Interscience, June 25, 2004.
- Lewis, Richard J. Hawley's Condensed Chemical Dictionary, 15th Edition. John Wiley & Sons, January 2007.
- Lewis, Richard J. Rapid Guide to Hazardous Chemicals in the Workplace, 4th Edition. John Wiley & Sons, March 2000.
- National Institute for Occupational Safety and Health. NIOSH Pocket Guide to Chemical Hazards.
- American Conference of Governmental Industrial Hygienists. 2009 Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs) with 7th Edition Documentation.

## 6.0 HAZARD ASSESSMENT

The potential hazards associated with planned site activities include chemical, physical and biological hazards. This section discusses those hazards that are anticipated to be encountered during the activities listed in the scope of work in Section 2.2 of this HASP.

The potential to encounter chemical hazards is dependent upon the work activity performed (invasive or non-invasive), the duration and location of the work activity. Such hazards could include inhalation or skin contact with chemicals that could cause: dermatitis, skin burn, being overcome by vapors or asphyxiation. In addition, the handling of contaminated materials and chemicals could result in fire and/or explosion.

The potential to encounter physical hazards during site work includes: heat stress, exposure to excessive noise, loss of limbs, being crushed, head injuries, cuts and bruises, and other physical hazards due to motor vehicle operation, heavy equipment and power tools.

### 6.1 Chemical Hazards

The potential for personnel and subcontractors to come in contact with chemical hazards may occur during the following tasks:

- Soil boring advancement and installation through potentially contaminated soil.

Material safety data sheets (MSDS) of the chemicals being analyzed for soil vapor are provided as Attachment A. Analytes are listed as follows:

VOCs		SVOCs	
1,1,1,2-Tetrachloroethane	630-20-6	1,2,4,5-Tetrachlorobenzene	95-94-3
1,1,1-Trichloroethane	71-55-6	1,2,4-Trichlorobenzene	120-82-1
1,1,2,2-Tetrachloroethane	79-34-5	1,2-Dichlorobenzene	95-50-1
1,1,2-Trichloroethane	79-00-5	1,3-Dichlorobenzene	541-73-1
1,1-Dichloroethane	75-34-3	1,4-Dichlorobenzene	106-46-7
1,1-Dichloroethene	75-35-4	2,4,5-Trichlorophenol	95-95-4
1,1-Dichloropropene	563-58-6	2,4,6-Trichlorophenol	88-06-2
1,2,3-Trichlorobenzene	87-61-6	2,4-Dichlorophenol	120-83-2
1,2,3-Trichloropropane	96-18-4	2,4-Dimethylphenol	105-67-9
1,2,4,5-Tetramethylbenzene	95-93-2	2,4-Dinitrophenol	51-28-5
1,2,4-Trichlorobenzene	120-82-1	2,4-Dinitrotoluene	121-14-2
1,2,4-Trimethylbenzene	95-63-6	2,6-Dinitrotoluene	606-20-2
1,2-Dibromo-3-chloropropane	96-12-8	2-Chlorophenol	95-57-8
1,2-Dibromoethane	106-93-4	2-Methylphenol	95-48-7
1,2-Dichlorobenzene	95-50-1	2-Nitroaniline	88-74-4
1,2-Dichloroethane	107-06-2	2-Nitrophenol	88-75-5
1,2-Dichloropropane	78-87-5	3,3'-Dichlorobenzidine	91-94-1
1,3,5-Trimethylbenzene	108-67-8	3-Methylphenol/4-Methylphenol	108-39-4
1,3-Dichlorobenzene	541-73-1	3-Nitroaniline	99-09-2
1,3-Dichloropropane	142-28-9	4,6-Dinitro-o-cresol	534-52-1
1,4-Dichlorobenzene	106-46-7	4-Bromophenyl phenyl ether	101-55-3
1,4-Diethylbenzene	105-05-5	4-Chloroaniline	106-47-8
2,2-Dichloropropane	594-20-7	4-Chlorophenyl phenyl ether	7005-72-3
2-Butanone	78-93-3	4-Nitroaniline	100-01-6
2-Hexanone	591-78-6	4-Nitrophenol	100-02-7
4-Ethyltoluene	622-96-8	Acetophenone	98-86-2

**SITE-SPECIFIC HEALTH & SAFETY PLAN**

For 583 Franklin Avenue, Brooklyn, NY 11238

NYCDEP Tracking No.: 09DEPTECH181K

4-Methyl-2-pentanone	108-10-1	Benzoic Acid	65-85-0
Acetone	67-64-1	Benzyl Alcohol	100-51-6
Acrylonitrile	107-13-1	Biphenyl	92-52-4
Benzene	71-43-2	Bis(2-chloroethoxy)methane	111-91-1
Bromobenzene	108-86-1	Bis(2-chloroethyl)ether	111-44-4
Bromochloromethane	74-97-5	Bis(2-chloroisopropyl)ether	108-60-1
Bromodichloromethane	75-27-4	Bis(2-Ethylhexyl)phthalate	117-81-7
Bromoform	75-25-2	Butyl benzyl phthalate	85-68-7
Bromomethane	74-83-9	Carbazole	86-74-8
Carbon disulfide	75-15-0	Dibenzofuran	132-64-9
Carbon tetrachloride	56-23-5	Diethyl phthalate	84-66-2
Chlorobenzene	108-90-7	Dimethyl phthalate	131-11-3
Chloroethane	75-00-3	Di-n-butylphthalate	84-74-2
Chloroform	67-66-3	Di-n-octylphthalate	117-84-0
Chloromethane	74-87-3	Hexachlorocyclopentadiene	77-47-4
cis-1,2-Dichloroethene	156-59-2	Isophorone	78-59-1
cis-1,3-Dichloropropene	10061-01-5	Nitrobenzene	98-95-3
Dibromochloromethane	124-48-1	NitrosoDiPhenylAmine (NDPA)/DPA	86-30-6
Dibromomethane	74-95-3	n-Nitrosodi-n-propylamine	621-64-7
Dichlorodifluoromethane	75-71-8	P-Chloro-M-Cresol	59-50-7
Ethyl ether	60-29-7	Phenol	108-95-2
Ethylbenzene	100-41-4	<b>Pesticides</b>	
Hexachlorobutadiene	87-68-3	4,4'-DDD	72-54-8
Isopropylbenzene	98-82-8	4,4'-DDE	72-55-9
Methyl tert butyl ether	1634-04-4	4,4'-DDT	50-29-3
Methylene chloride	75-09-2	Aldrin	309-00-2
m-Xylene	108-38-3	Alpha-BHC	319-84-6
Naphthalene	91-20-3	Beta-BHC	319-85-7
n-Butylbenzene	104-51-8	Chlordane	57-74-9
n-Propylbenzene	103-65-1	Delta-BHC	319-86-8
o-Chlorotoluene	95-49-8	Dieldrin	60-57-1
o-Xylene	95-47-6	Endosulfan I	959-98-8
p-Chlorotoluene	106-43-4	Endosulfan II	33213-65-9
p-Isopropyltoluene	99-87-6	Endosulfan sulfate	1031-07-8
p-Xylene	106-42-3	Endrin	72-20-8
sec-Butylbenzene	135-98-8	Endrin ketone	53494-70-5
Styrene	100-42-5	Heptachlor	76-44-8
tert-Butylbenzene	98-06-6	Heptachlor epoxide	1024-57-3
Tetrachloroethene	127-18-4	Lindane	58-89-9
Toluene	108-88-3	Methoxychlor	72-43-5
trans-1,2-Dichloroethene	156-60-5	Toxaphene	8001-35-2
trans-1,3-Dichloropropene	10061-02-6	trans-Chlordane	5103-74-2
trans-1,4-Dichloro-2-butene	110-57-6	<b>TAL Metals</b>	
Trichloroethene	79-01-6	Aluminum, Total	7429-90-5
Trichlorofluoromethane	75-69-4	Antimony, Total	7440-36-0
Vinyl acetate	108-05-4	Arsenic, Total	7440-38-2
Vinyl chloride	75-01-4	Barium, Total	7440-39-3
<b>PCBs</b>		Beryllium, Total	7440-41-7
Aroclor 1016	12674-11-2	Cadmium, Total	7440-43-9
Aroclor 1221	11104-28-2	Calcium, Total	7440-70-2

Aroclor 1232	11141-16-5	Chromium, Total	7440-47-3
Aroclor 1242	53469-21-9	Cobalt, Total	7440-48-4
Aroclor 1248	12672-29-6	Copper, Total	7440-50-8
Aroclor 1254	11097-69-1	Iron, Total	7439-89-6
Aroclor 1260	11096-82-5	Lead, Total	7439-92-1
		Magnesium, Total	7439-95-4
		Manganese, Total	7439-96-5
		Mercury, Total	7439-97-6
		Nickel, Total	7440-02-0
		Potassium, Total	97/7440
		Selenium, Total	7782-49-2
		Silver, Total	7440-22-4
		Sodium, Total	7440-23-5
		Thallium, Total	7440-28-0
		Vanadium, Total	7440-62-2
		Zinc, Total	7440-66-6

### 6.1.1 Exposure Pathways

Exposure to these compounds during ongoing activities may occur through inhalation of contaminated dust particles, inhalation of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), by way of dermal absorption, and accidental ingestion of the contaminant by either direct or indirect cross contamination activities (eating, smoking, poor hygiene). Indirectly, inhalation of contaminated dust particles (metals, silica, VOCs, SVOCs) can occur during adverse weather conditions (high or changing wind directions) or during operations that may generate airborne dust such as excavation, and sampling activities. Dust control measures such as applying water to roadways and work sites will be implemented, where visible dust is generated from non-contaminated and contaminated soils. Where dust control measures are not feasible or effective, respiratory protection will be used.

### 6.1.2 Additional Precautions

Dermal absorption or skin contact with chemical compounds is possible during invasive activities at the site, including removal of product, excavation of tanks, and handling of contaminated soils. The use of PPE in accordance with Section 9.2 and strict adherence to proper decontamination procedures should significantly reduce the risk of skin contact.

The potential for accidental ingestion of potentially hazardous chemicals is expected to be remote when good hygiene practices are used.

## 6.2 Physical Hazards

A variety of physical hazards may be present during site activities. These hazards are similar to those associated with any construction project. These physical hazards are due to motor vehicles and heavy equipment operation, the use or improper use of power and hand tools, misuse of pressurized cylinders, walking on objects, tripping over objects, working on surfaces which have the potential to promote falling, mishandling and improper storage of solid and hazardous materials, skin burns, crushing of fingers, toes, limbs, being hit on the head by falling objects or hitting one's head due to not seeing the object of concern, temporary loss of one's hearing and/or eyesight. These hazards are not unique and are generally familiar to most hazardous waste site workers at construction sites. Additional task-specific safety requirements will be covered during safety briefings.

### 6.2.1 Noise

Noise is a potential hazard associated with the operation of heavy equipment, power tools, pumps, and generators. High noise operators will be evaluated at the discretion of the SSO. Employees with an 8-hour time weighted average exposure exceeding 85 decibels (db) will be included in the hearing conservation program in accordance with 29 Code of Federal Regulations (CFR) 1910.85.

It is mandated that employees working around heavy equipment or using power tools that create noise levels exceeding 95 db are to wear hearing protection consisting of earplugs and earphones.

### **6.2.2 Heat/Cold Stress**

Extremes in temperature and the effects of hard work in impervious clothing can result in heat stress and/or hypothermia. The human body is designed to function at a certain internal temperature. When metabolism or external sources (fire, hot summer day, winter weather, etc.) cause the body temperature to rise or fall excessively, the body seeks to protect itself by triggering cooling/warming mechanisms. Profuse sweating is an example of a cooling mechanism, while uncontrollable shivering is an example of a warming mechanism. The SSO will monitor the ambient temperature to determine potential adverse effects to onsite personnel.

Protective clothing worn to guard against chemical contact effectively stops the evaporation of perspiration. Thus the use of protective clothing increases heat stress problems. Cold stress can occur in winter with sub-freezing ambient temperatures. Workers in protective garments may heat-up and sweat, only to rapidly cool once out of the PPE. The major disorders due to heat stress are heat cramps, heat exhaustion, and heat stroke.

HEAT CRAMPS are painful spasms that occur in the skeletal muscles of workers who sweat profusely in the heat and drink large quantities of water, but fail to replace the body's lost salts or electrolytes. Drinking water while continuing to lose salt tends to dilute the body's extra cellular fluids. Soon water seeps by osmosis into active muscles and causes pain. Muscles fatigued from work are usually most susceptible to cramps.

HEAT EXHAUSTION is characterized by extreme weakness or fatigue, dizziness, nausea, and headache. In serious cases, a person may vomit or lose consciousness. The skin is clammy and moist, complexion pale or flushed, and body temperature normal or slightly higher than normal. Treatment is rest in a cool place and replacement of body water lost by perspiration. Mild cases may recover spontaneously with this treatment; severe cases may require care for several days. There are no permanent effects.

HEAT STROKE is a very serious condition caused by the breakdown of the body's heat regulating mechanisms. The skin is very dry and hot with red mottled or bluish appearance. Unconsciousness, mental confusion, or convulsions may occur. Without quick and adequate treatment, the result can be death or permanent brain damage. Seek medical assistance immediately. As first aid treatment, the person should be moved to a cool place. Soaking the person's clothes with water and fanning them should reduce body heat artificially, but not too rapidly.

Steps that can be taken to reduce heat stress are:

- Acclimatize the body. Allow a period of adjustment to make further heat exposure endurable.
- Drink more liquids to replace body water lost during sweating.
- Rest is necessary and should be conducted under monitoring by the SSO, in order to note the effect on personnel physiological state.
- Wearing personal cooling devices. There are two basic designs; units with pockets for holding frozen packets and units that circulate a cooling fluid from a reservoir through tubes to different parts of the body. Both designs can be in the form of a vest, jacket, or coverall. Some circulating units also have a component for cooling the head.

The severe effects due to cold temperatures are FROSTBITE and HYPOTHERMIA.

FROSTBITE is the most common injury resulting from exposure to cold. The extremities of the body are often affected. The signs of frostbite are:

- The skin turns white or grayish-yellow.
- Pain is sometimes felt early but subsides later. Often there is no pain.
- The affected part feels intensely cold and numb.

HYPOTHERMIA is characterized by shivering, numbness, drowsiness, muscular weakness and a low internal body temperature. This can lead to unconsciousness and death. With both frostbite and hypothermia, the affected areas need to be warmed quickly. Immersing in warm, rather than hot, water best does this. In such cases medical assistance will be sought.

To prevent these effects from occurring, persons working in the cold should wear adequate clothing and reduce the time spent in the cold area. The field SSO will monitor this to determine appropriate time personnel may spend in adverse weather conditions.

### **6.2.3 Lockout/Tagout**

**PURPOSE** -- This program establishes procedures for de-energizing, isolating, and ensuring the energy isolation of equipment and machinery. The program will be used to ensure that equipment and machinery is de-energized and isolated from unexpected energization by physically locking (Lockout) energy isolation devices or, in the absence of locking capabilities, tagging out (Tagout) the device to warn against energization. These procedures will provide the means of achieving the purpose of this program, prevention of injury to Contractor employees from the unexpected energization or start-up of equipment and machinery, or from the release of stored energy.

**APPLICATION** -- This program applies to the control of energy during the servicing and/or maintenance of equipment and machinery. This program covers normal operations only if a guard or other safety device is removed or bypassed, or any part of the body is placed into an area of the equipment or machinery where work is performed on the material, or a danger zone exists during the operating cycle. Minor tool changes, adjustments, and other minor servicing activities which take place during normal production operations do not require isolation and lockout/tagout if they are routine and integral to the use of the equipment.

**SCOPE** -- This program will include all employees whose duties require them to service, install, repair, adjust, lubricate, inspect, or perform work on powered equipment or machinery that may also have the potential for stored energy.

**PROGRAM RESPONSIBILITIES** -- The SSO will have the overall responsibility of the program to ensure that: authorized and affected employees receive adequate training and information, the program is evaluated annually, and the lockout/tagout equipment is properly used and the procedures of this program are followed.

The program evaluation will be conducted to ensure that the procedures and requirements of the program are being followed and will be utilized to correct any deviations or inadequacies that may be discovered. The evaluation will consist of one or more inspections or audits of actual lockout/tagout procedures being used to isolate equipment. A review of the authorized and affected employee's responsibilities will be conducted at the time of the inspection /audit. Any authorized employee, except the one(s) utilizing the energy isolation procedure being inspected, may perform the inspection/audit.

A record will be maintained of program evaluation inspections and will include:

1. The identity of the equipment or machine on which energy control procedures were being utilized.
2. The date(s) of the inspection(s).
3. The employee(s) included in the inspection(s).
4. The person performing the inspection.

Authorized employees (persons who implement lockout/tagout procedures) will be responsible for following the procedures established by this program.

Affected employees are responsible for understanding the significance of a lockout/tagout device and the prohibition relating to attempts to restart or re-energize equipment or machinery that is locked out or tagged out.

TRAINING – Where applicable, Contractor employees will be provided instruction in the purpose and functions of the energy control program to ensure that they understand the significance of locked or tagged out equipment and also have the knowledge and skill to correctly apply and remove energy controls. Training will include:

1. The recognition of applicable hazardous energy source(s), the type and magnitude of energy available, and the policies and procedures of the Contractor’s energy control program.
2. Affected employees will be made aware of the purpose and use of energy control procedures and the prohibition relating to attempts to remove lockout or tagout devices.
3. Instruction in the limitations of tagout as a sole means of energy control.
  - a. Tags are warning devices and do not provide the physical restraint that a lock would.
  - b. Tags may provide a false sense of security.
  - c. Tags may become detached during use.

Initial training will be provided during the energy control program implementation, when new employees are hired or when job responsibilities change to include utilization of energy control procedures.

Retraining will be conducted whenever there is a change in job assignments that require the employee to utilize energy control procedures, a change in equipment that presents a new hazard, a change in the energy control procedures or when the program evaluation identifies inadequacies in the energy control program procedures.

Records of employee training will be maintained and will include the employee’s name and date(s) of training.

STANDARD OPERATING PROCEDURES –where necessary, the Contractor will provide the necessary devices to effectively lockout or tagout energy isolating devices. Lockout/tagout devices will be the only devices used for controlling energy and shall not be used for other purposes. Any device used for lockout/tagout will be capable of withstanding the environment to which they are exposed for the maximum period they are to be exposed. The devices will be substantial enough to prevent removal without excessive force. Excessive force for a locking device would be bolt cutters or other metal cuttings tools. Tagout devices will be attached by a non-reusable method, attachable by hand, and very difficult to remove by hand. A nylon cable tie or equivalent will be used. Lockout/tagout devices will indicate the identity of the employee who applied the device, and the tagout device will warn against the hazards if the equipment is energized.

Lockout is the preferred method of energy isolation. When physical lockout is not possible, the energy isolation will be tagged out of service with a warning tag attached at the power source. In the case of plug-in power source, the tag will be attached at the male plug. To ensure full employee protection using tagout instead of lockout, additional steps should be taken to guard against accidental or inadvertent energization. These steps may include, where applicable: removal of fuses, blocking switches, removal of a valve handle.

## **STANDARD OPERATING PROCEDURES**

### **I. APPLICATION OF CONTROLS**

#### **A. Preparing to Shut Down Equipment**

1. Prior to equipment shutdown, the authorized employee(s) must have knowledge of:
  - a. The type(s) and magnitude of power.
  - b. The hazards of the energy to be controlled.
  - c. The method(s) to control the energy.
  - d. The location and identity of all isolating devices that control or feed the equipment to be locked/tagged out.
2. Notify all affected employees that the lockout/tagout system will be in effect.

3. Assemble applicable lockout/tagout devices, i.e., padlocks, tags, multiple lock HASPs, etc.

#### B. Equipment Shutdown and Isolation

1. If equipment is in operation, shut it down by the normal stopping procedure (stop button, switch).
2. Operate disconnects, switches, valves, or other energy isolating devices so that the equipment is de-energizing and isolated from its energy source(s).
3. Verify that equipment is shut down by operating equipment from the normal operating location and any remote locations.

#### C. Installation of Lockout/Tagout Device, Release of Stored Energy, and Verification

1. Attach individually assigned lock(s) or tag(s) to energy isolating device(s). Where it is not possible to lock a switch, valve, or other isolating device, electrical fuses must be removed, blank flanges installed in piping, lines disconnected, or other suitable methods used to ensure that equipment is isolated from energy sources. A tag must be installed at the point of power interruption to warn against energizing.
  - a. Each lock or tag must positively identify the person who applied it and locks must be individually keyed.
  - b. If more than one person is involved in the task, employees will place their own lock and tag. Multiple lock HASPs are available for this.
2. Release, restrain, or dissipate stored energy such spring tension, elevated machine members, rotating flywheels, hydraulic pressure, pistons and air, gas, steam, water pressure, etc. by repositioning, blocking bleeding, or other suitable means.
3. Prior to starting work on equipment and after ensuring that no personnel are exposed, the authorized employee will verify that isolation and de-energization have been accomplished by:
  - a. Attempting, through normal effort, to operate energy isolating devices such as switches, valves, or circuit breaker with locks or tags installed.
  - b. Attempting to operate the equipment or machinery that is locked or tagged out. This includes all sources of energy, i.e. electrical, hydraulic, gravity, air, water, steam pressure, etc.
  - c. Verifying the presence and effectiveness of restraint (blocking) and energy dissipation or release (bleeding).
4. If there is a possibility of the re-accumulation of stored energy to a hazardous level, verification of isolation will be contained until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

#### D. Group Lockout/Tagout

1. When more than one individual is involved in locking or tagging equipment out of operation, each individual will attach their individual lock or tag, or the equivalent, to the energy isolating device(s).
- 2.

- a. An equivalent lockout device may be in the form of a group lockout device such as a multiple lock HASP or lock box.
- b. Primary responsibility for a group of authorized employees working under a group lockout device will be vested in a designated authorized employee.
- c. Group lockout methods will provide a level of protection equal to that afforded by a personal lockout/tagout device.

## II. RETURNING EQUIPMENT TO SERVICE

### A. Restore Equipment to Normal Operating Status

1. Re-install all parts or subassemblies removed for servicing or maintenance.
2. Re-install all tools, rests, or other operating devices
3. Re-install all guards and protective devices (i.e. limit switches).
4. Remove all blocks, wedges, or other restraints from the operating area of the equipment (ways, slides, etc.).
5. Remove all tools, equipment and shop towels from the operating area of the equipment.

### B. Verify Equipment Ready for Operation

1. Inspect area for non-essential items
2. Ensure that all employees are safely positioned clear of the operating areas of the equipment.  
Post a watch if energy isolation devices are not in line of sight of the equipment.

### C. Notify Affected Employees of Impending Start-up

1. The sudden noise of start-up may startle nearby employees.
2. Equipment may need to be tested to determine operational safety by a qualified operator.

### D. Remove Energy Isolation Devices - Only by authorized employee(s) who installed it/them.

1. Remove line blanks, reconnect piping (if applicable), and remove warning tag.
2. Close bleeder valves, remove warning tag.
3. Replace fuse(s), close circuit breaker(s), and remove warning tag.
4. Remove lock and tag from control panel, valve, etc.

Employee(s) who installed them may make an exception for removal of lockout/tagout devices. If it is necessary to operate a piece of equipment that is locked/tagged out, every effort must be made to locate the employee whose lock or tag is on the equipment. If he or she cannot be located and only after positive assurance is made that no one is working on the locked out equipment, the supervisor may personally remove the lock. The supervisor must assure that the equipment is once again locked out, or the employee notified that the equipment has been re-energized, before the employee resumes work. Employees will recheck locked out equipment if they have left the equipment (breaks, lunch, and end of shift) to make sure it is still de-energized and locked out.

## III. TEMPORARY REMOVAL OF LOCKOUT/TAGOUT PROTECTION

### A. In situations when the equipment must be temporarily energized to test or position the equipment or its components, the following steps will be followed:

1. Clear the equipment of tools and materials that are non-essential to the operation.
2. Ensure the equipment components are operationally intact.
3. Remove employees from the equipment area.
4. Remove the lockout/tagout devices by the employee who installed in/them.
5. Energize and proceed with testing or positioning.
6. De-energize all systems and re-install all energy control measures.
7. Verify re-installed energy control measures are effective.

#### IV. SHIFT OR PERSONNEL CHANGES

- A. The following steps will be followed to ensure continuity of employee protection during personnel changes.
1. All personnel involved in the maintenance or servicing activity will be notified that a transfer of personal locks/tags is about to occur.
  2. Clear all personnel from hazardous area(s) of equipment.
  3. Under the supervision of the shift supervisor or group designee, the off-going employee will immediately install theirs.
    - a. If an entire group or more than one employee will be transferring work responsibility, locks/tags will be removed and replaced one at a time in order of installation.
  4. When the transfer of lockout/tagout devices is complete, the effectiveness of all energy isolation devices will be verified to the satisfaction of all personnel involved.
  5. Once the effectiveness of energy isolation protection is confirmed, the service/maintenance operation may continue.

#### V. CONTRACTOR NOTIFICATION

- A. Whenever outside personnel may be engaged in activities covered by this program, they will inform the contractor of applicable lockout/tagout procedures used to protect Contractor employees from the hazards of working near energized equipment.
1. The Contractor will be expected to ensure that his/her employees understand and comply with the restrictions and prohibitions of this program.
  2. The Contractor must inform their employees and any other personnel onsite of their lockout/tagout procedures so that all persons onsite can comply with the restrictions and prohibitions of the contractor's program.
  3. Airtek also requires the contractor to notify the program administrator, the area supervisor, and affected Airtek employees prior to de-energizing, isolating, and locking out Airtek equipment. Conversely, notification is also required when this equipment will be returned to service.

#### DEFINITIONS

Affected employee - An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

“Authorized employee(s)” - A person or persons who locks or implements a tagout system procedure to perform servicing or maintenance on a machine or equipment. An authorized employee and an affected employee may be the same person when the affected employee's duties also include performing maintenance or service on a machine or equipment that must be locked or tagged out.

“Capable Of Being Locked Out” - An energy isolating device will be considered to be capable of being locked out either if it is designed with a HASP or other attachment or integral part to which, or through which, a lock can be affixed, or if it has a locking mechanism built into it. Other energy isolating devices will also be considered to be capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy-isolating device or permanently alter its energy control capability.

“Energized” - Connected to an energy source or containing residual or stored energy.

“Energy Isolating Device” - A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply

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conductors and, in addition, no pole can be operated independently; a slide gate; a slip blind; a line valve; a block; and any similar device used to block or isolate energy. The term does not include a push button, selector switch, and other control circuit type devices.

“Energy Source” - any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other type of energy.

“Lockout” - The placement of lockout device on an energy-isolating device, in accordance with an established procedure, is ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

“Lockout Device” - A device that utilizes positive means such as a lock, either key or combination type, to hold an energy isolating device in the safety position and prevent the energizing of a machine or equipment.

“Normal Production Operations” - The utilization of a machine or equipment to perform its intended production function.

“Servicing and/or Maintenance” - Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

“Setting Up” - Any work performed to prepare a machine or equipment to perform its normal production operation.

Stored energy - Energy that is available and may cause movement even after energy sources have been isolated. Stored energy may be in the form of compressed springs, elevated equipment components, hydraulic oil pressure, pressurized water, air, steam, or gas, or rotating flywheels, shafts or cams.

Tagout - The placement of a tagout device on an energy-isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout device - A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

**GENERAL MACHINERY AND EQUIPMENT LIST**

**EQUIPMENT/LOCATION**

**ENERGY SOURCES/LOCATION**

Soil Boring/Groundwater Monitoring Well Installation Equipment

Electricity, Petroleum Products

## **7.0 TRAINING**

### **7.1 General Health and Safety Training**

In accordance with 29 CFR 1910.120, hazardous waste site workers shall, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations. As a minimum, the training shall have consisted of instruction in the topics outlined in the above reference. Personnel who have not met the requirements for initial training will not be allowed to work in any site activities in which they may be exposed to hazards (chemical or physical).

In addition to the required initial training, each employee shall have received 3 days of directly supervised on-the-job training. This training will address the duties the employees are expected to perform.

The Contractor SSO has the responsibility of ensuring that personnel assigned to this project comply with these requirements. Written certification of completion of the required training will be provided to the SSO.

### **7.2 Manager/Supervisor Training**

In accordance with 29 CFR 1910.120, on-site management and supervisors who will be directly responsible for, or who supervise employees engaged in hazardous waste operation shall receive training as required in this HASP and at least eight (8) additional hours of specialized training on managing such operations at the time of job assignment.

### **7.3 Annual 8-Hour Refresher Training**

Annual 8-hour refresher training will be required of all hazardous waste site field personnel in order to maintain their qualification for fieldwork. The following topics will be reviewed: toxicology, respiratory protection, including air purifying devices and self-contained breathing apparatus (SCBA), medical surveillance, decontamination procedures, and personnel protective clothing. In addition, topics deemed necessary by the SSO may be added to the above list.

### **7.4 Site-Specific Training**

Prior to commencement of field activities, all personnel assigned to the project will be provided training that will specifically address the activities, procedures, monitoring, and equipment for the site operations. It will include site and facility layout, hazards, and emergency services at the site, and will highlight all provisions contained within this HASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

### **7.5 On-Site Safety Briefings**

Project personnel and visitors will be given periodic on-site health and safety briefings by the SSO, or their designee, to assist site personnel in safely conducting their work activities. The briefings will include information on new operations to be conducted, changes in work practices, or changes in the site's environmental conditions. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety audits.

### **7.6 Additional Training**

Additional training may be required by the SSO for participation in certain field tasks during the course of the project. Such additional training could be in the safe operation of heavy or power tool equipment or hazard communication training.

## **7.7 Subcontractor Training**

Subcontractor personnel working on site only occasionally, for a specific limited task and who are unlikely to be exposed over permissible exposure limits may be exempted from the initial 40-hour training requirement. The SSO will determine if this exemption is allowed. In any case, the subcontractor personnel who are exposed to hazards are not exempted from the 40-hours training requirement nor medical surveillance requirements found in Section 8.1.

## **8.0 MEDICAL SURVEILLANCE**

### **8.1 General**

All contractor and subcontractor personnel performing field work at the site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120 (f). A physician's medical release for work will be confirmed by the SSO before an employee can begin site activities. Such examinations shall include a statement as to the worker's present health status, the ability to work in a hazardous environment (including any required PPE which may be used during temperature extremes), and the worker's ability to wear respiratory protection.

A medical data sheet will be completed by all on-site personnel and kept at the site. Where possible, this medical data sheet will accompany the personnel needing medical assistance or transport to hospital facilities.

#### **8.1.1 Medical Surveillance Protocol**

The medical surveillance protocol to be implemented is the occupational physicians' responsibility, but shall meet the requirements of CFR 1910.120 and ANSI Z88.2 (1980). The medical surveillance protocol shall, as a minimum, cover the following:

- a. Medical and Occupational History
- b. General physical examination (including evaluation of major organ system)
- c. Serum lead and ZPP
- d. Chest X-ray (performed no more frequently than every four years, except when otherwise indicated).
- e. Pulmonary Function Testing (FVC and FEV1.0).
- f. Ability to wear respirator
- g. Audiometric testing.

Additional clinical tests may be included at the discretion of the occupational physician.

## **9.0 SITE CONTROL, PPE AND COMMUNICATIONS**

### **9.1 Site Control**

A Support Zone (SZ) is an uncontaminated area that will be the field support area for most operations. The SZ provides for field team communications and staging for emergency response. Appropriate sanitary facilities and safety equipment will be located in this zone. Potentially contaminated personnel or materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples. A contamination reduction corridor will be established. This is the route of entry and egress to the site, and it provides an area for decontamination of personnel and portable equipment as well.

The area where contamination exists is considered to be the Exclusion Zone (EZ). All areas where excavation and handling of contaminated materials take place are considered the EZ. This zone will be clearly delineated by cones, tape, or other means. The SSO may establish more than one EZ where different levels of protection may be employed or where different hazards exist. Personnel are not allowed in the EZ without:

- A buddy
- Appropriate personal protective equipment
- Medical authorization
- Training certification

### **9.2 Personal Protective Equipment**

#### **9.2.1 General**

The level of protection worn by field personnel will be enforced by the SSO. Levels of protection for general operations are provided below and are defined in this section. Levels of protection may be upgraded or downgraded at the discretion of the SSO. The decision shall be based on real-time air monitoring, site history data, and prior site experience. Any changes in the level of protection shall be recorded in the health and safety field logbook.

#### **9.2.2 Personal Protective Equipment Specifications**

For tasks requiring Level B PPE, the following equipment shall be used:

- Cotton or disposable coveralls
- Chemical protective suit (e.g. Saran-coated Tyvek®)
- Gloves, inner (latex)
- Gloves, outer (Nitrile®)
- Boots (PVC), steel toe/shank
- Boot Covers (as needed)
- Hard Hat
- Hearing protection (as needed)

For tasks requiring Level C PPE, the following equipment shall be used:

- Cotton or disposable coveralls
- Disposable outer coveralls (Poly-coated Tyvek)
- Gloves, inner (latex)
- Gloves, outer (Nitrile®)
- Boots (PVC), steel toe/shank
- Boot covers (as needed)
- Hard Hat

- Hearing protection (as needed)
- Splash suit and face shield for decontamination operations (as needed)

For tasks requiring Level D PPE, the following equipment shall be used:

- Cotton or disposable coveralls
- Gloves, inner (latex)
- Gloves, outer (Nitrile<sup>®</sup>)
- Boots (PVC) steel toe/shank
- Boot covers (as needed)
- Hard hat
- Hearing protection (as needed)
- Safety glasses

For tasks requiring respiratory protection, the following equipment shall be used:

Level D - No respiratory protective equipment necessary except for a dust mask.  
 Level C - A full-face air-purifying respirator equipped with organic vapor/pesticide-HEPA cartridges.  
 Level B - An air line respirator or a self-contained breathing apparatus (SCBA)

### **9.2.3 Initial Levels of Protection**

Levels of protection for the activities may be upgraded or downgraded depending on direct-reading instruments or personnel monitoring. The following are the initial levels of protection that shall be used for each planned field activity.

### **LEVEL OF PERSONAL PROTECTIVE EQUIPMENT REQUIRED**

<b>Activity</b>	<b>Level of Protection Respiratory/PPE</b>
Partial excavation of soil for the sampling of subsurface soil and vapor	D/D

## **9.3 Communications**

Communications is the ability to talk with others. While working in Level C/B Protection, personnel may find that communication become a more difficult task and process to accomplish. This is further complicated by distance and space. In order to address this problem, electronic instruments, mechanical devices or hand signals will be used as follows:

- Walkie-Talkies - Hand held radios would be utilized as much as possible by field teams for communication between downrange operations and the Command Post base station.
- Telephones - A mobile telephone will be located in the Command Post vehicle in the Support Zone for communication with emergency support services/facilities. If a telephone is demobilized, the nearest public phones will be identified.
- Air Horns - A member of the downrange field team will carry an air horn and another will be evident in the Support Zone to alert field personnel to an emergency situation.
- Hand Signals - Members of the field team long with use of the buddy system will employ this communication method. Signals become especially important when in the vicinity of heavy moving equipment and when using Level B respiratory equipment. The signals shall become familiar to the entire field team before site operations commence and they will be reinforced and reviewed during site-specific training.

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**HAND SIGNALS FOR ON-SITE COMMUNICATION**

<b><u>Signal</u></b>	<b><u>Meaning</u></b>
Hand gripping throat	Out of air, cannot breathe
Grip partners' wrist	Leave area immediately; no debate
Hands on top of head	Need assistance
Thumbs up	OK, I am all right; I understand
Thumbs down	No; negative, unable to understand you. I'm not all right

## **10.0 AIR MONITORING PLAN**

### **10.1 General**

Continuous air monitoring in the EZ during invasive tasks will accompany site operations, as indicated in this HASP or as required by the SSO. Monitoring will be performed to verify the adequacy of respiratory protection, to aid in site layout and to document work exposure. All monitoring instruments shall be operated by qualified personnel only and will be calibrated daily prior to use, or more often as necessary. For additional references and information, see the Contractor's Site-Specific Air Monitoring Program.

### **10.2 Real-Time Monitoring**

#### **10.2.1 Instrumentation**

At least one (1) of the following monitoring instruments will be available for use during field operations as necessary:

- Photoionization Detector (PID), Rae Instruments with 10.2 EV probe or equivalent
- Flame Ionization Detector (FID), Foxboro Model 128 or equivalent
- Combustible Gas Indicator (CGI)/Oxygen (O<sub>2</sub>) Meter, MSA or equivalent.

A FID or PID shall be used to monitor the organic vapor concentrations in active work areas. Organic vapor concentrations shall be measured upwind of the work areas to determine background concentrations. The SSO will interpret monitoring results using professional judgment. The PPE utilized shall always be the most protective, thus the action level criteria are flexible guidelines.

A CGI/O<sub>2</sub> meter shall be used to monitor for combustible gases and oxygen content in the boreholes during drilling activities.

Calibration records shall be documented, and included in the health and safety logbook or instrument calibration logbook. All instruments shall be calibrated before and after each daily use in accordance with the manufacturers' procedures.

#### **10.2.2 Action Levels**

Action levels for upgrading of PPE in this HASP will apply to all site work during the duration of field activities at the site. Action levels are for unknown contaminants using direct reading in the Breathing Zone (BZ) for organic vapors and dusts, and at the source for combustible gases.

#### **10.2.3 Monitoring During Field Activities**

The Contractor shall perform real time air monitoring prior to the commencement of work to establish baseline conditions. Baseline conditions will be established at the approximate center of the site and at the perimeter of the site both upwind and downwind.

During all work activities real time monitoring will occur. As necessary, the Contractor shall have at each applicable workstation a PID, explosimeter, and oxygen deficiency meter. The real time monitoring for remedial activities will be conducted approximating the Breathing Zone of the workers. The monitoring will be continuous during working operations.

The air-monitoring instrument may indicate that personnel working in the exclusion zone increase their level of protection. All personnel will be trained in the action levels. When conditions warrant an increase in protection,

all personnel will stop working and immediately leave the exclusion zone. They will then don the appropriate safety equipment necessary and return to their current workstation. All of this activity will be monitored by the SSO. The SSO will keep the Contractor Project Manager aware of any extraordinary situations and conditions that may occur. Working conditions and monitoring levels will be noted in the Field Notebook along with the time, date, and page number. Verbal reports will be given to the Project Manager when there is a change in the PPE level.

The previous day's results shall be reviewed each morning to determine what actions are necessary and the general conditions resulting from and around the site.

The record keeping will include:

- Date & Time of Monitoring
- Air Monitoring Location
- Instrument, Model #, Serial #
- Calibration/Background Levels
- Results of Monitoring
- SSO Signature
- Comments

Excavation Operations - Monitoring will be performed continuously during all excavation operations. A PID and/or FID shall be utilized to monitor the breathing zone, the excavated area and any material taken from the excavation. A CGI/O<sub>2</sub> meter shall be used to monitor the excavation for the presence of combustible gases.

**ACTION LEVELS OF AIRBORNE CONTAMINANTS**

<u>Instrument</u>	<u>Action Level</u>	<u>Action to be Taken</u>
FID/PID	< 100 ppm, for a 15-minute average	Stop work & initiate vapor control
	> 100 ppm, for a 15-minute average	Stop work & initiate evacuation procedure
CGI	10% LEL	Stop work, initiate ventilating
	50% LEL	Stop work, initiate evacuation procedure and contact fire dept.

**10.3 Personnel Monitoring Procedure**

The site SSO, concurrent with activities that may generate the contaminants in excess of OSHA PEL's, may perform assessment and evaluation of field personnel exposures to airborne contaminants.

Procedures to be followed include:

- The SSO may select high-risk individuals who may be subject to contaminant exposure based on job assignment.
- The Personal Sampling is being conducted to determine the proper levels of respiratory protection required, to document potential exposures to compounds, and to assure compliance with OSHA standards. Therefore it is important that the data collected be from "worst case" locations and personnel.

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For example: when work is being conducted to excavate at an underground tank location, those persons closest to the excavation and most intimately involved with the work should be sampled. If a backhoe operator solely conducted the excavation, then that employee should be monitored. However, if there are additional workers who must enter the excavation and work with the freshly excavated soil, these persons would be closer to the potential contaminants and they should be sampled.

- To meet the intent of the sampling will require sampling at periods of the most disturbances. To be accurate in determining potential exposures, as many tasks/trades shall be sampled as possible during the course of this project. At completion of the project, a goal of 20% of all workers who must perform their duties in or around the contaminated soil, tanks, and excavations is sought.

All sampling data must be provided in writing to the employees within three (3) days of receipt of results by the Contractor.

- Air sampling pumps used to collect employee exposure samples shall be calibrated before and after use each day. Calibration shall be accomplished using a primary standard calibration system, e.g. the bubble tube method. Results of the calibrations shall be included in the health and safety field logbook and with the exposure report.
- Chemical analysis of samples collected for assessment of employee exposures shall be performed in accordance with NIOSH or OSHA analytical methods only by laboratories accredited by the American Industrial Hygiene Association.
- Results of the personal exposure assessment shall be provided to the individual, in writing within fifteen (15) working days after receipt of laboratory reports. Reports to field personnel shall provide calculated time-weighted average exposures and shall provide comparative information relative to established permissible exposure limits. The air sampling data sheet and laboratory report is considered a part of the employee exposure report. A copy of the employee personal exposure assessment report shall also be included in the project file and the employees' medical record for Contractor employees. Reports for subcontractor employees will be sent directly to the subcontractors' employer.

### **10.4 Air Monitoring Reports**

Air Monitoring Reports will be completed by the SSO and/or authorized personnel and submitted to the Project Manager in the daily safety logs and will include the following:

- Date of monitoring
- Equipment utilized for air monitoring
- Real-time air monitoring results from each work location
- Calibration method of equipment and results

## **11.0 SAFETY CONSIDERATIONS**

### **11.1 General**

In addition to the specific requirements of this HASP, common sense should be used at all times. The general safety rules and practices below will be in effect at the site at the discretion of the Project Manager, SSO or other authorized personnel.

- The site will be suitably marked or barricaded as necessary to prevent unauthorized visitors but not hinder emergency services if needed.
- As needed, all open holes, trenches, and obstacles will be properly barricaded in accordance with local site requirements. These requirements will be determined by proximity to traffic ways, both pedestrian and vehicular, and site of the hole, trench, or obstacle. If holes are required to be left open during non-working hours, they will be adequately decked over or barricaded and sufficiently lighted.
- Before any digging or boring operations are conducted, underground utility locations will be identified. All boring, excavation, and other site work will be planned and performed with consideration for underground lines. Any excavation work will be performed in accordance with the Contractor's Standard Operating Procedures for Excavations.
- Dust mitigating procedures will be enacted when the potential for the inhalation of dust particles by either workers or other people exists.
- The act of smoking and ignition sources in the vicinity of potentially flammable or contaminated material is strictly prohibited.
- Drilling, boring, and use of cranes and drilling rigs, erection of towers, movement of vehicles and equipment and other activities will be planned and performed with consideration for the location, height, and relative position of aboveground utilities and fixtures, including signs; canopies; building and other structures and construction; and natural features such as trees, boulders, bodies of water, and terrain.
- When working in areas where flammable vapors may be present, particular care shall be exercised with tools and equipment that may be sources of ignition. All tools and equipment provided must be properly bonded and/or grounded. Metal buttons and zippers are prohibited on safety clothing for areas that may contain a flammable or explosive atmosphere.
- Approved and appropriate safety equipment (as specified in this HASP), such as eye protection, hard hats, foot protection, and respirators, must be worn in areas where required. In addition, eye protection must be worn when sampling soil or water that may be contaminated.
- Beards interfere with respirator fit and are not allowed within the site boundaries because all site personnel may be called upon to use respirator protection in some situations.
- No smoking, eating, chewing tobacco, gum chewing, or drinking will be allowed in the contaminated areas.
- Contaminated tools and hands must be kept away from the face.
- Personnel must use personal hygiene safe guards (washing up) at the end of the shift or as soon as possible after leaving the site.
- Each sample must be treated and handled as though it were contaminated.
- Persons with long hair and/or loose fitting clothing that could become entangled in power equipment must take adequate precautions.

- Horseplay is prohibited in the work area.
- Work while under the influence of intoxicants, narcotics, or controlled substances is prohibited.

## **11.2 Posted Signs**

Posted danger signs will be used where an immediate hazard exists. Caution signs will be posted to warn against potential hazards and to caution against unsafe practices. Traffic control methods and barricades will be used as needed. Wooden stakes and flagging tape, or equally effective material will be used to demarcate all restricted areas.

Other postings may include the OSHA poster, emergency hospital route, and telephone numbers of contact personnel.

## **11.3 Invasive Operations**

The SSO will be present on-site during all invasive work (e.g. demolition, excavations). The SSO will ensure that appropriate monitoring; levels of protection and safety procedures are followed. No personnel will enter any excavations for any reasons. All personnel will stay at least 10 feet back from the edge of the excavation and out of the swing radius of the backhoe. No drums or other potential sources will be sampled or removed during this phase without further additions to the HASP.

The proximity of water, sewer, and electrical lines will be identified prior to invasive operations. The possibility of the presence of underground conduits or vessels containing materials under pressure will also be investigated prior to invasive operations. Properly-sized containment systems will be utilized and consideration of the potential volume of liquid or waste released during operations will be discussed with members of the field team to minimize the potential for spills and provide a method for collection of waste materials. Emergency evacuation procedures and the location of safety equipment will be established prior to start up operations. The use of protective clothing, especially hard hats, boots, and gloves will be required during drilling and other heavy equipment work.

## **11.4 Sample Handling**

Personnel responsible for the handling of samples will wear the prescribed level of protection. Samples are to be identified as to their hazard and packaged as to prevent spillage or breakage. Any unusual sample conditions shall be noted. Laboratory personnel and all field personnel shall be advised of sample hazard levels and the potential contaminants present. This can be accomplished by a phone call to the lab coordinator and/or including a written statement with the samples reviewing lab safety procedures in handling in order to assure that the practices are appropriate for the suspected contaminants in the sample.

## **11.5 Heavy Equipment Decontamination**

Personnel steam cleaning heavy equipment shall use the prescribed level of protection and adhere to the buddy system. This task typically employs level C protective equipment. The heavy equipment decontamination shall be restricted to authorized personnel only. Special consideration will be given to wind speed and direction. Downwind areas are to be kept free of personnel to avoid unnecessary exposure to potential airborne contamination.

## **11.6 Additional Safety Considerations**

No other additional safety considerations at this time. As needed, safety considerations will be added.

## **12.0 DECONTAMINATION AND DISPOSAL PROCEDURES**

### **12.1 Contamination Prevention**

One of the most important aspects of decontamination is the prevention of contamination. Good contamination prevention should minimize worker exposure and help ensure valid sample results by precluding cross-contamination. Procedures for contamination avoidance include:

#### Personnel:

Do not walk through areas of obvious or known contamination  
Do not directly handle or touch contaminated materials  
Make sure that there are no cuts or tears on PPE.  
Fasten all closures in suits; cover with tape if necessary  
Particular care should be taken to prevent any skin injuries  
Stay upwind of airborne contaminants  
Do not carry cigarettes, cosmetics, gum, etc. into contaminated areas.

#### Sampling and Monitoring:

When required by the SSO, cover instruments with clear plastic, leaving openings for sampling ports. Bag sample containers prior to emplacement of sample material.

#### Heavy Equipment:

Care should be taken to limit the amount of contamination that comes in contact with heavy equipment (tires, contaminated augers). Dust control measures may be needed on roads inside the site boundaries.

### **12.2 Personnel Decontamination**

All personnel shall pass through an outlined decontamination procedure when exiting the hot zone at each location. A field wash for equipment and PPE shall be set up at each drilling location. The system will include a gross wash and rinse for all disposable clothing and boots worn in the EZ. Upon exiting the EZ, all personnel will wash their hands, arms, neck, and face before entering the Support Zone.

### **12.3 Equipment Decontamination**

Equipment used at the remediation system site that is potentially contaminated shall be decontaminated to prevent hazardous materials from leaving the site. All heavy equipment will be decontaminated at the decontamination pad and inspected by the SSO and Project Manager before it leaves the site. The decontamination area will provide for the containment of all wastewater from the decontamination process. Respirators, airline and any other personnel equipment that comes in contact with contaminated soils shall pass through a field wash.

### **12.4 Decontamination During Medical Emergencies**

If emergency life-saving first aid and/or medical treatment is required, normal decontamination procedures may need to be abbreviated or omitted. The site SSO or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination, when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment, or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed, a plastic barrier between the individual and clean surfaces should be used to help prevent contaminating the inside of ambulances and/or medical personnel. Outer garments are then removed at the medical facility.

No attempt will be made to wash or rinse the victim, unless it is known that the individual has been contaminated with an extremely toxic or corrosive material that could also cause severe injury or loss of life to emergency response personnel. For minor medical problems or injuries, the normal decontamination procedures will be followed. Note that heat stroke requires prompt treatment to prevent irreversible damage or death. Protective clothing must be promptly removed. Less serious forms of heat stress also require prompt attention and removal of protective clothing immediately. Unless the victim is obviously contaminated, decontamination should be omitted or minimized and treatment begun immediately.

## **12.5 Disposal Procedures**

A segregating system of non-hazardous waste and hazardous waste will be developed by the SSO and PM. All discarded material, waste materials, or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating sanitary hazards, or causing litter to be left on site. All potentially contaminated materials, e.g. clothing, gloves, etc., will be bagged or drummed as necessary, labeled and segregated for disposal. All non-contaminated materials shall be collected and bagged for appropriate disposal as normal domestic waste.

## **13.0 EMERGENCY PLAN**

The potential for the development of an emergency situation is typically low, when the concentrations of hazardous substances at typical work sites are considered. Nevertheless, an emergency situation could occur. All Contractor and subcontractor field team members prior to the start of work will know the emergency plan outlined in this section. The emergency plan will be available for use at all times during site work.

Various individual site characteristics will determine preliminary actions taken to assure that this emergency plan is successfully implemented in the event of a site emergency. Careful consideration must be given to the proximity of neighborhood housing or places of employment, and to the relative possibility of site fire, explosion or release of vapors or gases that could affect the surrounding community.

The Project Manager shall make contact with local fire, police, and other emergency units prior to beginning work on site. In these contacts, the Project Manager will inform the emergency units about the nature and duration of work expected to the site and the type of contaminants and the possible health or safety effects of emergencies involving these contaminants. At this time, the Project Manager and the emergency response units shall make the necessary arrangements to be prepared for any emergencies that could occur.

The Project Manager shall implement the contingency plan whenever conditions at the site warrant such action. The Project Manager will be responsible for coordination of the evacuation emergency treatment, and transportation of site personnel as necessary, and notification of emergency response units and the appropriate management staff.

The cases where the PM is not available, the SSO shall serve as the alternate emergency coordinator.

### **13.1 Evacuation**

In the event of an emergency situation, such as fire, explosion, or significant release of toxic gases, an air horn or other appropriate device will be sounded for approximately 10 second intervals indicating the initiation of evacuation procedures. All personnel will evacuate and assemble near the entrance to the site. The location shall be upwind of the site where possible.

For efficient and safe site evacuation and assessment of the emergency situation, the Project Manager will have authority to initiate action if outside services are required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given. The SSO or designated SSO must ensure that access for emergency equipment is provided and that all combustion apparatuses have been shut down once the alarm has been sounded. Once the safety of all personnel is established, the Fire Department and other emergency response groups as necessary will be notified by telephone of the emergency.

### **13.2 Potential or Actual Fire or Explosion**

Immediately evacuate the site (air horn will sound for 10-second intervals), notify the local fire and police departments, and other appropriate emergency response groups if an actual fire or explosion has taken place.

### **13.3 Personnel Injury**

Emergency first aid shall be applied on site as deemed necessary. If necessary, the individual shall be decontaminated and transported to the nearest medical facility.

The ambulance/rescue squad shall be contacted for transport as necessary in an emergency. However, since some situations may require transport of an injured party by other means, the hospital route is identified in Section 2.3.3. A map to this facility is provided with this HASP in Section 2.3.3.

### **13.4 Accident/Incident Reporting**

As soon as first aid and/or emergency response needs have been met, the following parties are to be contacted by telephone:

1. Ms. Christine Chen, (Site Safety Officer) 718-937-3720
2. Ms. Christine Chen (Project Manager) 718-937-3720
3. The employer of any injured worker (if not a Contractor employee)

Written confirmation of verbal reports are to be submitted within 24 hours. The report form entitled "Accident Data Report" is to be used for this purpose. All Contractor representatives contacted by telephone are to receive a copy of this report. If the employee involved is not a Contractor employee, his employer shall receive a copy of this report.

For reporting purposes, the term accident refers to fatalities, lost time injuries, spill, or exposure to hazardous materials (toxic materials, explosive or flammable materials).

Any information released from the health care provider, which is not deemed confidential patient information, is to be attached to the appropriate form. Any medical information that is released by patient consent is to be filed in the individuals' medical records and treated as confidential.

### **13.5 Overt Personnel Exposure**

- SKIN CONTACT: Use copious amounts of soap and water. Wash/rinse affected area thoroughly, and then provide appropriate medical attention. Eyes should be rinsed for 15 minutes upon chemical contamination.
- INHALATION: Move personnel to fresh air and if necessary, decontaminate and transport to hospital.
- INGESTION: Decontamination and transport to emergency medical facility.
- PUNCTURE WOUND  
OR LACERATION: Decontaminate and transport to emergency medical facility.

### **13.6 Adverse Weather Conditions**

In the event of adverse weather conditions, the SSO or designee will determine if work can continue without sacrificing the health and safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries
- Potential for cold stress and cold-related injuries
- Treacherous weather-related conditions
- Limited visibility
- Potential for electrical storms

Site activities will be limited to daylight hours and acceptable weather conditions. Inclement working conditions include heavy rain, fog, high winds, and lightning. Observe daily weather reports and evacuate if necessary in case of inclement weather conditions.

### **13.7 Emergency Response Equipment List**

**SITE-SPECIFIC HEALTH & SAFETY PLAN**

For 583 Franklin Avenue, Brooklyn, NY 11238

NYCDEP Tracking No.: 09DEPTECH181K

Some or all of the following will either be available on-site or be able to be brought to the site within a 2-hour period:

- 55-Gallon Drums
- 85-Gallon Drums
- Absorbent Pads
- Absorbent Booms
- Speedy-Dry
- Plastic Sheeting
- Hay Bales
- Pneumatic Nibbler
- Back Hoe
- Pressure Washer
- Air Compressor
- Wilden Pumps
- Equipment Storage Trailer
- Submersible Pumps
- Miscellaneous Hand Tools
- Portable Lighting

**13.8 Large Equipment**

If necessary, Contractor shall have the following large equipment brought to the site within 2-hours:

- Large Vacuum Truck
- Super Sucker
- Dump Trucks
- Drill Rig
- Utility Vehicle

## **14.0 LOGS, REPORTS AND RECORDKEEPING**

### **14.1 Medical and Training Records**

The employer keeps medical and training records. All subcontractors must provide verification of training and medical qualifications to the SSO. The SSO will keep a log of personnel meeting appropriate training and medical qualifications for site work. The log will be kept in the project file. Medical records will be maintained in accordance with 29 CFR 1910.20.

### **14.2 On-Site Log**

A log of personnel on-site each day will be kept by the SSO or designee. A copy of these logs will be sent to the Contractor records coordinator for data entry. Originals will be kept in the project file.

### **14.3 Exposure Records**

Any personal monitoring results, laboratory reports, calculations and air sampling data sheets are part of an employee exposure record. These records will be kept in accordance with 29 CFR 1910.20. For Contractor employees, the originals will be sent to the Contractor records coordinator. For subcontractor employees, the original will be sent to the subcontractor employer and a copy kept in the project file.

### **14.4 Accident/Incident Reports**

An accident/incident report must be completed for all accidents and incidents. The originals will be sent to the appropriate Contractor records coordinator for maintenance by the Contractor. Copies will be distributed as stated. A copy of the forms will be kept in the project file.

### **14.5 OSHA Form 200**

An OSHA Form 200 (Log of Occupational Injuries and Illnesses) will be kept at the project site. All recordable injuries or illnesses will be recorded on this form. At the end of the project, the original will be sent to the Contractor's corporate records administrator for maintenance. Subcontractor employers must also meet the requirements of maintaining an OSHA 200 form. The Contractor accident/incident report meets the requirements of the OSHA Form 101 (Supplemental Record) and must be maintained with the OSHA Form 200 for all recordable injuries or illnesses.

### **14.6 Health and Safety Field Log Book**

The SSO or designee will maintain the logbook in accordance with standard Contractor procedures. Daily site conditions, activities, personnel, calibration records, monitoring results and significant events will be recorded. The original logbooks will become part of the exposure records file.

## **15.0 SANITATION AT TEMPORARY WORK STATIONS**

If sanitary sewers are not provided at the site, provisions shall be made for access to sanitary systems by using nearby public facilities or on-site facilities consistent with provisions of governing local ordinance codes. In the latter case, provisions are required for the removal of accumulated waste products within those units.

If a commercial/industrial laundry is used to clean or launder clothing that is potentially contaminated, they shall be informed of the potential harmful effects of exposure to hazardous substances related to the affected clothing.

Personnel and subcontractors sites shall follow decontamination procedures described in the HASP, or as directed by the SSO. This will generally include at a minimum site-specific training in shower usage and cleanup, personal hygiene requirements and the donning of protective equipment/clothing.

**SITE-SPECIFIC HEALTH & SAFETY PLAN**

For 583 Franklin Avenue, Brooklyn, NY 11238

NYCDEP Tracking No.: 09DEPTECH181K

**ATTACHMENT A - Analyte Material Safety Data Sheets**

MSDS Number: **N4170** \* \* \* \* \* *Effective Date: 11/02/01* \* \* \* \* \* *Supersedes: 11/17/99*

From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 908-859-2151

CHEMTREC: 1-800-424-9300

National Response in Canada

CANUTEC: 613-996-6666

Outside U.S. And Canada

Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

## p-Nitroaniline

### 1. Product Identification

**Synonyms:** p-Aminonitrobenzene;PNA;4-Nitroaniline

**CAS No.:** 100-01-6

**Molecular Weight:** 138.13

**Chemical Formula:** NO<sub>2</sub>C<sub>6</sub>H<sub>4</sub>NH<sub>2</sub>

**Product Codes:** R871

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
p-Nitroaniline	100-01-6	95 - 100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**POISON! DANGER! HAZARDOUS SOLID AND DUST. HIGHLY TOXIC. RAPIDLY ABSORBED THROUGH SKIN. CAUSES METHEMOGLOBINEMIA, DECREASING OXYGEN IN BLOOD. COMBUSTIBLE DUST - EXPLOSION POTENTIAL. MAY BE FATAL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN. HANDLE IN A FUME HOOD. TARGET ORGAN(S): Lungs, heart, blood, liver.**

**J.T. Baker SAF-T-DATA<sup>(tm)</sup> Ratings** (Provided here for your convenience)

Health Rating: 3 - Severe (Life)

Flammability Rating: 1 - Slight

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe (Life)

Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES  
Storage Color Code: Blue (Health)

---

### Potential Health Effects

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EFFECTS OF EXPOSURE Inhalation and skin contact are expected to be the primary routes of occupational exposure to para-Nitroaniline. para-Nitroaniline is readily absorbed through human skin. Although para-Nitroaniline is considered to be only slightly toxic on the basis of single exposure animal tests, human experience has shown that man is much more sensitive to methemoglobinemia caused by aromatic amino compounds than the rat or the rabbit. Methemoglobinemia is a condition caused by changes in the blood cells which decrease the oxygen-carrying capacity of the blood. Cyanosis may occur and, as oxygen deficiency increases, there may be associated headache, weakness, irritability, drowsiness, shortness of breath, and unconsciousness. The appearance of methemoglobinemia may be delayed 0 to 12 hours after exposure. Because of the high potential for this material to cause methemoglobin formation, para-nitroaniline should be considered HAZARDOUS by all routes of exposure and exposures should be tightly controlled.

**Inhalation:**

Headache, coughing, dizziness, difficult breathing, nausea, vomiting, increased heart rate, cyanosis, unconsciousness.

**Ingestion:**

Nausea, vomiting, increased heart rate, methemoglobinemia cyanosis, (bluish discoloration of skin)

**Skin Contact:**

Not a skin irritant May be absorbed through the skin with possible systemic effects.

**Eye Contact:**

Slight irritation, with discomfort, tearing, blurring of vision.

**Chronic Exposure:**

Liver damage, kidney damage, bone marrow, blood damage.

**Aggravation of Pre-existing Conditions:**

Liver disorders.

---

## 4. First Aid Measures

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Prompt action is essential.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Immediately remove contaminated clothing and wash affected area thoroughly with soap and water.

**Eye Contact:**

In case of eye contact, immediately flush with plenty of water for at least 15 minutes.

**Note to Physician:**

Absorption of this product into the body may lead to the formation of methemoglobin that, in sufficient concentration, causes cyanosis. Since reversion of methemoglobin to hemoglobin occurs spontaneously after termination of exposure, moderate degrees of cyanosis need be treated only by supportive measures such as bed rest and oxygen inhalation. Thorough cleansing of the entire contaminated area of the body, including scalp and nails, is of utmost importance. If cyanosis is severe, intravenous injection of methylene blue, one milligram per kilogram of body weight, may be of value. Cyanocobalamin (Vitamin B12), one milligram intramuscularly, may speed recovery. Intravenous fluids and blood transfusions may be indicated in very severe exposure.

## 5. Fire Fighting Measures

**Fire:**

Flash point: 199C (390F) CC

**Explosion:**

Combustible dust. This material, like most organic materials in powder form, is capable of creating a dust explosion. Refer to NFPA pamphlet No. 654. "Standard for the Prevention of Fire and Dust Explosions in the Chemical, Dye, Pharmaceutical and Plastics Industries" if the material is to be reduced to or collected as a powder. Sensitive to static discharge.

**Fire Extinguishing Media:**

Water, dry chemical, foam or carbon dioxide.

**Special Information:**

Firefighters should wear proper protective equipment and self-contained breathing apparatus with full facepiece operated in positive pressure mode. Fire fighting equipment should be thoroughly decontaminated after use. This material, as normally packaged and handled, can contain sufficient fines to present a potential dust explosion hazard if a sufficient quantity of this material is dispersed in air.

---

## 6. Accidental Release Measures

Wear self-contained breathing apparatus and full protective clothing. With clean shovel, carefully place material into clean, dry container and cover; remove from area. Flush spill area with water. Ventilate area.

---

## 7. Handling and Storage

Store in a cool place away from heated areas, sparks, and flame. Store in a well ventilated area. Store away from incompatible materials. Keep containers tightly closed and dry. Avoid contact with skin and eyes. Avoid dust formation. Protect from freezing. Use only in a chemical fume hood. Do not breathe dust. Do not get in eyes, on skin, or on clothing. Avoid prolonged or repeated exposure. Wash thoroughly after handling. Keep it dry. Moisture causes nitration of organic materials and may result in spontaneous ignition. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):

1 ppm (TWA) The PEL listed denotes PEL (skin).

-ACGIH Threshold Limit Value (TLV):

3 mg/m<sup>3</sup> (TWA) The TLV listed denotes TLV (skin).

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

For conditions of use where exposure to the substance is apparent and engineering controls are not feasible, consult an industrial hygienist. For emergencies, or instances where the exposure levels are not known, use a full-facepiece

positive-pressure, air-supplied respirator. **WARNING:** Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

## 9. Physical and Chemical Properties

**Appearance:**

Yellow Powder.

**Odor:**

Faint amine odor.

**Solubility:**

Negligible (< 0.1%)

**Specific Gravity:**

1.44

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

0

**Boiling Point:**

332C (630F)

**Melting Point:**

149C (300F)

**Vapor Density (Air=1):**

4.77

**Vapor Pressure (mm Hg):**

Not applicable.

**Evaporation Rate (BuAc=1):**

No information found.

---

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Carbon monoxide, carbon dioxide, oxides of nitrogen.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Strong oxidizing agents, strong acids, strong reducing agents, strong bases, alcohols, ketones, aldehydes.

**Conditions to Avoid:**

Heat, flame, other sources of ignition, moisture.

---

## 11. Toxicological Information

**Reproductive Toxicity:**

The compound does produce genetic damage in bacterial cell cultures but does not produce genetic damage in animals. It does not produce heritable genetic damage.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
p-Nitroaniline (100-01-6)	No	No	None

## 12. Ecological Information

### Environmental Fate:

No information found.

### Environmental Toxicity:

Daphnia Magna: 48 Hr-LC50 = 20-30 ppm, slightly toxic. Rainbow Trout: 96 Hr-LC50 = 45 ppm, slightly toxic.

Bluegill Sunfish: 96 Hr-LC50 = 80 ppm, slightly toxic.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

### Domestic (Land, D.O.T.)

-----  
**Proper Shipping Name:** NITROANILINES

**Hazard Class:** 6.1

**UN/NA:** UN1661

**Packing Group:** II

**Information reported for product/size:** 100G

### International (Water, I.M.O.)

-----  
**Proper Shipping Name:** NITROANILINES

**Hazard Class:** 6.1

**UN/NA:** UN1661

**Packing Group:** II

**Information reported for product/size:** 100G

### International (Air, I.C.A.O.)

-----  
**Proper Shipping Name:** NITROANILINES

**Hazard Class:** 6.1

**UN/NA:** UN1661

**Packing Group:** II

**Information reported for product/size:** 100G

## 15. Regulatory Information

```

-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  EC   Japan  Australia
-----
p-Nitroaniline (100-01-6)                   Yes  Yes  Yes   Yes

```

```

-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     Korea  DSL   NDSL  Phil.
-----
p-Nitroaniline (100-01-6)                   Yes   Yes  No    Yes

```

```

-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-
RQ      TPQ      List  Chemical Catg.
-----
p-Nitroaniline (100-01-6)                   No     No    Yes   No

```

```

-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     CERCLA  -RCRA-  -TSCA-
                                         5000    261.33  8(d)
-----
p-Nitroaniline (100-01-6)                   5000    P077    Yes

```

Chemical Weapons Convention: No      TSCA 12(b): No      CDTA: No  
 SARA 311/312: Acute: Yes      Chronic: Yes      Fire: No      Pressure: No  
 Reactivity: Yes      (Pure / Solid)

**Australian Hazchem Code:** 2X

**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 3 Flammability: 1 Reactivity: 3

**Label Hazard Warning:**

POISON! DANGER! HAZARDOUS SOLID AND DUST. HIGHLY TOXIC. RAPIDLY ABSORBED THROUGH SKIN. CAUSES METHEMOGLOBINEMIA, DECREASING OXYGEN IN BLOOD. COMBUSTIBLE DUST - EXPLOSION POTENTIAL. MAY BE FATAL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN. HANDLE IN A FUME HOOD. TARGET ORGAN(S): Lungs, heart, blood, liver.

**Label Precautions:**

Do not get in eyes, on skin, on clothing.

Do not breathe dust. Keep in tightly closed container. Use with adequate ventilation. Wash thoroughly after handling. In case of fire, soak with water. In case of spill, sweep up and remove. Flush spill area with water.

**Label First Aid:**

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Prompt action is essential. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

MSDS Section(s) changed since last revision of document include: 8.

**Disclaimer:**

\*\*\*\*\*

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety  
Phone Number: (314) 654-1600 (U.S.A.)

# Material Safety Data Sheet

## 4-Nitrophenol

ACC# 96371

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** 4-Nitrophenol**Catalog Numbers:** AC157050000, AC157050050, AC157052500, AC220950000, AC220950500, 15705-0010, 15705-1000, BP612-1**Synonyms:** 4-Hydroxynitrobenzene; p-Nitrophenol.**Company Identification:**

Fisher Scientific

1 Reagent Lane

Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
100-02-7	4-Nitrophenol	98+	202-811-7

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: yellow crystals.

**Warning!** Harmful if swallowed, inhaled, or absorbed through the skin. May cause allergic respiratory reaction. May cause eye, skin, and respiratory tract irritation. Danger of cumulative effects.**Target Organs:** Kidneys, central nervous system, liver, respiratory system, skin.

#### Potential Health Effects

**Eye:** May cause eye irritation.**Skin:** May cause skin irritation. Harmful if absorbed through the skin. Substance is readily absorbed through the skin.**Ingestion:** Harmful if swallowed. May cause irritation of the digestive tract. May cause methemoglobinemia, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), convulsions, and death. Effects may be delayed 2 to 4 hours. Methemoglobinemia is characterized by dizziness, drowsiness, headache, shortness of breath, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), rapid heart rate and chocolate-brown colored blood.**Inhalation:** Harmful if inhaled. May cause cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood). May cause respiratory tract irritation. May cause asthmatic attacks due to allergic sensitization of the respiratory tract. May cause nausea and possible vomiting. May cause methemoglobinemia.**Chronic:** Prolonged or repeated skin contact may cause dermatitis. May cause liver and kidney

damage. Adverse reproductive effects have been reported in animals. Laboratory experiments have resulted in mutagenic effects. There is a danger of cumulative effects. Exposure to high concentrations may cause central nervous system depression.

## Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

**Skin:** Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

**Ingestion:** Do not induce vomiting. Get medical aid immediately. Call a poison control center.

**Inhalation:** Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Containers may explode in the heat of a fire. Vapors or dust may form explosive mixture with air.

**Extinguishing Media:** Use water spray to cool fire-exposed containers. Use water spray, dry chemical, carbon dioxide, or chemical foam.

**Flash Point:** 169 deg C ( 336.20 deg F)

**Autoignition Temperature:** 283 deg C ( 541.40 deg F)

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 2; Flammability: 1; Instability: 1

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Avoid generating dusty conditions. Provide ventilation. Do not let this chemical enter the environment.

## Section 7 - Handling and Storage

**Handling:** Minimize dust generation and accumulation. Do not get in eyes, on skin, or on clothing. Do not ingest or inhale. Use only in a chemical fume hood.

**Storage:** Store in a cool, dry place. Store in a tightly closed container. Store protected from light.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.

**Exposure Limits**

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
4-Nitrophenol	none listed	none listed	none listed

**OSHA Vacated PELs:** 4-Nitrophenol: No OSHA Vacated PELs are listed for this chemical.

**Personal Protective Equipment**

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Crystals

**Appearance:** brown - yellow

**Odor:** phenol-like

**pH:** 4.4 (5 g/L aq.sol.)

**Vapor Pressure:** Not available.

**Vapor Density:** 4.8 (air=1)

**Evaporation Rate:** Not available.

**Viscosity:** 2.56 mPa @ 121 deg C

**Boiling Point:** 279 deg C @ 760 mmHg

**Freezing/Melting Point:** > 112 deg C

**Decomposition Temperature:** 279 deg C

**Solubility:** Soluble.

**Specific Gravity/Density:** Not available.

**Molecular Formula:** C<sub>6</sub>H<sub>5</sub>NO<sub>3</sub>

**Molecular Weight:** 139.11

## Section 10 - Stability and Reactivity

**Chemical Stability:** Light sensitive. Heat sensitive

**Conditions to Avoid:** Incompatible materials, light, dust generation, temperatures above 75°C (167°F), heat.

**Incompatibilities with Other Materials:** Strong oxidizing agents, strong bases, caustic alkalis, combustible materials.

**Hazardous Decomposition Products:** Nitrogen oxides, carbon monoxide, carbon dioxide, phenol.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 100-02-7: SM2275000

**LD50/LC50:**

CAS# 100-02-7:

Dermal, guinea pig: LD50 = >1 gm/kg;

Oral, mouse: LD50 = 282 mg/kg;

Oral, rat: LD50 = 202 mg/kg;

Skin, rat: LD50 = 1024 mg/kg;

Inhalation, rat: LC50 = > 4.7 mg/l/4H.; Skin sensitization, guinea pig: None sensitized. (Eastman Kodak).

**Carcinogenicity:**

CAS# 100-02-7: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.

**Teratogenicity:** No information available.

**Reproductive Effects:** Adverse reproductive effects have occurred in experimental animals.

**Mutagenicity:** Mutagenic effects have occurred in experimental animals.

**Neurotoxicity:** No information available.

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. No information available.

**Environmental:** No information available.

**Physical:** No information available.

**Other:** Do not empty into drains.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3.

Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 100-02-7: waste number U170.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	NITROPHENOLS	NITROPHENOLS
<b>Hazard Class:</b>	6.1	6.1
<b>UN Number:</b>	UN1663	UN1663
<b>Packing Group:</b>	III	III

## Section 15 - Regulatory Information

### US FEDERAL

**TSCA**

CAS# 100-02-7 is listed on the TSCA inventory.

**Health & Safety Reporting List**

CAS# 100-02-7: Effective 4/13/89, Sunset 6/30/98

**Chemical Test Rules**

CAS# 100-02-7: 40 CFR 799.5055

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

CAS# 100-02-7: 100 lb final RQ; 45.4 kg final RQ

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**SARA Codes**

CAS # 100-02-7: immediate, delayed, reactive.

**Section 313**

This material contains 4-Nitrophenol (CAS# 100-02-7, 98+%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

**Clean Air Act:**

CAS# 100-02-7 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

CAS# 100-02-7 is listed as a Hazardous Substance under the CWA. CAS# 100-02-7 is listed as a Priority Pollutant under the Clean Water Act.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 100-02-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XN

**Risk Phrases:**

R 20/21/22 Harmful by inhalation, in contact with skin and if swallowed.

R 33 Danger of cumulative effects.

**Safety Phrases:**

S 28A After contact with skin, wash immediately with plenty of water

**WGK (Water Danger/Protection)**

CAS# 100-02-7: 2

**Canada - DSL/NDSL**

CAS# 100-02-7 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D1R D2R

This product has a WHIMIS classification of D1B, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 100-02-7 is listed on the Canadian Ingredient Disclosure List.

## Section 16 - Additional Information

**MSDS Creation Date:** 7/09/1998

**Revision #8 Date:** 4/04/2008

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 100-41-4****Date: 12/28/2006**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: **ETHYLBENZENE**SYNONYMS: **Ethylbenzol, Phenylethane**

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

<u>Ingredient Name</u>	<u>Formula</u>	<u>CAS #</u>	<u>Concentration</u>	<u>ACGIH TLV</u>	<u>Exposure Limits (PPM)</u>		
					<u>OSHA PEL</u>	<u>MAC</u>	<u>Other STEL</u>
<b>ETHYLBENZENE</b>	C8H10	100-41-4	99+%	100	100	50	125

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIAN

## 3. HAZARD IDENTIFICATION

**\*\*\* EMERGENCY OVERVIEW \*\*\***

Flammable liquid and vapor.

Can form explosive mixtures with air.

Can cause skin and respiratory tract irritation.

May cause irritation to the eyes and mucous membranes.

### POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: **Inhalation, Skin, Ingestion**

**ACUTE EFFECTS:** Inhalation of vapors may cause pulmonary edema, circulatory collapse, damage to upper respiratory tract, coughing, difficulty breathing and choking. Symptoms include burning sensation, coughing, wheezing, shortness of breath, headache, nausea, and vomiting. Excessive exposure can be fatal. Skin contact can cause defatting and dermatitis. Can be absorbed through the skin. Eye contact may result in destruction of eye tissue. Ingestion irritates the digestive tract and results in systemic effects from absorption.

**CHRONIC EFFECTS:** Skin and respiratory related disease. Suspected human carcinogen.**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** Skin conditions, respiratory problems.**OTHER EFFECTS OF OVEREXPOSURE:** **None****CARCINOGENICITY (US ONLY):**

NTP - No

IARC MONOGRAPHS - Yes

OSHA REGULATED - No

**4. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

**EYE CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes. Do not allow victim to rub or keep eyes tightly shut.

**SKIN CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes while removing contaminated clothing.

**INGESTION:** Never give anything by mouth to an unconscious person. If ingested, have that conscious and alert person drink 1 to 2 glasses of water. Do not induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce the risk of aspiration to the victim.

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: None

**5. FIRE FIGHTING MEASURES**

**FLASH POINT:** 21 deg.C

**AUTOIGNITION TEMPERATURE:** 432 deg. C

**FLAMMABLE LIMITS:** Vol. %

LOWER: 0.8

UPPER: 6.7

**EXTINGUISHING MEDIA:** Dry chemical, carbon dioxide, or alcohol foam. Water is ineffective in putting out a fire, but should be used for cooling fire exposed cylinders.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide may be given off during combustion.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Dangerous fire hazard and severe explosion hazard when exposed to heat or flame. Vapors may travel a considerable distance to the source of ignition and flash back. Vapors can collect in low lying areas. Cylinder rupture may occur under fire conditions.

**6. ACCIDENTAL RELEASE MEASURES**

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Remove leaking cylinder to exhaust hood or safe outdoor area. Shut off source if possible and remove source of heat.

**SPECIALIZED EQUIPMENT:** Absorb small spills using a solid adsorbent such as vermiculite. Use non-sparking tools.

## 7. HANDLING AND STORAGE

**PRECAUTIONS TO BE TAKEN IN HANDLING:** Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

**PRECAUTIONS TO BE TAKEN IN STORAGE:** Store in well ventilated areas. Keep valve protection cap on cylinders when not in use. Store away from heat, flame, and sparks. Ventilation equipment should be explosion proof.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**ENGINEERING CONTROLS:** Provide adequate general and local exhaust ventilation to maintain concentrations below exposure and flammable limits.

**EYE / FACE PROTECTION:** Safety glasses, Goggles.

**SKIN PROTECTION:** Impervious gloves, coveralls, boots, and/or other resistant protective clothing.

**RESPIRATORY PROTECTION:** In case of leakage, use self-contained breathing apparatus.

**OTHER PROTECTIVE EQUIPMENT:** Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**APPEARANCE:** Colorless

**ODOR:** Distinctive aromatic

**PHYSICAL PRESSURE:** Liquid

**VAPOR PRESSURE:** @20 deg. C: 7.1 mm Hg

**VAPOR DENSITY (AIR=1):** 3.66

**BOILING POINT (C):** 136

**SOLUBILITY IN WATER:** @20 deg.C: .015 wt. %

**SPECIFIC GRAVITY (H<sub>2</sub>O=1):** @ 20 deg.C: 0.867

**EVAPORATION RATE: (BuAC=1):** <1

**ODOR THRESHOLD:** 2.3 ppm

**10. STABILITY AND REACTIVITY**

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas.Storage near a heat source.

MATERIALS TO AVOID: Oxidizing agents, acids and bases.Ammonia.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: Toxic carbon monoxide.

**11. TOXICOLOGICAL INFORMATION**

LETHAL CONCENTRATION (LC50): None established

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

**12. ECOLOGICAL INFORMATION**

No adverse ecological effects are expected.

**13. DISPOSAL CONSIDERATIONS**

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state, and local regulations.Waste can be burned in an approved incinerator equipped with an afterburner and scrubber.Return cylinders to supplier with any valve outlet plugs or caps secured and valve protection cap in place.Follow federal, state and local regulations.

**14. TRANSPORT INFORMATION**

CONCENTRATION: 99%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Ethylbenzene  
HAZARD CLASS: 3 (flammable liquid), Packing Group II  
IDENTIFICATION NUMBER: UN1175  
REPORTABLE QUANTITIES: 1000 lb.

LABELING: **FLAMMABLE LIQUID**

ADR / RID (EU Only): Class 3,3(b)

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

**15. REGULATORY INFORMATION**

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 202-849-4

NUMBER IN ANNEX 1 OF DIR 67/548: Not listed in annex 1.

EU CLASSIFICATION: N/Av

R: 11-20

S: 16-24/25-29

**16. OTHER INFORMATION**

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.

# Material Safety Data Sheet

## Styrene Monomer, Inhibited

ACC# 22100

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Styrene Monomer, Inhibited**Catalog Numbers:** O4507-1**Synonyms:** Ethenylbenzene; Cinnamene; Cinnamenol; Ethenylbenzene; Phenethylene; Styrol; Vinylbenzene; Vinylbenzol**Company Identification:**

Fisher Scientific

1 Reagent Lane

Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
100-42-5	Styrene	>99.0	202-851-5

**Hazard Symbols:** XN**Risk Phrases:** 10 36/38 20

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless. Flash Point: 88 deg F. **Warning! Flammable liquid and vapor.** Aspiration hazard if swallowed. Can enter lungs and cause damage. May cause eye and skin irritation. May cause respiratory and digestive tract irritation. May cause central nervous system depression. May cause reproductive and fetal effects. May cause cancer based on animal studies. Uninhibited material may form explosive peroxides.

**Target Organs:** Central nervous system.

#### Potential Health Effects

**Eye:** Causes eye irritation.**Skin:** May be absorbed through the skin in harmful amounts. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis.**Ingestion:** May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.**Inhalation:** Aspiration may cause respiratory swelling and pneumonitis. Causes narcotic effects including headache, dizziness, weakness, unconsciousness, and possible death.**Chronic:** No information found.

## Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.

**Ingestion:** Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately. If conscious drink water, then induce vomiting. If unconscious, immediately take victim to a physician and do NOT attempt to induce vomiting.

**Inhalation:** Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

**Notes to Physician:** Treat symptomatically

**Antidote:** None reported.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Flammable Liquid. Can release vapors that form explosive mixtures at temperatures above the flashpoint. Containers may explode in the heat of a fire.

**Extinguishing Media:** This material is lighter than water and insoluble in water. The fire could easily be spread by the use of water in an area where the water cannot be contained. Use water fog, dry chemical, carbon dioxide, or regular foam.

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Clean up spills immediately, observing precautions in the Protective Equipment section. Use a spark-proof tool. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with skin and eyes. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Take precautionary measures against static discharges. Avoid ingestion and inhalation. Wash clothing before reuse. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from sources of ignition. Store in a cool place in the original container and protect from sunlight. Keep refrigerated. (Store below 4°C/39°F.) Keep containers tightly closed.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use adequate general or local exhaust ventilation to keep airborne

concentrations below the permissible exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Styrene	20 ppm TWA; 40 ppm STEL	50 ppm TWA; 215 mg/m <sup>3</sup> TWA 700 ppm IDLH	100 ppm TWA; C 200 ppm

**OSHA Vacated PELs:** Styrene: 50 ppm TWA; 215 mg/m<sup>3</sup> TWA; 100 ppm STEL; 425 mg/m<sup>3</sup> STEL

### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to minimize contact with skin.

**Respirators:** Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless

**Odor:** pungent odor

**pH:** Not available.

**Vapor Pressure:** 568 mm Hg

**Vapor Density:** 1.22 Kg/m<sup>3</sup>

**Evaporation Rate:**0.5 (Butyl Acetate=1)

**Viscosity:** 0.751 mPa

**Boiling Point:** 293 deg F

**Freezing/Melting Point:**- 23 deg F

**Autoignition Temperature:** 914 deg F ( 490.00 deg C)

**Flash Point:** 88 deg F ( 31.11 deg C)

**Decomposition Temperature:**Not available.

**NFPA Rating:** (estimated) Health: 2; Flammability: 3; Reactivity: 2

**Explosion Limits, Lower:**1.1% v/v

**Upper:** 7.0% v/v

**Solubility:** Practically insoluble in water

**Specific Gravity/Density:**0.9060

**Molecular Formula:**C<sub>8</sub> H<sub>8</sub>

**Molecular Weight:**104.1

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures. May form peroxides in the absence of inhibitors.

**Conditions to Avoid:** Incompatible materials, ignition sources.

**Incompatibilities with Other Materials:** Vapor is explosive when exposed to heat or flame and reacts with oxygen at temperatures above 104 F, uninhibited material may form explosive peroxides. Uninhibited material may polymerize which becomes self-sustaining at temperatures above 65 C. Exposure to butyllithium, dibenzoyl peroxide, azoisobutyronitrile or di-tert-butylperoxide may cause violent polymerization. Violent reaction with chlorosulfonic acid, oleum, sulfuric acid and oxidizers. Oxygen + heat is explosive.

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** May occur.

## Section 11 - Toxicological Information

**RTECS#:****CAS#** 100-42-5: WL3675000**LD50/LC50:**

CAS# 100-42-5:

Draize test, rabbit, eye: 100 mg Severe;

Draize test, rabbit, eye: 100 mg/24H Moderate;

Draize test, rabbit, skin: 100% Moderate;

Inhalation, mouse: LC50 = 9500 mg/m<sup>3</sup>/4H;Inhalation, rat: LC50 = 12 gm/m<sup>3</sup>/4H;

Oral, mouse: LD50 = 316 mg/kg;

Oral, rat: LD50 = 2650 mg/kg;

**Carcinogenicity:**

CAS# 100-42-5:

**ACGIH:** A4 - Not Classifiable as a Human Carcinogen**OSHA:** Possible Select carcinogen**IARC:** Group 2B carcinogen**Epidemiology:** TClO (Inhalation, rat) = 293 ppm/6H; Reproductive - Effects on Newborn - behavioral.**Teratogenicity:** TClO - Lowest published toxic concentration(Inhalation,rat)= 300 ppm/6H; Lungs, Thorax, or Respiration - structural or functional change in trachea or bronchi; Lungs, Thorax, or Respiration - other changes; Liver - other changes.**Reproductive Effects:** RTECs reports reproductive effects in animals such as effects on weaning/lactation index, naternal effects, fetoxity, stillbirth and post-implantation mortality. TClO (Inhalation, rat) = 293 ppm/6H; Reproductive - Effects on Newborn - behavioral.**Neurotoxicity:** No information available.**Mutagenicity:** An increased incidence of mutations such as chromosome aberrations and micronuclei in peripheral lymphocytes has been reported in workers exposed occupationally. Some studies have found a slight increase in the incidence of sister chromatid exchanges while no increase has been found in several other studies. Mutation in microorganisms(Salmonella typhimurium) =1 umol/plate(Yeast - Saccharomyces cerevisiae) =1 mmol/L.**Other Studies:** IARC has determined that there is inadequate evidence for carcinogenicity in humans. Three studies have suggested an association between leukaemia and lymphomas with exposure to styrene. Other studies have shown no excess in mortality from cancer in humans. IARC has determined there is sufficient evidence of carcinogenicity in animals. Standard Draize test(skin,rabbit) = 100%; Moderate. Standard Draize test(eye,rabbit) = 100 mg; Severe.

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. Cas# 100-42-5: LC50(96Hr.)Fathead Minnow = 46.4` mg/L; Static Bioassay Softwater. LC50(96Hr.)Fathead Minnow = 59.30 mg/L; Static Bioassay, Hardwater. LC50(96Hr.)Bluegill = 25.05 mg/L; Static Bioassay, Softwater. LC50(96Hr.)Goldfish = 64.74 mg/L; Static Bioassay, water. LC50(48Hr.) Water flea = 23.0 mg/L, Unspecified Bioassay. EC50(48Hr.) Water flea = 23.0 mg/L; Unspecified Bioassay.**Environmental:** Styrene does not absorb solar radiation at wavelengths above the solar cutoff (approximately 300 nm); therefore, it will not be directly photolyzed in the lower atmosphere (troposphere) or surface water. However, styrene is expected to be involved in indirect photochemical reactions. Styrenes have been found to be very active generators of photochemical smog.**Physical:** Styrene released to soil is subject to biodegradation. Volatilization and biodegradation are important transport and degradation processes respectively for styrene in water.**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
<b>Shipping Name:</b>	No information available.				STYRENE MONOMER
<b>Hazard Class:</b>					3(9.2)
<b>UN Number:</b>					UN2055
<b>Packing Group:</b>					III
<b>Additional Info:</b>					FLASHPOINT 31C

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 100-42-5 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### SARA

#### Section 302 (RQ)

CAS# 100-42-5: final RQ = 1000 pounds (454 kg)

#### Section 302 (TPQ)

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 100-42-5: acute, chronic, flammable, reactive.

#### Section 313

This material contains Styrene (CAS# 100-42-5, 99.0%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

CAS# 100-42-5 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depleters. This material does not contain any Class 2 Ozone depleters.

#### Clean Water Act:

CAS# 100-42-5 is listed as a Hazardous Substance under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are

product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 100-42-5 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XN

**Risk Phrases:**

R 10 Flammable.

R 36/38 Irritating to eyes and skin.

R 20 Harmful by inhalation.

**Safety Phrases:**

S 23 Do not inhale gas/fumes/vapour/spray.

**WGK (Water Danger/Protection)**

CAS# 100-42-5: 2

**Canada**

CAS# 100-42-5 is listed on Canada's DSL List. CAS# 100-42-5 is listed on Canada's DSL List.

This product has a WHMIS classification of B2, D2A, F.

CAS# 100-42-5 is listed on Canada's Ingredient Disclosure List.

**Exposure Limits**

CAS# 100-42-5: OEL-AUSTRALIA: TWA 50 ppm (215 mg/m<sup>3</sup>); STEL 100 ppm (425 mg/m<sup>3</sup>) OEL-BELGIUM: TWA 50 ppm (213 mg/m<sup>3</sup>); STEL 100 ppm (426 mg/m<sup>3</sup>); Skin OEL-CZECHOSLOVAKIA: TWA 200 mg/m<sup>3</sup>; STEL 1000 mg/m<sup>3</sup> OEL-DENMARK: TWA 25 ppm (105 mg/m<sup>3</sup>) OEL-FINLAND: TWA 20 ppm (85 mg/m<sup>3</sup>); STEL 100 ppm (420 mg/m<sup>3</sup>) OEL-FRANCE: TWA 50 ppm (215 mg/m<sup>3</sup>) OEL-GERMANY: TWA 20 ppm (85 mg/m<sup>3</sup>) OEL-HUNGARY: STEL 50 mg/m<sup>3</sup>; Carcinogen OEL-JAPAN: TWA 50 ppm (210 mg/m<sup>3</sup>) OEL-THE NETHERLANDS: TWA 100 ppm (420 mg/m<sup>3</sup>) OEL-THE PHILIPPINES: TWA 100 ppm (420 mg/m<sup>3</sup>) OEL-POLAND: TWA 100 mg/m<sup>3</sup> OEL-SWEDEN: TWA 25 ppm (110 mg/m<sup>3</sup>); STEL 75 ppm (30 mg/m<sup>3</sup>); Skin OEL-SWITZERLAND: TWA 50 ppm (215 mg/m<sup>3</sup>); STEL 100 ppm (430 mg/m<sup>3</sup>) OEL-THAILAND: TWA 100 ppm; STEL 200 ppm OEL-TURKEY: TWA 100 ppm (420 mg/m<sup>3</sup>) OEL-UNITED KINGDOM: TWA 100 ppm (420 mg/m<sup>3</sup>); STEL 260 ppm OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

## Section 16 - Additional Information

**MSDS Creation Date:** 4/28/1999

**Revision #2 Date:** 8/02/2000

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*



From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

24 Hour Emergency Telephone: 908-859-2151  
CHEMTREC: 1-800-424-9300  
National Response in Canada  
CANUTEC: 613-996-6666  
Outside U.S. And Canada  
Chemtree: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

## BENZYL CHLORIDE

### 1. Product Identification

**Synonyms:** alpha-chlorotoluene; chlorophenylmethane; chloromethylbenzene

**CAS No.:** 100-44-7

**Molecular Weight:** 126.59

**Chemical Formula:** C<sub>6</sub>H<sub>5</sub>CH<sub>2</sub>Cl

**Product Codes:** 1076

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Benzyl Chloride	100-44-7	90 - 100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**DANGER! CORROSIVE. CAUSES BURNS TO ANY AREA OF CONTACT. HARMFUL IF SWALLOWED OR INHALED. CAUSES SEVERE IRRITATION TO EYES, SKIN AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM. COMBUSTIBLE LIQUID AND VAPOR.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)

Flammability Rating: 2 - Moderate

Reactivity Rating: 2 - Moderate

Contact Rating: 3 - Severe (Corrosive)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

#### Potential Health Effects

##### Inhalation:

Toxic. May be corrosive to the respiratory tract, symptoms may include sore throat, coughing, and labored breathing. May also cause central nervous system depression, pulmonary edema, kidney and liver damage, and death.

##### Ingestion:

Corrosive. Swallowing can cause severe burns of the mouth, throat, and stomach, leading to death. Can cause sore throat, vomiting, diarrhea. May also cause systemic poisoning with symptoms paralleling inhalation.

##### Skin Contact:

Corrosive. Symptoms of redness, pain, and severe burn can occur.

##### Eye Contact:

For Vapor of Liquid: Corrosive. Contact can cause blurred vision, redness, pain and severe tissue burns. Permanent eye damage is possible if exposure is severe.

##### Chronic Exposure:

Mild leukopenia (abnormally low number of circulating white blood cells), liver function disturbances and kidney problems.

##### Aggravation of Pre-existing Conditions:

Persons with pre-existing neurological disorders, liver or kidney problems may be more susceptible to the effects of the substance.

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

**Ingestion:**

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

**Skin Contact:**

Wipe off excess material from skin then immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 67C (153F) CC

Autoignition temperature: 627C (1161F)

Flammable limits in air % by volume:

lel: 1.3; uel: 7.1

Combustible Liquid and Vapor!

**Explosion:**

Above flash point, vapor-air mixtures are explosive within flammable limits noted above.

**Fire Extinguishing Media:**

Water spray, dry chemical, alcohol foam, or carbon dioxide. Use water spray to blanket fire, cool fire exposed containers, and to flush non-ignited spills or vapors away from fire. Do not allow water runoff to enter sewers or waterways.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

---

## 7. Handling and Storage

Keep in a tightly closed container. Store in a cool, dry, ventilated area away from sources of heat or ignition. Protect against physical damage. Store separately from reactive or combustible materials, and out of direct sunlight. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):

1 ppm (TWA).

-ACGIH Threshold Limit Value (TLV):

1 ppm (TWA), A3: Animal carcinogen.

- NIOSH Immediately Dangerous to Life or Health (IDLH): 10 ppm

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a half-face respirator with an organic vapor/acid gas cartridge may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an organic vapor/acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Pungent odor.

**Solubility:**

Insoluble in water.

**Specific Gravity:**

1.10

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

179C (354F)

**Melting Point:**

-48 - -43C (-54 - -45F)

**Vapor Density (Air=1):**

4.36

**Vapor Pressure (mm Hg):**

1.6 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

No information found.

## 10. Stability and Reactivity

**Stability:**

Unstable. Inhibitors such as propylene oxide, sodium carbonate solution, lime, or trimethylamine must be used to prevent polymerization.

**Hazardous Decomposition Products:**

May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition.

**Hazardous Polymerization:**

Hazardous polymerization can occur in presence of catalytic impurities such as aluminum, iron, rust, or sodium acetate + pyridine + iron at 115C.

**Incompatibilities:**

Water, dimethyl sulfoxide, oxidizing material, steam. Corrodes all common metals except lead and nickel (explosive when heated).

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

**Toxicological Data:**

Oral rat LD50: 1231 mg/kg. Inhalation rat LD50: 150 ppm/2H. Investigated as a tumorigen, mutagen, reproductive effector.

**Carcinogenicity:**

EPA / IRIS classification: Group B2 - Probable human carcinogen, sufficient animal evidence.

Based on experiments done on rats, NIOSH has concluded that the carcinogenic risk from low exposure is probably negligible. There is limited evidence that workers exposed to benzyl chloride have a carcinogenic risk. In the NCI Carcinogenesis Studies (feed) clear evidence for carcinogenicity was found in the mouse and inadequate evidence was found in the rat. IARC Category: human - inadequate evidence; animal - limited evidence.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Benzyl Chloride (100-44-7)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material may leach into groundwater. When released into the soil, this material may evaporate to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals.

**Environmental Toxicity:**

No information found.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or

contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

### Domestic (Land, D.O.T.)

-----  
**Proper Shipping Name:** BENZYL CHLORIDE  
**Hazard Class:** 6.1, 8  
**UN/NA:** UN1738  
**Packing Group:** II  
**Information reported for product/size:** 500ML

### International (Water, I.M.O.)

-----  
**Proper Shipping Name:** BENZYL CHLORIDE  
**Hazard Class:** 6.1, 8  
**UN/NA:** UN1738  
**Packing Group:** II  
**Information reported for product/size:** 500ML

### International (Air, I.C.A.O.)

-----  
**Proper Shipping Name:** BENZYL CHLORIDE  
**Hazard Class:** 6.1, 8  
**UN/NA:** UN1738  
**Packing Group:** II  
**Information reported for product/size:** 500ML

## 15. Regulatory Information

```
-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  EC   Japan  Australia
-----
Benzyl Chloride (100-44-7)                   Yes  Yes  Yes    Yes
```

```
-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     Korea  DSL   NDSL  Phil.
-----
Benzyl Chloride (100-44-7)                   Yes   Yes  No    Yes
```

```
-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-
RQ   TPQ   List  Chemical Catg.
-----
Benzyl Chloride (100-44-7)                   100  500   Yes   No
```

```
-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     CERCLA  -RCRA-  -TSCA-
                                     261.33  8(d)
-----
Benzyl Chloride (100-44-7)                   100    P028   Yes
```

Chemical Weapons Convention: No    TSCA 12(b): Yes    CDTA: Yes  
SARA 311/312: Acute: Yes    Chronic: Yes    Fire: Yes    Pressure: No  
Reactivity: Yes    (Pure / Liquid)

### WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

### Australian Hazchem Code: 2W

**Poison Schedule:** None allocated.

### WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 3 Flammability: 2 Reactivity: 1

### Label Hazard Warning:

DANGER! CORROSIVE. CAUSES BURNS TO ANY AREA OF CONTACT. HARMFUL IF SWALLOWED OR INHALED. CAUSES SEVERE IRRITATION TO EYES, SKIN AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM. COMBUSTIBLE LIQUID AND VAPOR.

### Label Precautions:

Do not get in eyes, on skin, or on clothing.  
Do not breathe mist.  
Keep container closed.  
Use only with adequate ventilation.  
Wash thoroughly after handling.  
Keep away from heat and flame.

**Label First Aid:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, wipe off excess material from skin then immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In all cases get medical attention immediately.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

\*\*\*\*\*

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety  
Phone Number: (314) 654-1600 (U.S.A.)

	<b>24 Hour Emergency Telephone: 908-859-2151</b> <b>CHEMTREC: 1-800-424-9300</b>
	<b>National Response in Canada</b> <b>CANUTEC: 613-996-6666</b>
<b>Outside U.S. and Canada</b> <b>Chemtrec: 703-527-3887</b>	<b>NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.</b>

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

# BENZYL ALCOHOL

## 1. Product Identification

**Synonyms:** Benzenecarbinol; benzenemethanol; alpha-hydroxytoluene; Phenylmethyl alcohol; Phenyl carbinol

**CAS No.:** 100-51-6

**Molecular Weight:** 108.14

**Chemical Formula:** C<sub>6</sub>H<sub>5</sub>CH<sub>2</sub>OH

**Product Codes:**

J.T. Baker: 5190, 9039, 9040, 9041, 9050, 9051, 9421

Mallinckrodt: 1403, 1816, 71083

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Benzyl Alcohol	100-51-6	99 - 100%	Yes

## 3. Hazards Identification

### Emergency Overview

**WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM. COMBUSTIBLE LIQUID AND VAPOR.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate

Flammability Rating: 2 - Moderate

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

### Potential Health Effects

#### Inhalation:

Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. May be absorbed into the bloodstream with symptoms similar to ingestion.

#### Ingestion:

Large doses may cause sore throat, coughing, labored respiration, dizziness, dullness, abdominal pain, vomiting, central nervous system depression, convulsions, and death due to respiratory failure.

#### Skin Contact:

May cause irritation, redness, pain, and tissue injury. May be absorbed through the skin with symptoms paralleling ingestion.

#### Eye Contact:

Causes irritation, redness, and pain. Can cause eye damage.

#### Chronic Exposure:

Chronic exposure may cause skin effects.

#### Aggravation of Pre-existing Conditions:

No information found.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:**

Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 93C (199F)

Autoignition temperature: 436C (817F)

Combustible. High heat or direct flame is necessary to cause ignition.

**Explosion:**

Above the flash point, explosive vapor-air mixtures may be formed.

**Fire Extinguishing Media:**

Dry chemical, foam or carbon dioxide. Do not use a solid stream of water, since the stream will scatter and spread the fire. Water spray may be used to keep fire exposed containers cool.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer!

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

---

## 7. Handling and Storage

Protect against physical damage. Outside or detached storage is preferred. Inside storage should be in a standard flammable liquids storage room or cabinet. Separate from oxidizing materials. Storage and use areas should be No Smoking areas. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

AIHA Workplace Environmental Exposure Level (WEEL):10 ppm, 8-hour, TWA

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

For conditions of use where exposure to the substance is apparent and engineering controls are not feasible, consult an industrial hygienist. For emergencies, or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Faint aromatic odor.

**Solubility:**

1g/25ml water @ 17C

**Specific Gravity:**

1.05 @ 20C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

205C (401F)

**Melting Point:**

-15C (5F)

**Vapor Density (Air=1):**

3.72

**Vapor Pressure (mm Hg):**

0.15 @ 25C (77F)

**Evaporation Rate (BuAc=1):**

1.8 (Ether = 1)

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage. Undergoes slow oxidation in the presence of air or oxygen to form benzaldehyde and benzoic acid.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

When heated past 100C, Benzyl Alcohol containing hydrogen bromide and dissolved iron may polymerize with a rapid increase in temperature.

**Incompatibilities:**

Acids, oxidizing agents, and aluminum. Will attack some plastics.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

Oral rat LD50: 1230 mg/kg; skin rabbit LD50: 2000 mg/kg; irritation, skin rabbit, standard Draize, 100 mg/24-hour, open, moderate; investigated as a tumorigen, mutagen, reproductive effector.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Benzyl Alcohol (100-51-6)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material is not expected to evaporate significantly. When released into water, this material may biodegrade to a moderate extent. This material has an estimated bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition.

**Environmental Toxicity:**

The LC50/96-hour values for fish are from 10 to over 100 mg/l. This material may be toxic to aquatic life.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

Not regulated.

### 15. Regulatory Information

```

-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA EC   Japan Australia
-----
Benzyl Alcohol (100-51-6)                     Yes Yes  Yes   Yes
    
```

```

-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     Korea DSL  NDSL Phil.
-----
Benzyl Alcohol (100-51-6)                     Yes Yes  No   Yes
    
```

```

-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302- -SARA 313-----
RQ TPQ List Chemical Catg.
-----
Benzyl Alcohol (100-51-6)                     No No   No   No
    
```

```

-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     CERCLA -RCRA- -TSCA-
261.33 8(d)
-----
Benzyl Alcohol (100-51-6)                     No No   No
    
```

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No  
 SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No  
 Reactivity: No (Pure / Liquid)

**Australian Hazchem Code:** None allocated.

**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

### 16. Other Information

**NFPA Ratings:** Health: 2 Flammability: 2 Reactivity: 0

**Label Hazard Warning:**

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM. COMBUSTIBLE LIQUID AND VAPOR.

**Label Precautions:**

- Avoid breathing vapor or mist.
- Avoid contact with eyes, skin and clothing.
- Keep container closed.
- Use only with adequate ventilation.
- Wash thoroughly after handling.
- Keep away from heat and flame.

**Label First Aid:**

If swallowed, give large amounts of water to drink. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Information Found.

**Disclaimer:**

\*\*\*\*\*  
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**Prepared by:** Environmental Health & Safety  
 Phone Number: (314) 654-1600 (U.S.A.)



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 10061-01-5****Date: 12/28/2006**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: 1,3-DICHLOROPROPENE (CIS)      SYNONYMS: None

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	Exposure Limits (PPM)			
				ACGIH TLV	OSHA PEL	MAC	Other STEL
1,3-DICHLOROPROPENE (CIS)	C3H4CL2	10061-01-5	99+%	1.0	1.0	1.0	NE

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIANT

## 3. HAZARD IDENTIFICATION

\* \* \* EMERGENCY OVERVIEW \* \* \*

Flammable liquid and vapor.

Can form explosive mixtures in air.

May cause severe irritation or burns to the eyes and skin.

May cause irritation to the respiratory tract.

### POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation, Eye, Skin, Ingestion

ACUTE EFFECTS: This material will severely irritate and damage the skin, eyes, mucous membranes and upper respiratory tract. Inhalation may cause dizziness, vomiting, diarrhea, abdominal pain, convulsions, and visual disturbances. May damage liver and kidney. Blood and lung effects. Skin contact can cause defatting and dermatitis. Eye contact may result in destruction of eye tissue. Ingestion irritates the digestive tract and results in systemic effects from absorption.

CHRONIC EFFECTS: May damage liver and kidney.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Skin conditions, respiratory problems.

OTHER EFFECTS OF OVEREXPOSURE: None

CARCINOGENICITY (US ONLY):

NTP - Yes

IARC MONOGRAPHS - Yes

OSHA REGULATED - No

**4. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

**EYE CONTACT:** Do not allow victim to rub or keep eyes tightly shut. Flush with large amounts of water lifting upper and lower lids.

**SKIN CONTACT:** Rinse the affected area with flooding amounts of water and then wash it with soap and water.

**INGESTION:** Never give anything by mouth to an unconscious person. Have conscious and alert person drink 1 to 2 glasses of water.

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: None

**5. FIRE FIGHTING MEASURES**

**FLASH POINT:** 35 deg.C

**AUTOIGNITION TEMPERATURE:** N/Av

**FLAMMABLE LIMITS:** Vol. %

LOWER: 5.30

UPPER: 14.50

**EXTINGUISHING MEDIA:** Extinguish with water spray, water fog, dry chemical, or carbon dioxide.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray. If possible, stop the product flow.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide, hydrogen chloride and phosgene.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Cylinder rupture may occur under fire conditions. Severe when exposed to heat or flame. Vapors may travel a considerable distance to the source of ignition and flash back.

**6. ACCIDENTAL RELEASE MEASURES**

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Remove all sources of ignition. Prevent release of material to surface water or sewers. Absorb with sand or vermiculite and place in closed containers for disposal. Place waste into a clean, dry container for disposal.

SPECIALIZED EQUIPMENT: None

## 7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentrations below exposure and flammable limits.

EYE / FACE PROTECTION: Safety glasses

SKIN PROTECTION: Impervious gloves, coveralls, boots, and/or other resistant protective clothing.

RESPIRATORY PROTECTION: In case of leakage, use self-contained breathing apparatus.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless

ODOR: Sweet chloroform odor.

PHYSICAL PRESSURE: Liquid

VAPOR PRESSURE: @20 deg.C: 40-52 mm Hg

VAPOR DENSITY (AIR=1): 3.83

BOILING POINT (C): 104

SOLUBILITY IN WATER: 0.15%

SPECIFIC GRAVITY (H<sub>2</sub>O=1): @25 deg.C: 1.22

EVAPORATION RATE: N/Av

ODOR THRESHOLD: 1-3 ppm

## 10. STABILITY AND REACTIVITY

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas.Storage near a heat source.

MATERIALS TO AVOID: Oxidizing agents.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: Toxic carbon monoxide, hydrogen chloride and phosgene.

## 11. TOXICOLOGICAL INFORMATION

LETHAL CONCENTRATION (LC50): 500 ppm, rat one hour.

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

## 12. ECOLOGICAL INFORMATION

No adverse ecological effects are expected.

## 13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place.

## 14. TRANSPORT INFORMATION

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Dichloropropene  
HAZARD CLASS: 3 (flammable), Packing Group II  
IDENTIFICATION NUMBER: UN2047  
REPORTABLE QUANTITIES: 100 lbs.  
LABELING: FLAMMABLE LIQUID

ADR / RID (EU Only): Class 3, 31(c)

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

## 15. REGULATORY INFORMATION

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 208-826-5

NUMBER IN ANNEX 1 OF DIR 67/548: Not listed in annex 1.

EU CLASSIFICATION: N/Av

R: 10-20/21-25-36/37/38

S: 36/37-44

## 16. OTHER INFORMATION

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 10061-02-6****Date: 12/28/2006**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: 1,3-DICHLOROPROPENE (TRANS)      SYNONYMS: None

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	Exposure Limits (PPM)			
				ACGIH TLV	OSHA PEL	MAC	Other STEL
1,3 DICHLOROPROPENE (TRANS)	C3H4CL2	10061-02-6	99+%	1	1	1	NE

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIAN

## 3. HAZARD IDENTIFICATION

\*\*\* EMERGENCY OVERVIEW \*\*\*

Flammable liquid and vapor.

Can form explosive mixtures in air.

May cause severe irritation or burns to the eyes and skin.

May cause irritation to the respiratory tract.

### POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation, Eye, Skin, Ingestion

ACUTE EFFECTS: This material will severely irritate and damage the skin, eyes, mucous membranes and upper respiratory tract. Inhalation may cause dizziness, vomiting, diarrhea, abdominal pain, convulsions, and visual disturbances. May damage liver and kidney. Blood and lung effects. Skin contact can cause defatting and dermatitis. Eye contact may result in destruction of eye tissue. Ingestion irritates the digestive tract and results in systemic effects from absorption.

CHRONIC EFFECTS: May damage liver and kidney.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Skin conditions, respiratory problems.

OTHER EFFECTS OF OVEREXPOSURE: None

CARCINOGENICITY (US ONLY):

NTP - Yes

IARC MONOGRAPHS - Yes

OSHA REGULATED - No

**4. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

**EYE CONTACT:** Do not allow victim to rub or keep eyes tightly shut. Flush with large amounts of water lifting upper and lower lids.

**SKIN CONTACT:** Rinse the affected area with flooding amounts of water and then wash it with soap and water.

**INGESTION:** Never give anything by mouth to an unconscious person. Have conscious and alert person drink 1 to 2 glasses of water.

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: None

**5. FIRE FIGHTING MEASURES**

**FLASH POINT:** 35 deg. C

**AUTOIGNITION TEMPERATURE:** N/Av

**FLAMMABLE LIMITS:** Vol. %

LOWER: 5.30

UPPER: 14.50

**EXTINGUISHING MEDIA:** Extinguish with water spray, water fog, dry chemical, or carbon dioxide.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray. If possible, stop the product flow.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide, hydrogen chloride and phosgene.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Cylinder rupture may occur under fire conditions. Severe when exposed to heat or flame. Vapors may travel a considerable distance to the source of ignition and flash back.

**6. ACCIDENTAL RELEASE MEASURES**

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Remove all sources of ignition. Prevent release of material to surface water or sewers. Absorb with sand or vermiculite and place in closed containers for disposal. Place waste into a clean, dry container for disposal.

SPECIALIZED EQUIPMENT: None

## 7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentrations below exposure and flammable limits.

EYE / FACE PROTECTION: Safety glasses

SKIN PROTECTION: Impervious gloves, coveralls, boots, and/or other resistant protective clothing.

RESPIRATORY PROTECTION: In case of leakage, use self-contained breathing apparatus.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless

ODOR: Sweet chloroform odor.

PHYSICAL PRESSURE: Liquid

VAPOR PRESSURE: @20 deg.C: 40-52 mm Hg

VAPOR DENSITY (AIR=1): 3.83

BOILING POINT (C): 112

SOLUBILITY IN WATER: 0.15%

SPECIFIC GRAVITY (H<sub>2</sub>O=1): @25 deg.C: 1.22

EVAPORATION RATE: N/Av

ODOR THRESHOLD: 1-3 ppm

## 10. STABILITY AND REACTIVITY

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas.Storage near a heat source.

MATERIALS TO AVOID: Oxidizing agents.

HAZARDOUS POLYMERIZATION: May occur.

HAZARDOUS DECOMPOSITION: Toxic carbon monoxide, hydrogen chloride and phosgene.

## 11. TOXICOLOGICAL INFORMATION

LETHAL CONCENTRATION (LC50): 500 ppm, rat one hour.

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

## 12. ECOLOGICAL INFORMATION

No adverse ecological effects are expected.

## 13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state, and local regulations.Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood.If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection cap in place.

## 14. TRANSPORT INFORMATION

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Dichloropropene  
HAZARD CLASS: 3 (flammable), Packing Group II  
IDENTIFICATION NUMBER: UN2047  
REPORTABLE QUANTITIES: 100 lbs.  
LABELING: FLAMMABLE LIQUID

ADR / RID (EU Only): Class 3, 31(c)

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

## 15. REGULATORY INFORMATION

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 208-826-5

NUMBER IN ANNEX 1 OF DIR 67/548: Not listed in annex 1.

EU CLASSIFICATION: N/Av

R: 10-20/21-25-36/37/38

S: 36/37-44

## 16. OTHER INFORMATION

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.

# Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 06/01/2009

Reviewed on 05/29/2009

## 1 Identification of substance:

### Product details:

**Product name:** 4-Bromodiphenyl ether

**Stock number:** L01473

### Manufacturer/Supplier:

Alfa Aesar, A Johnson Matthey Company  
Johnson Matthey Catalog Company, Inc.  
30 Bond Street  
Ward Hill, MA 01835-8099  
Emergency Phone: (978) 521-6300  
CHEMTREC: (800) 424-9300  
Web Site: www.alfa.com

**Information Department:** Health, Safety and Environmental Department

### Emergency information:

During normal hours the Health, Safety and Environmental Department. After normal hours call Chemtrec at (800) 424-9300.

## 2 Composition/Data on components:

### Chemical characterization:

**Description: (CAS#)**

4-Bromodiphenyl ether (CAS# 101-55-3): 100%

**Identification number(s):**

**EINECS Number:** 202-952-4

## 3 Hazards identification

### Hazard description:



N Dangerous for the environment

### Information pertaining to particular dangers for man and environment

R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

### Classification system

**HMIS ratings (scale 0-4)**

(Hazardous Materials Identification System)

HEALTH	1
FIRE	1
REACTIVITY	1

Health (acute effects) = 1

Flammability = 1

Reactivity = 1

### GHS label elements



4.1/2 - Toxic to aquatic life with long lasting effects.

### Prevention:

Avoid release to the environment.

### Response:

Collect spillage.

### Disposal:

Dispose of contents/container in accordance with local/regional/national/international regulations.

## 4 First aid measures

### After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm. Seek immediate medical advice.

### After skin contact

Immediately wash with water and soap and rinse thoroughly. Seek immediate medical advice.

### After eye contact

Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek immediate medical advice.

USA

(Contd. on page 2)

**Material Safety Data Sheet**

acc. to OSHA and ANSI

Printing date 06/01/2009

Reviewed on 05/29/2009

**Product name: 4-Bromodiphenyl ether**

(Contd. of page 1)

**5 Fire fighting measures****Suitable extinguishing agents**

Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

**Special hazards caused by the material, its products of combustion or resulting gases:**

In case of fire, the following can be released:

Carbon monoxide and carbon dioxide

Hydrogen bromide (HBr)

**Protective equipment:**

Wear self-contained respirator.

Wear fully protective impervious suit.

**6 Accidental release measures****Person-related safety precautions:**

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

**Measures for environmental protection:**

Do not allow material to be released to the environment without proper governmental permits.

**Measures for cleaning/collecting:**

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

**Additional information:**

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

**7 Handling and storage****Handling****Information for safe handling:**

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

**Information about protection against explosions and fires:** Keep ignition sources away.**Storage****Requirements to be met by storerooms and receptacles:** No special requirements.**Information about storage in one common storage facility:** Store away from oxidizing agents.**Further information about storage conditions:**

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

**8 Exposure controls and personal protection****Additional information about design of technical systems:**

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

**Components with limit values that require monitoring at the workplace:** Not required.**Additional information:** No data**Personal protective equipment****General protective and hygienic measures**

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

**Breathing equipment:** Use suitable respirator when high concentrations are present.**Protection of hands:**

Impervious gloves

Check protective gloves prior to each use for their proper condition.

**Material of gloves**

The selection of suitable gloves not only depends on the material, but also on quality.

Quality will vary from manufacturer to manufacturer.

**Eye protection:** Safety glasses**Body protection:** Protective work clothing.

USA

(Contd. on page 3)

**Material Safety Data Sheet**

acc. to OSHA and ANSI

Printing date 06/01/2009

Reviewed on 05/29/2009

Product name: 4-Bromodiphenyl ether

(Contd. of page 2)

**9 Physical and chemical properties:****General Information**

<b>Form:</b>	Liquid
<b>Color:</b>	Colorless
<b>Odor:</b>	Not determined

**Change in condition**

<b>Melting point/Melting range:</b>	17-18°C (63-64°F)
<b>Boiling point/Boiling range:</b>	304-305°C (579-581°F)
<b>Sublimation temperature / start:</b>	Not determined

<b>Flash point:</b>	> 110°C (> 230°F)
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<b>Ignition temperature:</b>	Not determined
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<b>Decomposition temperature:</b>	Not determined
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<b>Danger of explosion:</b>	Product does not present an explosion hazard.
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**Explosion limits:**

<b>Lower:</b>	Not determined
<b>Upper:</b>	Not determined

<b>Vapor pressure:</b>	Not determined
------------------------	----------------

<b>Density at 20°C (68°F):</b>	1.42 g/cm <sup>3</sup>
--------------------------------	------------------------

<b>Solubility in / Miscibility with Water:</b>	Not miscible or difficult to mix
--	----------------------------------

**10 Stability and reactivity****Thermal decomposition / conditions to be avoided:**

Decomposition will not occur if used and stored according to specifications.

**Materials to be avoided:** Oxidizing agents**Dangerous reactions** No dangerous reactions known**Dangerous products of decomposition:**

Carbon monoxide and carbon dioxide

Hydrogen bromide

**11 Toxicological information****Acute toxicity:****Primary irritant effect:****on the skin:** May cause irritation**on the eye:** May cause irritation**Sensitization:** No sensitizing effects known.**Subacute to chronic toxicity:**

Other than potential irritation (see above), no information on illness or injury to humans from acute or chronic exposure to this product is available.

**Additional toxicological information:**

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

**12 Ecological information:****Ecotoxicological effects:****Remark:** Toxic for fish**General notes:**

Do not allow product to reach ground water, water course or sewage system.

Danger to drinking water if even small quantities leak into the ground.

Also poisonous for fish and plankton in water bodies.

Do not allow material to be released to the environment without proper governmental permits.

Toxic for aquatic organisms

**13 Disposal considerations****Product:****Recommendation** Consult state, local or national regulations to ensure proper disposal.

(Contd. on page 4)

USA

# Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 06/01/2009

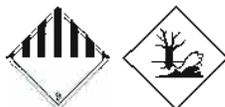
Reviewed on 05/29/2009

Product name: 4-Bromodiphenyl ether

(Contd. of page 3)

**Uncleaned packagings:****Recommendation:** Disposal must be made according to official regulations.**14 Transport information****DOT regulations:**

**Hazard class:** 9  
**Identification number:** UN3082  
**Packing group:** III  
**Proper shipping name (technical name):** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (4-Bromodiphenyl ether)  
**Label:** 9

**Land transport ADR/RID (cross-border)**

**ADR/RID class:** 9 (M6) Miscellaneous dangerous substances and articles  
**Danger code (Kemler):** 90  
**UN-Number:** 3082  
**Packaging group:** III  
**Description of goods:** 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (4-Bromodiphenyl ether)

**Maritime transport IMDG:**

**IMDG Class:** 9  
**UN Number:** 3082  
**Label:** 9  
**Packaging group:** III  
**EMS Number:** F-A, S-F  
**Proper shipping name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (4-Bromodiphenyl ether)

**Air transport ICAO-TI and IATA-DGR:**

**ICAO/IATA Class:** 9  
**UN/ID Number:** 3082  
**Label:** 9  
**Packaging group:** III  
**Proper shipping name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (4-Bromodiphenyl ether)

**UN "Model Regulation":** UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., 9, III  
**Environmental hazards:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID

**15 Regulations****Product related hazard informations:****Hazard symbols:**

N Dangerous for the environment

(Contd. on page 5)

USA

**Material Safety Data Sheet**

acc. to OSHA and ANSI

Printing date 06/01/2009

Reviewed on 05/29/2009

**Product name: 4-Bromodiphenyl ether**

(Contd. of page 4)

**Risk phrases:**

51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

**Safety phrases:**

57 Use appropriate container to avoid environmental contamination.

**National regulations**

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

All components of this product are listed on the Canadian Non-Domestic Substances List (NDSL).

**Information about limitation of use:**

For use only by technically qualified individuals.

This product is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.

**16 Other information:**

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

**Department issuing MSDS:** Health, Safety and Environmental Department.

**Contact:** Zachariah Holt

**Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)

ICAO: International Civil Aviation Organization

ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

EINECS: European Inventory of Existing Commercial Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

HMIS: Hazardous Materials Identification System (USA)

USA

## Composition/Information on Ingredient

**Cas:**

1024-57-3

**Code:**

M

**RTECS:**

PB9450000

**Code:**

M

**Name:**

HEPTACHLOR EPOXIDE (SARA III)

**Other REC Limits:**

N/K

**OSHA PEL:**

NOT ESTABLISHED

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

NOT ESTABLISHED

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

USE APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT.

**Ventilation:**

HANDLE ONLY IN A HOOD

**Protective Gloves:**

AS REQUIRED

**Eye Protection:**

EYE SHIELDS

**Other Protective Equipment:**

Equipment N/K

**Work Hygienic Practices:**

REMOVE/WASH CONTAMINATED CLOTHING BEFORE REUSE. ONLY TRAINED PERSONNEL SHOULD HANDLE THIS CHEMICAL OR ITS CONTAINER.

**Supplemental Safety and Health:**

N/K

## Health Hazards Data

**LD50LC50Mixture:**

ORAL LD50 (RAT): 62 MG/KG

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

SKIN: FATAL IF ABSORBED. INHALATION: FATAL. INGESTION: FATAL & TOXIC.

**Explanation Of Carcinogenicity:**

NONE

**Signs And Symptoms Of Overexposure:**

SKIN: FATAL IF ABSORBED. INHALATION: FATAL. INGESTION: FATAL & TOXIC.

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES/SKIN: FLUSH W/WATER FOR 15-20 MINS. IF NO BURNS HAVE OCCURED-USE SOAP & WATER TO CLEANSE SKIN. INHALATION: REMOVE TO FRESH AIR. ADMINISTER OXYGEN IF BREATHING DIFFICULTY. ADMINISTER CPR IF CARDIA C ARREST OCCURS. INGESTION: INDUCE VOMITING. DON'T ADMINISTER LIQUIDS/INDUCE VOMITING TO AN UNCONSCIOUS/CONVULSING PERSON. MAKE SURE AIRWAY DOESN'T BECOME OBSTRUCTED BY VOMIT. OBTAIN MEDICAL ATTENTION.

**Spill Release Procedures:**

EVACUATE AREA. WEAR APPROPRIATE EQUIPMENT. VENTILATE AREA. SWEEP UP & PLACE IN AN APPROPRIATE CONTAINER. WASH CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER. DISPOSE OF IN ACCORDANCE W/FEDERAL, STATE, & LOCAL REGULATIONS.

**Handling And Storage Precautions:**

KEEP CLOSED IN A COOL DRY PLACE. STORE ONLY W/COMPATIBLE CHEMICALS. FOR LABORATORY USE ONLY. DON'T WEAR CONTACT LENSES.

**Other Precautions:**

DON'T USE AS DRUGS, COSMETICS, AGRICULTURAL OR PESTICIDAL PRODUCTS, FOOD ADDITIVES OR AS HOUSEHOLD CHEMICALS. AVOID DIRECT PHYSICAL CONTACT. AVOID CONTACT W/SKIN, EYES & CLOTHING. COMPOUND IS VOLATILE . 2

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P

**Flash Point:****Flash Point Text:**

N/K

**Autoignition Temp:****Autoignition Temp Text:**

N/A

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

CO2, DRY CHEMICAL POWDER OR SPRAY.

**Fire Fighting Procedures:**

N/K

**Unusual Fire/Explosion Hazard:**

N/K

## Physical/Chemical Properties

**HCC:****NRC/State LIC No:****Net Prop WT For Ammo:****Boiling Point:****B.P. Text:**

N/K 3

**Melt/Freeze Pt:**

**M.P/F.P Text:**

327.2F

**Decomp Temp:**

**Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

N/K

**Volatile Org Content %:**

**Spec Gravity:**

N/K

**VOC Pounds/Gallon:**

**PH:** N/K

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

N/K

**Appearance and Odor:**

CRYSTALLINE SOLID.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/K

**Materials To Avoid:**

LOW REACTIVITY

**Hazardous Decomposition Products:**

N/K

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

**Information:**N/P

## MSDS Transport Information

**Information:**N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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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. Lookchem 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.

## Composition/Information on Ingredient

**Cas:**

1031-07-8

**Code:**

M

**RTECS:**

RB9150000

**Code:**

M

**Name:**

ENDOSULFAN SULFATE

**Other REC Limits:**

N/K

**OSHA PEL:**

N/K

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

N/K

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

N/K

**Ventilation:**

N/K

**Protective Gloves:**

RECOMMENDED

**Eye Protection:**

RECOMMENDED

**Other Protective Equipment:**

Equipment USE APPROPRIATE OSHA/MSHA SAFETY EQUIPMENT.

**Work Hygienic Practices:**

N/K

**Supplemental Safety and Health:**

N/K

## Health Hazards Data

**LD50LC50Mixture:**

ORAL (RAT) LD50: 5000 MG/KG (TOLUENE)

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

EYES/SKIN/INHALATION/INGESTION: IRRITATION.

**Explanation Of Carcinogenicity:**

LINDANE, DDT ISOMERS, & DIELDRIN ARE SUSPECTED HUMAN CARCINOGENS. HEPTACHLOR IS AN A2 CARCINOGEN.

**Signs And Symptoms Of Overexposure:**

EYES/SKIN/INGESTION/INHALATION: TOXIC & IRRITATION.

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES/SKIN: FLUSH W/COPIOUS AMOUNTS OF WATER. INHALATION: REMOVE TO FRESH AIR. GIVE OXYGEN IF NECESSARY. OBTAIN MEDICAL ATTENTION IN ALL CASES.

**Spill Release Procedures:**

DUE TO THE SMALL QUANTITY INVOLVED, SPILLS OR LEAKS SHOULD NOT POSE A SIGNIFICANT PROBLEM. A LEAKING BOTTLE MAY BE PLACED IN A PLASTIC BAG & NORMAL DISPOSAL PROCEDURES FOLLOWED. LIQUID SAMPLES MAY BE ABSORBED ON VERMICULITE OR SAND.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCUBBER. OBSERVE ALL FEDERAL, STATE, & LOCAL LAWS CONCERNING DISPOSAL.

**Handling And Storage Precautions:**

AVOID CONTACT W/EYES, SKIN, & CLOTHING. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE.

**Other Precautions:**

THIS MATERIAL SHOULD ONLY BE USED BY THOSE PERSONS TRAINED IN THE SAFE HANDLING OF HAZARDOUS CHEMICALS.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P 6

**Flash Point:****Flash Point Text:**

COMBUSTIBLE

**Autoignition Temp:****Autoignition Temp Text:**

N/A

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

CO2, DRY CHEMICAL POWDER, OR WATER SPRAY

**Fire Fighting Procedures:**

N/K

**Unusual Fire/Explosion Hazard:**

COMBUSTIBLE.

## Physical/Chemical Properties

**HCC:****NRC/State LIC No:****Net Prop WT For Ammo:****Boiling Point:****B.P. Text:**

N/K

**Melt/Freeze Pt:****M.P/F.P Text:**

N/K

**Decomp Temp:****Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

N/K

**Volatile Org Content %:**

**Spec Gravity:**

N/K 7

**VOC Pounds/Gallon:**

**PH:** N/K

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

N/K

**Appearance and Odor:**

LIQUID W/BENZENE-LIKE ODOR.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/K

**Materials To Avoid:**

STRONG OXIDIZERS

**Hazardous Decomposition Products:**

N/R

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

**Information:**N/P

## MSDS Transport Information

**Information:**N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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WARRANTY

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# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 103-65-1****Date: 03/09/2001**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: **PROPYL BENZENE**SYNONYMS: **1-Phenylpropane, Isocumene.**

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	ACGIH TLV	Exposure Limits (PPM)		
					OSHA PEL	MAC	Other STEL
<b>PROPYL BENZENE</b>	C9H12	103-65-1	99+%	NE	NE	NE	NE

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIANT

## 3. HAZARD IDENTIFICATION

**\*\*\* EMERGENCY OVERVIEW \*\*\***

Flammable liquid and vapor.  
Can form explosive mixtures with air.  
May cause irritation to eyes and skin.

### POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: **Inhalation , Ingestion**ACUTE EFFECTS: **Skin and eye irritation may occur. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.**CHRONIC EFFECTS: **None known**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: **None known**OTHER EFFECTS OF OVEREXPOSURE: **None**

CARCINOGENICITY (US ONLY):

NTP - **No**IARC MONOGRAPHS - **No**OSHA REGULATED - **No**

### 4 FIRST AID MEASURES

scotecatalog.com/msds.nsf/.../103-65...

**4. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration.

**EYE CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes.

**SKIN CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes while removing contaminated clothing.

**INGESTION:** Contact physician immediately.

**IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN**

**NOTE TO PHYSICIAN:** None

**5. FIRE FIGHTING MEASURES**

**FLASH POINT:** 30 deg. C

**AUTOIGNITION TEMPERATURE:** 450 deg. C

**FLAMMABLE LIMITS:** Vol. %

LOWER: .80  
UPPER: 6.00

**EXTINGUISHING MEDIA:** Water spray. Carbon dioxide, foam, or dry chemical.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide may be given off during combustion.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Cylinder rupture may occur under fire conditions. May form explosive mixture in air. Vapors may travel a considerable distance to the source of ignition and flash back. Dangerous when exposed to heat, flame or powerful oxidizers.

**6. ACCIDENTAL RELEASE MEASURES**

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Remove leaking cylinder to exhaust hood or safe outdoor area. Remove all sources of ignition. Absorb with sand or vermiculite and place in closed containers for disposal.

**SPECIALIZED EQUIPMENT:** None

**7. HANDLING AND STORAGE**

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentrations below flammable limits.

EYE / FACE PROTECTION: Goggles. A safety shower and eyewash station should be readily available.

SKIN PROTECTION: Wear suitable protective clothing.

RESPIRATORY PROTECTION: Use a self-contained breathing apparatus in case of emergency or non-routine use.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless to pale yellow

ODOR: Odorless

PHYSICAL PRESSURE: Liquid

VAPOR PRESSURE: @20 deg. C: 2.0 mm Hg

VAPOR DENSITY (AIR=1): 4.14

BOILING POINT (C): 159.2

SOLUBILITY IN WATER: Practically insoluble

SPECIFIC GRAVITY (H<sub>2</sub>O=1): 0.862

EVAPORATION RATE: N/Av

ODOR THRESHOLD: N/Ap

## 10. STABILITY AND REACTIVITY

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Sparks, flame, heat and other sources of ignition.

MATERIALS TO AVOID: [Strong oxidizing agents](#).

HAZARDOUS POLYMERIZATION: [Will not occur](#).

HAZARDOUS DECOMPOSITION: [Toxic carbon monoxide](#).

## 11. TOXICOLOGICAL INFORMATION

LETHAL CONCENTRATION (LC50): [91,910 ppm, Rat 1 hr](#).

LETHAL DOSE 50 (LD50): [N/Ap](#)

TERATOGENICITY: [N/Ap](#)

REPRODUCTIVE EFFECTS: [N/Ap](#)

MUTAGENICITY: [N/Ap](#)

## 12. ECOLOGICAL INFORMATION

[No adverse ecological effects are expected](#).

## 13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: [Waste material may be burned in a controlled manner in an approved incinerator. Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place.](#)

## 14. TRANSPORT INFORMATION

CONCENTRATION: [99+%](#)

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: [n-Propyl benzene](#)  
HAZARD CLASS: [3 \(flammable\), Packing group III](#).  
IDENTIFICATION NUMBER: [UN2364](#)  
REPORTABLE QUANTITIES: [None](#)  
LABELING: [FLAMMABLE LIQUID](#)

ADR / RID (EU Only): [Class 3, 31\(c\)](#)

SPECIAL PRECAUTIONS: [Cylinders should be transported in a secure upright position in a well ventilated truck.](#)

## 15. REGULATORY INFORMATION

**15. REGULATORY INFORMATION**

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 203-132-9

NUMBER IN ANNEX 1 OF DIR 67/548: Not listed in annex 1.

EU CLASSIFICATION: N/Av

R: 10-37

S: 2

**16. OTHER INFORMATION**

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 104-51-8****Date: 03/09/2001**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: BUTYL BENZENE

SYNONYMS: 1-Phenyl butane.

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	ACGIH TLV	Exposure Limits (PPM)		
					OSHA PEL	MAC	Other STEL
BUTYL BENZENE	C10H14	104-51-8	99+%	NE	NE	NE	NE

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIANT

## 3. HAZARD IDENTIFICATION

\*\*\* EMERGENCY OVERVIEW \*\*\*  
Flammable liquid and vapor.

### POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation , Skin , Ingestion

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

CHRONIC EFFECTS: None known

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None known

OTHER EFFECTS OF OVEREXPOSURE: None

CARCINOGENICITY (US ONLY):

NTP - No

IARC MONOGRAPHS - No

OSHA REGULATED - No

## 4. FIRST AID MEASURES

**INHALATION:** Immediately remove victim to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration.

**EYE CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes.

**SKIN CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes while removing contaminated clothing.

**INGESTION:** Never give anything by mouth to an unconscious person. Contact a poison control center.

**IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN**

**NOTE TO PHYSICIAN:** None

## 5. FIRE FIGHTING MEASURES

**FLASH POINT:** 71.1 deg. C

**AUTOIGNITION TEMPERATURE:** 412.22 deg. C

**FLAMMABLE LIMITS:** Vol. %

LOWER: .80

UPPER: 5.80

**EXTINGUISHING MEDIA:** Carbon dioxide, foam, or dry chemical. Water spray.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide may be given off during combustion.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** N/Av

## 6. ACCIDENTAL RELEASE MEASURES

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Absorb with sand or vermiculite and place in closed containers for disposal.

**SPECIALIZED EQUIPMENT:** None

## 7. HANDLING AND STORAGE

**PRECAUTIONS TO BE TAKEN IN HANDLING:** Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentrations below flammable limits.

EYE / FACE PROTECTION: Goggles. A safety shower and eyewash station should be readily available.

SKIN PROTECTION: Wear suitable protective clothing.

RESPIRATORY PROTECTION: Use a self-contained breathing apparatus in case of emergency or non-routine use.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless

ODOR: Odorless

PHYSICAL PRESSURE: Liquid

VAPOR PRESSURE: @22.7 deg. C: 1 mm Hg

VAPOR DENSITY (AIR=1): 4.6

BOILING POINT (C): 182.1

SOLUBILITY IN WATER: @20 deg. C: Insoluble

SPECIFIC GRAVITY (H<sub>2</sub>O=1): @20 deg. C: 0.860

EVAPORATION RATE: N/Av

ODOR THRESHOLD: N/Ap

## 10. STABILITY AND REACTIVITY

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Avoid contact with incompatible chemicals.

MATERIALS TO AVOID: Strong oxidizing agents.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: Toxic carbon monoxide.

## 11. TOXICOLOGICAL INFORMATION

LETHAL CONCENTRATION (LC50): NONE ESTABLISHED

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

## 12. ECOLOGICAL INFORMATION

No adverse ecological effects are expected.

## 13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Waste can be burned in an approved incinerator equipped with an afterburner and scrubber. Return cylinders to supplier with any valve outlet plugs or caps secured and valve protection cap in place. Follow federal, state and local regulations. Non-returnable cylinders must not be refilled. Dispose of non-refillable cylinders in accordance with federal, state, and local regulations.

## 14. TRANSPORT INFORMATION

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Butyl benzenes  
HAZARD CLASS: 3 (flammable), Packing group III  
IDENTIFICATION NUMBER: UN2709  
REPORTABLE QUANTITIES: None  
LABELING: FLAMMABLE LIQUID

ADR / RID (EU Only): 3, 31(c)

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

## 15. REGULATORY INFORMATION

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous  
scotecatalog.com/msds.nsf/.../104-51...

chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: N/Av

NUMBER IN ANNEX 1 OF DIR 67/548: Not listed in annex 1.

EU CLASSIFICATION: N/Av

R: N/Av

S: N/Av

## 16. OTHER INFORMATION

**OTHER PRECAUTIONS:** Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

**ABBREVIATIONS:** N/Av - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

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[FOREWORD](#)

[INTRODUCTION](#)

**1,4-DIETHYLBENZENE**  
***CAS N°: 105-05-5***

# SIDS Initial Assessment Report

(SIAM 2, Paris, 4-6 July 1994)

**Chemical Name:** 1,4-Diethylbenzene

**CAS No:** 105-05-5

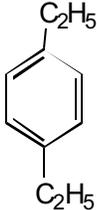
**Sponsor Country:** Japan

**National SIDS Contact Point in Sponsor Country:**

Mr. Yasuhisa Kawamura, Ministry of Foreign Affairs, Japan

**History:** As a high priority chemical for initial assessment, 1,4-Diethylbenzene was selected in the framework of the HPV Programme.  
At SIAM-2, conclusion was approved with comments.  
Comments at SIAM-2: Rearrangement of the documents.

**SIDS INITIAL ASSESSMENT PROFILE**

<b>CAS No.</b>	105-05-5
<b>Chemical Name</b>	Benzene, 1,4-diethyl-
<b>Structural Formula</b>	
<b>CONCLUSIONS AND RECOMMENDATIONS</b>	
It is currently considered of low potential risk and low priority for further work.	
<b>SHORT SUMMARY WHICH SUPPORTS THE REASONS FOR THE CONCLUSIONS AND RECOMMENDATIONS</b>	
<p><b>Exposure</b></p> <p>1,4-Diethylbenzene is a volatile liquid. Its production volume is ca. 1,300 tonnes/year in 1990 - 1992 in Japan and 1,200 tonnes/year were exported to the USA. This chemical is used as a solvent in closed systems. This chemical is stable in neutral, acidic or alkaline solution, and is considered to be “not readily biodegradable” (OECD TG 301C; 0 % by BOD; 02 % by GC after 28 days). Experimental BCF values (OECD TG 305) of the chemical are 320 – 629 in carp after 6 weeks.</p> <p>PECs have been calculated based on a fugacity level III model considering its physico-chemical properties (e.g. molecular weight, water solubility, vapour pressure and partition coefficient). The estimated environmental concentrations were <math>1.5 \times 10^{-8}</math> mg/l (air), <math>4.9 \times 10^{-6}</math> mg/l (water), <math>5.4 \times 10^{-4}</math> mg/kg (soil), <math>4.6 \times 10^{-3}</math> mg/kg (sediment).</p> <p>No monitoring data at the work place or the environment have been reported. The chemical is used in closed systems, and no data for consumer use are available. Based on the physico-chemical properties, the total exposed dose indirectly through the environment was estimated to be <math>8.8 \times 10^{-4}</math> mg/man/day. Also, the daily intake through drinking water is estimated to be <math>9.7 \times 10^{-6}</math> mg/man/day and through fish is calculated to be <math>5.7 \times 10^{-4}</math> mg/man/day.</p> <p><b>Environment</b></p> <p>For the environment, various NOEC and LC<sub>50</sub> values were gained from test results; 96 h LC<sub>50</sub> = 1.8 mg/l (acute fish); 24 h EC<sub>50</sub> = 32 mg/l (acute daphnia); 72 h EC<sub>50</sub> = 29 mg/l (algae); 21 d NOEC = 0.93 mg/l (long-term daphnia reproduction). As the lowest chronic toxicity result, the 21 d-NOEC (reproduction) for <i>Daphnia magna</i> (0.93 mg/l) were adopted. As assessment factor of 100 is applied. Thus the PNEC of 1,4-diethylbenzene is 0.0093 mg/l. Since the PEC is lower than the PNEC, the environmental risk is presumed to be low.</p> <p><b>Human Health</b></p> <p>The chemical showed no genotoxic effects in bacteria and chromosomal aberration test <i>in vitro</i>.</p> <p>In a combined repeat dose and reproductive/developmental toxicity screening test (OECD TG 422), increases of liver and kidney weights were observed at the dose level of 750 mg/kg/day and 150 mg/kg/day. In relation to the increase of liver weights, increases of incidence of brown colored livers and enlargement of the livers were observed at the highest dose (750 mg/kg/day) with histopathological findings of swelling of liver cells. For reproductive/developmental toxicity end-points, there were no effects observed concerning mating, fertility and oestrus cycle and also for dams during the pregnancy and lactation period. Therefore, the NOEL was 30 mg/kg/day</p>	

for repeated dose toxicity and 750 mg/kg/day for reproductive toxicity.

The total exposure dose indirectly through the environment was estimated to be  $8.8 \times 10^4$  mg/man/day. Also, the daily intake through drinking water is estimated as  $9.7 \times 10^6$  mg/man/day and through fish is calculated as  $5.7 \times 10^4$  mg/man/day. For human health, the margins of safety by indirect exposure from fish or drinking water are very large. Therefore, health risk is presumed to be low.

In conclusion, no further testing is needed at present considering its toxicity and exposure levels.

#### **NATURE OF FURTHER WORK RECOMMENDED**

This chemical is not a candidate for further work because all SIDS endpoints are sufficient.

## FULL SIDS SUMMARY

CAS NO: 105-05-5	SPECIES	PROTOCOL	RESULTS
<b>PHYSICAL-CHEMICAL</b>			
2.1	Melting Point		- 42 °C
2.2	Boiling Point		183 °C (at 1013 hPa)
2.3	Density		4.62 (relative density)
2.4	Vapour Pressure	OECD TG 104	1.054 torr at 25 °C
2.5	Partition Coefficient (Log Pow)	OECD TG 107	4.06 at 25 °C
2.6 A.	Water Solubility	OECD TG 105	17 mg/L at 25 °C
B.	pH		No data available.
	pKa		No data available
2.12	Oxidation: Reduction Potential		No data available.
<b>ENVIRONMENTAL FATE AND PATHWAY</b>			
3.1.1	Photodegradation	Estimated	Direct photodegradation in water $T_{1/2} = 9$ y
3.1.2	Stability in Water	OECD TG 111	Stable (pH 4.0, 7.0, 9.0)
3.2	Monitoring Data		No data available.
3.3	Transport and Distribution	Fugacity, level 3 Calculated (MNSEM-147S)	In Air 1.5E-8 mg/L In Water 4.9E-6 mg/L In Soil 5.4E-4 mg/kg In Sediment 4.6E-3 mg/kg
3.5	Biodegradation	OECD TG 301C	not readily biodegradable: 0 % (BOD) in 28 days, 0 - 2% (GC) in 28 days
3.6	Bioaccumulation	Carp OECD TG 305C	BCF: 320 - 629
<b>ECOTOXICOLOGY</b>			
4.1	Acute/Prolonged Toxicity to Fish	<i>Oryzias latipes</i> OECD TG 203	LC <sub>50</sub> (72hr): 2.5 mg/L LC <sub>50</sub> (96hr): 1.8 mg/L
4.2	Acute Toxicity to Aquatic Invertebrates ( <i>Daphnia</i> )	<i>Daphnia magna</i> OECD TG 202	EC <sub>50</sub> (24hr): 32 mg/l
4.3	Toxicity to Aquatic Plants e.g. Algae	<i>Selenastrum</i> <i>Capricornutum</i> OECD TG 201	EC <sub>50</sub> (72hr): 29 mg/l
4.5.2	Chronic Toxicity to Aquatic Invertebrates ( <i>Daphnia</i> )	<i>Daphnia magna</i> OECD TG 202	EC <sub>50</sub> (21d, Mortality): 2.4 mg/l NOEC(21d, Repro): 0.93 mg/l
4.6.1	Toxicity to Soil Dwelling Organisms		No data available.
4.6.2	Toxicity to Terrestrial Plants		No data available.
(4.6.3)	Toxicity to Other Non- Mammalian Terrestrial Species (Including Birds)		No data available
<b>TOXICOLOGY</b>			
5.1.1	Acute Oral Toxicity	Rat OECD TG 401	LD <sub>50</sub> > 2,000 mg/kg
5.1.2	Acute Inhalation Toxicity		No data available.

CAS NO: 105-05-5		SPECIES	PROTOCOL	RESULTS
5.1.3	Acute Dermal Toxicity			No data available.
5.4	Repeated Dose Toxicity	Rat	OECD Combined Test	NOAEL = 30 mg/kg/day
5.5	Genetic Toxicity In Vitro			
A.	Bacterial Test (Gene mutation)	<i>S. typhimurium</i> <i>E. coli</i>	OECD Guidelines No.471 and 472 and Guidelines for Screening Mutagenicity Testing of Chemicals (Japan)	Negative (With metabolic activation) Negative (Without metabolic activation)
B.	Non-Bacterial In Vitro Test (Chromosomal aberrations)	CHL cells	OECD Guideline No.473 and Guidelines for Screening Mutagenicity Testing of Chemicals (Japan)	Negative(With metabolic activation) Negative(Without metabolic activation)
5.6	Genetic Toxicity In Vivo			No data available.
5.8	Toxicity to Reproduction	Rat	OECD Combined Test	NOAEL Parental = 750 mg/kg/day NOAEL F1 offspring = 750 mg/kg/day
5.9	Developmental Toxicity/ Teratogenicity	Rat	OECD Combined Test	NOAEL Maternal toxicity = 750 mg/kg/day NOAEL Teratogenicity = 750 mg/kg/day
5.11	Experience with Human Exposure			

## SIDS Initial Assessment Report

### 1. Identity

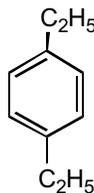
**OECD Name:** 1,4-Diethylbenzene

**Synonym:** None

**CAS Number:** 105-05-5

**Empirical Formula:** C<sub>10</sub>H<sub>14</sub>

**Structural Formula:**



**Degree of Purity:** 97 %

**Major Impurities:** 1,3-Diethylbenzene

**Essential Additives:** None

**Physical-chemical Properties:**

Melting Point:	-42.85 °C
Boiling Point:	183.75 °C
Density:	4.62
Vapor pressure:	1.054 Torr at 25 °C
Water solubility:	17 mg/L at 25 °C
Log Pow:	4.06 at 25 °C

## 2. Exposure

### 2.1 General discussion

1,4-Diethylbenzene is a volatile stable liquid. The production volume was ca. 1,300 tonnes/year in 1990 - 1992 in Japan, and 1,200 tonnes/year were exported to the U.S.A.

This chemical is used as a solvent. Releases to the environment may occur at the production site and specific industrial sites. All disposal wastes are treated by incineration. 1,4-Dethylbenzene seems to be released into water and air from its production sites after biological treatment. No specific monitoring data of the chemical is available. This chemical is stable in neutral, acidic or alkaline solutions, and is classified as "not readily biodegradable".

### 2.2 Environmental exposure

#### a) Biodegradability:

If released into water, this substance is not readily biodegraded. In a MITI (I) test, corresponding to the OECD 301C, 0 % degradation during 28 days based on BOD and 0 - 2 % based on GC analysis were measured.

#### b) Hydrolysis as a function to pH:

The chemical is stable in water at pH 4, 7 and 9 (OECD TG 111).

#### c) Photodegradability (estimation)

A half-life time of 9 years is estimated for the degradation of 1,4-diethylbenzene in water by direct photodegradation through absorption of UV light (MITI, Japan).

#### d) Bioaccumulation:

A measured BCF of 320 – 629 in carp (6 weeks at 25 °C) suggests that the potential for bioconcentration in aquatic organisms is low.

#### e) Estimates of environmental fate, pathway and concentration:

The potential environmental distribution of 1,4-diethylbenzene obtained from a generic fugacity model, Mackay level III, under emission scenarios is shown in Table 1. The results show that when 1,4-diethylbenzene is released into water, the majority of the chemical is likely distributed into soil and sediment

PECs have been calculated based on several models (MNSEM, CHEMCAN, CHEMFRN) considering its physico-chemical properties (e.g. molecular weight, water solubility, vapour pressure and partition coefficient). The estimated concentrations of MNSEM model were  $1.5 \times 10^8$  mg/l (air),  $4.9 \times 10^6$  mg/l (water),  $5.4 \times 10^4$  mg/kg (soil),  $4.6 \times 10^3$  mg/kg (sediment). No monitoring data at work place and environment have been reported. The chemical is used in closed system, and no data for consumer use are available. Based on the physico-chemical properties, the total exposed dose indirectly through the environment was estimated as  $8.8 \times 10^4$

mg/man/day. Also, the daily intake through drinking water is estimated as  $9.7 \times 10^{-6}$  mg/man/day and through fish is calculated as  $5.7 \times 10^{-4}$  mg/man/day.

Global situation:

Method: MNSEM 147S (Details are shown in Form-1 Annex)  
 Input data: Molecular weight: 134.21  
 Water solubility: 17.00 [mg/l]  
 Vapor pressure: 1.05 [mmHg]  
 Log Pow: 4.06  
 Results: Steady state mass and concentration calculated using MNSEM 147S  
 Air: 1.5E-08 [mg/l]  
 Water: 4.9E-06 [mg/l]  
 Soil: 5.4E-04 [mg/kg dry solid]  
 Sediment: 4.6E-03 [mg/kg dry solid]  
 Environmental exposure dose (Concentration in foods)  
 Inhalation of air: 3.0E-04 [mg/day]  
 Drinking water: 9.7E-06 [mg/day]  
 Ingestion of fish: 5.7E-04 [mg/day]  
     meat: 2.9E-08 [mg/day]  
     milk: 2.9E-08 [mg/day]  
     vegetation: 3.5E-06 [mg/day]  
 Total exposure dose: 8.8E-04 [mg/day]

Table 1: Comparison of calculated environmental concentration using several models.

Model	Air[mg/l]	Water[mg/l]	Soil[mg/kg]	Sediment[mg/kg]
MNSEM	1.5E-08	4.9E-06	5.4E-04	4.6E-03
CHEMCAN2	5.3E-08	3.5E-06	1.0E-04	3.2E-03
CHEMFRAN	5.3E-08	3.6E-06	1.1E-04	3.3E-03

### 2.3 Consumer Exposure

No data on consumer exposure are available.

### 2.4 Occupational Exposure

No data on work place monitoring have been reported.

### 3. Toxicity

#### 3.1 Human Toxicity

##### a) Acute toxicity

Only one acute toxicity data is available for rat using a limit test according to OECD Test Guideline 401. Rats were administered orally (gavage) at 0 or 2,000 mg/kg. No deaths occurred for either males or females in the treated groups. As clinical signs, decrease of spontaneous motor activity was observed in both male and female rats and lacrimation was additionally observed in one female rat. No death were observed during the course of the study. All animals gained body weight on day 7 and 14 after administration. No remarkable macroscopical changes were observed in both males and females (MHW, Japan, 1993a). No acute toxicity data are available by inhalation and dermal routes of 1,4-diethylbenzene.

##### b) Repeated toxicity

There is only one key study on repeated dose toxicity of 1,4-diethylbenzene. This chemical was studied for oral toxicity in rats according to the OECD combined repeated dose and reproductive/developmental toxicity test [OECD TG 422]. As the study was well controlled and conducted according to GLP, this was appropriate to regard as a key study. Male and female SD rats were orally administered (gavage) at doses of 0, 30, 150 and 750 mg/kg/day. In male rats, the administration period was two weeks prior to mating, 2 weeks of mating and 2 weeks after the completion of mating period. In female, in addition to maximum four weeks pre-mating and mating period, they were given through pregnant period until day 3 of post delivery.

The results in clinical observations did not reveal any effects attributable to the administration of test substance and there were no mortality in all groups. Depression of body weight gain observed in both male and female rats receiving 750 mg/kg/day, and food consumption of male rats receiving 750 mg/kg/day was less than those of control until day 7 and thereafter, increases in food consumption were observed in them from Day 28. As a results of hematology, there were no essential effects of test substance.

As the results of blood clinical examination, increases in the BUN and GPT were observed in male rat receiving 150 and 750 mg/kg/day, and increases in total protein, albumin, creatinine and total bilirubin and decrease in glucose were observed in male rats receiving 750 mg/kg/day, suggesting that those changes were due to the effect on kidneys and liver. As the results of organ weight analysis, increases in liver weight were observed in both male and female rats receiving 750 mg/kg/day, moreover increases in kidneys weights were observed in male rats receiving 150 mg/kg/day or more groups. As the gross findings, in relation to increase of liver weights, increases in incidence of brown colored livers or enlargement of the livers were observed in male rats receiving 750 mg/kg/day, and swelling of the liver cells was observed in them, histopathologically. The results described above led to a conclusion that effects of repeated dose toxicity study were considered to appear at 150 mg/kg/day or more in male rats and at 750 mg/kg/day in female rats (MHW, Japan, 1993b). The NOAEL for repeated dose toxicity in rats is considered to be 30 mg/kg/day in males and 150 mg/kg/day in female rats.

##### c) Reproductive toxicity

1,4-Diethylbenzene was studied for oral toxicity in rats according to the OECD

combined repeated dose and reproductive/developmental toxicity test [OECD TG 422] at doses of 0, 100, 300 and 1,000 mg/kg/day. Although this combined study was designed to investigate reproductive capability in parental generation as well as development in F<sub>1</sub> offspring, parameters to evaluate developmental toxicity were limited to only body weights at day 0 and day 4 after birth, and autopsy findings at day 4.

The results observed in mating, fertility and estrous cycle did not reveal any effects attributable to the administration of test substance. Observation of delivery, all gestation animals delivered of pups, normally and there were not a treatment-related effect throughout the lactation period. The external examination of pups revealed no effects attributable to the administration of test substance. The body weights of fetuses showed the favorably froths until Day 4 of lactation. The necropsy of stillborn, dead pups until Day 4 of lactation and newborns at Day 4 of lactation did not reveal any effects attributable to the administration of test substance. The influences of the test substance on reproductive and developmental toxicity were not observed in both male and female rats receiving 750 mg/kg/day, therefore maximum NOELs were considered to be 750 mg/kg/day in both sexes (MHW, 1993). The NOAEL values for both parental and F<sub>1</sub> offspring in reproductive toxicity are considered to be 750 mg/kg/day. As for developmental toxicity, the NOAEL for F<sub>1</sub> offspring is estimated to be 750 mg/kg/day.

#### d) Genetic toxicity

##### Bacterial tests

Reverse gene mutation assays were conducted in line with Guidelines for Screening Mutagenicity Testing of Chemicals (Japan) and OECD Test Guidelines 471 and 472, using the pre-incubation method. This study was well controlled and regarded as a key study.

1,4-Diethylbenzene showed negative results in *Salmonella typhimurium* TA100, TA1535, TA98, TA1537 and *Escherichia coli* WP2 *uvrA* at concentrations up to 50 ug/plate with or without metabolic activation (MHW, 1993c).

##### Non-bacterial test *in vitro*

A chromosomal aberration test in line with the Guidelines for Screening Mutagenicity Testing of Chemicals (Japan) and OECD Test Guideline 473 was conducted using cultured Chinese Hamster lung (CHL/IU) cells. This study was well controlled and regarded as a key study. The maximum concentration of the chemical was used within no apparent cytotoxic effect in continuous treatment.

Either structural chromosomal aberrations or polyploidy were not recognized up to a maximum concentration of 0.11 and 1.3 mg/ml under conditions of both continuous treatment and short-term treatment, respectively with or without an exogenous metabolic activation system (MHW, 1993c).

##### *in vivo* test

No data are available on *in vivo* genotoxic effects.

#### e) Other human health related information

None

### 3.2 Ecotoxicity

1,4-Diethylbenzene has been tested in a limited number of aquatic species (*Selenastrum capricornutum*, *Daphnia magna* and *Oryzias latipes*), according to OECD test guidelines [OECD TG 201, 202, 203, 204 and 211]. Acute and chronic toxicity data to test organisms for 1,4-diethylbenzene are summarized in Table 2. No other ecotoxicological data are available.

Various NOEC and LC<sub>50</sub> values were gained from above tests; LC<sub>50</sub> = 1.8 mg/l (acute fish); EC<sub>50</sub> = 32 mg/l (acute daphnia); EC<sub>50</sub> = 29 mg/l (algae); NOEC = 0.93 mg/l (long-term daphnia reproduction). The lowest chronic toxicity result (21 d-NOEC, reproduction, for *Daphnia magna*: 0.93 mg/l) was adopted for the calculation of the PNEC. An assessment factor of 100 is applied. Thus the PNEC of 1,4-diethylbenzene is 0.0093 mg/l. Since the PEC is lower than the PNEC the environmental risk is presumed to be low.

Table 2. Acute and chronic toxicity data of 1,4-diethylbenzene to aquatic organisms.

Species	Endpoint <sup>*1</sup>	Conc. (mg/L)	Reference
<i>Selenastrum capricornutum</i> (algae)	Biomass: EC <sub>50</sub> (72h)	29 mg/L	MOE, Japan. (1992)
<i>Daphnia magna</i> (water flea)	Mor: LC <sub>50</sub> (24h)	32 mg/L	
	Mor: LC <sub>50</sub> (21d)	2.4 mg/L	
	Rep: EC <sub>50</sub> (21d)	1.3 mg/L	
	NOEC(21d)	0.93 mg/L	
<i>Oryzias latipes</i> (fish, Medaka)	Mor: LC <sub>50</sub> (24h)	2.5 mg/L	
	Mor: LC <sub>50</sub> (72h)	2.5 mg/L	
	Mor: LC <sub>50</sub> (96h)	1.8 mg/L	

Notes: <sup>\*1</sup> Mor; mortality, Rep; reproduction.

#### 4. Initial assessment

For the environment, various NOEC and LC<sub>50</sub> values were gained from test results; LC<sub>50</sub> = 1.8 mg/l (acute fish); EC<sub>50</sub> = 32 mg/l (acute daphnia); EC<sub>50</sub> = 29 mg/l (acute algae); NOEC = 0.93 mg/l (long-term daphnia reproduction). The lowest chronic toxicity result (21 d-NOEC, reproduction, for *Daphnia magna*: 0.93 mg/l) was adopted for the calculation of the PNEC. An assessment factor of 100 is applied. Thus the PNEC of 1,4-diethylbenzene is 0.0093 mg/l. Since the PEC is lower than the PNEC the environmental risk is presumably low.

The chemical showed no genotoxic effects in bacteria or chromosomal aberrations *in vitro*. In a combined repeat dose and reproductive/developmental toxicity screening test, increases of liver and kidney weights were observed at the dose level of 750 mg/kg/day and 150 mg/kg/day. In relation to the increase of liver weights, increases of incidence of brown colored livers and enlargement of the livers were observed at the highest dose (750 mg/kg/day) with histopathological findings of swelling of liver cells. For reproductive/developmental toxicity end-points, there were no effects observed concerning mating, fertility and oestrus cycle and also for dams during the pregnancy and lactation period. Therefore, the NOEL was 30 mg/kg/day for repeated dose toxicity and 750 mg/kg/day for reproductive toxicity. The total exposed dose indirectly through the environment was estimated as  $8.8 \times 10^{-4}$  mg/man/day. Also, the daily intake through drinking water is estimated as  $9.7 \times 10^{-6}$  mg/man/day and through fish is calculated as  $5.7 \times 10^{-4}$  mg/man/day. For human health, the margin of safety by indirect exposure from fish or drinking water are very large. Therefore, health risk is presumed to be low.

**5. Overall recommendation and initial assessment****5.1 Conclusion**

It is currently considered of low potential risk and low priority for further work.

**5.2 Recommendation**

None

## 6. REFERENCES

- Driesbach, R.R. (1961) Physical Properties of Chemical Compounds. Vol. 3, Am. Chem.Soc., Washington D.C.
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- MHW, Japan (1993b) Unpublished Report on Combined Repeat Dose and Reproductive/Developmental Toxicity Screening Test of 1,4-diethylbenzene. (HPV/SIDS Test conducted by MHW, Japan)
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- MITI, Japan (1993) Unpublished Report (1993) (HPV/SIDS Test conducted by MITI, Japan. Test was performed in Chemicals Inspection and Testing Institute, Japan)

# **REVISED SIDS DOSSIER ON THE HPV CHEMICAL**

**1,4-Diethylbenzene**

**CAS No. 105-05-5**

Sponsor Country : Japan

DATE: March 2001

## SIDS PROFILE

1.01 A.	<b>CAS No.</b>	105-05-5
1.01 C.	<b>CHEMICAL NAME ( OECD Name)</b>	1,4-Diethylbenzene
1.01 D.	<b>CAS DESCRIPTOR</b>	Not applicable in this case
1.01 G.	<b>STRUCTURAL FORMULA</b>	C <sub>10</sub> H <sub>15</sub>
	<b>OTHER CHEMICAL IDENTITY INFORMATION</b>	
1.5	<b>QUANTITY</b>	In Japan, approx 1,300 tonnes in 1990 - 1992, and 1,200 tonnes were exported to the U. S. A.
1.7	<b>USE PATTERN</b>	Solvent (100 %)
1.9	<b>SOURCES AND LEVELS OF EXPOSURE</b>	<p>1. Amount released from production site to water is negligible in Japan. All leaks and spills are contained and cleaned up in an appropriate manner, i.e., water treatment or incineration.</p> <p>2. Amount released to air from production site is negligible.</p> <p>3. Information on consumer exposure is not available.</p>
	<b>ISSUES FOR DISCUSSION (IDENTIFY, IF ANY)</b>	

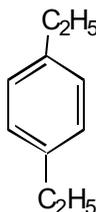
## SIDS SUMMARY

## 1, 4-Diethylbenzene

CAS NO: 105-05-5		Information	OECD Study	GLP	Other Study	Estimation Method	Acceptable	SIDS Testing Required
STUDY		Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
<b>PHYSICAL-CHEMICAL DATA</b>								
2.1	Melting Point	Y	N	N	Y	N	Y	N
2.2	Boiling Point	Y	N	N	Y	N	Y	N
2.3	Density	Y	N	N	Y	N	Y	N
2.4	Vapour Pressure	N						Y
2.5	Partition Coefficient	N						Y
2.6	Water Solubility	Y	N	N	Y	N	Y	N
	pH and pKa values	N						N
OTHER P/C STUDIES RECEIVED								
<b>ENVIRONMENTAL FATE and PATHWAY</b>								
3.1.1	Photodegradation	N						Y
3.1.2	Stability in water	N						Y
3.2	Monitoring data	N						N
3.3	Transport and Distribution	N						N
3.5	Biodegradation	N						Y
3.6	Bioaccumulation	Y	Y	Y	N	N	Y	N
OTHER ENV FATE STUDIES RECEIVED								
<b>ECOTOXICITY</b>								
4.1	Acute toxicity to Fish	N						Y
4.2	Acute toxicity to Daphnia	N						Y
4.3	Toxicity to Algae	N						Y
4.5.2	Chronic toxicity to Daphnia	N						Y
4.6.1	Toxicity to Soil dwelling organisms	N						N
4.6.2	Toxicity to Terrestrial plants	N						N
4.6.3	Toxicity to Birds	N						N
OTHER ECOTOXICITY STUDIES RECEIVED								
<b>TOXICITY</b>								
5.1.1	Acute Oral	N						Y
5.1.2	Acute Inhalation	N						N
5.1.3	Acute Dermal	N						N
5.4	Repeated Dose	N						Y
5.5	Genetic Toxicity <i>in vitro</i>							
	. Gene mutation	N						Y
	. Chromosomal aberration	N						Y
5.6	Genetic Toxicity <i>in vivo</i>	N						N
5.8	Reproduction Toxicity	N						Y
5.9	Development / Teratogenicity	N						Y
5.11	Human experience	N						N
OTHER TOXICITY STUDIES RECEIVED								

**1. GENERAL INFORMATION****1.01 SUBSTANCE INFORMATION**

- A. CAS-Number** 105-05-5
- B. Name (IUPAC name)** Benzene, 1,4-diethyl-
- C. Name (OECD name)** 1,4-Diethylbenzene
- D. CAS Descriptor** Not applicable
- E. EINECS-Number** 203-265-2
- F. Molecular Formula** C<sub>10</sub>H<sub>14</sub>
- G. Structural Formula**



- H. Substance Group** Not applicable
- I. Substance Remark** None
- J. Molecular Weight** 134.22

**1.02 OECD INFORMATION**

- A. Sponsor Country:** Japan
- B. Lead Organisation:**  
 Name of Lead Organisation: Ministry of Health and Welfare (MHW)  
 Ministry of International Trade and Industry (MITI)  
 Environment Agency (EA)  
 Contact person: Mr. Yasuhisa Kawamura  
 Director  
 Second International Organization Bureau  
 Ministry of Foreign Affairs  
 Address: 2-2-1 Kasumigaseki, Chiyoda-ku  
 Tokyo 100, Japan  
 TEL 81-3-3581-0018  
 FAX 81-3-3503-3136
- C. Name of responder**  
 Name: Same as above contact person

**1.1 GENERAL SUBSTANCE INFORMATION****A. Type of Substance**

element [ ]; inorganic [ ]; natural substance [ ];  
organic [X]; organometallic [ ]; petroleum product [ ]

**B. Physical State**

gaseous [ ]; liquid [X]; solid [ ]

**C. Purity**

97 % (weight/weight)

**1.2 SYNONYMS****1.3 IMPURITIES**

Name: 1,3-Diethylbenzene  
Value: unknown

**1.4 ADDITIVES** None**1.5 QUANTITY**

Location	Production(tonnes)	Date
Japan	1,300/year	1990-1992
export to U.S.A	1,200/year	1990-1992

Reference: MITI, Japan

**1.6 LABELLING AND CLASSIFICATION**

Labelling None

Classification None

**1.7 USE PATTERN****A. General****Type of Use:****Category:**

(a) main industry use

Solvent (Closed system)  
100 %

Remarks: None

Reference: MITI, Japan

**B. Uses in Consumer Products** None

Function

Amount present Physical state

**1.8 OCCUPATIONAL EXPOSURE LIMIT VALUE**

None

**1.9 SOURCES OF EXPOSURE**

Source: Media of release: Air from a production site  
Quantities per media: Negligible small  
Remarks:  
Reference: MITI, Japan

**1.10 ADDITIONAL REMARKS**

- A. Options for disposal** Incineration  
Reference: MITI, Japan
- B. Other remarks** None

**2. PHYSICAL-CHEMICAL DATA****2.1 MELTING POINT**

Value: - 42.85 °C  
Decomposition: Yes [ ] No [X] Ambiguous [ ]  
Sublimation: Yes [ ] No [X] Ambiguous [ ]  
Method: Unknown  
GLP: Yes [ ] No [ ] ? [X]  
Remarks: None  
Reference: API

**2.2 BOILING POINT**

Value: 183.75 °C  
Pressure: at 1013 hPa  
Decomposition: Yes [ ] No [X] Ambiguous [ ]  
Method: Unknown  
GLP: Yes [ ] No [ ] ? [X]  
Remarks: None  
Reference: API

**2.3 DENSITY (Relative density)**

Type: Bulk density [ ]; Density [ ]; Relative Density [X]  
Value: 4.62  
Temperature: Unknown  
Method: Unknown  
GLP: Yes [ ] No [ ] ? [X]  
Remarks: None  
Reference: ECDIN database

**2.4 VAPOUR PRESSURE**

Value: 1.054 Torr  
Temperature: 25 °C  
Method: calculated [ ]; measured [X]  
OECD Test Guideline 104 Static Method  
GLP: Yes [ ] No [ ] ? [X]  
Remarks:  
Reference: Driesbach, R.R. (1961)

**2.5 PARTITION COEFFICIENT  $\log_{10}P_{ow}$** 

Log Pow: 4.06  
Temperature: 25 °C  
Method: calculated [ ]; measured [X]  
OECD Test Guideline 107  
GLP: Yes [X] No [ ] ? [ ]  
Remarks: None  
Reference: MITI, Japan (1993)

**2.6 WATER SOLUBILITY****A. Solubility****(a) Preferred result**

Value: 17 mg/l  
Temperature: 25°C  
Description: Miscible ; Of very high solubility ;  
Of high solubility ; Soluble ; Slightly soluble ;  
Of low solubility ; Of very low solubility ;  
Not soluble   
Method: Unknown  
GLP: Yes  No  ?   
Remarks:  
Reference: Company data

**B. pH Value, pKa Value** Not applicable

**2.7 FLASH POINT**

Value: 57 °C  
Type of test: Closed cup ; Open cup ; Other   
Method: Unknown  
GLP: Yes  No  ?   
Remarks:  
Reference: Company data

**2.8 AUTO FLAMMABILITY**

Not applicable

**2.9 FLAMMABILITY**

No studies located

**2.10 EXPLOSIVE PROPERTIES**

No studies located

**2.11 OXIDIZING PROPERTIES**

No studies located

**2.12 OXIDATION: REDUCTION POTENTIAL**

No studies located

**2.13 ADDITIONAL DATA****A. Partition co-efficient between soil/sediment and water (Kd)**

No studies located

**B. Other data**

None

### 3. ENVIRONMENTAL FATE AND PATHWAYS

#### 3.1 STABILITY

##### 3.1.1 PHOTODEGRADATION

Type: Air [ ]; Water [X]; Soil [ ]; Other [ ]  
 Light source: Sun light [X]; Xenon lamp [ ]; Other [ ]  
 Light spectrum:  
 Relative intensity:  
 Spectrum of substance: epsilon = 4.70 at 300 nm  
 Concentration of Substance:  
 Estimated parameter for calculation:

Quantum yield	0.01
Concentration	5 x 10 <sup>-5</sup> M
Depth of water body	500 cm
Conversion rate	6.023 x 10 <sup>-20</sup>

Results: Degradation rate 1.22 x 10<sup>-13</sup> mol/l/s  
 Half life 9.00 years  
 Reference Lyman, W. J. et al. (1981)

##### 3.1.2 STABILITY IN WATER

Type: Abiotic (hydrolysis) [X]; biotic (sediment) [ ]  
 Half life: Not hydrolysed at pH 4, 7 and 9  
 Method: OECD TG 111  
 GLP: Yes [X] No [ ] ? [ ]  
 Test substance: 1,4-Diethylbenzene  
 Reference: MITI, Japan (1993)

##### 3.1.3 STABILITY IN SOIL

No studies located

#### 3.2 MONITORING DATA (ENVIRONMENT)

No studies located

### 3.3 TRANSPORT AND DISTRIBUTION BETWEEN ENVIRONMENTAL COMPARTMENT INCLUDING ESTIMATED ENVIRONMENTAL CONCENTRATIONS AND DISTRIBUTION PATHWAY

#### 3.3.1 TRANSPORT

No studies located

#### 3.3.2 THEORETICAL DISTRIBUTION (FUGACITY CALCULATION)

Media: Air-biota [ ]; Air-biota-sediment-soil-water [ ]; Soil-biota [ ];  
 Water-air [ ]; Water-biota [ ]; Water-soil  
 Other [ X ] (Air-soil-water-sediment)

Method: Fugacity level I [ ]; Fugacity level II [ ]; Fugacity level III [ ];  
 Fugacity level IV [ ]; Other(calculation) [ X ];

## Other(measurement) [ ]

Results: Steady state mass and concentration calculated using MNSEM 147S

Air: 1.5E-08 [mg/l]  
 Water: 4.9E-06 [mg/l]  
 Soil: 5.4E-04 [mg/kg dry solid]  
 Sediment: 4.6E-03 [mg/kg dry solid]

## Exposure dose

Inhalation of air: 3.0E-04 [mg/day]  
 Drinking water: 9.7E-06 [mg/day]  
 Ingestion of fish: 5.7E-04 [mg/day]  
     Meat: 2.9E-08 [mg/day]  
     milk: 2.9E-08 [mg/day]  
     vegetation: 3.5E-06 [mg/day]

Total exposure dose: 8.8E-04 [mg/day]

Remarks: Input data:

Molecular weight: 134.21  
 Water solubility: 17.00 [mg/l]  
 Vapor pressure: 1.05 [mmHg]  
 Log Pow: 4.06

MNSEM 147S is a slightly revised version of MNSEM 145I.

1. addition of air particle compartment to air phase
2. execution of calculation on a spreadsheet program

Comparison of calculated environmental concentration using several methods (Japanese environmental conditions are applied to the calculations.)

Model	Air[mg/l]	Water[mg/l]	Soil[mg/kg]	Sediment[mg/kg]
MNSEM	1.5E-08	4.9E-06	5.4E-04	4.6E-03
CHEMCAN2	5.3E-08	3.5E-06	1.0E-04	3.2E-03
CHEMFRAN	5.3E-08	3.6E-06	1.1E-04	3.3E-03

Reference: EA and MITI, Japan (1993)

### 3.4 IDENTIFICATION OF MAIN MODE OF DEGRADABILITY IN ACTUAL USE

No studies located

### 3.5 BIODEGRADATION

Type: aerobic [X]; anaerobic [ ]  
 Inoculum: adapted [ ]; non-adapted [X];  
 activated sludge, 30 mg/l as suspended solid  
 Concentration of the chemical: 100 mg/l related to COD [ ]; DOC [ ]; Test substance [X];  
 Medium: water [ ]; water-sediment [ ]; soil [ ]; sewage treatment others [X]  
 (Japanese standard activated sludge)  
 Degradation: Degree of degradation after 28 days  
 0, 0 and 0 % from BOD  
 2, 0 and 0 % from GC analysis  
 Results: Readily biodeg. [ ]; Inherently biodeg. [ ]; under test condition no  
 biodegradation observed [X], Other [ ]

Method: OECD Test Guideline 301C  
 GLP: Yes  No  ?   
 Test substance: 1,4-Diethylbenzene, purity: > 95 %  
 Remarks: None  
 Reference: MITI, Japan (1993)

### 3.6 BOD<sub>5</sub>, COD OR RATIO BOD<sub>5</sub>/COD

Not applicable

### 3.7 BIOACCUMULATION

Species: Carp  
 Exposure period: 6 weeks  
 Temperature: 25 °C  
 Concentration: (1) 20 µg/l  
 (2) 2 µg/l  
 BCF: (1) 362 - 598  
 (2) 320 - 629  
 Elimination: Yes  No  ?   
 Method: OECD TG 305C  
 Type of test:  calculated;  measured  
 static ; semi-static ; flow-through ; other   
 GLP: Yes  No  ?   
 Test substance: 1,4-Diethylbenzene, Purity: > 95 %  
 Remarks: None  
 Reference: MITI, Japan (1992)

### 3.8 ADDITIONAL REMARKS

- A. Sewage treatment None  
 B. Other information None

**4. ECOTOXICOLOGICAL DATA****4.1 ACUTE/PROLONGED TOXICITY TO FISH**

Type of test: static [ ]; semi-static [X]; flow-through [ ]; other [ ]  
 open-system [X]; closed-system [ ]  
 Species: *Oryzias latipes*  
 Exposure period: 96 hr  
 Results: LC<sub>50</sub> (24h) = 2.5 mg/l (95% confidence level: 1.8-3.4 mg/l)  
 LC<sub>50</sub> (48h) = 2.5 mg/l (95% confidence level: 1.8-3.4 mg/l)  
 LC<sub>50</sub> (72h) = 2.5 mg/l (95% confidence level: 1.9-3.2 mg/l)  
 LC<sub>50</sub> (96h) = 1.8 mg/l (95% confidence level: 1.0-3.2 mg/l)  
 NOEC =  
 LOEC =  
 Analytical monitoring: Yes [ ] No [X] ? [ ]  
 Method: OECD Test Guideline 203 (1981)  
 GLP: Yes [ ] No [X] ? [ ]  
 Test substance: 1,4-Diethylbenzene, Purity = 99.9 %  
 Remarks: A group of 10 fishes were exposed to 5 nominal concentrations (0.56-5.6 mg/l), control of Tween 80 (5.6 mg/l) and laboratory water control.  
 Reference: EA, Japan (1992)

**4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES****A. Daphnia**

Type of test: static [X]; semi-static [ ]; flow-through [ ]; other [ ]  
 open-system [X]; closed-system [ ]  
 Species: *Daphnia magna*  
 Exposure period: 24 hrs  
 Results: EC<sub>50</sub> (24h) = 32 mg/l (95% confidence level: 28-37 mg/l)  
 EC<sub>50</sub> (48h) =  
 NOEC =  
 LOEC =  
 Analytical monitoring: Yes [ ] No [X] ? [ ]  
 Method: OECD Test Guideline 202 (1984)  
 GLP: Yes [ ] No [X] ? [ ]  
 Test substance: 1,4-Diethylbenzene, purity: = 99.9 %  
 Remarks: 20 daphnids (4 replicates; 5 organisms per replicate) were exposed to 5 nominal concentrations (10-100 mg/l), control of DMSO:HCO-40 = 9:1 (100 mg/l) and laboratory water control.  
 Reference: EA, Japan (1992)

**B. Other aquatic organisms**

C.

No studies located

**4.3 TOXICITY TO AQUATIC PLANTS e.g. Algae**

Species: *Selenastrum capricornutum* ATCC 22662  
 End-point: Biomass [X]; Growth rate [ ]; Other [ ]  
 Exposure period: 72 hours  
 Results: Biomass: EC<sub>50</sub> (72h) = 29 mg/l

NOEC =  
 LOEC =

Analytical monitoring: Yes  No  ?   
 Method: OECD Test Guideline 201 (1984)  
 open-system ; closed-system   
 GLP: Yes  No  ?   
 Test substance: 1,4-Diethylbenzene, purity = 99.9 %  
 Remarks: The EC<sub>30</sub> values were calculated based on 4 nominal concentrations  
 (17-100 mg/l), ethanol control (100 mg/l) and laboratory water control.  
 Reference: EA, Japan (1992)

#### 4.4 TOXICITY TO BACTERIA

No studies located

#### 4.5 CHRONIC TOXICITY TO AQUATIC ORGANISMS

##### 4.5.1 CHRONIC TOXICITY TO FISH

No studies located

##### 4.5.2 CHRONIC TOXICITY TO AQUATIC INVERTEBRATES

Type of test: static ; semi-static ; flow-through ; other ;  
 End-point: Mortality ; Reproduction rate ; Other   
 Exposure period: 21 days  
 Results:  
 Mortality: LC<sub>50</sub> (24 h) = 7.2 mg/l (95% confidence level: 5.4-9.8 mg/l)  
 LC<sub>50</sub> (48 h) = 6.0 mg/l (95% confidence level: 4.5-8.0 mg/l)  
 LC<sub>50</sub> (96 h) = 4.2 mg/l (95% confidence level: 3.2-5.4 mg/l)  
 LC<sub>50</sub> (7 d) = 3.2 mg/l (95% confidence level: 2.4-4.1 mg/l)  
 LC<sub>50</sub> (14 d) = 2.6 mg/l (95% confidence level: 1.9-3.5 mg/l)  
 LC<sub>50</sub> (21 d) = 2.4 mg/l (95% confidence level: 1.8-3.2 mg/l)  
 Reproduction: EC<sub>50</sub> (14 d) = 1.1 mg/l (95% confidence level: 0.66-1.7 mg/l)  
 EC<sub>50</sub> (21 d) = 1.3 mg/l (95% confidence level: 0.97-1.8 mg/l)  
 NOEC = 0.93 mg/l (p < 0.05)  
 LOEC = 3.0 mg/l (p < 0.05)  
 Analytical monitoring: Yes  No  ?   
 Method: OECD Test Guideline 202 (1984)  
 GLP: Yes  No  ?   
 Test substance: 1,4-Diethylbenzene, purity = 99.9 %  
 Remarks: 40 daphnids (4 replicates; 10 organisms per replicate) were exposed  
 to 5 nominal concentrations (0.3-30 mg/l), control of DMSO:HCO-40  
 = (:1 (100 mg/l) and laboratory water control.  
 Reference: EA, Japan (1992)

#### 4.6 TOXICITY TO TERRESTRIAL ORGANISMS

##### 4.6.1 TOXICITY TO SOIL DWELLING ORGANISMS

No studies located

##### 4.6.2 TOXICITY TO TERRESTRIAL PLANTS

No studies located

**4.6.3 TOXICITY TO OTHER NON MAMMALIAN TERRESTRIAL SPECIES  
(INCLUDING AVIAN)**

No studies located

**4.7 BIOLOGICAL EFFECTS MONITORING (INCLUDING BIOMAGNIFICATION)**

No studies located

**4.8 BIOTRANSFORMATION AND KINETICS IN ENVIRONMENTAL SPECIES**

No studies located

**4.9 ADDITIONAL REMARKS**

None

**5. TOXICITY****5.1 ACUTE TOXICITY****5.1.1 ACUTE ORAL TOXICITY**

Type : LD<sub>0</sub> [ ]; LD<sub>100</sub> [ ]; LD<sub>50</sub> [X]; LDLo [ ]; Other [ ]

Species/strain: Rat (Crj:CD(SD))

Value : > 2,000 (mg/kg) for male or female

Method: OECD Test Guideline 401

GLP: Yes [X] No [ ] ? [ ]

Test substance: 1,4-Diethylbenzene, purity: 97.2 %

Remarks: As clinical signs, decrease of spontaneous motor activity was observed in both male and female rats and lacrimation was additionally observed in one female rat. No death were observed during the course of the study. All animals gained body weight on day 7 and 14 after administration. No remarkable macroscopical changes were observed in both males and females.

Reference: MHW, Japan (1993a)

**5.1.2 ACUTE INHALATION TOXICITY**

No studies located

**5.1.3 ACUTE DERMAL TOXICITY**

No studies located

**5.1.4 ACUTE TOXICITY, OTHER ROUTES OF ADMINISTRATION**

No studies located

**5.2 CORROSIVENESS/IRRITATION****5.2.1 SKIN IRRITATION/CORROSION**

No studies located

**5.2.2 EYE IRRITATION/CORROSION**

No studies located

**5.3 SKIN SENSITISATION**

No studies located

**5.4 REPEATED DOSE TOXICITY**

Species/strain: Rat (Crj:CD(SD))

Sex: Female [ ]; Male [ ]; Male/Female [X]; No data [ ]

Route of Administration: oral (gavage)

Exposure period: Male: 44 days including 14 days before mating

Female: from 14 days before mating to day 3 of lactation

Frequency of treatment: 7 days/week

Post exposure observation period:	
Dose:	0, 30, 150 or 750 mg/kg (12 animals /group)
Control group:	Yes <input checked="" type="checkbox"/> ; No <input type="checkbox"/> ; No data <input type="checkbox"/> ; Concurrent no treatment <input type="checkbox"/> ; Concurrent vehicle <input checked="" type="checkbox"/> ; Historical <input type="checkbox"/>
NOEL:	30 mg/kg/day
LOEL:	150 mg/kg/day
Results:	The results in clinical observations did not reveal any effects attributable to the administration of test substance and there were no mortality in all groups. Depression of body weight gain observed in both male and female rats receiving 750 mg/kg/day, and food consumption of male rats receiving 750 mg/kg/day was less than those of control until day 7 and thereafter, increases in food consumption were observed in them from Day 28. As a results of hematology, there were no essential effects of test substance. As the results of blood clinical examination, increases in the BUN and GPT were observed in male rat receiving 150 and 750 mg/kg/day, and increases in total protein, albumin, creatinine and total bilirubin and decrease in glucose were observed in male rats receiving 750 mg/kg/day, suggesting that those changes were due to the effect on kidneys and liver. As the results of organ weight analysis, increases in liver weight were observed in both male and female rats receiving 750 mg/kg/day, moreover increases in kidneys weights were observed in male rats receiving 150 mg/kg/day or more groups. As the gross findings, in relation to increase of liver weights, increases in incidence of brown colored livers or enlargement of the livers were observed in male rats receiving 750 mg/kg/day, and swelling of the liver cells was observed in them, histopathologically. The results described above led to a conclusion that effects of repeated dose toxicity study were considered to appear at 150 mg/kg/day or more in male rats and at 750 mg/kg/day in female rats, and maximum NOELs were considered to be 30 mg/kg/day in males and to be 150 mg/kg/day in females.
Method:	OECD Combined Repeat dose and Reproductive/Developmental Toxicity Test (1992)
GLP:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> ? <input type="checkbox"/>
Test substance:	Commercial, purity: 97.2 %
Reference:	MHW, Japan (1993b)

## 5.5 GENETIC TOXICITY IN VITRO

### A. BACTERIAL TEST

(a)	
Type :	Bacterial reverse mutation assay
System of testing:	
Species/strain:	<i>S. typhimurium</i> TA 98, TA 100, TA 1535, TA 1537, TA 1539 <i>E. coli</i> WP2 uvrA
Concentration:	0, 2.4 - 78.12 µg/plate
Metabolic activation:	With <input type="checkbox"/> ; Without <input type="checkbox"/> ; With and Without <input checked="" type="checkbox"/> ; No data <input type="checkbox"/>
Results:	
Cytotoxicity conc:	With metabolic activation: 50 µg/plate Without metabolic activation: 50 µg/plate
Precipitation conc:	
Genotoxic effects:	+ ? - With metabolic activation: <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> Without metabolic activation: <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
Method:	Japanese Guideline for Screening Mutagenicity testing of chemicals

GLP: Yes  No  ?   
 Test substance: Commercial, purity: 97.2 %  
 Remarks: Procedure: Pre-incubation.  
 Plates/test: 3  
 Activation system: Liver S-9 fraction from Phenobarbital and 5,6-Benzoflavone pretreated male SD rats with NADPH-generating system  
 Media: Histidine selective  
 No. replicates: 2  
 Reference: MHW, Japan (1993c)

## B. NON-BACTERIAL IN VITRO TEST

Type : Cytogenetics Assay  
 System of testing: Species/strain: Chinese hamster CHL cells  
 Concentration: Incubated with 0, 0.03 - 0.11 mg/ml (-S9)  
 0, 0.33 - 1.30 mg/ml (+S9)  
 Metabolic activation: With  ; Without  ; With and Without  ; No data   
 Results:  
 Cytotoxicity conc: With metabolic activation: 1.30 mg/ml  
 Without metabolic activation: 0.11 mg/ml  
 Precipitation conc:  
 Genotoxic effects: + ? -  
 With metabolic activation:     
 Without metabolic activation:     
 Method: Japanese Guideline for Screening Mutagenicity testing of chemicals  
 GLP: Yes  No  ?   
 Test substance: Commercial, purity 97.2 %  
 Remarks: Plates/test: 2  
 Activation system: S-9 fraction from the liver of Phenobarbital and 5,6-Benzoflavone induced male SD derived rats with NADPH-generating system  
 No. replicates: 1  
 Reference: MHW, Japan (1993c)

## 5.6 GENETIC TOXICITY IN VIVO

No studies located

## 5.7 CARCINOGENICITY

No studies located

## 5.8 TOXICITY TO REPRODUCTION

Type: Fertility  ; One generation study  ; Two generation study  ; Other   
 Species/strain: Rat slc:SD  
 Sex: Female  ; Male  ; Male/Female  ; No data   
 Route of Administration: Oral (gavage)  
 Exposure period: Male: 44 days including 14 days before mating  
 Female: from 14 days before mating to day 3 of lactation  
 Frequency of treatment: 7 days/week  
 Postexposure observation period:  
 Premating exposure period: male: 14 days, female: 14 days  
 Duration of the test;  
 Doses: 0, 30, 150, or 750 mg/kg ( 12 /animals /sex/ group)

Control group:	Yes [ <input checked="" type="checkbox"/> ]; No [ <input type="checkbox"/> ]; No data [ <input type="checkbox"/> ]; Concurrent no treatment [ <input type="checkbox"/> ]; Concurrent vehicle [ <input checked="" type="checkbox"/> ]; Historical [ <input type="checkbox"/> ]
NOEL Parental :	= 750 mg/kg/day
NOEL F1 Offspring:	= 750 mg/kg/day
NOEL F2 Offspring:	N/A
Results:	The results observed in mating, fertility and estrous cycle did not reveal any effects attributable to the administration of test substance. Observation of delivery, all gestation animals delivered of pups, normally and there were not a treatment-related effect throughout the lactation period. The external examination of pups revealed no effects attributable to the administration of test substance. The body weights of fetuses showed the favorably froths until Day 4 of lactation. The necropsy of stillborn, dead pups until Day 4 of lactation and newborns at Day 4 of lactation did not reveal any effects attributable to the administration of test substance. The influences of test substance on reproductive and developmental toxicity were not observed in both male and female rats receiving 750 mg/kg/day, therefore maximum NOELs were considered to be 750 mg/kg/day in both sexes.
Method:	OECD Combined Repeated Dose and Reproductive/Developmental toxicity Test
GLP:	Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ] ? [ <input type="checkbox"/> ]
Test substance:	Commercial, purity 97.2 %
Remarks:	None
Reference:	MHW, Japan (1993b)

## 5.9 DEVELOPMENTAL TOXICITY/ TERATOGENICITY

No studies located

## 5.10 OTHER RELEVANT INFORMATION

### A. Specific toxicities

No studies located

### B. Toxicodynamics, toxicokinetics

No studies located

## 5.11 EXPERIENCE WITH HUMAN EXPOSURE

No studies located

**6. REFERENCES**

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- Lyman, W. J., W. F. Reehl and D. H. Rosenblatt (1981) "Handbook of Chemical Property Estimation Method", McGraw Hill Book Co.
- MHW, Japan (1993a) Unpublished Report on Acute Oral Toxicity Test of 1,4-Diethylbenzene. (HPV/SIDS Test conducted by MHW, Japan)
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- MHW, Japan (1993c) Unpublished Report on Mutagenicity Test of 1,4-Diethylbenzene. (HPV/SIDS Test conducted by MHW, Japan)
- MITI, Japan: Unpublished data
- MITI, Japan (1992) Biodegradation and Bioaccumulation Data of Existing Chemicals Based on the CSCL Japan, Edit CITI, Japan (1992)
- MITI, Japan (1993) Unpublished Report (1993) (HPV/SIDS Test conducted by MITI, Japan. Test was performed in Chemicals Inspection and Testing Institute, Japan)

## Section 1 - Chemical Product and Company Identification

**MSDS Name:** 2,4-Dimethylphenol, 99%

**Catalog Numbers:** AC408450050, AC408450250, AC408451000

**Synonyms:** 2,4-Xylenol; 4,6-Dimethylphenol Benzene; 1-Hydroxy-2,4-Dimethyl Benzene; M-Xylenol.

**Company Identification:**

Acros Organics N.V.

One Reagent Lane

Fair Lawn, NJ 07410

**For information in North America, call:** 800-ACROS-01

**For emergencies in the US, call CHEMTREC:** 800-424-9300

## Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
105-67-9	2,4-Dimethylphenol	99	203-321-6

## Section 3 - Hazards Identification

### EMERGENCY OVERVIEW

Appearance: colorless or almost colorless crystals.

**Danger!** Causes eye and skin burns. Causes digestive and respiratory tract burns. Harmful if swallowed or absorbed through the skin. May cause kidney damage.

**Target Organs:** Kidneys, respiratory system, gastrointestinal system, eyes, skin.

#### Potential Health Effects

**Eye:** Causes eye burns.

**Skin:** Harmful if absorbed through the skin. Causes skin burns.

**Ingestion:** Harmful if swallowed. Causes gastrointestinal tract burns. A case of fatal xylenol ingestion by a long stay mental hospital patient is described. Clinical course was similar to that observed in other phenolic poisonings with active bowel sounds, nausea, vomiting, severe metabolic acidosis, hypotension, and cardiac and renal failure.

**Inhalation:** Causes chemical burns to the respiratory tract.

**Chronic:** May cause kidney damage. Chronic exposure may cause effects similar to those of acute exposure.

## Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid immediately.

**Skin:** In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.

**Ingestion:** If swallowed, do NOT induce vomiting. Get medical aid immediately. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person.

**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Dust from this material can form explosive organic dust cloud.

**Extinguishing Media:** For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray.

**Flash Point:** 96 deg C ( 204.80 deg F)

**Autoignition Temperature:** Not available.

**Explosion Limits, Lower:**1.40 vol %

**Upper:** Not available.

**NFPA Rating:**(estimated) Health: 3; Flammability: 1; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up or absorb material, then place into a suitable clean, dry, closed container for disposal. Avoid generating dusty conditions. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Do not breathe dust, vapor, mist, or gas. Do not get in eyes, on skin, or on clothing. Keep container tightly closed.

**Storage:** Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Do not store in metal containers.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
2,4-Dimethylphenol	none listed	none listed	none listed

**OSHA Vacated PELs:** 2,4-Dimethylphenol: No OSHA Vacated PELs are listed for this chemical.

### Personal Protective Equipment

**Eyes:** Wear chemical splash goggles.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Crystals

**Appearance:** colorless or almost colorless

**Odor:** Characteristic phenolic odor.

**pH:** Not available.

**Vapor Pressure:** 10 mm Hg @92.3

**Vapor Density:** Not available.

**Evaporation Rate:**Not available.

**Viscosity:** Not available.

**Boiling Point:** 211 deg C

**Freezing/Melting Point:**21-26 deg C

**Decomposition Temperature:**Not available.

**Solubility:** 0.5% (25癩)

**Specific Gravity/Density:**.9700 g/cm3

**Molecular Formula:**C8H10O

**Molecular Weight:**122.17

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Dust generation, excess heat.

**Incompatibilities with Other Materials:** Bases - acid chlorides - acid anhydrides - oxidizing agents  
- corrodes steel - brass - copper - copper alloys.

**Hazardous Decomposition Products:** Carbon monoxide, irritating and toxic fumes and gases,  
carbon dioxide.

**Hazardous Polymerization:** Has not been reported

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 105-67-9: ZE5600000

**LD50/LC50:**

CAS# 105-67-9:

Oral, mouse: LD50 = 809 mg/kg;

Oral, rat: LD50 = 3200 mg/kg;

Skin, rat: LD50 = 1040 mg/kg;

**Carcinogenicity:**

CAS# 105-67-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:**No information available.

**Teratogenicity:**No information found

**Reproductive Effects:**No information found

**Mutagenicity:**No information found

**Neurotoxicity:**No information found

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. No information available.

**Environmental:** Terrestrial: Would adsorb moderately to soil. It is reported to have been biodegraded in soil in 4 days at 19 deg C. Aquatic: May adsorb moderately to sediment and will be readily biodegradable. Atmospheric: Should degrade by reaction with photochemically produced

hydroxyl radicals (half-life 8 hr). Expected to slightly bioconcentrate.

**Physical:** No information available.

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 105-67-9: waste number U101.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	TOXIC SOLIDS, CORROSIVE, ORGANIC, N.O.S.	Toxic Solid, Corrosive, Organic, N.O.S.
<b>Hazard Class:</b>	6.1	6.1
<b>UN Number:</b>	UN2928	UN2928
<b>Packing Group:</b>	II	II

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 105-67-9 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 105-67-9: 100 lb final RQ; 45.4 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 105-67-9: immediate.

#### Section 313

This material contains 2,4-Dimethylphenol (CAS# 105-67-9, 99%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

#### Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 105-67-9 is listed as a Priority Pollutant under the Clean Water Act. CAS# 105-67-

9 is listed as a Toxic Pollutant under the Clean Water Act.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 105-67-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

T C N

**Risk Phrases:**

R 34 Causes burns.

R 24/25 Toxic in contact with skin and if swallowed.

R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Safety Phrases:**

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 105-67-9: No information available.

**Canada - DSL/NDSL**

CAS# 105-67-9 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of E, D1A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 105-67-9 is not listed on the Canadian Ingredient Disclosure List.

## Section 16 - Additional Information

**MSDS Creation Date:** 4/16/1999

**Revision #4 Date:** 1/09/2006

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 106-42-3****Date: 04/17/2007**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: P-XYLENE

SYNONYMS: P-Xylol, 1,4-Dimethylbenzene

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	ACGIH TLV	Exposure Limits (PPM)		
					OSHA PEL	MAC	Other STEL
P-XYLENE	C8H10	106-42-3	99+%	100	100	100	150

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIAN

## 3. HAZARD IDENTIFICATION

**\* \* \* EMERGENCY OVERVIEW \* \* \***

Flammable liquid and vapor.

Can form explosive mixtures with air.

Can cause skin and respiratory track irritation.

May cause irritation to the eyes and mucous membranes.

### POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation, Ingestion

**ACUTE EFFECTS:** Inhalation of vapors may cause pulmonary edema, circulatory collapse, damage to upper respiratory tract, coughing, difficulty breathing and choking. Symptoms include burning sensation, coughing, wheezing, shortness of breath, headache, nausea, and vomiting. May cause pulmonary edema, fainting, convulsions and coma. Skin contact can cause defatting and dermatitis. Eye contact may result in destruction of eye tissue. Ingestion irritates the digestive tract and results in systemic effects from absorption.

**CHRONIC EFFECTS:** Kidney and liver damage. Blood effects.

**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** Liver, kidney, skin, and central nervous system diseases or disorders.

**OTHER EFFECTS OF OVEREXPOSURE:** None

**CARCINOGENICITY (US ONLY):**

NTP - No

IARC MONOGRAPHS - No

OSHA REGULATED - No

**4. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

**EYE CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes. Do not allow victim to rub or keep eyes tightly shut.

**SKIN CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes while removing contaminated clothing.

**INGESTION:** Never give anything by mouth to an unconscious person. If ingested, have that conscious and alert person drink 1 to 2 glasses of water. Do not induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce the risk of aspiration to the victim.

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: None

**5. FIRE FIGHTING MEASURES**

**FLASH POINT:** 25 deg.C

**AUTOIGNITION TEMPERATURE:** 496 deg.C

**FLAMMABLE LIMITS:** Vol.%

LOWER: 1.1

UPPER: 6.6

**EXTINGUISHING MEDIA:** Carbon dioxide, foam, or dry chemical. Water is ineffective in putting out a fire, but should be used for cooling fire exposed cylinders.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide may be given off during combustion.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** May form explosive mixture in air. Dangerous fire hazard and moderate explosion hazard when heated. Vapors may travel a considerable distance to the source of ignition and flash back.

**6. ACCIDENTAL RELEASE MEASURES**

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Remove leaking cylinder to exhaust hood or safe outdoor

area. Shut off source if possible and remove source of heat.

SPECIALIZED EQUIPMENT: Absorb small spills using a solid adsorbent such as vermiculite. Use non-sparking tools.

## 7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentrations below exposure and flammable limits.

EYE / FACE PROTECTION: Safety glasses, Goggles.

SKIN PROTECTION: Protective gloves.

RESPIRATORY PROTECTION: In case of leakage, use self-contained breathing apparatus.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders. Use explosion-proof ventilation equipment.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless

ODOR: Mild aromatic odor.

PHYSICAL PRESSURE: Gas

VAPOR PRESSURE: 9.0 mm Hg

VAPOR DENSITY (AIR=1): 3.7

BOILING POINT (C): 138

SOLUBILITY IN WATER: @25 deg.C: 162 mg/L

SPECIFIC GRAVITY (H<sub>2</sub>O=1): @20 deg.C: 0.857

EVAPORATION RATE: N/A

ODOR THRESHOLD: 2.1 ppm

**10. STABILITY AND REACTIVITY**

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas.Storage near a heat source.

MATERIALS TO AVOID: Oxidizing agents.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: Toxic carbon monoxide.

**11. TOXICOLOGICAL INFORMATION**

LETHAL CONCENTRATION (LC50): 9100 ppm, rat 1 hour.

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

**12. ECOLOGICAL INFORMATION**

No adverse ecological effects are expected.

**13. DISPOSAL CONSIDERATIONS**

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place.Waste material may be burned in a controlled manner in an approved incinerator.

**14. TRANSPORT INFORMATION**

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Xylenes  
HAZARD CLASS: 3 (flammable)  
IDENTIFICATION NUMBER: UN1307  
REPORTABLE QUANTITIES: 1000 lb.  
LABELING: FLAMMABLE LIQUID

ADR / RID (EU Only): Class 3, 31(c)

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

## 15. REGULATORY INFORMATION

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 203-396-5

NUMBER IN ANNEX 1 OF DIR 67/548: Material is listed in annex 1.

EU CLASSIFICATION: N/Av

R: 10-20/21-38

S: 25

## 16. OTHER INFORMATION

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.

# Material Safety Data Sheet

## 4-Chlorotoluene, 98%

ACC# 55349

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** 4-Chlorotoluene, 98%**Catalog Numbers:** AC150210000, AC150210010, AC150210050**Synonyms:** p-Tolylchloride; 1-Chloro-4-methylbenzene; p-Chlorotoluene.**Company Identification:**Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
106-43-4	4-Chlorotoluene	98.0	203-397-0

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: colourless. Flash Point: 121 deg F.

**Warning! Flammable liquid and vapor.** Causes eye and skin irritation. Causes digestive and respiratory tract irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. May cause central nervous system depression.**Target Organs:** None.**Potential Health Effects****Eye:** Causes eye irritation.**Skin:** Causes skin irritation.**Ingestion:** Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.**Inhalation:** Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Causes respiratory tract irritation.**Chronic:** No information found.

### Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

**Skin:** Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

**Ingestion:** If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Flammable liquid and vapor.

**Extinguishing Media:** In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam.

**Flash Point:** 121e deg F ( 49.44 deg C)

**Autoignition Temperature:** Not applicable.

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 1; Flammability: 1; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Avoid contact with skin and eyes. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. Use with adequate ventilation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from heat, sparks, and flame. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use adequate ventilation to keep airborne concentrations low.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
4-Chlorotoluene	none listed	none listed	none listed

**OSHA Vacated PELs:** 4-Chlorotoluene: No OSHA Vacated PELs are listed for this chemical.

### **Personal Protective Equipment**

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** colourless

**Odor:** None reported.

**pH:** Not available.

**Vapor Pressure:** 10 mm Hg @ 45 C

**Vapor Density:** 4.38

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 162 deg C

**Freezing/Melting Point:** 7 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Slightly soluble in water.

**Specific Gravity/Density:** 1.070

**Molecular Formula:** C7H7Cl

**Molecular Weight:** 126.502

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** High temperatures, mechanical shock, incompatible materials, ignition sources, strong oxidants.

**Incompatibilities with Other Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Hydrogen chloride, chlorine, carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 106-43-4: XS9010000

**LD50/LC50:**

CAS# 106-43-4:

Inhalation, mouse: LC50 = 34 gm/m<sup>3</sup>/2H;

Oral, mouse: LD50 = 1900 mg/kg;

Oral, rat: LD50 = 2100 mg/kg;

**Carcinogenicity:**

CAS# 106-43-4: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.

**Teratogenicity:** No information available.

**Reproductive Effects:** No information available.

**Mutagenicity:** No information available.

**Neurotoxicity:** No information available.

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. No information available.

**Environmental:** No information found.

**Physical:** No information found.

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	CHLOROTOLUENES	No information available.
<b>Hazard Class:</b>	3	
<b>UN Number:</b>	UN2238	
<b>Packing Group:</b>	III	

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 106-43-4 is listed on the TSCA inventory.

#### Health & Safety Reporting List

CAS# 106-43-4: Effective 6/1/87, Sunset 12/19/95

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RO.

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPO.

**Section 313** No chemicals are reportable under Section 313.

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 106-43-4 can be found on the following state right to know lists: Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XN N

**Risk Phrases:**

R 10 Flammable.

R 20 Harmful by inhalation.

R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Safety Phrases:**

S 24/25 Avoid contact with skin and eyes.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 106-43-4: 2

**Canada - DSL/NDSL**

CAS# 106-43-4 is listed on Canada's NDSL List.

**Canada - WHMIS**

not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 11/04/1998

**Revision #3 Date:** 10/03/2005

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From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

24 Hour Emergency Telephone: 908-859-2151  
CHEMTREC: 1-800-424-9300  
National Response in Canada  
CANUTEC: 613-996-6666  
Outside U.S. And Canada  
Chemtree: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

## p-DICHLOROBENZENE

### 1. Product Identification

**Synonyms:** 1,4-Dichlorobenzene; para-dichlorobenzene; Paracide; PDCB

**CAS No.:** 106-46-7

**Molecular Weight:** 147.01

**Chemical Formula:** C<sub>6</sub>H<sub>4</sub>Cl<sub>2</sub>

**Product Codes:** G970

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
p-Dichlorobenzene	106-46-7	100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS THE RESPIRATORY SYSTEM, LIVER, KIDNEYS, EYES, SKIN AND BLOOD. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. COMBUSTIBLE. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Cancer Causing)

Flammability Rating: 2 - Moderate

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate (Life)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

#### Potential Health Effects

##### Inhalation:

Inhalation of dust or vapors can irritate the nose and throat. May also cause headache, swelling around the eyes and runny nose. Can cause loss of appetite, nausea, vomiting, central nervous system effects, weight loss and liver and kidney damage.

##### Ingestion:

Toxic. Swallowing can produce adverse health effects paralleling inhalation.

##### Skin Contact:

Causes skin irritation, with a slight burning sensation. Red blotching of the skin due to allergic reactions may occur. May be absorbed through the skin; symptoms may parallel inhalation.

##### Eye Contact:

Causes irritation, redness, and pain.

##### Chronic Exposure:

Chronic exposure may damage blood, lungs, central nervous system, liver and kidneys. p-Dichlorobenzene is a possible carcinogen.

##### Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance.

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.

**Skin Contact:**

Wash skin with soap or mild detergent and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 66C (151F) CC

Combustible!

**Explosion:**

Above the flash point, explosive vapor-air mixtures may be formed. Contact with strong oxidizers may cause fire.

**Fire Extinguishing Media:**

Water spray, dry chemical, alcohol foam, or carbon dioxide. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

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## 6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

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## 7. Handling and Storage

Protect against physical damage. Outside or detached storage is preferred. Inside storage should be in a standard flammable liquids storage room or cabinet. Separate from oxidizing materials. Storage and use areas should be No Smoking areas. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):

75 ppm (TWA)

-ACGIH Threshold Limit Value (TLV):

10 ppm (TWA), listed as A3, animal carcinogen.

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded, and engineering controls are not feasible, a full-face piece respirator with an organic vapor cartridge and particulate filter (NIOSH type N100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P particulate filter. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

## 9. Physical and Chemical Properties

**Appearance:**

White crystals.

**Odor:**

Moth-ball odor

**Solubility:**

Practically insoluble in water.

**Specific Gravity:**

1.25 @ 20C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

174C (345F)

**Melting Point:**

53C (127F)

**Vapor Density (Air=1):**

5.08

**Vapor Pressure (mm Hg):**

10 @ 54.8C (131F)

**Evaporation Rate (BuAc=1):**

Not applicable.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Oxidizing agents, aluminum and its alloys.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

Oral rat LD50: 500 mg/kg; skin rabbit LD50: &gt; 2 gm/kg; investigated as a tumorigen, mutagen, reproductive effector.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
p-Dichlorobenzene (106-46-7)	No	Yes	2B

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material may leach into groundwater. When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. This material has an experimentally-determined bioconcentration factor (BCF) of greater than 100. This material may bioaccumulate to some extent. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals.

When released into the air, this material is expected to have a half-life of greater than 30 days. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition.

**Environmental Toxicity:**

The LC50/96-hour values for fish are between 1 and 10 mg/l. The LC50/96-hour values for fish are between 10 and 100 mg/l. This material may be toxic to aquatic life.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

**Domestic (Land, D.O.T.)****Proper Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (PARA-DICHLOROBENZENE)**Hazard Class:** 9

UN/NA: UN3077

Packing Group: III

Information reported for product/size: 5KG

**International (Water, I.M.O.)**-----  
**Proper Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (PARA-DICHLOROBENZENE)**Hazard Class:** 9

UN/NA: UN3077

Packing Group: III

Information reported for product/size: 5KG

**International (Air, I.C.A.O.)**-----  
**Proper Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (PARA-DICHLOROBENZENE)**Hazard Class:** 9

UN/NA: UN3077

Packing Group: Information reported for product/size: 5KG

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**15. Regulatory Information**

```

-----\Chemical Inventory Status - Part 1\-----
Ingredient                TSCA  EC   Japan  Australia
-----
p-Dichlorobenzene (106-46-7)  Yes  Yes  Yes    Yes

```

```

-----\Chemical Inventory Status - Part 2\-----
Ingredient                Korea  DSL  NDSL  Phil.
-----
p-Dichlorobenzene (106-46-7)  Yes   Yes  No    Yes

```

```

-----\Federal, State & International Regulations - Part 1\-----
Ingredient                -SARA 302-  -SARA 313-
RQ  TPQ  List  Chemical Catg.
-----
p-Dichlorobenzene (106-46-7)  No   No   Yes   No

```

```

-----\Federal, State & International Regulations - Part 2\-----
Ingredient                CERCLA  -RCRA-  -TSCA-
                261.33  8(d)
-----
p-Dichlorobenzene (106-46-7)  100    U072    No

```

Chemical Weapons Convention: No    TSCA 12(b): Yes    CDTA: Yes  
SARA 311/312: Acute: Yes    Chronic: Yes    Fire: Yes    Pressure: No  
Reactivity: No    (Pure / Solid)

**WARNING:**

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

**Australian Hazchem Code:** None allocated.**Poison Schedule:** None allocated.**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

**16. Other Information****NFPA Ratings:** Health: 2 Flammability: 2 Reactivity: 0**Label Hazard Warning:**

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS THE RESPIRATORY SYSTEM, LIVER, KIDNEYS, EYES, SKIN AND BLOOD. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. COMBUSTIBLE. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA.

**Label Precautions:**

Avoid breathing dust or vapors.  
Use only with adequate ventilation.  
Avoid contact with eyes, skin and clothing.  
Keep container closed.  
Use with adequate ventilation.  
Wash thoroughly after handling.  
Keep away from heat and flame.

**Label First Aid:**

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes

while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

MSDS Section(s) changed since last revision of document include: 3.

**Disclaimer:**

\*\*\*\*\*

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

# Material Safety Data Sheet

## 4-Chloroaniline, 99% (Titr.)

ACC# 49468

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** 4-Chloroaniline, 99% (Titr.)**Catalog Numbers:** AC404480000, AC404481000, AC404485000, ACE1064922**Synonyms:** 1-Amino-4-chlorobenzene; p-Chloroaniline; 4-Chloraniline; 4-Chlorobenzenamine.**Company Identification:**Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
106-47-8	4-Chloroaniline	99.0	203-401-0

**Hazard Symbols:** T N**Risk Phrases:** 23/24/25 43 45 50/53

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: colorless solid. **Warning!** Causes skin irritation. Causes severe eye irritation. May cause liver and kidney damage. May cause methemoglobinemia. Harmful if swallowed, inhaled, or absorbed through the skin. Causes respiratory tract irritation. Cancer suspect agent. May cause allergic skin reaction. Light sensitive. Air sensitive.

**Target Organs:** Blood, kidneys, liver, eyes, skin.

#### Potential Health Effects

**Eye:** Causes severe eye irritation.**Skin:** Causes skin irritation. Harmful if absorbed through the skin. Prolonged and/or repeated contact may cause irritation and/or dermatitis. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.**Ingestion:** Harmful if swallowed. Causes gastrointestinal irritation with nausea, vomiting and diarrhea. Methemoglobinemia is characterized by dizziness, drowsiness, headache, shortness of breath, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), rapid heart rate and chocolate-brown colored blood. Overexposure may cause methemoglobinemia.**Inhalation:** May cause irritation of the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. Methemoglobinemia is characterized by dizziness, drowsiness, headache, shortness of breath, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), rapid heart rate and chocolate-brown blood. Inhalation of aniline causes anoxia due to the formation of methemoglobinemia.**Chronic:** May cause liver and kidney damage. May cause methemoglobinemia, which is characterized

by chocolate-brown colored blood, headache, weakness, dizziness, breath shortness, cyanosis (bluish skin due to deficient oxygenation of blood), rapid heart rate, unconsciousness and possible death. May cause cancer according to animal studies. May cause reproductive and fetal effects.

## Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

**Ingestion:** Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

**Inhalation:** Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation.

**Notes to Physician:** For methemoglobinemia, administer oxygen alone or with Methylene blue depending on the methemoglobinemia concentration in the blood.

**Antidote:** Methylene blue, alone or in combination with oxygen is indicated as a treatment in nitrite induced methemoglobinemia.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

**Extinguishing Media:** In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam.

**Flash Point:** > 120 deg C (> 248.00 deg F)

**Autoignition Temperature:** > 450 deg C (> 842.00 deg F)

**Explosion Limits, Lower:** Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 2; Flammability: 1; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Reduce airborne dust and prevent scattering by moistening with water. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Wash hands before eating. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Wash clothing before reuse. Use only with adequate ventilation. Avoid breathing dust.

**Storage:** Keep container closed when not in use. Store in a cool, dry, well-ventilated area away

from incompatible substances. Store protected from light and air.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
4-Chloroaniline	none listed	none listed	none listed

**OSHA Vacated PELs:** 4-Chloroaniline: No OSHA Vacated PELs are listed for this chemical.

### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

## Section 9 - Physical and Chemical Properties

**Physical State:** Solid

**Appearance:** colorless

**Odor:** None reported.

**pH:** Not available.

**Vapor Pressure:** 1 mm Hg @ 58 C

**Vapor Density:** Not available.

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 232 deg C

**Freezing/Melting Point:** 71 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Soluble in hot water.

**Specific Gravity/Density:** 1.169

**Molecular Formula:** C<sub>6</sub>H<sub>6</sub>ClN

**Molecular Weight:** 127.57

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Light, dust generation, excess heat, prolonged exposure to air.

**Incompatibilities with Other Materials:** Acids, acid chlorides, acid anhydrides, chloroformates, and strong oxidizing agents.

**Hazardous Decomposition Products:** Hydrogen chloride, nitrogen oxides, carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:****CAS#** 106-47-8: BX0700000**LD50/LC50:**

CAS# 106-47-8:

Draize test, rabbit, eye: 250 ug/24H Severe;

Draize test, rabbit, skin: 500 mg/24H Mild;

Inhalation, rat: LC50 = 2340 mg/m<sup>3</sup>/4H;

Oral, mouse: LD50 = 100 mg/kg;

Oral, rat: LD50 = 300 mg/kg;

Skin, rabbit: LD50 = 360 mg/kg;

Skin, rat: LD50 = 3200 mg/kg;

**Carcinogenicity:**

CAS# 106-47-8:

**ACGIH:** A3 - Animal Carcinogen (listed as Aniline).**California:** carcinogen; initial date 10/01/94**NIOSH:** potential occupational carcinogen (listed as Aniline)**OSHA:** Possible Select carcinogen**IARC:** IARC Group 3 - not classifiable (listed as Aniline).**Epidemiology:** Substance has been identified as a carcinogen by the NTP and the under CA prop 65. IARC has determined that evidence for carcinogenicity of aniline is limited in animals and inadequate in humans. There is experimental neoplastic data. The high risk of bladder cancer observed originally in workers in the aniline dye industry has been attributed to exposure to chemicals other than aniline.**Teratogenicity:** No information found.**Reproductive Effects:** No information found.**Neurotoxicity:** No information found.**Mutagenicity:** No information found.**Other Studies:** See actual entry in RTECS for complete information.

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. No information available.**Environmental:** Terrestrial: Will bind tightly to soil although in the first few hours after a spill, a small amount should volatilize. It will undergo both biological and chemical transformation. Aquatic: Will volatilize (half-life 35.7 days in a typical river), photooxidize in surface layers (half-life 0.4 hr), biodegrade (half-life several days in well acclimated water but otherwise of the order of several months), and chemically bind to clay and humus in sediment and particulate matter in the water column. Atmospheric: Should exist in the atmosphere as a vapor.**Physical:** Will biodegrade but not bioconcentrate.**Other:** For more information, see "HANDBOOK OF ENVIRONMENTAL FATE AND EXPOSURE DATA."

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** CAS# 106-47-8: waste number P024.**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
<b>Shipping Name:</b>	CHLOROANILINES, SOLID				CHLOROANILINES SOLID
<b>Hazard Class:</b>	6.1				6.1
<b>UN Number:</b>	UN2018				UN2018
<b>Packing Group:</b>	II				II

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 106-47-8 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### SARA

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 106-47-8: 1000 lb final RQ; 454 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 106-47-8: acute.

#### Section 313

This material contains 4-Chloroaniline (CAS# 106-47-8, 99.0%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depleters. This material does not contain any Class 2 Ozone depleters.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 106-47-8 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

#### The following statement(s) is(are) made in order to comply with the California Safe Drinking

**Water Act:** WARNING: This product contains 4-Chloroaniline, a chemical known to the state of California to cause cancer. California No Significant Risk Level: None of the chemicals in this product are listed.

### European/International Regulations

#### European Labeling in Accordance with EC Directives

**Hazard Symbols:**

T N

**Risk Phrases:**

R 23/24/25 Toxic by inhalation, in contact with skin and if swallowed.

R 43 May cause sensitization by skin contact.

R 45 May cause cancer.

R 50/53 Very toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

**Safety Phrases:**

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 53 Avoid exposure - obtain special instructions before use.

S 60 This material and/or its container must be disposed of as hazardous waste.

S 61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 106-47-8: 3

**Canada - DSL/NDSL**

CAS# 106-47-8 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D1B, D2A, D2B.

**Canadian Ingredient Disclosure List**

CAS# 106-47-8 is listed on the Canadian Ingredient Disclosure List.

**Exposure Limits**

CAS# 106-47-8 (listed as aniline): OEL-ARAB Republic of Egypt: TWA 2 ppm (10 mg/m<sup>3</sup>); Skin OEL-AUSTRALIA: TWA 2 ppm (10 mg/m<sup>3</sup>); Skin OEL-AUSTRIA: TWA 2 ppm (8 mg/m<sup>3</sup>); Skin OEL-BELGIUM: TWA 2 ppm (7.6 mg/m<sup>3</sup>); Skin OEL-CZECHOSLOVAKIA: TWA 5 mg/m<sup>3</sup>; STEL 20 mg/m<sup>3</sup> JAN9 OEL-DENMARK: TWA 1 ppm (4 mg/m<sup>3</sup>); Skin OEL-FINLAND: TWA 2 ppm (7.6 mg/m<sup>3</sup>); STEL 4 ppm (15 mg/m<sup>3</sup>); Skin; CAR OEL-FRANCE: TWA 2 ppm (10 mg/m<sup>3</sup>); Skin OEL-GERMANY: TWA 2 ppm (8 mg/m<sup>3</sup>); Skin; Carcinogen OEL-HUNGARY: TWA 5 mg/m<sup>3</sup>; STEL 10 mg/m<sup>3</sup>; Skin OEL-INDIA: TWA 0.2 mg/m<sup>3</sup>; Skin OEL-JAPAN: TWA 1 ppm (3.8 mg/m<sup>3</sup>); Skin OEL-THE NETHERLANDS: TWA 5 ppm (19 mg/m<sup>3</sup>); Skin OEL-THE PHILIPPINES: TWA 5 ppm (19 mg/m<sup>3</sup>); Skin OEL-POLAND: TWA 5 mg/m<sup>3</sup>; STEL 20 mg/m<sup>3</sup>; Skin OEL-RUSSIA: TWA 1 ppm; STEL 0.1 mg/m<sup>3</sup>; Skin OEL-SWEDEN: TWA 1 ppm (4 mg/m<sup>3</sup>); STEL 2 ppm (8 mg/m<sup>3</sup>); Skin OEL-SWITZERLAND: TWA 2 ppm (8 mg/m<sup>3</sup>); STEL 10 ppm (40 mg/m<sup>3</sup>); Skin OEL-TURKEY: TWA 5 ppm (19 mg/m<sup>3</sup>); Skin OEL-UNITED KINGDOM: TWA 2 ppm (10 mg/m<sup>3</sup>); STEL 5 ppm; Skin OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

## Section 16 - Additional Information

**MSDS Creation Date:** 11/13/1997

**Revision #6 Date:** 9/25/2001

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*possibility of such damages.*



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 106-93-4****Date: 12/28/2006**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: 1,2-DIBROMOETHANE

SYNONYMS: Ethylene dibromide, ethylene bromide, EDB

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	ACGIH TLV	Exposure Limits (PPM)		
					OSHA PEL	MAC	Other STEL
1,2-DIBROMOETHANE	C <sub>2</sub> H <sub>4</sub> Br <sub>2</sub>	106-93-4	99+%	NE	20	20	NE

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIANT

## 3. HAZARD IDENTIFICATION

**\*\*\* EMERGENCY OVERVIEW \*\*\***

Poisonous liquid and vapor.

May cause liver, kidney and heart damage.

May cause central nervous system depression.

Can cause irritation to eyes, skin and respiratory tract.

### POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation, Skin, Ingestion

**ACUTE EFFECTS:** Vapor or mist is irritating to the eyes, skin, mucous membrane, and upper respiratory tract. Can be absorbed through the skin. Skin exposure may cause irritation, itching, erythema, swelling, burning and pain. Eye contact may cause irritation, redness, or blurred vision. Symptoms of exposure can include headache, dizziness, nausea, diarrhea, weakness, fatigue, thirst, cough, difficulty in breathing, and chest or abdominal pain. Possible central nervous system depression.

**CHRONIC EFFECTS:** Suspected human carcinogen. Respiratory irritation and pulmonary edema, dermatitis, central nervous system depression, and conjunctivitis. Kidney and liver damage. Lung damage.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None known

OTHER EFFECTS OF OVEREXPOSURE: None

CARCINOGENICITY (US ONLY):

NTP - Yes

IARC MONOGRAPHS - Yes

OSHA REGULATED - No

**4. FIRST AID MEASURES**

INHALATION: Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

EYE CONTACT: Immediately flush with copious amounts of water for at least 15 minutes.

SKIN CONTACT: Immediately flush with copious amounts of water for at least 15 minutes while removing contaminated clothing.

INGESTION: Have conscious and alert person drink 1 to 2 glasses of water. Induce vomiting after victim drinks water.

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: None

**5. FIRE FIGHTING MEASURES**

FLASH POINT: Nonflammable

AUTOIGNITION TEMPERATURE: N/Ap

FLAMMABLE LIMITS: Nonflammable

LOWER:

UPPER:

EXTINGUISHING MEDIA: Use what is appropriate for surrounding fire.

SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT: Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray.

HAZARDOUS COMBUSTION PRODUCTS: Toxic carbon monoxide and HBr may be given off during combustion.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Cylinder rupture may occur under fire conditions.

**6. ACCIDENTAL RELEASE MEASURES**

CLEAN UP PROCEDURES: Evacuate and ventilate area. Remove leaking cylinder to exhaust hood or safe outdoor area. Absorb with sand or vermiculite and place in closed containers for disposal.

SPECIALIZED EQUIPMENT: None

**7. HANDLING AND STORAGE**

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders. Use only in a well-ventilated area.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentration below exposure limits.

EYE / FACE PROTECTION: Goggles. A safety shower and eyewash station should be readily available.

SKIN PROTECTION: Impervious gloves, coveralls, boots, and/or other resistant protective clothing.

RESPIRATORY PROTECTION: Use a self-contained breathing apparatus in case of emergency or non-routine use.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

APPEARANCE: Clear, Colorless

ODOR: Mild, Sweet odor. (chloroform-like)

PHYSICAL PRESSURE: Liquid

VAPOR PRESSURE: @20 deg.C: 11 mm Hg

VAPOR DENSITY (AIR=1): 1.65

BOILING POINT (C): 131-132

SOLUBILITY IN WATER: Slight

SPECIFIC GRAVITY (H<sub>2</sub>O=1): @20 deg.C: 1.18

EVAPORATION RATE: N/A

ODOR THRESHOLD: 26 ppm

**10. STABILITY AND REACTIVITY**

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: [Storage in poorly ventilated areas.](#)

MATERIALS TO AVOID: [Oxidizing agents. Alkali or alkaline earth metals, powdered Al, Zn, and Be.](#)

HAZARDOUS POLYMERIZATION: [Will not occur.](#)

HAZARDOUS DECOMPOSITION: [Toxic carbon monoxide and hydrogen bromide.](#)

## 11. TOXICOLOGICAL INFORMATION

LETHAL CONCENTRATION (LC50): [None established](#)

LETHAL DOSE 50 (LD50): [N/Ap](#)

TERATOGENICITY: [N/Ap](#)

REPRODUCTIVE EFFECTS: [N/Ap](#)

MUTAGENICITY: [N/Ap](#)

## 12. ECOLOGICAL INFORMATION

[No adverse ecological effects are expected.](#)

## 13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: [Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place. Waste material may be burned in a controlled manner in an approved incinerator.](#)

## 14. TRANSPORT INFORMATION

CONCENTRATION: [99+%](#)

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: [Ethylene dibromide](#)

HAZARD CLASS: [6.1 \(poison\), Packing Group I](#)

IDENTIFICATION NUMBER: [UN1605](#)

REPORTABLE QUANTITIES: [1 lb.](#)

LABELING: [POISON](#)

ADR / RID (EU Only): [Class 6.1, 15\(a\)](#)

SPECIAL PRECAUTIONS: [Cylinders should be transported in a secure upright position in a well ventilated truck.](#)

**15. REGULATORY INFORMATION**

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 203-44-5

NUMBER IN ANNEX 1 OF DIR 67/548: Material is listed in annex 1.

EU CLASSIFICATION: N/Av

R: 45-23/24/25-36/37/38

S: 53-44

**16. OTHER INFORMATION**

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 106-99-0****Date: 09/29/2005**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: 1,3-BUTADIENE

SYNONYMS: None

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	ACGIH TLV	Exposure Limits (PPM)		
					OSHA PEL	MAC	Other STEL
1,3-BUTADIENE	C4H6	106-99-0	99+%	2	1	50	5

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIANT

## 3. HAZARD IDENTIFICATION

**\*\*\* EMERGENCY OVERVIEW \*\*\***

Flammable liquid and gas under pressure.

Can cause cancer.

Can form explosive mixtures with air.

May cause irritation to eyes, skin and mucous membranes.

May cause frostbite.

## POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation

**ACUTE EFFECTS:** May cause irritation to eyes, skin, mucous membranes and throat. Symptoms include rapid respiration, diminished mental alertness, fatigue, muscular incoordination and loss of consciousness. Can act as an asphyxiant by displacing breathable air. Pressure drop through valves and piping may cause extreme cold and frostbite on contact.

**CHRONIC EFFECTS:** Material is a carcinogen. Exposure can cause leukemia, non-Hodgkins lymphoma, and anemia.

**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** None known

**OTHER EFFECTS OF OVEREXPOSURE:** None

**CARCINOGENICITY (US ONLY):**

NTP - Yes

IARC MONOGRAPHS - Yes

OSHA REGULATED - Yes

**4. FIRST AID MEASURES**

INHALATION: Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

EYE CONTACT: Immediately flush with copious amounts of water for at least 15 minutes.

SKIN CONTACT: If frostbite occurs, flush affected areas with lukewarm water.

INGESTION: None

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: None

**5. FIRE FIGHTING MEASURES**

FLASH POINT: -76 deg.C

AUTOIGNITION TEMPERATURE: 420 deg.C

FLAMMABLE LIMITS:

LOWER: 2%

UPPER: 11.5%

EXTINGUISHING MEDIA: Dry chemical or carbon dioxide. Do not extinguish burning gas if flow cannot be shut off.

SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT: Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray. If possible, stop the product flow.

HAZARDOUS COMBUSTION PRODUCTS: Toxic carbon monoxide may be given off during combustion.

UNUSUAL FIRE AND EXPLOSION HAZARDS: High explosion hazard exists if heated under pressure in air and mixed with phenol, CLO<sub>2</sub>, and crontonaldehyde. Vapors may travel a considerable distance to the source of ignition and flash back.

**6. ACCIDENTAL RELEASE MEASURES**

CLEAN UP PROCEDURES: Evacuate and ventilate area. Shut off source if possible and remove source of heat. Remove leaking cylinder to exhaust hood or safe outdoor area.

SPECIALIZED EQUIPMENT: None

## 7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentration below exposure limits.

EYE / FACE PROTECTION: Safety glasses

SKIN PROTECTION: Protective gloves to prevent contact with cold equipment.

RESPIRATORY PROTECTION: In case of leakage, use self-contained breathing apparatus.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless

ODOR: Slightly aromatic

PHYSICAL PRESSURE: Gas

VAPOR PRESSURE: @ 20 deg.C: 36.0 psia

VAPOR DENSITY (AIR=1): 1.9

BOILING POINT (C): -4

SOLUBILITY IN WATER: Insoluble

SPECIFIC GRAVITY (H2O=1): Gas

EVAPORATION RATE: Gas

ODOR THRESHOLD: N/A

## 10. STABILITY AND REACTIVITY

STABILITY: Unstable.Stable when inhibited.

CONDITIONS TO AVOID: Storage in poorly ventilated areas.Storage near a heat source.

MATERIALS TO AVOID: Avoid oxidizers, copper, and copper alloys, halogens.

HAZARDOUS POLYMERIZATION: May occur due to lowered levels of inhibitor, or elevated temperatures.

HAZARDOUS DECOMPOSITION: Toxic carbon monoxide.

## 11. TOXICOLOGICAL INFORMATION

LETHAL CONCENTRATION (LC50): 220,000 ppm, rat 1 hour

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

## 12. ECOLOGICAL INFORMATION

No adverse ecological effects are expected.

## 13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place.

## 14. TRANSPORT INFORMATION

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Butadienes, inhibited  
HAZARD CLASS: 2.1 (flammable)  
IDENTIFICATION NUMBER: UN1010  
REPORTABLE QUANTITIES: 10 lb.  
LABELING: FLAMMABLE GAS

ADR / RID (EU Only): Class 2, 2F

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

## 15. REGULATORY INFORMATION

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 203-450-8

NUMBER IN ANNEX 1 OF DIR 67/548: Material is listed in annex 1.

EU CLASSIFICATION: N/Av

R: 45-13

S: 53-9-16-33

## 16. OTHER INFORMATION

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

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# MATERIAL SAFETY DATA SHEET

## SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

### MSDS Identification:

- **Key:** 74402
- **Name:** Acrolein, stabilized, 97%

### Catalog Numbers:

AC149640000, AC149640010, AC149640250, AC149642500

### Synonyms:

- Acrolein; Acryaldehyde; Acrylic aldehyde; Acraldehyde; 2-Propenal.

### Company Identification (Europe):

Acros Organics BVBA  
Janssen Pharmaceuticaaan 3a  
2440 Geel, Belgium

### Company Identification (USA):

Acros Organics  
One Reagent Lane  
Fairlawn, NJ 07410

### For information in North America, call:

- 800-ACROS-01

### For information in Europe, call:

- 0032(0) 14575211

### For emergencies in the US, call CHEMTREC:

- 800-424-9300

### For emergencies in Europe, call:

- 0032(0) 14575299

## SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS

CAS #	Chemical Name	%	EINECS #
107-02-8	Acrolein	97	203-453-4
123-31-9	Hydroquinone	> 0.1	204-617-8

**Text for R-phrases:** see Section 16

**Hazard Symbols:** T+ F C N

**Risk Phrases:** 11 26 34 24/25 50

### SECTION 3 - HAZARDS IDENTIFICATION

#### **EMERGENCY OVERVIEW**

**Appearance:** clear colorless to slightly yellow liquid. Flash Point: -26 deg C. Danger! May be fatal if swallowed. May be fatal if absorbed through the skin. Lachrymator (substance which increases the flow of tears). Causes eye and skin burns. Causes digestive and respiratory tract burns. May be fatal if inhaled. May form unstable peroxides. Extremely flammable liquid and vapor. Vapor may cause flash fire. Keep refrigerated. (Store below 4列/39勿.) May polymerize explosively on loss of inhibitor.

**Target Organs:** Lungs, eyes, skin, mucous membranes.

#### **POTENTIAL HEALTH EFFECTS**

**Eye:** May result in corneal injury. Contact with eyes may cause severe irritation, and possible eye burns. Lachrymator (substance which increases the flow of tears).

**Skin:** May be fatal if absorbed through the skin. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. May cause severe irritation and possible burns.

**Ingestion:** May be fatal if swallowed. May cause severe gastrointestinal tract irritation with nausea, vomiting and possible burns.

**Inhalation:** May cause severe irritation of the respiratory tract with sore throat, coughing, shortness of breath and delayed lung edema. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema.

**Chronic:** No information found.

### SECTION 4 - FIRST AID MEASURES

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid immediately.

**Skin:** In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.

**Ingestion:** If swallowed, do NOT induce vomiting. Get medical aid immediately. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person.

**Inhalation:** POISON material. If inhaled, get medical aid immediately. Remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

**Notes to Physician:** Treat symptomatically and

**Antidote:** None reported.

### SECTION 5 - FIRE FIGHTING MEASURES

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Closed containers may rupture violently when heated. Extremely flammable liquid and vapor. Vapor may cause flash fire. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

**Extinguishing Media:** Use water spray, dry chemical, "alcohol resistant" foam, or carbon dioxide.

**Autoignition Temperature:** 235 deg C ( 455.00 deg F)

**Flash Point:** -26 deg C ( -14.80 deg F)

**Explosion Limits, lower:** 2.8%

**Explosion Limits, upper:** 31%

**NFPA Rating:** (estimated) Health: 4; Flammability: 3; Instability: 3

## SECTION 6 - ACCIDENTAL RELEASE MEASURES

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Use a spark-proof tool. Isolate area and deny entry. Provide ventilation. Evacuate unnecessary personnel. Use water spray to cool and disperse vapors, protect personnel, and dilute spills to form nonflammable mixtures.

## SECTION 7 - HANDLING AND STORAGE

**Handling:** Wash thoroughly after handling. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Do not get in eyes, on skin, or on clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Use and store under nitrogen. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Do not breathe vapor or mist. Pure vapor will be uninhibited and may polymerize in vents or other confined spaces.

**Storage:** Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Keep under a nitrogen blanket. Store in a cool, dry, well-ventilated area away from incompatible substances. Refrigerator/flammables. Store protected from light and air. Separate from oxidizing materials. Inhibitor level should be checked periodically.

## SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

### EXPOSURE LIMITS

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Acrolein	skin - potential for cutaneous absorption; 0.1 ppm Ceiling	0.1 ppm TWA; 0.25 mg/m <sup>3</sup> TWA 2 ppm IDLH	0.1 ppm TWA; 0.25 mg/m <sup>3</sup> TWA
Hydroquinone	2 mg/m <sup>3</sup>	50 mg/m <sup>3</sup> IDLH	2 mg/m <sup>3</sup> TWA

**OSHA Vacated PELs:**

**Acrolein:** 0.1 ppm TWA; 0.25 mg/m<sup>3</sup> TWA

**Hydroquinone:** 2 mg/m<sup>3</sup> TWA

### PERSONAL PROTECTIVE EQUIPMENT

**Eyes:** Wear chemical goggles and face shield.

**Skin:** Wear appropriate gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

## SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

**Physical State:** Liquid

**Color:** clear colorless to slightly yellow

**Odor:** disagreeable odor - strong odor

**pH:** Not available.

**Vapor Pressure:** 210 mm Hg @ 20 deg C

**Vapor Density:** 1.94 (Air=1)

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 53 deg C

**Freezing/Melting Point:** -87 deg C

**Decomposition Temperature:** Not available.

**Solubility in water:** Soluble.

**Specific Gravity/Density:** 0.83

**Molecular Formula:** C<sub>3</sub>H<sub>4</sub>O

**Molecular Weight:** 56.06

#### SECTION 10 - STABILITY AND REACTIVITY

**Chemical Stability:** Unstable. May form unstable peroxides. Acrolein polymerizes with release of heat on contact with minor amounts of acids (including sulfur dioxide), alkalis, volatile amines, salts, thiourea, oxidants (air) and on exposure to light and heat.

**Conditions to Avoid:** High temperatures, mechanical shock, light, ignition sources, exposure to air, excess heat.

**Incompatibilities with Other Materials:** Polymerizes violently upon exposure to strong acids or bases, oxidants (such as air), light or heat. Also incompatible with amines, sulfur dioxide and metal salts.

**Hazardous Decomposition Products:** Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.

**Hazardous Polymerization:** Will occur.

#### SECTION 11 - TOXICOLOGICAL INFORMATION

**RTECS#:**

- CAS# 107-02-8: AS1050000
- CAS# 123-31-9: MX3500000

**LD50/LC50:**

- CAS# 107-02-8: Draize test, rabbit, eye: 1 mg Severe; Draize test, rabbit, eye: 50 ug/24H Severe; Draize test, rabbit, skin: 2 mg/24H Severe; Inhalation, mouse: LC50 = 66 ppm/6H; Inhalation, mouse: LC50 = 875 ppm/1M; Inhalation, mouse: LC50 = 175 ppm/10M; Inhalation, mouse: LC50 = 152 mg/m<sup>3</sup>/6H; Inhalation, rabbit: LC50 = 10.5 ppm/6H; Inhalation, rat: LC50 = 18 mg/m<sup>3</sup>/4H; Inhalation, rat: LC50 = 131 ppm/30M; Inhalation, rat: LC50 = 8 ppm/4H; Oral, mouse: LD50 = 13900 ug/kg; Oral, mouse: LD50 = 28 mg/kg; Oral, rabbit: LD50 = 7 mg/kg; Oral, rat: LD50 = 26 mg/kg; Skin, rabbit: LD50 = 200 mg/kg.
- CAS# 123-31-9: Oral, mouse: LD50 = 245 mg/kg; Oral, mouse: LD50 = 350 mg/kg; Oral, rabbit: LD50 = 200 mg/kg; Oral, rat: LD50 = 302 mg/kg; Oral, rat: LD50 = 320 mg/kg. Not available.

**Carcinogenicity:**

**Acrolein -**

- Not listed by ACGIH, IARC, or NTP.

**Hydroquinone -**

- ACGIH: A3 - Confirmed animal carcinogen with unknown relevance to humans

**Epidemiology:**

No information available.

**Teratogenicity:**

No information available.

**Reproductive Effects:**

No information available.

**Neurotoxicity:**

No information available.

**Mutagenicity:**

No information available.

**Other Studies:**

No data available.

SECTION 12 - ECOLOGICAL INFORMATION
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**Ecotoxicity:**

**Fish:** Fathead Minnow: LC50 = 0.0195 mg/L; 96 Hr.; Flow-through; 24.9

- degrees; pH 7.9Fish: Rainbow trout: LC50 = 0.065 mg/L; 24 Hr.;

**Static ConditionsFish:** Bluegill/Sunfish: LC50 = 0.09-0.10 mg/L; 96 Hr.; Static Conditions; 21.5-22.0 degrees CWater flea EC50 = 0.083 mg/L; 48 Hr.; UnspecifiedBacteria: Phytobacterium phosphoreum: EC50 = 0.12-0.674 mg/L; 5, 15 minutes; Microtox test; 15 degrees C

SECTION 13 - DISPOSAL CONSIDERATIONS
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Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** CAS# 107-02-8: waste number P003.

**RCRA U-Series:** None listed.

SECTION 14 - TRANSPORT INFORMATION
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**US DOT**

- Shipping Name: ACROLEIN, STABILIZED
- Hazard Class: 6.1
- UN Number: UN1092
- Packing Group: I

**Canadian TDG**

- No information available.

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**USA RQ: CAS# 107-02-8: 1 lb final RQ; 0.454 kg final RQ**

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**USA RQ: CAS# 123-31-9: 100 lb final RQ; 45.4 kg final RQ**

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<b>SECTION 15 - REGULATORY INFORMATION</b>
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**US FEDERAL**

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**TSCA**

- CAS# 107-02-8 is listed on the TSCA inventory.
- CAS# 123-31-9 is listed on the TSCA inventory.

**Health & Safety Reporting List**

- CAS# 123-31-9: Effective 10/4/84; Sunset 10/4/94

**Chemical Test Rules**

- None of the chemicals in this product are under a Chemical Test Rule.

**Section 12b**

- None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

- None of the chemicals in this material have a SNUR under TSCA.

**SARA****CERCLA Hazardous Substances and corresponding RQs**

- CAS# 107-02-8: 1 lb final RQ; 0.454 kg final RQ
- CAS# 123-31-9: 100 lb final RQ; 45.4 kg final RQ

**SARA Section 302 Extremely Hazardous Substances**

- CAS# 107-02-8: 500 lb TPQ
- CAS# 123-31-9: 500 lb TPQ (lower threshold); 10000 lb TPQ (upper threshold)

**SARA Codes**

- CAS # 123-31-9: acute, chronic.

**Section 313**

- This material contains Acrolein (CAS# 107-02-8, 97%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 372.
- This chemical is not at a high enough concentration to be reportable under Section 313.

#### Clean Air Act:

- CAS# 107-02-8 is listed as a hazardous air pollutant (HAP).
- CAS# 123-31-9 is listed as a hazardous air pollutant (HAP).
- This material does not contain any Class 1 Ozone depleters.
- This material does not contain any Class 2 Ozone depleters.

#### Clean Water Act:

- CAS# 107-02-8 is listed as a Hazardous Substance under the CWA.
- CAS# 107-02-8 is listed as a Priority Pollutant under the Clean Water Act.
- CAS# 107-02-8 is listed as a Toxic Pollutant under the Clean Water Act.

#### OSHA:

- None of the chemicals in this product are considered highly hazardous by OSHA.

### STATE

Acrolein can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

Hydroquinone can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California No Significant Risk Level: None of the chemicals in this product are listed.

### European/International Regulations

#### European Labeling in Accordance with EC Directives

- Hazard Symbols: T+ F C N
- Risk Phrases:
  - R 11 Highly flammable.
  - R 24/25 Toxic in contact with skin and if swallowed.
  - R 26 Very toxic by inhalation.
  - R 34 Causes burns.
  - R 50 Very toxic to aquatic organisms.
- Safety Phrases:
  - S 23 Do not inhale gas/fumes/vapour/spray.
  - S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
  - S 28A After contact with skin, wash immediately with plenty of water.
  - S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
  - S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
  - S 61 Avoid release to the environment. Refer to special instructions/safety data sheets.

#### WGK (Water Danger/Protection)

- CAS# 107-02-8: 3
- CAS# 123-31-9: 2

#### United Kingdom Occupational Exposure Limits

- CAS# 107-02-8: OES-United Kingdom, TWA 0.1 ppm TWA; 0.23 mg/m<sup>3</sup> TWA
- CAS# 107-02-8: OES-United Kingdom, STEL 0.3 ppm STEL; 0.70 mg/m<sup>3</sup> STEL

**United Kingdom Maximum Exposure Limits**

- CAS# 123-31-9: MEL-United Kingdom, TWA 0.5 mg/m3 TWA

**Canada**

- CAS# 107-02-8 is listed on Canada's DSL List.
- CAS# 123-31-9 is listed on Canada's DSL List.
- This product has a WHMIS classification of E, D1A, B2, F.
- CAS# 107-02-8 is listed on Canada's Ingredient Disclosure List.
- CAS# 123-31-9 is listed on Canada's Ingredient Disclosure List.

**Exposure Limits**

- CAS# 107-02-8: OEL-ARAB Republic of Egypt:TWA 0.1 ppm (0.25 mg/m3)
- OEL-AUSTRALIA:TWA 0.1 ppm (0.25 mg/m3);STEL 0.3 ppm (0.8 mg/m3)
- OEL-AUSTRIA:TWA 0.1 ppm (0.25 mg/m3)
- OEL-BELGIUM:TWA 0.1 ppm (0.23 mg/m3);STEL 0.3 ppm (0.69 mg/m3)
- OEL-CZECHOSLOVAKIA:TWA 0.5 mg/m3;STEL 1 mg/m3
- OEL-DENMARK:TWA 0.1 ppm (0.25 mg/m3)
- OEL-FINLAND:STEL 0.1 ppm (0.25 mg/m3);Skin
- OEL-FRANCE:STEL 0.1 ppm (0.25 mg/m3)
- OEL-GERMANY:TWA 0.1 ppm (0.25 mg/m3)
- OEL-HUNGARY:TWA 0.25 mg/m3;STEL 0.5 mg/m3
- OEL-INDIA:TWA 0.1 ppm (0.25 mg/m3);STEL 0.3 ppm (0.8 mg/m3)
- OEL-JAPAN:TWA 0.1 ppm (0.23 mg/m3)
- OEL-THE NETHERLANDS:TWA 0.1 ppm (0.25 mg/m3) JAN9
- OEL-THE PHILIPPINES:TWA 0.1 ppm (0.25 mg/m3) JAN9
- OEL-POLAND:TWA 0.5 mg/m3
- OEL-RUSSIA:TWA 0.1 ppm;STEL 0.2 mg/m3
- OEL-SWEDEN:TWA 0.1 ppm (0.2 mg/m3);STEL 0.3 ppm (0.7 mg/m3)
- OEL-SWITZERLAND:TWA 0.1 ppm (0.25 mg/m3);STEL 0.2 ppm
- OEL-TURKEY:TWA 0.1 ppm (0.25 mg/m3)
- OEL-UNITED KINGDOM:TWA 0.1 ppm (0.25 mg/m3);STEL 0.3 ppm OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV
- CAS# 123-31-9: OEL-AUSTRALIA:TWA 2 mg/m3
- OEL-BELGIUM:TWA 2 mg/m3
- OEL-DENMARK:STEL 2 mg/m3
- OEL-FINLAND:TWA 2 mg/m3;STEL 4 mg/m3;Skin
- OEL-FRANCE:TWA 2 mg/m3
- OEL-GERMANY:TWA 2 mg/m3
- OEL-THE NETHERLANDS:TWA 2 mg/m3
- OEL-THE PHILIPPINES:TWA 2 mg/m3
- OEL-POLAND:TWA 2 mg/m3
- OEL-SWEDEN:TWA 0.5 mg/m3;STEL 1.5 mg/m3
- OEL-SWITZERLAND:TWA 2 mg/m3;STEL 4 mg/m3
- OEL-TURKEY:TWA 2 mg/m3
- OEL-UNITED KINGDOM:TWA 2 mg/m3;STEL 4 mg/m3 OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

**SECTION 16 - ADDITIONAL INFORMATION**

**MSDS Creation Date:** 5/10/1999, **Revision #3 Date:** 7/08/2002

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 107-05-1****Date: 03/09/2001**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: 3-CHLORO-1-PROPENE

SYNONYMS: 3-Chloropropylene, Chlorallylene, 3-Chloropropene, Allyl Chloride

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	ACGIH TLV	Exposure Limits (PPM)		
					OSHA PEL	MAC	Other STEL
3-CHLORO-1-PROPENE	C3H5CL	107-05-1	99+%	1	1	1	2

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIAN

## 3. HAZARD IDENTIFICATION

**\*\*\* EMERGENCY OVERVIEW \*\*\***

Flammable liquid and vapor.

Can form explosive mixtures with air.

May be fatal if inhaled.

Can cause irritation to eyes, skin, and respiratory tract.

## POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation , Skin , Ingestion

ACUTE EFFECTS: Can be absorbed through the skin. Vapor or mist is irritating to the eyes, skin, mucous membranes, and upper respiratory tract. Ingestion of the liquid causes gastrointestinal irritation. Inhalation may be fatal due to spasm, inflammation, edema, of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Liquid contact with the eye causes severe corneal injury. Overexposure may cause nausea, headache, dizziness, vomiting and weakness.

CHRONIC EFFECTS: Kidney and liver damage.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None known

OTHER EFFECTS OF OVEREXPOSURE: None

CARCINOGENICITY (US ONLY):

NTP - No

IARC MONOGRAPHS - No

OSHA REGULATED - No

**4. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

**EYE CONTACT:** Do not allow victim to rub or keep eyes tightly shut. Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes. Seek medical attention as soon as possible.

**SKIN CONTACT:** Immediately remove contaminated clothing. Rinse the affected area with flooding amounts of water and then wash it with soap and water. For reddened or blistered skin, consult a physician.

**INGESTION:** Never give anything by mouth to an unconscious person. Contact a poison control center. Unless the poison control center advises otherwise, have the conscious and alert person drink 1 to 2 glasses of water to dilute. Do not induce vomiting.

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: None

**5. FIRE FIGHTING MEASURES**

**FLASH POINT:** -31 deg. C

**AUTOIGNITION TEMPERATURE:** 485 deg. C

**FLAMMABLE LIMITS:** Vol.% in air

LOWER: 2.90

UPPER: 11.20

**EXTINGUISHING MEDIA:** Carbon dioxide, foam, or dry chemical. Water spray.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray. If possible, stop the product flow.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide, hydrogen chloride and phosgene.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Cylinder rupture may occur under fire conditions. May form explosive mixture in air. Vapors may travel a considerable distance to the source of ignition and flash back. Emits toxic fumes under fire conditions. Poses an explosion hazard indoors, outdoors, and in sewers.

**6. ACCIDENTAL RELEASE MEASURES**

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Shut off source if possible and remove source of heat. Absorb with sand or vermiculite and place in closed containers for disposal. Use non-sparking tools.

**SPECIALIZED EQUIPMENT:** None

## 7. HANDLING AND STORAGE

**PRECAUTIONS TO BE TAKEN IN HANDLING:** Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

**PRECAUTIONS TO BE TAKEN IN STORAGE:** Store in well ventilated areas. Keep valve protection cap on cylinders when not in use. Storage should be suitable for an OSHA 1B flammable liquid.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**ENGINEERING CONTROLS:** Provide adequate general and local exhaust ventilation to maintain concentrations below exposure and flammable limits.

**EYE / FACE PROTECTION:** Safety glasses . A safety shower and eyewash station should be readily available.

**SKIN PROTECTION:** Impervious gloves, coveralls, boots, and/or other resistant protective clothing.

**RESPIRATORY PROTECTION:** Use a self-contained breathing apparatus in case of emergency or non-routine use.

**OTHER PROTECTIVE EQUIPMENT:** Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**APPEARANCE:** Colorless to pale yellow

**ODOR:** Garlic like odor.

**PHYSICAL PRESSURE:** Liquid

**VAPOR PRESSURE:** @20 deg. C: 295 mm Hg

**VAPOR DENSITY (AIR=1):** 2.6

**BOILING POINT (C):** 45

**SOLUBILITY IN WATER:** @20 deg. C: 0.36%

**SPECIFIC GRAVITY (H<sub>2</sub>O=1):** @25 deg. C: 0.932

**EVAPORATION RATE: (n-BuAC=1):** 7

**ODOR THRESHOLD:** 3-6 ppm

**10. STABILITY AND REACTIVITY**

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas. Storage near a heat source.

MATERIALS TO AVOID: Avoid contact with metals. Oxidizing agents, acids and bases.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: Toxic carbon monoxide and hydrogen chloride. Phosgene.

**11. TOXICOLOGICAL INFORMATION**

LETHAL CONCENTRATION (LC50): NONE ESTABLISHED

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

**12. ECOLOGICAL INFORMATION**

No adverse ecological effects are expected.

**13. DISPOSAL CONSIDERATIONS**

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place.

**14. TRANSPORT INFORMATION**

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Allyl chloride  
HAZARD CLASS: 3 (flammable), Packing group I  
IDENTIFICATION NUMBER: UN1100  
REPORTABLE QUANTITIES: 1,000 lbs

LABELING: **FLAMMABLE LIQUID**

ADR / RID (EU Only): **Class 3, 16(a)**

SPECIAL PRECAUTIONS: **Cylinders should be transported in a secure upright position in a well ventilated truck.**

## 15. REGULATORY INFORMATION

OSHA: **Process Safety Management: Material is listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.**

TSCA: **Material is listed in TSCA inventory.**

SARA: **The threshold planning quantity for material is 10,000 lbs.**

EU NUMBER: **203-457-6**

NUMBER IN ANNEX 1 OF DIR 67/548: **Not listed in annex 1.**

EU CLASSIFICATION: **N/Av**

R: **11-26**

S: **16-29-33-45**

## 16. OTHER INFORMATION

OTHER PRECAUTIONS: **Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).**

ABBREVIATIONS: **N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established**

DISCLAIMER: **Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.**



**SPI Supplies Division**

**Structure Probe, Inc.**

P.O. Box 656 West Chester, PA 19381-0656 USA

Phone: 1-(610)-436-5400 Fax: 1-(610)-436-5755

E-mail: [spi3spi@2spi.com](mailto:spi3spi@2spi.com)

WWW: <http://www.2spi.com>

Manufacturer's CAGE: 1P573

# Material Safety Data Sheet

**SPI #02515-AA and 02515-AB Ethylene Dichloride**

## Section 1: Identification

Date Effective..... January 8, 2009  
(most recent revision)

Chemical Name/Synonyms... Ethylene dichloride; 1,2-Dichloroethane; Glycol dichloride

Emergencies

Contacting CHEMTREC:

24 Hour Emergency Use Only #'s...

Worldwide phone: 1-(703)-527-3887

Worldwide FAX: 1-(703)-741-6090

Toll-free phone: 1-(800)-424-9300 USA only

Product or Trade Name.... SPI #02515-AA and 02515-AB Ethylene Dichloride

Synonyms..... 1,2-Dichloroethane; Glycol dichloride

<b>Hazardous Material Information System USA</b>	Health	2	<b>National Fire Protection Association USA</b>	
	Fire Hazard	3		
	Reactivity	0		
	Personal Protection			

**NFPA Rating:**

---

## Section 2 Composition

Component Name	CAS #	Percent	EINECS/ELINCS
1,2-Dichloroethane	107-06-2	>99	203-458-1

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## Section 3: Hazard Identification

### Emergency overview:

**Appearance:** Colorless

**Flash Point:** 13°C (56°F)

**Warning! Flammable liquid and vapor.**

May cause central nervous system depression.

May cause liver and kidney damage.

May cause cancer based on animal studies.

Causes eye and skin irritation.

Causes respiratory tract irritation.

Irritant.

May be harmful if swallowed.

Potential cancer hazard.

### Target Organs:

Kidneys, central nervous system, liver, eyes, skin.

### Potential Health Effects

#### Eye:

Causes eye irritation. Vapors may cause eye irritation. May cause chemical conjunctivitis and corneal damage.

#### Skin:

Causes skin irritation. May be absorbed through the skin. May cause irritation and dermatitis. May cause cyanosis of the extremities.

#### Ingestion:

May cause central nervous system depression, kidney damage, and liver damage. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause liver and kidney damage. May cause effects similar

to those for inhalation exposure. May be harmful if swallowed.

**Aspiration hazard:**

May cause central nervous system depression, kidney damage, and liver damage.

**Inhalation:**

Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Causes respiratory tract irritation. May cause liver and kidney damage. Aspiration may lead to pulmonary edema. Vapors may cause dizziness or suffocation. Can produce delayed pulmonary edema. May cause burning sensation in the chest.

**Chronic:**

Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated eye contact may cause conjunctivitis. May cause liver and kidney damage. Effects may be delayed.

---

## Section 4: First Aid Measures

**Eyes:**

Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids. Get medical aid immediately. Do *not* allow victim to rub or keep eyes closed.

**Skin:**

Get medical aid immediately. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Discard contaminated clothing in a manner which limits further exposure.

**Ingestion:**

Do *not* induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Possible aspiration hazard. Get medical aid immediately.

**Inhalation:**

Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. Do *not* use mouth-to-mouth resuscitation.

**Notes to Physician:**

Treat symptomatically and supportively.

---

## Section 5: Fire Fighting Measures

### General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Will burn if involved in a fire. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. Flammable liquid and vapor. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

### Extinguishing Media:

For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. Do NOT use straight streams of water.

---

## Section 6: Accidental Release Measures

### General Information:

Use proper personal protective equipment as indicated in Section 8.

### Spills/Leaks:

Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately. Remove all sources of ignition. Use only spark-proof tools in the area that this product is to be used. A vapor suppressing foam may be used to reduce vapors.

---

## Section 7: Handling and Storage

### Handling:

Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty bottles retain product residue, (liquid and/or vapor), and can be dangerous.

Keep container tightly closed. Avoid contact with heat, sparks and flame. Avoid ingestion and inhalation. Use with adequate ventilation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:**

Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances.

**Flammables-area:**

Storage under a nitrogen blanket has been recommended.

## Section 8: Exposure Controls and Personal Protection

**Engineering Controls:**

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local explosion-proof ventilation to keep airborne levels to acceptable levels.

**Exposure Limits:**

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
1,2-Dichloroethane	10 ppm TWA	1 ppm TWA; 4 mg/m <sup>3</sup> TWA; 50 ppm IDHL	50 ppm TWA 100 ppm ceiling

Occupational Carcinogen - see Appendix A ; see Appendix C (Chloroethanes) for supplementary exposure limits Potential NIOSH carcinogen.

**OSHA Vacated PELs:**

1,2-Dichloroethane: 1 ppm TWA; 4 mg/m<sup>3</sup> TWA; 2 ppm STEL; 8 mg/m<sup>3</sup> STEL

**Personal Protective Equipment****Eyes:**

Wear chemical goggles.

**Skin:**

Wear appropriate protective gloves to prevent skin exposure.

**Clothing:**

Wear appropriate protective clothing to prevent skin exposure.

**Respirators:**

A respiratory protection program that meets OSHA's **29 CFR §1910 .134** and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

**Engineering Controls:**

Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

---

**Section 9: Physical and Chemical Properties**

**Physical State:** Liquid

**Appearance:** Colorless

**Odor:** Chloroform-like

**pH:** Not available.

**Vapor Pressure:** 100 mm Hg @29°C

**Vapor Density:** 3.4 (Air=1)

**Evaporation Rate:** 6.5 (Butyl acetate=1)

**Viscosity:** Not available.

**Boiling Point:** 81-85°C (178-185°F)

**Freezing/Melting Point:** -35°C (-31°F)

**Autoignition Temperature:** 413°C (775°F)

**Flash Point:** 13.3°C (56°F)

**Decomposition Temperature:** Not available.

**Explosion Limits, Lower:** 6.2%

**Upper:** 15.9%

**Solubility in water:** Insoluble.

**Specific Gravity/Density:** 1.25 (Water=1)

**Molecular Formula:** C<sub>2</sub>H<sub>4</sub>Cl<sub>2</sub>

**Molecular Weight:** 98.96

---

**Section 10: Stability and Reactivity****Chemical Stability:**

Stable at room temperature in closed containers under normal storage and handling conditions.

**Conditions to Avoid:**

Incompatible materials, light, ignition sources, excess heat, electrical sparks.

**Incompatibility with Other Materials:**

Strong oxidizing agents, strong reducing agents, bases, alkali metals, aluminum, amines, liquid ammonia, nitric acid, organic peroxides, ketones.

**Hazardous Decomposition of Products:**

Hydrogen chloride, phosgene, carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

---

## Section 11: Toxicological Information

**RTECS#:** KI0525000

**CAS#:** 107-06-2:

**LD<sub>50</sub>/LC<sub>50</sub> Information:**

CAS #: 107-06-2

Draize test, rabbit, eye: 63 mg Severe;

Draize test, rabbit, eye: 500 mg/24 hours Mild;

Draize test, rabbit, skin: 500 mg/24 hours Mild;

Inhalation, rat: LC<sub>50</sub>=1000 ppm/7 hours;

Oral, mouse: LD<sub>50</sub> = 413 mg/kg;

Oral, rabbit: LD<sub>50</sub> = 860 mg/kg;

Oral, rat: LD<sub>50</sub> = 670 mg/kg;

Skin, rabbit: LD<sub>50</sub> = 2800 mg/kg;

**Carcinogenicity:**

CAS# 107-06-2

**ACGIH:** A4 - Not Classifiable as a Human Carcinogen

**California:** carcinogen - initial date 10/1/87

**NIOSH:** occupational carcinogen

**NTP:** Suspect carcinogen

**OSHA:** Possible Select carcinogen

**IARC:** Group 2B carcinogen

**Epidemiology:**

IARC Group 2B: Proven animal carcinogenic substance of potential relevance to humans. No data available on human carcinogenicity, however sufficient evidence of carcinogenicity in animals is present.

**Teratogenicity:**

See actual entry in RTECS for complete information.

**Reproductive Effects:**

No information found.

**Neurotoxicity:** No information available.

**Mutagenicity:**

No information found.

**Other Studies:** See actual entry in RTECS for complete information.

---

## Section 12: Ecological Information

**Exotoxicity:**

Water flea Daphnia: 218mg/liter; 48 hours;

Bluegill/Sunfish: 430mg/liter; 96hour;

Static Fathead Minnow: 136mg/liter; 96 hours;

Static No data available.

**Environmental Fate:**

Terrestrial: Smaller releases on land will evaporate fairly rapidly.

Larger releases may leach rapidly through sandy soil into groundwater.

**Aquatic:**

If released to surface water, its primary loss will be by evaporation.

The half-life for evaporation will depend on wind and mixing conditions and was of the order of hours in the laboratory. However a modeling study using the EXAMS model for a eutrophic lake gave a half-life of 10 days.

**Atmospheric:**

Will degrade by reaction with hydroxyl radicals formed photochemically in the atmosphere. Half-life over one month.

**Physical:** Not expected to biodegrade or bioconcentrate.

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## Section 13: Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** CAS# 107-06-2: waste number U077.

## Section 14: Transport Information

**US DOT Hazard Class:**

Shipping Name: (TOXIC), Ethylene dichloride

Hazard Class: 3 (6.1)

UN Number: UN1184

Packing Group: II

**IATA (for international shipments)**

Shipping Name: Ethylene dichloride

Hazard Class: 3(6.1)

UN Number: UN1184

Packing Group: II

**Additional Information:**Flashpoint: 13°C (55.4°F)

---

## Section 15: Regulatory Information

**United States:****TSCA**

CAS# 107-06-2 is listed on the TSCA inventory.

**Health & Safety Reporting List**

CAS# 107-06-2: Effective Date: June 1, 1987; Sunset Date: June 1, 1997

**Chemical Test Rules**

CAS# 107-06-2: 40 CFR 7.99.5115

**Section 12b:**

CAS# 107-06-2: Section 4

**TSCA Significant New Use Rule:**

None of the chemicals in this material have a SNUR under TSCA.

**SARA:****CERCLA (RQ)**

CAS# 107-06-2: final RQ = 100 pounds (45.4 kg)

**SARA:****Section 302 (TPQ)**

None of the chemicals in this product have a TPQ.

**SARA Codes**

CAS # 107-06-2: immediate, delayed, fire

**Section 313**

This material contains 1,2-Dichloroethane (CAS# 107-06-2, 99+%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

**Clean Air Act:**

CAS# 107-06-2 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depleters. This material does not contain any Class 2 Ozone depleters.

**Clean Water Act:**

CAS# 107-06-2 is listed as a Hazardous Substance under the CWA.

CAS# 107-06-2 is listed as a Priority Pollutant under the Clean Water Act.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**State (Individual states in the USA)**

CAS# 107-06-2 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act: WARNING: This product contains 1,2-Dichloroethane, a chemical known to the state of California to cause cancer.

California No Significant Risk Level:

CAS# 107-06-2: no significant risk level = 10 ug/day

**California Prop. 65:**

Proposition 65 requires manufacturers or distributors of consumer products into the State of California to provide a warning statement if the product contains ingredients for which the State has found to cause cancer, birth defects or other reproductive harm. If this product contains an ingredient listed by the State of California to cause cancer or reproductive toxicity, it will be listed below:

Ethylene dichloride                      CAS# 107-06-2

European/International Regulations:

European Labeling in Accordance with EC Directives

Hazard Symbols:    T F

Risk Phrases:

R 11 Highly flammable.

R 22 Harmful if swallowed.

R 36/37/38 Irritating to eyes, respiratory system and skin.

R 45 May cause cancer.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 53 Avoid exposure - obtain special instructions before use.

**WGK (Water Danger/Protection):**

CAS# 107-06-2: 3

Canada

CAS# 107-06-2 is listed on Canada's DSL List.

This product has a WHMIS classification of B2, D2A, D1B.

CAS# 107-06-2 is listed on Canada's Ingredient Disclosure List.

**Exposure Limits:**

CAS# 107-06-2: OEL

ARAB Republic of Egypt: TWA 5 ppm (2 mg/m<sup>3</sup>)

AUSTRALIA: TWA 10 ppm (40 mg/m<sup>3</sup>)

AUSTRIA: TWA 20 ppm (80 mg/m<sup>3</sup>)

BELGIUM: TWA 10 ppm (40 mg/m<sup>3</sup>)

DENMARK: TWA 1 ppm (4 mg/m<sup>3</sup>);Skin

FINLAND: TWA 10 ppm (40 mg/m<sup>3</sup>);STEL 20 ppm (80 mg/m<sup>3</sup>);CAR

FRANCE: TWA 10 ppm (40 mg/m<sup>3</sup>)

GERMANY: Carcinogen

HUNGARY: STEL 4 mg/m<sup>3</sup>;Carcinogen

JAPAN: TWA 10 ppm (40 mg/m<sup>3</sup>)

THE NETHERLANDS: TWA 50 ppm (200 mg/m<sup>3</sup>)

THE PHILIPPINES: TWA 50 ppm (200 mg/m<sup>3</sup>)

RUSSIA: TWA 10 ppm

SWEDEN: TWA 1 ppm (4 mg/m<sup>3</sup>);STEL 5 ppm (20 mg/m<sup>3</sup>);Skin;CAR

SWITZERLAND: TWA 10 ppm (40 mg/m<sup>3</sup>);STEL 20 ppm (80 mg/m<sup>3</sup>)

TURKEY: TWA 50 ppm (200 mg/m<sup>3</sup>)

UNITED KINGDOM: TWA 10 ppm (40 mg/m<sup>3</sup>);STEL 15 ppm (60 mg/m<sup>3</sup>)

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## Section 16: Other Information

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# **Material Safety Data Sheet (MSDS)**

## **Harmonised Version for Acrylonitrile**

### Disclaimer

The members of the Acrylonitrile Sector Group recommend that this template document be used for writing up or updating the companies' MSDS for Acrylonitrile. It contains the basic information which the Sector Group recommend to be included in any Acrylonitrile MSDS.

The information, specifications, procedures, methods and recommendations herein are presented in good faith, are believed to be accurate and reliable, but may well be incomplete and/or not applicable to all conditions or situations that may exist or occur. No representation, guarantee or warranty is made as to the accuracy, reliability or completeness of said information, specifications, procedures, methods and recommendations or that the application or use of any of the same will avoid hazards, accidents, losses, damages or injury of any kind to persons or property or that the same will not infringe patents of others or give desired results. Readers are cautioned to satisfy themselves as to the suitability of said information, specifications, procedures, methods and recommendations for the purposes intended prior to use.

# Material Safety Data Sheet (MSDS) Harmonised Version for Acrylonitrile

## Section 1 - Identification of the Substance/Preparation and Company/Undertaking

**Substance Name:** Acrylonitrile  
**Synonyms:** Vinyl cyanide, Propene nitrile  
**Intended Use:** Raw material for chemical synthesis  
**Company:** *Name of company*  
**Manufacture Site:** *Address/telephone number of manufacturing site*  
**Emergency Information:** *24-hour emergency telephone number*

## Section 2 – Composition/Information on Ingredients

Hazardous Components	Classification	Concentration	CAS-No.	EINECS-No	Chemical Formula
Acrylonitrile (stabilised)	F: R11 Carc Cat 2: R45 T: R23/24/25 Xi: R37/38, R41, R43 N: R51/53	>99%	107-13-1	203-466-5	CH <sub>2</sub> =CH-CN

## Section 3 – Hazards Identification

### **Physical & Chemical**

Highly flammable.  
May polymerise violently unless stabilised.  
May react violently with acids, alkalis or peroxides.

### **Health**

Toxic by inhalation, in contact with skin and if swallowed.  
Irritating to respiratory system and skin.  
Risk of serious damage to eyes.  
May cause sensitisation by skin contact.  
May cause cancer.

### **Environmental**

Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.

## Section 4 – First Aid Measures

### **General Advice**

The ready availability of oxygen is essential for First Aid treatment in cases of acrylonitrile poisoning. Take off all contaminated clothing and shower immediately. Symptoms include headache, vomiting, dizziness, larger doses may result in unconsciousness, paralysis/cramp, cessation of breathing, death.

Anyone affected by acrylonitrile, significantly exposed to acrylonitrile but not yet showing symptoms or suspected of being significantly exposed to acrylonitrile must be referred promptly to a doctor following any necessary first aid.

First aiders must protect themselves against acrylonitrile.

Mouth-to-mouth resuscitation should not be used.

If a patient stops breathing, mechanical means should be used to inflate the lungs e.g. oxygen resuscitator.

Transfer patient to hospital.

Delayed effects may occur up to 8 hours after exposure.

#### **Inhalation**

Remove patient to fresh air.

Administer oxygen continuously even if patient appears healthy.

Keep patient quiet and warm.

Follow up with Medical treatment.

#### **Skin Contact**

Remove patient to fresh air.

Remove contaminated clothing including underwear and shoes.

Wash affected area with plenty of water until irritation has stopped.

Keep patient quiet and warm.

Follow up with medical treatment.

#### **Eye Contact**

Flush the eye immediately with plenty of water protecting the unaffected eye, until irritation has stopped.

Follow up with medical/ophthalmic treatment.

#### **Ingestion**

Conscious patients should drink at least 1 pint of water.

If patient vomits, take care to prevent inhalation of any vomit.

Keep patient quiet and warm.

Follow up with medical treatment.

*Refer to Section 16 for medical notes.*

## **Section 5 – Fire Fighting Measures**

### **General Hazard**

Severe fire hazard.

Highly flammable and volatile liquid.

Highly flammable vapours emitted.

The vapour is heavier than air.

Vapours or gases may ignite at distant ignition sources and flash back.  
May be ignited by heat, sparks, static electrical discharge or flame.

#### **Suitable Extinguishing Media**

Dry chemical powder, alcohol foam, water spray (fog), CO<sub>2</sub>.  
After fire is extinguished re-ignition may occur from hot surfaces.  
Cool containing vessels with flooding quantities of water until well after fire is out.

#### **Extinguishing Media NOT to be used**

Water jet (solid water stream may scatter and spread fire).

#### **Special Exposure Hazards**

If involved in a fire acrylonitrile produces very toxic fumes and dense, black, acrid smoke clouds.  
Liquid will float and may re-ignite on surface water.

#### **Special Protective Equipment for Fire-fighters**

Fire-fighters must wear breathing apparatus and full chemical protection.

#### **Further Information**

Contaminated fire water must be contained and prevented from entering water courses.  
If the fire is impossible to control withdraw and let it burn.  
See sections 8 and 10.

## **Section 6 – Accidental Release Measures**

#### **General Precautions**

Inform emergency services and alert appropriate authorities.  
Avoid ignition; vapours may be contained within water spray.  
Consider evacuation for large releases.

#### **Personal Precautions**

Use personal protective equipment (see section 8) to avoid contact with skin, inhalation or ingestion.  
Keep upwind.  
Warn people downwind to remain indoors with all windows closed and forced ventilation systems turned off.

#### **Environmental Precautions**

Do not allow material to enter drains, water courses or groundwater.  
Contain and absorb with earth, sand or other suitable inert material.

#### **Methods for Cleaning Up**

Smaller spills should be absorbed in earth or sand.  
Dam-up large spills.  
Use a non-sparking or explosion-proof means to transfer into an appropriate container for disposal.  
After clean-up flush spill area with water.  
Observe regulatory requirements for discharge to drain.

## **Section 7 – Handling and Storage**

#### **Handling**

Avoid any personal exposure to vapour or liquid.  
Prevent all sources of ignition, including electrostatic discharge.  
Handle material in closed systems whenever possible.

Provide appropriately designed ventilation systems, including vent scrubbers, where closed system containment is not possible.

Facilities storing or utilising this material should be equipped with an eyewash facility and a safety shower.

See section 6 (Accidental Release Measures), section 8 (Exposure Controls and Personal Protection) and section 13 (Disposal Considerations).

### **Storage**

Keep containers tightly closed under an inert atmosphere.

Store containers in a cool, well ventilated place, away from physical damage hazards.

Store away from sources of ignition (no smoking), including electrostatic discharge.

Store in carbon steel, stainless steel or aluminium containers; the use of copper or copper containing alloys is not suitable.

Keep away from drainage systems.

Provide secondary containment, e.g. bunding for all storage vessels and kerbed contained areas for drums and IBCs.

Agitation is recommended in storage tanks.

Segregate from and avoid contact with peroxides, alkalis and oxidising agents.

The material is stabilised/inhibited against spontaneous polymerisation prior to dispatch with MEHQ (monomethyl ether of hydroquinone or p-methoxyphenol) and very small amounts of oxygen (ca. 5 ppm). A minimal content of oxygen supports maximum effectiveness of the stabiliser MEHQ. Complete removal of the oxygen content should be avoided. A scenario for complete oxygen removal could be: Long storage periods under nitrogen atmosphere together with constant stripping of the oxygen with nitrogen used for level control. In this case, the presence of oxygen should be confirmed by analysis and eventually re-established by adding dilute air. When adding air, explosion limits have of course to be respected.

If bulk volumes of acrylonitrile are stored for longer periods (about 6 weeks under normal storage conditions) without adding additional volumes of fresh product, the stabiliser content should be checked by analysis.

If stored without proper stabilisation, spontaneous polymerisation could start, detectable by turbidity, cloudiness and rising APHA (Hazen) numbers.

Avoid storage times for the material (in bulk volumes) for periods greater than 6 months.

When possible, transfer to and from tanks on a first in, first out basis.

## **Section 8 – Exposure Controls and Personal Protection**

### **Exposure Limit Values**

Workplace Exposure Limits (WELs) EH40/2005 (UK), acrylonitrile, CAS no. 107-13-1, Long-term exposure limit (8-hour TWA) 4.4 mg/m<sup>3</sup>.

### **Engineering Measures**

Use material in closed systems to avoid any exposure.

All pipework, storage vessels and process equipment should be designed to ensure total containment at all times.

Take measures against the build up of electrostatic charges.

Where total containment cannot be provided, ventilation and/or personal protective equipment should be used to prevent any exposure or ensure exposure limit is not exceeded.

Safety shower and eye wash should be continually available in working area.

### **Occupational Exposure Controls**

Avoid any exposure to liquid and vapours including contact with skin.

Atmospheric concentrations should be prevented or minimised below the occupational exposure limit.

Wear personal protective equipment (PPE) appropriate to task.

PPE manufacturers should be consulted.

### **Respiratory Protection**

Use self-contained breathing apparatus.

### Hand Protection

Chemical resistant protective gloves (EN 374). Suitable materials also with prolonged, direct contact (*recommended: Protective index 6, corresponding >480 minutes of permeation time according to EN 374*): butyl rubber (butyl) - 0.7 mm coating thickness. Supplementary note: the specifications are based on own tests, literature data and information of glove manufacturers or are derived from similar substances by analogy. Due to many conditions (e.g. temperature) it must be considered, that the practical usage of a chemical-protective glove in practice may be much shorter than the permeation time determined in accordance to EN 374. Manufacturer's directions for use should be observed because of great diversity of types.

### Eye Protection

Wear appropriate protective eye glasses, face shield or chemical safety goggles to European Standard EN166 (unless breathing apparatus affords full eye protection).

### Skin Protection

Wear appropriate protective clothing to prevent skin exposure (to DIN-EN 465), e.g. butyl rubber boots and neoprene suit.

Recommended material(s): >8 hours (breakthrough time); butyl rubber.

Do not wear footwear with leather soles.

### Environmental Exposure Controls

Avoid spillage to land or water. See section 6 (Accidental Release Measures), section 7 (Handling and Storage), section 12 (Ecological Information) and section 13 (Disposal Considerations).

### Occupational Hygiene

Observe good hygiene and safety practices at all times.

When using do not eat, drink or smoke.

Wash hands, forearms and face thoroughly and immediately after working with this material.

Keep away from food and drinks.

Change contaminated clothing if only lightly contaminated and wash before re-use, otherwise dispose of appropriately.

Contaminated leather items, clothing, footwear, etc. should be appropriately disposed of and not reused. See section 7 (Handling and Storage) and section 13 (Disposal Considerations).

## Section 9 – Physical and Chemical Properties

<b>Appearance</b>	Clear Liquid
<b>Colour</b>	Colourless
<b>Odour</b>	Mild/sweetish
<b>Freezing/melting point/range</b>	-83 °C
<b>Boiling point/range</b>	77 °C at atmospheric pressure
<b>Density</b>	806 kg/m <sup>3</sup> at 20 °C
<b>Vapour density (Air=1)</b>	1.8
<b>Vapour Pressure</b>	116 mbar at 20 °C 400 mbar at 50 °C
<b>Viscosity</b>	0.4 cp at 20 °C
<b>Solubility in Water</b>	Up to 73 g/l at 20 °C
<b>pH Value (at 50 g/l in H<sub>2</sub>O)</b>	7 at 20 °C
<b>Flash Point</b>	- 1 °C Tag closed cup - 5 °C DIN 51 758
<b>Auto-ignition Temperature</b>	480 °C DIN 51 794
<b>Flammability limits in air</b>	2.8% to 28% by volume
<b>Octanol/Water Partition Coefficient (log Pow)</b>	-0.37 to 0.25 (various data sources)
<b>Explosive properties</b>	None (flammable not explosive)

<b>Oxidising properties</b>	None
<b>Critical temperature</b>	263 °C
<b>Heat of combustion</b>	-33173 kJ/kg at 25 °C
<b>Surface tension</b>	0.0273 J/m <sup>2</sup> at 24 °C
<b>Solubility in solvents/fats</b>	Very soluble in acetone, benzene, diethyl ether and ethanol.
<b>Evaporation rate</b>	High
<b>Conductivity</b>	Low

## **Section 10 – Stability and Reactivity**

### **Stability**

Stable under recommended storage and handling conditions (see section 7).

Stabilisation/inhibition against polymerisation is essential for storage and transport.

Contains polymerisation inhibitors MEHQ (monomethyl ether of hydroquinone, also known as 4-methoxy phenol or p-methoxy phenol) and water, in the following concentration ranges; MeHQ: 35-45 ppm, Water: 0.2-0.5%.

### **Thermal Decomposition**

Unstable in contact with heat and light.

### **Conditions to Avoid**

Alkaline conditions (pH above 7) may result in rapid polymerisation. See section 7 Handling and Storage.

### **Materials to Avoid**

Alkalis and bases. Materials containing copper. Oxidising agents.

### **Hazardous Reactions**

Contact with strong acids, caustic, or peroxides can cause spontaneous polymerisation generating large amounts of heat. Highly exothermic; heat of polymerisation 17.3 kcal/mol. See section 7 Handling and Storage.

### **Hazardous Decomposition Products**

Hydrogen Cyanide can be produced on decomposition.

## **Section 11 – Toxicological Information**

### **Effects of Exposure**

Headache, vomiting, dizziness.

Larger doses may result in unconsciousness, paralysis/cramp, cessation of breathing, death.

The toxicity of acrylonitrile is attributed to the compound itself and its breakdown to cyanide in the body. Symptoms may not appear for up to 10 hours after exposure due to delayed breakdown of acrylonitrile to hydrogen cyanide in the body.

See section 16 - "Notes for Physician", section 4 (First Aid Measures) and section 8 (Exposure Controls and Personal Protection).

### **Inhalation**

Irritation of respiratory system, headache, vomiting, dizziness, unconsciousness, paralysis/cramp, cessation of breathing, death.

### **Skin Contact**

Irritation, rash, blistering, sensitisation, headache, vomiting, dizziness.

**Eye Contact**

Irritation, blurred vision, headache, vomiting, dizziness.

**Ingestion**

Headache, vomiting, dizziness, unconsciousness, paralysis/cramp, cessation of breathing, death.

**Acute Toxicity**

LD50 rat (oral) - 82 mg/kg  
LD50 rabbit (dermal) - 280 mg/kg  
LC50 rat (inhalation) - 946 ppm (4 hours)

**Corrosivity/Irritation**

Irritating to eyes and skin.

Contact with the skin can lead to blistering, and may cause sensitisation.

**Sensitisation**

Skin contact may cause sensitisation.

**Repeated-Dose Toxicity**

No known additional effects other than those described elsewhere in this section.

**Carcinogenicity/Mutagenicity/Reproductive Toxicity**

Known to cause cancer in animals.

Suspected human carcinogen.

No known mutagenic or reproductive toxicity effects.

**Section 12 – Ecological Information****Ecotoxicity**

*Freshwater data suggests that Acrylonitrile is of moderate toxicity to aquatic organisms with reported 48 hour LC50 values ranging from 7.6 mg/l (water flea Daphnia Magna) to 70 mg/l (Rainbow trout Oncorhynchus mykiss).*

**Mobility**

Limited solubility in water.

See Section 9 (Physical and Chemical Properties).

**Persistence and Degradability**

Standard degradation tests indicate that this material will degrade in the aquatic environment but not readily.

Acrylonitrile is readily degraded in acclimatised aerobic systems; anaerobic systems display greater sensitivity and may be inhibited.

Atmospheric degradation occurs via photooxidation.

**Bioaccumulative Potential**

Acrylonitrile is not expected to bioaccumulate due to its degradability and low octanol/water partition coefficient.

**Other Adverse Effects**

None known.

**Section 13 – Disposal Considerations****General**

Disposal must be carried out in accordance with local and national regulatory requirements. In the UK, the *Hazardous Waste (England & Wales) Regulations 2005 (SI 2005 No. 894)* and the *Environmental Protection (Duty of Care) Regulations 1991 (SI 2839)* and subsequent amendments apply.

**Material**

Handle and dispose of in compliance with current environmental waste legislation. Seek professional advice regarding disposal. Incinerate only in an appropriately licensed chemical waste incinerator. If in doubt consult the Regulator (*in the UK the Environment Agency*).

**Contaminated Material**

Empty containers may be suitable for reuse or recycling after cleaning and appropriate disposal of the cleaning liquors. Disposal method dependent upon degree and nature of contaminated material. Disposal must be carried out in accordance with local and national regulatory requirements – see *General* above. If in doubt seek professional advice or contact the Regulator (*in the UK the Environment Agency*).

**Section 14 – Transport Information**

<b>General</b>	UN No. 1093 Class 3 Subsidiary Hazard 6.1 Proper Shipping Name: ACRYLONITRILE, INHIBITED Packing Group I TREM CARD TEC(R)61
<b>CDG (UK Road)</b>	EAC 3WE
<b>ADR (European Road)</b>	Hazard Identification No 336
<b>IATA (Air)</b>	<i>Forbidden?</i>
<b>RID (Rail)</b>	Hazard Identification No 336
<b>IMDG (Sea)</b>	EmS F-E, S-D Marine Pollutant No
<b>I (Inland Water ways)</b>	ADN B2-3
<b>Channel Tunnel</b>	Not permitted

**Section 15 – Regulatory Information**

**Regulatory Information**

*Quote relevant international and national legislation/regulations.*

**Label**

F: Highly flammable  
T: Toxic  
N: Dangerous for the Environment

**Classification**

*This information already appears in section 2.*

**Risk Phrases**

R11	Highly flammable
R23/24/25	Toxic by inhalation, in contact with skin and if swallowed
R37/38	Irritating to respiratory system and skin
R41	Risk of serious damage to eyes
R43	May cause sensitisation by skin contact
R45	May cause cancer
R51/53	Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment

**Safety Phrases**

S9	Keep container in a well ventilated place.
S16	Keep away from sources of ignition – No smoking.
S45	In case of accident or if you feel unwell seek medical advice immediately (show the label where possible).
S53	Avoid exposure - Obtain special instruction before use.
S61	Avoid release to the environment. Refer to special instructions/safety data sheet.

**Section 16 – Other Information**

# Material Safety Data Sheet

## Vinyl acetate monomer, inhibited with 3-30ppm Hydroquinone

ACC# 01681

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Vinyl acetate monomer, inhibited with 3-30ppm Hydroquinone

**Catalog Numbers:** AC140840000, AC140840010, AC140840025, AC140840250, O5057-4, O5057FB115

**Synonyms:** Ethenyl acetate; Ethenyl ethanoate; Vinyl A monomer; Vinyl ethanoate; 1-Acetoxyethylene.

**Company Identification:**

Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410

**For information, call:** 201-796-7100

**Emergency Number:** 201-796-7100

**For CHEMTREC assistance, call:** 800-424-9300

**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
108-05-4	Vinyl acetate	99	203-545-4

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: -8 deg C.

**Danger!** Possible cancer hazard. May cause cancer based on animal data. Risk of cancer depends on duration and level of exposure. Extremely flammable liquid and vapor. Vapor may cause flash fire. Causes eye and skin irritation and possible burns. May cause allergic skin reaction. May cause respiratory tract irritation. This material has been reported to be susceptible to autoxidation and therefore should be classified as peroxidizable. Light sensitive. Hazardous due to peroxide initiation of polymerization.

**Target Organs:** Central nervous system, liver, eyes, skin.

#### Potential Health Effects

**Eye:** Contact with eyes may cause severe irritation, and possible eye burns.

**Skin:** May cause mild skin irritation. May be absorbed through the skin in harmful amounts. Material evaporates quickly from open skin. However, it may cause burns if trapped under clothing. May cause an allergic reaction in certain individuals.

**Ingestion:** Aspiration hazard. May cause gastrointestinal irritation with nausea, vomiting and diarrhea.

**Inhalation:** Harmful if inhaled. May cause irritation of the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. Vapors may cause dizziness or suffocation.

**Chronic:** Possible cancer hazard based on tests with laboratory animals. Chronic ingestion may cause liver damage. Prolonged or repeated skin contact may cause sensitization dermatitis and possible destruction and/or ulceration. Repeated inhalation may cause chronic bronchitis. Prolonged exposure may produce a narcotic effect. Repeated exposure may cause central nervous system damage.

## Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

**Ingestion:** Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors can travel to a source of ignition and flash back. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. May accumulate static electrical charges, and may cause ignition of its own vapors. Polymerizes readily if not inhibited; heat can initiate reaction. Extremely flammable liquid and vapor. Vapor may cause flash fire.

**Extinguishing Media:** For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Do NOT use water directly on fire. Use water spray to cool fire-exposed containers. Water may be ineffective. Do NOT use straight streams of water. Use water only in flooding quantities as fog.

**Flash Point:** -8 deg C ( 17.60 deg F)

**Autoignition Temperature:** 426 deg C ( 798.80 deg F)

**Explosion Limits, Lower:**2.6

**Upper:** 14.0

**NFPA Rating:** (estimated) Health: 2; Flammability: 3; Instability: 2

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Ground and bond containers when transferring material. Use spark-

proof tools and explosion proof equipment. Do not get in eyes, on skin, or on clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. Store protected from light. Wash clothing before reuse. Discard contaminated shoes. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from sources of ignition. Refrigerator/flammables. Keep away from polymerization catalysts. Store protected from light. Vinyl acetate inhibited with hydroquinone should be stored at temperatures not exceeding 86°F (30°C), and for periods not exceeding 6 months. Refrigeration is recommended.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Ventilation fans and other electrical service must be non-sparking and have an explosion-proof design.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Vinyl acetate	10 ppm TWA; 15 ppm STEL	none listed	none listed

**OSHA Vacated PELs:** Vinyl acetate: 10 ppm TWA; 30 mg/m<sup>3</sup> TWA

### Personal Protective Equipment

**Eyes:** Wear chemical splash goggles.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless

**Odor:** sweetish odor - sharp odor

**pH:** Not available.

**Vapor Pressure:** 85 mm Hg @ 20 deg C

**Vapor Density:** 3.0

**Evaporation Rate:** Not available.

**Viscosity:** 0.43 cP@20 deg C

**Boiling Point:** 72 - 73 deg C

**Freezing/Melting Point:** -93 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:** .9340

**Molecular Formula:** C<sub>4</sub>H<sub>6</sub>O<sub>2</sub>

**Molecular Weight:** 86.0408

## Section 10 - Stability and Reactivity

**Chemical Stability:** Peroxide formation may occur in containers that have been opened and remain in storage. May form explosive peroxides. May polymerize violently or explosively if contaminated or overheated. Uncontrolled polymerization can cause rapid evolution of heat and increased pressure which can result in violent rupture of storage vessels or containers.

**Conditions to Avoid:** Incompatible materials, light, ignition sources, excess heat, oxidizers.

**Incompatibilities with Other Materials:** Nonoxidizing mineral acids, ammonia, aliphatic amines, ethylene diamine, ethyleneimine, ozone, oleum, peroxides, strong acids, alkanolamines, hydrochloric acid, hydrofluoric acid, nitric acid, sulfuric acid, polymerizing initiators, oxygen.

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** May occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 108-05-4: AK0875000

**LD50/LC50:**

CAS# 108-05-4:

Inhalation, mouse: LC50 = 1550 ppm/4H;

Inhalation, rabbit: LC50 = 2500 ppm/4H;

Inhalation, rat: LC50 = 11400 mg/m<sup>3</sup>/4H;

Oral, mouse: LD50 = 1600 mg/kg;

Oral, rat: LD50 = 2900 mg/kg;

Skin, rabbit: LD50 = 2335 mg/kg;

**Carcinogenicity:**

CAS# 108-05-4:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** Not listed.
- **NTP:** Not listed.
- **IARC:** Group 2B carcinogen

**Epidemiology:** No information found

**Teratogenicity:** No information found

**Reproductive Effects:** No data available.

**Mutagenicity:** No data available.

**Neurotoxicity:** No information found

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Fathead Minnow: LC50 = 31.0 mg/L; 96 Hr.; UnspecifiedFish: Bluegill/Sunfish: LC50 = 31.0 mg/L; 96 Hr.; UnspecifiedFish: Goldfish: LC50 = 31.0 mg/L; 96 Hr.; UnspecifiedWater flea EC50 = 52.0 mg/L; 24 Hr.; Unspecified No data available.

**Environmental:** Under aerobic conditions, Vinyl acetate readily biodegrades. BOD (5-day) values are in the range of 42-62% of COD. Biodegradation also occurs under anaerobic conditions.

**Physical:** No information available.

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	VINYL ACETATE, STABILIZED	VINYL ACETATE STABILIZED
<b>Hazard Class:</b>	3	3
<b>UN Number:</b>	UN1301	UN1301
<b>Packing Group:</b>	II	II
<b>Additional Info:</b>		FLASHPOINT -8 C

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 108-05-4 is listed on the TSCA inventory.

#### Health & Safety Reporting List

CAS# 108-05-4: Effective 2/10/86, Sunset 2/10/96

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 108-05-4: 5000 lb final RQ; 2270 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

CAS# 108-05-4: 1000 lb TPQ

#### SARA Codes

CAS # 108-05-4: immediate, fire, reactive.

#### Section 313

This material contains Vinyl acetate (CAS# 108-05-4, 99%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

CAS# 108-05-4 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

CAS# 108-05-4 is listed as a Hazardous Substance under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 108-05-4 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

### California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

## European/International Regulations

### European Labeling in Accordance with EC Directives

#### Hazard Symbols:

XN F

#### Risk Phrases:

R 11 Highly flammable.

R 40 Limited evidence of a carcinogenic effect.

#### Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.

S 23 Do not inhale gas/fumes/vapour/spray.

S 29 Do not empty into drains.

S 33 Take precautionary measures against static discharges.

### WGK (Water Danger/Protection)

CAS# 108-05-4: 2

### Canada - DSL/NDSL

CAS# 108-05-4 is listed on Canada's DSL List.

### Canada - WHMIS

This product has a WHMIS classification of B2, D2A, F.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

### Canadian Ingredient Disclosure List

CAS# 108-05-4 is listed on the Canadian Ingredient Disclosure List.

## Section 16 - Additional Information

**MSDS Creation Date:** 5/19/1999

**Revision #7 Date:** 10/25/2007

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

# Material Safety Data Sheet

## Methyl Isobutyl Ketone

ACC# 14550

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Methyl Isobutyl Ketone**Catalog Numbers:** M213 1, M213 20, M213 4, M213-1, M213-20, M213-4, M2131, M21320, M213200, M2134, NC9652550, XX213200LI**Synonyms:** Hexone, Isopropylacetone, 4-Methyl-2-Oxopentane, MIBK.**Company Identification:**

Fisher Scientific

1 Reagent Lane

Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
108-10-1	Methyl isobutyl ketone	>98.5	203-550-1

**Hazard Symbols:** XN F**Risk Phrases:** 11 36/37 20 66

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless. Flash Point: 14 deg C. **Warning! Flammable liquid.** May cause central nervous system depression. May cause liver damage. Causes eye and skin irritation. Causes digestive and respiratory tract irritation. May cause fetal effects.

**Target Organs:** Central nervous system, liver.

#### Potential Health Effects

**Eye:** Vapors may cause eye irritation. May cause painful sensitization to light. Contact produces irritation, tearing, and burning pain.

**Skin:** Causes skin irritation. Prolonged and/or repeated contact may cause irritation and/or dermatitis.

**Ingestion:** Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause effects similar to those for inhalation exposure.

**Inhalation:** Inhalation of high concentrations may cause central nervous system effects characterized by headache, dizziness, unconsciousness and coma. Causes respiratory tract irritation. Exposure produces central nervous system depression. May cause liver abnormalities. May cause visual abnormalities.

**Chronic:** Prolonged or repeated skin contact may cause defatting and dermatitis.

## Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed.

**Skin:** Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.

**Ingestion:** If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

**Inhalation:** Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Firefighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Containers may explode in the heat of a fire. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. May polymerize explosively when involved in a fire.

**Extinguishing Media:** For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. Water may be ineffective. For large fires, use water spray, fog or alcohol-resistant foam. Do NOT use straight streams of water. Cool containers with flooding quantities of water until well after fire is out.

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Avoid runoff into storm sewers and ditches which lead to waterways. Wear a self contained breathing apparatus and appropriate Personal protection. (See Exposure Controls, Personal Protection section). Scoop up with a nonsparking tool, then place into a suitable container for disposal. Remove all sources of ignition. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with skin and eyes. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from sources of ignition. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Methyl isobutyl ketone	50 ppm; 75 ppm STEL	50 ppm TWA; 205 mg/m <sup>3</sup> TWA 500 ppm IDLH	100 ppm TWA; 410 mg/m <sup>3</sup> TWA

**OSHA Vacated PELs:** Methyl isobutyl ketone: 50 ppm TWA; 205 mg/m<sup>3</sup> TWA

### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to minimize contact with skin.

**Respirators:** Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless

**Odor:** Sweet, camphor-like.

**pH:** Not available.

**Vapor Pressure:** 15.7 mm Hg @ 20

**Vapor Density:** 3.5 (air=1)

**Evaporation Rate:** 1.6 (butyl acetate=1)

**Viscosity:** Not available.

**Boiling Point:** 117.4 deg C @ 760.00mm Hg

**Freezing/Melting Point:** -84 deg C

**Decomposition Temperature:** Not available.

**Autoignition Temperature:** 460 deg C ( 860.00 deg F)

**Flash Point:** 14 deg C ( 57.20 deg F)

**NFPA Rating:** (estimated) Health: 2; Flammability: 3; Reactivity: 1

**Explosion Limits, Lower:** 1.40 vol %

**Upper:** 7.50 vol %

**Solubility:** 17 g/l (20 c)

**Specific Gravity/Density:** .8010g/cm<sup>3</sup>

**Molecular Formula:** C<sub>6</sub>H<sub>12</sub>O

**Molecular Weight:** 100.16

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable at room temperature in closed containers under normal storage and handling conditions.

**Conditions to Avoid:** Incompatible materials, ignition sources, excess heat.

**Incompatibilities with Other Materials:** Oxidizing agents, potassium tert-butoxide, reducing agents, strong bases. Substance may form explosive peroxides with air.

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** May occur.

## Section 11 - Toxicological Information

**RTECS#:**

CAS# 108-10-1: SA9275000

**LD50/LC50:**

CAS# 108-10-1:

Inhalation, mouse: LC50 =23300 mg/m<sup>3</sup>;

Oral, mouse: LD50 = 2671 mg/kg;

Oral, rat: LD50 = 2080 mg/kg;

Skin, rabbit: LD50 = &gt;20 gm/kg;

**Carcinogenicity:**

CAS# 108-10-1: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.

**Epidemiology:** No information available.**Teratogenicity:** Embryo or Fetus: Death, inhalation(ihl)-mouse TCLo=3000 ppm/6H; Stunted fetus, ihl-rat TCLo=300ppm/6H. Specific Developmental Abnormalities: Cardiovascular and Central nervous system, ihl-mouse TCLo=3000ppm/6H; Musculoskeletal, ihl-rat TCLo=300ppm/6H.**Reproductive Effects:** No information available.**Neurotoxicity:** No information available.**Mutagenicity:** No information available.**Other Studies:** None.

## Section 12 - Ecological Information

**Ecotoxicity:** Redwinged blackbird, oral LD50=100mg/kg. Goldfish LC50=460mg/L/24H.**Environmental Fate:** In soil, substance will undergo direct photolysis, volatilization, or aerobic biodegradation. Substance is highly mobile and may also leach to groundwater. In water, substance will undergo direct photolysis and volatilization. Bioaccumulation is not highly predicted. In air, substance will react with hydroxyl radicals or undergo direct photolysis.**Physical/Chemical:** None.**Other:** Please refer to the Handbook of Environmental Fate and Exposure Data for additional information.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.**RCRA U-Series:** CAS# 108-10-1: waste number U161; (Ignitable waste).

## Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
<b>Shipping Name:</b>	METHYL ISOBUTYL KETONE				METHYL ISOBUTYL KEYTONES
<b>Hazard Class:</b>	3				3
<b>UN Number:</b>	UN1245				UN1245

<b>Packing Group:</b>	II				II
<b>Additional Info:</b>					FLASHPOINT 18C

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 108-10-1 is listed on the TSCA inventory.

#### Health & Safety Reporting List

CAS# 108-10-1: Effective Date: October 4, 1982; Sunset Date: October 4, 1992

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### SARA

#### Section 302 (RQ)

CAS# 108-10-1: final RQ = 5000 pounds (2270 kg)

#### Section 302 (TPQ)

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 108-10-1: acute, chronic, flammable, reactive.

#### Section 313

This material contains Methyl isobutyl ketone (CAS# 108-10-1, 98.5%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

CAS# 108-10-1 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depleters. This material does not contain any Class 2 Ozone depleters.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 108-10-1 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California No Significant Risk Level: None of the chemicals in this product are listed.

### European/International Regulations

#### European Labeling in Accordance with EC Directives

#### Hazard Symbols:

XN F

#### Risk Phrases:

R 11 Highly flammable. R 36/37 Irritating to eyes and respiratory system. R 20 Harmful by inhalation. R 66 Repeated exposure may cause skin dryness or cracking.

#### Safety Phrases:

S 16 Keep away from sources of ignition - No smoking. S 29 Do not empty into drains. S 9 Keep container in a well-ventilated place.

#### WGK (Water Danger/Protection)

CAS# 108-10-1: 1

**Canada**

CAS# 108-10-1 is listed on Canada's DSL/NDSL List.

This product has a WHMIS classification of B2, D2B.

CAS# 108-10-1 is not listed on Canada's Ingredient Disclosure List.

**Exposure Limits**

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 5/19/1999

**Revision #3 Date:** 8/02/2000

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Health	2
Fire	3
Reactivity	0
Personal Protection	J

## Material Safety Data Sheet m-Xylene MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** m-Xylene

**Catalog Codes:** SLX1066

**CAS#:** 108-38-3

**RTECS:** ZE2275000

**TSCA:** TSCA 8(b) inventory: m-Xylene

**CI#:** Not applicable.

**Synonym:** m-Methyltoluene

**Chemical Name:** 1,3-Dimethylbenzene

**Chemical Formula:** C<sub>6</sub>H<sub>4</sub>(CH<sub>3</sub>)<sub>2</sub>

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**  
1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
{m-}Xylene	108-38-3	100

**Toxicological Data on Ingredients:** m-Xylene: ORAL (LD50): Acute: 5000 mg/kg [Rat.]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit.].

### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Very hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

**Potential Chronic Health Effects:**

Hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation. **CARCINOGENIC EFFECTS:** Not available. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to blood, kidneys, the nervous system, liver. Repeated or prolonged exposure to the substance can produce target organs damage.

### Section 4: First Aid Measures

**Eye Contact:** Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

**Skin Contact:**

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

**Serious Skin Contact:**

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

**Inhalation:** Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

**Serious Ingestion:** Not available.

### Section 5: Fire and Explosion Data

**Flammability of the Product:** Flammable.

**Auto-Ignition Temperature:** 527°C (980.6°F)

**Flash Points:** CLOSED CUP: 25°C (77°F). OPEN CUP: 28.9°C (84°F) (Cleveland).

**Flammable Limits:** LOWER: 1.1% UPPER: 7%

**Products of Combustion:** These products are carbon oxides (CO, CO<sub>2</sub>).

**Fire Hazards in Presence of Various Substances:** Highly flammable in presence of open flames and sparks, of heat.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

**Special Remarks on Fire Hazards:**

Explosive in the form of vapor when exposed to heat or flame. Vapor may travel considerable distance to source of ignition and flash back. When heated to decomposition it emits acrid smoke and irritating fumes.

**Special Remarks on Explosion Hazards:** Not available.

### Section 6: Accidental Release Measures

**Small Spill:** Absorb with an inert material and put the spilled material in an appropriate waste disposal.

**Large Spill:**

Flammable liquid, insoluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

### Section 7: Handling and Storage

**Precautions:**

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes Keep away from incompatibles such as oxidizing agents.

**Storage:**

Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:** Splash goggles. Lab coat. Gloves.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**

TWA: 100 STEL: 150 (ppm) from ACGIH (TLV) TWA: 434 STEL: 651 (mg/m3) from ACGIH Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid. (Liquid.)

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 106.17 g/mole

**Color:** Colorless.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 139.3°C (282.7°F)

**Melting Point:** -47.87°C (-54.2°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 0.86 (Water = 1)

**Vapor Pressure:** 6 mm of Hg (@ 20°C)

**Vapor Density:** 3.7 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** 0.62 ppm

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water, methanol, diethyl ether.

**Solubility:**

Easily soluble in methanol, diethyl ether. Insoluble in cold water, hot water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Reactive with oxidizing agents.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** No.

## Section 11: Toxicological Information

**Routes of Entry:** Eye contact.

**Toxicity to Animals:**

Acute oral toxicity (LD50): 5000 mg/kg [Rat.]. Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit].

**Chronic Effects on Humans:** The substance is toxic to blood, kidneys, the nervous system, liver.

**Other Toxic Effects on Humans:**

Very hazardous in case of skin contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:**

0347 Animal: embryotoxic, foetotoxic, passes through the placental barrier. 0900 Detected in maternal milk in human. Narcotic effect; may cause nervous system disturbances.

**Special Remarks on other Toxic Effects on Humans:** Material is irritating to mucous membranes and upper respiratory tract.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are more toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

## Section 14: Transport Information

**DOT Classification:** Class 3: Flammable liquid.

**Identification:** : Xylene : UN1307 PG: III

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

### Federal and State Regulations:

Pennsylvania RTK: m-Xylene Massachusetts RTK: m-Xylene TSCA 8(b) inventory: m-Xylene SARA 313 toxic chemical notification and release reporting: m-Xylene CERCLA: Hazardous substances.: m-Xylene

**Other Regulations:** OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

### Other Classifications:

#### WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

#### DSCL (EEC):

R10- Flammable. R38- Irritating to skin. R41- Risk of serious damage to eyes.

#### HMIS (U.S.A.):

**Health Hazard:** 2

**Fire Hazard:** 3

**Reactivity:** 0

**Personal Protection:** j

#### National Fire Protection Association (U.S.A.):

**Health:** 2

**Flammability:** 3

**Reactivity:** 0

**Specific hazard:**

#### Protective Equipment:

Gloves. Lab coat. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

## Section 16: Other Information

### References:

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité internationale. 1986.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 08:33 PM

**Last Updated:** 11/01/2010 12:00 PM

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From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

24 Hour Emergency Telephone: 908-859-2151  
CHEMTREC: 1-800-424-9300  
National Response in Canada  
CANUTEC: 613-996-6666  
Outside U.S. And Canada  
Chemtree: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

## m-CRESOL

### 1. Product Identification

**Synonyms:** m-Cresol practical; phenol, 3-methyl-; 3-hydroxytoluene; meta-Cresylic Acid; 3-Cresol; m-Cresylic Acid

**CAS No.:** 108-39-4

**Molecular Weight:** 108.14

**Chemical Formula:** C<sub>7</sub>H<sub>8</sub>O

**Product Codes:** F842

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
m-Cresol	108-39-4	90 - 100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**POISON! DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CORROSIVE. CAUSES SEVERE BURNS TO EVERY AREA OF CONTACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER, KIDNEYS, PANCREAS AND CARDIOVASCULAR SYSTEM. VAPOR IS IRRITATING TO EYES AND RESPIRATORY TRACT. COMBUSTIBLE LIQUID AND VAPOR.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)

Flammability Rating: 2 - Moderate

Reactivity Rating: 1 - Slight

Contact Rating: 4 - Extreme (Corrosive)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: White (Corrosive)

#### Potential Health Effects

Cresol is toxic via ingestion and skin absorption. Cresol is similar to phenol in its action on the body, but is less severe in its effects.

#### Inhalation:

Breathing vapor, dust or mist results in digestive disturbances (vomiting, difficulty in swallowing, diarrhea, loss of appetite). Will irritate, possibly burn respiratory tract. Other symptoms listed under ingestion may also occur.

#### Ingestion:

Poison. Symptoms may include burning pain in mouth and throat, abdominal pain, headache, dizziness, muscular weakness, irregular breathing, weak pulse, lung damage, liver damage, pancreas damage, kidney damage, coma, and possibly death from circulatory or cardiac failure.

#### Skin Contact:

Corrosive. Causes severe pain followed by numbness. May be absorbed through the skin with systemic poisoning effects to follow. Discoloration and severe burns may occur.

#### Eye Contact:

Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.

#### Chronic Exposure:

Repeated exposure may cause symptoms described for acute poisoning as well as liver damage.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

**Ingestion:**

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

**Skin Contact:**

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

**Note to Physician:**

Onset of systemic effects may be delayed as long as 72 hours.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 86C (187F) CC

Autoignition temperature: 1038C (1900F)

Flammable limits in air % by volume:

lcl: 1.1; ucl: 1.4

Combustible Liquid and Vapor! Contact with strong oxidizers may cause fire.

**Explosion:**

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Vapors can flow along surfaces to distant ignition source and flash back. Sealed containers may rupture when heated.

**Fire Extinguishing Media:**

Water spray, dry chemical, alcohol foam, or carbon dioxide.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

## 6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8.

**Solid Spills:** Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.

**Liquid Spills:** Absorb with vermiculite, dry sand, earth or similar material and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer.

**Any Spill:**

US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

---

## 7. Handling and Storage

Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Protect from light. Outside or detached storage is preferred. Separate from other storage. Do not allow untrained workers to handle cresol. Containers of this material may be hazardous when empty since they retain product residues (dust, solids, vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):

5 ppm (TWA) (skin), cresol, all isomers

-ACGIH Threshold Limit Value (TLV):

5 ppm (TWA) (skin), cresol, all isomers

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded, a full-face piece respirator with an organic vapor cartridge and particulate filter (NIOSH type P100 or R100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. Please note that N series filters are not recommended for this material. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Colorless to yellow liquid.

**Odor:**

Phenolic odor.

**Solubility:**

Soluble in water.

**Specific Gravity:**

1.034 @ 20C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

No information found.

**Boiling Point:**

202C (396F)

**Melting Point:**

11 - 12C (52 - 54F)

**Vapor Density (Air=1):**

3.72

**Vapor Pressure (mm Hg):**

0.1528 @ 25C (77F)

**Evaporation Rate (BuAc=1):**

No information found.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage. Darkens on exposure to air or light.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Oxidizing agents and bases.

**Conditions to Avoid:**

Heat, flame, ignition sources, incompatibles, light, and air.

## 11. Toxicological Information

**Toxicological Data:**

Rat oral LD50: 242 mg/kg; Rabbit skin LD50: 2050 mg/kg. Irritant (std Draize) rabbit: skin = 517 mg/24H, severe; eye = 103 mg, severe. Investigated as a tumorigen, mutagen, reproductive effector.

**Carcinogenicity:**

EPA / IRIS classification: Group C - Possible human carcinogen.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
m-Cresol (108-39-4)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

When released into water, this material is expected to readily biodegrade. This material is not expected to significantly bioaccumulate. When released into the air, this

material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals.

**Environmental Toxicity:**

The LC50/96-hour values for fish are between 10 and 100 mg/l.

**13. Disposal Considerations**

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

**14. Transport Information****Domestic (Land, D.O.T.)**

-----

**Proper Shipping Name:** CRESOLS

**Hazard Class:** 6.1, 8

**UN/NA:** UN2076

Packing Group: II

**Information reported for product/size:** 4L

**International (Water, I.M.O.)**

-----

**Proper Shipping Name:** CRESOLS, LIQUID

**Hazard Class:** 6.1, 8

**UN/NA:** UN2076

Packing Group: II

**Information reported for product/size:** 4L

**International (Air, I.C.A.O.)**

-----

**Proper Shipping Name:** CRESOLS

**Hazard Class:** 6.1, 8

**UN/NA:** UN2076

Packing Group: II

**Information reported for product/size:** 4L

**15. Regulatory Information**

```
-----\Chemical Inventory Status - Part 1\-----
Ingredient                TSCA  EC   Japan  Australia
-----
m-Cresol (108-39-4)      Yes  Yes  Yes    Yes
```

```
-----\Chemical Inventory Status - Part 2\-----
Ingredient                Korea  DSL  NDSL  Phil.
-----
m-Cresol (108-39-4)      Yes   Yes  No    Yes
```

```
-----\Federal, State & International Regulations - Part 1\-----
Ingredient                -SARA 302-  -SARA 313-----
                        RQ   TPQ   List  Chemical Catg.
-----
m-Cresol (108-39-4)      No   No    Yes   No
```

```
-----\Federal, State & International Regulations - Part 2\-----
Ingredient                CERCLA  -RCRA-  -TSCA-
                        100    261.33  8(d)
-----
m-Cresol (108-39-4)      100    No     No
```

Chemical Weapons Convention: No    TSCA 12(b): No    CDTA: Yes  
 SARA 311/312: Acute: Yes    Chronic: Yes    Fire: Yes    Pressure: No  
 Reactivity: No    (Pure / Liquid)

**Australian Hazchem Code:** 2X

**Poison Schedule:** S6

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 3 Flammability: 2 Reactivity: 0

**Label Hazard Warning:**

POISON! DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CORROSIVE. CAUSES SEVERE BURNS TO EVERY AREA OF CONTACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER, KIDNEYS, PANCREAS AND CARDIOVASCULAR SYSTEM. VAPOR IS IRRITATING TO EYES AND RESPIRATORY TRACT. COMBUSTIBLE LIQUID AND VAPOR.

**Label Precautions:**

- Do not breathe vapor or mist.
- Do not get in eyes, on skin, or on clothing.
- Keep container closed.
- Use only with adequate ventilation.
- Wash thoroughly after handling.
- Keep away from heat and flame.

**Label First Aid:**

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In all cases get medical attention immediately.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

MSDS Section(s) changed since last revision of document include: 3.

**Disclaimer:**

\*\*\*\*\*

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

## MATERIAL SAFETY DATA SHEET

Date Printed: 01/17/2008

Date Updated: 01/31/2007

Version 1.2

## Section 1 - Product and Company Information

Product Name BIS(2-CHLOROISOPROPYL)ETHER, 100MG, NEAT  
Product Number 48498  
Brand SUPELCO

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
BIS(2-CHLOROISOPROPYL)ETHER	108-60-1	Yes

Formula C6H12Cl2O  
Synonyms Bis(beta-chloroisopropyl)ether \*  
Bis(2-chloroisopropyl) ether \*  
Bis(2-chloro-1-methylethyl) ether \*  
Bis(1-chloro-2-propyl) ether \*  
(2-Chloro-1-methylethyl) ether \* DCIP \* DCIP  
(nematocide) \* Dichlorodiisopropyl ether \*  
beta,beta'-Dichlorodiisopropyl ether \*  
Dichloroisopropyl ether \* 2,2'-Dichloroisopropyl  
ether \* Isopropylchlorex \* NCI-C50044 \* Nemamol \*  
Nemamort \* Nemamorte \*  
2,2'-Oxybis(1-chloropropane) \* Propane,  
2,2'-oxybis(1-chloro- \* RCRA waste number U027

RTECS Number: KN1750000

## Section 3 - Hazards Identification

## EMERGENCY OVERVIEW

Harmful.

Harmful if swallowed. Irritating to eyes, respiratory system and skin.

## HMIS RATING

HEALTH: 2

FLAMMABILITY: 0

REACTIVITY: 0

## NFPA RATING

HEALTH: 2

FLAMMABILITY: 0

REACTIVITY: 0

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 not breathing give artificial respiration. If breathing is difficult, give oxygen.

#### DERMAL EXPOSURE

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

#### 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: Water spray. 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

Evacuate area.

#### PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

#### METHODS FOR CLEANING UP

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. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

#### STORAGE

Suitable: Keep tightly closed.  
Store at 2-8°C

---

## Section 8 - Exposure Controls / PPE

---

### ENGINEERING CONTROLS

Safety shower and eye bath. Mechanical exhaust required.

### 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 dust mask type N95 (US) or type P1 (EN 143) respirator.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

### GENERAL HYGIENE MEASURES

Wash thoroughly after handling.

---

## Section 9 - Physical/Chemical Properties

---

Appearance	Physical State: Solid	
Property	Value	At Temperature or Pressure
Molecular Weight	N/A	
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	N/A	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	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

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### STABILITY

Stable: Stable.

Materials to Avoid: 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: Causes skin irritation.

Skin Absorption: May be harmful if absorbed through the skin.

Eye Contact: Causes eye irritation.

Inhalation: May be harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract.

Ingestion: Harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE

The chemical, physical, and toxicological properties of this product have not been thoroughly investigated.

TOXICITY DATA

Oral

Rat

240 mg/kg

LD50

Skin

Rat

> 2000 mg/kg

LD50

Oral

Mouse

296 mg/kg

LD50

Skin

Rabbit

3 ML/KG

LD50

CHRONIC EXPOSURE - CARCINOGEN

Result: 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 CARCINOGEN LIST

Rating: Group 3

NTP CARCINOGEN LIST

Rating: No evidence.

Species: Rat

Route: Gavage

CHRONIC EXPOSURE - MUTAGEN

Species: Mouse

Dose: 250 MG/L

Cell Type: lymphocyte

Mutation test: Mutation in mammalian somatic cells.

Species: Hamster  
Dose: 124 MG/L  
Cell Type: ovary  
Mutation test: Cytogenetic analysis

Species: Hamster  
Dose: 11300 UG/L  
Cell Type: ovary  
Mutation test: Sister chromatid exchange

---

## Section 12 - Ecological Information

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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. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

---

## Section 14 - Transport Information

---

### DOT

Proper Shipping Name: Toxic solids, organic, n.o.s.  
UN#: 2811  
Class: 6.1  
Packing Group: Packing Group III  
Hazard Label: Toxic substances.  
PIH: Not PIH

### IATA

Proper Shipping Name: Toxic solid, organic, n.o.s.  
IATA UN Number: 2811  
Hazard Class: 6.1  
Packing Group: III

---

## Section 15 - Regulatory Information

---

### EU ADDITIONAL CLASSIFICATION

Symbol of Danger: Xn  
Indication of Danger: Harmful.  
R: 22-36/37/38  
Risk Statements: Harmful if swallowed. Irritating to eyes, respiratory system and skin.  
S: 26  
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

### US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Harmful.  
Risk Statements: Harmful if swallowed. Irritating to eyes, respiratory system and skin.  
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

### UNITED STATES REGULATORY INFORMATION

SARA LISTED: Yes  
DEMINIMIS: 1 %

NOTES: This product is subject to SARA section 313 reporting requirements.

TSCA INVENTORY ITEM: Yes

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 2007 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 108-67-8****Date: 03/09/2001**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: 1,3,5-TRIMETHYLBENZENE

SYNONYMS: Trimethylbenzol, Mesitylene

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	Exposure Limits (PPM)			
				ACGIH TLV	OSHA PEL	MAC	Other STEL
1,3,5-TRIMETHYLBENZENE	C9H12	108-67-8	99+%	25	NE	NE	NE

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIANT

## 3. HAZARD IDENTIFICATION

**\*\*\* EMERGENCY OVERVIEW \*\*\***

Flammable liquid and vapor.

Can form explosive mixtures with air.

Can cause skin and respiratory tract irritation.

May cause irritation to the eyes and mucous membrane.

### POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation , Ingestion

**ACUTE EFFECTS:** Inhalation of vapors may cause pulmonary edema, circulatory collapse, damage to upper respiratory tract, coughing, difficulty breathing and choking. Symptoms include burning sensation, coughing, wheezing, shortness of breath, headache, nausea, and vomiting. May cause pulmonary edema, fainting, convulsions and coma. Skin contact can cause defatting and dermatitis. Eye contact may result in destruction of eye tissue. Ingestion irritates the digestive tract and results in systemic effects from absorption.

**CHRONIC EFFECTS:** Kidney and liver damage. Blood effects.

**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** Liver, kidney, skin, and central nervous system diseases or disorders.

**OTHER EFFECTS OF OVEREXPOSURE:** None

**CARCINOGENICITY (US ONLY):**

NTP - No

IARC MONOGRAPHS - No

OSHA REGULATED - No

**4. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

**EYE CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes. Do not allow victim to rub or keep eyes tightly shut.

**SKIN CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes while removing contaminated clothing.

**INGESTION:** Never give anything by mouth to an unconscious person. If ingested, have that conscious and alert person drink 1 to 2 glasses of water. Do not induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce the risk of aspiration to the victim.

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: None

**5. FIRE FIGHTING MEASURES**

**FLASH POINT:** 50 deg. C

**AUTOIGNITION TEMPERATURE:** 595 deg. C

**FLAMMABLE LIMITS:** Vol. %

LOWER: .93

UPPER: 8.62

**EXTINGUISHING MEDIA:** Carbon dioxide, foam, or dry chemical. Water is ineffective in putting out a fire, but should be used for cooling fire exposed cylinders.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide may be given off during combustion.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** May form explosive mixture in air. Dangerous fire hazard and moderate explosion hazard when heated. Vapors may travel a considerable distance to the source of ignition and flash back.

**6. ACCIDENTAL RELEASE MEASURES**

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Remove leaking cylinder to exhaust hood or safe outdoor

area. Shut off source if possible and remove source of heat.

SPECIALIZED EQUIPMENT: Absorb small spills using a solid adsorbent such as vermiculite. Use non-sparking tools.

## 7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentrations below exposure and flammable limits.

EYE / FACE PROTECTION: Safety glasses , Goggles.

SKIN PROTECTION: Protective gloves.

RESPIRATORY PROTECTION: In case of leakage, use self-contained breathing apparatus.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless

ODOR: Odorless

PHYSICAL PRESSURE: Liquid

VAPOR PRESSURE: @20 deg.C: 1.86 mm Hg

VAPOR DENSITY (AIR=1): 4.14

BOILING POINT (C): 165

SOLUBILITY IN WATER: Insoluble

SPECIFIC GRAVITY (H2O=1): @4 deg.C: 0.888

EVAPORATION RATE: N/Av

ODOR THRESHOLD: N/Av

**10. STABILITY AND REACTIVITY**

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas. Storage near a heat source.

MATERIALS TO AVOID: Oxidizing agents.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: Toxic carbon monoxide.

**11. TOXICOLOGICAL INFORMATION**

LETHAL CONCENTRATION (LC50): 7,230 ppm, Rat 1 hour

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/AP

**12. ECOLOGICAL INFORMATION**

No adverse ecological effects are expected.

**13. DISPOSAL CONSIDERATIONS**

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place.

**14. TRANSPORT INFORMATION**

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: 1,3,5-Trimethylbenzene

HAZARD CLASS: 3 (flammable), Packing Group III

IDENTIFICATION NUMBER: UN2825

REPORTABLE QUANTITIES: None

LABELING: FLAMMABLE LIQUID

ADR / RID (EU Only): Class 3, 31(c)

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

## 15. REGULATORY INFORMATION

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 202-436-9

NUMBER IN ANNEX 1 OF DIR 67/548: Material is listed in annex 1.

EU CLASSIFICATION: N/Av

R: 10

S: 9

## 16. OTHER INFORMATION

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.

MSDS Number: **B4080** \* \* \* \* \* *Effective Date: 11/17/99* \* \* \* \* \* *Supersedes: 12/08/96*

From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 908-859-2151

CHEMTREC: 1-800-424-9300

National Response in Canada

CANUTEC: 613-996-6666

Outside U.S. And Canada

Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

# BROMOBENZENE

## 1. Product Identification

**Synonyms:** Monobromobenzene, phenyl bromide

**CAS No.:** 108-86-1

**Molecular Weight:** 157.01

**Chemical Formula:** C<sub>6</sub>H<sub>5</sub>Br

**Product Codes:** 2711

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Bromobenzene	108-86-1	99 - 100%	Yes

## 3. Hazards Identification

### Emergency Overview

**WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY AFFECT LIVER AND CENTRAL NERVOUS SYSTEM. FLAMMABLE LIQUID AND VAPOR. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.**

**J.T. Baker SAF-T-DATA<sup>(tm)</sup> Ratings** (Provided here for your convenience)

Health Rating: 2 - Moderate

Flammability Rating: 2 - Moderate

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER.

Storage Color Code: Red (Flammable)

---

**Potential Health Effects**

---

**Inhalation:**

Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. Affects central nervous system causing dizziness, incoordination and unconsciousness. May be absorbed into the bloodstream with symptoms similar to ingestion.

**Ingestion:**

May cause abdominal pain, nausea, vomiting, diarrhea, headache, dullness, central nervous system effects and liver damage. Estimated lethal human dose is 50 - 500 mg/kg.

**Skin Contact:**

Causes irritation to skin. Symptoms include redness, itching, and pain. May be absorbed through the skin with possible systemic effects.

**Eye Contact:**

Causes irritation, redness, and pain.

**Chronic Exposure:**

No information found.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing liver damage may be more susceptible to the effects of this material.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Ingestion:**

Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Wash skin with soap or mild detergent and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 51C (124F)

Autoignition temperature: 566C (1051F)

**Explosion:**

Above the flash point, explosive vapor-air mixtures may be formed. Vapors can flow along surfaces to distant ignition source and flash back. Contact with strong oxidizers may cause fire. Sealed containers may rupture when heated.

Sensitive to static discharge.

**Fire Extinguishing Media:**

Water spray, dry chemical, alcohol foam, or carbon dioxide. Use water spray to blanket fire, cool fire exposed containers, and to flush non-ignited spills or vapors away from fire.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

---

## 7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

### **Airborne Exposure Limits:**

None established.

### **Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

### **Personal Respirators (NIOSH Approved):**

For conditions of use where exposure to the substance is apparent, consult an industrial hygienist. For emergencies, or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator.

WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

### **Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

### **Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

## 9. Physical and Chemical Properties

### **Appearance:**

Clear, colorless liquid.

### **Odor:**

Characteristic aromatic odor.

### **Solubility:**

Insoluble in water.

**Specific Gravity:**

1.50 @ 20C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

No information found.

**Boiling Point:**

156C (313F)

**Melting Point:**

-31C (-24F)

**Vapor Density (Air=1):**

5.41

**Vapor Pressure (mm Hg):**

10 @ 40C (104F)

**Evaporation Rate (BuAc=1):**

No information found.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Oxides of carbon as well as ionic or oxidized halogen.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Strong oxidizers.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

Oral rat LD50: 2699 mg/kg. Inhalation rat LC50: 20411 mg/kg. Investigated as a mutagen.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Bromobenzene (108-86-1)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

No information found.

**Environmental Toxicity:**

No information found.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

### Domestic (Land, D.O.T.)

-----  
**Proper Shipping Name:** BROMOBENZENE  
**Hazard Class:** 3  
**UN/NA:** UN2514  
**Packing Group:** III  
**Information reported for product/size:** 500ML

### International (Water, I.M.O.)

-----  
**Proper Shipping Name:** BROMOBENZENE  
**Hazard Class:** 3.3  
**UN/NA:** UN2514  
**Packing Group:** III  
**Information reported for product/size:** 500ML

### International (Air, I.C.A.O.)

-----  
**Proper Shipping Name:** BROMOBENZENE  
**Hazard Class:** 3.3  
**UN/NA:** UN2514  
**Packing Group:** III  
**Information reported for product/size:** 500ML

## 15. Regulatory Information

```
-----\Chemical Inventory Status - Part 1\-----
Ingredient                                TSCA  EC   Japan  Australia
-----
Bromobenzene (108-86-1)                   Yes   Yes  Yes    Yes
```

```
-----\Chemical Inventory Status - Part 2\-----
Ingredient                                Korea  DSL  NDSL  Phil.
-----
Bromobenzene (108-86-1)                   Yes   Yes  No    Yes
```

```
-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                -SARA 302-  -SARA 313-
RQ    TPQ    List  Chemical Catg.
-----
Bromobenzene (108-86-1)                   No    No    No    No
```

```
-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                -RCRA-  -TSCA-
CERCLA 261.33 8(d)
-----
Bromobenzene (108-86-1)                   No      No      No
```

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No  
 SARA 311/312: Acute: Yes Chronic: No Fire: Yes Pressure: No  
 Reactivity: No (Pure / Liquid)

**Australian Hazchem Code:** 2[Y]

**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 2 Flammability: 2 Reactivity: 0

**Label Hazard Warning:**

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY AFFECT LIVER AND CENTRAL NERVOUS SYSTEM. FLAMMABLE LIQUID AND VAPOR. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

**Label Precautions:**

Wash thoroughly after handling.  
 Avoid contact with eyes, skin and clothing.  
 Avoid breathing vapor.  
 Keep container closed.  
 Use only with adequate ventilation.  
 Keep away from heat, sparks and flame.

**Label First Aid:**

If swallowed, give large amounts of water to drink. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

New 16 section MSDS format, all sections have been revised.

**Disclaimer:**

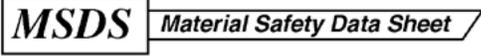
\*\*\*\*\*

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

	24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
	National Response in Canada CANUTEC: 613-996-6666
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865	Outside U.S. and Canada Chemtrec: 703-527-3887
	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.	

# TOLUENE

## 1. Product Identification

**Synonyms:** Methylbenzene; Toluol; Phenylmethane

**CAS No.:** 108-88-3

**Molecular Weight:** 92.14

**Chemical Formula:** C<sub>6</sub>H<sub>5</sub>-CH<sub>3</sub>

**Product Codes:**

J.T. Baker: 5375, 5812, 9336, 9351, 9364, 9456, 9457, 9459, 9460, 9462, 9466, 9472, 9476

Mallinckrodt: 4483, 8092, 8604, 8608, 8610, 8611, V560

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Toluene	108-88-3	100%	Yes

## 3. Hazards Identification

### Emergency Overview

**POISON! DANGER! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY AFFECT LIVER, KIDNEYS, BLOOD SYSTEM, OR CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)

Flammability Rating: 3 - Severe (Flammable)

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe (Life)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

### Potential Health Effects

#### Inhalation:

Inhalation may cause irritation of the upper respiratory tract. Symptoms of overexposure may include fatigue, confusion, headache, dizziness and drowsiness. Peculiar skin sensations (e. g. pins and needles) or numbness may be produced. Very high concentrations may cause unconsciousness and death.

#### Ingestion:

Swallowing may cause abdominal spasms and other symptoms that parallel over-exposure from inhalation. Aspiration of material into the lungs can cause chemical pneumonitis, which may be fatal.

#### Skin Contact:

Causes irritation. May be absorbed through skin.

#### Eye Contact:

Causes severe eye irritation with redness and pain.

#### Chronic Exposure:

Reports of chronic poisoning describe anemia, decreased blood cell count and bone marrow hypoplasia. Liver and kidney damage may occur. Repeated or prolonged

contact has a defatting action, causing drying, redness, dermatitis. Exposure to toluene may affect the developing fetus.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin disorders or impaired liver or kidney function may be more susceptible to the effects of this substance. Alcoholic beverage consumption can enhance the toxic effects of this substance.

---

## 4. First Aid Measures

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. CALL A PHYSICIAN IMMEDIATELY.

**Ingestion:**

Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately. If vomiting occurs, keep head below hips to prevent aspiration into lungs.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician immediately.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 7C (45F) CC

Autoignition temperature: 422C (792F)

Flammable limits in air % by volume:

lel: 1.1; uel: 7.1

Flammable liquid and vapor!

Dangerous fire hazard when exposed to heat or flame. Vapors can flow along surfaces to distant ignition source and flash back.

**Explosion:**

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire or explosion. Sensitive to static discharge.

**Fire Extinguishing Media:**

Dry chemical, foam or carbon dioxide. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Water spray may be used to keep fire exposed containers cool.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

---

## 7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

Toluene:

- OSHA Permissible Exposure Limit (PEL):

200 ppm (TWA); 300 ppm (acceptable ceiling conc.); 500 ppm (maximum conc.).

- ACGIH Threshold Limit Value (TLV):

20 ppm (TWA), A4 - Not Classifiable as a Human Carcinogen.

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Aromatic benzene-like.

**Solubility:**

0.05 gm/100gm water @ 20C (68F).

**Specific Gravity:**

0.86 @ 20C / 4 C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

111C (232F)

**Melting Point:**

-95C (-139F)

**Vapor Density (Air=1):**

3.14

**Vapor Pressure (mm Hg):**

22 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

2.24

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage. Containers may burst when heated.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Heat, flame, strong oxidizers, nitric and sulfuric acids, chlorine, nitrogen tetroxide; will attack some forms of plastics, rubber, coatings.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

**Toxicological Data:**

Oral rat LD50: 636 mg/kg; skin rabbit LD50: 14100 uL/kg; inhalation rat LC50: 49 gm/m<sup>3</sup>/4H; Irritation data: skin rabbit, 500 mg, Moderate; eye rabbit, 2 mg/24H, Severe. Investigated as a tumorigen, mutagen, reproductive effector.

**Reproductive Toxicity:**

Has shown some evidence of reproductive effects in laboratory animals.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Toluene (108-88-3)	No	No	3

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly

bioaccumulate. This material has a log octanol-water partition coefficient of less than 3.0. Bioconcentration factor = 13.2 (eels).

**Environmental Toxicity:**

This material is expected to be toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

### 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

### 14. Transport Information

**Domestic (Land, D.O.T.)**

-----  
**Proper Shipping Name:** TOLUENE  
**Hazard Class:** 3  
**UN/NA:** UN1294  
**Packing Group:** II  
**Information reported for product/size:** 390LB

**International (Water, I.M.O.)**

-----  
**Proper Shipping Name:** TOLUENE  
**Hazard Class:** 3  
**UN/NA:** UN1294  
**Packing Group:** II  
**Information reported for product/size:** 390LB

### 15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Toluene (108-88-3)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	Korea	--Canada--		Phil.
		DSL	NDSL	
Toluene (108-88-3)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----				
Ingredient	-SARA 302-		-SARA 313-	
	RQ	TPQ	List	Chemical Catg.
Toluene (108-88-3)	No	No	Yes	No

-----\Federal, State & International Regulations - Part 2\-----			
Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8(d)
Toluene (108-88-3)	1000	U220	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes  
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No  
Reactivity: No (Pure / Liquid)

**WARNING:**  
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

**Australian Hazchem Code:** 3[Y]E

**Poison Schedule:** S6

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

### 16. Other Information

**NFPA Ratings:** Health: 2 Flammability: 3 Reactivity: 0

**Label Hazard Warning:**

POISON! DANGER! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL.

FLAMMABLE LIQUID AND VAPOR. MAY AFFECT LIVER, KIDNEYS, BLOOD SYSTEM, OR CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

**Label Precautions:**

- Keep away from heat, sparks and flame.
- Keep container closed.
- Use only with adequate ventilation.
- Wash thoroughly after handling.
- Avoid breathing vapor.
- Avoid contact with eyes, skin and clothing.

**Label First Aid:**

Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If vomiting occurs, keep head below hips to prevent aspiration into lungs. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician immediately.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

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**Prepared by:** Environmental Health & Safety  
Phone Number: (314) 654-1600 (U.S.A.)

<b>MSDS</b>	<b>Material Safety Data Sheet</b>		24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
			National Response in Canada CANUTEC: 613-996-6666
			Outside U.S. and Canada Chemtrec: 703-527-3887
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		 	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.			

# CHLOROBENZENE

## 1. Product Identification

**Synonyms:** Monochlorobenzene; Chlorobenzol; Phenyl chloride; Benzene chloride

**CAS No.:** 108-90-7

**Molecular Weight:** 112.56

**Chemical Formula:** C<sub>6</sub>H<sub>5</sub>Cl

**Product Codes:**

J.T. Baker: 5153, 5163, 9179

Mallinckrodt: 4419, 4426

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Chlorobenzene	108-90-7	99 - 100%	Yes

## 3. Hazards Identification

### Emergency Overview

**WARNING! FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM AND LIVER.**

SAF-T-DATA<sup>(tm)</sup> Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)

Flammability Rating: 2 - Moderate

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

### Potential Health Effects

#### Inhalation:

Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. Affects central nervous system causing dizziness, incoordination and unconsciousness.

#### Ingestion:

Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea. Toxic! May cause systemic poisoning with symptoms paralleling those of inhalation.

#### Skin Contact:

Causes irritation to skin. Symptoms include redness, itching, and pain. May be slowly absorbed through the skin with possible systemic effects.

#### Eye Contact:

Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.

#### Chronic Exposure:

Prolonged or repeated skin exposure may cause dermatitis or skin burns. Prolonged or repeated exposure may cause liver, kidney, or lung damage.

#### Aggravation of Pre-existing Conditions:

Persons with pre-existing skin, eye or central nervous system disorders, or impaired liver, kidney, or pulmonary function may be more susceptible to the effects of this substance.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:**

Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 28C (82F) CC

Autoignition temperature: 593C (1099F)

Flammable limits in air % by volume:

lel: 1.3; uel: 9.6

Flammable Liquid

**Explosion:**

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Reactions with incompatibles may pose an explosion hazard. Vapors can flow along surfaces to distant ignition source and flash back. Sealed containers may rupture when heated. Sensitive to static discharge.

**Fire Extinguishing Media:**

Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. This highly flammable liquid must be kept from sparks, open flame, hot surfaces, and all sources of heat and ignition. Combustion by-products include phosgene and hydrogen chloride gases.

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## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

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## 7. Handling and Storage

Protect against physical damage. Outside or detached storage is preferred. Inside storage should be in a standard flammable liquids storage room or cabinet. Separate from oxidizing materials. Storage and use areas should be No Smoking areas. Containers should be bonded and grounded for transfers to avoid static sparks. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):

75 ppm (TWA)

-ACGIH Threshold Limit Value (TLV):

10 ppm (TWA)

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be

worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Faint, almond like odor.

**Solubility:**

Insoluble in water.

**Specific Gravity:**

1.11 @ 20C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

132C (270F)

**Melting Point:**

-45C (-49F)

**Vapor Density (Air=1):**

3.9

**Vapor Pressure (mm Hg):**

11.8 @ 25C (77F)

**Evaporation Rate (BuAc=1):**

1.1

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Oxidizing agents, dimethyl sulfoxide, silver perchlorate, silver chromate.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

For Chlorobenzene: Oral rat LD50: 1110 mg/kg; Inhalation rat LC50: 2965 ppm. Investigated as a tumorigen, mutagen, reproductive effector.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Chlorobenzene (108-90-7)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is not expected to biodegrade. When released into the soil, this material may leach into groundwater. When released to water, this material is expected to quickly evaporate. When released into the water, this material is expected to have a half-life of less than 1 day. When released into water, this material is not expected to biodegrade. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.

**Environmental Toxicity:**

The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be slightly toxic to aquatic life.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

### Domestic (Land, D.O.T.)

-----  
**Proper Shipping Name:** RQ, CHLOROBENZENE  
**Hazard Class:** 3  
**UN/NA:** UN1134  
 Packing Group: III  
**Information reported for product/size:** 52L

### International (Water, I.M.O.)

-----  
**Proper Shipping Name:** CHLOROBENZENE  
**Hazard Class:** 3  
**UN/NA:** UN1134  
 Packing Group: III  
**Information reported for product/size:** 52L

### International (Air, I.C.A.O.)

-----  
**Proper Shipping Name:** CHLOROBENZENE  
**Hazard Class:** 3  
**UN/NA:** UN1134  
 Packing Group: III  
**Information reported for product/size:** 52L

## 15. Regulatory Information

```
-----\Chemical Inventory Status - Part 1\-----
Ingredient                               TSCA  EC   Japan  Australia
-----
Chlorobenzene (108-90-7)                 Yes  Yes  Yes    Yes
```

```
-----\Chemical Inventory Status - Part 2\-----
Ingredient                               --Canada--
                               Korea  DSL  NDSL  Phil.
-----
Chlorobenzene (108-90-7)                 Yes  Yes  No    Yes
```

```
-----\Federal, State & International Regulations - Part 1\-----
Ingredient                               -SARA 302-  -SARA 313-----
                               RQ   TPQ   List  Chemical Catg.
-----
Chlorobenzene (108-90-7)                 No   No    Yes   No
```

```
-----\Federal, State & International Regulations - Part 2\-----
Ingredient                               -RCRA-  -TSCA-
                               CERCLA  261.33  8(d)
-----
Chlorobenzene (108-90-7)                 100    U037   Yes
```

Chemical Weapons Convention: No    TSCA 12(b): Yes    CDTA: Yes  
 SARA 311/312: Acute: Yes    Chronic: Yes    Fire: Yes    Pressure: No  
 Reactivity: No    (Pure / Liquid)

### Australian Hazchem Code: 2Y

**Poison Schedule:** None allocated.

### WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 2 Flammability: 3 Reactivity: 0

### Label Hazard Warning:

WARNING! FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM AND LIVER.

### Label Precautions:

Keep away from heat, sparks and flame.  
 Avoid breathing vapor.  
 Keep container closed.  
 Wash thoroughly after handling.  
 Avoid contact with eyes, skin and clothing.  
 Use only with adequate ventilation.

**Label First Aid:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, give large amounts of water to drink. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

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**Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose.**

**MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.**

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 \*\*\*\*\*

**Prepared by:** Environmental Health & Safety  
 Phone Number: (314) 654-1600 (U.S.A.)

<b>MSDS</b>	<b>Material Safety Data Sheet</b>		24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
			National Response in Canada CANUTEC: 613-996-6666
			Outside U.S. and Canada Chemtrec: 703-527-3887
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		 <b>J.T. Baker</b>	<b>NOTE:</b> CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.			

## PHENOL, CRYSTALS

### 1. Product Identification

**Synonyms:** Carboic acid; Phenic acid; Phenylic acid; Hydroxybenzene; Phenol, fused; Monohydroxybenzene; Phenol, solid

**CAS No.:** 108-95-2

**Molecular Weight:** 94.11

**Chemical Formula:** C<sub>6</sub>H<sub>5</sub>OH

**Product Codes:**

J.T. Baker: 2858, 2862, 4056

Mallinckrodt: 0028, 0052, 0273, 0605, H602

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Phenol	108-95-2	99 - 100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**POISON! DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. RAPIDLY ABSORBED THROUGH SKIN. CORROSIVE. CAUSES SEVERE BURNS TO EVERY AREA OF CONTACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. COMBUSTIBLE.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)

Flammability Rating: 2 - Moderate

Reactivity Rating: 1 - Slight

Contact Rating: 4 - Extreme (Corrosive)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: White Stripe (Store Separately)

#### Potential Health Effects

The major hazard of phenol is its ability to penetrate the skin rapidly, particularly when liquid, causing severe injury which can be fatal. Phenol also has a strong corrosive effect on body tissue causing severe chemical burns. Due to its local anesthetizing properties, skin burns may be painless.

#### Inhalation:

Breathing vapor, dust or mist results in digestive disturbances (vomiting, difficulty in swallowing, diarrhea, loss of appetite). Will irritate, possibly burn respiratory tract. Other symptoms listed under ingestion may also occur.

#### Ingestion:

Poison. Symptoms may include burning pain in mouth and throat, abdominal pain, nausea, vomiting, headache, dizziness, muscular weakness, central nervous system effects, increase in heart rate, irregular breathing, coma, and possibly death. Acute exposure is also associated with kidney and liver damage. Ingestion of 1 gram has been lethal to humans.

#### Skin Contact:

Corrosive. Rapidly absorbed through the skin with systemic poisoning effects to follow. Discoloration and severe burns may occur, but may be disguised by a loss in pain

sensation.

**Eye Contact:**

Corrosive. Eye burns with redness, pain, blurred vision may occur. May cause severe damage and blindness.

**Chronic Exposure:**

Repeated exposure may cause symptoms described for acute poisoning as well as eye and skin discoloration.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin, eye or central nervous system disorders, or impaired liver, kidney, or pulmonary function may be more susceptible to the effects of this substance.

---

## 4. First Aid Measures

IN CASE OF PHENOL POISONING, start first aid treatment immediately, then get medical attention. People administering first aid should take precautions to avoid contact with phenol. A phenol antidote kit (castor oil or other vegetable oil, polyethylene glycol 300) should be available in any phenol work area. Actions to be taken in case of phenol poisoning should be planned and practiced before beginning work with phenol. Castor oil and/or polyethylene glycol can be given by a first responder before medical help arrives.

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

**Ingestion:**

If swallowed, immediately administer castor oil or other vegetable oil. Never give anything by mouth to an unconscious person. Be ready to induce vomiting at the advice of physician or poison control center. Castor oil (or vegetable oil) dosage should be between 15 and 30 cc. Get medical attention immediately.

**Skin Contact:**

In case of skin contact, immediately flush skin with large amounts of water while removing contaminated clothing and shoes. As soon as possible, repeatedly apply polyethylene glycol to affected area. Destroy contaminated clothing and shoes. Flush skin with water for at least 30 minutes. It is very important to avoid rubbing or wiping affected parts which would aggravate irritation and cause product dispersion. Continue treatment until the burned area changes color from white to pink. Expect that this can take a long period of time (20 minutes or more). The polyethylene glycol application should be done during transportation to the hospital. If polyethylene glycol is not available, flush with water for at least 30 minutes prior to going to hospital. Get medical attention immediately.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

**Note to Physician:**

Treat ingestion with gastric lavage using 40% aqueous Bacto-Peptune, milk or water until phenolic odor is eliminated. Then give 15 to 50 cc castor or vegetable oil. Debride necrotic skin. Monitor vital signs, fluid status, electrolytes, BUN, renal and hepatic function, and electrocardiogram. Manage sedation, seizures, renal failure, and fluid electrolyte imbalances symptomatically as indicated.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 79C (174F) CC

Autoignition temperature: 715C (1319F)

Flammable limits in air % by volume:

lcl: 1.3; ucl: 8.6

Combustible. Contact with strong oxidizers may cause fire.

**Explosion:**

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Sealed containers may rupture when heated.

**Fire Extinguishing Media:**

Water spray, dry chemical, alcohol foam, or carbon dioxide. Water spray may be used to keep fire exposed containers cool.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Structural firefighter's protective clothing is ineffective for fires involving this material. Stay away from sealed containers.

---

## 6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. Do not flush to the sewer. Dry lime or soda ash may be used on spill for neutralization. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

## 7. Handling and Storage

Keep in a tightly closed container. Store in a cool, dry, ventilated area away from sources of heat or ignition. Protect against physical damage. Store separately from reactive or combustible materials, and out of direct sunlight. Avoid dust formation and control ignition sources. Employ grounding, venting and explosion relief provisions in accord with accepted engineering practices in any process capable of generating dust and/or static electricity. Empty only into inert or non-flammable atmosphere. Emptying contents into a non-inert atmosphere where flammable vapors may be present could cause a flash fire or explosion due to electrostatic discharge. All phenol workers should be properly trained on its hazards and the proper protective measures required. This training should also include emergency actions. All phenol operations should be enclosed to eliminate any potential exposure routes. Containers of this material may be hazardous when empty since they retain product residues

(dust, solids); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

### Airborne Exposure Limits:

Phenol:

-OSHA Permissible Exposure Limit (PEL):

5 ppm (TWA) (skin)

-ACGIH Threshold Limit Value (TLV):

5 ppm (TWA) (skin)

### Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

### Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, a full facepiece respirator with organic vapor cartridge and dust/mist filter may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

### Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Butyl rubber and neoprene are suitable materials for personal protective equipment.

### Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

## 9. Physical and Chemical Properties

### Appearance:

Colorless to light pink crystals.

### Odor:

Sharp, medicinal, sweet, tarry.

### Solubility:

1 g/15 ml of water; very soluble in alcohol.

### Specific Gravity:

1.06 @ 20C/4C

### pH:

ca. 6.0 Aqueous solution

### % Volatiles by volume @ 21C (70F):

100

### Boiling Point:

182C (360F)

### Melting Point:

43C (109F)

### Vapor Density (Air=1):

3.2

### Vapor Pressure (mm Hg):

0.4 @ 20C (68F)

### Evaporation Rate (BuAc=1):

< 0.01

---

## 10. Stability and Reactivity

### Stability:

Stable under ordinary conditions of use and storage. Heat will contribute to instability.

### Hazardous Decomposition Products:

Carbon dioxide and carbon monoxide may form when heated to decomposition. Toxic gases and vapors may be released if involved in a fire.

### Hazardous Polymerization:

Will not occur.

### Incompatibilities:

Oxidizers, aluminum chloride and nitrobenzene, calcium hypochlorite, butadiene, halogens, formaldehyde, mineral oxidizing acids, isocyanates, sodium nitrite and many other materials. Hot liquid phenol will attack aluminum, magnesium, lead, and zinc metals.

### Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

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## 11. Toxicological Information

Oral rat LD50: 317 mg/Kg; skin rabbit LD50:630 mg/kg; inhalation rat LC50: 316 mg/m3; irritation data: skin rabbit, standard Draize, 500 mg/24H severe; eye rabbit, standard Draize 5 mg/30S rinse, mild. Investigated as a tumorigen, mutagen, reproductive effector.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Phenol (108-95-2)	No	No	3

## 12. Ecological Information

### Environmental Fate:

When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is not expected to leach into groundwater. When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to have a half-life between 1 and 10 days. When released into water, this material is expected to readily biodegrade. When released into water, this material is not expected to evaporate significantly. When released into water, this material is expected to have a half-life between 10 and 30 days. This material has an estimated bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material may be moderately degraded by photolysis. When released into the air, this material is expected to have a half-life of less than 1 day.

### Environmental Toxicity:

This material is expected to be toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

### Domestic (Land, D.O.T.)

**Proper Shipping Name:** PHENOL, SOLID

**Hazard Class:** 6.1

**UN/NA:** UN1671

**Packing Group:** II

**Information reported for product/size:** 2.5KG

### International (Water, I.M.O.)

**Proper Shipping Name:** PHENOL, SOLID

**Hazard Class:** 6.1

**UN/NA:** UN1671

**Packing Group:** II

**Information reported for product/size:** 2.5KG

## 15. Regulatory Information

Ingredient	TSCA	EC	Japan	Australia
Phenol (108-95-2)	Yes	Yes	Yes	Yes

Ingredient	Korea	Canada DSL	NDSL	Phil.
Phenol (108-95-2)	Yes	Yes	No	Yes

Ingredient	-SARA 302-		-SARA 313-	
	RQ	TPQ	List	Chemical Catg.
Phenol (108-95-2)	1000	500*	Yes	No

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Phenol (108-95-2)	1000	U188	No

Chemical Weapons Convention: No    TSCA 12(b): No    CDTA: No

SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No  
Reactivity: No (Pure / Solid)

**Australian Hazchem Code:** 2X

**Poison Schedule:** S6

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

## 16. Other Information

**NFPA Ratings:** Health: 4 Flammability: 2 Reactivity: 0

**Label Hazard Warning:**

POISON! DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. RAPIDLY ABSORBED THROUGH SKIN. CORROSIVE. CAUSES SEVERE BURNS TO EVERY AREA OF CONTACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. COMBUSTIBLE.

**Label Precautions:**

Do not breathe dust.

Do not get in eyes, on skin, or on clothing.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

Keep away from heat, sparks and flame.

**Label First Aid:**

IN ALL CASES, GET MEDICAL ATTENTION IMMEDIATELY. KEEP A PHENOL ANTIDOTE KIT in area of product use or storage. Administer castor oil and/or polyethylene glycol per pre-planned directions. If swallowed, immediately administer castor oil or other vegetable oil. Never give anything by mouth to an unconscious person. In case of skin contact, immediately flush skin with large amounts of water while removing contaminated clothing and shoes. As soon as possible, repeatedly apply polyethylene glycol to affected area. Destroy contaminated clothing and shoes. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes while lifting lower and upper eyelids.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

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**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

<b>MSDS</b>	<b>Material Safety Data Sheet</b>		24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
			National Response in Canada CANUTEC: 613-996-6666
			Outside U.S. and Canada Chemtec: 703-527-3887
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		 	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.			

# TETRAHYDROFURAN

## 1. Product Identification

**Synonyms:** Diethylene oxide, oxacyclopentane; THF; tetrahydrofuran and stabilizer; 1,4-Epoxybutane; Butylene Oxide; Cycloctetramethylene Oxide; Furan, tetrahydro

**CAS No.:** 109-99-9

**Molecular Weight:** 72.11

**Chemical Formula:** CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>O

**Product Codes:**  
 J.T. Baker: 9439, 9440, 9441, 9442, 9446, 9447, 9449, 9450, V530  
 Mallinckrodt: 2858, 8497, 8498, 8499, V558

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Tetrahydrofuran	109-99-9	99 - 100%	Yes

## 3. Hazards Identification

### Emergency Overview

**DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. MAY FORM EXPLOSIVE PEROXIDES. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)  
 Flammability Rating: 3 - Severe (Flammable)  
 Reactivity Rating: 2 - Moderate  
 Contact Rating: 3 - Severe  
 Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER  
 Storage Color Code: Red (Flammable)

### Potential Health Effects

#### Inhalation:

Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. THF is an anesthetic agent in high concentrations. Overexposure may cause dizziness, headache, nausea and possible fluid in the lungs. May cause liver, kidney or lung injury.

#### Ingestion:

Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea. May cause sore throat and abdominal pain. May cause liver or kidney injury.

#### Skin Contact:

Causes irritation to skin. Symptoms include redness, itching, and pain.

#### Eye Contact:

Causes irritation, redness, and pain. Contact may cause permanent eye damage.

#### Chronic Exposure:

Repeated or high exposures may cause kidney or liver damage; may affect the lungs. Repeated skin exposure can cause dryness, cracking of skin and rash.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance.

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## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse.

Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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## 5. Fire Fighting Measures

**Fire:**

Flash point: -14C (7F) CC

Autoignition temperature: 321C (610F)

Flammable limits in air % by volume:

lcl: 2.0; ucl: 11.8

Extremely Flammable Liquid and Vapor! Vapor may cause flash fire. Dangerous fire hazard when exposed to heat or flame.

**Explosion:**

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. May form explosive organic peroxides when exposed to air or light or with age.

Vapors can flow along surfaces to distant ignition source and flash back. Sealed containers may rupture when heated.

**Fire Extinguishing Media:**

Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Water spray may be used to keep fire exposed containers cool. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures. Vapors can flow along surfaces to distant ignition source and flash back.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

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## 7. Handling and Storage

Store in dark glass bottles or steel drums. Protect against physical damage. Store in a cool, dry well-ventilated location, away from direct sunlight and any area where the fire hazard may be acute. Store in tightly closed containers (preferably under nitrogen atmosphere). Outside or detached storage is preferred. Inside storage should be in a standard flammable liquids storage room or cabinet. Separate from oxidizing materials. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment. Do not use compressed air for filling, discharging, or handling. Peroxides can be removed by treatment with strong ferrous sulfate solution made slightly acidic with sodium bisulfite. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death. Do not allow to evaporate to near dryness unless absence of peroxides has been shown. Addition of appropriate reducing agents will lessen peroxide formation.

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## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):

200 ppm (TWA).

-ACGIH Threshold Limit Value (TLV):

50 ppm (TWA), 100 ppm (STEL): A3 Confirmed Animal Carcinogen with Unknown Relevance to Humans.

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH

document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

**Other Control Measures:**

Odor threshold: 2 - 50 ppm

## 9. Physical and Chemical Properties

**Appearance:**

Colorless, mobile liquid.

**Odor:**

Ether odor.

**Solubility:**

Miscible in water.

**Specific Gravity:**

0.88 @ 20C/4C

**pH:**

ca. 7

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

66C (151F)

**Melting Point:**

-108C (-162F)

**Vapor Density (Air=1):**

2.5

**Vapor Pressure (mm Hg):**

129 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

8.0

## 10. Stability and Reactivity

**Stability:**

Stable in closed containers with oxygen and light excluded. Distillation or evaporation can concentrate peroxides (if present) to create an explosion hazard.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition. May also release toxic and irritating vapors.

**Hazardous Polymerization:**

May occur.

**Incompatibilities:**

Tetrahydrofuran reacts violently with air on standing. LiAlH<sub>2</sub>, strong oxidizers, NaAlH<sub>2</sub> and potassium hydroxide. Will attack some forms of plastics, rubbers and coatings.

**Conditions to Avoid:**

Heat, flame, ignition sources, incompatibles, light, and air.

## 11. Toxicological Information

**Toxicological Data:**

Oral rat LD50: 1650 mg/kg. Inhalation rat LC50: 21,000 ppm/3H. Investigated as a tumorigen, mutagen, reproductive effector.

**Reproductive Toxicity:**

Animal data show developmental effects only at exposures levels producing other toxic effects in the adult animal. Animal testing for reproductive effects show no change in reproductive performance.

**Carcinogenicity:**

Under the National Toxicology Program (NTP), the U.S. Public Health Service completed a 2-year (lifetime) inhalation study in rats and mice on Tetrahydrofuran (THF) which suggests that THF is a carcinogen in laboratory animals. There is no data linking THF exposure to cancer in humans. The data shows carcinogenic activity in the liver and kidneys of laboratory animals.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Tetrahydrofuran (109-99-9)	No	No	None

## 12. Ecological Information

### Environmental Fate:

When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released into water, this material may biodegrade to a moderate extent. This material is not expected to significantly bioaccumulate. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition.

### Environmental Toxicity:

96-hour LC50, fathead minnows: 2160 mg/L.

24 Hr EC50 Daphnia magna (Water flea): >10000 mg/L.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

### Domestic (Land, D.O.T.)

-----  
**Proper Shipping Name:** TETRAHYDROFURAN

**Hazard Class:** 3

**UN/NA:** UN2056

**Packing Group:** II

**Information reported for product/size:** 400LB

### International (Water, I.M.O.)

-----  
**Proper Shipping Name:** TETRAHYDROFURAN

**Hazard Class:** 3

**UN/NA:** UN2056

**Packing Group:** II

**Information reported for product/size:** 400LB

## 15. Regulatory Information

F, Xi

R11 - Highly flammable

R19 - May form explosive peroxides

R36/37 - Irritating to eyes and respiratory system

S2 - Keep out of the reach of children

S16 - Keep away from sources of ignition - No smoking

S29 - Do not empty into drains

S33 - Take precautionary measures against static discharges

```
-----\Chemical Inventory Status - Part 1\-----
Ingredient                TSCA  EC   Japan  Australia
-----
Tetrahydrofuran (109-99-9)  Yes  Yes  Yes    Yes
```

```
-----\Chemical Inventory Status - Part 2\-----
Ingredient                Korea  DSL   NDSL   Phil.
-----
Tetrahydrofuran (109-99-9)  Yes   Yes   No     Yes
```

```
-----\Federal, State & International Regulations - Part 1\-----
Ingredient                -SARA 302-  -SARA 313-
RQ  TPQ      List  Chemical Catg.
-----
Tetrahydrofuran (109-99-9)  No   No     No     No
```

```
-----\Federal, State & International Regulations - Part 2\-----
Ingredient                CERCLA    -RCRA-    -TSCA-
                1000      261.33    8(d)
-----
Tetrahydrofuran (109-99-9)  1000      U213     Yes
```

Chemical Weapons Convention: No    TSCA 12(b): Yes    CDTA: Yes  
 SARA 311/312: Acute: Yes    Chronic: No    Fire: Yes    Pressure: No  
 Reactivity: Yes    (Pure / Liquid)

**Australian Hazchem Code:** 2SE

**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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## 16. Other Information

**NFPA Ratings:** Health: 2 Flammability: 3 Reactivity: 1

**Label Hazard Warning:**

DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. MAY FORM EXPLOSIVE PEROXIDES. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.

**Label Precautions:**

Keep away from heat, sparks and flame.

Keep container closed.

Use only with adequate ventilation.

Avoid breathing vapor or mist.

Avoid contact with eyes, skin and clothing.

Wash thoroughly after handling.

Do not allow to evaporate to near dryness unless absence of peroxides has been shown. Addition of appropriate reducing agents will lessen peroxide formation.

**Label First Aid:**

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

MSDS Section(s) changed since last revision of document include: 15.

**Disclaimer:**

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**This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product.**

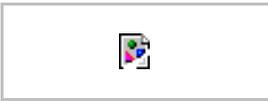
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**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)



# Material Safety Data Sheet

## Hexanes, c.p.

ACC# 98123

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Hexanes, c.p.**Catalog Numbers:** AC210590000, AC210590010, AC210590025**Synonyms:** n-Hexane; Hexyl Hydride; Dipropyl**Company Identification:**

Acros Organics N.V.  
One Reagent Lane  
Fairlawn, NJ 07410

**For information in North America, call:** 800-ACROS-01**For information in Europe, call:** 0032(0) 14575211**For emergencies in the US, call CHEMTREC:** 800-424-9300**For emergencies outside the US, call:** 0032(0) 14575299

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
110-54-3	Hexanes	100.0	203-777-6

**Hazard Symbols:** XN F**Risk Phrases:** 11 48/20

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless. Flash Point: -22 deg C. **Danger! Extremely flammable liquid.** May cause respiratory tract irritation. Causes skin irritation. Air sensitive. May cause central nervous system depression. Aspiration hazard. May cause reproductive effects based upon animal studies. Causes severe eye irritation. May cause digestive tract irritation with nausea, vomiting, and diarrhea.  
**Target Organs:** Central nervous system.

#### Potential Health Effects

**Eye:** Causes severe eye irritation.**Skin:** Causes skin irritation. Causes irritation with burning pain, itching, and redness. May cause blistering of the skin.**Ingestion:** Aspiration hazard. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. May cause central nervous system effects.**Inhalation:** Causes respiratory tract irritation. May cause severe irritation of the upper respiratory tract with pain, burns, and inflammation. Exposure produces central nervous system depression. Aspiration may cause respiratory swelling and pneumonitis. Vapors may cause dizziness or suffocation.**Chronic:** May cause reproductive and fetal effects. Chronic exposure produces peripheral

neuropathy.

## Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids. Get medical aid immediately.

**Skin:** Get medical aid immediately. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

**Ingestion:** Never give anything by mouth to an unconscious person. Get medical aid immediately. Do NOT induce vomiting. Allow the victim to rinse his mouth and then to drink 2-4 cupfuls of water, and seek medical advice.

**Inhalation:** Get medical aid immediately. Remove from exposure to fresh air immediately. If breathing is difficult, give oxygen.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Firefighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Use water spray to keep fire-exposed containers cool. Extremely flammable liquid. Containers may explode in the heat of a fire. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.

**Extinguishing Media:** Use water spray to cool fire-exposed containers. In case of fire, use water fog, dry chemical, carbon dioxide, or regular foam. Do NOT use straight streams of water. Contact professional fire-fighters immediately.

**Autoignition Temperature:** 225 deg C (437.00 deg F)

**Flash Point:** -22 deg C (32.00 deg F)

**NFPA Rating:** health-1; flammability-3; reactivity-0 Explosion Limits, Lower: 1.10 vol % Upper: 7.50 vol %

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material, (e.g., dry sand or earth), then place into a chemical waste container. Remove all sources of ignition. A vapor suppressing foam may be used to reduce vapors.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Use only in a well ventilated area. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Take precautionary measures against static discharges. Keep container tightly closed. Avoid contact with heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a

tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Hexanes	(50) ppm ; (176) mg/m <sup>3</sup>	50 ppm TWA; 180 mg/m <sup>3</sup> TWA 1100 ppm IDLH (10 percent lower explosive limit)	500 ppm TWA; 1800 mg/m <sup>3</sup> TWA

**OSHA Vacated PELs:** Hexanes: 50 ppm TWA; 180 mg/m<sup>3</sup> TWA

### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless

**Odor:** gasoline-like

**pH:** Not available.

**Vapor Pressure:** 150 mm Hg @24.8C

**Vapor Density:** 3.0 (air=1)

**Evaporation Rate:**

**Viscosity:** 0.31 mPas 20 de

**Boiling Point:** 156 deg F

**Freezing/Melting Point:** -95 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:** 0.7

**Molecular Formula:** C<sub>6</sub>H<sub>14</sub>

**Molecular Weight:**

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Ignition sources, exposure to air, excess heat, electrical sparks.

**Incompatibilities with Other Materials:** Strong oxidizing agents, coatings, plastics, rubber.

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Has not been reported

## Section 11 - Toxicological Information

**RTECS#:****CAS#** 110-54-3: MN9275000**LD50/LC50:**

CAS# 110-54-3:

Oral, rat: LD50 = 28710 mg/kg;

**Carcinogenicity:**

CAS# 110-54-3: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.

**Epidemiology:** Carcinogenicity: Calculated mean lifetime cancer risk in humans from indoor pollution levels of 1.8-51.0 5g/m<sup>3</sup> was negligible.**Teratogenicity:** Effects on Newborn: reduced weight gain, ihl-rat TClO=1000 ppm/6H. Embryo or Fetus: Stunted fetus, ihl-rat TClO=5000 ppm/20H. Inhalation pregnant rat and offspring 500, 800, 1000, 1500 ppm, 23 hr/day showed concentration dependant intrauterine mortality. Offspring exposed prenatally only showed reduced body growth at all concentrations and delayed cerebellar cortex maturation. In pre- and post-exposure cases, effects of malnutrition added to the solvent-induced retardation causing delayed tissue maturation and cell maturation. Neurotoxicity was restricted to axonal damage in adults.**Reproductive Effects:** ihl-rat TClO: 10000ppm/7H (15D pre-mating) ihl-rat TClO: 1000 ppm/6H (8-16D preg) ihl-rat TClO: 5000 ppm/20H (6-19D preg) orl-mus TDLo: 238 gm/kg (6-15D preg) Paternal Effects: Testes/sperm duct/epididymis, ihl-rat TClO=1 pph/6H. Inhalation rat 5000 ppm for <6 wk caused testicular damage. The earliest lesions were observed after 24 hr continuous treatment which involved primary spermatocytes and spermatids, while numerous exfoliated injured germ cells reached the epididymus. After interruption, testicular lesions became increasingly severe suggesting an irreversible sterility.**Neurotoxicity:** Of 56 offset printing workers exposed to n-Hexane, 20 developed symptomatic peripheral neuropathy and 26 had sub-clinical neuropathy. Development of neuropathy bore no relationship to the duration of exposure. Calculated whole body dermal permeability constants for humans were two to four times less than experimental permeability constants for rats exposed to 60,000 ppm probably due to physiological differences in skin.**Mutagenicity:** cyt-ham: fbr 500 mg/lsln-smc: 132 mmol/l Salmonella typhimurium TA98, TA100 with and without metabolic activation negative.**Other Studies:** None.

## Section 12 - Ecological Information

**Ecotoxicity:** Fish toxicity: LC50 (24 hr) goldfish 4 mg/l LC5, LC50, LC95 cichlid 40-185.5 ppm at pH 7.1 and 27.80C (duration unspecified). Exposed fish showed gill damage, respiratory distress and loss of balance. Invertebrate toxicity: LC50 Branchiura sowerbyi 3290 ppm at pH 7.1 and 27.80C (duration unspecified). LC50 (96 hr) Chlorella vulgaris 1097 mg/l.**Environmental Fate:** Substance readily volatilizes when released on soil or to water (with minor absorption to soil or sediment). The potential for aquatic bioconcentration is low. In air, substance is predicted to exist in vapor phase and will react with photochemically produced hydroxyl radicals. Degradation studies: Hydroxylated and oxidised to the corresponding alcohol, aldehyde, acid and ketone mixture by methane oxidising bacterium H-2 (type I). ThOD 3.52 mg/l O<sub>2</sub>.**Physical/Chemical:** No information available.**Other:** Degradation studies: Incubation with natural flora in groundwater in presence of other components of high octane gasoline (100 5l/l), biodegraded by 46% after 192 hr at 130C, initial concentration 1.36 5l/l. Catabolically degraded by gasoline-degrading bacteria Pseudomonas sp., Nocardia sp. and Micrococcus sp. Abiotic removal: Photooxidation by UV light in aqueous medium at 500C, 50.51% degraded to carbon dioxide after 24 hr.

## Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

**RCRA D-Series Maximum Concentration of Contaminants:** None listed.

**RCRA D-Series Chronic Toxicity Reference Levels:** None listed.

**RCRA F-Series:** None listed.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
<b>Shipping Name:</b>	HEXANES	HEXANES	HEXANES	HEXANES	No information available.
<b>Hazard Class:</b>	3	3	3(3B)	3.1	
<b>UN Number:</b>	UN1208	UN1208	UN1208	UN1208	
<b>Packing Group:</b>	II	II		II	

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 110-54-3 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### SARA

#### Section 302 (RQ)

None of the chemicals in this material have an RQ.

#### Section 302 (TPQ)

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 110-54-3: acute, chronic, flammable, sudden release of pressure.

#### Section 313

This material contains Hexanes (CAS# 110-54-3, 100 0%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

CAS# 110-54-3 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 110-54-3 can be found on the following state right to know lists: New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XN F

**Risk Phrases:**

R 11 Highly flammable. R 48/20 Harmful : danger of serious damage to health by prolonged exposure through inhalation.

**Safety Phrases:**

S 16 Keep away from sources of ignition - No smoking. S 24/25 Avoid contact with skin and eyes. S 29 Do not empty into drains. S 51 Use only in well ventilated areas. S 9 Keep container in a well-ventilated place.

**WGK (Water Danger/Protection)**

CAS# 110-54-3: 1

**Canada**

CAS# 110-54-3 is listed on Canada's DSL/NDSL List.

WHMIS: Not available.

CAS# 110-54-3 is not listed on Canada's Ingredient Disclosure List.

**Exposure Limits**

CAS# 110-54-3: OEL-AUSTRALIA:TWA 50 ppm (180 mg/m<sup>3</sup>) OEL-BELGIUM:TWA 50 ppm (176 mg/m<sup>3</sup>) OEL-DENMARK:TWA 50 ppm (180 mg/m<sup>3</sup>) OEL-FINLAND: TWA 50 ppm (180 mg/m<sup>3</sup>); STEL 150 ppm (530 mg/m<sup>3</sup>) OEL-FRANCE:TWA 50 ppm (170 mg/m<sup>3</sup>) OEL-GERMANY:TWA 50 ppm (180 mg/m<sup>3</sup>) OEL-HUNGARY:TWA 100 mg/m<sup>3</sup>; STEL 200 mg/m<sup>3</sup>; Skin OEL-JAPAN:TWA 40 ppm (140 mg/m<sup>3</sup>); Skin OEL-THE NETHERLANDS:TWA 100 ppm (360 mg/m<sup>3</sup>) OEL-THE PHILIPPINES:TWA 500 ppm (1800 mg/m<sup>3</sup>) JAN9 OEL-POLAND:TWA 400 mg/m<sup>3</sup> OEL-RUSSIA:TWA 40 ppm; STEL 300 mg/m<sup>3</sup> OEL-SWEDEN:TWA 25 ppm (90 mg/m<sup>3</sup>); STEL 50 ppm (180 mg/m<sup>3</sup>) OEL-SWITZERLAND:TWA 50 ppm (180 mg/m<sup>3</sup>); STEL 100 ppm (360 mg/m<sup>3</sup>) OEL-TURKEY:TWA 500 ppm (1800 mg/m<sup>3</sup>) OEL-UNITED KINGDOM:TWA 100 ppm (360 mg/m<sup>3</sup>); STEL 125 ppm OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

## Section 16 - Additional Information

**MSDS Creation Date:** 11/19/1996

**Revision #3 Date:** 10/20/1997

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# Material Safety Data Sheet

## trans-1,4-Dichloro-2-butene, 95%

ACC# 00269

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** trans-1,4-Dichloro-2-butene, 95%**Catalog Numbers:** AC325930000, AC325930050, AC325930250**Synonyms:****Company Identification:**

Acros Organics N.V.

One Reagent Lane

Fair Lawn, NJ 07410

**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
110-57-6	trans-1,4-Dichloro-2-butene	95%	203-779-7

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Not available.

**Target Organs:** Respiratory system, gastrointestinal system, eyes, skin.

#### Potential Health Effects

**Eye:** Causes eye burns. Lachrymator (substance which increases the flow of tears).**Skin:** Causes skin burns. Toxic in contact with skin.**Ingestion:** Poison by ingestion. Causes gastrointestinal tract burns.**Inhalation:** May be fatal if inhaled. Causes chemical burns to the respiratory tract. May cause abdominal pain, nausea, vomiting, and inflammation of the gums and mouth.**Chronic:** May cause cancer in humans.

### Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.**Skin:** Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.**Ingestion:** Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. SPEED IS ESSENTIAL. A DOCTOR MUST BE NOTIFIED AT ONCE.**Inhalation:** Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Will burn if involved in a fire.

**Extinguishing Media:** Use water spray, dry chemical, carbon dioxide, or chemical foam.

**Flash Point:** 53 deg C ( 127.40 deg F)

**Autoignition Temperature:** Not available.

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:** Not published.

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Use a spark-proof tool.

## Section 7 - Handling and Storage

**Handling:** Use spark-proof tools and explosion proof equipment. Do not breathe dust, mist, or vapor. Do not get in eyes, on skin, or on clothing. Use only in a chemical fume hood.

**Storage:** Keep away from sources of ignition. Store in a tightly closed container. Store in a dry area. Keep under an argon blanket. Keep refrigerated. (Store below 4°C/39°F.)

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
trans-1,4-Dichloro-2-butene	none listed	none listed	none listed

**OSHA Vacated PELs:** trans-1,4-Dichloro-2-butene: No OSHA Vacated PELs are listed for this chemical.

### Personal Protective Equipment

**Eyes:** Not available.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to minimize contact with skin.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid  
**Appearance:** colorless  
**Odor:** Not available.  
**pH:** Not available.  
**Vapor Pressure:** Not available.  
**Vapor Density:** Not available.  
**Evaporation Rate:** Not available.  
**Viscosity:** Not available.  
**Boiling Point:** 74 - 76 deg C @ 40.  
**Freezing/Melting Point:** 1 - 3 deg C  
**Decomposition Temperature:** Not available.  
**Solubility:** Miscible.  
**Specific Gravity/Density:** 1.1830g/cm<sup>3</sup>  
**Molecular Formula:** ClCH<sub>2</sub>CH=CHCH<sub>2</sub>Cl  
**Molecular Weight:** 125.00

## Section 10 - Stability and Reactivity

**Chemical Stability:** Not available.  
**Conditions to Avoid:** Light, exposure to moist air or water.  
**Incompatibilities with Other Materials:** Strong oxidizing agents, strong bases.  
**Hazardous Decomposition Products:** Hydrogen chloride, carbon monoxide, carbon dioxide.  
**Hazardous Polymerization:** Has not been reported

## Section 11 - Toxicological Information

**RTECS#:**  
**CAS#** 110-57-6: EM4903000  
**LD50/LC50:**  
CAS# 110-57-6:  
Inhalation, rat: LC50 = 86 ppm/4H;

**Carcinogenicity:**  
CAS# 110-57-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No data available.  
**Teratogenicity:** No data available.  
**Reproductive Effects:** No data available.  
**Mutagenicity:** No data available.  
**Neurotoxicity:** No data available.  
**Other Studies:**

## Section 12 - Ecological Information

No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	DOT regulated - small quantity provisions apply (see 49CFR173.4)	No information available.
<b>Hazard Class:</b>		
<b>UN Number:</b>		
<b>Packing Group:</b>		

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 110-57-6 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

#### SARA Section 302 Extremely Hazardous Substances

CAS# 110-57-6: 500 lb TPQ

#### Section 313

This material contains trans-1,4-Dichloro-2-butene (CAS# 110-57-6, 95%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40

#### Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 110-57-6 can be found on the following state right to know lists: New Jersey,

Pennsylvania, Massachusetts.

### California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

## European/International Regulations

### European Labeling in Accordance with EC Directives

#### Hazard Symbols:

T + N

#### Risk Phrases:

R 26 Very toxic by inhalation.

R 34 Causes burns.

R 45 May cause cancer.

R 24/25 Toxic in contact with skin and if swallowed.

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

#### Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 53 Avoid exposure - obtain special instructions before use.

S 60 This material and its container must be disposed of as hazardous waste.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

### WGK (Water Danger/Protection)

CAS# 110-57-6: No information available.

### Canada - DSL/NDSL

CAS# 110-57-6 is listed on Canada's NDSL List.

### Canada - WHMIS

WHMIS: Not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

### Canadian Ingredient Disclosure List

## Section 16 - Additional Information

**MSDS Creation Date:** 2/01/1999

**Revision #4 Date:** 3/28/2008

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# Material Safety Data Sheet

## Cyclohexane

ACC# 05870

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Cyclohexane

**Catalog Numbers:** AC111110000, AC111110010, AC111110025, AC111110050, AC111110100, AC111110250, AC167740000, AC167740010, AC167740025, AC167745000, AC176810000, AC176810010, AC176810025, AC176810050, AC176810250, AC176815000, AC210570000, AC210570010, AC210570025, AC279590000, AC279590010, AC279590025, AC326590000, AC326590010, AC326590025, AC326830000, AC326831000, AC326832500, AC364660000, AC364660010, AC364661000, AC406020000, AC406025000, AC610040040, AC610150040, AC610291000, S79990, S79990-1, S93227, S93228, S93327A, S93328A, C553-4, C555-1, C555-4, C556-1, C556-4, C556-500, C620-1, C620-4, C620SK-1, C620SK-4, O2093-20, O2093-4

**Synonyms:** Benzene hexahydride; Hexahydrobenzene; Hexamethylene.**Company Identification:**

Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
110-82-7	Cyclohexane	>99	203-806-2

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: colorless liquid. Flash Point: -20 deg C.

**Danger!** Extremely flammable liquid and vapor. Vapor may cause flash fire. Breathing vapors may cause drowsiness and dizziness. Causes skin irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. May cause eye and respiratory tract irritation.

**Target Organs:** Central nervous system, skin.**Potential Health Effects****Eye:** May cause mild eye irritation. Vapors may cause eye irritation.

**Skin:** May cause irritation with burning pain, itching and redness. Not expected to cause an allergic skin reaction. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts.

**Ingestion:** Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. May cause central nervous system depression.

**Inhalation:** May cause respiratory tract irritation. Inhalation of vapors may cause drowsiness and

dizziness.

**Chronic:** Prolonged or repeated skin contact may cause defatting and dermatitis.

## Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

**Skin:** In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

**Ingestion:** Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.

**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Liquid will float and may reignite on the surface of water. Extremely flammable liquid and vapor. Vapor may cause flash fire. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

**Extinguishing Media:** Water may be ineffective. This material is lighter than water and insoluble in water. The fire could easily be spread by the use of water in an area where the water cannot be contained. Do NOT use straight streams of water. For large fires, use water spray, fog or regular foam. For small fires, use dry chemical, carbon dioxide, water spray or regular foam. Cool containers with flooding quantities of water until well after fire is out.

**Flash Point:** -20 deg C ( -4.00 deg F)

**Autoignition Temperature:** 245 deg C ( 473.00 deg F)

**Explosion Limits, Lower:**1.3

**Upper:** 8.0

**NFPA Rating:** (estimated) Health: 1; Flammability: 3; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Remove all sources of ignition. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing.

Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Avoid breathing vapor.

**Storage:** Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Cyclohexane	100 ppm TWA	300 ppm TWA; 1050 mg/m <sup>3</sup> TWA 1300 ppm IDLH	300 ppm TWA; 1050 mg/m <sup>3</sup> TWA

**OSHA Vacated PELs:** Cyclohexane: 300 ppm TWA; 1050 mg/m<sup>3</sup> TWA

### Personal Protective Equipment

**Eyes:** Wear chemical splash goggles.

**Skin:** Wear appropriate gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** colorless

**Odor:** sweetish odor - chloroform-like

**pH:** Not available.

**Vapor Pressure:** 96.9 mm Hg @ 25 deg C

**Vapor Density:** 2.90 (air=1)

**Evaporation Rate:** 6.1 (Butyl acetate=1)

**Viscosity:** 1.02 cP @ 17 deg C

**Boiling Point:** 80.7 deg C

**Freezing/Melting Point:** 6.5 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Practically insoluble in water.

**Specific Gravity/Density:** 0.77 (Water=1)

**Molecular Formula:** C<sub>6</sub>H<sub>12</sub>

**Molecular Weight:** 84.15

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable at room temperature in closed containers under normal storage and handling conditions.

**Conditions to Avoid:** Ignition sources, excess heat, confined spaces.

**Incompatibilities with Other Materials:** Strong oxidizing agents, nitrogen dioxide.

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 110-82-7: GU6300000

**LD50/LC50:**

CAS# 110-82-7:

Draize test, rabbit, skin: 1548 mg/2D (Intermittent);

Inhalation, mouse: LC50 = 70000 mg/m<sup>3</sup>/2H;

Oral, mouse: LD50 = 813 mg/kg;

Oral, rat: LD50 = 12705 mg/kg;

**Carcinogenicity:**

CAS# 110-82-7: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.

**Teratogenicity:** No information available.

**Reproductive Effects:** No information available.

**Mutagenicity:** No data available.

**Neurotoxicity:** No information available.

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Fathead Minnow: LC50 = 117.0 mg/L; 96 Hr.; Static conditions  
Bluegill/Sunfish: LC50 = 34.72 mg/L; 96 Hr.; 25 degrees C  
Water flea Daphnia: EC50 = 400.00 mg/L; 48 Hr.; Unspecified  
Bacteria: Phytobacterium phosphoreum: EC50 = 227.00 mg/L; 5, 30 minutes;  
Microtox test No data available.

**Environmental:** Atmospheric Fate: Cyclohexane is expected to partition to the atmosphere where it will rapidly react with hydroxyl radicals. **TERRESTRIAL FATE:** If released on land, cyclohexane will be lost through volatilization and should leach into the ground. Cyclohexane is resistant to biodegradation but may biodegrade slowly in the presence of other hydrocarbons that are themselves degraded. **AQUATIC FATE:** Volatilization from water (estimated half-life 2 hr in a model river) should be the most important fate process occurring in aquatic systems.

**Physical:** **ATMOSPHERIC FATE:** In the atmosphere, cyclohexane will degrade by reaction with photochemically produced hydroxyl radicals (half-life 52 hr). The half-life is much faster under photochemical smog conditions with half-lives as low as 6 hr being reported.

**Other:** No experimental data are available on the bioconcentration of cyclohexane in aquatic organisms. Using the octanol/water partition coefficient, 3.44, one can estimate a BCF of 242 using a recommended regression equation.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3.

Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 110-82-7: waste number U056 (Ignitable waste).

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	CYCLOHEXANE	CYCLOHEXANE
<b>Hazard Class:</b>	3	3
<b>UN Number:</b>	UN1145	UN1145
<b>Packing Group:</b>	II	II

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 110-82-7 is listed on the TSCA inventory.

#### Health & Safety Reporting List

CAS# 110-82-7: Effective 12/19/85, Sunset 12/19/95

#### Chemical Test Rules

CAS# 110-82-7: 40 CFR 799.5000

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 110-82-7: 1000 lb final RQ; 454 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 110-82-7: immediate, delayed, fire.

#### Section 313

This material contains Cyclohexane (CAS# 110-82-7, >99%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

#### Clean Water Act:

CAS# 110-82-7 is listed as a Hazardous Substance under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 110-82-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

#### California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

## European/International Regulations

### European Labeling in Accordance with EC Directives

#### Hazard Symbols:

XN F N

#### Risk Phrases:

R 11 Highly flammable.

R 38 Irritating to skin.

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R 65 Harmful: may cause lung damage if swallowed.

R 67 Vapours may cause drowsiness and dizziness.

#### Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.

S 25 Avoid contact with eyes.

S 33 Take precautionary measures against static discharges.

S 9 Keep container in a well-ventilated place.

S 60 This material and its container must be disposed of as hazardous waste.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

S 62 If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

#### WGK (Water Danger/Protection)

CAS# 110-82-7: 1

#### Canada - DSL/NDSL

CAS# 110-82-7 is listed on Canada's DSL List.

#### Canada - WHMIS

This product has a WHMIS classification of B2.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

#### Canadian Ingredient Disclosure List

CAS# 110-82-7 is listed on the Canadian Ingredient Disclosure List.

## Section 16 - Additional Information

**MSDS Creation Date:** 6/04/1999

**Revision #7 Date:** 12/01/2006

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# Composition/Information on Ingredient

**Cas:**

11096-82-5

**Code:**

M

**RTECS:**

TQ1362000

**Code:**

M

**Name:**

POLYCHLORINATED BIPHENYL, PCB, AROCLOR 1260, (CL

**Other REC Limits:**

0.001 MG/CUM NIOSH

**OSHA PEL:**

N/K

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

N/K

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

USE ORGANIC VAPOR CARTRIDGE, FULL FACE PIECE OR SELF-CONTAINED OR AIR SUPPLIED RESPIRATOR

**Ventilation:**

LOCAL EXHAUST: USE IN HOOD.

**Protective Gloves:**

VITON OR NEOPRENE

**Eye Protection:**

SPLASH GOGGLES

**Other Protective Equipment:**

Equipment LABORATORY COAT, CLOSED SHOES

**Work Hygienic Practices:**

USE CAREFUL LABORATORY TECHNIQUE. AVOID HAND CONTACT.

**Supplemental Safety and Health:**

SEVERAL OF THE PCB'S & PESTICIDES, AS WELL AS OTHER EPA PRIORITY POLLUTANTS HAVE BEEN LISTED AS ANIMAL SUSPECT, ANIMAL POSITIVE HUMAN SUSPECT, OR HUMAN POSITIVE CARCINOGENS BY VARIOUS AGENCIES.

HANDLE THESE SPECIMENS WITH CARE & APPROPRIATE CAUTION FOR THIS REASON.

## Health Hazards Data

**LD50LC50Mixture:**

N/K

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

YES

**IARC:**

YES

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

INHALATION: DAMAGES ALL TISSUES, IRRITATION, LIVER, KIDNEY, & LUNG DAMAGE, JAUNDICE, NAUSEA, VOMITING, UREMIA, ACIDOSIS, COUGHING, & WHEEZING. SKIN: REDN, DRY SCALY, CRACKING, WEEPING, ALLERGIC DERMAT ITIS, & CHLORACNE.

**Explanation Of Carcinogenicity:**

SUFFICIENT EVIDENCE FOR THE CARCINOGENICITY OF SEVERAL MIXTURES OF POLYCHLORINATED BIPHENYLS.

**Signs And Symptoms Of Overexposure:**

INHALATION: CARDIAC ARRHYTHMIA, SENSITIZE HEART TO EPINEPHRINE, ACIDOSIS, BLINDNESS, & MAY CAUSE CANCER IN HUMANS.

**Medical Cond Aggravated By Exposure:**

DERMATITIS, LIVER & KIDNEY DISEASE

**First Aid:**

INHALATION: REMOVE FROM EXPOSURE. BE PREPARED TO DO CPR IF UNCONSCIOUS. INGESTION: GIVE SYRUP OF IPECAC 60CC W/180CC WATER. SKIN: WASH W/SOAP & WATER. OBTAIN MEDICAL ATTENTION IN ALL CASES.

**Spill Release Procedures:**

DAM UP & ABSORB. VENTILATE AREA. CALL CLEANUP TEAM. DON'T WASH TO DRAINS.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

ABSORB & INCINERATE OR DISPOSE AS HAZARDOUS WASTE.

**Handling And Storage Precautions:**

AVOID FREEZING, BREAKAGE. HANDLE W/CARE. MATERIAL CONTAINS CARCINOGENS.

**Other Precautions:**

N/K 3

# Fire and Explosion Hazard Information

**Flash Point Method:**

TOC

**Flash Point:**

**Flash Point Text:**

15.5C

**Autoignition Temp:**

**Autoignition Temp Text:**

N/A

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

DRY CHEMICAL, CO2, ALCOHOL FOAM

**Fire Fighting Procedures:**

USE SELF-CONTAINED BREATHING APPARATUS & WET DOWN TO KEEP FROM EXPLODING. USE WATER MIST OR ALCOHOL FOAM.

**Unusual Fire/Explosion Hazard:**

MAY FORM CO, PHOSGENE, & CARBONYL BROMIDE WHEN INVOLVED IN FIRE.

## Physical/Chemical Properties

**HCC:**

**NRC/State LIC No:**

4

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

64.5C

**Melt/Freeze Pt:**

**M.P/F.P Text:**

N/K

**Decomp Temp:**

**Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

1.11

**Volatile Org Content %:**

**Spec Gravity:**

0.792

**VOC Pounds/Gallon:**

PH: N/K

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

COMPLETE

**Appearance and Odor:**

CLEAR, COLORLESS LIQUID W/ORGANIC ODOR

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/K

**Materials To Avoid:**

CHROMIC ANHYDRIDE, IODINE, ETHANOL, MERCURIC OXIDE, POTASSIUM HYDROXIDE, SODIUM HYDROXIDE, CHLOROFORM, LEAD PERCHLORATE

**Hazardous Decomposition Products:**

CO, PHOSGENE, &amp; CARBONYL BROMIDE WHEN INVOLVED IN FIRE

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

**Sara Title III Information:** N/P**Federal Regulatory Information:** N/P**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P[www.lookchem.com](http://www.lookchem.com)

For R&amp;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. Lookchem 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.

## MATERIAL SAFETY DATA SHEET

Date Printed: 09/03/2008

Date Updated: 01/04/2006

Version 1.3

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Section 1 - Product and Company Information

---

Product Name                    AROCLOR 1254, 50MG, NEAT  
Product Number                48586  
Brand                            SUPELCO

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
AROCLOR 1254	11097-69-1	No

Synonyms                    Arochlor 1254 \* Aroclor 1254 \* Chlorierte  
                                  biphenyle, chloorgehalt 54% (German) \*  
                                  Chlorodiphenyl (54% chlorine) (ACGIH,OSHA) \*  
                                  Chlorodiphenyl (54% Cl) \* Clorodifenili, cloro  
                                  54% (Italian) \* Diphenyle chlore, 54% de chlore  
                                  (French) \* NCI-C02664 \* PCB (OSHA)

RTECS Number:                TQ1360000

---

Section 3 - Hazards Identification

---

## EMERGENCY OVERVIEW

Toxic.

May cause cancer. Harmful if swallowed.

Target organ(s): Liver.

## HMIS RATING

HEALTH: 1\*

FLAMMABILITY: 0

REACTIVITY: 0

## NFPA RATING

HEALTH: 1

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 not breathing give artificial respiration. If breathing is difficult, give oxygen.

#### DERMAL EXPOSURE

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

#### 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. Water spray.

##### 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

Evacuate area.

##### PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

##### METHODS FOR CLEANING UP

Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

---

#### Section 7 - Handling and Storage

---

##### HANDLING

User Exposure: Avoid prolonged or repeated exposure. Do not breathe vapor. Avoid contact with eyes, skin, and clothing.

##### STORAGE

Suitable: Keep tightly closed.

---

#### Section 8 - Exposure Controls / PPE

---

##### ENGINEERING CONTROLS

Safety shower and eye bath. Mechanical exhaust required.

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 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.  
Hand: Compatible chemical-resistant gloves.  
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS

Country	Source	Type	Value
USA	ACGIH	TWA	0.5 MG/M3
Remarks: Skin			
USA	MSHA Standard-air	TWA	0.5 MG/M3 (SKIN)
USA	OSHA.	PEL	8H TWA 0.5 MG/M3 (SKIN)
New Zealand OEL			
Remarks: check ACGIH TLV			
USA	NIOSH	TWA	0.001 MG/M3

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	1 MG/M3
Poland		NDSch	-
Poland		NDSP	-

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Liquid	
Property	Value	At Temperature or Pressure
Molecular Weight	N/A	
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	N/A	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	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

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### STABILITY

Stable: Stable.

Materials to Avoid: Strong oxidizing agents.

### HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Hydrogen chloride gas.

### HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

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## Section 11 - Toxicological Information

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### 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: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.

Ingestion: May be harmful if swallowed.

### TARGET ORGAN(S) OR SYSTEM(S)

Liver.

### SIGNS AND SYMPTOMS OF EXPOSURE

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

### TOXICITY DATA

Oral  
Rat  
1010 mg/kg  
LD50

Intravenous  
Rat  
358 MG/KG  
LD50

Remarks: Lungs, Thorax, or Respiration: Dyspnea.  
Behavioral: Somnolence (general depressed activity).  
Gastrointestinal: Hypermotility, diarrhea.

Intraperitoneal  
Mouse  
880 MG/KG  
LD50

Oral  
Mammal  
4000 mg/kg  
LD50

Intraperitoneal  
Mammal

>1250 MG/KG  
LD50

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: Oral  
Dose: 73500 MG/KG  
Exposure Time: 2Y  
Frequency: C  
Result: Tumorigenic: Carcinogenic by RTECS criteria. Liver: Tumors.

Species: Mouse  
Route of Application: Oral  
Dose: 17 GM/KG  
Exposure Time: 48W  
Frequency: C  
Result: Tumorigenic: Neoplastic by RTECS criteria. Liver: Tumors.

Species: Mouse  
Route of Application: Skin  
Dose: 4 MG/KG  
Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors. Tumorigenic: Tumors at site or application.

Species: Mouse  
Route of Application: Intraperitoneal  
Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Tumorigenic Effects: Uterine tumors. Lungs, Thorax, or Respiration: Tumors.

Species: Rat  
Route of Application: Oral  
Dose: 1 MG/KG  
Exposure Time: D  
Frequency: C  
Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Gastrointestinal: Tumors.

Species: Rat  
Route of Application: Oral  
Dose: 3 MG/KG  
Exposure Time: D  
Frequency: C  
Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Gastrointestinal: Tumors.

Species: Rat  
Route of Application: Oral  
Dose: 4 GM/KG  
Exposure Time: 2Y  
Frequency: I  
Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Gastrointestinal: Tumors. Liver: Tumors.

IARC CARCINOGEN LIST

Rating: Group 2A

NTP CARCINOGEN LIST

Rating: Equivocal evidence.  
Species: Rat  
Route: Feed

CHRONIC EXPOSURE - TERATOGEN

Species: Rat  
Dose: 90 MG/KG  
Route of Application: Oral  
Exposure Time: (7-15D PREG)  
Result: Specific Developmental Abnormalities: Hepatobiliary system.

CHRONIC EXPOSURE - MUTAGEN

Species: Rat  
Route: Oral  
Dose: 25 PPM  
Exposure Time: 2Y  
Mutation test: Morphological transformation.

Species: Rat  
Route: Oral  
Dose: 1295 MG/KG  
Mutation test: DNA damage

Species: Rat  
Route: Intraperitoneal  
Dose: 500 MG/KG  
Mutation test: DNA damage

Species: Rat  
Dose: 300 UMOL/L  
Cell Type: liver  
Mutation test: DNA damage

Species: Rat  
Dose: 20 MG/L  
Cell Type: liver  
Mutation test: Unscheduled DNA synthesis

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat  
Dose: 192 MG/KG  
Route of Application: Oral  
Exposure Time: (6D POST)  
Result: Effects on Newborn: Delayed effects. Effects on Newborn: Physical. Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Species: Rat  
Dose: 148 MG/KG  
Route of Application: Oral  
Exposure Time: (6-21D PREG/21D POST)  
Result: Effects on Newborn: Behavioral.

Species: Rat  
Dose: 35 MG/KG

Route of Application: Oral  
Exposure Time: (10-16D PREG)  
Result: Effects on Newborn: Biochemical and metabolic.

Species: Rat  
Dose: 40 MG/KG  
Route of Application: Oral  
Exposure Time: (5D POST)  
Result: Effects on Newborn: Delayed effects.

Species: Rat  
Dose: 750 MG/KG  
Route of Application: Oral  
Exposure Time: (5D MALE)  
Result: Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea).

Species: Rat  
Dose: 96 MG/KG  
Route of Application: Oral  
Exposure Time: (6-21D PREG)  
Result: Effects on Newborn: Behavioral.

Species: Rat  
Dose: 250 MG/KG  
Route of Application: Intraperitoneal  
Exposure Time: (15D PREG)  
Result: Maternal Effects: Other effects. Effects on Newborn: Biochemical and metabolic.

Species: Mouse  
Dose: 59400 UG/KG  
Route of Application: Oral  
Exposure Time: (3D PRE-21D POST)  
Result: Effects on Newborn: Behavioral.

Species: Rabbit  
Dose: 350 MG/KG  
Route of Application: Oral  
Exposure Time: (1-28D PREG)  
Result: Effects on Fertility: Abortion. Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Embryo or Fetus: Fetal death.

Species: Rabbit  
Dose: 280 MG/KG  
Route of Application: Oral  
Exposure Time: (1-28D PREG)  
Result: Effects on Newborn: Biochemical and metabolic.

Species: Mammal  
Dose: 14 MG/KG  
Route of Application: Oral  
Exposure Time: (30D PRE)  
Result: Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated ).

---

Section 12 - Ecological Information

---

No data available.

---

### Section 13 - Disposal Considerations

---

#### APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Caution: contains PCB's (polychlorinated biphenyls). For proper disposal information contact the US Environmental Protection Agency. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

---

### Section 14 - Transport Information

---

#### DOT

Proper Shipping Name: Polychlorinated biphenyls, liquid  
UN#: 2315  
Class: 9  
Packing Group: Packing Group II  
Hazard Label: Class 9  
PIH: Not PIH

#### IATA

Proper Shipping Name: Polychlorinated biphenyls, liquid  
IATA UN Number: 2315  
Hazard Class: 9  
Packing Group: II

---

### Section 15 - Regulatory Information

---

#### EU DIRECTIVES CLASSIFICATION

Symbol of Danger: N  
Indication of Danger: Dangerous for the environment.  
R: 33-50/53  
Risk Statements: Danger of cumulative effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
S: 35-60-61  
Safety Statements: This material and its container must be disposed of in a safe way. 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.  
Risk Statements: May cause cancer. Harmful if swallowed.  
Safety Statements: 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).  
US Statements: Target organ(s): Liver.

#### UNITED STATES REGULATORY INFORMATION

SARA LISTED: No  
NOTES: This product is subject to SARA section 313 reporting requirements.

#### 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: Yes  
NDSL: No

---

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 2008 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

## MATERIAL SAFETY DATA SHEET

Date Printed: 09/03/2008

Date Updated: 08/23/2005

Version 1.3

---

Section 1 - Product and Company Information

---

Product Name                    AROCLOR 1221, 50MG, NEAT  
Product Number                48587  
Brand                            SUPELCO

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
AROCLOR 1221	11104-28-2	No

Synonyms                    Aroclor 1221 \* Chlorodiphenyl (21% Cl)  
RTECS Number:              TQ1352000

---

Section 3 - Hazards Identification

---

## EMERGENCY OVERVIEW

Harmful.

Danger of cumulative effects. Irritating to eyes, respiratory system and skin. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Target organ(s): Nerves. Probable Carcinogen (US).

## 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 not breathing give artificial respiration. If breathing is difficult, give oxygen.

#### DERMAL EXPOSURE

In case of contact, immediately wash skin with soap and copious amounts of water.

#### EYE EXPOSURE

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

---

### Section 5 - Fire Fighting Measures

---

#### FLASH POINT

N/A

#### AUTOIGNITION TEMP

N/A

#### FLAMMABILITY

N/A

#### EXTINGUISHING MEDIA

Suitable: Water spray. 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(S) OF PERSONAL PRECAUTION(S)

Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

#### METHODS FOR CLEANING UP

Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

---

### Section 7 - Handling and Storage

---

#### HANDLING

User Exposure: Do not breathe vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

---

### Section 8 - Exposure Controls / PPE

---

#### ENGINEERING CONTROLS

Mechanical exhaust required. 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 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.  
Hand: Compatible chemical-resistant gloves.  
Eye: Chemical safety goggles.



Eye Contact: May cause eye irritation.  
Inhalation: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.  
Ingestion: May be harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)  
Nerves.

SIGNS AND SYMPTOMS OF EXPOSURE  
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Oral  
Rat  
3980 mg/kg  
LD50

Oral  
Mammal  
> 750 mg/kg  
LD50

Intraperitoneal  
Mammal  
>500 MG/KG  
LD50

CHRONIC EXPOSURE - CARCINOGEN  
Result: Carcinogen.

IARC CARCINOGEN LIST  
Rating: Group 2A Group 2A

NTP CARCINOGEN LIST  
Rating: Reasonably anticipated to be carcinogenic.

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat  
Dose: 1 GM/KG  
Route of Application: Subcutaneous  
Exposure Time: (1D PRE)  
Result: Maternal Effects: Uterus, cervix, vagina.

Species: Rat  
Dose: 2 GM/KG  
Route of Application: Subcutaneous  
Exposure Time: (2D PRE)  
Result: Effects on Fertility: Other measures of fertility

Species: Rabbit  
Dose: 28 MG/KG  
Route of Application: Oral  
Exposure Time: (1-28D PREG)  
Result: Effects on Newborn: Biochemical and metabolic.

---

Section 12 - Ecological Information

---

No data available.

---

## Section 13 - Disposal Considerations

---

### APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Caution: contains PCB's (polychlorinated biphenyls). For proper disposal information contact the US Environmental Protection Agency. Observe all federal, state, and local environmental regulations.

---

## Section 14 - Transport Information

---

### DOT

Proper Shipping Name: Polychlorinated biphenyls, liquid  
UN#: 2315  
Class: 9  
Packing Group: Packing Group II  
Hazard Label: Class 9  
PIH: Not PIH

### IATA

Proper Shipping Name: Polychlorinated biphenyls  
IATA UN Number: 2315  
Hazard Class: 9  
Packing Group: II

---

## Section 15 - Regulatory Information

---

### EU DIRECTIVES CLASSIFICATION

Symbol of Danger: N  
Indication of Danger: Dangerous for the environment.  
R: 33-50/53  
Risk Statements: Danger of cumulative effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
S: 35-60-61  
Safety Statements: This material and its container must be disposed of in a safe way. 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: Harmful.  
Risk Statements: Danger of cumulative effects. Irritating to eyes, respiratory system and skin. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. This material and its container must be disposed of in a safe way. 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): Nerves. Probable Carcinogen (US).

### UNITED STATES REGULATORY INFORMATION

SARA LISTED: No  
NOTES: This product is subject to SARA section 313 reporting requirements.

### 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: Yes  
NDSL: No

---

## 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 2008 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

## MATERIAL SAFETY DATA SHEET

Date Printed: 09/29/2008

Date Updated: 04/27/2006

Version 1.2

---

Section 1 - Product and Company Information

---

Product Name                    AROCLOR 1232, 10MG, NEAT  
Product Number                48588  
Brand                            SUPELCO

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
AROCLOR 1232	11141-16-5	No

Synonyms                    Aroclor 1232 \* Chlorodiphenyl (32% Cl)  
 RTECS Number:            TQ1354000

---

Section 3 - Hazards Identification

---

## EMERGENCY OVERVIEW

Dangerous for the environment.

Danger of cumulative effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

## HMIS RATING

HEALTH: 1  
FLAMMABILITY: 0  
REACTIVITY: 0

## NFPA RATING

HEALTH: 0  
FLAMMABILITY: 0  
REACTIVITY: 0

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: Water spray. 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(S) OF PERSONAL PRECAUTION(S)

Exercise appropriate precautions to minimize direct contact with skin or eyes and prevent inhalation of vapors.

##### METHODS FOR CLEANING UP

Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

---

#### Section 7 - Handling and Storage

---

##### HANDLING

User Exposure: Avoid inhalation. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

##### STORAGE

Suitable: Keep tightly closed.

---

#### Section 8 - Exposure Controls / PPE

---

##### ENGINEERING CONTROLS

Safety shower and eye bath. Mechanical exhaust required.

##### PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Respiratory protection is not required. Where protection is desired, use multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges.  
Hand: Protective gloves.  
Eye: Chemical safety goggles.

##### GENERAL HYGIENE MEASURES

Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS

Country	Source	Type	Value
USA	NIOSH	TWA	0.001 MG/M3

---

Section 9 - Physical/Chemical Properties

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Appearance                      Physical State: Liquid

Property	Value	At Temperature or Pressure
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Molecular Weight	N/A	
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	N/A	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	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

---

STABILITY

Stable: Stable.

Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Hydrogen chloride gas.

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: May be harmful if inhaled. Material may be

irritating to mucous membranes and upper respiratory tract.  
Ingestion: May be harmful if swallowed.

#### SIGNS AND SYMPTOMS OF EXPOSURE

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

#### TOXICITY DATA

Oral  
Rat  
4470 mg/kg  
LD50

---

#### Section 12 - Ecological Information

---

No data available.

#### ADDITIONAL RESULTS/DATA FROM RELEVANT SCIENTIFIC EXPERIMENTS

Avoid contamination of the environment

---

#### Section 13 - Disposal Considerations

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#### APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Caution: contains PCB's (polychlorinated biphenyls). For proper disposal information contact the US Environmental Protection Agency. Observe all federal, state, and local environmental regulations.

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#### Section 14 - Transport Information

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##### DOT

Proper Shipping Name: Polychlorinated biphenyls, liquid  
UN#: 2315  
Class: 9  
Packing Group: Packing Group II  
Hazard Label: Class 9  
PIH: Not PIH

##### IATA

Proper Shipping Name: Polychlorinated biphenyls, liquid  
IATA UN Number: 2315  
Hazard Class: 9  
Packing Group: II

---

#### Section 15 - Regulatory Information

---

##### EU DIRECTIVES CLASSIFICATION

Symbol of Danger: N  
Indication of Danger: Dangerous for the environment.  
R: 33-50/53  
Risk Statements: Danger of cumulative effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
S: 35-60-61  
Safety Statements: This material and its container must be disposed of in a safe way. 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: Dangerous for the environment.

Risk Statements: Danger of cumulative effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Statements: This material and its container must be disposed of in a safe way. This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

#### UNITED STATES REGULATORY INFORMATION

SARA LISTED: No

NOTES: This product is subject to SARA section 313 reporting requirements.

#### 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: Yes

NDSL: No

---

#### 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 2008 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

EN

\*\*\*\* MATERIAL SAFETY DATA SHEET \*\*\*\*

2,2-Dichlorodiethylether, 99+%

## \*\*\*\* SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION \*\*\*\*

MSDS Name: 2,2-Dichlorodiethylether, 99+%

Catalog Numbers:

26494-0000, 26494-0050, 26494-2500

Synonyms:

Bis-2-chloroethyl ether

Company Identification (Europe): Acros Organics BVBA  
 Janssen Pharmaceuticaaan 3a  
 2440 Geel, Belgium

Company Identification (USA): Acros Organics  
 One Reagent Lane  
 Fairlawn, NJ 07410

For information in North America, call: 800-ACROS-01

For information in Europe, call: 0032(0) 14575211

For emergencies in the US, call CHEMTREC: 800-424-9300

For emergencies in Europe, call: 0032(0) 14575299

## \*\*\*\* SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS \*\*\*\*

CAS#	Chemical Name	%	EINECS#	Haz Symbols	Risk Phrases
111-44-4	2,2-Dichlorodiethylether		203-870-1		

Hazard Symbols: T+

Risk Phrases: 10 26/27/28 40

## \*\*\*\* SECTION 3 - HAZARDS IDENTIFICATION \*\*\*\*

## EMERGENCY OVERVIEW

Flammable. Very toxic by inhalation, in contact with skin and if swallowed. Limited evidence of a carcinogenic effect.

## Potential Health Effects

Eye:

Lachrymator (substance which increases the flow of tears).

Skin:

Not available.

Ingestion:

Not available.

Inhalation:

Not available.

Chronic:

Not available.

## \*\*\*\* SECTION 4 - FIRST AID MEASURES \*\*\*\*

Eyes:

Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids.

Skin:

Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion:

Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.

Inhalation:

Remove from exposure and move to fresh air immediately.

Notes to Physician:

## \*\*\*\* SECTION 5 - FIRE FIGHTING MEASURES \*\*\*\*

## General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full

protective gear.

Extinguishing Media:

In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam.

\*\*\*\* SECTION 6 - ACCIDENTAL RELEASE MEASURES \*\*\*\*

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:

Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container.

\*\*\*\* SECTION 7 - HANDLING and STORAGE \*\*\*\*

Handling:

Not available.

Storage:

Not available.

\*\*\*\* SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION \*\*\*\*

Engineering Controls:

Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Personal Protective Equipment

Eyes:

Wear safety glasses and chemical goggles if splashing is possible.

Skin:

Wear appropriate protective gloves and clothing to prevent skin exposure.

Clothing:

Wear appropriate protective clothing to minimize contact with skin.

Respirators:

Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.

\*\*\*\* SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES \*\*\*\*

Physical State:	Clear liquid
Color:	colorless
Odor:	Not available.
pH:	Not available.
Vapor Pressure:	1.1 mbar @ 20 deg C
Viscosity:	Not available.
Boiling Point:	178.5 deg C @ 760.00mm Hg
Freezing/Melting Point:	0 deg C
Autoignition Temperature:	369 deg C ( 696.20 deg F)
Flash Point:	55 deg C ( 131.00 deg F)
Explosion Limits, lower:	.80 vol %
Explosion Limits, upper:	.00 vol %
Decomposition Temperature:	
Solubility in water:	insoluble
Specific Gravity/Density:	1.2200g/cm3
Molecular Formula:	O(CH <sub>2</sub> CH <sub>2</sub> Cl) <sub>2</sub>
Molecular Weight:	143.02

\*\*\*\* SECTION 10 - STABILITY AND REACTIVITY \*\*\*\*

Chemical Stability:

Stable under normal temperatures and pressures.

Conditions to Avoid:

Not available.

Incompatibilities with Other Materials:

Oxidizing agents.

Hazardous Decomposition Products:

Hydrogen chloride, carbon monoxide, carbon dioxide

hydrogen chloride, carbon monoxide, carbon dioxide.

Hazardous Polymerization: Has not been reported.

## \*\*\*\* SECTION 11 - TOXICOLOGICAL INFORMATION \*\*\*\*

## RTECS#:

CAS# 111-44-4: KN0875000

## LD50/LC50:

CAS# 111-44-4: Dermal, guinea pig: LD50 = 300 mg/kg; Draize test, rabbit, eye: 100 mg Severe; Inhalation, mouse: LC50 = 650 mg/m<sup>3</sup>/2H; Inhalation, rat: LC50 = 330 mg/m<sup>3</sup>/4H; Inhalation, rat: LC50 = 330 mg/m<sup>3</sup>; Oral, mouse: LD50 = 209 mg/kg; Oral, mouse: LD50 = 112 mg/kg; Oral, rabbit: LD50 = 126 mg/kg; Oral, rat: LD50 = 75 mg/kg; Skin, rabbit: LD50 = 90 mg/kg.

## Carcinogenicity:

2,2-Dichlorodiethylether -

California: carcinogen; initial date 4/1/88

NIOSH: potential occupational carcinogen

See actual entry in RTECS for complete information.

## \*\*\*\* SECTION 12 - ECOLOGICAL INFORMATION \*\*\*\*

## \*\*\*\* SECTION 13 - DISPOSAL CONSIDERATIONS \*\*\*\*

Dispose of in a manner consistent with federal, state, and local regulations.

## \*\*\*\* SECTION 14 - TRANSPORT INFORMATION \*\*\*\*

## IATA

Shipping Name: 2,2'-DICHLORODIETHYL ETHER

Hazard Class: 6.1

UN Number: 1916

Packing Group: II

## IMO

Shipping Name: 2,2'-DICHLORODIETHYL ETHER

Hazard Class: 6.1

UN Number: 1916

Packing Group: II

## RID/ADR

Shipping Name: 2,2'-DICHLORODIETHYL ETHER

Hazard Class: 6.1

UN Number: 1916

Packing group: II

USA RQ: CAS# 111-44-4: 10 lb final RQ; 4.54 kg final RQ

## \*\*\*\* SECTION 15 - REGULATORY INFORMATION \*\*\*\*

## European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: T+

Risk Phrases:

R 10 Flammable.

R 26/27/28 Very toxic by inhalation, in contact with skin and if swallowed.

R 40 Limited evidence of a carcinogenic effect.

## Safety Phrases:

S 7/9 Keep container tightly closed and in a well-ventilated place.

S 27 Take off immediately all contaminated clothing.

S 38 In case of insufficient ventilation, wear suitable respiratory equipment.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

## WGK (Water Danger/Protection)

CAS# 111-44-4: 2

United Kingdom Occupational Exposure Limits

United Kingdom Maximum Exposure Limits

## Canada

CAS# 111-44-4 is listed on Canada's NDSL List.

CAS# 111-44-4 is listed on Canada's Ingredient Disclosure List.

## Exposure Limits

CAS# 111-44-4: OEL-AUSTRALIA:TWA 5 ppm (30 mg/m3);STEL 10 ppm (60 mg/m3);Skin

OEL-AUSTRIA:TWA 10 ppm (60 mg/m3);Skin

OEL-BELGIUM:TWA 5 ppm (29 mg/m3);STEL 10 ppm (58 mg/m3);Skin

OEL-DENMARK:TWA 5 ppm (30 mg/m3);Skin

OEL-FINLAND:TWA 5 ppm (30 mg/m3);STEL 10 ppm (60 mg/m3);Skin

OEL-FRANCE:TWA 5 ppm (30 mg/m3);Skin

OEL-GERMANY:TWA 10 ppm (60 mg/m3);Skin

OEL-JAPAN:TWA 15 ppm (88 mg/m3);Skin

OEL-THE NETHERLANDS:TWA 5 ppm (30 mg/m3);Skin

OEL-THE PHILIPPINES:TWA 15 ppm (90 mg/m3);Skin

OEL-POLAND:TWA 10 mg/m3

OEL-RUSSIA:STEL 0.6 mg/m3;Skin

OEL-RUSSIA:TWA 15 ppm;STEL 2 mg/m3;Skin

OEL-SWEDEN;Carcinogen

OEL-SWITZERLAND:TWA 5 ppm (30 mg/m3);STEL 25 ppm;Skin

OEL-SWITZERLAND:TWA 5 ppm (30 mg/m3);STEL 25 ppm (50 mg/m3);Skin

OEL-THAILAND:TWA 15 ppm (90 mg/m3)

OEL-TURKEY:TWA 15 ppm (90 mg/m3);Skin

OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV

OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

## US FEDERAL

## TSCA

CAS# 111-44-4 is listed on the TSCA inventory.

\*\*\*\* SECTION 16 - ADDITIONAL INFORMATION \*\*\*\*

MSDS Creation Date: 7/16/1996 Revision #0 Date: Original.

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

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# Material Safety Data Sheet

## Octane

ACC# 17260

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Octane**Catalog Numbers:** AC129370020, AC129370250, AC129375000, AC325950010, AC325950020, AC325950025, AC325950250, O3980-1**Synonyms:** n-Octane.**Company Identification:**

Fisher Scientific

1 Reagent Lane

Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
111-65-9	Octane	>95	203-892-1

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: 13 deg C.

**Warning! Flammable liquid and vapor.** Causes eye, skin, and respiratory tract irritation. Breathing vapors may cause drowsiness and dizziness. Aspiration hazard if swallowed. Can enter lungs and cause damage.

**Target Organs:** Central nervous system.

#### Potential Health Effects

**Eye:** Causes eye irritation.**Skin:** Causes skin irritation. May be absorbed through the skin in harmful amounts. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis.**Ingestion:** Aspiration hazard. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.**Inhalation:** Causes respiratory tract irritation. May cause narcotic effects in high concentration.**Chronic:** Prolonged or repeated skin contact may cause defatting and dermatitis.

### Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid.

**Skin:** In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

**Ingestion:** Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.

**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. May accumulate static electrical charges, and may cause ignition of its own vapors. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. This liquid floats on water and may travel to a source of ignition and spread fire.

**Extinguishing Media:** Use foam, dry chemical, or carbon dioxide. Water may be ineffective. Water may spread fire.

**Flash Point:** 13 deg C ( 55.40 deg F)

**Autoignition Temperature:** 206 deg C ( 402.80 deg F)

**Explosion Limits, Lower:**1.0

**Upper:** 6.5

**NFPA Rating:** (estimated) Health: 1; Flammability: 3; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep away from heat, sparks and flame. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

**Exposure Limits**

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Octane	300 ppm TWA	75 ppm TWA; 350 mg/m <sup>3</sup> TWA 1000 ppm IDLH	500 ppm TWA; 2350 mg/m <sup>3</sup> TWA

**OSHA Vacated PELs:** Octane: 300 ppm TWA; 1450 mg/m<sup>3</sup> TWA

**Personal Protective Equipment**

**Eyes:** Wear chemical splash goggles.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless

**Odor:** mild odor - gasoline-like

**pH:** Not available.

**Vapor Pressure:** 11 mm Hg @ 20 deg C

**Vapor Density:** 3.9 (air=1)

**Evaporation Rate:** 0.6 (butyl acetate=1)

**Viscosity:** Not available.

**Boiling Point:** 124-127 deg C

**Freezing/Melting Point:** -57 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:** 0.708

**Molecular Formula:** C<sub>8</sub>H<sub>18</sub>

**Molecular Weight:** 114.23

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Ignition sources, excess heat.

**Incompatibilities with Other Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 111-65-9: RG8400000

**LD50/LC50:**

CAS# 111-65-9:

Inhalation, rat: LC50 = 118 gm/m<sup>3</sup>/4H;**Carcinogenicity:**

CAS# 111-65-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.**Teratogenicity:** No information available.**Reproductive Effects:** No information available.**Mutagenicity:** No information available.**Neurotoxicity:** No information available.**Other Studies:**

Section 12 - Ecological Information
-------------------------------------

**Ecotoxicity:** Water flea EC50 = 0.38 mg/L; 48 Hr.; Unspecified Conditions Bacteria: *Phytobacterium phosphoreum*: EC50 = 890 mg/L; 30 minutes; Microtox test No data available.**Environmental:** No information available.**Physical:** No information available.**Other:** AQUATIC FATE: Photolysis or hydrolysis of n-octane in aquatic systems is not expected to be important. The biodegradation of n-octane may occur in aquatic environments, however volatilization and adsorption are expected to be far more important fate processes. The log bioconcentration factor (log BCF) for n-octane has been estimated to range from 2.89 to 3.71 suggesting bioconcentration may be an important factor in aquatic systems. An estimated range for K<sub>oc</sub> from 5500 to 15,600 indicates n-octane will strongly adsorb to carbon.

Section 13 - Disposal Considerations
--------------------------------------

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.**RCRA U-Series:** None listed.

Section 14 - Transport Information
------------------------------------

	US DOT	Canada TDG
<b>Shipping Name:</b>	OCTANES	OCTANES
<b>Hazard Class:</b>	3	3
<b>UN Number:</b>	UN1262	UN1262
<b>Packing Group:</b>	II	II
<b>Additional Info:</b>		FLASHPOINT 13C

Section 15 - Regulatory Information
-------------------------------------

**US FEDERAL**

**TSCA**

CAS# 111-65-9 is listed on the TSCA inventory.

**Health & Safety Reporting List**

None of the chemicals are on the Health & Safety Reporting List.

**Chemical Test Rules**

None of the chemicals in this product are under a Chemical Test Rule.

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

None of the chemicals in this material have an RQ.

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**SARA Codes**

CAS # 111-65-9: immediate, fire.

**Section 313** No chemicals are reportable under Section 313.

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 111-65-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XN F N

**Risk Phrases:**

R 11 Highly flammable.

R 38 Irritating to skin.

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R 65 Harmful: may cause lung damage if swallowed.

R 67 Vapours may cause drowsiness and dizziness.

**Safety Phrases:**

S 16 Keep away from sources of ignition - No smoking.

S 29 Do not empty into drains.

S 33 Take precautionary measures against static discharges.

S 9 Keep container in a well-ventilated place.

S 60 This material and its container must be disposed of as hazardous waste.

S 61 Avoid release to the environment. Refer to special instructions

/safety data sheets

Safety data sheets.

S 62 If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

**WGK (Water Danger/Protection)**

CAS# 111-65-9: 1

**Canada - DSL/NDSL**

CAS# 111-65-9 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B2, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 111-65-9 is listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 6/08/1999

**Revision #6 Date:** 5/24/2006

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

# Material Safety Data Sheet

## n-Nonane

ACC# 11826

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** n-Nonane**Catalog Numbers:** AC129110000, AC129110020, AC129110025, AC129111000, AC129115000, AC264310000 AC264310000, AC264310010, AC264310020, AC264311000, AC264315000**Synonyms:** Nonane.**Company Identification:**Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
111-84-2	n-Nonane	99+	203-913-4

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: 31 deg C.

**Danger!** Flammable liquid and vapor. Harmful if inhaled. Breathing vapors may cause drowsiness and dizziness. Causes eye and skin irritation. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. May cause respiratory tract irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage.**Target Organs:** Blood, kidneys, liver, respiratory system, eyes.**Potential Health Effects****Eye:** Causes eye irritation.**Skin:** Causes skin irritation. May be harmful if absorbed through the skin.**Ingestion:** Aspiration hazard. May cause irritation of the digestive tract. May cause nausea and vomiting. May be harmful if swallowed. May cause lung damage.**Inhalation:** May cause respiratory tract irritation. Harmful if inhaled. Aspiration hazard. Inhalation of vapors may cause drowsiness and dizziness.**Chronic:** Prolonged or repeated skin contact may cause defatting and dermatitis. May cause liver and kidney damage. Chronic exposure may cause blood effects.

### Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the

upper and lower eyelids. Get medical aid.

**Skin:** Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

**Ingestion:** Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.

**Inhalation:** Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Containers may explode in the heat of a fire. Flammable liquid and vapor.

**Extinguishing Media:** Use water spray to cool fire-exposed containers. Use water spray, dry chemical, carbon dioxide, or chemical foam.

**Flash Point:** 31 deg C ( 87.80 deg F)

**Autoignition Temperature:** 206 deg C ( 402.80 deg F)

**Explosion Limits, Lower:**0.8 Vol %

**Upper:** 2.9 Vol %

**NFPA Rating:** (estimated) Health: 2; Flammability: 3; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Remove all sources of ignition. Use a spark-proof tool. Do not let this chemical enter the environment.

## Section 7 - Handling and Storage

**Handling:** Use spark-proof tools and explosion proof equipment. Do not get in eyes, on skin, or on clothing. Take precautionary measures against static discharges. Keep away from heat, sparks and flame. Do not ingest or inhale. Use only in a chemical fume hood.

**Storage:** Keep away from sources of ignition. Store in a cool, dry place. Store in a tightly closed container. Flammables-area.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.

**Exposure Limits**

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
n-Nonane	200 ppm TWA	200 ppm TWA; 1050 mg/m <sup>3</sup> TWA	none listed

**OSHA Vacated PELs:** n-Nonane: 200 ppm TWA; 1050 mg/m<sup>3</sup> TWA

**Personal Protective Equipment**

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless

**Odor:** gasoline-like

**pH:** Not available.

**Vapor Pressure:** 5 hPa @ 20 deg C

**Vapor Density:** Not available.

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 151 deg C @ 760 mmHg

**Freezing/Melting Point:** -53 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:** 0.718

**Molecular Formula:** C<sub>9</sub>H<sub>20</sub>

**Molecular Weight:** 128.26

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Incompatible materials, ignition sources, excess heat.

**Incompatibilities with Other Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 111-84-2: RA6115000

**LD50/LC50:**

CAS# 111-84-2:

Inhalation, rat: LC50 = 3200 ppm/4H;

Inhalation, rat: LC50 = 17000 mg/m<sup>3</sup>/4H;

**Carcinogenicity:**

CAS# 111-84-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information found

**Teratogenicity:** No information found

**Reproductive Effects:** No information found

**Mutagenicity:** No information found

**Neurotoxicity:** No information found

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. No information available.

**Environmental:** Terrestrial: Photolysis or hydrolysis is not expected to be important in soils.

Biodegradation may occur in soils; however, volatilization and adsorption are expected to be far more important fate processes. Aquatic: Photolysis and hydrolysis in aquatic systems are not expected to be important. The log bioconcentration factor has been estimated to range from 3.31 to 3.92, suggesting bioconcentration may be an important fate process in aquatic systems. Atmospheric: Expected to exist almost entirely in the vapor phase in ambient air.

**Physical:** No information available.

**Other:** Do not empty into drains.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3.

Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	NONANES	NONANES
<b>Hazard Class:</b>	3	3
<b>UN Number:</b>	UN1920	UN1920
<b>Packing Group:</b>	III	III
<b>Additional Info:</b>		FLASHPOINT 31C

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 111-84-2 is listed on the TSCA inventory.

**Health & Safety Reporting List**

None of the chemicals are on the Health & Safety Reporting List.

**Chemical Test Rules**

CAS# 111-84-2: 40 CFR 799.5115

**Section 12b**

CAS# 111-84-2: Section 4, 1 % de minimus concentration

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

None of the chemicals in this material have an RQ.

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**SARA Codes**

CAS # 111-84-2: immediate, fire.

**Section 313** No chemicals are reportable under Section 313.

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 111-84-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XN

**Risk Phrases:**

R 10 Flammable.

R 38 Irritating to skin.

R 20 Harmful by inhalation.

R 53 May cause long-term adverse effects in the aquatic environment.

R 65 Harmful: may cause lung damage if swallowed.

R 67 Vapours may cause drowsiness and dizziness.

**Safety Phrases:**

S 16 Keep away from sources of ignition - No smoking.

S 37 Wear suitable gloves.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 111-84-2: 1

**Canada - DSL/NDSL**

CAS# 111-84-2 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B2, D1B, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 111-84-2 is listed on the Canadian Ingredient Disclosure List.

<h2>Section 16 - Additional Information</h2>
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**MSDS Creation Date:** 3/11/1997

**Revision #10 Date:** 7/24/2008

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

## MATERIAL SAFETY DATA SHEET

F-120

07/13/89 LAST REVISED JUNE 1989

## SECTION I PRODUCT SPECIFICATIONS

CAT. NO. F43 BIS(2-CHLOROETHOXY)METHANE

CAS. NO. 111-91-1

SUPPLIED BY CHEM SERVICE, INC. PO BOX 3108, WEST CHESTER, PA, 19381

(215) 692-3026

EMERGENCY PHONE #: 215-386-2100

## SECTION II TOXICITY DATA

```
=====
RAT OR MOUSE LD50 ! RTECS# ! OSHA PEL ! ACGIH TLV
-----
```

```
NA PA3675000 NA NA
-----
```

NO TOXICITY DATA HAS BEEN FOUND. ASSUME THIS CHEMICAL TO BE HAZARDOUS.

## SECTION III PHYSICAL DATA

```
=====
MELTING POINT ! BOILING POINT ! DENSITY ! VAPOR PRESSURE ! VAPOR DENSITY
-----
```

```
NA 218-219 C 1.21 NA NA
-----
```

## EVAPORATION RATE

```
(BUTYL ACETATE=1)! ODOR ! COLOR ! PHASE ! SOLUBILITY IN WATER
-----
```

```
NA NA LIQUID
-----
```

## SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: DATA NOT AVAILABLE.

EXTINGUISHING MEDIA: CARBON DIOXIDE, DRY CHEMICAL POWDER OR SPRAY.

NO EXPLOSION LIMITS ARE AVAILABLE FOR THIS COMPOUND.

## SECTION V HEALTH HAZARD DATA

CONTACT LENSES SHOULD NOT BE WORN IN THE LABORATORY.

ALL CHEMICALS SHOULD BE CONSIDERED HAZARDOUS - AVOID DIRECT PHYSICAL CONTACT!

## SECTION VI FIRST AID

AN ANTIDOTE IS A SUBSTANCE INTENDED TO COUNTERACT THE EFFECT OF A POISON. IT SHOULD BE ADMINISTERED ONLY BY A PHYSICIAN OR TRAINED EMERGENCY PERSONNEL. MEDICAL ADVICE CAN BE OBTAINED FROM A POISON CONTROL CENTER.

IN CASE OF CONTACT: FLUSH EYES CONTINUOUSLY WITH WATER FOR 15-20 MINUTES. FLUSH SKIN WITH WATER FOR 15-20 MINUTES. IF NO BURNS HAVE OCCURRED, USE SOAP AND WATER TO CLEANSE SKIN. IF INHALED REMOVE PATIENT TO FRESH AIR. ADMINISTER OXYGEN IF PATIENT IS HAVING DIFFICULTY BREATHING. IF PATIENT HAS STOPPED BREATHING ADMINISTER ARTIFICIAL RESPIRATION. IF PATIENT IS IN CARDIAC ARREST ADMINISTER CPR. CONTINUE LIFE SUPPORTING MEASURES UNTIL MEDICAL ASSISTANCE HAS ARRIVED. REMOVE AND WASH CONTAMINATED CLOTHING. IF PATIENT IS EXHIBITING SIGNS OF SHOCK - KEEP WARM AND QUIET. CONTACT POISON CONTROL CENTER IMMEDIATELY IF NECESSARY. DO NOT ADMINISTER LIQUIDS OR INDUCE VOMITING TO AN UNCONSCIOUS OR CONVULSING PERSON.

IF PATIENT IS VOMITING - WATCH CLOSELY TO MAKE SURE AIRWAY DOES NOT BECOME OBSTRUCTED BY VOMIT.

GET MEDICAL ATTENTION IF NECESSARY.

SECTION VII REACTIVITY DATA

REACTIVITY UNAVAILABLE.

SECTION VIII SPILL OR LEAK PROCEDURES

SPILLS OR LEAKS: EVACUATE AREA. WEAR APPROPRIATE OSHA REGULATED EQUIPMENT. VENTILATE AREA. ABSORB ON VERMICULITE OR SIMILAR MATERIAL. SWEEP UP AND PLACE IN AN APPROPRIATE CONTAINER. HOLD FOR DISPOSAL. WASH CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.

DISPOSAL: BURN IN A CHEMICAL INCINERATOR WITH AN AFTER BURNER AND SCRUBBER.

SECTION IX PRECAUTIONS TO BE TAKEN IN HANDLING

THIS CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD. EYE SHIELDS SHOULD BE WORN. USE APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT. AVOID CONTACT WITH SKIN, EYES AND CLOTHING. KEEP TIGHTLY CLOSED IN A COOL DRY PLACE. STORE ONLY WITH COMPATIBLE CHEMICALS.

SECTION X SPECIAL PRECAUTIONS AND COMMENTS

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT ON THE DATE IT IS PUBLISHED AND MUST NOT BE CONSIDERED ALL INCLUSIVE. THE INFORMATION HAS BEEN OBTAINED ONLY BY A SEARCH OF AVAILABLE LITERATURE AND IS ONLY A GUIDE FOR HANDLING THE CHEMICALS. OSHA REGULATIONS REQUIRE THAT IF OTHER HAZARDS BECOME EVIDENT, AN UPGRADED MSDS MUST BE MADE AVAILABLE TO THE EMPLOYEE WITHIN THREE MONTHS. RESPONSIBILITY FOR UPDATES LIES WITH THE EMPLOYER AND NOT WITH CHEM SERVICE, INC. PERSONS NOT SPECIFICALLY AND PROPERLY TRAINED SHOULD NOT HANDLE THIS CHEMICAL OR ITS CONTAINER. THIS MSDS IS PROVIDED WITHOUT ANY WARRANTY EXPRESSED OR IMPLIED, INCLUDING MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

THIS PRODUCT IS FURNISHED FOR LABORATORY USE ONLY! OUR PRODUCT MAY NOT BE USED AS DRUGS, COSMETICS, AGRICULTURAL OR PESTICIDAL PRODUCTS, FOOD ADDITIVES OR AS HOUSEHOLD CHEMICALS.



**MATERIAL SAFETY DATA SHEET**

PRODUCT NAME: PROPYLENE

### 1. Chemical Product and Company Identification

BOC Gases,  
Division of  
The BOC Group, Inc.  
575 Mountain Avenue  
Murray Hill, NJ 07974

BOC Gases  
Division of  
BOC Canada Limited  
5975 Falbourne Street, Unit 2  
Mississauga, Ontario L5R 3W6

TELEPHONE NUMBER: (908) 464-8100  
24-HOUR EMERGENCY TELEPHONE NUMBER:  
CHEMTREC (800) 424-9300

TELEPHONE NUMBER: (905) 501-1700  
24-HOUR EMERGENCY TELEPHONE NUMBER:  
(905) 501-0802  
EMERGENCY RESPONSE PLAN NO: 20101

PRODUCT NAME: PROPYLENE  
CHEMICAL NAME: Propylene  
COMMON NAMES/SYNONYMS: Propene  
TDG (Canada) CLASSIFICATION: 2.1  
WHMIS CLASSIFICATION: A, B1, D2B

PREPARED BY: Loss Control (908)464-8100/(905)501-1700  
PREPARATION DATE: 6/1/95  
REVIEW DATES: 6/7/96

### 2. Composition, Information on Ingredients

INGREDIENT	% VOLUME	PEL-OSHA <sup>1</sup>	TLV-ACGIH <sup>2</sup>	LD <sub>50</sub> or LC <sub>50</sub> Route/Species
Propylene FORMULA: C <sub>3</sub> H <sub>6</sub> CAS: 115-07-1 RTECS #: UC6740000	99.0 to 99.7	Simple Asphyxiant	Simple Asphyxiant	Not Available

<sup>1</sup> As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)

<sup>2</sup> As stated in the ACGIH 1994-95 Threshold Limit Values for Chemical Substances and Physical Agents

### 3. Hazards Identification

#### EMERGENCY OVERVIEW

This product does not contain oxygen and may cause asphyxia if released in a confined area. Simple hydrocarbons can cause irritation and central nervous system depression at high concentrations. Extremely flammable.

#### ROUTE OF ENTRY:

Skin Contact Yes	Skin Absorption No	Eye Contact Yes	Inhalation Yes	Ingestion No
---------------------	-----------------------	--------------------	-------------------	-----------------

PRODUCT NAME: PROPYLENE

**HEALTH EFFECTS:**

Exposure Limits No	Irritant Yes	Sensitization No
Teratogen No	Reproductive Hazard No	Mutagen No
Synergistic Effects None Reported		

Carcinogenicity: -- NTP: No IARC: No OSHA: No

**EYE EFFECTS:**

Irritation may occur.

**SKIN EFFECTS:**

None anticipated as product is a gas at room temperature.

**INGESTION EFFECTS:**

Ingestion is unlikely.

**INHALATION EFFECTS:**

Product is relatively nontoxic. Simple hydrocarbons can irritate the eyes, mucous membranes and respiratory system at high concentrations.

Inhalation of high concentrations may cause dizziness, disorientation, incoordination, narcosis, nausea or narcotic effects.

This product may displace oxygen if released in a confined space. Maintain oxygen levels above 19.5% at sea level to prevent asphyxiation.

Effects of oxygen deficiency resulting from simple asphyxiants may include: rapid breathing, diminished mental alertness, impaired muscular coordination, faulty judgement, depression of all sensations, emotional instability, and fatigue. As asphyxiation progresses, nausea, vomiting, prostration, and loss of consciousness may result, eventually leading to convulsions, coma, and death.

Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

**NFPA HAZARD CODES**

Health: 1  
Flammability: 4  
Reactivity: 1

**HMIS HAZARD CODES**

Health: 0  
Flammability: 4  
Reactivity: 0

**RATINGS SYSTEM**

0 = No Hazard  
1 = Slight Hazard  
2 = Moderate Hazard  
3 = Serious Hazard  
4 = Severe Hazard

#### 4. First Aid Measures

**EYES:**

Never introduce oil or ointment into the eyes without medical advice! If pain is present, refer the victim to an ophthalmologist for further treatment and follow up.

**SKIN:**

Remove contaminated clothing and flush affected area with cold water and soap. DO NOT USE HOT WATER.

**INGESTION:**

Not normally required. Seek immediate medical attention.

**INHALATION:**

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO PRODUCT. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given assisted (artificial) respiration and supplemental oxygen. Further treatment should be symptomatic and supportive.

#### 5. Fire Fighting Measures

Conditions of Flammability: Flammable liquid and vapor		
Flash point: -162°F (-108°C)	Method: TCC	Autoignition Temperature: 927°F (460°C)
LEL(%): 2.0	UEL(%): 11.1	
Hazardous combustion products: Carbon monoxide, Carbon dioxide		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: Not Available		

**FIRE AND EXPLOSION HAZARDS:**

This product will ignite at ambient temperatures and can be expected to form a flammable mixture upon release to the atmosphere. May burn with an almost invisible flame in bright light.

**EXTINGUISHING MEDIA:**

Water, carbon dioxide, dry chemical.

**FIRE FIGHTING INSTRUCTIONS:**

If possible, stop the flow of gas with a remote valve. Use water spray to cool fire exposed containers. If fire is extinguished and flow of gas is continued, increase ventilation to prevent a build up of a flammable/explosive atmosphere. Extinguish sources of ignition.

Be cautious of a Boiling Liquid Evaporating Vapor Explosion, BLEVE, if flame is impinging on surrounding containers. Direct 500 GPM water stream onto containers above the liquid level with remote monitors. Limit the number of personnel in proximity to the fire. Evacuate surrounding areas to at least 3000 feet in all directions.

#### 6. Accidental Release Measures

**PRODUCT NAME: PROPYLENE**

Evacuate all personnel from affected area. Use appropriate protective equipment. Increase ventilation to prevent build up of a flammable/explosive atmosphere. Extinguish all sources of ignition! If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest BOC location

## 7. Handling and Storage

Earth bond and ground all lines and equipment associated with the product system. Electrical equipment should be non-sparking and explosion proof.

Propylene is non-corrosive and may be used with any common structural material.

Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure regulator when connecting cylinder to lower pressure (<250 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130°F (54°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time.

Post "No Smoking" signs in storage or use areas.

For additional recommendations consult Compressed Gas Association Pamphlet P-1.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

## 8. Exposure Controls, Personal Protection

### EXPOSURE LIMITS<sup>1</sup>:

INGREDIENT	% VOLUME	PEL-OSHA <sup>2</sup>	TLV-ACGIH <sup>3</sup>	LD <sub>50</sub> or LC <sub>50</sub> Route/Species
Propylene FORMULA: C <sub>3</sub> H <sub>6</sub> CAS: 115-07-1 RTECS #: UC6740000	>99.0 to 99.7	Simple Asphyxiant	Simple Asphyxiant	Not Available

<sup>1</sup> Refer to individual state or provincial regulations, as applicable, for limits which may be more stringent than those listed here.

<sup>2</sup> As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)

<sup>3</sup> As stated in the ACGIH 1994-1995 Threshold Limit Values for Chemical Substances and Physical Agents.

PRODUCT NAME: PROPYLENE

**ENGINEERING CONTROLS:**

Use local exhaust to prevent accumulation. Use general ventilation to prevent build up of flammable concentrations. May use hood with forced ventilation when handling small quantities. If product is handled routinely where the potential for leaks exists, all electrical equipment must be rated for use in potentially flammable atmospheres. Consult the National Electrical Code for details.

**EYE/FACE PROTECTION:**

Safety goggles or glasses.

**SKIN PROTECTION:**

Protective gloves made of plastic or rubber.

**RESPIRATORY PROTECTION:**

Positive pressure air line with full-face mask and escape bottle or self-contained breathing apparatus should be available for emergency use.

**OTHER/GENERAL PROTECTION:**

Safety shoes, safety shower, eyewash.

## 9. Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure at 70°F	: 151	psia
Vapor density at STP (Air = 1)	: 1.43	
Evaporation point	: Not Available	
Boiling point	: -53.9	°F
	: -47.7	°C
Freezing point	: Not Available	
	: Not Available	
pH	: Not Available	
Specific gravity	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H2O)	: Slightly soluble	
Odor threshold	: Not Available	
Odor and appearance	: A colorless gas with a mild olefinic odor.	

## 10. Stability and Reactivity

**STABILITY:**

Stable

**INCOMPATIBLE MATERIALS:**

Keep away from open flames, oxygen and oxidizing materials. Reacts violently with oxides of nitrogen (NO<sub>2</sub>, N<sub>2</sub>O<sub>4</sub> and N<sub>2</sub>O). Oxidizers, mineral acids, halogenated compounds, nitrogen dioxide, molten sulfur.

**HAZARDOUS DECOMPOSITION PRODUCTS:**

Carbon monoxide

PRODUCT NAME: PROPYLENE

**HAZARDOUS POLYMERIZATION:**

Will not occur.

**11. Toxicological Information**

Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

No chronic effects data given in the Registry of Toxic Effects of Chemical Substances (RTECS) or Sax, Dangerous Properties of Industrial Materials, 7th ed.

**12. Ecological Information**

No data given.

**13. Disposal Considerations**

Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to BOC Gases or authorized distributor for proper disposal.

**14. Transport Information**

PARAMETER	United States DOT	Canada TDG
PROPER SHIPPING NAME:	Propylene	Propylene
HAZARD CLASS:	2.1	2.1
IDENTIFICATION NUMBER:	UN 1077	UN 1077
SHIPPING LABEL:	FLAMMABLE GAS	FLAMMABLE GAS

**15. Regulatory Information**

Propylene is listed under the accident prevention provisions of section 112(r) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 10,000 pounds.

**SARA TITLE III NOTIFICATIONS AND INFORMATION**

This product contains the following toxic chemical subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

CAS NUMBER	INGREDIENT NAME	PERCENT BY VOLUME
115-07-1	PROPYLENE	99.0 to 99.7

This information must be included on all MSDSs that are copied and distributed for this material.

**SARA TITLE III - HAZARD CLASSES:**

Acute Health Hazard  
Fire Hazard  
Sudden Release of Pressure Hazard

## 16. Other Information

Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

### **DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES:**

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

MSDS Number: **E6500** \* \* \* \* \* Effective Date: 07/06/06 \* \* \* \* \* Supercedes: 01/15/04

<b>MSDS</b> <i>Material Safety Data Sheet</i>	24 Hour Emergency Telephone: 908-959-2151 CHEMTREC: 1-800-424-9300
	National Response in Canada CANUTEC: 613-996-6666
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865	Outside U.S. and Canada Chemtrec: 703-527-3887
	<b>NOTE:</b> CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

# DIOCTYLPHTHALATE

## 1. Product Identification

**Synonyms:** Di-(2-ethylhexyl)phthalate; DEHP; bis(2-ethylhexyl)phthalate; DOP; 1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl)ester; Di-sec-octyl phthalate  
**CAS No.:** 117-81-7  
**Molecular Weight:** 390.56  
**Chemical Formula:** C<sub>24</sub>H<sub>38</sub>O<sub>4</sub>  
**Product Codes:** H187

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Di-sec-octyl Phthalate	117-81-7	100%	Yes

## 3. Hazards Identification

### Emergency Overview

**WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS THE CENTRAL NERVOUS SYSTEM, LIVER, REPRODUCTIVE SYSTEM, AND GASTROINTESTINAL TRACT. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure. MAY CAUSE ADVERSE REPRODUCTIVE EFFECTS.**

SAF-T-DATA<sup>(tm)</sup> Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Cancer)  
 Flammability Rating: 1 - Slight  
 Reactivity Rating: 1 - Slight  
 Contact Rating: 2 - Moderate  
 Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES  
 Storage Color Code: Green (General Storage)

### Potential Health Effects

#### Inhalation:

The low vapor pressure of this material essentially eliminates inhalation hazards unless the material is heated or misted. Inhalation of mists can cause nausea and is irritating to the respiratory tract.

#### Ingestion:

Ingestion causes nausea, abdominal cramps, diarrhea. CNS depression - lethargy, drowsiness, staggering and sleepiness - can result from absorbing large amounts.

#### Skin Contact:

Slight skin irritation may occur from prolonged skin contact. Low levels may be absorbed through the skin.

#### Eye Contact:

Causes irritation, redness, and pain.

#### Chronic Exposure:

Material is a suspected carcinogen and a suspected teratogen.

#### Aggravation of Pre-existing Conditions:

No information found.

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:**

Do NOT induce vomiting. Give large amounts of water. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 215C (419F) OC

Autoignition temperature: 390C (734F)

Flammable limits in air % by volume:

lel: 0.3

Slight fire hazard.

**Explosion:**

Above the flash point, explosive vapor-air mixtures may be formed.

**Fire Extinguishing Media:**

Water spray, dry chemical, alcohol foam, or carbon dioxide.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Wear special protective equipment (Sec. 8) for maintenance break-in or where exposures may exceed established exposure levels. Wash hands, face, forearms and neck when exiting restricted areas. Shower, dispose of outer clothing, change to clean garments at the end of the day. Avoid cross-contamination of street clothes. Wash hands before eating and do not eat, drink, or smoke in workplace. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

- OSHA Permissible Exposure Limit (PEL):

5 mg/m<sup>3</sup> (TWA).

- ACGIH Threshold Limit Value (TLV):

5 mg/m<sup>3</sup> (TWA); A3 - animal carcinogen.

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece particulate respirator (with NIOSH type P100 or R100 filters) may be worn for up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. Please note that N series filters are not recommended for this material. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

## 9. Physical and Chemical Properties

**Appearance:**

Clear oily liquid.

**Odor:**

Slightly amine to odorless.

**Solubility:**

Insoluble in water.

**Specific Gravity:**

0.9861 @ 20C/20C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

No information found.

**Boiling Point:**

230C (446F)

**Melting Point:**

-50C (-58F)

**Vapor Density (Air=1):**

16

**Vapor Pressure (mm Hg):**

1.32 @ 200C (392F)

**Evaporation Rate (BuAc=1):**

No information found.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Nitrates, strong oxidizers, acids and alkalis.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

Oral rat LD50: 30 g/kg; Skin rabbit LD50: 25 g/kg. Irritation Data (rabbit, std Draize, 500mg/24H): Skin, mild; Eye, mild. Investigated as a tumorigen, mutagen, reproductive effector.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Di-sec-octyl Phthalate (117-81-7)	No	Yes	3

## 12. Ecological Information

**Environmental Fate:**

When released into water, this material may biodegrade to a moderate extent. This material may bioaccumulate to some extent. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition.

**Environmental Toxicity:**

The LC50/96-hour values for fish are over 100 mg/l.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

Not regulated.

## 15. Regulatory Information

```

-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  EC   Japan  Australia
-----
Di-sec-octyl Phthalate (117-81-7)           Yes  Yes  Yes    Yes

```

```

-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     Korea  DSL   NDSL  Phil.
-----
Di-sec-octyl Phthalate (117-81-7)           Yes   Yes  No    Yes

```

```

-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-
RQ  TPQ  List  Chemical Catg.
-----
Di-sec-octyl Phthalate (117-81-7)           No   No   Yes   No

```

```

-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     CERCLA  -RCRA-  -TSCA-
                                     261.33  8(d)
-----
Di-sec-octyl Phthalate (117-81-7)           100    U028   No

```

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes  
 SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No  
 Reactivity: No (Pure / Liquid)

### WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

**Australian Hazchem Code:** None allocated.

**Poison Schedule:** None allocated.

### WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 1 Flammability: 1 Reactivity: 0

### Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS THE CENTRAL NERVOUS SYSTEM, LIVER, REPRODUCTIVE SYSTEM, AND GASTROINTESTINAL TRACT. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure. MAY CAUSE ADVERSE REPRODUCTIVE EFFECTS.

### Label Precautions:

Do not get in eyes, on skin, or on clothing.

Do not breathe mist.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

### Label First Aid:

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air.

If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

### Product Use:

Laboratory Reagent.

### Revision Information:

MSDS Section(s) changed since last revision of document include: 3.

### Disclaimer:

\*\*\*\*\*

**Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy.**

**This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product.**

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

## Composition/Information on Ingredient

**Cas:**

117-84-0

**Code:**

M

**RTECS:**

TI1925000

**Code:**

M

**Name:**

N-DIOCTYLPHTHALATE (SARA III)

**Other REC Limits:**

NK

**OSHA PEL:**

NOT ESTABLISHED

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

NOT ESTABLISHED

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

NIOSH/MAHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN(FPN)

**Ventilation:**

VOL&PATTERN TO KEEP CONC.OF HZDUS INGRED BELOW THE LOWEST LEVEL LISTED.RME DECOMP PROD

GENERATED WHEN HEATING.VENT VAPOR

**Protective Gloves:**

SOLVENT IMPERMEABLE GLOVES

**Eye Protection:**

CHEMICAL WORKER GOGGLES(FPN)

**Other Protective Equipment:**

Equipment EYEWASH FACILITY,SAFETY SHOWER

**Work Hygienic Practices:**

N/P

**Supplemental Safety and Health:**

VAP-DENS:>1; WT/GL: 7L7 LBS. ALSO CONTAINS:ISOPROPYL ALCOHOL 1-11%,TLVS,400

PPM: ETHYL ACETATE 2-

12%,TLV 400 PPM. MEETS TT-L- 32, TYPE II.

## Health Hazards Data

**LD50LC50Mixture:**

N/P

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

INGEST:GI IRRITATION,NAUSEA&VOMITING,ASPIRATION INTO LUNG MAY CAUSE CHEM PNEUMONITIS,WHICH CAN BE FATAL.

INHALE:ANESTHETIC,IRRITATION TO NOSE&THROAT,ACUTE NERVOUS SYSTEM DEPRESS.CHAR

BY:HEADACHE,DIZZI

NESS,CONFUSION,NAUSEA,UNCONSCIOUSNESS,AND ASPHYXIATION.EYE:MAY CAUSE

IRRIT.SKIN:PRIMARY IRRITANT.DEFATTING&IRRIT

OF SKIN

**Explanation Of Carcinogenicity:**

N/P

**Signs And Symptions Of Overexposure:**

RPTED OVEREXPOSURE TO TOULENE MAY CAUSE LIVER DAMAGE.RPTS HAVE ASSOC PRLNGD/RPTED

OCCUPATIONAL OVEREXPOSURE TO

SOLVENTS W/PERMANENT BRAIN & NERVOUS SYSTEM DAMAGE.INTENTIONAL MISUSE BY DILIBERTELY

CONC ENTRATING AND INHALING

THE CONTENTS MAYHARMFUL OR FATAL. 5

**Medical Cond Aggravated By Exposure:**

TOULENE HAS BEEN FOUND TO CAUSE KIDNEY,LUNG AND SPLEN DAMAGE IN LABORATORY ANIMALS.

**First Aid:**

INGEST:CALL POISON CNTRL CENT,ER, OR PHYSICIAN IMMED. INHALE:RME TO FRESH AIR IMMED.IF

BREATHING HAS SPED,GIVE ART

RESP,KEEP WARM&QUIET,GET MED ATTN IMMED.EYE:FLUSH W/LRG AMTS OF H\*2O,LIFTING LIDS

OCCASIONAAY.CONT FOR 15MIN.GET

MED ATTN.SKIN:IMMED FLUSH THE CONTAMINATED AREA W/LRG AMTS OF H\*2O.RME CONTAMINATED

CLOTHING AS H\*2O IS

APPLIED.GET MEDICAL ATTENTION IF IRRITATION PERSISTS.

**Spill Release Procedures:**

WEAR PPE APPROPRIATE FOR EXPOSURE OF CONCERN.ELIMINATE SOURCES OF IGNITION.DIKE AND

CONTAIN SPILL W/INERT

MATERIALS.TRANS LIQUID TO COVERED METAL CONTAINER FOR RECOVERY OR DISPOSAL,OR RME

W/INERT ABSO RBENTS.USE

NONSPRK TOOLS.PLACE ABS (SEESUPP DATA)

**Neutralizing Agent:**

N/P

**Waste Disposal Methods:**

DISPOSE OF IAW FED,STATE,&LOCAL LAWS.INCINERATE ONLY IN EPA APPRVD FACILITY.DO NOT

INCINERATE CLSD

CONTAINER.CONTAMINATED ABSORBENT MAY BE DISPOSED OF IN A HZDOUS WST LANDFILL.

**Handling And Storage Precautions:**

DO NOT STORE ABOVE 95F/35C.STORE LARGE QUANTITIES IN COMPLIANCE W/OSHA 29CFR1910.106.

**Other Precautions:**

DO NOT TAKE INTERNALLY.CLOSE CONTAINERS AFTER USE.EMPTY CONTAINERS MUST NOT BE WASHED AND REUSED FOR ANY

PURPOSE.CONTAINERS SHOULD BE GROUNDED AND BONDED TO THE RECEIVING CONTAINER.DO NOT

WELD,BRAZE,OR CUT ON EMPTY

CONTAINER.(SEE SUPP DATA)

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P

**Flash Point:**

**Flash Point Text:**

20F/-6.6C CAL

**Autoignition Temp:**

**Autoignition Temp Text:**

N/K

**Lower Limits:**

NK

**Upper Limits:**

NK

**Extinguishing Media:**

6 CO\*2, DRY CHEM, ALCOHOL FOAM, POLYMER FOAM IS PREFERRED FOR LARGE FIRES.

**Fire Fighting Procedures:**

FIREFIGHTERS SHOULD WEAR SCBA. H\*2O MAY BE INEFFECTIVE, MAY BE USED TO COOL EXPOSED CONTS TO PVNT PRESSURE BUILDUP & POSS AUTOIGNITION OR EXPLO WHEN (SEE SUPP DATA

**Unusual Fire/Explosion Hazard:**

DURING EMER CONDITIONS, OVEREXPOS TO DECOMP PRODT MAY CAUSE A HLTH HZD. SYMPTOMS MAY NOT BE IMMED APPARENT. OBTAIN MEDICAL ATTENTION.

## Physical/Chemical Properties

**HCC:**

7 F2

**NRC/State LIC No:**

N/A

**Net Prop WT For Ammo:****Boiling Point:****B.P. Text:**

180F-428F

**Melt/Freeze Pt:****M.P/F.P Text:**

NK

**Decomp Temp:****Decomp Text:**

N/A

**Vapor Pres:**

NK

**Vapor Density:**

&gt;AIR

**Volatile Org Content %:****Spec Gravity:**

0.91

**VOC Pounds/Gallon:**

PH: N/P

**VOC Grams/Liter:****Viscosity:**

N/K

**Evaporation Rate & Reference:**

SLOWER THAN ETHER

**Solubility in Water:**

NK

**Appearance and Odor:**

NK

**Percent Volatiles by Volume:**

79

**Corrosion Rate:**

N/P

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

AVOID EXCESSIVE HEAT AND SOURCES OF IGNITION.

**Materials To Avoid:**

STRONG ACIDS OR ALKALINE MATERIALS. OXIDIZING MATERIALS.

**Hazardous Decomposition Products:**

BURNING, INCL WHEN HEATED BY WELDING OR CUTTING, WILL PROD SMOKE, CO, CO\*2, OF NITROGEN MAY BE GENERATED.

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

KEEP AWAY FROM HEAT SPARKS AND FLAME.

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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### 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. Lookchem 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.



# Material Safety Data Sheet

## 1,2,4-Trichlorobenzene, 99%

ACC# 95590

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** 1,2,4-Trichlorobenzene, 99%**Catalog Numbers:** AC157900000, AC157900010, AC157900025**Synonyms:** unsym-Trichlorobenzene**Company Identification:**

Acros Organics N.V.

One Reagent Lane

Fairlawn, NJ 07410

**For information in North America, call:** 800-ACROS-01**For information in Europe, call:** 0032(0) 14575211**For emergencies in the US, call CHEMTREC:** 800-424-9300**For emergencies outside the US, call:** 0032(0) 14575299

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
120-82-1	1,2,4-TRICHLOROBENZENE	99%	204-428-0

**Hazard Symbols:** XN**Risk Phrases:** 22 38 51/53

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless. **Caution!** May be harmful if swallowed. May cause central nervous system depression. Causes severe eye irritation. Causes digestive and respiratory tract irritation. May cause blurred vision. May cause severe skin irritation.

**Target Organs:** Kidneys, central nervous system, liver.

#### Potential Health Effects

**Eye:** May cause severe eye irritation.

**Skin:** Causes skin irritation. May cause dermatitis.

**Ingestion:** Harmful if swallowed. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause a narcotic effect with possible coma. May cause central nervous system depression.

**Inhalation:** May cause respiratory tract irritation.

**Chronic:** Prolonged or repeated skin contact may cause dermatitis. May cause liver and kidney damage.

### Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids. Get medical aid immediately.

**Skin:** Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.

**Ingestion:** Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Do NOT administer adrenaline after exposure via inhalation or ingestion.

## Section 5 - Firefighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Will burn if involved in a fire. Use water spray to keep fire-exposed containers cool. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated. Combustible material; may burn but does not ignite readily.

**Extinguishing Media:** For small fires, use dry chemical, carbon dioxide, halon, or water spray. Do NOT get water inside containers. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. Cool containers with flooding quantities of water until well after fire is out.

**Autoignition Temperature:** 571 deg C (1,059.80 deg F)

**Flash Point:** 110 deg C (230.00 deg F)(estimated) Health: 2; Flammability: 1; Reactivity: 0 Explosion Limits, Lower: 2.50 vol % Upper: 6.60 vol %

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material, (e.g., dry sand or earth), then place into a chemical waste container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Scoop up with a nonsparking tool, then place into a suitable container for disposal. Remove all sources of ignition. Provide ventilation. Do not get water inside containers.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Avoid breathing dust, vapor, mist, or gas. Avoid contact with skin and eyes. Avoid ingestion and inhalation.

**Storage:** Keep away from sources of ignition. Store in a cool, dry place. Store in a tightly closed container.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
1,2,4-TRICHLOROBENZENE	C 5 ppm; C 37 mg/m <sup>3</sup>	none listed	none listed

**OSHA Vacated PELs:** 1,2,4-TRICHLOROBENZENE: No OSHA Vacated PELs are listed for this chemical.

### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to minimize contact with skin.

**Respirators:** Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless

**Odor:** Characteristic aromatic odor

**pH:** Not available.

**Vapor Pressure:** 2 hPa @ 50 deg C

**Vapor Density:** 6.26

**Evaporation Rate:**

**Viscosity:** Not available.

**Boiling Point:** 214760.00 deg C

**Freezing/Melting Point:** 16 deg C

**Decomposition Temperature:** Not available.

**Solubility:** insoluble

**Specific Gravity/Density:** 1.4540g/cm<sup>3</sup>

**Molecular Formula:** C<sub>6</sub>H<sub>3</sub>Cl<sub>3</sub>

**Molecular Weight:**

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** High temperatures, incompatible materials, ignition sources, excess heat.

**Incompatibilities with Other Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Hydrogen chloride, phosgene, carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS# 120-82-1:** DC2100000

**LD50/LC50:**

CAS# 120-82-1:

Oral, mouse: LD50 = 300 mg/kg;

Oral, rat: LD50 = 756 mg/kg;

Skin, rat: LD50 = 6139 mg/kg;

**Carcinogenicity:**

CAS# 120-82-1: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.

**Epidemiology:** No information available.

**Teratogenicity:** No information available.

**Reproductive Effects:** orl-rat TDLO: 1800 mg/kg (9-13D preg) ipr-rat TDLO: 750 mg/kg (3D pre)

**Neurotoxicity:** No information available.

**Mutagenicity:** mnt-mus-ipr: 210 mg/kg/24H

**Other Studies:** No data available.

## Section 12 - Ecological Information

**Ecotoxicity:** Acute fish toxicity: LC50 on *Poecilia reticula*: approx. 2,4 mg/l. Duration of test: 14 d (Verschuere, K. Handb. of Environm. Data on Org. Chem., 2 ed., 1983); LC50 on *Lepomis macrochirus*: approx. 3,4 mg/l (Buccafusco, R.J. et al. Bull. Environm. Toxicol. 26, 446-452, 1981).

**Environmental Fate:** According to WORNE biological degradation with complete ring cleavage occurs within 46 hours at 30°C in the presence of *Pseudomonas* sp. The test was conducted with adapted bacteria (Worne, H.E. Magazine from BECEWA, Liege, Belgium 22, 1972, 61-71).

**Physical/Chemical:** Not available.

**Other:** Not available.

## Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

**RCRA D-Series Maximum Concentration of Contaminants:** None listed.

**RCRA D-Series Chronic Toxicity Reference Levels:** None listed.

**RCRA F-Series:** None listed.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
<b>Shipping Name:</b>	TRICHLOROBENZENES, LIQUID				
<b>Hazard Class:</b>	6.1	6.1	6.1(15C)	6.1	6.1
<b>UN Number:</b>	UN2321	UN2321	UN2321	UN2321	UN2321
<b>Packing Group:</b>	III	III		III	III

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 120-82-1 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

CAS# 120-82-1: Testing required by: manufacturers; processors (40 CFR 799.1

#### Section 12b

CAS# 120-82-1: export notification required - Section 4

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### SARA

#### Section 302 (RQ)

CAS# 120-82-1: final RQ = 100 pounds (45.4 kg)

#### Section 302 (TPQ)

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 120-82-1: acute, chronic.

#### Section 313

This material contains 1,2,4-TRICHLOROBENZENE (CAS# 120-82-1, 99%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

CAS# 120-82-1 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 120-82-1 is listed as a Priority Pollutant under the Clean Water Act. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 120-82-1 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California No Significant Risk Level: None of the chemicals in this product are listed. **European/International**

### Regulations

#### European Labeling in Accordance with EC Directives

#### Hazard Symbols:

XN

#### Risk Phrases:

R 22 Harmful if swallowed. R 38 Irritating to skin. R 51/53 Toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

#### Safety Phrases:

S 36/37 Wear suitable protective clothing and gloves. S 61 Avoid release to the environment. Refer to special

instructions/Safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 120-82-1: 3

**Canada**

CAS# 120-82-1 is listed on Canada's DSL/NDSL List.

This product does not have a WHMIS classification.

CAS# 120-82-1 is not listed on Canada's Ingredient Disclosure List.

**Exposure Limits**

CAS# 120-82-1: OEL-AUSTRALIA:TWA 5 ppm (40 mg/m3) OEL-BELGIUM:STEL 5 ppm (37 mg/m3) OEL-DENMARK:TWA 5 ppm (40 mg/m3) OEL-FINLAND:TWA 5 ppm (40 mg/m3);STEL 10 ppm (74 mg/m3);Skin OEL-FRANCE:TWA 5 ppm (40 mg/m3) OEL-GERMANY:TWA 5 ppm (40 mg/m3) OEL-THE NETHERLANDS:TWA 5 ppm (40 mg/m3) OEL-SWITZERLAND:TWA 5 ppm (40 mg/m3) OEL-UNITED KINGDOM:TWA 5 ppm (40 mg/m3);STEL 5 pp (40 mg/m3) OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

## Section 16 - Additional Information

**MSDS Creation Date:** 11/24/1995

**Revision #3 Date:** 9/08/1998

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

# Material Safety Data Sheet

## 2,4-Dichlorophenol, 99%

ACC# 93183

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** 2,4-Dichlorophenol, 99%**Catalog Numbers:** AC147720000, AC147720050, AC147721000, AC147725000**Synonyms:** 2,4-Dichlorohydroxybenzene; 2,4-DCP.**Company Identification:**

Acros Organics N.V.

One Reagent Lane

Fair Lawn, NJ 07410

**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
120-83-2	2,4-Dichlorophenol	99	204-429-6

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: white crystals.

**Danger!** Causes eye and skin burns. Causes digestive and respiratory tract burns. May be fatal if absorbed through the skin. Harmful if swallowed.**Target Organs:** Blood, kidneys, liver, eyes, skin, mucous membranes.

#### Potential Health Effects

**Eye:** Causes eye burns.**Skin:** May be fatal if absorbed through the skin. Causes skin burns. Molten or hot 2,4-dichlorophenol (2,4-DCP) is immediately absorbed through the skin in amounts that have caused death to humans. Rapid death in humans has been caused by skin exposure without immediate decontamination. Amounts of molten 2,4-DCP that may cover as little as 1% body surface area (palm of hand-sized) may cause death. 2,4-DCP is absorbed more readily through skin when in solution or molten than as a solid.**Ingestion:** Harmful if swallowed. Causes gastrointestinal tract burns.**Inhalation:** Causes severe respiratory tract irritation with possible burns.**Chronic:** May cause liver and kidney damage. Chronic exposure may cause blood effects.

### Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid immediately.

**Skin:** SPEEDY ACTION IS CRITICAL! Destroy contaminated shoes. In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.

**Ingestion:** If swallowed, do NOT induce vomiting. Get medical aid immediately. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person.

**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Material may destroy the nerve endings in the skin; the absence of pain does not necessarily mean the skin has been properly decontaminated.

**Antidote:** It is recommended that further amounts of 2,4-DCP may be removed from the skin by repeatedly spraying/swabbing the skin with polyethylene or polypropylene glycol mixtures, alternating with rinsing with large quantities of water for 30 minutes.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.

**Extinguishing Media:** Use water spray, dry chemical, carbon dioxide, or appropriate foam. Solid streams of water or high volume water jet may spread fire.

**Flash Point:** 104 deg C ( 219.20 deg F)

**Autoignition Temperature:** 653 deg C ( 1,207.40 deg F)

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 3; Flammability: 1; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Do not breathe dust, mist, or vapor. Do not get in eyes, on skin, or on clothing. Use only with adequate ventilation.

**Storage:** Store in a cool, dry place. Store in a tightly closed container. Do not store in copper or copper alloy storage vessels. Moisture in 2,4-DCP increases the potential for corrosion, therefore, rendering carbon steel inadequate as a material of construction. Stainless steel should be avoided due to the potential for stress-corrosion cracking.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. EXPOSURE GUIDELINE

for 2,4-DCP: Dow Agrosiences industrial hygiene guideline is 1 ppm, Skin. (Immediately absorbed through the skin in amounts that have caused rapid death to humans).

#### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
2,4-Dichlorophenol	none listed	none listed	none listed

**OSHA Vacated PELs:** 2,4-Dichlorophenol: No OSHA Vacated PELs are listed for this chemical.

#### Personal Protective Equipment

**Eyes:** Wear chemical splash goggles and face shield.

**Skin:** Wear appropriate protective gloves to prevent skin exposure. Nitrile or Neoprene gloves are recommended.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure. Recommended personal protective clothing includes neoprene boots and suit of Saranex, Neoprene, or Kapler CPF3.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Crystals

**Appearance:** white

**Odor:** phenolic

**pH:** Not available.

**Vapor Pressure:** 0.07 mm Hg @ 25 deg C

**Vapor Density:** 5.6 (air=1)

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 209-210 deg C @ 760 mm Hg

**Freezing/Melting Point:** 41-44 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Slightly soluble.

**Specific Gravity/Density:** 1.382 @ 60°/4°C

**Molecular Formula:** C<sub>6</sub>H<sub>4</sub>Cl<sub>2</sub>O

**Molecular Weight:** 163.00

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** High temperatures, dust generation.

**Incompatibilities with Other Materials:** Oxidizing agents, acid chlorides, copper, steel, acid anhydrides.

**Hazardous Decomposition Products:** Hydrogen chloride, carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 120-83-2: SK8575000

**LD50/LC50:**

CAS# 120-83-2:

- Draize test, rabbit, skin: 500 uL/24H Severe;
- Oral, mouse: LD50 = 1276 mg/kg;
- Oral, mouse: LD50 = 1276 mg/kg;
- Oral, mouse: LD50 = 580 mg/kg;
- Oral, rat: LD50 = 47 mg/kg;
- Oral, rat: LD50 = 380 mg/kg;

Liquid 2,4-DCP is immediately absorbed through the skin in amounts that have caused death to humans. The dermal LD50 for humans is estimated to be 50-190 mg/kg.

**Carcinogenicity:**

CAS# 120-83-2:

- **ACGIH:** Not listed.
- **California:** Not listed.
- **NTP:** Not listed.
- **IARC:** Group 2B carcinogen

**Epidemiology:** No data available.**Teratogenicity:** No data available.**Reproductive Effects:** See actual entry in RTECS for complete information.**Mutagenicity:** See actual entry in RTECS for complete information.**Neurotoxicity:** No data available.**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Fathead Minnow: 7.75 mg/l.; 96 hour; bioassay not specified

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.**RCRA U-Series:**

CAS# 120-83-2: waste number U081.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	TOXIC SOLIDS, CORROSIVE, ORGANIC, N.O.S.	Toxic Solid, Corrosive, Organic, N.O.S.
<b>Hazard Class:</b>	6.1	6.1
<b>UN Number:</b>	UN2928	UN2928
<b>Packing Group:</b>	II	II

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 120-83-2 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

CAS# 120-83-2: Section 4, 0.1 % de minimus concentration [see 40 CFR 766 and 707.72]

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 120-83-2: 100 lb final RQ; 45.4 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 120-83-2: immediate, delayed.

#### Section 313

This material contains 2,4-Dichlorophenol (CAS# 120-83-2, 99%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

#### Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 120-83-2 is listed as a Priority Pollutant under the Clean Water Act. CAS# 120-83-2 is listed as a Toxic Pollutant under the Clean Water Act.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 120-83-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

#### California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

### European/International Regulations

#### European Labeling in Accordance with EC Directives

#### Hazard Symbols:

T C N

#### Risk Phrases:

R 22 Harmful if swallowed.

R 24 Toxic in contact with skin.

R 34 Causes burns.

R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

#### Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 36/37/39 Wear suitable protective clothing, gloves and eye/face pr

otection.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 120-83-2: 3

**Canada - DSL/NDSL**

CAS# 120-83-2 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D1A, E.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 120-83-2 is not listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 2/23/1998

**Revision #4 Date:** 9/26/2007

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

# Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 11/10/2008

Reviewed on 11/10/2008

## 1 Identification of substance:

### Product details:

Product name: 2,4-Dinitrotoluene

### Manufacturer/Supplier:

Shangyu Jiehua Chemical Co., Ltd  
51 Baiheng Rd., Sanpeng Bridge, Shangyu  
312351, Zhejiang  
P.R.China  
Emergency Phone: +86 575 82131151  
CHEMTREC: (800) 424-9300  
Web Site: www.runyoutech.com

**Information Department:** Health, Safety and Environmental Department

### Emergency information:

During normal hours the Health, Safety and Environmental Department.  
After normal hours call Chemtrec at (800) 424-9300.

## 2 Composition/Data on components:

### Chemical characterization:

#### Description: (CAS#)

2,4-Dinitrotoluene (CAS# 121-14-2): 100%

#### Identification number(s):

EINECS Number: 204-450-0

Index number: 609-007-00-9

## 3 Hazards identification

### Hazard description:



T Toxic

N Dangerous for the environment

### Information pertaining to particular dangers for man and environment

R 45 May cause cancer.

R 23/24/25 Also toxic by inhalation, in contact with skin and if swallowed.

R 48/22 Also harmful: danger of serious damage to health by prolonged exposure if swallowed.

R 62 Possible risk of impaired fertility

R 68 Possible risk of irreversible effects.

R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

### Classification system

#### HMIS ratings (scale 0-4)

(Hazardous Materials Identification System)

HEALTH	3
FIRE	1
REACTIVITY	1

Health (acute effects) = 3

Flammability = 1

Reactivity = 1

USA

(Contd. on page 2)

# Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 11/10/2008

Reviewed on 11/10/2008

**Product name: 2,4-Dinitrotoluene**

(Contd. of page 1)

## 4 First aid measures

### General information

Immediately remove any clothing soiled by the product.

Remove breathing apparatus only after contaminated clothing has been completely removed.

In case of irregular breathing or respiratory arrest provide artificial respiration.

### After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

### After skin contact

Immediately wash with water and soap and rinse thoroughly.

Seek immediate medical advice.

### After eye contact

Rinse opened eye for several minutes under running water. Then consult a doctor.

### After swallowing

Do not induce vomiting; immediately call for medical help.

Seek immediate medical advice.

## 5 Fire fighting measures

### Suitable extinguishing agents

Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

### Special hazards caused by the material, its products of combustion or resulting gases:

In case of fire, the following can be released:

Carbon monoxide and carbon dioxide

Nitrogen oxides (NO<sub>x</sub>)

### Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

## 6 Accidental release measures

### Person-related safety precautions:

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

### Measures for environmental protection:

Do not allow material to be released to the environment without proper governmental permits.

### Measures for cleaning/collecting:

Dispose contaminated material as waste according to item 13.

Ensure adequate ventilation.

### Additional information:

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

USA

(Contd. on page 3)

**Material Safety Data Sheet**  
acc. to OSHA and ANSI

Printing date 11/10/2008

Reviewed on 11/10/2008

**Product name: 2,4-Dinitrotoluene**

(Contd. of page 2)

## 7 Handling and storage

### Handling

#### Information for safe handling:

Keep container tightly sealed.  
Store in cool, dry place in tightly closed containers.  
Ensure good ventilation at the workplace.  
Open and handle container with care.

#### Information about protection against explosions and fires:

Keep ignition sources away.

### Storage

#### Requirements to be met by storerooms and receptacles:

No special requirements.

#### Information about storage in one common storage facility:

Store away from oxidizing agents.

#### Further information about storage conditions:

Keep container tightly sealed.  
Store in cool, dry conditions in well sealed containers.

## 8 Exposure controls and personal protection

#### Additional information about design of technical systems:

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

#### Components with limit values that require monitoring at the workplace:

Not required.

**Additional information:** No data

### Personal protective equipment

#### General protective and hygienic measures

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Store protective clothing separately.

Avoid contact with the eyes and skin.

#### Breathing equipment:

Use suitable respirator when high concentrations are present.

#### Protection of hands:

Impervious gloves

Check protective gloves prior to each use for their proper condition.

#### Material of gloves

The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

**Eye protection:** Safety glasses

**Body protection:** Protective work clothing.

## 9 Physical and chemical properties:

### General Information

<b>Form:</b>	Crystalline
<b>Color:</b>	Yellow

(Contd. on page 4)

**Material Safety Data Sheet**

acc. to OSHA and ANSI

Printing date 11/10/2008

Reviewed on 11/10/2008

**Product name: 2,4-Dinitrotoluene**

(Contd. of page 3)

<b>Odor:</b>	Not determined
<b>Change in condition</b>	
<b>Melting point/Melting range:</b>	67-70°C (153-158°F)
<b>Boiling point/Boiling range:</b>	Not determined
<b>Sublimation temperature / start:</b>	Not determined
<b>Flash point:</b>	> 110°C (> 230°F)
<b>Ignition temperature:</b>	Not determined
<b>Decomposition temperature:</b>	Not determined
<b>Danger of explosion:</b>	Product does not present an explosion hazard.
<b>Explosion limits:</b>	
<b>Lower:</b>	Not determined
<b>Upper:</b>	Not determined
<b>Vapor pressure:</b>	Not determined
<b>Density:</b>	Not determined
<b>Solubility in / Miscibility with Water:</b>	Insoluble

**10 Stability and reactivity****Thermal decomposition / conditions to be avoided:**

Decomposition will not occur if used and stored according to specifications.

**Materials to be avoided:** Oxidizing agents

**Dangerous reactions** No dangerous reactions known

**Dangerous products of decomposition:**

Carbon monoxide and carbon dioxide

Nitrogen oxides

**11 Toxicological information****Acute toxicity:****LD/LC50 values that are relevant for classification:**

Oral	LD50	790 mg/kg (mouse) 268 mg/kg (rat)
Dermal	LD50	>1 gm/kg (guinea pig)
Irritation of skin	mild	500 mg/24H (rabbit)

**Primary irritant effect:**

**on the skin:** Irritant to skin and mucous membranes.

**on the eye:** Irritating effect.

**Sensitization:** No sensitizing effects known.

**Other information (about experimental toxicology):**

Tumorigenic effects have been observed on tests with laboratory animals.

Reproductive effects have been observed on tests with laboratory animals.

Mutagenic effects have been observed on tests with bacteria.

Mutagenic effects have been observed on tests with insects.

Mutagenic effects have been observed on tests with laboratory animals.

(Contd. on page 5)

**Material Safety Data Sheet**  
acc. to OSHA and ANSI

Printing date 11/10/2008

Reviewed on 11/10/2008

**Product name: 2,4-Dinitrotoluene**

(Contd. of page 4)

**Subacute to chronic toxicity:****Subacute to chronic toxicity:**

The Registry of Toxic Effects of Chemical Substances (RTECS) reports the following effects in laboratory animals:

Behavioral - food intake (animal).

Related to Chronic Data - death.

Related to Chronic Data - changes in testicular weight.

Liver - changes in liver weight.

Blood - normocytic anemia.

Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol).

Blood - methemoglobinemia-carboxyhemoglobin.

Blood - changes in other cell count (unspecified)

Blood - other changes.

Endocrine - changes in spleen weight.

Endocrine - changes in luteinizing hormone.

Brain and Coverings - other degenerative changes.

Nutritional and Gross Metabolic - weight loss or decreased weight gain.

Reproductive - Paternal Effects - spermatogenesis (including genetic material, sperm morphology, motility, and count).

Reproductive - Paternal Effects - testes, epididymis, sperm duct.

Skin and Appendages - tumors.

Kidney, Ureter, Bladder - Kidney tumors.

Kidney, Ureter, Bladder - tumors.

Reproductive - Fertility - pre-implantation mortality (e.g. reduction in number of implants per female; total number of implants per corpora lutea)

Reproductive - Fertility - other measures of fertility.

Reproductive - Paternal Effects - spermatogenesis.

Tumorigenic - neoplastic by RTECS criteria.

Tumorigenic - carcinogenic by RTECS criteria.

Tumorigenic - equivocal tumorigenic agent by RTECS criteria.

**Additional toxicological information:**

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

Danger through skin absorption.

Possible risk of impaired fertility.

IARC-2B: Possibly carcinogenic to humans: limited evidence in humans in the absence of sufficient evidence in experimental animals.

**12 Ecological information:****Ecotoxicological effects:**

**Remark:** Toxic for fish

**General notes:**

Do not allow product to reach ground water, water course or sewage system, even in small quantities.

Danger to drinking water if even extremely small quantities leak into the ground.

Also poisonous for fish and plankton in water bodies.

Do not allow material to be released to the environment without proper governmental permits.

Toxic for aquatic organisms

USA

(Contd. on page 6)

**Material Safety Data Sheet**  
acc. to OSHA and ANSI

Printing date 11/10/2008

Reviewed on 11/10/2008

**Product name: 2,4-Dinitrotoluene**

(Contd. of page 5)

**13 Disposal considerations****Product:****Recommendation**

Consult state, local or national regulations to ensure proper disposal.

**Uncleaned packagings:****Recommendation:** Disposal must be made according to official regulations.**14 Transport information****DOT regulations:**

**Hazard class:** 6.1  
**Identification number:** UN3454  
**Packing group:** II  
**Proper shipping name (technical name):** DINITROTOLUENES, SOLID  
**Label:** 6.1

**Land transport ADR/RID (cross-border)**

**ADR/RID class:** 6.1 (T2) Toxic substances  
**Danger code (Kemler):** 60  
**UN-Number:** 3454  
**Packaging group:** II  
**Description of goods:** 3454 DINITROTOLUENES, SOLID

**Maritime transport IMDG:**

**IMDG Class:** 6.1  
**UN Number:** 3454  
**Label:** 6.1  
**Packaging group:** II  
**Proper shipping name:** DINITROTOLUENES, SOLID

**Air transport ICAO-TI and IATA-DGR:**

**ICAO/IATA Class:** 6.1  
**UN/ID Number:** 3454  
**Label:** 6.1

(Contd. on page 7)

**Material Safety Data Sheet**  
acc. to OSHA and ANSI

Printing date 11/10/2008

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**Product name: 2,4-Dinitrotoluene**

(Contd. of page 6)

<b>Packaging group:</b>	II
<b>Proper shipping name:</b>	DINITROTOLUENES, SOLID

**15 Regulations****Product related hazard informations:****Hazard symbols:**

T Toxic  
N Dangerous for the environment

**Risk phrases:**

45 May cause cancer.  
23/24/25 Also toxic by inhalation, in contact with skin and if swallowed.  
48/22 Also harmful: danger of serious damage to health by prolonged exposure if swallowed.  
62 Possible risk of impaired fertility  
68 Possible risk of irreversible effects.  
51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

**Safety phrases:**

53 Avoid exposure - obtain special instructions before use.  
45 In case of accident or if you feel unwell, seek medical advice immediately.  
61 Avoid release to the environment. Refer to special instructions/Safety data sheets

**National regulations**

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

This product contains a chemical known to the state of California to cause cancer or reproductive toxicity.

All components of this product are listed on the Canadian Domestic Substances List (DSL).

**Information about limitation of use:**

For use only by technically qualified individuals.  
This product is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.

**16 Other information:**

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

**Department issuing MSDS:** Health, Safety and Environmental Department.  
**Contact:** Paul V. Connolly

# Material Safety Data Sheet

## n-Butyl acetate

ACC# 15380

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** n-Butyl acetate

**Catalog Numbers:** AC107750000, AC107750010, AC107750025, AC167680000, AC167680010, AC167680040, AC167685000, AC327850000, AC327850010, B395-4, B396-1, B396-4, B396-4LC, B3961LC, B396FB115, B396FB19, B396FB200, B396FB50, B396POP19, B396POP200, B396POP50, B396POPB200, B396POPB50, B396RB200, B396RB50, B396RS200, B396RS50, B396SS115, B396SS19, B396SS200, B396SS28, B396SS50, BP1135-500, NC9461437

**Synonyms:** Acetic acid, butyl ester; Butyl acetate; 1-Butyl acetate; Butyl ethanoate.

**Company Identification:**

Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410

**For information, call:** 201-796-7100

**Emergency Number:** 201-796-7100

**For CHEMTREC assistance, call:** 800-424-9300

**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
123-86-4	n-Butyl acetate	>98	204-658-1

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: 22 deg C.

**Warning! Flammable liquid and vapor.** Breathing vapors may cause drowsiness and dizziness. Causes eye and respiratory tract irritation. Repeated exposure may cause skin dryness or cracking.

**Target Organs:** Central nervous system, respiratory system, eyes, skin.

#### Potential Health Effects

**Eye:** Causes eye irritation. Vapors cause eye irritation.

**Skin:** Prolonged and/or repeated contact may cause defatting of the skin and dermatitis. Not expected to cause an allergic skin reaction. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts. Fifty subjects underwent repeated insult patch-testing with n-butyl acetate. Patches containing 0.5 ml of butyl acetate were applied for nine 24-hour applications over a 3-week period; challenge patches were applied 10 to 14 days after the final induction application. No subject was sensitized.

**Ingestion:** May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Ingestion of large amounts may cause CNS depression.

**Inhalation:** Causes respiratory tract irritation. Inhalation of vapors may cause drowsiness and dizziness.

**Chronic:** Prolonged or repeated skin contact may cause defatting and dermatitis.

## Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

**Skin:** In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

**Ingestion:** If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. Liquid will float and may reignite on the surface of water. Flammable liquid and vapor. May accumulate static electrical charges, and may cause ignition of its own vapors. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

**Extinguishing Media:** For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Water may be ineffective.

**Flash Point:** 22 deg C ( 71.60 deg F)

**Autoignition Temperature:** 407 deg C ( 764.60 deg F)

**Explosion Limits, Lower:** 1.3

**Upper:** 7.6

**NFPA Rating:** (estimated) Health: 2; Flammability: 3; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Use water spray to disperse the gas/vapor. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only

with adequate ventilation. Keep away from heat, sparks and flame. Avoid breathing vapor.

**Storage:** Keep away from sources of ignition. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
n-Butyl acetate	150 ppm TWA; 200 ppm STEL	150 ppm TWA; 710 mg/m <sup>3</sup> TWA 1700 ppm IDLH	150 ppm TWA; 710 mg/m <sup>3</sup> TWA

**OSHA Vacated PELs:** n-Butyl acetate: 150 ppm TWA; 710 mg/m<sup>3</sup> TWA

### Personal Protective Equipment

**Eyes:** Wear chemical splash goggles.

**Skin:** Wear appropriate gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless

**Odor:** ester-like - sweet, fruity odor

**pH:** Not available.

**Vapor Pressure:** 11.5 mm Hg @ 25 deg C

**Vapor Density:** 4.0 (air=1)

**Evaporation Rate:** 5.8 (CCl<sub>4</sub>=1)

**Viscosity:** 0.73 cps @ 20 deg C

**Boiling Point:** 125 - 126 deg C

**Freezing/Melting Point:** -77 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Slightly soluble.

**Specific Gravity/Density:** 0.8800 @ 20°C

**Molecular Formula:** C<sub>6</sub>H<sub>12</sub>O<sub>2</sub>

**Molecular Weight:** 116.16

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable at room temperature in closed containers under normal storage and handling conditions.

**Conditions to Avoid:** Ignition sources, excess heat, confined spaces.

**Incompatibilities with Other Materials:** Strong oxidizing agents, strong acids, nitrates, caustics (e.g. ammonia, ammonium hydroxide, calcium hydroxide, potassium hydroxide, sodium hydroxide), potassium tert-butoxide. Reacts w/H<sub>2</sub>O on standing to form acetic acid & n-butyl alcohol. This is a

very slow reaction..

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 123-86-4: AF7350000

**LD50/LC50:**

CAS# 123-86-4:

Draize test, rabbit, eye: 100 mg Moderate;

Draize test, rabbit, skin: 500 mg/24H Moderate;

Inhalation, mouse: LC50 = 6 gm/m<sup>3</sup>/2H;

Inhalation, rat: LC50 = 390 ppm/4H;

Oral, mouse: LD50 = 6 gm/kg;

Oral, rabbit: LD50 = 3200 mg/kg;

Oral, rat: LD50 = 10768 mg/kg;

Skin, rabbit: LD50 = >17600 mg/kg;

**Carcinogenicity:**

CAS# 123-86-4: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information found

**Teratogenicity:** Exposure to n-butyl acetate vapors throughout gestation did not cause significant teratogenicity in rabbits, rats, or mice.

**Reproductive Effects:** No information found

**Mutagenicity:** No information found

**Neurotoxicity:** No information found

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Fathead Minnow: LC50 = 18.0 mg/L; 96 Hr.; Unspecified Fish: Bluegill/Sunfish: LC50 = 100.0 mg/L; 96 Hr.; Static condition Water flea EC50 = 44.0 mg/L; 48 Hr.; 23 degrees C Algae: LC50 = 320.0 mg/L; 96 Hr.; Unspecified Bacteria: Phytobacterium phosphoreum: EC50 = 3100.0-130 mg/L; 5, 15 minutes; Microtox test, 15 degrees C Daphnia: Daphnia: 44-205 mg/l; 96 H; LC50 No data available.

**Environmental:** Based on estimated Koc values of 34 and 233, n-butyl acetate may be subject to moderate-to-high leaching. Volatilization from dry soil surfaces is likely to be rapid. n-Butyl acetate may be susceptible to significant biodegradation in natural water.

**Physical:** n-Butyl acetate will exist almost entirely in the vapor-phase in the ambient atmosphere due to its relatively high vapor pressure. The half-life for the vapor-phase reaction of n-butyl acetate with photochemically produced hydroxyl radicals has been estimated to be about 6 days in an average atmosphere indicating that this reaction will be the dominant removal mechanism.

**Other:** ThOD: 2.207 g oxygen/g BOD-5: 1.020 g oxygen/g BOD-20: 1.45 g oxygen/g

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3.

Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	BUTYL ACETATES	BUTYL ACETATES
<b>Hazard Class:</b>	3	3
<b>UN Number:</b>	UN1123	UN1123
<b>Packing Group:</b>	II	II
<b>Additional Info:</b>		FLASHPOINT 22 C

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 123-86-4 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

CAS# 123-86-4: 40 CFR 799.5000

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 123-86-4: 5000 lb final RQ; 2270 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 123-86-4: immediate, fire.

**Section 313** No chemicals are reportable under Section 313.

#### Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

CAS# 123-86-4 is listed as a Hazardous Substance under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 123-86-4 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

#### California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

## European/International Regulations

### European Labeling in Accordance with EC Directives

#### Hazard Symbols:

Not available.

#### Risk Phrases:

R 10 Flammable.

R 66 Repeated exposure may cause skin dryness or cracking.

R 67 Vapours may cause drowsiness and dizziness.

#### Safety Phrases:

S 25 Avoid contact with eyes.

#### WGK (Water Danger/Protection)

CAS# 123-86-4: 1

#### Canada - DSL/NDSL

CAS# 123-86-4 is listed on Canada's DSL List.

#### Canada - WHMIS

This product has a WHMIS classification of B2, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

#### Canadian Ingredient Disclosure List

CAS# 123-86-4 is listed on the Canadian Ingredient Disclosure List.

## Section 16 - Additional Information

**MSDS Creation Date:** 6/16/1999

**Revision #8 Date:** 6/29/2007

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

MSDS Number: **D7552** \* \* \* \* \* Effective Date: **05/19/08** \* \* \* \* \* Supercedes: **08/16/05**

<b>MSDS</b>	<b>Material Safety Data Sheet</b>		24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
	From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		National Response in Canada CANUTEC: 613-996-6666
 			Outside U.S. and Canada Chemtrec: 703-527-3887
NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.			
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.			

# DIOXANE

## 1. Product Identification

**Synonyms:** Diethylene dioxide; 1,4-dioxane; dioxyethylene ether; p-dioxane; Diethylene Ether

**CAS No.:** 123-91-1

**Molecular Weight:** 88.12

**Chemical Formula:** C<sub>4</sub>H<sub>8</sub>O<sub>2</sub>

**Product Codes:**

J.T. Baker: 9196, 9228, 9231

Mallinckrodt: 4937

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Dioxane	123-91-1	99 - 100%	Yes

## 3. Hazards Identification

### Emergency Overview

**DANGER! TENDS TO FORM EXPLOSIVE PEROXIDES, ESPECIALLY WHEN ANHYDROUS. FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.**

SAF-T-DATA<sup>(tm)</sup> Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Cancer)

Flammability Rating: 3 - Severe (Flammable)

Reactivity Rating: 2 - Moderate

Contact Rating: 3 - Severe (Life)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

### Potential Health Effects

#### Inhalation:

Highly toxic by inhalation. Easily absorbed through lungs. Symptoms include irritation of the respiratory tract, headache, nausea, vomiting, dizziness, and narcosis. Can cause liver damage and brain and lung edema. Death may occur from kidney failure. Dioxane poisoning has poor warning properties.

#### Ingestion:

Sore throat, abdominal pain. Other symptoms parallel those from inhalation.

#### Skin Contact:

Causes irritation to skin. Symptoms include redness, itching, and pain. May be absorbed through the skin with possible systemic effects.

#### Eye Contact:

Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.

#### Chronic Exposure:

Prolonged exposure may cause central nervous system depression, loss of appetite, nausea, abdominal tenderness, and liver or kidney damage. Prolonged skin contact

may cause dermatitis. Suspected human carcinogen based on animal data. Repeated inhalation exposures to low concentrations have been fatal.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance.

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## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 12C (54F) CC

Autoignition temperature: 180C (356F)

Flammable limits in air % by volume:

lcl: 2.0; ucl: 22.0

Flammable.

**Explosion:**

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Vapors can flow along surfaces to distant ignition source and flash back.

Substance can explode when redistilled. Contact with strong oxidizers may cause fire. Sealed containers may rupture when heated. Sensitive to static discharge.

**Fire Extinguishing Media:**

Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. This highly flammable liquid must be kept from sparks, open flame, hot surfaces, and all sources of heat and ignition.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

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## 7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from direct sunlight and any area where the fire hazard may be acute. Store in tightly closed containers (preferably under nitrogen atmosphere). Outside or detached storage is preferred. Inside storage should be in a standard flammable liquids storage room or cabinet. Separate from oxidizing materials. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment. Protect from freezing. Before using bulk quantities of this material, test for presence of explosive peroxides. Wear special protective equipment (Sec. 8) for maintenance break-in or where exposures may exceed established exposure levels. Wash hands, face, forearms and neck when exiting restricted areas. Shower, dispose of outer clothing, change to clean garments at the end of the day. Avoid cross-contamination of street clothes. Wash hands before eating and do not eat, drink, or smoke in workplace. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):

100 ppm (TWA) skin

-ACGIH Threshold Limit Value (TLV):

20 ppm (TWA) skin, A3 - Animal Carcinogen

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH

document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airtight hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). This substance has questionable warning properties.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Nitrile is recommended as a suitable material for personal protective equipment.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless solution.

**Odor:**

Faint ether-like odor.

**Solubility:**

Soluble

**Specific Gravity:**

1.03 @ 20C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

101C (214F)

**Melting Point:**

11.8C (54F)

**Vapor Density (Air=1):**

3.03

**Vapor Pressure (mm Hg):**

27 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

2.7

## 10. Stability and Reactivity

**Stability:**

Stable in closed containers under nitrogen at room temperature. Anhydrous dioxane slowly reacts with atmospheric oxygen to form explosive peroxides. If these peroxides are concentrated by evaporation or distillation, there exists a serious risk of explosion.

**Hazardous Decomposition Products:**

Reacts with air to form explosive peroxides under certain conditions; exposure to sunlight accelerates this formation. Decomposes to carbon monoxide.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Silver perchlorate, oxidizing agents, sulfur trioxide. Dioxane may react with hydrogen in the presence of Raney nickel above 210C (410F).

**Conditions to Avoid:**

Heat, flame, ignition sources, incompatibles, air, sunlight.

## 11. Toxicological Information

Oral rat LD50:4200 mg/kg; inhalation rat LC50: 46 gm/m<sup>3</sup>/2H; skin rabbit LD50: 7600 mg/kg; investigated as a mutagen, tumorigen, reproductive effector.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Dioxane (123-91-1)	No	Yes	2B

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material is not expected to biodegrade. When released into the soil, this material may leach into groundwater. When released into the soil, this material may evaporate to a moderate extent. When released into water, this material is not expected to biodegrade. When released into water, this material may evaporate to a moderate extent. This material has a log octanol-water partition coefficient of less than 3.0. This material is not expected to significantly bioaccumulate.

When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day.

**Environmental Toxicity:**

This material is not expected to be toxic to aquatic life. The LC50/96-hour values for fish are over 100 mg/l.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

### Domestic (Land, D.O.T.)

-----  
**Proper Shipping Name:** RQ, DIOXANE  
**Hazard Class:** 3  
**UN/NA:** UN1165  
**Packing Group:** II  
**Information reported for product/size:** 473LB

### International (Water, I.M.O.)

-----  
**Proper Shipping Name:** DIOXANE  
**Hazard Class:** 3  
**UN/NA:** UN1165  
**Packing Group:** II  
**Information reported for product/size:** 473LB

## 15. Regulatory Information

```
-----\Chemical Inventory Status - Part 1\-----
Ingredient                TSCA  EC   Japan  Australia
-----
Dioxane (123-91-1)       Yes   Yes   Yes    Yes
```

```
-----\Chemical Inventory Status - Part 2\-----
Ingredient                Korea  DSL   NDSL   Phil.
-----
Dioxane (123-91-1)       Yes   Yes   No     Yes
```

```
-----\Federal, State & International Regulations - Part 1\-----
Ingredient                -SARA 302-  -SARA 313-----
                        RQ   TPQ   List  Chemical Catg.
-----
Dioxane (123-91-1)       No   No    Yes   No
```

```
-----\Federal, State & International Regulations - Part 2\-----
Ingredient                CERCLA  -RCRA-  -TSCA-
                        100    261.33  8(d)
-----
Dioxane (123-91-1)       100    U108    No
```

Chemical Weapons Convention: No    TSCA 12(b): No    CDTA: No  
SARA 311/312: Acute: Yes    Chronic: Yes    Fire: Yes    Pressure: No  
Reactivity: Yes    (Pure / Liquid)

### WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

### Australian Hazchem Code: 2SE

### Poison Schedule: S6

### WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 2 Flammability: 3 Reactivity: 1

### Label Hazard Warning:

DANGER! TENDS TO FORM EXPLOSIVE PEROXIDES, ESPECIALLY WHEN ANHYDROUS. FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.

**Label Precautions:**

Wash thoroughly after handling.  
Do not breathe vapor.  
Keep container tightly closed.  
Use only with adequate ventilation.  
Do not get in eyes, on skin, or on clothing.  
Keep away from heat, sparks and flame.  
Do not evaporate to dryness unless absence of peroxides has been shown.

**Label First Aid:**

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

\*\*\*\*\*  
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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety  
Phone Number: (314) 654-1600 (U.S.A.)



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 124-48-1****Date: 03/09/2001**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: **CHLORODIBROMOMETHANE**SYNONYMS: **Dibromochloromethane**

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	Exposure Limits (PPM)			
				ACGIH TLV	OSHA PEL	MAC	Other STEL
<b>CHLORODIBROMOMETHANE</b>	CIBr <sub>2</sub> CH	124-48-1	99+%	NE	NE	NE	NE

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIANT

## 3. HAZARD IDENTIFICATION

**\*\*\* EMERGENCY OVERVIEW \*\*\***

**Nonflammable liquid and vapor.**  
**Can cause irritation to the upper respiratory tract.**

### POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: **Inhalation , Ingestion**

**ACUTE EFFECTS:** **Skin and eye irritation may occur. If inhaled, may be irritating to mucous membrane and upper respiratory tract. Prolonged exposure can cause nausea, dizziness and headaches. High concentrations may have a narcotic effect.**

CHRONIC EFFECTS: **None**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: **None**OTHER EFFECTS OF OVEREXPOSURE: **None**

CARCINOGENICITY (US ONLY):

NTP - **No**IARC MONOGRAPHS - **No**OSHA REGULATED - **No**

### 4 FIRST AID MEASURES

scotecatalog.com/msds.nsf/.../124-48...

**4. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

**EYE CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes.

**SKIN CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes while removing contaminated clothing.

**INGESTION:** Never give anything by mouth to an unconscious person. Do not induce vomiting because of aspiration hazard.

**IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN**

**NOTE TO PHYSICIAN:** None

**5. FIRE FIGHTING MEASURES**

**FLASH POINT:** Nonflammable

**AUTOIGNITION TEMPERATURE:** N/Ap

**FLAMMABLE LIMITS:** Nonflammable

LOWER:

UPPER:

**EXTINGUISHING MEDIA:** Use what is appropriate for surrounding fire. Use water spray to keep fire exposed cylinders cool.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide, hydrogen chloride, and hydrogen bromide.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Cylinder rupture may occur under fire conditions.

**6. ACCIDENTAL RELEASE MEASURES**

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Remove leaking cylinder to exhaust hood or safe outdoor area. Shut off source if possible and remove source of heat.

**SPECIALIZED EQUIPMENT:** None

**7. HANDLING AND STORAGE**

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas away from heat and source of ignition. Keep valve protection cap on cylinders when not in use.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation.

EYE / FACE PROTECTION: Safety glasses

SKIN PROTECTION: Protective gloves.

RESPIRATORY PROTECTION: In case of leakage, use self-contained breathing apparatus.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Pale yellow heavy liquid.

ODOR: N/Av

PHYSICAL PRESSURE: Liquid

VAPOR PRESSURE: N/Av

VAPOR DENSITY (AIR=1): N/Av

BOILING POINT (C): 120

SOLUBILITY IN WATER: N/Av

SPECIFIC GRAVITY (H<sub>2</sub>O=1): @20 deg. celsius: 2.451

EVAPORATION RATE: N/Av

ODOR THRESHOLD: N/Av

## 10. STABILITY AND REACTIVITY

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas. Storage near a heat source.

MATERIALS TO AVOID: Strong bases, strong oxidizing agents and magnesium.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: Fumes of carbon monoxide, hydrogen chloride gas and hydrogen bromide gas.

### 11. TOXICOLOGICAL INFORMATION

LETHAL CONCENTRATION (LC50): None established

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

### 12. ECOLOGICAL INFORMATION

No adverse ecological effects are expected.

### 13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Return cylinders to supplier with any valve outlet plugs or caps secured and valve protection cap in place. Empty cylinders will contain hazardous residue.

### 14. TRANSPORT INFORMATION

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: This material is not hazardous according to DOT definitions. No DOT label or shipping paper work is required.

HAZARD CLASS: N/Ap

IDENTIFICATION NUMBER: N/Ap

REPORTABLE QUANTITIES: None

LABELING: N/Ap

ADR / RID (EU Only): N/Av

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

### 15. REGULATORY INFORMATION

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: N/Av

NUMBER IN ANNEX 1 OF DIR 67/548: Not listed in annex 1.

EU CLASSIFICATION: N/Av

R: N/Av

S: N/Av

## 16. OTHER INFORMATION

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Av - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.

## MATERIAL SAFETY DATA SHEET

Date Printed: 09/03/2008

Date Updated: 11/10/2005

Version 1.4

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Section 1 - Product and Company Information

---

Product Name                    AROCLOR 1248, 50MG, NEAT  
Product Number                48589  
Brand                            SUPELCO

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
AROCLOR 1248	12672-29-6	No

Synonyms                    Aroclor 1248 \* Chlorodiphenyl (48% Cl)  
RTECS Number:              TQ1358000

---

Section 3 - Hazards Identification

---

## EMERGENCY OVERVIEW

Harmful. Dangerous for the environment.  
Danger of cumulative effects. Irritating to eyes and skin. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
Target organ(s): Liver.

## 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: Water spray. 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

Evacuate area.

#### PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

#### METHODS FOR CLEANING UP

Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

---

### Section 7 - Handling and Storage

---

#### HANDLING

User Exposure: Do not breathe vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

#### STORAGE

Suitable: Keep tightly closed.

---

### Section 8 - Exposure Controls / PPE

---

#### ENGINEERING CONTROLS

Safety shower and eye bath. Mechanical exhaust required.

#### 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



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: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.  
Ingestion: May be harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)

Liver.

SIGNS AND SYMPTOMS OF EXPOSURE

Nausea, dizziness, and headache. Sweating. Symptoms may include, muscle pain and weakness, stiffness in the neck, throat, trunk and limbs, headache, thick feeling in the tongue, constant thirst, difficulty in swallowing and speaking, sweating, and vomiting. Myoglobinuria may also develop. In the most severe cases, respiratory failure, hyperkalemic cardiac arrest, and renal failure may result. \*

TOXICITY DATA

Oral Oral  
Rat Rat  
11000 mg/kg 11000 mg/kg  
LD50 LD50

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.

IARC CARCINOGEN LIST

Rating: Group 2A Group 2A

CHRONIC EXPOSURE - TERATOGEN

Species: Rabbit Rabbit  
Dose: 165 MG/KG 165 MG/KG  
Route of Application: Oral Oral  
Exposure Time: (1-31D PREG) (1-31D PREG)  
Result: Specific Developmental Abnormalities: Immune and reticuloendothelial system. Specific Developmental Abnormalities: Immune and reticuloendothelial system.

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Result: Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Species: Monkey Monkey  
Dose: 32 MG/KG 32 MG/KG  
Route of Application: Oral Oral  
Exposure Time: (1-23W PREG/91D POST) (1-23W PREG/91D POST)  
Result: Effects on Newborn: Behavioral. Effects on Newborn: Behavioral.

Species: Monkey Monkey  
Dose: 55 MG/KG 55 MG/KG

Route of Application: Oral Oral  
Exposure Time: (26W PRE-13W POST) (26W PRE-13W POST)  
Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Physical. Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Physical.

Species: Monkey Monkey  
Dose: 17 MG/KG 17 MG/KG  
Route of Application: Oral Oral  
Exposure Time: (26W PRE) (26W PRE)  
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Monkey Monkey  
Dose: 35 MG/KG 35 MG/KG  
Route of Application: Oral Oral  
Exposure Time: (26W PRE) (26W PRE)  
Result: Effects on Fertility: Abortion. Effects on Fertility: Abortion.

Species: Monkey Monkey  
Dose: 24 MG/KG 24 MG/KG  
Route of Application: Oral Oral  
Exposure Time: (17W PRE) (17W PRE)  
Result: Maternal Effects: Menstrual cycle changes or disorders. Maternal Effects: Menstrual cycle changes or disorders.

Species: Monkey Monkey  
Dose: 83 MG/KG 83 MG/KG  
Route of Application: Oral Oral  
Exposure Time: (58W PRE-13W POST) (58W PRE-13W POST)  
Result: Effects on Newborn: Other postnatal measures or effects. Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Behavioral. Effects on Newborn: Other postnatal measures or effects. Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Behavioral.

---

## Section 12 - Ecological Information

---

No data available.

---

## Section 13 - Disposal Considerations

---

### APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Caution: contains PCB's (polychlorinated biphenyls). For proper disposal information contact the US Environmental Protection Agency. Observe all federal, state, and local environmental regulations.

---

## Section 14 - Transport Information

---

### DOT

Proper Shipping Name: Polychlorinated biphenyls, liquid  
UN#: 2315  
Class: 9  
Packing Group: Packing Group II  
Hazard Label: Class 9  
PIH: Not PIH

IATA

Proper Shipping Name: Polychlorinated biphenyls, liquid  
IATA UN Number: 2315  
Hazard Class: 9  
Packing Group: II

---

Section 15 - Regulatory Information

---

EU DIRECTIVES CLASSIFICATION

Symbol of Danger: N  
Indication of Danger: Dangerous for the environment.  
R: 33-50/53  
Risk Statements: Danger of cumulative effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
S: 35-60-61  
Safety Statements: This material and its container must be disposed of in a safe way. 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: Harmful. Dangerous for the environment.  
Risk Statements: Danger of cumulative effects. Irritating to eyes and skin. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
Safety Statements: 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): Liver.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: No  
NOTES: This product is subject to SARA section 313 reporting requirements.

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: Yes  
NDSL: No

---

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 2008 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

## MATERIAL SAFETY DATA SHEET

Date Printed: 09/03/2008

Date Updated: 10/19/2005

Version 1.3

---

Section 1 - Product and Company Information

---

Product Name                    AROCLOR 1016, 50MG, NEAT  
Product Number                48591  
Brand                            SUPELCO

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
AROCHLOR 1016	12674-11-2	Yes

Synonyms                    Aroclor 1016 \* Chlorodiphenyl (41% Cl)  
 RTECS Number:            TQ1351000

---

Section 3 - Hazards Identification

---

## EMERGENCY OVERVIEW

Dangerous for the environment.  
Danger of cumulative effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
Probable Carcinogen (US). Target organ(s): Nerves. Calif. Prop. 65 carcinogen & developmental hazard.

## HMIS RATING

HEALTH: 1\*  
FLAMMABILITY: 0  
REACTIVITY: 0

## NFPA RATING

HEALTH: 0  
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: Water spray. 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(S) OF PERSONAL PRECAUTION(S)

Exercise appropriate precautions to minimize direct contact with skin or eyes and prevent inhalation of vapors.

#### METHODS FOR CLEANING UP

Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

---

### Section 7 - Handling and Storage

---

#### HANDLING

User Exposure: Avoid inhalation. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

#### STORAGE

Suitable: Keep tightly closed.

---

### Section 8 - Exposure Controls / PPE

---

#### ENGINEERING CONTROLS

Safety shower and eye bath. Mechanical exhaust required.

#### PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Respiratory protection is not required. Where protection is desired, use multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges.

Hand: Protective gloves.

Eye: Chemical safety goggles.

#### GENERAL HYGIENE MEASURES

Wash thoroughly after handling.

---

#### Section 9 - Physical/Chemical Properties

---

Appearance	Physical State: Liquid	
Property	Value	At Temperature or Pressure
Molecular Weight	N/A	
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	N/A	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	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

---

##### STABILITY

Stable: Stable.

Materials to Avoid: Strong oxidizing agents.

##### HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Hydrogen chloride gas.

##### HAZARDOUS POLYMERIZATION

Hazardous Polymerization: May occur

Hazardous Polymerization Reactions: May polymerize on exposure to heat.

---

#### 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: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.  
Ingestion: May be harmful if swallowed.

#### SIGNS AND SYMPTOMS OF EXPOSURE

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

#### TOXICITY DATA

Oral  
Rat  
2300 mg/kg  
LD50

#### 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.

#### CHRONIC EXPOSURE - TERATOGEN

Species: Rat  
Dose: 31500 UG/KG  
Route of Application: Oral  
Exposure Time: (1-21D POST)  
Result: Specific Developmental Abnormalities: Central nervous system.

#### CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat  
Dose: 120 MG/KG  
Route of Application: Oral  
Exposure Time: (8-21D PREG)  
Result: Effects on Newborn: Biochemical and metabolic.

Species: Monkey  
Dose: 18410 UG/KG  
Route of Application: Oral  
Exposure Time: (30W PRE-17W POST)  
Result: Effects on Newborn: Behavioral.

Species: Mammal  
Dose: 750 MG/KG  
Route of Application: Oral  
Exposure Time: (17W PRE-28D POST)  
Result: Effects on Fertility: Other measures of fertility  
Effects on Newborn: Weaning or lactation index (e.g., # alive at weaning per # alive at day 4). Effects on Newborn: Growth statistics (e.g., reduced weight gain).

---

#### Section 12 - Ecological Information

---

No data available.

#### ADDITIONAL RESULTS/DATA FROM RELEVANT SCIENTIFIC EXPERIMENTS

Avoid contamination of the environment

---

#### Section 13 - Disposal Considerations

---

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Caution: contains PCB's (polychlorinated biphenyls). For proper disposal information contact the US Environmental Protection Agency. Observe all federal, state, and local environmental regulations.

---

Section 14 - Transport Information

---

DOT

Proper Shipping Name: Polychlorinated biphenyls, liquid  
UN#: 2315  
Class: 9  
Packing Group: Packing Group II  
Hazard Label: Class 9  
PIH: Not PIH

IATA

Proper Shipping Name: Polychlorinated biphenyls, liquid  
IATA UN Number: 2315  
Hazard Class: 9  
Packing Group: II

---

Section 15 - Regulatory Information

---

EU DIRECTIVES CLASSIFICATION

Symbol of Danger: N  
Indication of Danger: Dangerous for the environment.  
R: 33-50/53  
Risk Statements: Danger of cumulative effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
S: 35-60-61  
Safety Statements: This material and its container must be disposed of in a safe way. 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: Dangerous for the environment.  
Risk Statements: Danger of cumulative effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
Safety Statements: This material and its container must be disposed of in a safe way. 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: Probable Carcinogen (US). Target organ(s): Nerves. Calif. Prop. 65 carcinogen & developmental hazard.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: Yes  
NOTES: This product is subject to SARA section 313 reporting requirements.

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 developmental toxicity.

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: Yes

NDSL: No

---

Section 16 - Other Information

---

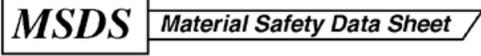
DISCLAIMER

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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 2008 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

MSDS Number: **T0767** \* \* \* \* \* Effective Date: 05/19/08 \* \* \* \* \* Supercedes: 08/16/05

	24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
	National Response in Canada CANUTEC: 613-996-6666
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865	Outside U.S. and Canada Chemtrec: 703-527-3887
	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

# TETRACHLOROETHYLENE

## 1. Product Identification

**Synonyms:** ethylene tetrachloride; tetrachloroethene; perchloroethylene; carbon bichloride; carbon dichloride

**CAS No.:** 127-18-4

**Molecular Weight:** 165.83

**Chemical Formula:** Cl<sub>2</sub>C:CCl<sub>2</sub>

**Product Codes:**

J.T. Baker: 9218, 9360, 9453, 9465, 9469

Mallinckrodt: 1933, 8058

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Tetrachloroethylene	127-18-4	99 - 100%	Yes

## 3. Hazards Identification

### Emergency Overview

**WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Poison)

Flammability Rating: 0 - None

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate (Life)

Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

Storage Color Code: Blue (Health)

### Potential Health Effects

#### Inhalation:

Irritating to the upper respiratory tract. Giddiness, headache, intoxication, nausea and vomiting may follow the inhalation of large amounts while massive amounts can cause breathing arrest, liver and kidney damage, and death. Concentrations of 600 ppm and more can affect the central nervous system after a few minutes.

#### Ingestion:

Not highly toxic by this route because of low water solubility. Used as an oral dosage for hookworm (1 to 4 ml). Causes abdominal pain, nausea, diarrhea, headache, and dizziness.

#### Skin Contact:

Causes irritation to skin. Symptoms include redness, itching, and pain. May be absorbed through the skin with possible systemic effects.

#### Eye Contact:

Causes irritation, redness, and pain.

#### Chronic Exposure:

May cause liver, kidney or central nervous system damage after repeated or prolonged exposures. Suspected cancer risk from animal studies.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance. The use of alcoholic beverages enhances the toxic effects.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Ingestion:**

Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

**Skin Contact:**

Wash skin with soap or mild detergent and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

**Note to Physician:**

Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

---

## 5. Fire Fighting Measures

**Fire:**

Not considered to be a fire hazard but becomes hazardous in a fire situation because of vapor generation and possible degradation to phosgene (highly toxic) and hydrogen chloride (corrosive). Vapors are heavier than air and collect in low-lying areas.

**Explosion:**

Not considered to be an explosion hazard. Containers may explode when involved in a fire.

**Fire Extinguishing Media:**

Use any means suitable for extinguishing surrounding fire. Water spray may be used to keep fire exposed containers cool.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

## 7. Handling and Storage

Store in a cool, dry, ventilated area away from sources of heat or ignition. Isolate from flammable materials. Protect from direct sunlight. Wear special protective equipment (Sec. 8) for maintenance break-in or where exposures may exceed established exposure levels. Wash hands, face, forearms and neck when exiting restricted areas. Shower, dispose of outer clothing, change to clean garments at the end of the day. Avoid cross-contamination of street clothes. Wash hands before eating and do not eat, drink, or smoke in workplace. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):

100 ppm (TWA), 200 ppm (ceiling),

300 ppm/5min/3-hour (max)

-ACGIH Threshold Limit Value (TLV):

25 ppm (TWA), 100 ppm (STEL); listed as A3, animal carcinogen

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Ethereal odor.

**Solubility:**

0.015 g in 100 g of water.

**Specific Gravity:**

1.62 @ 20C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

121C (250F)

**Melting Point:**

-19C (-2F)

**Vapor Density (Air=1):**

5.7

**Vapor Pressure (mm Hg):**

18 @ 25C (77F)

**Evaporation Rate (BuAc=1):**

0.33 (trichloroethylene = 1)

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage. Slowly decomposed by light. Deteriorates rapidly in warm, moist climates.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition. Hydrogen chloride gas and phosgene gas may be formed upon heating. Decomposes with moisture to yield trichloroacetic acid and hydrochloric acid.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Strong acids, strong oxidizers, strong alkalis, especially NaOH, KOH; finely divided metals, especially zinc, barium, lithium. Slowly corrodes aluminum, iron and zinc.

**Conditions to Avoid:**

Moisture, light, heat and incompatibles.

## 11. Toxicological Information

Oral rat LD50: 2629 mg/kg; inhalation rat LC50: 4100 ppm/6H; investigated as a tumorigen, mutagen, reproductive effector.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Tetrachloroethylene (127-18-4)	No	Yes	2A

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material is expected to quickly evaporate. When released into the soil, this material may leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released to water, this material is expected to quickly evaporate. When released into water, this material is not expected to biodegrade. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals.

**Environmental Toxicity:**

The LC50/96-hour values for fish are between 1 and 10 mg/l. The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be toxic to aquatic life.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal

disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

### Domestic (Land, D.O.T.)

-----  
**Proper Shipping Name:** TETRACHLOROETHYLENE  
**Hazard Class:** 6.1  
**UN/NA:** UN1897  
**Packing Group:** III  
**Information reported for product/size:** 4L

### International (Water, I.M.O.)

-----  
**Proper Shipping Name:** TETRACHLOROETHYLENE  
**Hazard Class:** 6.1  
**UN/NA:** UN1897  
**Packing Group:** III  
**Information reported for product/size:** 4L

### International (Air, I.C.A.O.)

-----  
**Proper Shipping Name:** TETRACHLOROETHYLENE  
**Hazard Class:** 6.1  
**UN/NA:** UN1897  
**Packing Group:** III  
**Information reported for product/size:** 4L

## 15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----  

Ingredient	TSCA	EC	Japan	Australia
Tetrachloroethylene (127-18-4)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----  

Ingredient	Korea	--Canada--		
		DSL	NDSL	Phil.
Tetrachloroethylene (127-18-4)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----  

Ingredient	-SARA 302-		-SARA 313-	
	RQ	TPQ	List	Chemical Catg.
Tetrachloroethylene (127-18-4)	No	No	Yes	No

-----\Federal, State & International Regulations - Part 2\-----  

Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8(d)
Tetrachloroethylene (127-18-4)	100	U210	No

Chemical Weapons Convention: No    TSCA 12(b): No    CDTA: No  
SARA 311/312: Acute: Yes    Chronic: Yes    Fire: No    Pressure: No  
Reactivity: No    (Pure / Liquid)

### WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

**Australian Hazchem Code:** 2[Z]

**Poison Schedule:** None allocated.

### WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 2 Flammability: 0 Reactivity: 0

### Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

### Label Precautions:

Do not get in eyes, on skin, or on clothing.  
Do not breathe vapor or mist.  
Keep container closed.  
Use only with adequate ventilation.  
Wash thoroughly after handling.

**Label First Aid:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

\*\*\*\*\*

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**This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product.**

**Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose.**

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**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)



From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

24 Hour Emergency Telephone: 908-859-2151  
CHEMTREC: 1-800-424-9300  
National Response in Canada  
CANUTEC: 613-996-6666  
Outside U.S. And Canada  
Chemtree: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

## DIMETHYL PHTHALATE

### 1. Product Identification

**Synonyms:** 1,2-Benzenedicarboxylic acid, dimethyl ester; D.M.P.; Phthalic acid, dimethyl ester; Methyl phthalate

**CAS No.:** 131-11-3

**Molecular Weight:** 194.19

**Chemical Formula:** C<sub>6</sub>H<sub>4</sub>(CH<sub>3</sub>OOC)<sub>2</sub>

**Product Codes:** K075

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Dimethyl Phthalate	131-11-3	90 - 100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**WARNING! HARMFUL IF SWALLOWED OR INHALED. VAPOR OR MIST IS IRRITATING TO THE EYES AND UPPER RESPIRATORY TRACT. MAY CAUSE IRRITATION TO SKIN.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)

Flammability Rating: 1 - Slight

Reactivity Rating: 0 - None

Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

Storage Color Code: Green (General Storage)

#### Potential Health Effects

Due to low water solubility and relatively high lipid solubility, DMP is able to accumulate in body tissues. As a result, chronic exposure tends to be more important than acute exposure.

#### Inhalation:

Toxic. Inhalation of vapors irritates the respiratory tract. Symptoms may include coughing, shortness of breath and chest pain. At room temperature the substance has such a low vapor pressure that inhalation of the vapor is unlikely.

#### Ingestion:

Swallowing can cause burning sensation of lips, tongue, mouth; vomiting and diarrhea may occur. Central nervous system effects, including coma, are possible.

#### Skin Contact:

May cause irritation with redness and pain.

#### Eye Contact:

Causes irritation, redness, and pain.

#### Chronic Exposure:

May accumulate in body tissues. May affect central nervous system.

#### Aggravation of Pre-existing Conditions:

No information found.

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention if irritation develops.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 146C (295F) CC

Autoignition temperature: 490C (914F)

Flammable limits in air % by volume:

lel: 0.9

Slight fire hazard when exposed to heat or flame.

**Explosion:**

Above the flash point, explosive vapor-air mixtures may be formed.

**Fire Extinguishing Media:**

Water spray, dry chemical, alcohol foam, or carbon dioxide. Water spray may be used to keep fire exposed containers cool. Water or foam may cause frothing.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

## 6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

## 7. Handling and Storage

Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL): 5 mg/m<sup>3</sup> (TWA)

-ACGIH Threshold Limit Value (TLV): 5 mg/m<sup>3</sup> (TWA)

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded, a half-face respirator with an organic vapor cartridge and particulate filter (NIOSH type P95 or R95 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an organic vapor cartridge and particulate filter (NIOSH P100 or R100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. Please note that N series filters are not recommended for this material. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. This compound possibly exists in both particulate and vapor phase. A gas/vapor cartridge should be used in addition to the particulate filter (NIOSH type P95 or better filter). If the vapor concentration alone exceeds the exposure limits, use a supplied air respirator, because warning properties are unknown for these compounds. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134).

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

## 9. Physical and Chemical Properties

**Appearance:**

Clear oily liquid.

**Odor:**

Slight aromatic odor.

**Solubility:**

0.4% in water @ 32C (90F)

**Specific Gravity:**

1.19 @ 20C/20C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

282C (540F)

**Melting Point:**

5.5C (43F)

**Vapor Density (Air=1):**

6.69

**Vapor Pressure (mm Hg):**

1 @ 100.3C (212F)

**Evaporation Rate (BuAc=1):**

ca. 0

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Strong acids or bases, nitrates, and strong oxidizing agents.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

Oral rat LD50: 6800 mg/Kg; skin rabbit LD50: > 20 mL/kg. Investigated as a mutagen, reproductive effector.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Dimethyl Phthalate (131-11-3)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material may biodegrade to a moderate extent. When released into the soil, this material may leach into groundwater. When released into water, this material may biodegrade to a moderate extent. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals.

**Environmental Toxicity:**

This material is expected to be slightly toxic to aquatic life.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

Not regulated.

## 15. Regulatory Information

```

-----\Chemical Inventory Status - Part 1\-----
Ingredient          TSCA  EC   Japan  Australia
-----
Dimethyl Phthalate (131-11-3)  Yes  Yes  Yes    Yes

```

```

-----\Chemical Inventory Status - Part 2\-----
Ingredient          Korea  DSL   NDSL  Phil.
-----
Dimethyl Phthalate (131-11-3)  Yes   Yes   No    Yes

```

```

-----\Federal, State & International Regulations - Part 1\-----
Ingredient          -SARA 302-  -SARA 313-
RQ   TPQ   List  Chemical Catg.
-----
Dimethyl Phthalate (131-11-3)  No    No    Yes   No

```

```

-----\Federal, State & International Regulations - Part 2\-----
Ingredient          CERCLA  -RCRA-  -TSCA-
                5000    261.33  8(d)
-----
Dimethyl Phthalate (131-11-3)  5000    U102    No

```

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes  
 SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No  
 Reactivity: No (Pure / Liquid)

**Australian Hazchem Code:** None allocated.

**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 2 Flammability: 1 Reactivity: 0

**Label Hazard Warning:**

WARNING! HARMFUL IF SWALLOWED OR INHALED. VAPOR OR MIST IS IRRITATING TO THE EYES AND UPPER RESPIRATORY TRACT. MAY CAUSE IRRITATION TO SKIN.

**Label Precautions:**

Avoid breathing vapor or mist.  
 Avoid contact with eyes, skin and clothing.  
 Keep container closed.  
 Use only with adequate ventilation.  
 Wash thoroughly after handling.

**Label First Aid:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. In case of contact, immediately flush skin with plenty of water for at least 15 minutes. In all cases, get medical attention.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

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 \*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

# Material Safety Data Sheet

## Dibenzofuran

ACC# 95339

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Dibenzofuran**Catalog Numbers:** AC159300000, AC159300050, AC159300250, AC159300500, AC159301000, AC159302500 AC159302500, AC217030000, AC217030050, AC217030500**Synonyms:** Diphenylene oxide; 2,2'-Biphenylene oxide; Dibenzo(b,d)furan; a polynuclear aromatic compound; oxygen heterocyclic PAH.**Company Identification:**Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
132-64-9	Dibenzofuran	> 98	205-071-3

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: white to pale yellow crystalline powder.

**Warning!** Causes eye irritation. May cause skin and respiratory tract irritation. The toxicological properties of this material have not been fully investigated.**Target Organs:** Eyes.**Potential Health Effects****Eye:** Causes eye irritation.**Skin:** May cause skin irritation.**Ingestion:** May cause gastrointestinal irritation with nausea, vomiting and diarrhea. The toxicological properties of this substance have not been fully investigated.**Inhalation:** May cause respiratory tract irritation.**Chronic:** Some polycyclic aromatic hydrocarbons are suspect carcinogens, as well as air and water contaminants.

### Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.**Skin:** Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing

and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.

**Ingestion:** Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water. Wash mouth out with water.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.

**Extinguishing Media:** Use water spray, dry chemical, carbon dioxide, or chemical foam.

**Flash Point:** 130 deg C ( 266.00 deg F)

**Autoignition Temperature:** Not applicable.

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 2; Flammability: 1; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation. Do not let this chemical enter the environment.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid breathing dust.

**Storage:** Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Local exhaust may be necessary to control concentrations to acceptable levels.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Dibenzofuran	none listed	none listed	none listed

**OSHA Vacated PELs:** Dibenzofuran: No OSHA Vacated PELs are listed for this chemical.

### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear a chemical apron.

**Respirators:** A NIOSH/MSHA approved air purifying dust or mist respirator or European Standard EN 149.

## Section 9 - Physical and Chemical Properties

**Physical State:** Crystalline powder

**Appearance:** white to pale yellow

**Odor:** Not available.

**pH:** Not available.

**Vapor Pressure:** 0.0175 mm Hg @ 25 deg C

**Vapor Density:** 5.8 (air=1)

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 285 deg C @ 760 mm Hg

**Freezing/Melting Point:** 81 - 85 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:** Not available.

**Molecular Formula:** C<sub>12</sub>H<sub>8</sub>O

**Molecular Weight:** 168.19

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable at room temperature in closed containers under normal storage and handling conditions.

**Conditions to Avoid:** Dust generation, excess heat.

**Incompatibilities with Other Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Carbon monoxide, carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 132-64-9: HP4430000

**LD50/LC50:**

Not available.

**Carcinogenicity:**

CAS# 132-64-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** Mortality studies have demonstrated that exposure to coke oven emissions, which contain a variety of PAHs (Polycyclic aromatic hydrocarbons), caused increased incidences of lung and genitourinary cancer mortality in coke oven workers.

**Teratogenicity:** No information found

**Reproductive Effects:** No information found

**Mutagenicity:** See actual entry in RTECS for complete information.

**Neurotoxicity:** No information found

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. Fish toxicity : time to produce sickness at 5 ppm : brown trout 4 hr.; bluegill sunfish 6 hr; goldfish 6 hr. All species died within 8 hr. Time to produce sickness at 1 ppm : brown trout 22 hr. Water characteristics for tests were pH7, dissolved oxygen conc. 7.5 ppm, total hardness 300ppm (soap method), methyl orange alkalinity 310ppm, free carbon dioxide 5 ppm, temperature 35°C (USEPA August 1987. Part I : The toxicity of 3400 chemicals to fish EPA 560/6-87-002)

**Environmental:** Considered to be persistent, bioaccumulative, and toxic. Even when released in very small amounts, can accumulate and cause environmental problems.

**Physical:** No information available.

**Other:** Dibenzofuran has been listed as a pollutant of concern to EPA's Great Waters Program due to its persistence in the environment, potential to bioaccumulate, and toxicity to humans and the environment. It is a Persistent Organic Pollutant (POPs).

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S.	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SO
<b>Hazard Class:</b>	9	9
<b>UN Number:</b>	UN3077	UN3077
<b>Packing Group:</b>	III	III

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 132-64-9 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

CAS# 132-64-9: 100 lb final RQ; 45.4 kg final RQ

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**Section 313**

This material contains Dibenzofuran (CAS# 132-64-9, > 98%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

**Clean Air Act:**

CAS# 132-64-9 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 132-64-9 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

N

**Risk Phrases:**

R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Safety Phrases:**

S 24/25 Avoid contact with skin and eyes.

S 29 Do not empty into drains.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 132-64-9: No information available.

**Canada - DSL/NDSL**

CAS# 132-64-9 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

Section 16 - Additional Information
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**MSDS Creation Date:** 9/02/1997

**Revision #5 Date: 11/20/2008**

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

# Material Safety Data Sheet

## sec-Butylbenzene, 99+ %

ACC# 73785

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** sec-Butylbenzene, 99+%**Catalog Numbers:** AC107860050, AC107860500, AC107861000, AC107862500, AC107865000**Synonyms:** 2-Phenylbutane; Benzene, (1-methylpropyl)-; (1-Methylpropyl)benzene; Benzene, sec-butyl-**Company Identification:**

Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410

**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
135-98-8	sec-Butylbenzene	99+	205-227-0

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear colorless liquid. Flash Point: 45 deg C.

**Warning! Flammable liquid and vapor.** Causes eye, skin, and respiratory tract irritation. May cause central nervous system depression.**Target Organs:** Central nervous system.**Potential Health Effects****Eye:** Causes eye irritation.**Skin:** Causes skin irritation.**Ingestion:** May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Ingestion of large amounts may cause CNS depression.**Inhalation:** Causes respiratory tract irritation.**Chronic:** Prolonged or repeated skin contact may cause dermatitis.

### Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.**Skin:** Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.**Ingestion:** Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water.

Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Will burn if involved in a fire. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. Flammable liquid and vapor.

**Extinguishing Media:** For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. Use agent most appropriate to extinguish fire. Do NOT use straight streams of water.

**Flash Point:** 45 deg C ( 113.00 deg F)

**Autoignition Temperature:** 415 deg C ( 779.00 deg F)

**Explosion Limits, Lower:**0.80 vol %

**Upper:** 6.90 vol %

**NFPA Rating:** (estimated) Health: 2; Flammability: 2; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local explosion-proof ventilation to keep

airborne levels to acceptable levels.

#### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
sec-Butylbenzene	none listed	none listed	none listed

**OSHA Vacated PELs:** sec-Butylbenzene: No OSHA Vacated PELs are listed for this chemical.

#### Personal Protective Equipment

**Eyes:** Wear chemical splash goggles.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear colorless

**Odor:** None reported.

**pH:** Not available.

**Vapor Pressure:** 4 mm Hg @ 37.7 deg C

**Vapor Density:** 4.62

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 173 - 174 deg C @ 760 mm Hg

**Freezing/Melting Point:** -75 deg C

**Decomposition Temperature:** Not available.

**Solubility:** 0.015 g/L water

**Specific Gravity/Density:** 0.8630 g/cm<sup>3</sup>

**Molecular Formula:** C<sub>10</sub>H<sub>14</sub>

**Molecular Weight:** 134.22

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Ignition sources, excess heat.

**Incompatibilities with Other Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 135-98-8: CY9100000

**LD50/LC50:**

CAS# 135-98-8:

Draize test, rabbit, eye: 500 mg/24H Mild;

Draize test, rabbit, skin: 100 mg/24H Moderate;

Oral, mouse: LD50 = 8700 mg/kg;

Oral, rat: LD50 = 2240 uL/kg;

Oral, rat: LD50 = 6300 mg/kg;

Skin, rabbit: LD50 = >16 mL/kg;

**Carcinogenicity:**

CAS# 135-98-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.

**Teratogenicity:** No information available.

**Reproductive Effects:** No information available.

**Mutagenicity:** No information available.

**Neurotoxicity:** No information available.

**Other Studies:**

## Section 12 - Ecological Information

No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3.

Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	BUTYL BENZENES	BUTYLBENZENES
<b>Hazard Class:</b>	3	3
<b>UN Number:</b>	UN2709	UN2709
<b>Packing Group:</b>	III	III

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 135-98-8 is listed on the TSCA inventory.

#### Health & Safety Reporting List

CAS# 135-98-8: Effective 6/1/87, Sunset 12/19/95

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

None of the chemicals in this material have an RQ.

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**Section 313** No chemicals are reportable under Section 313.

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 135-98-8 can be found on the following state right to know lists: Pennsylvania, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XI

**Risk Phrases:**

R 10 Flammable.

R 36/37/38 Irritating to eyes, respiratory system and skin.

**Safety Phrases:**

S 16 Keep away from sources of ignition - No smoking.

S 33 Take precautionary measures against static discharges.

S 9 Keep container in a well-ventilated place.

**WGK (Water Danger/Protection)**

CAS# 135-98-8: 1

**Canada - DSL/NDSL**

CAS# 135-98-8 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B3, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 9/02/1997

**Revision #7 Date:** 2/15/2006

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<b>MSDS</b>	<b>Material Safety Data Sheet</b>		24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
	From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		National Response in Canada CANUTEC: 613-996-6666
Outside U.S. and Canada Chemtrec: 703-527-3887			NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.			

## ETHYL ACETATE

### 1. Product Identification

**Synonyms:** Acetic acid ethyl ester; Acetic ether; Acetoxyethane; Ethyl Acetic Ester; Ethyl ethanoate

**CAS No.:** 141-78-6

**Molecular Weight:** 88

**Chemical Formula:** CH<sub>3</sub>COOC<sub>2</sub>H<sub>5</sub>

**Product Codes:**

J.T. Baker: 5541, 9260, 9278, 9279, 9280, 9282, 9284, 9828

Mallinckrodt: 3427, 3432, 3442, 4988, 4992, 4996, H078, V553

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Ethyl Acetate	141-78-6	99 - 100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**WARNING! FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED OR INHALED. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)

Flammability Rating: 3 - Severe (Flammable)

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

#### Potential Health Effects

##### Inhalation:

Inhalation can cause severe irritation of mucous membranes and upper respiratory tract. Symptoms may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting. High concentrations may cause lung damage. An irritant to the nose, throat, and upper respiratory tract. Exposure to high concentrations have a narcotic effect and may cause liver and kidney damage.

##### Ingestion:

Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea.

##### Skin Contact:

Causes irritation to skin. Symptoms include redness, itching, and pain. Repeated or prolonged contact with the skin has a defatting effect and may cause dryness, cracking, and possibly dermatitis.

##### Eye Contact:

Causes irritation, redness, and pain.

##### Chronic Exposure:

Chronic overexposure may cause anemia with leukocytosis (transient increase in the white blood cell count) and damage to the liver and kidneys.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance.

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## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:**

Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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## 5. Fire Fighting Measures

**Fire:**

Flash point: -4C (25F) CC

Autoignition temperature: 426C (799F)

Flammable limits in air % by volume:

lel: 2.0; uel: 11.5

Flammable Liquid and Vapor! Contact with strong oxidizers may cause fire.

**Explosion:**

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Vapors can flow along surfaces to distant ignition source and flash back. Sealed containers may rupture when heated. Sensitive to static discharge.

**Fire Extinguishing Media:**

Water spray, dry chemical, alcohol foam, or carbon dioxide. Water may be ineffective. Water spray may be used to keep fire exposed containers cool.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures. Vapors can flow along surfaces to distant ignition source and flash back.

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## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802. If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

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## 7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

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## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL): 400 ppm (TWA)

-ACGIH Threshold Limit Value (TLV): 400 ppm (TWA), A4 - Not classifiable as a human carcinogen.

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece respirator with organic vapor cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in

oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Clear liquid.

**Odor:**

Fruity odor.

**Solubility:**

1 ml/10ml water @ 25C

**Specific Gravity:**

0.902 @ 20C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

77C (171F)

**Melting Point:**

-83C (-117F)

**Vapor Density (Air=1):**

3.0

**Vapor Pressure (mm Hg):**

76 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

6

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage. Heat will contribute to instability. Slowly decomposed by moisture.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Avoid heat, flame and other sources of ignition. Contact with nitrates, strong oxidizers, strong alkalis, or strong acids may cause fire and explosions. Will attack some forms of plastic, rubber, and coatings.

**Conditions to Avoid:**

No information found.

## 11. Toxicological Information

Inhalation rat LC50: 200 gm/m<sup>3</sup>; oral rat LD50: 5620 mg/kg; Skin rabbit LD50: > 20 ml/kg. Investigated as a mutagen.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Ethyl Acetate (141-78-6)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material may leach into groundwater. When released into the soil, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released to water, this material is expected to quickly evaporate. When released into the water, this material is expected to have a half-life of less than 1 day. This material has a log octanol-water partition coefficient of less than 3.0. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material may be moderately degraded by photolysis. When released into the air, this material is expected to have a half-life between 1 and 10 days.

**Environmental Toxicity:**

For Ethyl Acetate:

96 Hr LC50 *Pimephales promelas*: 230 mg/L [flow-through]; 96 Hr LC50 *Oncorhynchus mykiss*: 484 mg/L [flow-through];

48 Hr EC50 *Daphnia magna* (water flea): 717 mg/L;

48 Hr EC50 *Scenedesmus subspicatus* (algae): 3300 mg/L;

## Ethyl Acetate Microtox Data:

5 min EC50 Photobacterium phosphoreum: 1180 mg/L;  
 15 min EC50 Photobacterium phosphoreum: 5870 mg/L;  
 2 Hr EC50 Pseudomonas fluorescens: 7400 mg/L;  
 15 min EC50 Pseudomonas fluorescens: 1500 mg/L

### 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

### 14. Transport Information

#### Domestic (Land, D.O.T.)

-----  
**Proper Shipping Name:** ETHYL ACETATE  
**Hazard Class:** 3  
**UN/NA:** UN1173  
**Packing Group:** II  
**Information reported for product/size:** 400LB

#### International (Water, I.M.O.)

-----  
**Proper Shipping Name:** ETHYL ACETATE  
**Hazard Class:** 3  
**UN/NA:** UN1173  
**Packing Group:** II  
**Information reported for product/size:** 400LB

### 15. Regulatory Information

```
-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  EC   Japan  Australia
-----
Ethyl Acetate (141-78-6)                       Yes  Yes   Yes    Yes
```

```
-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     Korea  DSL   NDSL   Phil.
-----
Ethyl Acetate (141-78-6)                       Yes   Yes   No     Yes
```

```
-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-
RQ  TPQ  List  Chemical Catg.
-----
Ethyl Acetate (141-78-6)                       No   No   No     No
```

```
-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     CERCLA      -RCRA-      -TSCA-
                                     5000        261.33      8(d)
-----
Ethyl Acetate (141-78-6)                       5000        U112        No
```

Chemical Weapons Convention: No    TSCA 12(b): No    CDTA: No  
 SARA 311/312: Acute: Yes    Chronic: Yes    Fire: Yes    Pressure: No  
 Reactivity: No    (Pure / Liquid)

**Australian Hazchem Code:** 3[Y]E

**Poison Schedule:** None allocated.

#### WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

### 16. Other Information

**NFPA Ratings:** Health: 1 Flammability: 3 Reactivity: 0

**Label Hazard Warning:**

WARNING! FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED OR INHALED. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

**Label Precautions:**

- Keep away from heat, sparks and flame.
- Avoid breathing vapor.
- Keep container closed.
- Use only with adequate ventilation.
- Avoid contact with eyes, skin and clothing.
- Wash thoroughly after handling.

**Label First Aid:**

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, give large amounts of water to drink. Never give anything by mouth to an unconscious person. In all cases, get medical attention.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

MSDS Section(s) changed since last revision of document include: 15.

**Disclaimer:**

\*\*\*\*\*

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

## Composition/Information on Ingredient

**Cas:**

142-28-9

**Code:**

M

**RTECS:**

TX9660000

**Code:**

M

**Name:**

1,3-DICHLOROPROPANE

**Other REC Limits:**

N/K

**OSHA PEL:**

N/K

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

N/K

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

WEAR APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT.

**Ventilation:**

CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD.

**Protective Gloves:**

N/K

**Eye Protection:**

EYE SHIELDS

**Other Protective Equipment:**

Equipment N/K

**Work Hygienic Practices:**

N/K

**Supplemental Safety and Health:**

N/K

## Health Hazards Data

**LD50LC50Mixture:**

ORAL LD50 (RAT/MOUSE): 3000 MG/KG

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

INHALATION: HARMFUL/FATAL, MUCOUS MEMBRANE IRRITATION. EYES: IRRITATION, DAMAGE. SKIN: HARMFUL IF ABSORBED, IRRITATION, ALLERGIC REACTION. INGESTION: HARMFUL/FATAL. EXPOSURE CAN CAUSE LIVER & KIDNEY DAMAGE, NERVOUS SYSTEM INJURY.

**Explanation Of Carcinogenicity:**

NONE

**Signs And Symptoms Of Overexposure:**

IRRITATION, NAUSEA, HEADACHE, DIZZINESS.

**Medical Conditions Aggravated By Exposure:**

N/K

**First Aid:**

EYES: FLUSH CONTINUOUSLY W/WATER FOR 15-20 MINS. SKIN: FLUSH W/WATER FOR 15-20 MINS. IF NOT BURNED, WASH W/SOAP &

WATER. INHALATION: REMOVE TO FRESH AIR. GIVE CPR/OXYGEN IF NEEDED. OBTAIN MEDICAL ATTENTION IN ALL CASES.

**Spill Release Procedures:**

EVACUATE AREA. WEAR APPROPRIATE OSHA REGULATED EQUIPMENT. VENTILATE AREA. ABSORB ON VERMICULITE/SIMILAR MATERIAL.

SWEEP UP & PLACE IN APPROPRIATE CONTAINER/HOLD FOR DISPOSAL. WASH CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER IAW/FEDERAL, STATE & LOCAL REGULATIONS.

**Handling And Storage Precautions:**

STORE IN A COOL DRY PLACE ONLY W/COMPATIBLE CHEMICALS. KEEP TIGHTLY CLOSED. FOR LABORATORY USE ONLY.

**Other Precautions:**

AVOID CONTACT W/SKIN, EYES & CLOTHING. DON'T BREATHE VAPORS. CONTACT LENSES SHOULDNT BE WORN IN THE LABORATORY. ALL

CHEMICALS SHOULD BE CONSIDERED HAZARDOUS. AVOID DIRECT PHYSICAL CONTACT. 2

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P

**Flash Point:**

**Flash Point Text:**

89.6F

**Autoignition Temp:**

**Autoignition Temp Text:**

N/A

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

CO2, DRY CHEMICAL POWDER/SPRAY.

**Fire Fighting Procedures:**

N/K

**Unusual Fire/Explosion Hazard:**

FLAMMABLE CHEMICAL.

## Physical/Chemical Properties

**HCC:**

**NRC/State LIC No:**

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

251.6F 3

**Melt/Freeze Pt:**

**M.P/F.P Text:**

-146.2F

**Decomp Temp:****Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

N/K

**Volatile Org Content %:****Spec Gravity:**

N/K

**VOC Pounds/Gallon:**

PH: N/K

**VOC Grams/Liter:****Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

INSOLUBLE

**Appearance and Odor:**

COLORLESS LIQUID W/ETHER LIKE ODOR.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/K

**Materials To Avoid:**

STRONG OXIDIZING AGENTS/BASES/ACIDS, MAGNESIUM, ALUMINUM.

**Hazardous Decomposition Products:**

TOXIC FUMES. DECOMPOSITION PRODUCTS ARE CORROSIVE.

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

Sara Title III Information: N/P

Federal Regulatory Information: N/P

State Regulatory Information: N/P

## Other Information

Other Information:N/P

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**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. Lookchem 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.

<b>MSDS</b>	<b>Material Safety Data Sheet</b>		
	<p>From: <b>Mallinckrodt Baker, Inc.</b> 222 Red School Lane Phillipsburg, NJ 08865</p> <p><b>M</b> Mallinckrodt CHEMICALS</p> <p><b>J.T.Baker</b></p>		
<p>24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300</p>		<p>National Response in Canada CANUTEC: 613-996-6666</p>	
<p>Outside U.S. and Canada Chemtrec: 703-527-3887</p>		<p>NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.</p>	
<p>All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.</p>			

# HEPTANE

## 1. Product Identification

**Synonyms:** n-Heptane; normal heptane; dipropyl methane; heptyl hydride

**CAS No.:** 142-82-5

**Molecular Weight:** 100.20

**Chemical Formula:** CH<sub>3</sub>(CH<sub>2</sub>)<sub>5</sub>CH<sub>3</sub>

**Product Codes:**

J.T. Baker: 9177, 9198, 9338, 9365, M953, M955, M956, V652

Mallinckrodt: 3162, 4830, 5139, 5164, 5166, 5177, V554, V678

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Heptane	142-82-5	90 - 100%	Yes

## 3. Hazards Identification

### Emergency Overview

**DANGER! FLAMMABLE LIQUID AND VAPOR. HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate

Flammability Rating: 3 - Severe (Flammable)

Reactivity Rating: 0 - None

Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

### Potential Health Effects

#### Inhalation:

Inhalation of vapors irritates the respiratory tract. May produce light headedness, dizziness, muscle incoordination, loss of appetite and nausea. Higher concentrations can produce central nervous system depression, narcosis, and unconsciousness.

#### Ingestion:

May produce abdominal pain, nausea. Aspiration into lungs can produce severe lung damage and is a medical emergency. Other symptoms expected to parallel inhalation.

#### Skin Contact:

May cause mild irritation, redness, pain.

#### Eye Contact:

Vapors may irritate the eyes. Splashes may produce redness, pain.

#### Chronic Exposure:

Repeated or prolonged skin contact may defat the skin and produce irritation and dermatitis.

#### Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or impaired pulmonary function may be more susceptible to the effects of this substance.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:**

Aspiration hazard. Do NOT induce vomiting. Give large amounts of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

**Skin Contact:**

Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention if irritation develops.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: -4C (25F) CC

Autoignition temperature: 204C (399F)

Flammable limits in air % by volume:

lcl: 1.05; ucl: 6.7

Flammable Liquid and Vapor!

**Explosion:**

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Vapors can flow along surfaces to distant ignition source and flash back.

Sensitive to static discharge.

**Fire Extinguishing Media:**

Dry chemical, foam or carbon dioxide. Water may be ineffective. Water spray may be used to keep fire exposed containers cool.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

---

## 7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

N-Heptane:

- OSHA Permissible Exposure Limit (PEL) -

500 ppm (TWA)

- ACGIH Threshold Limit Value (TLV) -

400 ppm (TWA), 500 ppm (STEL)

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For

emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Mild, gasoline-like.

**Solubility:**

Insoluble in water.

**Specific Gravity:**

0.684 @ 20C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

98C (208F)

**Melting Point:**

- 91C (-132F)

**Vapor Density (Air=1):**

3.5

**Vapor Pressure (mm Hg):**

40 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

No information found.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage. Heat will contribute to instability.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Strong oxidizers.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

For n-Heptane: Inhalation rat LC50: 103 gm/m<sup>3</sup>/4H

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Heptane (142-82-5)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

For n-Heptane: When released into the soil, this material may biodegrade to a moderate extent. When released into the soil, this material is not expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released into water, this material may biodegrade to a moderate extent. When released to water, this material is expected to quickly evaporate. This material has an estimated bioconcentration factor (BCF) of greater than 100. This material has a log octanol-water partition coefficient of greater than 3.0. This material may bioaccumulate to some extent. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.

**Environmental Toxicity:**

No information found.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

### Domestic (Land, D.O.T.)

-----  
**Proper Shipping Name:** HEPTANES  
**Hazard Class:** 3  
**UN/NA:** UN1206  
**Packing Group:** II  
**Information reported for product/size:** 215L

### International (Water, I.M.O.)

-----  
**Proper Shipping Name:** HEPTANES  
**Hazard Class:** 3  
**UN/NA:** UN1206  
**Packing Group:** II  
**Information reported for product/size:** 215L

## 15. Regulatory Information

```
-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  EC   Japan  Australia
-----
Heptane (142-82-5)                            Yes  Yes  Yes    Yes
```

```
-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     Korea  DSL   NDSL  Phil.
-----
Heptane (142-82-5)                            Yes   Yes   No    Yes
```

```
-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-
RQ   TPQ   List  Chemical Catg.
-----
Heptane (142-82-5)                            No    No    No    No
```

```
-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     CERCLA  -RCRA-  -TSCA-
                                     261.33  8(d)
-----
Heptane (142-82-5)                            No      No      Yes
```

Chemical Weapons Convention: No    TSCA 12(b): Yes    CDTA: No  
 SARA 311/312: Acute: Yes    Chronic: No    Fire: Yes    Pressure: No  
 Reactivity: No    (Pure / Liquid)

**Australian Hazchem Code:** 3[Y]E

**Poison Schedule:** None allocated.

### WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 1 Flammability: 3 Reactivity: 0

### Label Hazard Warning:

DANGER! FLAMMABLE LIQUID AND VAPOR. HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.

### Label Precautions:

Keep away from heat, sparks and flame.  
 Keep container closed.  
 Avoid breathing vapor or mist.  
 Use only with adequate ventilation.  
 Avoid contact with eyes, skin and clothing.  
 Wash thoroughly after handling.

### Label First Aid:

Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. In all cases call a physician.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

\*\*\*\*\*

**Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose.**

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 156-59-2****Date: 03/09/2001**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: 1,2-DICHLOROETHYLENE (CIS)      SYNONYMS: cis-Dichloroethylene

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	Exposure Limits (PPM)			
				ACGIH TLV	OSHA PEL	MAC	Other STEL
1,2-DICHLOROETHYLENE (CIS)	C2H2CL2	156-59-2	99+%	200	NE	NE	NE

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIANT

## 3. HAZARD IDENTIFICATION

\* \* \* EMERGENCY OVERVIEW \* \* \*

Flammable liquid and vapor.

Can form explosive mixtures with air.

Can cause irritation to eyes, skin and respiratory tract.

## POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation , Ingestion

ACUTE EFFECTS: Vapor or mist is irritating to the eyes, skin, mucous membrane, and upper respiratory tract. Skin and eye irritation may occur. High concentrations may have a narcotic effect.

CHRONIC EFFECTS: Kidney and liver damage.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None known

OTHER EFFECTS OF OVEREXPOSURE: None

CARCINOGENICITY (US ONLY):

NTP - No

IARC MONOGRAPHS - No

OSHA REGULATED - No

## 4 FIRST AID MEASURES

scotecatalog.com/msds.nsf/.../156-59...

**7. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

**EYE CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes.

**SKIN CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes while removing contaminated clothing.

**INGESTION:** Never give anything by mouth to an unconscious person. Have conscious and alert person drink 1 to 2 glasses of water. Induce vomiting after victim drinks water.

**IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN**

**NOTE TO PHYSICIAN:** None

**5. FIRE FIGHTING MEASURES**

**FLASH POINT:** 2 deg.C

**AUTOIGNITION TEMPERATURE:** 460 deg. C

**FLAMMABLE LIMITS:** Vol.%

LOWER: 5.6  
UPPER: 12.80

**EXTINGUISHING MEDIA:** Carbon dioxide, foam, or dry chemical.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide, hydrogen chloride and phosgene.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Cylinder rupture may occur under fire conditions. Emits toxic fumes under fire conditions. Vapors may travel a considerable distance to the source of ignition and flash back.

**6. ACCIDENTAL RELEASE MEASURES**

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Remove leaking cylinder to exhaust hood or safe outdoor area. Shut off source if possible and remove source of heat. Absorb with sand or vermiculite and place in closed containers for disposal.

**SPECIALIZED EQUIPMENT:** None

**7. HANDLING AND STORAGE**

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders. Use only in a well-ventilated area.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use. Store away from oxidizers, combustible materials, and source of ignition or heat.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentrations below exposure and flammable limits.

EYE / FACE PROTECTION: Goggles. A safety shower and eyewash station should be readily available.

SKIN PROTECTION: Wear suitable protective clothing.

RESPIRATORY PROTECTION: Use a self-contained breathing apparatus in case of emergency or non-routine use.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless

ODOR: Pleasant aromatic odor

PHYSICAL PRESSURE: Liquid

VAPOR PRESSURE: @41 deg.C: 400 mm Hg

VAPOR DENSITY (AIR=1): 3.34

BOILING POINT (C): 59

SOLUBILITY IN WATER: Insoluble

SPECIFIC GRAVITY (H<sub>2</sub>O=1): @20 deg.C: 1.284

EVAPORATION RATE: N/Av

ODOR THRESHOLD: N/Av

## 10. STABILITY AND REACTIVITY

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas. Storage near a heat source.

MATERIALS TO AVOID: Oxidizing agents, air and moisture. Nitrogen dioxide, sodium, potassium hydroxide.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: HCl gas, phosgene gas, CO and oxides of chlorine.

## 11. TOXICOLOGICAL INFORMATION

LETHAL CONCENTRATION (LC50): None established

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

## 12. ECOLOGICAL INFORMATION

No adverse ecological effects are expected.

## 13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place. Waste can be burned in an approved incinerator equipped with an afterburner and scrubber.

## 14. TRANSPORT INFORMATION

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Flammable liquids, n.o.s.

HAZARD CLASS: 3 (flammable), Packing Group I

IDENTIFICATION NUMBER: UN1993

REPORTABLE QUANTITIES: 1000 lb.

LABELING: FLAMMABLE LIQUID

ADR / RID (EU Only): Class 3, 3(b)

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

**15. REGULATORY INFORMATION**

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: N/Av

NUMBER IN ANNEX 1 OF DIR 67/548: Material is listed in annex 1.

EU CLASSIFICATION: N/Av

R: 22-33-35-64

S: 15-22-23-27-36-65-71-76-104

**16. OTHER INFORMATION**

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.

# Material Safety Data Sheet

trans-1,2-Dichloroethylene, 99.7%, stabilized with 950 ppm BLO and 100 ppm MEHQ

ACC# 62420

## Section 1 - Chemical Product and Company Identification

**MSDS Name:** trans-1,2-Dichloroethylene, 99.7%, stabilized with 950 ppm BLO and 100 ppm MEHQ

**Catalog Numbers:** AC406840000, AC406840250, AC406842500, ACE1128255

**Synonyms:** trans-Acetylene dichloride.

**Company Identification:**

Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410

**For information in North America, call:** 800-ACROS-01

**For emergencies in the US, call CHEMTREC:** 800-424-9300

## Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
156-60-5	trans-1,2-Dichloroethylene	99.7	205-860-2

## Section 3 - Hazards Identification

### EMERGENCY OVERVIEW

Appearance: Clear liquid. Flash Point: 6 deg C.

**Warning! Flammable liquid and vapor.** Harmful if inhaled. Unstabilized substance may polymerize. Causes eye and skin irritation. May be harmful if swallowed. May cause respiratory tract irritation.

**Target Organs:** Central nervous system, respiratory system, eyes, skin.

#### Potential Health Effects

**Eye:** Causes moderate eye irritation.

**Skin:** Causes moderate skin irritation. May cause dermatitis.

**Ingestion:** May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May be harmful if swallowed. May cause central nervous system depression.

**Inhalation:** May cause respiratory tract irritation. May cause narcotic effects in high concentration. Eye irritation, vertigo, and nausea were reported in humans exposed at 2200 ppm.

**Chronic:** Not available. Some German investigators reported fatty degeneration of the liver upon repeated narcotic doses in rats and

## Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

**Skin:** In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

**Ingestion:** If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. Fire or excessive heat may result in violent rupture of the container due to bulk polymerization. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. Hazardous polymerization may occur under fire conditions.

**Extinguishing Media:** Use water fog, dry chemical, carbon dioxide, or regular foam.

**Flash Point:** 6 deg C ( 42.80 deg F)

**Autoignition Temperature:** 440 deg C ( 824.00 deg F)

**Explosion Limits, Lower:**9.70 vol %

**Upper:** 12.80 vol %

**NFPA Rating:** (estimated) Health: 2; Flammability: 3; Instability: 2

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Pure vapor will be uninhibited and may polymerize in vents or other confined spaces.

**Storage:** Keep away from sources of ignition. Store in a tightly closed container. Flammables-area. Store protected from light and air.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

**Exposure Limits**

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
trans-1,2-Dichloroethylene	200 ppm TWA	none listed	none listed

**OSHA Vacated PELs:** trans-1,2-Dichloroethylene: No OSHA Vacated PELs are listed for this chemical.

**Personal Protective Equipment**

**Eyes:** Wear chemical splash goggles.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** Clear

**Odor:** Pleasant odor

**pH:** Not available.

**Vapor Pressure:** 331 mm Hg @ 25 deg C

**Vapor Density:** 3.34 (air=1)

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 48 deg C @ 760 mm Hg

**Freezing/Melting Point:** -50 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:** 1.2600

**Molecular Formula:** C<sub>2</sub>H<sub>2</sub>Cl<sub>2</sub>

**Molecular Weight:** 96.94

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures. This material is a monomer and may polymerize under certain conditions if the stabilizer is lost.

**Conditions to Avoid:** Light, ignition sources, exposure to air, excess heat.

**Incompatibilities with Other Materials:** Strong oxidizing agents, strong bases, copper.

**Hazardous Decomposition Products:** Hydrogen chloride, phosgene, carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** May occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 156-60-5: KV9400000

**LD50/LC50:**

CAS# 156-60-5:

Draize test, rabbit, eye: 10 mg Moderate;  
 Draize test, rabbit, skin: 500 mg/24H Moderate;  
 Inhalation, rat: LC50 = 24100 ppm;  
 Oral, mouse: LD50 = 2122 mg/kg;  
 Oral, rat: LD50 = 1235 mg/kg;  
 Skin, rabbit: LD50 = >5 gm/kg;

**Carcinogenicity:**

CAS# 156-60-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No data available.

**Teratogenicity:** No data available.

**Reproductive Effects:** No data available.

**Mutagenicity:** No data available.

**Neurotoxicity:** No data available.

**Other Studies:**

## Section 12 - Ecological Information

No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 156-60-5: waste number U079.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	1,2-DICHLOROETHYLENE	1,2-DICHLOROETHYLENE
<b>Hazard Class:</b>	3	3
<b>UN Number:</b>	UN1150	UN1150
<b>Packing Group:</b>	II	II

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 156-60-5 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

CAS# 156-60-5: 1000 lb final RQ; 454 kg final RQ

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPO.

**SARA Codes**

CAS # 156-60-5: immediate, delayed, fire.

**Section 313** No chemicals are reportable under Section 313.**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 156-60-5 is listed as a Priority Pollutant under the Clean Water Act.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 156-60-5 can be found on the following state right to know lists: California, Pennsylvania, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XN F

**Risk Phrases:**

R 11 Highly flammable.

R 20 Harmful by inhalation.

R 52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Safety Phrases:**

S 16 Keep away from sources of ignition - No smoking.

S 29 Do not empty into drains.

S 7 Keep container tightly closed.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 156-60-5: No information available.

**Canada - DSL/NDSL**

CAS# 156-60-5 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B2, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 156-60-5 is not listed on the Canadian Ingredient Disclosure List

## Section 16 - Additional Information

**MSDS Creation Date:** 11/21/1997

**Revision #5 Date:** 11/20/2008

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

MSDS Number: **B7222** \* \* \* \* \* Effective Date: **05/26/09** \* \* \* \* \* Supercedes: **07/06/06**

<b>MSDS</b>	<b>Material Safety Data Sheet</b>		24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
			National Response in Canada CANUTEC: 613-996-6666
			Outside U.S. and Canada Chemtrec: 703-527-3887
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		 	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.			

# METHYL TERT-BUTYL ETHER

## 1. Product Identification

**Synonyms:** 2-Methoxy-2-methylpropane; tert-Butyl methyl ether; Methyl 1,1-dimethyl ethyl ether; MTBE

**CAS No.:** 1634-04-4

**Molecular Weight:** 88.15

**Chemical Formula:** C<sub>5</sub>H<sub>12</sub>O

**Product Codes:**

J.T. Baker: 9034, 9042, 9043

Mallinckrodt: 5398

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Methyl tert-butyl Ether	1634-04-4	99 - 100%	Yes

## 3. Hazards Identification

### Emergency Overview

**DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY AFFECT CENTRAL NERVOUS SYSTEM, BLOOD, AND KIDNEYS. A CENTRAL NERVOUS SYSTEM DEPRESSANT. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)

Flammability Rating: 3 - Severe (Flammable)

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate (Life)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

### Potential Health Effects

#### Inhalation:

Inhalation of vapor can irritate respiratory tract. Causes central nervous system effects. Breathing high concentrations in air can cause lightheadedness, dizziness, weakness, nausea, headache.

#### Ingestion:

May cause nausea, vomiting. Other symptoms similar to inhalation may occur. Laryngeal, ocular, and respiratory muscles are affected in severe poisoning.

#### Skin Contact:

A mild skin irritant which causes loss of natural oils. May be a route of absorption into the body.

#### Eye Contact:

Vapors can irritate eyes; splashes may cause damage to eye tissue.

#### Chronic Exposure:

Symptoms noted above may be produced by cumulative exposure.

#### Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Remove any contaminated clothing. Wash skin with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: -27C (-17F)

Autoignition temperature: 435C (815F)

Flammable limits in air % by volume:

lcl: 1.6; ucl: 8.4

Extremely Flammable Liquid and Vapor! Vapor may cause flash fire.

**Explosion:**

Above the flash point, explosive vapor-air mixtures may be formed. Vapors can flow along surfaces to distant ignition source and flash back. Sealed containers may rupture when heated. Sensitive to static discharge.

**Fire Extinguishing Media:**

Water spray, dry chemical, alcohol foam, or carbon dioxide. Water spray may be used to keep fire exposed containers cool.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

---

## 7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-ACGIH Threshold Limit Value (TLV): 50 ppm (TWA), A3 - Confirmed animal carcinogen with unknown relevance to humans

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details. Use explosion-proof equipment.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Characteristic ethereal odor.

**Solubility:**

4.8 g/100g of water.

**Specific Gravity:**

0.74

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

55C (131F)

**Melting Point:**

-110C (-166F)

**Vapor Density (Air=1):**

No information found.

**Vapor Pressure (mm Hg):**

245 @ 25C (77F)

**Evaporation Rate (BuAc=1):**

No information found.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage. Unstable in acid solutions.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Oxidizers, acids.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

Methyl tert butyl ether: Oral rat LD50: 4 gm/kg; inhalation rat LC50: 23576 ppm/4H.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Methyl tert-butyl Ether (1634-04-4)	No	No	3

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material is not expected to biodegrade. When released into the air, this material is expected to adversely affect the ozone layer. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. When released into the water, this material is expected to have a half-life between 1 and 10 days. This material has an estimated bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is not expected to be degraded by photolysis. When released into the air, this material is expected to have a half-life between 1 and 10 days.

**Environmental Toxicity:**

No information found.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

**14. Transport Information****Domestic (Land, D.O.T.)**-----  
**Proper Shipping Name:** METHYL TERT-BUTYL ETHER**Hazard Class:** 3**UN/NA:** UN2398**Packing Group:** II**Information reported for product/size:** 215L**International (Water, I.M.O.)**-----  
**Proper Shipping Name:** METHYL BUTYL ETHER**Hazard Class:** 3**UN/NA:** UN2398**Packing Group:** II**Information reported for product/size:** 215L**15. Regulatory Information**

```

-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  EC   Japan  Australia
-----
Methyl tert-butyl Ether (1634-04-4)          Yes  Yes  Yes    Yes

```

```

-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     --Canada--
Korea  DSL  NDSL  Phil.
-----
Methyl tert-butyl Ether (1634-04-4)          Yes  Yes  No     Yes

```

```

-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-
RQ      TPQ      List  Chemical Catg.
-----
Methyl tert-butyl Ether (1634-04-4)          No   No    Yes    No

```

```

-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     -RCRA-      -TSCA-
CERCLA     261.33     8(d)
-----
Methyl tert-butyl Ether (1634-04-4)          1000      No        No

```

Chemical Weapons Convention: No    TSCA 12(b): No    CDTA: No  
SARA 311/312: Acute: Yes    Chronic: Yes    Fire: Yes    Pressure: No  
Reactivity: No    (Pure / Liquid)

**Australian Hazchem Code:** 3[Y]E**Poison Schedule:** None allocated.**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

**16. Other Information****NFPA Ratings:** Health: 2 Flammability: 3 Reactivity: 0**Label Hazard Warning:**

DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY AFFECT CENTRAL NERVOUS SYSTEM, BLOOD, AND KIDNEYS. A CENTRAL NERVOUS SYSTEM DEPRESSANT. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

**Label Precautions:**

Keep away from heat, sparks and flame.  
Avoid contact with eyes, skin and clothing.  
Avoid breathing vapor.  
Keep container closed.  
Use only with adequate ventilation.  
Wash thoroughly after handling.

**Label First Aid:**

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

\*\*\*\*\*

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

## Composition/Information on Ingredient

**Cas:**

309-00-2

**Code:**

M

**RTECS:**

IO2100000

**Code:**

M

**Name:**

ALDRIN

**Other REC Limits:**

N/K

**OSHA PEL:**

0.25 MG/M3;SKIN

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

0.25 MG/M3;SKIN 9394

**Code:**

M

**ACGIHSTEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

N/K

**Ventilation:**

N/K

**Protective Gloves:**

RECOMMENDED

**Eye Protection:**

RECOMMENDED

**Other Protective Equipment:**

Equipment USE APPROPRIATE OSHA/MSHA SAFETY EQUIPMENT.

**Work Hygienic Practices:**

N/K

**Supplemental Safety and Health:**

N/K

## Health Hazards Data

**LD50LC50Mixture:**

ORAL (RAT) LD50: 5000 MG/KG (TOLUENE)

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

EYES/SKIN/INHALATION/INGESTION: IRRITATION.

**Explanation Of Carcinogenicity:**

LINDANE, DDT ISOMERS, & DIELDRIN ARE SUSPECTED HUMAN CARCINOGENS. HEPTACHLOR IS AN A2 CARCINOGEN.

**Signs And Symptoms Of Overexposure:**

EYES/SKIN/INGESTION/INHALATION: TOXIC & IRRITATION.

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES/SKIN: FLUSH W/COPIOUS AMOUNTS OF WATER. INHALATION: REMOVE TO FRESH AIR. GIVE OXYGEN IF NECESSARY. OBTAIN MEDICAL ATTENTION IN ALL CASES.

**Spill Release Procedures:**

DUE TO THE SMALL QUANTITY INVOLVED, SPILLS OR LEAKS SHOULD NOT POSE A SIGNIFICANT PROBLEM. A LEAKING BOTTLE MAY BE PLACED IN A PLASTIC BAG & NORMAL DISPOSAL PROCEDURES FOLLOWED. LIQUID SAMPLES MAY BE ABSORBED ON VERMICULITE OR SAND.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCUBBER. OBSERVE ALL FEDERAL, STATE, & LOCAL LAWS CONCERNING DISPOSAL.

**Handling And Storage Precautions:**

AVOID CONTACT W/EYES, SKIN, & CLOTHING. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE.

**Other Precautions:**

THIS MATERIAL SHOULD ONLY BE USED BY THOSE PERSONS TRAINED IN THE SAFE HANDLING OF HAZARDOUS CHEMICALS.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P 6

**Flash Point:****Flash Point Text:**

COMBUSTIBLE

**Autoignition Temp:****Autoignition Temp Text:**

N/A

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

CO2, DRY CHEMICAL POWDER, OR WATER SPRAY

**Fire Fighting Procedures:**

N/K

**Unusual Fire/Explosion Hazard:**

COMBUSTIBLE.

## Physical/Chemical Properties

**HCC:****NRC/State LIC No:****Net Prop WT For Ammo:****Boiling Point:****B.P. Text:**

N/K

**Melt/Freeze Pt:****M.P/F.P Text:**

N/K

**Decomp Temp:****Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

N/K

**Volatile Org Content %:**

**Spec Gravity:**

N/K 7

**VOC Pounds/Gallon:**

**PH:** N/K

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

N/K

**Appearance and Odor:**

LIQUID W/BENZENE-LIKE ODOR.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/K

**Materials To Avoid:**

STRONG OXIDIZERS

**Hazardous Decomposition Products:**

N/R

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

**Information:**N/P

## MSDS Transport Information

**Information:**N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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## Composition/Information on Ingredient

**Cas:**

319-84-6

**Code:**

M

**RTECS:**

GV3500000

**Code:**

M

**Name:**

ALPHA-BENZENE HEXACHLORIDE (BHC)

**Other REC Limits:**

N/K

**OSHA PEL:**

N/K

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

N/K

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

N/K

**Ventilation:**

N/K

**Protective Gloves:**

RECOMMENDED

**Eye Protection:**

RECOMMENDED

**Other Protective Equipment:**

Equipment USE APPROPRIATE OSHA/MSHA SAFETY EQUIPMENT.

**Work Hygienic Practices:**

N/K

**Supplemental Safety and Health:**

N/K

## Health Hazards Data

**LD50LC50Mixture:**

ORAL (RAT) LD50: 5000 MG/KG (TOLUENE)

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

EYES/SKIN/INHALATION/INGESTION: IRRITATION.

**Explanation Of Carcinogenicity:**

LINDANE, DDT ISOMERS, & DIELDRIN ARE SUSPECTED HUMAN CARCINOGENS. HEPTACHLOR IS AN A2 CARCINOGEN.

**Signs And Symptoms Of Overexposure:**

EYES/SKIN/INGESTION/INHALATION: TOXIC & IRRITATION.

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES/SKIN: FLUSH W/COPIOUS AMOUNTS OF WATER. INHALATION: REMOVE TO FRESH AIR. GIVE OXYGEN IF NECESSARY. OBTAIN MEDICAL ATTENTION IN ALL CASES.

**Spill Release Procedures:**

DUE TO THE SMALL QUANTITY INVOLVED, SPILLS OR LEAKS SHOULD NOT POSE A SIGNIFICANT PROBLEM. A LEAKING BOTTLE MAY BE PLACED IN A PLASTIC BAG & NORMAL DISPOSAL PROCEDURES FOLLOWED. LIQUID SAMPLES MAY BE ABSORBED ON VERMICULITE OR SAND.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCUBBER. OBSERVE ALL FEDERAL, STATE, & LOCAL LAWS CONCERNING DISPOSAL.

**Handling And Storage Precautions:**

AVOID CONTACT W/EYES, SKIN, & CLOTHING. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE.

**Other Precautions:**

THIS MATERIAL SHOULD ONLY BE USED BY THOSE PERSONS TRAINED IN THE SAFE HANDLING OF HAZARDOUS CHEMICALS.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P 6

**Flash Point:****Flash Point Text:**

COMBUSTIBLE

**Autoignition Temp:****Autoignition Temp Text:**

N/A

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

CO2, DRY CHEMICAL POWDER, OR WATER SPRAY

**Fire Fighting Procedures:**

N/K

**Unusual Fire/Explosion Hazard:**

COMBUSTIBLE.

## Physical/Chemical Properties

**HCC:****NRC/State LIC No:****Net Prop WT For Ammo:****Boiling Point:****B.P. Text:**

N/K

**Melt/Freeze Pt:****M.P/F.P Text:**

N/K

**Decomp Temp:****Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

N/K

**Volatile Org Content %:**

**Spec Gravity:**

N/K 7

**VOC Pounds/Gallon:**

**PH:** N/K

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

N/K

**Appearance and Odor:**

LIQUID W/BENZENE-LIKE ODOR.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/K

**Materials To Avoid:**

STRONG OXIDIZERS

**Hazardous Decomposition Products:**

N/R

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

**Information:**N/P

## MSDS Transport Information

**Information:**N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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## Composition/Information on Ingredient

**Cas:**

319-85-7

**Code:**

M

**RTECS:**

GV4375000

**Code:**

M

**Name:**

BETA BENZENE HEXACHLORIDE (BHC)

**Other REC Limits:**

N/K

**OSHA PEL:**

N/K

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

N/K

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

N/K

**Ventilation:**

N/K

**Protective Gloves:**

RECOMMENDED

**Eye Protection:**

RECOMMENDED

**Other Protective Equipment:**

Equipment USE APPROPRIATE OSHA/MSHA SAFETY EQUIPMENT.

**Work Hygienic Practices:**

N/K

**Supplemental Safety and Health:**

N/K

## Health Hazards Data

**LD50LC50Mixture:**

ORAL (RAT) LD50: 5000 MG/KG (TOLUENE)

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

EYES/SKIN/INHALATION/INGESTION: IRRITATION.

**Explanation Of Carcinogenicity:**

LINDANE, DDT ISOMERS, & DIELDRIN ARE SUSPECTED HUMAN CARCINOGENS. HEPTACHLOR IS AN A2 CARCINOGEN.

**Signs And Symptoms Of Overexposure:**

EYES/SKIN/INGESTION/INHALATION: TOXIC & IRRITATION.

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES/SKIN: FLUSH W/COPIOUS AMOUNTS OF WATER. INHALATION: REMOVE TO FRESH AIR. GIVE OXYGEN IF NECESSARY. OBTAIN MEDICAL ATTENTION IN ALL CASES.

**Spill Release Procedures:**

DUE TO THE SMALL QUANTITY INVOLVED, SPILLS OR LEAKS SHOULD NOT POSE A SIGNIFICANT PROBLEM. A LEAKING BOTTLE MAY BE PLACED IN A PLASTIC BAG & NORMAL DISPOSAL PROCEDURES FOLLOWED. LIQUID SAMPLES MAY BE ABSORBED ON VERMICULITE OR SAND.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCUBBER. OBSERVE ALL FEDERAL, STATE, & LOCAL LAWS CONCERNING DISPOSAL.

**Handling And Storage Precautions:**

AVOID CONTACT W/EYES, SKIN, & CLOTHING. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE.

**Other Precautions:**

THIS MATERIAL SHOULD ONLY BE USED BY THOSE PERSONS TRAINED IN THE SAFE HANDLING OF HAZARDOUS CHEMICALS.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P 6

**Flash Point:****Flash Point Text:**

COMBUSTIBLE

**Autoignition Temp:****Autoignition Temp Text:**

N/A

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

CO2, DRY CHEMICAL POWDER, OR WATER SPRAY

**Fire Fighting Procedures:**

N/K

**Unusual Fire/Explosion Hazard:**

COMBUSTIBLE.

## Physical/Chemical Properties

**HCC:****NRC/State LIC No:****Net Prop WT For Ammo:****Boiling Point:****B.P. Text:**

N/K

**Melt/Freeze Pt:****M.P/F.P Text:**

N/K

**Decomp Temp:****Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

N/K

**Volatile Org Content %:**

**Spec Gravity:**

N/K 7

**VOC Pounds/Gallon:**

**PH:** N/K

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

N/K

**Appearance and Odor:**

LIQUID W/BENZENE-LIKE ODOR.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/K

**Materials To Avoid:**

STRONG OXIDIZERS

**Hazardous Decomposition Products:**

N/R

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

**Information:**N/P

## MSDS Transport Information

**Information:**N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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## Composition/Information on Ingredient

**Cas:**

319-86-8

**Code:**

M

**RTECS:**

GV4550000

**Code:**

M

**Name:**

D-BHC

**Other REC Limits:**

N/K 5

**OSHA PEL:**

N/K

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

N/K

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

N/K

**Ventilation:**

N/K

**Protective Gloves:**

RECOMMENDED

**Eye Protection:**

RECOMMENDED

**Other Protective Equipment:**

Equipment USE APPROPRIATE OSHA/MSHA SAFETY EQUIPMENT.

**Work Hygienic Practices:**

N/K

**Supplemental Safety and Health:**

N/K

## Health Hazards Data

**LD50LC50Mixture:**

ORAL (RAT) LD50: 5000 MG/KG (TOLUENE)

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

EYES/SKIN/INHALATION/INGESTION: IRRITATION.

**Explanation Of Carcinogenicity:**

LINDANE, DDT ISOMERS, & DIELDRIN ARE SUSPECTED HUMAN CARCINOGENS. HEPTACHLOR IS AN A2 CARCINOGEN.

**Signs And Symptoms Of Overexposure:**

EYES/SKIN/INGESTION/INHALATION: TOXIC & IRRITATION.

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES/SKIN: FLUSH W/COPIOUS AMOUNTS OF WATER. INHALATION: REMOVE TO FRESH AIR. GIVE OXYGEN IF NECESSARY. OBTAIN MEDICAL ATTENTION IN ALL CASES.

**Spill Release Procedures:**

DUE TO THE SMALL QUANTITY INVOLVED, SPILLS OR LEAKS SHOULD NOT POSE A SIGNIFICANT PROBLEM. A LEAKING BOTTLE MAY BE PLACED IN A PLASTIC BAG & NORMAL DISPOSAL PROCEDURES FOLLOWED. LIQUID SAMPLES MAY BE ABSORBED ON VERMICULITE OR SAND.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCUBBER. OBSERVE ALL FEDERAL, STATE, & LOCAL LAWS CONCERNING DISPOSAL.

**Handling And Storage Precautions:**

AVOID CONTACT W/EYES, SKIN, & CLOTHING. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE.

**Other Precautions:**

THIS MATERIAL SHOULD ONLY BE USED BY THOSE PERSONS TRAINED IN THE SAFE HANDLING OF HAZARDOUS CHEMICALS.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P 6

**Flash Point:****Flash Point Text:**

COMBUSTIBLE

**Autoignition Temp:****Autoignition Temp Text:**

N/A

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

CO2, DRY CHEMICAL POWDER, OR WATER SPRAY

**Fire Fighting Procedures:**

N/K

**Unusual Fire/Explosion Hazard:**

COMBUSTIBLE.

## Physical/Chemical Properties

**HCC:****NRC/State LIC No:****Net Prop WT For Ammo:****Boiling Point:****B.P. Text:**

N/K

**Melt/Freeze Pt:****M.P/F.P Text:**

N/K

**Decomp Temp:****Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

N/K

**Volatile Org Content %:**

**Spec Gravity:**

N/K 7

**VOC Pounds/Gallon:**

**PH:** N/K

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

N/K

**Appearance and Odor:**

LIQUID W/BENZENE-LIKE ODOR.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/K

**Materials To Avoid:**

STRONG OXIDIZERS

**Hazardous Decomposition Products:**

N/R

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

**Information:**N/P

## MSDS Transport Information

**Information:**N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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## Composition/Information on Ingredient

**Cas:**

33213-65-9

**Code:**

M

**RTECS:**

RB9875200

**Code:**

M

**Name:**

ENDOSULFAN II

**Other REC Limits:**

N/K

**OSHA PEL:**

N/K

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

N/K

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

N/K

**Ventilation:**

N/K

**Protective Gloves:**

RECOMMENDED

**Eye Protection:**

RECOMMENDED

**Other Protective Equipment:**

Equipment USE APPROPRIATE OSHA/MSHA SAFETY EQUIPMENT.

**Work Hygienic Practices:**

N/K

**Supplemental Safety and Health:**

N/K

## Health Hazards Data

**LD50LC50Mixture:**

ORAL (RAT) LD50: 5000 MG/KG (TOLUENE)

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

EYES/SKIN/INHALATION/INGESTION: IRRITATION.

**Explanation Of Carcinogenicity:**

LINDANE, DDT ISOMERS, & DIELDRIN ARE SUSPECTED HUMAN CARCINOGENS. HEPTACHLOR IS AN A2 CARCINOGEN.

**Signs And Symptoms Of Overexposure:**

EYES/SKIN/INGESTION/INHALATION: TOXIC & IRRITATION.

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES/SKIN: FLUSH W/COPIOUS AMOUNTS OF WATER. INHALATION: REMOVE TO FRESH AIR. GIVE OXYGEN IF NECESSARY. OBTAIN MEDICAL ATTENTION IN ALL CASES.

**Spill Release Procedures:**

DUE TO THE SMALL QUANTITY INVOLVED, SPILLS OR LEAKS SHOULD NOT POSE A SIGNIFICANT PROBLEM. A LEAKING BOTTLE MAY BE PLACED IN A PLASTIC BAG & NORMAL DISPOSAL PROCEDURES FOLLOWED. LIQUID SAMPLES MAY BE ABSORBED ON VERMICULITE OR SAND.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCUBBER. OBSERVE ALL FEDERAL, STATE, & LOCAL LAWS CONCERNING DISPOSAL.

**Handling And Storage Precautions:**

AVOID CONTACT W/EYES, SKIN, & CLOTHING. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE.

**Other Precautions:**

THIS MATERIAL SHOULD ONLY BE USED BY THOSE PERSONS TRAINED IN THE SAFE HANDLING OF HAZARDOUS CHEMICALS.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P 6

**Flash Point:****Flash Point Text:**

COMBUSTIBLE

**Autoignition Temp:****Autoignition Temp Text:**

N/A

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

CO2, DRY CHEMICAL POWDER, OR WATER SPRAY

**Fire Fighting Procedures:**

N/K

**Unusual Fire/Explosion Hazard:**

COMBUSTIBLE.

## Physical/Chemical Properties

**HCC:****NRC/State LIC No:****Net Prop WT For Ammo:****Boiling Point:****B.P. Text:**

N/K

**Melt/Freeze Pt:****M.P/F.P Text:**

N/K

**Decomp Temp:****Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

N/K

**Volatile Org Content %:**

**Spec Gravity:**

N/K 7

**VOC Pounds/Gallon:**

**PH:** N/K

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

N/K

**Appearance and Odor:**

LIQUID W/BENZENE-LIKE ODOR.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/K

**Materials To Avoid:**

STRONG OXIDIZERS

**Hazardous Decomposition Products:**

N/R

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

**Information:**N/P

## MSDS Transport Information

**Information:**N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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# Composition/Information on Ingredient

**Cas:**

50-29-3

**Code:**

M

**RTECS:**

KJ3325000

**Code:**

M

**Name:**

DDT (DICHLORODIPHENYLTRICHLOROETHANE) (SARA III)

**Other REC Limits:**

N/P

**OSHA PEL:**

S, 1 MG/M3

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

1 MG/M3; 9192

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

N/P

**Ventilation:**

N/P

**Protective Gloves:**

N/P

**Eye Protection:**

N/P

**Other Protective Equipment:**

Equipment N/P

**Work Hygienic Practices:**

N/P

**Supplemental Safety and Health:**

N/P

## Health Hazards Data

**LD50LC50Mixture:**

N/P

**Route Of Entry Inds - Inhalation:**

N/P

**Skin:**

N/P

**Ingestion:**

N/P

**Carcinogenicity Inds - NTP:**

N/P

**IARC:**

N/P

**OSHA:**

N/P

**Health Hazards Acute And Chronic:**

N/P 2

**Explanation Of Carcinogenicity:**

N/P

**Signs And Symptions Of Overexposure:**

N/P

**Medical Cond Aggravated By Exposure:**

N/P

**First Aid:**

N/P

**Spill Release Procedures:**

N/P

**Neutralizing Agent:**

N/P

**Waste Disposal Methods:**

N/P

**Handling And Storage Precautions:**

N/P

**Other Precautions:**

N/P

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P

**Flash Point:**

**Flash Point Text:**

105F CC

**Autoignition Temp:**

**Autoignition Temp Text:**

N/A 3

**Lower Limits:**

**Upper Limits:**

**Extinguishing Media:**

N/P

**Fire Fighting Procedures:**

N/P

**Unusual Fire/Explosion Hazard:**

N/P

## Physical/Chemical Properties

**HCC:**

F5

**NRC/State LIC No:**

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

N/A

**Melt/Freeze Pt:**

**M.P/F.P Text:**

N/A

**Decomp Temp:**

**Decomp Text:**

N/A

**Vapor Pres:**

N/P

**Vapor Density:**

N/P

**Volatile Org Content %:**

**Spec Gravity:**

N/P

**VOC Pounds/Gallon:**

**PH:** N/P

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/P

**Solubility in Water:**

N/P

**Appearance and Odor:**

**Percent Volatiles by Volume:**

N/P

**Corrosion Rate:**

N/P

## Reactivity Data

**Stability Indicator:**

N/P

**Stability Condition To Avoid:**

N/P

**Materials To Avoid:**

N/P

**Hazardous Decomposition Products:**

N/P

**Hazardous Polymerization Indicator:**

N/P

**Conditions To Avoid Polymerization:**

N/P

## Toxicological Information

**Information:**N/P

## MSDS Transport Information

**Information:**N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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### WARRANTY

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applicable to the product with regard to appropriate safety precautions. It does not represent any

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terms and conditions of sale.

## Composition/Information on Ingredient

**Cas:**

5103-74-2

**Code:**

M

**RTECS:**

PC0365000

**Code:**

M

**Name:**

TRANS-CHLORDANE (SUSPECTED HUMAN CARCINOGEN BY IA

**Other REC Limits:**

N/K

**OSHA PEL:**

N/K

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

N/K

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

USE APPROPRIATE OSHA/MSHA APPROVED EQUIPMENT

**Ventilation:**

HOOD

**Protective Gloves:**

REQUIRED

**Eye Protection:**

EYESHIELD

**Other Protective Equipment:**

Equipment N/K

**Work Hygienic Practices:**

REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.

**Supplemental Safety and Health:**

INFORMATION IF FOR THE COMPONENT. METHYL ALCOHOL.

## Health Hazards Data

**LD50LC50Mixture:**

ORAL LD50 (MOUSE): 5628 MG/KG

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

YES

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

SKIN: FATAL IF ABSORBED THROUGH SKIN EYES: REPEATED EXPOSURE TO VAPORS & DUST CAN CAUSE EYE INJURY. INGESTION: INGESTED CAN CAUSE GASTRO-INTESTINAL DISTURBANCES. INHALATION: EXPOSURE CAN CAUSE LIVE R DAMAGE, KIDNEY DAMAGE & CARDIOVASCULAR SYSTEM INJURY. CAN CAUSE CONVULSIONS.

**Explanation Of Carcinogenicity:**

SEE INGREDIENTS

**Signs And Symptions Of Overexposure:**

N/K

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES: FLUSH W/WATER FOR 15-20 MINS. SKIN: FLUSH W/WATER FOR 15-20 MINS. IF NO BURNS HAVE OCCURRED-USE SOAP & WATER TO CLEANSE SKIN. INHALATION: REMOVE TO FRESH AIR. ADMINISTER OXYGEN IF PATIENT IS HAV EING DIFFICULTY BREATHING. IF PATIENT HAS SPED BREATHING ADMINISTER ARTIFICIAL RESPIRATIONS. IF PATIENT IS IN CARDIAC ARREST ADMINISTER CPR. OBTAIN MEDICAL ATTENTION IN ALL CASES. (SEE SUPP).

**Spill Release Procedures:**

EVACUATE AREA. WEAR APPROPRIATE OSHA REGULATED EQUIPMENT. VENTILATE AREA. ABSORB ON VERMICULITE/SIMILAR MATERIAL. SWEEP UP & PLACE IN AN APPROPRIATE CONTAINER. HOLD FOR DISPOSAL. WASH CONTAMINATED SUR FACES TO REMOVE ANY RESIDUES.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER, IAW/LOCAL, STATE, FEDERAL REGULATION.

**Handling And Storage Precautions:**

KEEP TIGHTLY CLOSED IN A COOL DRY PLACE. STORE ONLY W/COMPATIBLE CHEMICALS.METH ALCOHOL IS HYGROSCOPIC & FLAMMABLE

**Other Precautions:**

PERONS NOT SPECIFICALLY & PROPERLY TRAINED SHOULD NOT HANDLE THIS CHEMICAL/ITS CONTAINER. FOR LABORATORY USE ONLY. CONTECT LENSES SHOULDN'T BE WORN IN THE LABORATORY. AVOID DIRECT PHYSICAL CONTACT.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P

**Flash Point:**

**Flash Point Text:**

51.8F (SUPP)

**Autoignition Temp:**

**Autoignition Temp Text:**

N/A

**Lower Limits:**

36%(SUPP)

**Upper Limits:**

6.7% (SUPP) 4

**Extinguishing Media:**

CO2, DRY CHEMICAL POWDER. DON'T USE WATER. (SUPP)

**Fire Fighting Procedures:**

N/K

**Unusual Fire/Explosion Hazard:**

FLAMMABLE (METHYL ALCOHOL)

## Physical/Chemical Properties

**HCC:**

**NRC/State LIC No:**

**Net Prop WT For Ammo:**

**Boiling Point:****B.P. Text:**

148.28F SUP

**Melt/Freeze Pt:****M.P/F.P Text:**

-98C(SUPP)

**Decomp Temp:****Decomp Text:**

N/K

**Vapor Pres:**

97(SUPP)

**Vapor Density:**

1.11 (SUP)

**Volatile Org Content %:****Spec Gravity:**

N/K

**VOC Pounds/Gallon:**

PH: N/K

**VOC Grams/Liter:****Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

MISCIBLE (SUPP)

**Appearance and Odor:**

COLORLESS LIQUID (SUPP) 5

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/K

**Materials To Avoid:**

STRONG ACIDS, ACID HALIDES, ANHYDRIDES, STRONG OXIDIZING AGENTS, STRONG REDUCING AGENTS. ACTIVE METALS. (SUPP)

**Hazardous Decomposition Products:**

TOXIC FUMES. (SUPP)

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

Sara Title III Information: N/P

Federal Regulatory Information: N/P

State Regulatory Information: N/P

## Other Information

Other Information:N/P

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Health	3
Fire	3
Reactivity	3
Personal Protection	X

## Material Safety Data Sheet

### 2,4-Dinitrophenol, moist MSDS

#### Section 1: Chemical Product and Company Identification

**Product Name:** 2,4-Dinitrophenol, moist

**Catalog Codes:** SLD3364

**CAS#:** 51-28-5

**RTECS:** SL2800000

**TSCA:** TSCA 8(b) inventory: 2,4-Dinitrophenol, moist

**CI#:** Not available.

**Synonym:** 2,4-Dinitrophenol, moist with up to 35% water.

**Chemical Name:** 2,4-Ditronitrophenol

**Chemical Formula:** C<sub>6</sub>H<sub>4</sub>N<sub>2</sub>O<sub>5</sub>

**Contact Information:**

Sciencelab.com, Inc.  
14025 Smith Rd.

Houston, Texas 77396

US Sales: 1-800-801-7247

International Sales: 1-281-441-4400

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**  
1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

#### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
{2,4-}Dinitrophenol, moist	51-28-5	100

**Toxicological Data on Ingredients:** 2,4-Dinitrophenol, moist: ORAL (LD50): Acute: 30 mg/kg [Rat]. 45 mg/kg [Mouse]. 30 mg/kg [Rabbit].

#### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Very hazardous in case of ingestion, of inhalation. Hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (sensitizer). Severe over-exposure can result in death.

**Potential Chronic Health Effects:**

**CARCINOGENIC EFFECTS:** Not available. **MUTAGENIC EFFECTS:** Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED]. The substance may be toxic to the reproductive system, heart, cardiovascular system, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

#### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

**Serious Skin Contact:**

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

**Ingestion:**

If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** Flammable.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** These products are carbon oxides (CO, CO<sub>2</sub>), nitrogen oxides (NO, NO<sub>2</sub>...).

**Fire Hazards in Presence of Various Substances:**

Highly flammable in presence of open flames and sparks, of heat. Flammable in presence of reducing materials, of combustible materials.

**Explosion Hazards in Presence of Various Substances:** Explosive in presence of open flames and sparks, of shocks, of heat, of alkalis.

**Fire Fighting Media and Instructions:**

Explosive. Flammable solid. **SMALL FIRE:** Use DRY chemical powder. **LARGE FIRE:** Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion. Use absorbent chemicals or DRY sand. Use flooding quantities of water.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:**

Explosion is caused by heat, friction or shock. Dinitrophenol forms explosive salts with alkali or ammonia and should not be heated with them in closed vessels.

## Section 6: Accidental Release Measures

**Small Spill:** Use appropriate tools to put the spilled solid in a convenient waste disposal container.

**Large Spill:**

Explosive, class 1.4. Flammable solid. Poisonous solid. Stop leak if without risk. Do not touch damaged container or spilled material. Do not clean-up or dispose except under supervision of a specialist. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal.

**Section 7: Handling and Storage****Precautions:**

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Take precautionary measures against electrostatic discharges. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, combustible materials, alkalis, moisture.

**Storage:**

Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Do not store above 23°C (73.4°F).

**Section 8: Exposure Controls/Personal Protection****Engineering Controls:**

Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:**

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:** Not available.

**Section 9: Physical and Chemical Properties**

**Physical state and appearance:** Solid.

**Odor:** Sweet, musty

**Taste:** Bitter.

**Molecular Weight:** 184.11 g/mole

**Color:** Yellowish-brown (yellow to brown)

**pH (1% soln/water):** Not available.

**Boiling Point:** Not available.

**Melting Point:** 113°C (235.4°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 1.683 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** 6.35 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** The product is more soluble in oil;  $\log(\text{oil/water}) = 1.7$

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water.

**Solubility:** Partially soluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** High temperatures, incompatible materials, light, ignition sources, dehydrating agents.

**Incompatibility with various substances:**

Highly reactive with reducing agents, combustible materials, alkalis, moisture. Reactive with oxidizing agents.

**Corrosivity:** Not available.

**Special Remarks on Reactivity:** Incompatible with acid chlorides, and acid anhydrides. Light sensitive

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Inhalation. Ingestion.

**Toxicity to Animals:** Acute oral toxicity (LD50): 30 mg/kg [Rabbit].

**Chronic Effects on Humans:**

**MUTAGENIC EFFECTS:** Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. **DEVELOPMENTAL TOXICITY:** Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED]. May cause damage to the following organs: the reproductive system, heart, cardiovascular system, central nervous system (CNS).

**Other Toxic Effects on Humans:**

Very hazardous in case of ingestion, of inhalation. Hazardous in case of skin contact (irritant). Slightly hazardous in case of skin contact (sensitizer).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** May affect genetic material and cause adverse reproductive effects based on animal data.

**Special Remarks on other Toxic Effects on Humans:**

**Acute Potential Health Effects:** Skin: Causes skin irritation. Eyes: Causes eye irritation. Inhalation: Causes respiratory tract irritation. May cause similar effects to those described for ingestion. Ingestion: May be fatal if swallowed. Causes gastrointestinal (digestive) tract irritation with nausea, vomiting and diarrhea. May affect behavior, central nervous system, cardiovascular system, blood, metabolism, and sense organs.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

### Section 13: Disposal Considerations

**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

### Section 14: Transport Information

**DOT Classification:**

CLASS 4.1: Flammable solid. CLASS 6.1: Poisonous material.

**Identification:** : Dinitrophenol, wetted UNNA: 1320 PG: I

**Special Provisions for Transport:** Not available.

### Section 15: Other Regulatory Information

**Federal and State Regulations:**

New York release reporting list: 2,4-Dinitrophenol, moist Pennsylvania RTK: 2,4-Dinitrophenol, moist Michigan critical material: 2,4-Dinitrophenol, moist Massachusetts RTK: 2,4-Dinitrophenol, moist New Jersey: 2,4-Dinitrophenol, moist California Director's List of Hazardous Substances: 2,4-Dinitrophenol, moist TSCA 8(b) inventory: 2,4-Dinitrophenol, moist TSCA 8(a) PAIR: 2,4-Dinitrophenol, moist TSCA 8(d) H and S data reporting: 2,4-Dinitrophenol, moist: Effective: 9/30/91; Sunset: 12/19/95 SARA 313 toxic chemical notification and release reporting: 2,4-Dinitrophenol, moist CERCLA: Hazardous substances.: 2,4-Dinitrophenol, moist: 10 lbs. (4.536 kg)

**Other Regulations:**

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):**

CLASS B-4: Flammable solid. CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).

**DSCL (EEC):**

R1- Explosive when dry. R11- Highly flammable. R23/24/25- Toxic by inhalation, in contact with skin and if swallowed. R33- Danger of cumulative effects. S28- After contact with skin, wash immediately with plenty of [\*\*\*] S37- Wear suitable gloves. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

**HMIS (U.S.A.):**

**Health Hazard:** 3

**Fire Hazard:** 3

**Reactivity:** 3

**Personal Protection:** x

**National Fire Protection Association (U.S.A.):**

**Health:** 3

**Flammability:** 1

**Reactivity:** 3

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

### Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/09/2005 05:13 PM

**Last Updated:** 11/01/2010 12:00 PM

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## Analysis

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Search

534-52-1 msds



ENTER A NAME, CAS# OR OTHER KEYWORD

MSDS : 4,6-Dinitro-o-cresol, 98%, contains about 10% water  
 CAS : 534-52-1  
 SYNONYMS : DNOC; 2-Methyl-4,6-dinitrophenol.

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Suppliers:

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Address: 2819 Whipple Road Union City, CA 94587 USA

Website:[HBCChem,Inc](http://HBCChem,Inc)Europe: Tel:+31 630 661105 Fax:+31 317 484821 Email:[helen@feiyang.com.cn](mailto:helen@feiyang.com.cn)

Buyers:

Not Available



## Section 1 - Chemical Product and Company Identification

**MSDS Name:** 4,6-Dinitro-o-cresol, 98%, contains about 10% water**Catalog Numbers:** AC188600000, AC188600010, AC188601000, AC188602500**Synonyms:** DNOC; 2-Methyl-4,6-dinitrophenol.**Company Identification:**

Acros Organics N.V.  
 One Reagent Lane  
 Fair Lawn, NJ 07410

**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

## Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
534-52-1	4,6-Dinitro-o-cresol	98	208-601-1

## Section 3 - Hazards Identification

**EMERGENCY OVERVIEW**

Appearance: yellow powder.

**Danger!** May be fatal if inhaled, absorbed through the skin or swallowed. Causes eye irritation and possible injury. Risk of explosion if heated under confinement. May cause allergic skin reaction. Causes skin irritation. Danger of cumulative effects.**Target Organs:** Central nervous system, respiratory system, gastrointestinal system, cardiovascular system.**Potential Health Effects****Eye:** Causes eye irritation and possible injury. Exposure causes a yellow pigmentation of the sclera and conjunctivae. Bilateral cataracts and blindness have

been observed in individuals chronically exposed to DNOC by ingestion.

**Skin:** Causes skin irritation. May be fatal if absorbed through the skin. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. May cause skin discoloration. Exposure causes a yellow pigmentation of the skin and hair. Dermal contact may lead to local necrosis.

**Ingestion:** May be fatal if swallowed. Human fatalities have been reported from acute poisoning. Damage to the liver, kidney, and nervous system have been reported in humans following acute exposure to DNOC.

**Inhalation:** May be fatal if inhaled. May cause respiratory tract irritation. May cause effects similar to those described for ingestion.

**Chronic:** Repeated exposure may cause metabolic disturbances. There is a danger of cumulative effects. Possible risk of irreversible effects. DNOC is a cumulative poison in humans but not in animals. DNOC selectively blocks the biosynthesis of some proteins and stimulates that of others. Effects to the respiratory, cardiovascular, gastrointestinal, and central nervous system of chronically exposed workers have been

#### Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid immediately.

**Skin:** POISON material. In case of contact, get medical aid immediately. Immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.

**Ingestion:** POISON material. If swallowed, get medical aid immediately. Only induce vomiting if directed to do so by medical personnel. Never give anything by mouth to an unconscious person.

**Inhalation:** POISON material. If inhaled, get medical aid immediately. Remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

**Notes to Physician:** Treat symptomatically and supportively.

#### Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. This material poses an explosion hazard when dry. Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated. Combustible material; may burn but does not ignite readily.

**Extinguishing Media:** For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray.

**Flash Point:** Not applicable.

**Autoignition Temperature:** Not applicable.

**Explosion Limits, Lower:** Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 3; Flammability: 1; Instability: 1

#### Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

#### Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Use only with adequate ventilation or respiratory protection.

**Storage:** Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Poison room locked.

#### Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

##### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
4,6-Dinitro-o-cresol	0.2 mg/m <sup>3</sup> TWA; Skin - potential significant contribution to overall exposure by the cutaneous route	0.2 mg/m <sup>3</sup> TWA 5 mg/m <sup>3</sup> IDLH	0.2 mg/m <sup>3</sup> TWA

**OSHA Vacated PELs:** 4,6-Dinitro-o-cresol: 0.2 mg/m<sup>3</sup> TWA

##### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

#### Section 9 - Physical and Chemical Properties

**Physical State:** Powder

**Appearance:** yellow

**Odor:** odorless

**pH:** Not available.

**Vapor Pressure:** 0.00005 mm Hg @ 20 deg C

**Vapor Density:** Not available.

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 312 deg C

**Freezing/Melting Point:** 83-85 deg C

**Decomposition Temperature:** Not available.

**Solubility:** sparingly soluble

**Specific Gravity/Density:** Not available.

**Molecular Formula:** C<sub>7</sub>H<sub>6</sub>N<sub>2</sub>O<sub>5</sub>  
**Molecular Weight:** 198.13

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Dust generation, excess heat, heating in a confined space.

**Incompatibilities with Other Materials:** Metals, strong oxidizing agents.

**Hazardous Decomposition Products:** Nitrogen oxides, carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 534-52-1: GO9625000

**LD50/LC50:**

**CAS#** 534-52-1:

Draize test, rabbit, eye: 20 mg/24H Moderate;  
 Draize test, rabbit, skin: 105 mg/9D (Intermittent) Mild;  
 Oral, mouse: LD50 = 21 mg/kg;  
 Oral, rabbit: LD50 = 24600 ug/kg;  
 Oral, rat: LD50 = 7 mg/kg;  
 Oral, rat: LD50 = 40 mg/kg;  
 Skin, rabbit: LD50 = 1 gm/kg;  
 Skin, rat: LD50 = 200 mg/kg;

**Carcinogenicity:**

**CAS#** 534-52-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information found

**Teratogenicity:** No information found

**Reproductive Effects:** No information found

**Mutagenicity:** No information found

**Neurotoxicity:** No information found

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Fathead Minnow: 1.54mg/L; 96H; Flow-throughFish: Bluegill/Sunfish: 360ug/L; 96H; StaticFish: Rainbow trout: 66ug/L; 96H; Static No data available.

**Environmental:** Terrestrial: Usually disappears from soil within a few weeks to 2 months when applied at normal pesticidal rates. Biodegradation is probably the main removal process from agricultural soils. Aquatic: Aquatic hydrolysis, volatilization, bioconcentration, and adsorption to sediments are not expected to be important fate processes with respect to 4,6-dinitro-o-cresol. Atmospheric: May exist in both the vapor-phase and adsorbed to the particulate phase in the atmosphere. Half life approximately 8 hours.

**Physical:** Will biodegrade and bioconcentrate.

**Other:** DNOC was used as a pesticide until 1991. EPA cancelled registration as a pesticide in 1991.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** CAS# 534-52-1: waste number P047.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	DINITRO-O-CRESOL	DINITRO-O-CRESOL
<b>Hazard Class:</b>	6.1	6.1
<b>UN Number:</b>	UN1598	UN1598
<b>Packing Group:</b>	II	II

## Section 15 - Regulatory Information

**US FEDERAL****TSCA**

CAS# 534-52-1 is listed on the TSCA inventory.

**Health & Safety Reporting List**

None of the chemicals are on the Health & Safety Reporting List.

**Chemical Test Rules**

None of the chemicals in this product are under a Chemical Test Rule.

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

CAS# 534-52-1: 10 lb final RQ; 4.54 kg final RQ

**SARA Section 302 Extremely Hazardous Substances**

CAS# 534-52-1: 10 lb lower threshold TPQ; 10000 lb upper threshold TPQ

5/17/2011

MSDS 4,6-Dinitro-o-cresol, 98%, conta...

**SARA Codes**

CAS # 534-52-1: immediate, delayed, reactive.

**Section 313**

This material contains 4,6-Dinitro-o-cresol (CAS# 534-52-1, 98%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

**Clean Air Act:**

CAS# 534-52-1 is listed as a hazardous air pollutant (HAP).  
This material does not contain any Class 1 Ozone depleters.  
This material does not contain any Class 2 Ozone depleters.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 534-52-1 is listed as a Priority Pollutant under the Clean Water Act. CAS# 534-52-1 is listed as a Toxic Pollutant under the Clean Water Act.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 534-52-1 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations**

**European Labeling in Accordance with EC Directives**

**Hazard Symbols:**

T+ N

**Risk Phrases:**

R 26/27/28 Very toxic by inhalation, in contact with skin and if swallowed.  
R 38 Irritating to skin.  
R 41 Risk of serious damage to eyes.  
R 43 May cause sensitization by skin contact.  
R 44 Risk of explosion if heated under confinement.  
R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
R 68 Possible risk of irreversible effects.

**Safety Phrases:**

S 36/37 Wear suitable protective clothing and gloves.  
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).  
S 60 This material and its container must be disposed of as hazardous waste.  
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 534-52-1: No information available.

**Canada - DSL/NDSL**

CAS# 534-52-1 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D1A, D2B. This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 534-52-1 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

**MSDS Creation Date:** 9/02/1997

**Revision #9 Date:** 6/18/2007

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

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[Hazard Communication Kit](#) CFR 1910.1200 Standard, Spill Clean-Up, PPE, MSDS & More! [www.safetyservicescompany.com](#)

**ALL Chemical Analysis PAGES IN THIS GROUP**

NAME	CAS
<a href="#">(6-Piperidinopyrid-2-yl)methanol</a>	869901-07-5
<a href="#">1-[1-(2,3-Dichlorophenyl)-5-methyl-1H-1,2,3-triazol-4-yl]ethan-1-one</a>	519056-56-5
<a href="#">4-[(tert-Butoxycarbonyl)amino]benzoic acid</a>	66493-39-8
<a href="#">1-[4-(Benzyloxy)-2-hydroxy-3-methylphenyl]ethan-1-one</a>	73640-74-1
<a href="#">3,4-Dimethyl-2,5-dihydro-1H-pyrrol-2-one</a>	4030-22-2
<a href="#">N-(3-Chloro-4-methylphenyl)-N'-[2-[(5-[(dimethylamino)methyl]-2-furyl)methyl]sulfanyl]ethyl]urea</a>	Not available
<a href="#">2,5-Bis(trifluoromethyl)furan</a>	56286-72-7
<a href="#">N1-[(Diphenylphosphoryl)(2-furyl)methyl]-2,3-dichloroaniline</a>	Not available
<a href="#">1-(4-Chlorophenyl)-2,5-dimethyl-1H-pyrrole-3-carboxylic acid</a>	60217-76-7
<a href="#">2-[2-(Dimethylamino)ethoxy]benzoic acid</a>	206261-66-7
<a href="#">4-(4-Methylperhydro-1,4-diazepin-1-yl)benzylamine</a>	448934-01-8
<a href="#">(1-Methyl-3-thien-2-yl-1H-pyrazol-5-yl)methylamine</a>	898289-09-3

5/17/2011

MSDS 4,6-Dinitro-o-cresol, 98%, conta...

<a href="#">1-Methyl-1H-indole-6-carbonitrile</a>	20996-87-6
<a href="#">4-(4-Methylperhydro-1,4-diazepin-1-yl)benzaldehyde</a>	166438-86-4
<a href="#">Methyl 5-methylsalicylate, 97%</a>	22717-57-3
<a href="#">5-(Bromoacetyl)-2-oxoindoline</a>	105316-98-1
<a href="#">2-Pyrrolidin-1-ylisonicotinaldehyde</a>	898289-23-1
<a href="#">(6,7-Dihydro-4H-thieno[3,2-c]pyran-4-yl)methylamine</a>	63932-26-3
<a href="#">Acid blue 41</a>	2666-17-3
<a href="#">5-(2-Thienyl)cyclohexane-1,3-dione</a>	23994-65-2
<a href="#">Hydrazine hydrate, 55% (Hydrazine, 35%)</a>	302-01-2
<a href="#">Methyl 3-hydrazino-4-(isopropylsulfonyl)thiophene-2-carboxylate</a>	175201-97-5
<a href="#">Hydrogen chloride, 1.25M solution in methanol</a>	7647-01-0
<a href="#">Methyl 2-[2-(dimethylamino)ethoxy]benzoate</a>	18167-29-8
<a href="#">4,6-Dinitro-o-cresol, 98%, contains about 10% water</a>	534-52-1
<a href="#">Methyl 2-(3-methyl-1,2,4-oxadiazol-5-yl)benzoate</a>	898289-14-0
<a href="#">1-Methyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-1H-indole</a>	898289-06-0
<a href="#">(1-Methyl-1H-indol-4-yl)methylamine</a>	864264-02-8
<a href="#">Methyl Red Free Acid</a>	493-52-7
<a href="#">1-Methyl-1H-indole-4-carbonitrile</a>	628711-58-0
<a href="#">[2-(Phenoxy)methyl]phenylmethanol</a>	34904-98-8
<a href="#">4-Bromoveratrole, 97%</a>	2859-78-1
<a href="#">2,5-Dimethyl-4-(morpholinomethyl)-phenol hydrochloride monohydrate, 97%</a>	33625-43-3
<a href="#">Methyl Salicylate</a>	119-36-8
<a href="#">2-(Phenoxy)methylbenzoyl chloride</a>	21733-94-8
<a href="#">[4-(4-Methylperhydro-1,4-diazepin-1-yl)phenyl]methanol</a>	898289-58-2
<a href="#">2-Piperidin-1-ylisonicotinonitrile</a>	127680-89-1
<a href="#">Ethyl 2-(tert-butylamino)acetate</a>	37885-76-0
<a href="#">2-[4-(Methylsulfonyl)piperazino]ethyl methanesulfonate</a>	Not available
<a href="#">6-Chloro-1,1-dioxo-1,2,3,4-tetrahydro-1lambda~6~,2,4-benzothiadiazine-7-sulfonamide</a>	58-93-5
<a href="#">3,4-Hexanedione, 96%</a>	4437-51-8
<a href="#">1-Nitro-3-(trichloromethyl)benzene</a>	709-58-0
<a href="#">Syringic Acid, 97%</a>	530-57-4
<a href="#">2-(4-Methoxyphenyl)-4,4-dimethyl-4,5-dihydro-1,3-oxazole</a>	53416-46-9
<a href="#">Diethyl 3,4-furandicarboxylate</a>	30614-77-8
<a href="#">2',5'-Dimethoxyacetophenone</a>	1201-38-3
<a href="#">2,4,5-Trichlorobenzenesulfonyl chloride</a>	15945-07-0
<a href="#">Methyl 3-(1,3-benzodioxol-5-yl)acrylate</a>	16386-34-8
<a href="#">1-[4-(3-Bromopropoxy)-2-hydroxy-3-propylphenyl]ethan-1-one</a>	40786-20-7
<a href="#">1-(4-Propylphenyl)ethan-1-one oxime</a>	64128-26-3

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## MATERIAL SAFETY DATA SHEET

Date Printed: 09/03/2008

Date Updated: 02/22/2006

Version 1.4

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Section 1 - Product and Company Information

---

Product Name                    AROCLOR 1242, 50MG, NEAT  
Product Number                48585  
Brand                            SUPELCO

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
AROCLOR 1242	53469-21-9	No

Synonyms                    Arochlor 1242 \* Aroclor 1242 \* Chlorierte  
                                  biphenyle, chloorgehalt 42% (German) \*  
                                  Chlorodiphenyl (42% chlorine) (ACGIH,OSHA) \*  
                                  Chlorodiphenyl (42% Cl) \* Clorodifenili, cloro  
                                  42% (Italian) \* Diphenyle chlore, 42% de chlore  
                                  (French) \* Gechloreerdedifenyl (Dutch) \* PCB  
                                  (OSHA)  
RTECS Number:                TQ1356000

---

Section 3 - Hazards Identification

---

## EMERGENCY OVERVIEW

Dangerous for the environment.

Danger of cumulative effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Calif. Prop. 65 carcinogen & developmental hazard.

## HMIS RATING

HEALTH: 0

FLAMMABILITY: 0

REACTIVITY: 0

## NFPA RATING

HEALTH: 0

FLAMMABILITY: 0

REACTIVITY: 0

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: Water spray. 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(S) OF PERSONAL PRECAUTION(S)

Exercise appropriate precautions to minimize direct contact with skin or eyes and prevent inhalation of vapors.

#### METHODS FOR CLEANING UP

Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

---

### Section 7 - Handling and Storage

---

#### HANDLING

User Exposure: Avoid inhalation. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

#### STORAGE

Suitable: Keep tightly closed.

---

### Section 8 - Exposure Controls / PPE

---

#### ENGINEERING CONTROLS

Safety shower and eye bath. Mechanical exhaust required.

#### PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Respiratory protection is not required. Where protection is



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#### STABILITY

Stable: Stable.

Materials to Avoid: Strong oxidizing agents.

#### HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Hydrogen chloride gas.

#### HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

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### Section 11 - Toxicological Information

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#### 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: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.

Ingestion: May be harmful if swallowed.

#### SIGNS AND SYMPTOMS OF EXPOSURE

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

#### TOXICITY DATA

Oral

Rat

4250 mg/kg

LD50

Remarks: Gastrointestinal:Hypermotility, diarrhea. Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Chromodacryorrhea. Nutritional and Gross Metabolic:Weight loss or decreased weight gain.

Oral

Mammal

> 3000 mg/kg

LD50

Intraperitoneal

Mammal

>1 GM/KG

LD50

#### CHRONIC EXPOSURE - MUTAGEN

Species: Mouse

Dose: 25 PPM

Exposure Time: 4H

Cell Type: Other cell types

Mutation test: Other mutation test systems

#### CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Result: Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Species: Rat

Dose: 945 MG/KG

Route of Application: Oral

Exposure Time: (36W PRE)  
Result: Maternal Effects: Other effects. Endocrine:Estrogenic.

Species: Rat  
Dose: 1890 MG/KG  
Route of Application: Oral  
Exposure Time: (36W PRE)  
Result: Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated ).

Species: Rat  
Dose: 1250 MG/KG  
Route of Application: Oral  
Exposure Time: (5D MALE)  
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Pig  
Dose: 93 MG/KG  
Route of Application: Oral  
Exposure Time: (1-16W PREG)  
Result: Effects on Newborn: Live birth index (# fetuses per litter; measured after birth).

Species: Mammal  
Dose: 188 MG/KG  
Route of Application: Oral  
Exposure Time: (17W PRE-28D POST)  
Result: Effects on Fertility: Other measures of fertility

---

## Section 12 - Ecological Information

---

No data available.

ADDITIONAL RESULTS/DATA FROM RELEVANT SCIENTIFIC EXPERIMENTS  
Avoid contamination of the environment

---

## Section 13 - Disposal Considerations

---

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION  
Caution: contains PCB's (polychlorinated biphenyls). For proper disposal information contact the US Environmental Protection Agency. Observe all federal, state, and local environmental regulations.

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## Section 14 - Transport Information

---

### DOT

Proper Shipping Name: Polychlorinated biphenyls, liquid  
UN#: 2315  
Class: 9  
Packing Group: Packing Group II  
Hazard Label: Class 9  
PIH: Not PIH

### IATA

Proper Shipping Name: Polychlorinated biphenyls, liquid  
IATA UN Number: 2315  
Hazard Class: 9  
Packing Group: II

---

## Section 15 - Regulatory Information

---

### EU DIRECTIVES CLASSIFICATION

Symbol of Danger: N

Indication of Danger: Dangerous for the environment.

R: 33-50/53

Risk Statements: Danger of cumulative effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S: 35-60-61

Safety Statements: This material and its container must be disposed of in a safe way. 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: Dangerous for the environment.

Risk Statements: Danger of cumulative effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Statements: This material and its container must be disposed of in a safe way. 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: Calif. Prop. 65 carcinogen & developmental hazard.

### UNITED STATES REGULATORY INFORMATION

SARA LISTED: No

NOTES: These products are subject to SARA section 313 reporting requirements. These products are subject to SARA section 313 reporting requirements.

### 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 developmental toxicity.

### 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: Yes

NDSL: No

---

## 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.

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## Composition/Information on Ingredient

**Cas:**

53494-70-5

**Code:**

M

**RTECS:**

PC8600000

**Code:**

M

**Name:**

ENDRIN KETONE

**Other REC Limits:**

N/K 3

**OSHA PEL:**

N/K

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

N/K

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

USE APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT.

**Ventilation:**

N/K

**Protective Gloves:**

CHEMICAL RESISTANT

**Eye Protection:**

CHEMICAL GOGGLES/FACE SHIELD

**Other Protective Equipment:**

Equipment CHEMICAL RESISTANT CLOTHING SUCH AS LAB COAT/RUBBER APRON.

**Work Hygienic Practices:**

N/K

**Supplemental Safety and Health:**

N/K

## Health Hazards Data

**LD50LC50Mixture:**

ORAL LD50 (RAT): 6000 MG/KG METHOXYCHLOR

**Route Of Entry Inds - Inhalation:**

NO

**Skin:**

NO

**Ingestion:**

NO

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

YES

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

TOXIC, IRRITANT

**Explanation Of Carcinogenicity:**

SEE INGREDIENTS

**Signs And Symptoms Of Overexposure:**

IRRITATION

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES/SKIN: FLUSH W/COPIOUS AMOUNTS OF WATER. INHALATION: REMOVE TO FRESH AIR. GIVE OXYGEN IF NEEDED. OBTAIN MEDICAL ATTENTION IN ALL CASES.

**Spill Release Procedures:**

A LEAKING BOTTLE MAY BE PLACED IN A PLASTIC BAG & NORMAL DISPOSAL PROCEDURES FOLLOWED. LIQUID SAMPLES MAY BE ABSORBED ON VERMICULITE/SAND.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AFTERBURNER & SCRUBBER IAW/FEDERAL, STATE & LOCAL REGULATIONS.

**Handling And Storage Precautions:**

KEEP TIGHTLY CLOSED & STORE IN A COOL, DRY PLACE.

**Other Precautions:**

THIS MATERIAL SHOULD ONLY BE USED BY THOSE PERSONS TRAINED IN SAFE HANDLING OF HAZARDOUS CHEMICALS. ALL CHEMICALS SHOULD BE CONSIDERED HAZARDOUS. DIRECT PHYSICAL CONTACT SHOULD BE AVOIDED.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P 4

**Flash Point:****Flash Point Text:**

N/K

**Autoignition Temp:****Autoignition Temp Text:**

N/A

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

CO<sub>2</sub>, DRY CHEMICAL POWDER/WATER SPRAY

**Fire Fighting Procedures:**

N/K

**Unusual Fire/Explosion Hazard:**

N/K

## Physical/Chemical Properties

**HCC:****NRC/State LIC No:****Net Prop WT For Ammo:****Boiling Point:****B.P. Text:**

N/K

**Melt/Freeze Pt:****M.P/F.P Text:**

N/K

**Decomp Temp:****Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

N/K

**Volatile Org Content %:**

**Spec Gravity:**

N/K 5

**VOC Pounds/Gallon:**

**PH:** N/K

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

N/K

**Appearance and Odor:**

LIQUID

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/K

**Materials To Avoid:**

N/K

**Hazardous Decomposition Products:**

N/K

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

**Information:**N/P

## MSDS Transport Information

**Information:**N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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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. Lookchem 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.



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 541-73-1****Date: 03/09/2001**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: 1,3-DICHLOROBENZENE

SYNONYMS: M-Dichlorobenzene, M-Dichlorobenzol, M-Phenylenedichloride

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	Exposure Limits (PPM)			
				ACGIH TLV	OSHA PEL	MAC	Other STEL
1,3-DICHLOROBENZENE	C <sub>6</sub> H <sub>4</sub> CL <sub>2</sub>	541-73-1	99+%	NE	NE	NE	NE

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIAN

## 3. HAZARD IDENTIFICATION

**\*\*\* EMERGENCY OVERVIEW \*\*\***

Flammable liquid and vapor.

Can form explosive mixtures in air.

May cause severe irritation or burns to the eyes and skin.

May cause irritation to the respiratory tract.

## POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation , Eye , Ingestion

**ACUTE EFFECTS:** Acts as a central nervous system depressant. High concentrations may have a narcotic effect. Irritation to the eyes, mucous membranes, and upper respiratory tract. Symptoms include dizziness, drowsiness, cyanosis, pallor, spastic contraction of extremities, and loss of consciousness.

**CHRONIC EFFECTS:** Irritation to the eyes, mucous membranes, and upper respiratory tract. Inhalation at high concentrations may be fatal due to spasm, inflammation and edema of the lungs, chemical pneumonitis and pulmonary edema. Kidney and liver damage. Can cause lung damage.

**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** Kidney and liver damage. Central nervous system diseases.

OTHER EFFECTS OF OVEREXPOSURE: None

## CARCINOGENICITY (US ONLY):

NTP - No

IARC MONOGRAPHS - No

OSHA REGULATED - No

**4. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

**EYE CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes.

**SKIN CONTACT:** Rinse the affected area with flooding amounts of water and then wash it with soap and water.

**INGESTION:** Never give anything by mouth to an unconscious person. Have conscious and alert person drink 1 to 2 glasses of water.

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

**NOTE TO PHYSICIAN:** If patient is conscious, attempt to induce vomiting with Ipecac Syrup. Consider activated charcoal cathartic. Administer charcoal slurry with saline, water, or sorbitol. In an unconscious patient, do gastric lavage with suction.

**5. FIRE FIGHTING MEASURES**

**FLASH POINT:** 63 deg. celsius

**AUTOIGNITION TEMPERATURE:** N/Av

**FLAMMABLE LIMITS:** N/Av

LOWER:

UPPER:

**EXTINGUISHING MEDIA:** Use water spray to keep fire exposed cylinders cool. Extinguish with water spray, water fog, dry chemical, or carbon dioxide. Use water in flooding quantities as fog since solid streams of water may spread fire.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. If possible, stop the product flow. Keep fire exposed cylinders cool with water spray.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide, hydrogen chloride and phosgene.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Cylinder rupture may occur under fire conditions. Severe when exposed to heat or flame. Vapors may travel a considerable distance to the source of ignition and flash back.

**6. ACCIDENTAL RELEASE MEASURES**

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Remove all sources of ignition. Prevent release of material to surface water or sewers. Absorb with sand or vermiculite and place in closed containers for disposal. Place waste into a clean, dry container for disposal.

**SPECIALIZED EQUIPMENT:** None

## 7. HANDLING AND STORAGE

**PRECAUTIONS TO BE TAKEN IN HANDLING:** Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

**PRECAUTIONS TO BE TAKEN IN STORAGE:** Store in well ventilated areas. Keep valve protection cap on cylinders when not in use.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**ENGINEERING CONTROLS:** Provide adequate general and local exhaust ventilation.

**EYE / FACE PROTECTION:** Safety glasses

**SKIN PROTECTION:** Impervious gloves, coveralls, boots, and/or other resistant protective clothing.

**RESPIRATORY PROTECTION:** In case of leakage, use self-contained breathing apparatus.

**OTHER PROTECTIVE EQUIPMENT:** Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**APPEARANCE:** Colorless

**ODOR:** Odorless

**PHYSICAL PRESSURE:** Liquid

**VAPOR PRESSURE:** @25 deg. celsius: 2.3 mm Hg

**VAPOR DENSITY (AIR=1):** 5.08

**BOILING POINT (C):** 173

**SOLUBILITY IN WATER:** Insoluble

**SPECIFIC GRAVITY (H2O=1):** @20 deg. celsius: 1.288

**EVAPORATION RATE:** N/Av

**ODOR THRESHOLD:** None

**10. STABILITY AND REACTIVITY**

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas. Storage near a heat source.

MATERIALS TO AVOID: Oxidizing agents.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: Toxic carbon monoxide, hydrogen chloride and phosgene.

**11. TOXICOLOGICAL INFORMATION**

LETHAL CONCENTRATION (LC50): None Established

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

**12. ECOLOGICAL INFORMATION**

No adverse ecological effects are expected.

**13. DISPOSAL CONSIDERATIONS**

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place.

**14. TRANSPORT INFORMATION**

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Combustible Liquid, N.O.S.

HAZARD CLASS: Combustible Liquid, Packing Group III

IDENTIFICATION NUMBER: NA1993

REPORTABLE QUANTITIES: 100 lbs.

LABELING: None

ADR / RID (EU Only): Class 3, 31(c)

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

## 15. REGULATORY INFORMATION

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 208-792-1

NUMBER IN ANNEX 1 OF DIR 67/548: Not listed in annex 1.

EU CLASSIFICATION: N/Av

R: 10-20-22

S: 24/25

## 16. OTHER INFORMATION

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.

# Material Safety Data Sheet

## Carbon tetrachloride

ACC# 90116

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Carbon tetrachloride

**Catalog Numbers:** AC148170000, AC148170250, AC167720000, AC167720010, AC167720025, AC167720100, AC167721000, AC258530000, AC269370000, AC269370010, AC269371000, AC326580000, AC326580010, AC326580025, AC600220000, AC600220010, AC600220025, AC600230000, AC600230010, AC600230025, 14817-0010, 14817-0025, 16772-5000, 25853-0010, 25853-0025, C1874, C1994, NC9267677, NC9472507, NC9596627

**Synonyms:** Tetrachloromethane; Carbon tet; Carbona; Carbon chloride; Methane tetrachloride.**Company Identification:**

Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
56-23-5	Carbon tetrachloride	99-100	200-262-8

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless liquid.

**Danger!** May be fatal if inhaled, absorbed through the skin or swallowed. Causes eye, skin, and respiratory tract irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. Cancer suspect agent. May cause liver and kidney damage. May cause central nervous system effects. This is a CFC substance which destroys ozone in the upper atmosphere. Destruction of the ozone layer can lead to increased ultraviolet radiation which, with excess exposure to sunlight, can lead to an increase in skin cancer and eye cataracts. Marine pollutant.

**Target Organs:** Kidneys, central nervous system, liver.**Potential Health Effects****Eye:** Causes eye irritation. Vapors cause eye irritation.**Skin:** Causes skin irritation. May be absorbed through the skin in harmful amounts. Contact with the skin defats the skin.**Ingestion:** May cause liver and kidney damage. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Substance is a hepatotoxin and is capable of producing a toxic effect on the liver.

**Inhalation:** Causes respiratory tract irritation. May cause liver and kidney damage. Exposure produces central nervous system depression. May be harmful if inhaled.

**Chronic:** Prolonged or repeated skin contact may cause dermatitis. Chronic ingestion may cause effects similar to those of acute ingestion. May cause liver and kidney damage. May cause cancer according to animal studies. Chronic exposure may cause visual disturbances. Carbon tetrachloride is a CNS depressant.

## Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

**Skin:** In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.

**Ingestion:** Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.

**Inhalation:** POISON material. If inhaled, get medical aid immediately. Remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Material will not burn. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.

**Extinguishing Media:** Use extinguishing media most appropriate for the surrounding fire.

**Flash Point:** Not applicable.

**Autoignition Temperature:** > 982 deg C (> 1,799.60 deg F)

**Explosion Limits, Lower:** Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 3; Flammability: 0; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Isolate area and deny entry. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Do not breathe vapor. Use only with adequate ventilation.

**Storage:** Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Use only under a chemical fume hood.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Carbon tetrachloride	5 ppm TWA; 10 ppm STEL; Skin - potential significant contribution to overall exposure by the cutaneous route	200 ppm IDLH	10 ppm TWA; 25 ppm Ceiling

**OSHA Vacated PELs:** Carbon tetrachloride: 2 ppm TWA; 12.6 mg/m<sup>3</sup> TWA

### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless

**Odor:** chloroform-like

**pH:** Not available.

**Vapor Pressure:** 91 mm Hg @ 20 deg C

**Vapor Density:** 5.31 (air=1)

**Evaporation Rate:** 12.8 (butyl acetate=1)

**Viscosity:** 0.97 PAS 20 deg C

**Boiling Point:** 76 deg C @ 760 mm Hg

**Freezing/Melting Point:** -23 deg C

**Decomposition Temperature:** > 100 deg C

**Solubility:** Insoluble.

**Specific Gravity/Density:** 1.5900 g/cm<sup>3</sup>

**Molecular Formula:** CCl<sub>4</sub>

**Molecular Weight:** 153.82

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Light, excess heat.

**Incompatibilities with Other Materials:** Alkali metals, powdered aluminum, powdered magnesium,

zinc powder, ethylene, allyl alcohol, barium, fluorine, dimethylformamide, powdered beryllium, decaborane, potassium tert-butoxide.

**Hazardous Decomposition Products:** Hydrogen chloride, chlorine, phosgene, carbon monoxide, carbon dioxide, chlorine dioxide, which may be spontaneously explosive.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 56-23-5: FG4900000

**LD50/LC50:**

CAS# 56-23-5:

Dermal, guinea pig: LD50 = >9400 uL/kg;  
Draize test, rabbit, eye: 2200 ug/30S Mild;  
Draize test, rabbit, eye: 500 mg/24H Mild;  
Draize test, rabbit, skin: 4 mg Mild;  
Draize test, rabbit, skin: 500 mg/24H Mild;  
Inhalation, mouse: LC50 = 9526 ppm/8H;  
Inhalation, mouse: LC50 = 34500 mg/m<sup>3</sup>/2H;  
Inhalation, rat: LC50 = 8000 ppm/4H;  
Inhalation, rat: LC50 = 46000 mg/m<sup>3</sup>/6H;  
Oral, mouse: LD50 = 7749 mg/kg;  
Oral, rabbit: LD50 = 5760 mg/kg;  
Oral, rat: LD50 = 2350 mg/kg;

Skin, rabbit: LD50 = >20 Carbon tetrachloride is harmful to the liver and a CNS depressant following short-term inhalation, skin contact or ingestion. The liver effects have been observed at concentrations lower than those required to produce CNS effects. Two reviews indicate that ingestion of 14-20 ml or 50-150 ml could be fatal. Although, 1.5 ml (34 mg/kg) has caused death in a few cases.

**Carcinogenicity:**

CAS# 56-23-5:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 10/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

**Epidemiology:** No data available.

**Teratogenicity:** Animal studies have only shown harmful effects in the offspring of animals exposed to doses which also produced significant maternal toxicity.

**Reproductive Effects:** There is no human information available. There is insufficient animal information available to draw any conclusions about potential reproductive toxicity.

**Mutagenicity:** No data available.

**Neurotoxicity:** No data available.

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Fathead Minnow: LC50 = 20.8-41.4 mg/L; 96 Hr.; Flow-through; 21.7 degrees  
CFish: Bluegill/Sunfish: LC50 = 27-125 mg/L; 96 Hr.; Static Conditions; 23 degrees  
CBacteria: Phytobacterium phosphoreum: EC50 = 6.0 mg/L; Not available; Microtox test  
Bacteria:

Phytobacterium phosphoreum: EC50 = 33.0 mg/L; 30 minutes; Microtox test No data available.

**Environmental:** Terrestrial: Evaporates rapidly and migrates into groundwater. Aquatic: Rapidly evaporates, biodegradation an important fate process.

**Physical:** Atmospheric: Very stable in troposphere with a residence time of 30-50 years.

**Other:** Carbon tetrachloride has a low potential to bioconcentrate. Log of the bioconcentration factor in trout is 1.24, in bluegill sunfish - 1.48. Bioconcentration factor predicted from water solubility = 14.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 56-23-5: waste number U211.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	CARBON TETRACHLORIDE	CARBON TETRACHLORIDE
<b>Hazard Class:</b>	6.1	6.1(9.2)
<b>UN Number:</b>	UN1846	UN1846
<b>Packing Group:</b>	II	II

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 56-23-5 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 56-23-5: 10 lb final RQ; 4.54 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 56-23-5: immediate, delayed.

#### Section 313

This material contains Carbon tetrachloride (CAS# 56-23-5, 99-100%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

#### Clean Air Act:

CAS# 56-23-5 is listed as a hazardous air pollutant (HAP). CAS# 56-23-5 is listed as a Class 1 ozone depletor with an 1.1 ODP

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

CAS# 56-23-5 is listed as a Hazardous Substance under the CWA. CAS# 56-23-5 is listed as a Priority Pollutant under the Clean Water Act. CAS# 56-23-5 is listed as a Toxic Pollutant under the Clean Water Act.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 56-23-5 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**California Prop 65**

**The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:**

WARNING: This product contains Carbon tetrachloride, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 56-23-5: 5 æg/day NSRL

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

T N

**Risk Phrases:**

R 23/24/25 Toxic by inhalation, in contact with skin and if swallowed.

R 40 Limited evidence of a carcinogenic effect.

R 59 Dangerous for the ozone layer.

R 48/23 Toxic : danger of serious damage to health by prolonged exposure through inhalation.

R 52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Safety Phrases:**

S 23 Do not inhale gas/fumes/vapour/spray.

S 36/37 Wear suitable protective clothing and gloves.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 59 Refer to manufacturer/supplier for information on recovery/recycling.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 56-23-5: 3

**Canada - DSL/NDSL**

CAS# 56-23-5 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D1A, D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 56-23-5 is listed on the Canadian Ingredient Disclosure List.

**MSDS Creation Date:** 7/20/1999

**Revision #7 Date:** 2/06/2008

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

## Composition/Information on Ingredient

**Cas:**

563-58-6

**Code:**

M

**RTECS:**

UC8290000

**Code:**

M

**Name:**

1,1-DICHLOROPROPYLENE

**Other REC Limits:**

N/K

**OSHA PEL:**

N/K

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

N/K

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

WEAR FACE MASK W/ORGANIC VAPOR CANISTER.

**Ventilation:**

ADEQUATE

**Protective Gloves:**

RUBBER

**Eye Protection:**

PROTECTIVE GLASSES

**Other Protective Equipment:**

Equipment N/K

**Work Hygienic Practices:**

REMOVE & WASH CONTAMINATED CLOTHES BEFORE REUSE. WASH HANDS THOROUGHLY AFTER HANDLING.

**Supplemental Safety and Health:**

PRODUCT SHOULD BE HANDLED ONLY BY QUALIFIED PERSONS TRAINED IN LABORATORY PROCEDURES & GOOD SAFETY PRACTICES.

## Health Hazards Data

**LD50LC50 Mixture:**

LD50 ORAL (RAT): 5628 MG/KG METHANOL

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

NO

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

YES

**IARC:**

YES

**OSHA:**

YES

**Health Hazards Acute And Chronic:**

INHALATION: HARMFUL, HEADACHE, NAUSEA & GASTROINTESTINAL DISTURBANCES. INGESTION: FATAL, BLINDNESS.

**Explanation Of Carcinogenicity:**

SEE INGREDIENTS

**Signs And Symptoms Of Overexposure:**

INGESTION: MAY CAUSE CANCER.

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES: FLUSH W/WATER FOR AT LEAST 15 MINS. SKIN: WASH W/LARGE AMOUNTS OF WATER.

INHALATION: REMOVE TO FRESH AIR. IF

BREATHING SS, GIVE ARTIFICIAL RESPIRATION. INGESTION: NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. NEVER

TRY TOMAKE AN UNCONSCIOUS PERSON VOMIT. GIVE 2 TABLESPOONS OF BAKING SODA IN A GLASS OF WATER, PRESS FINGERS BACK

OF TONGUE TO INDUCE VOMIT. OBTAIN MEDICAL ATTENTION.

**Spill Release Procedures:**

TAKE UP W ABSORBENT MATERIAL. VENTILATE AREA. ELIMINATE ALL IGNITION SOURCES.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

DISPOSE OF IN ACCORDANCE W/FEDERAL, STATE & LOCAL REGULATIONS.

**Handling And Storage Precautions:**

STORE IN SEALED CONTAINERS IN COOL, DRY LOCATION. KEEP AWAY FROM OXIDIZERS. KEEP AWAY FROM IGNITION SOURCES.

**Other Precautions:**

AVOID EYE/SKIN CONTACT. AVOID BREATHING VAPORS.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P 4

**Flash Point:**

**Flash Point Text:**

50F

**Autoignition Temp:**

**Autoignition Temp Text:**

N/A

**Lower Limits:**

6.0%

**Upper Limits:**

36.5%

**Extinguishing Media:**

CO2, DRY CHEMICAL, ALCOHOL FOAM

**Fire Fighting Procedures:**

WEAR SELF-CONTAINED BREATHING APPARATUS WHEN FIGHTING A CHEMICAL FIRE.

**Unusual Fire/Explosion Hazard:**

THE FOLLOWING TOXIC VAPORS ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.

HYDROCHLORIC ACID, HYDROGEN

BROMIDE.

## Physical/Chemical Properties

**HCC:**

**NRC/State LIC No:**

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

65C

**Melt/Freeze Pt:**

**M.P/F.P Text:**

-98C

**Decomp Temp:**  
**Decomp Text:**  
N/K  
**Vapor Pres:**  
100  
**Vapor Density:**  
1.1 5  
**Volatile Org Content %:**  
**Spec Gravity:**  
0.79  
**VOC Pounds/Gallon:**  
**PH:** N/K  
**VOC Grams/Liter:**  
**Viscosity:**  
N/P  
**Evaporation Rate & Reference:**  
(ETHER = 1) >1  
**Solubility in Water:**  
COMPLETE  
**Appearance and Odor:**  
CLEAR COLORLESS LIQUID  
**Percent Volatiles by Volume:**  
100  
**Corrosion Rate:**  
N/K

## Reactivity Data

**Stability Indicator:**  
YES  
**Stability Condition To Avoid:**  
ALL IGNITION SOURCES.  
**Materials To Avoid:**  
OXIDIZING AGENTS, CHROMIC ANHYDRIDE, LEAD PERCHLORATE, PERCHLORIC ACIDS.  
**Hazardous Decomposition Products:**  
HYDROCHLORIC ACID, HYDROGEN BROMIDE  
**Hazardous Polymerization Indicator:**  
NO  
**Conditions To Avoid Polymerization:**  
N/K

## Toxicological Information

**Information:**N/P

## MSDS Transport Information

**Information:**N/P

## Regulatory Information

**Sara Title III Information:** N/P  
**Federal Regulatory Information:** N/P  
**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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### 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. Lookchem 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.

## Composition/Information on Ingredient

**Cas:**

57-74-9

**Code:**

M

**RTECS:**

PB9800000

**Code:**

M

**Name:**

CHLORDANE (SARA III)

**Other REC Limits:**

N/P

**OSHA PEL:**

S, 0.5 MG/M3

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

S, 0.5 MG/M3; 9192

**Code:**

M

**ACGIHSTEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

NIOSH/MSHA APPRVD RESP PROTECTN FOR EXPOSURE OR CONCERN

**Ventilation:**

LOCAL EXHAUST-YES

**Protective Gloves:**

4 RUBBER

**Eye Protection:**

CHEMICAL GOGGLES

**Other Protective Equipment:**

Equipment RUBBER APRON OR EQUIVALENT,SHOWERS,DAILY CLOTHING CHANGE

**Work Hygienic Practices:**

N/P

**Supplemental Safety and Health:**

EVENING EMERGENCY PHONE:815-685-2676. FIRE PROCEDURES (CONT):IF CNTNR

BROKEN.USE FOAM OIL

CO\*2,SOLUTN WATER DISPERSIBLE.OPA REGISTRATION NO. 6720-67

## Health Hazards Data

**LD50LC50Mixture:**

N/P

**Route Of Entry Inds - Inhalation:**

N/P

**Skin:**

N/P

**Ingestion:**

N/P

**Carcinogenicity Inds - NTP:**

N/P

**IARC:**

N/P

**OSHA:**

N/P

**Health Hazards Acute And Chronic:**

N/P

**Explanation Of Carcinogenicity:**

N/P

**Signs And Symptions Of Overexposure:**

ACTS ON THE CNS; NAUSEA AND/OR DIARRHEA,WEAKNESS,CONVULSIONS.

**Medical Cond Aggravated By Exposure:**

N/P

**First Aid:**

IMMEDIATELY FLUSH W/WATER AT LEAST 15 MINUTES.REMOVE FROM SKIN IMMEDIATELY W/SOAP &amp; WATER

ONLY.INHALATION:REMOVE TO FRESH AIR.

**Spill Release Procedures:**

CLEAN UP W/SHOVEL FOR REUSE OR DISPOSAL. WASH AREA W/DETERGENT &amp; WATER. DO NOT ALLOW IN SEWERS. KEEP AWAY FROM

SPARKS OR OPEN FLAME.

**Neutralizing Agent:**

N/P

**Waste Disposal Methods:**

3 DO NOT REUSE EMPTY CONTAINERS.DESTROY BY BURIAL AWAY FROM WATER SUPPLIES OR BURN,KEEPING AWAY FROM SMOKE OR

FUMES. DISPOSAL MUST BE DONE IN ACCORDANCE W/LOCAL,STATE &amp; FEDERAL REGULATIONS.

**Handling And Storage Precautions:**

STORE IN WELL VENTILATED AREAS, AWAY FROM SPARK &amp; OPEN FLAME.

**Other Precautions:**

SELF-CONTAINED BREATHING APPARATUS &amp; PROTECTIVE CLOTHING SHOULD BE AVAILABLE IN CASE OF SEVERE FIRES.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P

**Flash Point:****Flash Point Text:**

N/A

**Autoignition Temp:****Autoignition Temp Text:**

N/A

**Lower Limits:****Upper Limits:****Extinguishing Media:**

FOG,FOAM,CARBON DIOXIDE

**Fire Fighting Procedures:**

INTACT CNTNR-WET W/H2O TO PREVENT OVERHEATNG.SEE SUPP DATA

**Unusual Fire/Explosion Hazard:**

DECOMPOSES ON EXCESSIVE HEAT-FORMS HCL,ORGANOCHLORIDE PRODUCTS,CO\*2,CO

## Physical/Chemical Properties

**HCC:****NRC/State LIC No:**

N/A

**Net Prop WT For Ammo:****Boiling Point:****B.P. Text:**

N/A

**Melt/Freeze Pt:****M.P/F.P Text:**

N/A

**Decomp Temp:****Decomp Text:**

N/A

**Vapor Pres:**

N/P

**Vapor Density:**

N/P

**Volatile Org Content %:****Spec Gravity:**

N/P

**VOC Pounds/Gallon:**

PH: N/P

**VOC Grams/Liter:****Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/A

**Solubility in Water:**

NEGLIGIBLE 5

**Appearance and Odor:**

TAN POWDER-SLIGHTLY PUNGENT ODOR

**Percent Volatiles by Volume:**

N/P

**Corrosion Rate:**

N/P

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

STABLE UNDER NORMAL CONDITIONS OF STORAGE

**Materials To Avoid:**

N/P

**Hazardous Decomposition Products:**

HCL,ORGANOCHLORIDE PRODUCTS,CO\*2,CO

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/P

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

**Sara Title III Information:** N/P**Federal Regulatory Information:** N/P**State Regulatory Information:** N/P

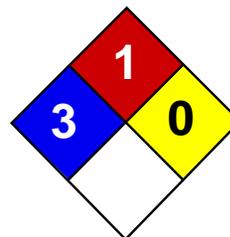
## Other Information

**Other Information:**N/P[www.lookchem.com](http://www.lookchem.com)

For R&amp;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. Lookchem 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.



Health	3
Fire	1
Reactivity	0
Personal Protection	E

## Material Safety Data Sheet

### 1,2,3,4,5,6-Hexachlorocyclohexane,gamma- Isomer MSDS

#### Section 1: Chemical Product and Company Identification

**Product Name:** 1,2,3,4,5,6-Hexachlorocyclohexane,gamma- Isomer

**Catalog Codes:** SLH1075

**CAS#:** 58-89-9

**RTECS:** GV4900000

**TSCA:** TSCA 8(b) inventory: 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer

**CI#:** Not available.

**Synonym:** gamma-Benzene Hexachloride; Aalindan; Hexicide; Viton; Lindane; gamma-BHC

**Chemical Name:** 1,2,3,4,5,6-Hexachlorocyclohexane, gamma-Isomer

**Chemical Formula:** Not available.

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**  
1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

#### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
{1,2,3,4,5,6}-Hexachlorocyclohexane, gamma-	58-89-9	100

**Toxicological Data on Ingredients:** Isomer 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer: ORAL (LD50): Acute: 76 mg/kg [Rat]. 44 mg/kg [Mouse]. DERMAL (LD50): Acute: 50 mg/kg [Rabbit].

#### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation (lung irritant). Hazardous in case of skin contact (permeator). Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

**Potential Chronic Health Effects:**

CARCINOGENIC EFFECTS: Classified + (Proven.) by OSHA. Classified A3 (Proven for animal.) by ACGIH. Classified SUSPECTED by NTP. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Development toxin [SUSPECTED]. The substance may be toxic to

blood, kidneys, liver, upper respiratory tract, skin, eyes, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

#### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

**Serious Skin Contact:**

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

**Ingestion:**

If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

**Serious Ingestion:** Not available.

#### Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** CLOSED CUP: Higher than 93.3°C (200°F).

**Flammable Limits:** Not available.

**Products of Combustion:** Corrosive and toxic fumes (toxic fumes of halides, hydrogen chloride, and phosgene)

**Fire Hazards in Presence of Various Substances:** Slightly flammable to flammable in presence of heat.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of heat.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:**

May decompose on heating to produce corrosive and/or toxic fumes. Very toxic fumes of chlorides, hydrogen chloride, and phosgene are released when lindane is heated to decomposition.

**Special Remarks on Explosion Hazards:** Containers may explode when heated.

#### Section 6: Accidental Release Measures

**Small Spill:** Use appropriate tools to put the spilled solid in a convenient waste disposal container.

**Large Spill:**

Poisonous solid. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 23°C (73.4°F).

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:**

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**

TWA: 0.5 (mg/m<sup>3</sup>) from ACGIH (TLV) [United States] [1999] Inhalation TWA: 0.5 STEL: 1.5 (mg/m<sup>3</sup>) [Canada] Inhalation TWA: 0.5 (mg/m<sup>3</sup>) from NIOSH SKIN TWA: 0.5 (mg/m<sup>3</sup>) from NIOSH Inhalation TWA: 0.1 (mg/m<sup>3</sup>) [United Kingdom (UK)] Inhalation<sup>3</sup> Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid. (Powdered solid.)

**Odor:**

Odorless to slight musty odor. Pure Lindane is odorless

**Taste:** Not available.

**Molecular Weight:** 290.83 g/mole

**Color:** White.

**pH (1% soln/water):** Not available.

**Boiling Point:** 323.4°C (614.1°F)

**Melting Point:** 113°C (235.4°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 1.85 (Water = 1)

**Vapor Pressure:** 0.0000094 mm Hg @ 20 C.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** 1 ppm

**Water/Oil Dist. Coeff.:** The product is more soluble in oil;  $\log(\text{oil/water}) = 3.6$

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water, acetone.

**Solubility:**

Soluble in acetone. Very slightly soluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Incompatible materials, excess heat.

**Incompatibility with various substances:** Reactive with oxidizing agents, metals, acids, alkalis.

**Corrosivity:** Corrosive in presence of aluminum.

**Special Remarks on Reactivity:**

It decomposes in the presence of alkalis at ambient temperature, forming trichlorobenzenes. It is decomposed by powdered iron, aluminum, and zinc. Lindane is incompatible with lime, sulfur, calcium arsenate, and other strong alkaline materials.

**Special Remarks on Corrosivity:** Lindane is corrosive to aluminum and other metals.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:**

Acute oral toxicity (LD50): 44 mg/kg [Mouse]. Acute dermal toxicity (LD50): 50 mg/kg [Rabbit].

**Chronic Effects on Humans:**

CARCINOGENIC EFFECTS: Classified + (Proven.) by OSHA. Classified A3 (Proven for animal.) by ACGIH. Classified SUSPECTED by NTP. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. DEVELOPMENTAL TOXICITY: Classified Development toxin [SUSPECTED]. May cause damage to the following organs: blood, kidneys, liver, upper respiratory tract, skin, eyes, central nervous system (CNS).

**Other Toxic Effects on Humans:**

Very hazardous in case of skin contact (irritant), of ingestion, of inhalation (lung irritant). Hazardous in case of skin contact (permeator).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:**

Can cause adverse reproductive effects and birth defects. May cause cancer based on animal data. May affect genetic material based on animal data.

**Special Remarks on other Toxic Effects on Humans:**

Acute Potential Health Effects: Skin: May cause skin irritation; can be absorbed through skin. May be fatal if absorb pure product through skin. May affect behavior and cardiovascular system Inhalation: May cause respiratory tract irritation, cyanosis, and breathing difficulty. Eyes: Can cause eye irritation. It may be absorbed through the eyes. Ingestion: Harmful

(toxic) if swallowed. Can affect the gastrointestinal system (nausea, vomiting, malaise), behavior (headaches, excitability, unconsciousness, tremor, dizziness, loss of coordination, clonic/tonic seizures, muscle spasm, sleeplessness, CNS depression), and the respiratory system (cyanosis breathing difficulty). May affect metabolism. Chronic Potential Health Effects: May affect blood, liver, kidneys, metabolism

## Section 12: Ecological Information

### Ecotoxicity:

Ecotoxicity in water (LC50): 0.1 ppm 96 hours [Fathead minnow]. 0.1 ppm 96 hours [Bluegill]. 0.1 ppm 96 hours [rainbow trout]. 0.1 ppm any hours [lake trout]. 0.1 ppm any hours [goldfish].

**BOD5 and COD:** Not available.

### Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** Not available.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

## Section 14: Transport Information

**DOT Classification:** CLASS 6.1: Poisonous material.

**Identification:** : Toxic Solid, Organic, n.o.s. (Lindane) UNNA: 2810 PG: II

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

### Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer California prop. 65 (no significant risk level): 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer: 6 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer New York release reporting list: 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer Rhode Island RTK hazardous substances: 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer Pennsylvania RTK: 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer Florida: 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer Minnesota: 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer Massachusetts RTK: 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer New Jersey: 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer Tennessee: 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer California Director's List of Hazardous Substances (8 CCR 339): 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer TSCA 8(b) inventory: 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer SARA 302/304/311/312 extremely hazardous substances: 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer SARA 313 toxic chemical notification and release reporting: 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer CERCLA: Hazardous substances.: 1,2,3,4,5,6-Hexachlorocyclohexane, gamma- Isomer: 1 lbs. (0.4536 kg)

### Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

### Other Classifications:

**WHMIS (Canada):**

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**

R25- Toxic if swallowed. R27- Very toxic in contact with skin. R37/38- Irritating to respiratory system and skin. R41- Risk of serious damage to eyes. R45- May cause cancer. R61- May cause harm to the unborn child. S1/2- Keep locked up and out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S28- After contact with skin, wash immediately with plenty of [\*\*\*] S36/37- Wear suitable protective clothing and gloves. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label. S53- Avoid exposure - obtain special instructions before use.

**HMIS (U.S.A.):**

**Health Hazard:** 3

**Fire Hazard:** 1

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 3

**Flammability:** 1

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

**Section 16: Other Information**

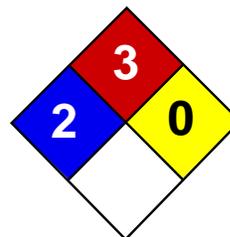
**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/09/2005 05:42 PM

**Last Updated:** 11/06/2008 12:00 PM

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Health	2
Fire	3
Reactivity	0
Personal Protection	H

## Material Safety Data Sheet 2-Hexanone MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** 2-Hexanone

**Catalog Codes:** SLH2950

**CAS#:** 591-78-6

**RTECS:** MP1400000

**TSCA:** TSCA 8(b) inventory: 2-Hexanone

**CI#:** Not available.

**Synonym:** Methyl butyl ketone

**Chemical Formula:** C<sub>6</sub>H<sub>12</sub>O

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
{2-}Hexanone	591-78-6	100

**Toxicological Data on Ingredients:** 2-Hexanone: ORAL (LD50): Acute: 2590 mg/kg [Rat]. 2430 mg/kg [Mouse]. DERMAL (LD50): Acute: 4860 mg/kg [Rabbit]. VAPOR (LC50): Acute: 8000 ppm 4 hour(s) [Rat].

### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Very hazardous in case of eye contact (irritant), of inhalation (lung irritant). Hazardous in case of skin contact (irritant), of ingestion, . Slightly hazardous in case of skin contact (permeator). Inflammation of the eye is characterized by redness, watering, and itching.

**Potential Chronic Health Effects:**

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

**Skin Contact:**

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

**Serious Skin Contact:**

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

**Inhalation:** Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

**Ingestion:**

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

**Serious Ingestion:** Not available.

### Section 5: Fire and Explosion Data

**Flammability of the Product:** Flammable.

**Auto-Ignition Temperature:** 533°C (991.4°F)

**Flash Points:** CLOSED CUP: 23°C (73.4°F). OPEN CUP: 28°C (82.4°F) (TAG).

**Flammable Limits:** LOWER: 1.2% UPPER: 8%

**Products of Combustion:** These products are carbon oxides (CO, CO<sub>2</sub>).

**Fire Hazards in Presence of Various Substances:** Flammable in presence of open flames and sparks.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

### Section 6: Accidental Release Measures

**Small Spill:**

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

**Large Spill:**

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

### Section 7: Handling and Storage

**Precautions:**

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

**Storage:**

Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:**

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**

TWA: 25 CEIL: 40 (ppm) TWA: 100 CEIL: 165 (mg/m<sup>3</sup>) Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid.

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 100.16 g/mole

**Color:** Colorless to light yellow.

**pH (1% soln/water):** Not available.

**Boiling Point:** 127.5°C (261.5°F)

**Melting Point:** -56.9°C (-70.4°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 0.8113 (Water = 1)

**Vapor Pressure:** 12 mm of Hg (@ 20°C)

**Vapor Density:** 3.45 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** 0.18 ppm

**Water/Oil Dist. Coeff.:** The product is equally soluble in oil and water; log(oil/water) = 0

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water, acetone.

**Solubility:**

Easily soluble in acetone. Partially soluble in cold water.

### Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Not available.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** No.

### Section 11: Toxicological Information

**Routes of Entry:** Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:**

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2430 mg/kg [Mouse]. Acute dermal toxicity (LD50): 4860 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 8000 ppm 4 hour(s) [Rat].

**Chronic Effects on Humans:** Not available.

**Other Toxic Effects on Humans:**

Very hazardous in case of inhalation (lung irritant). Hazardous in case of skin contact (irritant), of ingestion, . Slightly hazardous in case of skin contact (permeator).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Passes through the placental barrier in animal. Testicular damage in animal.

**Special Remarks on other Toxic Effects on Humans:** Not available.

### Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are more toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

### Section 13: Disposal Considerations

**Waste Disposal:**

### Section 14: Transport Information

**DOT Classification:** Class 3: Flammable liquid.

**Identification:** : Ketone Liquid, n.o.s.(2-Hexanone) : UN1224 PG: III

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

### Federal and State Regulations:

Rhode Island RTK hazardous substances: 2-Hexanone Pennsylvania RTK: 2-Hexanone Florida: 2-Hexanone Massachusetts RTK: 2-Hexanone New Jersey: 2-Hexanone TSCA 8(b) inventory: 2-Hexanone

### Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

### Other Classifications:

**WHMIS (Canada):** CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).

### DSCL (EEC):

R10- Flammable. R37/38- Irritating to respiratory system and skin. R41- Risk of serious damage to eyes.

### HMIS (U.S.A.):

**Health Hazard:** 2

**Fire Hazard:** 3

**Reactivity:** 0

**Personal Protection:** h

### National Fire Protection Association (U.S.A.):

**Health:** 2

**Flammability:** 3

**Reactivity:** 0

**Specific hazard:**

### Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/09/2005 05:43 PM

**Last Updated:** 11/01/2010 12:00 PM

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4-CHLORO-3-METHYLPHENOL, 99%



PROFEPA:	01-800-770-3372
SETIQ:	01-800-002-1400
PROTECCION CIVIL:	01-800-004-1300

AMPEX CHEMICALS, S.A. DE C.V., SANTA ANA 577, ESCOBEDO, N.L., MEX. 66055, TEL: (81) 8307-2043

# 4-CHLORO-3-METHYLPHENOL, 99%

## 1. Product Identification

**Synonyms:** 4-Chloro-M-Cresol; 6-Chloro-3-Hydroxytoluene

**CAS No.:** 59-50-7

**Molecular Weight:** 142.5014

**Chemical Formula:** C<sub>7</sub>H<sub>7</sub>ClO

**Product Codes:** C0209, C0210

## 2. Composition/Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
59-50-7	4-Chloro-3-Methylphenol	99	200-431-6

## 3. Hazards Identification

### EMERGENCY OVERVIEW

Appearance: white to pale pink.

**Caution!** Causes eye and skin irritation. May cause allergic skin reaction. May be harmful if swallowed. Causes digestive and respiratory tract irritation. May cause liver and kidney damage. May cause dermatitis.

**Target Organs:** Kidneys, liver.

### Potential Health Effects

**Eye:** Causes eye irritation.

**Skin:** Causes skin irritation. Prolonged and/or repeated contact may cause irritation and/or dermatitis. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.

**Ingestion:** Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May be harmful if swallowed.

**Inhalation:** Causes respiratory tract irritation.

**Chronic:** May cause liver and kidney damage.

## 4. First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

**Skin:** Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.

**Ingestion:** If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically.

---

## 5. Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.

**Extinguishing Media:** In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam.

**Flash Point:** Not applicable.

**Autoignition Temperature:** 590 deg C ( 1,094.00 deg F)

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: ; Flammability: ; Instability:

---

## 6. Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Reduce airborne dust and prevent scattering by moistening with water. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

---

## 7. Handling and Storage

**Handling:** Wash thoroughly after handling. Wash hands before eating. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Avoid contact with skin and eyes. Avoid ingestion and inhalation.

**Storage:** Store in a cool, dry place. Keep container closed when not in use.

---

## 8. Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

#### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
4-Chloro-3-Methylphenol	none listed	none listed	none listed

**OSHA Vacated PELs:** 4-Chloro-3-Methylphenol: No OSHA Vacated PELs are listed for this chemical.

#### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

## 9. Physical and Chemical Properties

**Physical State:** Solid

**Appearance:** white to pale pink

**Odor:** Odorless.

**pH:** Not available.

**Vapor Pressure:** 0.08 mm Hg @ 20C

**Vapor Density:** 4.9

**Evaporation Rate:**Not available.

**Viscosity:** Not available.

**Boiling Point:** 235 deg C

**Freezing/Melting Point:**66 deg C

**Decomposition Temperature:**Not available.

**Solubility:** Slightly soluble in water.

**Specific Gravity/Density:**Not available.

**Molecular Formula:**C7H7ClO

**Molecular Weight:**142.5014

## 10. Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Incompatible materials, dust generation.

**Incompatibilities with Other Materials:** Bases, acid chlorides, acid anhydrides, sodium hydroxide, oxidizing agents, steel, brass, copper, and copper alloys.

**Hazardous Decomposition Products:** Hydrogen chloride, chlorine, phosgene, carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## 11. Toxicological Information

**RTECS#:**

CAS# 59-50-7: GO7100000

**LD50/LC50:**

CAS# 59-50-7:

Oral, mouse: LD50 = 600 mg/kg;

Oral, rat: LD50 = 1830 mg/kg;

**Carcinogenicity:**

CAS# 59-50-7: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.

**Teratogenicity:** No information available.

**Reproductive Effects:** No information available.

**Mutagenicity:** No information available.

**Neurotoxicity:** No information available.

**Other Studies:**

## 12. Ecological Information

No information available.

## 13. Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 59-50-7: waste number U039.

## 14. Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	CHLOROCRESOLS	CHLOROCRESOLS, SOLID
<b>Hazard Class:</b>	6.1	6.1
<b>UN Number:</b>	UN2669	UN2669
<b>Packing Group:</b>	II	II

## 15. Regulatory Information

### US FEDERAL

#### TSCA

CAS# 59-50-7 is listed on the TSCA inventory.

**Health & Safety Reporting List**

None of the chemicals are on the Health & Safety Reporting List.

**Chemical Test Rules**

None of the chemicals in this product are under a Chemical Test Rule.

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

CAS# 59-50-7: 5000 lb final RQ; 2270 kg final RQ

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**SARA Codes**

CAS # 59-50-7: acute.

**Section 313** No chemicals are reportable under Section 313.**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 59-50-7 is listed as a Priority Pollutant under the Clean Water Act.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 59-50-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XN N

**Risk Phrases:**

R 21/22 Harmful in contact with skin and if swallowed.

R 41 Risk of serious damage to eyes.

R 43 May cause sensitization by skin contact.

R 50 Very toxic to aquatic organisms.

**Safety Phrases:**

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

S 61 Avoid release to the environment. Refer to special instructions/safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 59-50-7: 2

**Canada - DSL/NDSL**

CAS# 59-50-7 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D1A, D2B.

**Canadian Ingredient Disclosure List**

CAS# 59-50-7 is not listed on the Canadian Ingredient Disclosure List.

## 16. Other Information

**Product Use:**

Laboratory Reagent.

**Revision Information:**

Jan. 2008.

**Disclaimer:**

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# Material Safety Data Sheet

## d-Limonene

ACC# 54537

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** d-Limonene**Catalog Numbers:** AC179390000, AC179390050, AC179395000, AC413170000, AC413171000, AC413180000, AC413180010, AC413180030, AC413180050, 15182507A, 15182507C, 22143975, 22143976, BN08170011, BP2696-1G, BP2696-4, 23245686**Synonyms:** Hemo-De; Carvene; (+)-4-Isopropenyl-1-methylcyclohexene; (+)-R-Limonene; (R)-1-Methyl-4-(1-methylethenyl)cyclohexene; D-(+)-Limonene; d-Limonene; d-p-Mentha-1,8-diene; optically active terpene; (The racemic mixture of d-limonene and l-limonene isomers is known as dipentene).**Company Identification:**

Fisher Scientific

1 Reagent Lane

Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
5989-27-5	d-Limonene	>95	227-813-5

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear almost colorless. Flash Point: 48 deg C.

**Warning! Flammable liquid and vapor.** May cause allergic skin reaction. Causes eye and skin irritation. May cause respiratory tract irritation. Marine pollutant.**Target Organs:** Skin.**Potential Health Effects****Eye:** Causes eye irritation.**Skin:** Causes skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis.**Ingestion:** May cause digestive tract disturbances.**Inhalation:** May cause respiratory tract irritation.**Chronic:** In 2-year gavage studies, there was clear evidence of carcinogenic activity of d-limonene for male rats, as shown by increased incidences of tubular cell hyperplasia, adenomas, and adenocarcinomas of the kidney. There was NO evidence of carcinogenic activity of d-limonene for female rats, for male mice, or for female mice.

## Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

**Skin:** In case of contact, immediately flush skin with soap and plenty of water. Remove contaminated clothing and shoes. Get medical aid if symptoms occur. Wash clothing before reuse.

**Ingestion:** If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Containers may explode in the heat of a fire. Flammable liquid and vapor. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. This liquid floats on water and may travel to a source of ignition and spread fire.

**Extinguishing Media:** Use water fog, dry chemical, carbon dioxide or alcohol type foam.

**Flash Point:** 48 deg C ( 118.40 deg F)

**Autoignition Temperature:** 255 deg C ( 491.00 deg F)

**Explosion Limits, Lower:** .70 vol %

**Upper:** 6.10 vol %

**NFPA Rating:** (estimated) Health: 2; Flammability: 2; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Forms smooth, slippery surfaces on floors, posing an accident risk. Remove all sources of ignition. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep away from heat, sparks and flame. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Avoid breathing vapor or mist.

**Storage:** Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area. Separate from oxidizing materials. Partially filled containers should be blanketed with nitrogen.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

#### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
d-Limonene	none listed	none listed	none listed

**OSHA Vacated PELs:** d-Limonene: No OSHA Vacated PELs are listed for this chemical.

#### Personal Protective Equipment

**Eyes:** Wear chemical splash goggles.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use. Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear almost colorless

**Odor:** citrus-like odor

**pH:** Not available.

**Vapor Pressure:** 1.98 mm Hg @ 25 deg C

**Vapor Density:** 4.7 (air=1)

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 175 - 176 deg C @ 760 mmHg

**Freezing/Melting Point:** -74 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:** .8400 g/ml

**Molecular Formula:** C<sub>10</sub>H<sub>16</sub>

**Molecular Weight:** 136.24

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures. Oxidizes to a film in air, oxidation behavior similar to that of rubber or drying oils.

**Conditions to Avoid:** Ignition sources, excess heat, prolonged exposure to air.

**Incompatibilities with Other Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 5989-27-5: GW6360000

**LD50/LC50:**

CAS# 5989-27-5:

Draize test, rabbit, skin: 10%/24H Mild;

Oral, mouse: LD50 = 5600 mg/kg;

Oral, rat: LD50 = 4400 mg/kg;

Skin, rabbit: LD50 = &gt;5 gm/kg;

**Carcinogenicity:**

CAS# 5989-27-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.**Teratogenicity:** Not known to be teratogenic.**Reproductive Effects:** See actual entry in RTECS for complete information.**Mutagenicity:** d-Limonene was not mutagenic in 4 strains of *S. typhimurium*, did not significantly increase the number of Tft-resistant cells in the mouse L5178Y/TK+/- assay, and did not induce chromosomal aberrations or SCEs in cultured CHO cells.**Neurotoxicity:** No information available.**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. No information available.**Environmental:** May bioconcentrate in aquatic organisms and fish. Has low mobility in soil and may rapidly volatilize in the atmosphere. Limonene can be readily degraded in soil.**Physical:** No information available.**Other:** Dipentene, which is optically inactive limonene, is a marine pollutant.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3.

Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	DIPENTENE	Dipentene
<b>Hazard Class:</b>	3	3
<b>UN Number:</b>	UN2052	UN2052
<b>Packing Group:</b>	III	III

## Section 15 - Regulatory Information

**US FEDERAL**

**TSCA**

CAS# 5989-27-5 is listed on the TSCA inventory.

**Health & Safety Reporting List**

None of the chemicals are on the Health & Safety Reporting List.

**Chemical Test Rules**

None of the chemicals in this product are under a Chemical Test Rule.

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

None of the chemicals in this material have an RQ.

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**SARA Codes**

CAS # 5989-27-5: immediate, fire.

**Section 313** No chemicals are reportable under Section 313.

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 5989-27-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XI N

**Risk Phrases:**

R 10 Flammable.

R 38 Irritating to skin.

R 43 May cause sensitization by skin contact.

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Safety Phrases:**

S 24 Avoid contact with skin.

S 37 Wear suitable gloves.

S 60 This material and its container must be disposed of as hazardous waste.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 5989-27-5: No information available.

**Canada - DSI /NDSI**

CAS# 5989-27-5 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B3, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 5989-27-5 is listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 1/09/1998

**Revision #7 Date:** 6/06/2006

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<b>MSDS</b>	<b>Material Safety Data Sheet</b>		24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
			National Response in Canada CANUTEC: 613-996-6666
			Outside U.S. and Canada Chemtrec: 703-527-3887
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		 	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.			

# ETHYL ETHER

## 1. Product Identification

**Synonyms:** Ether; ether, anhydrous; Diethyl ether; 1,1'Oxybisethane; ethyl oxide; diethyl oxide; Ethyl ether anhydrous;

**CAS No.:** 60-29-7

**Molecular Weight:** 74.12

**Chemical Formula:** C<sub>2</sub>H<sub>5</sub>OC<sub>2</sub>H<sub>5</sub>

**Product Codes:**

J.T. Baker: 9238, 9244, 9246, 9248, 9250

Mallinckrodt: 0848

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Diethyl Ether	60-29-7	99 - 100%	Yes

## 3. Hazards Identification

### Emergency Overview

**DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.**

SAF-T-DATA<sup>(tm)</sup> Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)

Flammability Rating: 4 - Extreme (Flammable)

Reactivity Rating: 2 - Moderate

Contact Rating: 2 - Moderate (Life)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

### Potential Health Effects

#### Inhalation:

Irritant. General anesthesia by inhalation can occur. Continued exposure may lead to respiratory failure or death. Early symptoms include irritation of nose and throat, vomiting, and irregular respiration, followed by dizziness, drowsiness, and unconsciousness.

#### Ingestion:

Irritating to the mucous membranes. Ingestion of 1 or 2 ounces may be fatal. Because of volatility the stomach becomes distended, which may cause belching. Other symptoms can include vomiting, unconsciousness, and coma.

#### Skin Contact:

Irritating to the skin and mucous membranes by drying effect. Can cause dermatitis on prolonged exposure. May be absorbed through skin.

#### Eye Contact:

May cause irritation, redness and pain. Prolonged exposures to high concentrations of vapor can cause eye damage.

#### Chronic Exposure:

Repeated exposures may be habit forming. Prolonged exposures may result in headache, drowsiness, excitation, and psychic disturbances. Teratogenic effects are possible.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin disorders or eye problems or impaired liver, kidney or respiratory function may be more susceptible to the effects of this substance. Alcoholic beverage consumption can enhance the toxic effects of this substance.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Ingestion:**

DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Call a physician immediately.

**Skin Contact:**

Remove any contaminated clothing. Wash skin with soap or mild detergent and water for at least 15 minutes. Call a physician.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: -45C (-49F) CC

Autoignition temperature: 160C (320F)

Flammable limits in air % by volume:

lfl: 1.9; uel: 36.0

Dangerous highly flammable liquid.

**Explosion:**

Containers may explode when involved in a fire. Above flash point, vapor-air mixtures are explosive within flammable limits noted above. May form explosive peroxides on long standing or after exposure to air or light. May explode when brought in contact with nitric acid. Sensitivity to mechanical impact: Yes, if peroxides are formed.

Sensitive to static discharge.

**Fire Extinguishing Media:**

Dry chemical, foam or carbon dioxide. Treat as a flammable gas in a fire situation. Water spray may be used to keep fire exposed containers cool. Water is ineffective as an extinguishing agent.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. This highly flammable liquid must be kept from sparks, open flame, hot surfaces, and all sources of heat and ignition. Vapors can flow along surfaces to distant ignition source and flash back.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

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## 7. Handling and Storage

Protect against physical damage. Outside or detached storage is preferred. Inside storage should be in a standard flammable liquids storage room or cabinet. Separate from oxidizing materials. Storage and use areas should be No Smoking areas. Bond and ground containers when transferring liquid. Isolate from other combustible material. Protect from direct sunlight. Protect against static electricity and lightning for large quantity storage rooms, protect with automatic sprinkler systems and total flooding carbon dioxide systems. The reactivity hazard may be increased on longstanding due to peroxide formation. Ether is subject to peroxide formation in opened containers and should be protected from exposure to air. When low peroxide ether is required, use only material from an unopened can. Do not allow to evaporate to near dryness. Addition of water or appropriate reducing agents will lessen peroxide formation. Any ether remaining in opened containers that has not been consumed/used after 2-3 days, should be discarded. Store At A Temperature Not Exceeding 30C (86F).

DO NOT OPEN Unless Contents Are At Room Temperature (72F) or Below For At Least 24 Hours. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):  
400 ppm (TWA)

-ACGIH Threshold Limit Value (TLV):  
400 ppm (TWA), 500 ppm STEL

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. An organic vapor respirator is predicted to have a short service life (less than 30 minutes at concentrations of ten times the TLV/PEL) when used with this material.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

**Other Control Measures:**

Shoes should be conductive and nonsparking.

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Sweet, ethereal odor.

**Solubility:**

8.43% by wt in H<sub>2</sub>O @ 15C; 6.05% by wt in H<sub>2</sub>O @ 25C.

**Specific Gravity:**

0.71 at 20C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

No information found.

**Boiling Point:**

35C (95F)

**Melting Point:**

-123C (-189F)

**Vapor Density (Air=1):**

2.6

**Vapor Pressure (mm Hg):**

440 @ 20C (68F) (ether)

**Evaporation Rate (BuAc=1):**

37.5

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage. Heat, light, and long standing contribute to instability. Reacts with air to form explosive peroxides.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Can react dangerously with acetyl peroxide, liquid oxygen, bromoazide, chlorine, and strong oxidizers such as nitrates. Avoid heat, flame, other sources of ignition, and exposure to light, air.

**Conditions to Avoid:**

Heat, flame, ignition sources, incompatibles, light, and air.

## 11. Toxicological Information

**Toxicological Data:**

Oral rat LD50: 1215 mg/kg; investigated as a tumorigen and mutagen; irritation eye rabbit: 100 mg moderate; skin rabbit 360 mg open mild

**Reproductive Toxicity:**

See Chronic Health Hazards.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Diethyl Ether (60-29-7)	No	No	None

## 12. Ecological Information

### Environmental Fate:

When released into the soil, this material is expected to quickly evaporate. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is not expected to biodegrade. When released into water, this material is not expected to biodegrade. When released into the water, this material is expected to have a half-life of less than 1 day. When released to water, this material is expected to quickly evaporate. This material is not expected to significantly bioaccumulate. This material has a log octanol-water partition coefficient of less than 3.0. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is not expected to be degraded by photolysis. When released into the air, this material is expected to have a half-life between 1 and 10 days.

### Environmental Toxicity:

The LC50/96-hour values for fish are over 100 mg/l. This material is not expected to be toxic to aquatic life.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

### Domestic (Land, D.O.T.)

Proper Shipping Name: RQ, DIETHYL ETHER

Hazard Class: 3

UN/NA: UN1155

Packing Group: I

Information reported for product/size: 215L

### International (Water, I.M.O.)

Proper Shipping Name: DIETHYL ETHER

Hazard Class: 3

UN/NA: UN1155

Packing Group: I

Information reported for product/size: 215L

### International (Air, I.C.A.O.)

Proper Shipping Name: RQ, DIETHYL ETHER

Hazard Class: 3

UN/NA: UN1155

Packing Group: I

Information reported for product/size: 215L

## 15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Diethyl Ether (60-29-7)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	--Canada--			
	Korea	DSL	NDSL	Phil.
Diethyl Ether (60-29-7)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----				
Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Diethyl Ether (60-29-7)	No	No	No	No

-----\Federal, State & International Regulations - Part 2\-----			
Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8(d)
Diethyl Ether (60-29-7)	100	U117	Yes

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes  
 SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No  
 Reactivity: Yes (Pure / Liquid)

**Australian Hazchem Code:** 3YE

**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: **2** Flammability: **4** Reactivity: **1**

**Label Hazard Warning:**

DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.

**Label Precautions:**

May form explosive peroxides.

Keep away from heat, sparks and flame.

Keep container closed.

Use only with adequate ventilation.

Avoid breathing vapor.

Do not get in eyes, on skin, or on clothing.

Wash thoroughly after handling.

Store At A Temperature Not Exceeding 30C (86F).DO NOT OPEN Unless Contents Are At Room Temperature (72F) or Below For At Least 24 Hours.

**Label First Aid:**

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In all cases call a physician.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

\*\*\*\*\*

**Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy.**

**This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product.**

**Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose.**

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**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

**1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : Dieldrin

Product Number : 49024

Brand : Supelco

Company : Sigma-Aldrich  
3050 Spruce Street  
SAINT LOUIS MO 63103  
USA

Telephone : +18003255832

Fax : +18003255052

Emergency Phone # : (314) 776-8555

**2. HAZARDS IDENTIFICATION****Emergency Overview****OSHA Hazards**

Target Organ Effect, Highly toxic by inhalation, Highly toxic by ingestion, Toxic by skin absorption, Carcinogen

**Target Organs**

Central nervous system, Liver, BloodCentral nervous system, Liver, Blood

**GHS Label elements, including precautionary statements****Pictogram****Signal word**

Danger

**Hazard statement(s)**

H300 + H330 Fatal if swallowed or if inhaled.  
H311 Toxic in contact with skin.  
H351 Suspected of causing cancer.  
H372 Causes damage to organs through prolonged or repeated exposure if swallowed.  
H400 Very toxic to aquatic life.

**Precautionary statement(s)**

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.  
P264 Wash hands thoroughly after handling.  
P273 Avoid release to the environment.  
P280 Wear protective gloves/ protective clothing.  
P284 Wear respiratory protection.  
P310 Immediately call a POISON CENTER or doctor/ physician.

**HMIS Classification**

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

**NFPA Rating**

Health hazard: 3  
Fire: 0  
Reactivity Hazard: 0

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

#### Potential Health Effects

**Inhalation** May be fatal if inhaled. May cause respiratory tract irritation.  
**Skin** Toxic if absorbed through skin. May cause skin irritation.  
**Eyes** May cause eye irritation.  
**Ingestion** May be fatal if swallowed.

---

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

**Synonyms** : 1,2,3,4,10,10-Hexachloro-1,4,4a,5,6,7,8,8a-octahydro-6,7-epoxy-1,4:5,8-dimethanonaphthalene  
**Formula** : C<sub>12</sub>H<sub>8</sub>Cl<sub>6</sub>O  
**Molecular Weight** : 380.91 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
<b>Dieldrin</b>			
60-57-1	200-484-5	602-049-00-9	-

---

### 4. 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.

---

### 5. FIRE-FIGHTING MEASURES

#### Suitable extinguishing media

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

#### Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

---

### 6. ACCIDENTAL RELEASE MEASURES

#### Personal precautions

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

#### Environmental precautions

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

#### 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.

---

### 7. HANDLING AND STORAGE



Melting point	143 - 144 °C (289 - 291 °F)
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Water solubility	no data available

---

## 10. STABILITY AND REACTIVITY

### Chemical stability

Stable under recommended storage conditions.

### Conditions to avoid

no data available

### Materials to avoid

Strong oxidizing agents

### Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

---

## 11. TOXICOLOGICAL INFORMATION

### Acute toxicity

LD50 Oral - mouse - 38.0 mg/kg

LD50 Oral - dog - 65.0 mg/kg

LD50 Oral - Monkey - 3.0 mg/kg

LD50 Oral - rabbit - 45.0 mg/kg

LD50 Oral - Pig - 38.0 mg/kg

LD50 Oral - guinea pig - 49.0 mg/kg

LD50 Oral - Hamster - 60.0 mg/kg

LD50 Oral - Pigeon - 23.7 mg/kg

LD50 Oral - Chicken - 20.0 mg/kg

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Miosis (pupillary constriction). Behavioral:Excitement. Behavioral:Food intake (animal).

LD50 Oral - Quail - 10.8 mg/kg

Remarks: Behavioral:Altered sleep time (including change in righting reflex). Behavioral:Somnolence (general depressed activity). Behavioral:Irritability.

LD50 Oral - Duck - 381.0 mg/kg

LD50 Oral - Mammal - 94.0 mg/kg

Remarks: Peripheral Nerve and Sensation:Flaccid paralysis without anesthesia (usually neuromuscular blockage). Behavioral:Tremor. Behavioral:Convulsions or effect on seizure threshold.

LD50 Oral - Bird (wild) - 13.3 mg/kg

LDLO Oral - rat - 30.0 mg/kg

Remarks: Liver:Other changes.

LDLO Oral - Human - male - 65.0 mg/kg

LDLO Oral - cat - 500 mg/kg

Remarks: Lungs, Thorax, or Respiration:Chronic pulmonary edema. Liver:Fatty liver degeneration. Kidney, Ureter, Bladder:Other changes.

TDLo Oral - rat - 140 mg/kg

Remarks: Liver:Other changes. Blood:Other changes. Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels: Other esterases.

TDLo Oral - rat - 109 mg/kg

Remarks: Liver:Changes in liver weight.

TDLo Oral - rat - 88 mg/kg

Remarks: Behavioral:Food intake (animal). Nutritional and Gross Metabolic:Weight loss or decreased weight gain. Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels: Phosphatases.

LC50 Inhalation - rat - 4 h - 13 mg/m<sup>3</sup>

LD50 Dermal - rabbit - 250.0 mg/kg

**Skin corrosion/irritation**

no data available

**Serious eye damage/eye irritation**

no data available

**Respiratory or skin sensitization**

no data available

**Germ cell mutagenicity**

no data available

**Carcinogenicity**

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

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.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Dieldrin)

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

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

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

**Reproductive toxicity**

no data available

**Specific target organ toxicity - single exposure (Globally Harmonized System)**

no data available

**Specific target organ toxicity - repeated exposure (Globally Harmonized System)**

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

**Aspiration hazard**

no data available

**Potential health effects**

<b>Inhalation</b>	May be fatal if inhaled. May cause respiratory tract irritation.
<b>Ingestion</b>	May be fatal if swallowed.
<b>Skin</b>	Toxic if absorbed through skin. May cause skin irritation.
<b>Eyes</b>	May cause eye irritation.

**Signs and Symptoms of Exposure**

Discomfort, Headache, Nausea, Vomiting, Dizziness, Tremors, tonic convulsions, clonic spasms, Coma., respiratory failure, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

**Additional Information**

RTECS: IO1750000

---

**12. ECOLOGICAL INFORMATION**

**Toxicity**

Toxicity to fish                      mortality LC50 - Carassius auratus (goldfish) - 1.6 µg/l - 96.0 h

Toxicity to daphnia                      Immobilization EC50 - Daphnia magna (Water flea) - 79.5 µg/l - 48 h  
and other aquatic  
invertebrates.

**Persistence and degradability**

no data available

**Bioaccumulative potential**

no data available

**Mobility in soil**

no data available

**PBT and vPvB assessment**

no data available

**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**

**Product**

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

**Contaminated packaging**

Dispose of as unused product.

---

**14. TRANSPORT INFORMATION**

**DOT (US)**

UN-Number: 2811    Class: 6.1                      Packing group: I

Proper shipping name: Toxic solids, organic, n.o.s. (Dieldrin)

Reportable Quantity (RQ): 1 lbs

Marine pollutant: No

Poison Inhalation Hazard: No

**IMDG**

UN-Number: 2811    Class: 6.1                      Packing group: I

EMS-No: F-A, S-A

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

Marine pollutant: No

**IATA**

UN-Number: 2811    Class: 6.1                      Packing group: I

Proper shipping name: Toxic solid, organic, n.o.s. (Dieldrin)

IATA Passenger: Not permitted for transport

---

**15. REGULATORY INFORMATION**

**OSHA Hazards**

Target Organ Effect, Highly toxic by inhalation, Highly toxic by ingestion, Toxic by skin absorption, Carcinogen

**DSL Status**

This product contains the following components that are not on the Canadian DSL nor NDSL lists.

Dieldrin

CAS-No.  
60-57-1**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, Chronic Health Hazard

**Massachusetts Right To Know Components**

Dieldrin

CAS-No.  
60-57-1Revision Date  
2007-03-01**Pennsylvania Right To Know Components**

Dieldrin

CAS-No.  
60-57-1Revision Date  
2007-03-01**New Jersey Right To Know Components**

Dieldrin

CAS-No.  
60-57-1Revision Date  
2007-03-01**California Prop. 65 Components**

WARNING! This product contains a chemical known to the State of California to cause cancer.

Dieldrin

CAS-No.  
60-57-1Revision Date  
1990-06-15

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**16. OTHER INFORMATION****Further information**

Copyright 2010 Sigma-Aldrich Co. 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 Co., 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.

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# Material Safety Data Sheet

## 2,6-Dinitrotoluene, 99%

ACC# 71341

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** 2,6-Dinitrotoluene, 99%**Catalog Numbers:** AC117070000, AC117070250, AC117071000**Synonyms:** 2,6-DNT.**Company Identification:**

Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410

**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
606-20-2	2,6-Dinitrotoluene	99	210-106-0

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: slightly yellow needles.

**Danger!** Explosive hazard if confined and heated. Organic contaminants lower decomposition temperature and increase risk of explosion. May be fatal if inhaled. Causes eye, skin, and respiratory tract irritation. Harmful if swallowed or absorbed through the skin. Methemoglobin former - can cause cyanosis. Possible risk of impaired fertility.

**Target Organs:** Cardiovascular system, reproductive system.

#### Potential Health Effects

**Eye:** Causes eye irritation.

**Skin:** Causes skin irritation.

**Ingestion:** Harmful if swallowed. Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause methemoglobinemia, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), convulsions, and death. Methemoglobinemia is characterized by dizziness, drowsiness, headache, shortness of breath, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), rapid heart rate and chocolate-brown colored blood. May cause allergic reaction.

**Inhalation:** Causes respiratory tract irritation. Methemoglobinemia is characterized by dizziness, drowsiness, headache, shortness of breath, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), rapid heart rate and chocolate-brown blood.

**Chronic:** Prolonged exposure may cause anemia and methemoglobinemia, characterized by dizziness, drowsiness, headache, breath shortness, cyanosis (bluish skin due to deficient oxygenation of the blood), rapid heart rate and chocolate-brown colored blood. May cause cancer according to animal studies.

## Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

**Skin:** Get medical aid immediately. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

**Ingestion:** If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

**Extinguishing Media:** Use water fog, dry chemical, carbon dioxide, or regular foam.

**Flash Point:** 207 deg C ( 404.60 deg F)

**Autoignition Temperature:** Not available.

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 3; Flammability: 1; Instability: 3

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Use only in a well-ventilated area. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Avoid ingestion and inhalation.

**Storage:** Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from reducing agents. Separate from oxidizing materials.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
	0.2 mg/m <sup>3</sup> TWA (listed)		

2,6-Dinitrotoluene	under Dinitrotoluene (mixed isomers)).Skin - potential significant contribution to overall exposure by the cutaneous route (listed under Dinitrotoluene (mixed isomers)).	1.5 mg/m <sup>3</sup> TWA (listed under Dinitrotoluene (mixed isomers)).50 mg/m <sup>3</sup> IDLH (listed under Dinitrotoluene (mixed isomers)).	1.5 mg/m <sup>3</sup> TWA (listed under Dinitrotoluene (mixed isomers)).
Dinitrotoluene (mixed isomers)	0.2 mg/m <sup>3</sup> TWA; Skin - potential significant contribution to overall exposure by the cutaneous route	1.5 mg/m <sup>3</sup> TWA 50 mg/m <sup>3</sup> IDLH	1.5 mg/m <sup>3</sup> TWA

**OSHA Vacated PELs:** 2,6-Dinitrotoluene: No OSHA Vacated PELs are listed for this chemical.  
Dinitrotoluene (mixed isomers): 1.5 mg/m<sup>3</sup> TWA

#### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Needles

**Appearance:** slightly yellow

**Odor:** None reported.

**pH:** Not available.

**Vapor Pressure:** 1 mm Hg @ 20 deg C

**Vapor Density:** Not available.

**Evaporation Rate:**Not available.

**Viscosity:** Not available.

**Boiling Point:** 250 deg C

**Freezing/Melting Point:**64- 70 deg C

**Decomposition Temperature:**Not available.

**Solubility:** practically insoluble

**Specific Gravity/Density:**Not available.

**Molecular Formula:**C<sub>7</sub>H<sub>6</sub>N<sub>2</sub>O<sub>4</sub>

**Molecular Weight:**182.14

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures. There are instances of explosion during manufacture or storage. May explode when heated.

**Conditions to Avoid:** Excess heat.

**Incompatibilities with Other Materials:** Oxidizing agents, reducing agents, strong bases, mixture with nitric acid is highly explosive, ignites on contact with sodium oxide.

**Hazardous Decomposition Products:** Nitrogen oxides, carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:****CAS#** 606-20-2: XT1925000**CAS#** 25321-14-6: XT1300000**LD50/LC50:****CAS#** 606-20-2:

Draize test, rabbit, skin: 500 mg/24H Mild;

Inhalation, rat: LC50 = 240 mg/m<sup>3</sup>/6H;

Oral, mouse: LD50 = 621 mg/kg;

Oral, rat: LD50 = 177 mg/kg;

**CAS#** 25321-14-6:

Oral, mouse: LD50 = 750 mg/kg;

**Carcinogenicity:****CAS#** 606-20-2:

- **ACGIH:** A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans (listed as 'Dinitrotoluene (mixed isomers)').
- **California:** carcinogen, initial date 7/1/95
- **NTP:** Not listed.
- **IARC:** Group 2B carcinogen

**CAS#** 25321-14-6:

- **ACGIH:** A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
- **California:** carcinogen, initial date 5/1/96
- **NTP:** Not listed.
- **IARC:** Not listed.

**Epidemiology:** No data available.**Teratogenicity:** No data available.**Reproductive Effects:** No data available.**Mutagenicity:** No data available.**Neurotoxicity:** No data available.**Other Studies:**

## Section 12 - Ecological Information

No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 606-20-2: waste number U106.

<b>Section 14 - Transport Information</b>
---

	US DOT	Canada TDG
<b>Shipping Name:</b>	DINITROTOLUENES	DINITROTOLUENES, SOLID
<b>Hazard Class:</b>	6.1	6.1
<b>UN Number:</b>	UN2038	UN2038
<b>Packing Group:</b>	II	II

<b>Section 15 - Regulatory Information</b>
--

**US FEDERAL****TSCA**

CAS# 606-20-2 is listed on the TSCA inventory.

CAS# 25321-14-6 is listed on the TSCA inventory.

**Health & Safety Reporting List**

None of the chemicals are on the Health &amp; Safety Reporting List.

**Chemical Test Rules**

None of the chemicals in this product are under a Chemical Test Rule.

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

CAS# 606-20-2: 100 lb final RQ; 45.4 kg final RQ      CAS# 25321-14-6: 10 lb final RQ; 4.54 kg final RQ

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**Section 313**

This material contains 2,6-Dinitrotoluene (CAS# 606-20-2, 99%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Dinitrotoluene (mixed isomers) (CAS# 25321-14-6, -%), which is subject to the reporting requirements of Section 313 of SARA Title

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

**Clean Water Act:**

CAS# 606-20-2 is listed as a Hazardous Substance under the CWA. CAS# 25321-14-6 is listed as a Hazardous Substance under the CWA. CAS# 606-20-2 is listed as a Priority Pollutant under the Clean Water Act. CAS# 606-20-2 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 25321-14-6 is listed as a Toxic Pollutant under the Clean Water Act.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 606-20-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Dinitrotoluene (mixed isomers)), Massachusetts.

CAS# 25321-14-6 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**California Prop 65**

**The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:**

WARNING: This product contains 2,6-Dinitrotoluene, a chemical known to the state of California to cause cancer. WARNING: This product contains 2,6-Dinitrotoluene, a chemical known to the state of California to cause male reproductive toxicity. WARNING: This product contains Dinitrotoluene (mixed isomers), a chemical known to the state of California to cause cancer. WARNING: This product contains Dinitrotoluene (mixed isomers), a chemical known to the state of California to cause male reproductive toxicity.

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

T

**Risk Phrases:**

R 23/24/25 Toxic by inhalation, in contact with skin and if swallowed.

R 45 May cause cancer.

R 48/22 Harmful : danger of serious damage to health by prolonged exposure if swallowed.

R 62 Possible risk of impaired fertility.

R 52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Safety Phrases:**

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 53 Avoid exposure - obtain special instructions before use.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 606-20-2: 3

CAS# 25321-14-6: No information available.

**Canada - DSL/NDSL**

CAS# 606-20-2 is listed on Canada's DSL List.

CAS# 25321-14-6 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D2A, D1B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 606-20-2 (listed as Dinitrotoluene (mixed isomers)) is listed on the Canadian Ingredient Disclosure List.

CAS# 25321-14-6 is listed on the Canadian Ingredient Disclosure List.

**Section 16 - Additional Information**

**MSDS Creation Date:** 4/13/1998

**Revision #5 Date:** 11/20/2008

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their*

*particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

### 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : N-Nitrosodi-*n*-propylamine  
 Product Number : 48554  
 Brand : Supelco  
 Company : Sigma-Aldrich  
 3050 Spruce Street  
 SAINT LOUIS MO 63103  
 USA  
 Telephone : +18003255832  
 Fax : +18003255052  
 Emergency Phone # : (314) 776-6555

### 2. HAZARDS IDENTIFICATION

#### Emergency Overview

##### OSHA Hazards

Toxic by ingestion, Carcinogen

##### Target Organs

Liver, Kidney, Throat., Lungs

##### GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H302 Harmful if swallowed.  
 H350 May cause cancer.  
 H401 Toxic to aquatic life.  
 H413 May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

P201 Obtain special instructions before use.  
 P308 + P313 IF exposed or concerned: Get medical advice/ attention.

#### HMIS Classification

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

#### NFPA Rating

Health hazard: 2  
 Fire: 0  
 Reactivity Hazard: 0

#### Potential Health Effects

**Inhalation** May be harmful if inhaled. May cause respiratory tract irritation.  
**Skin** May be harmful if absorbed through skin. May cause skin irritation.  
**Eyes** May cause eye irritation.  
**Ingestion** Toxic if swallowed.

---

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C<sub>6</sub>H<sub>14</sub>N<sub>2</sub>O  
Molecular Weight : 130.22 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
<b>N-Nitroso dipropylamine</b>			
621-64-7	210-698-0	612-098-00-8	-

---

### 4. 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

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

---

### 5. FIRE-FIGHTING MEASURES

#### Suitable extinguishing media

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

#### Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

---

### 6. ACCIDENTAL RELEASE MEASURES

#### Personal precautions

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

#### 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.

#### 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.

---

### 7. HANDLING AND STORAGE

#### Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.  
Normal measures for preventive fire protection.

#### Conditions for safe storage

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.

---

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

### Personal protective equipment

#### 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).

#### Hand 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.

#### Eye 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 and 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.

#### Hygiene measures

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

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### Appearance

Form                      liquid

### Safety data

pH	no data available
Melting point	no data available
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	0.92 g/cm <sup>3</sup>
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 1.36

---

## 10. STABILITY AND REACTIVITY

### Chemical stability

Stable under recommended storage conditions.

### Conditions to avoid

no data available

### Materials to avoid

copper salts, mercury salts, Strong mineral acids, Strong oxidizing agents

## Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NOx)

---

## 11. TOXICOLOGICAL INFORMATION

### Acute toxicity

LD50 Oral - rat - 480.0 mg/kg

### Skin corrosion/irritation

no data available

### Serious eye damage/eye irritation

no data available

### Respiratory or skin sensitization

no data available

### Germ cell mutagenicity

no data available

### Carcinogenicity

Possible human carcinogen

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

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

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

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

### Reproductive toxicity

no data available

### Specific target organ toxicity - single exposure (Globally Harmonized System)

no data available

### Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

### Aspiration hazard

no data available

### Potential health effects

<b>Inhalation</b>	May be harmful if inhaled. May cause respiratory tract irritation.
<b>Ingestion</b>	Toxic if swallowed.
<b>Skin</b>	May be harmful if absorbed through skin. May cause skin irritation.
<b>Eyes</b>	May cause eye irritation.

### Signs and Symptoms of Exposure

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

### Additional Information

RTECS: JL9700000

---

## 12. ECOLOGICAL INFORMATION

### Toxicity

no data available

### Persistence and degradability

no data available

### Bioaccumulative potential

no data available

**Mobility in soil**

no data available

**PBT and vPvB assessment**

no data available

**Other adverse effects**

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic life.

---

**13. DISPOSAL CONSIDERATIONS****Product**

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

**Contaminated packaging**

Dispose of as unused product.

---

**14. TRANSPORT INFORMATION****DOT (US)**

UN-Number: 3082 Class: 9

Packing group: III

Proper shipping name: Environmentally hazardous substances, liquid, n.o.s. (N-Nitroso dipropylamine)

Marine pollutant: No

Poison Inhalation Hazard: No

**IMDG**

UN-Number: 3082 Class: 9

Packing group: III

EMS-No: F-A, S-F

Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (N-Nitroso dipropylamine)

Marine pollutant: No

**IATA**

UN-Number: 3082 Class: 9

Packing group: III

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (N-Nitroso dipropylamine)

**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****OSHA Hazards**

Toxic by ingestion, Carcinogen

**DSL Status**

This product contains the following components that are not on the Canadian DSL nor NDSL lists.

N-Nitroso dipropylamine

CAS-No.

621-64-7

**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, Chronic Health Hazard

**Massachusetts Right To Know Components**

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

**Pennsylvania Right To Know Components**

N-Nitroso dipropylamine

CAS-No.  
621-64-7

Revision Date

**New Jersey Right To Know Components**

N-Nitroso dipropylamine

CAS-No.  
621-64-7

Revision Date

**California Prop. 65 Components**

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

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**16. OTHER INFORMATION****Further information**

Copyright 2010 Sigma-Aldrich Co. 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 Co., 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.

---

# Material Safety Data Sheet

## p-Ethyltoluene, 98%

ACC# 35092

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** p-Ethyltoluene, 98%**Catalog Numbers:** AC119010000, AC119010050, AC119010100, AC119010250, AC119010500**Synonyms:** 4-Ethyltoluene; 1-Ethyl-4-methylbenzene; 1-Methyl-4-ethylbenzene; p-Ethyltoluene.**Company Identification:**Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
622-96-8	p-Ethyltoluene	98	210-761-2

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear very slight yellow liquid. Flash Point: 36 deg C.

**Warning! Flammable liquid and vapor.** May cause eye and skin irritation. May cause respiratory tract irritation. May cause central nervous system depression. May cause lung damage. The toxicological properties of this material have not been fully investigated.**Target Organs:** Central nervous system, lungs.

#### Potential Health Effects

**Eye:** May cause chemical conjunctivitis and corneal damage.**Skin:** May be harmful if absorbed through the skin. May cause irritation and dermatitis. May cause cyanosis of the extremities.**Ingestion:** Aspiration hazard. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Ingestion of large amounts may cause CNS depression. May cause lung damage.**Inhalation:** May cause respiratory tract irritation. Aspiration may lead to pulmonary edema. May be harmful if inhaled. Vapors may cause dizziness or suffocation. May cause burning sensation in the chest.**Chronic:** Effects may be delayed.

### Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

**Ingestion:** Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Water may be ineffective. Material is lighter than water and a fire may be spread by the use of water. Flammable liquid and vapor. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

**Extinguishing Media:** For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Water may be ineffective. Do NOT use straight streams of water.

**Flash Point:** 36 deg C ( 96.80 deg F)

**Autoignition Temperature:** 475 deg C ( 887.00 deg F)

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 1; Flammability: 3; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Avoid breathing vapor or mist.

**Storage:** Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local explosion-proof ventilation to keep airborne levels to acceptable levels.

#### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
p-Ethyltoluene	none listed	none listed	none listed

**OSHA Vacated PELs:** p-Ethyltoluene: No OSHA Vacated PELs are listed for this chemical.

#### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear very slight yellow

**Odor:** Toluene-like

**pH:** Not available.

**Vapor Pressure:** 3 mm Hg @ 25 deg C

**Vapor Density:** 4.15 (air=1)

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 162 deg C @ 760 mm Hg

**Freezing/Melting Point:** -62 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:** .8600 g/cm<sup>3</sup>

**Molecular Formula:** C<sub>9</sub>H<sub>12</sub>

**Molecular Weight:** 120.19

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Ignition sources, excess heat.

**Incompatibilities with Other Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 622-96-8: XT2550000**LD50/LC50:**

CAS# 622-96-8:

Inhalation, mouse: LC50 = 54000 mg/m<sup>3</sup>/4H;

Oral, rat: LD50 = 4850 mg/kg;

**Carcinogenicity:**

CAS# 622-96-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information found**Teratogenicity:** No information found**Reproductive Effects:** See actual entry in RTECS for complete information.**Mutagenicity:** See actual entry in RTECS for complete information.**Neurotoxicity:** No information found**Other Studies:**

<b>Section 12 - Ecological Information</b>
--

No information available.

<b>Section 13 - Disposal Considerations</b>
---

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.**RCRA U-Series:** None listed.

<b>Section 14 - Transport Information</b>
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	US DOT	Canada TDG
<b>Shipping Name:</b>	FLAMMABLE LIQUIDS, N.O.S.	FLAMMABLE LIQUID NOS (P-ETHYLTOLUENE)
<b>Hazard Class:</b>	3	3
<b>UN Number:</b>	UN1993	UN1993
<b>Packing Group:</b>	III	III
<b>Additional Info:</b>		FP 36 C

<b>Section 15 - Regulatory Information</b>
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**US FEDERAL****TSCA**

CAS# 622-96-8 is listed on the TSCA inventory.

**Health & Safety Reporting List**

CAS# 622-96-8: Effective 4/29/83, Sunset 4/29/93

**Chemical Test Rules**

None of the chemicals in this product are under a Chemical Test Rule.

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

None of the chemicals in this material have an RQ.

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPO.

**Section 313** No chemicals are reportable under Section 313.

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 622-96-8 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XN

**Risk Phrases:**

R 10 Flammable.

R 65 Harmful: may cause lung damage if swallowed.

**Safety Phrases:**

S 16 Keep away from sources of ignition - No smoking.

**WGK (Water Danger/Protection)**

CAS# 622-96-8: No information available.

**Canada - DSL/NDSL**

CAS# 622-96-8 is listed on Canada's NDSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B2.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 622-96-8 is not listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 9/02/1997

**Revision #8 Date:** 9/26/2007

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no*

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## Composition/Information on Ingredient

**Cas:**

630-20-6

**Code:**

M

**RTECS:**

KI8450000

**Code:**

M

**Name:**

ETHANE, 1,1,1,2-TETRACHLORO- (SARA 313) (CERCLA)

**Other REC Limits:**

NONE RECOMMENDED

**OSHA PEL:**

NOT ESTABLISHED

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

NOT ESTABLISHED

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

NONE REQUIRED FOR NORMAL USE W/ADEQUATE VENTILATION. IN POORLY VENTILATED AREAS, USE NIOSH/MSHA APPROVED ORGANIC VAPOR RESPIRATOR.

**Ventilation:**

LOCAL EXHAUST IS RECOMMENDED FOR CONFINED AREAS. GENERAL MECHANICAL VENTILATION IS ADEQUATE FOR NORMAL USE. 7

**Protective Gloves:**

CHEMICAL RESIST GLOVES, (PVC).

**Eye Protection:**

SAFETY GLASSES. SPLASH PROOF GOGGLES.

**Other Protective Equipment:**

Equipment EYE BATH AND SAFETY SHOWER.

**Work Hygienic Practices:**

FOLLOW CURRENT H.M.I.S. REGULATIONS.

**Supplemental Safety and Health:**

NONE

## Health Hazards Data

**LD50LC50Mixture:**

ORAL LD50 (RAT) IS UNKNOWN

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

YES

**IARC:**

YES

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

ACUTE: EYES-MODERATE IRRITANT. SKIN-MODERATE IRRITANT. INHALATION-HIGH CONCENTRATIONS OF VAPORS MAY PRODUCE

IRRITATION OF THE RESPIRATORY TRACT, HEADACHE, DIZZINESS, AND NAUSEA. INGESTION-SIMILAR TO INHALATION.

CHRONIC:PROLONGED REPEATED OVEREXPOSURE TO THIS PRODUCT MAY LEAD TO SKIN SENSITIZATION OR DERMATITIS.

**Explanation Of Carcinogenicity:**

CHROMIUM: IARC MONOGRAPHS, VOL 49, PG 49, 1990:GRP 1. NTP 6TH ANNUAL RPT ON CARCINS, 1991:KNOWN TO BE CARCIN. (SUPP DATA)

**Signs And Symptoms Of Overexposure:**

INHALATION-HIGH CONCENTRATIONS OF VAPORS MAY PRODUCE IRRITATION OF THE RESPIRATORY TRACT, HEADACHE, DIZZINESS, &amp; NAUSEA. SKIN-MODERATE IRRITATION. INGESTION-NAUSEA AND VOMITING.

**Medical Cond Aggravated By Exposure:**

SKIN DISORDERS, RESPIRATORY DISORDERS.

**First Aid:**

EYES: FLUSH WELL W/WATER FOR AT LEAST 15 MINUTES. CONTACT A PHYSICIAN IF IRRITATION PERSISTS. SKIN: WASH W/SOAP &amp;

WATER. INHALE: REMOVE PATIENT TO FRESH AIR. IF BREATHING IS DIFFICULT, ADMINISTER OXYG EN. INGEST: DO NOT INDUCE

VOMITING. CONTACT A PHYSICIAN. IF VOMITING OCCURS, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO LUNGS.

**Spill Release Procedures:**

PREVENT SKIN &amp; EYE CONTACT. USE NON-COMBUSTIBLE MATERIAL TO CONFINE &amp;/OR ABSORB.

ELIMINATE IGNITION SOURCES.

VENTILATE AREA.

**Neutralizing Agent:**

NONE SPECIFIED BY MANUFACTURER.

**Waste Disposal Methods:**

6 REMOVE TO A WASTE DISPOSAL FACILITY OPERATING IN COMPLIANCE W/FEDERAL, STATE &amp; LOCAL REGULATIONS. HAZ WASTE

CODES: D001 (IGNITABILITY); U031 (BUTYL ALCOHOL). RQ: 100 LBS.

**Handling And Storage Precautions:**

"EMPTY" CONTAINER RETAIN RESIDUE (LIQUID AND/OR VAPOR) AND CAN BE DANGEROUS.

**Other Precautions:**

DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND/EXPOSE SUCH CONTAINERS TO HEAT, SPARKS, FLAMES, STATIC

ELECTRICITY OR OTHER SOURCES OF IGNIT.

## Fire and Explosion Hazard Information

**Flash Point Method:**

OC

**Flash Point:****Flash Point Text:**

-156F,-104C

**Autoignition Temp:****Autoignition Temp Text:**

N/K

**Lower Limits:**

1.38%

**Upper Limits:**

36.5%

**Extinguishing Media:**

CARBON DIOXIDE, DRY CHEMICAL, FOAM.

**Fire Fighting Procedures:**

FIRE FIGHTERS SHOULD WEAR SELF-CONTAINED BREATHING APPARATUS IN CONFINED AREAS.

**Unusual Fire/Explosion Hazard:**

VAPORS ARE HEAVIER THAN AIR & MAY TRAVEL ALONG GROUND, OR BE MOVED BY VENTILATION & BE IGNITED BY IGNITION SOURCE.

## Physical/Chemical Properties

**HCC:**

V3

**NRC/State LIC No:**

N/R

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

10F-275F

**Melt/Freeze Pt:**

**M.P/F.P Text:**

N/K

**Decomp Temp:**

**Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

>1

**Volatile Org Content %:**

**Spec Gravity:**

0.86 (H2O=1)

**VOC Pounds/Gallon:**

**PH:** N/K

**VOC Grams/Liter:**

**Viscosity:**

N/R

**Evaporation Rate & Reference:**

>1 (BUTYL ACETATE=1)

**Solubility in Water:**

APPRECIABLE 8

**Appearance and Odor:**

BLUE OPAQUE LOW VISCOSITY LIQUID W/SWEET SOLVENT ODOR.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

HEAT, SPARKS OPEN FLAMES.

**Materials To Avoid:**

STRONG OXIDIZING AGENTS.

**Hazardous Decomposition Products:**

OXIDES OF CARBON.

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

NOT RELEVANT

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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### 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. Lookchem 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.

# Material Safety Data Sheet

## Ethanol, Absolute

ACC# 89308

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Ethanol, Absolute**Catalog Numbers:** NC9602322**Synonyms:** Ethyl Alcohol; Ethyl Alcohol Anhydrous; Ethyl Hydrate; Ethyl Hydroxide; Fermentation Alcohol; Grain Alcohol; Methylcarbinol; Molasses Alcohol; Spirits of Wine.**Company Identification:**

Fisher Scientific

1 Reagent Lane

Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
64-17-5	Ethanol	ca.100	200-578-6

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: colorless clear liquid. Flash Point: 16.6 deg C.

**Warning!** Causes severe eye irritation. **Flammable liquid and vapor.** Causes respiratory tract irritation. This substance has caused adverse reproductive and fetal effects in humans. May cause central nervous system depression. May cause liver, kidney and heart damage. Causes moderate skin irritation.

**Target Organs:** Kidneys, heart, central nervous system, liver.

#### Potential Health Effects

**Eye:** Causes severe eye irritation. May cause painful sensitization to light. May cause chemical conjunctivitis and corneal damage.

**Skin:** Causes moderate skin irritation. May cause cyanosis of the extremities.

**Ingestion:** May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause systemic toxicity with acidosis. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure.

**Inhalation:** Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Causes respiratory tract irritation. May cause narcotic effects in high concentration. Vapors may cause dizziness or suffocation.

**Chronic:** May cause reproductive and fetal effects. Laboratory experiments have resulted in

mutagenic effects. Animal studies have reported the development of tumors. Prolonged exposure may cause liver, kidney, and heart damage.

## Section 4 - First Aid Measures

**Eyes:** Get medical aid. Gently lift eyelids and flush continuously with water.

**Skin:** Get medical aid. Wash clothing before reuse. Flush skin with plenty of soap and water.

**Ingestion:** Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation.

**Notes to Physician:** Treat symptomatically and supportively. Persons with skin or eye disorders or liver, kidney, chronic respiratory diseases, or central and peripheral nervous system diseases may be at increased risk from exposure to this substance.

**Antidote:** None reported.

## Section 5 - Fire Fighting Measures

**General Information:** Containers can build up pressure if exposed to heat and/or fire. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Flammable Liquid. Can release vapors that form explosive mixtures at temperatures above the flashpoint. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire.

**Extinguishing Media:** For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. Do NOT use straight streams of water.

**Flash Point:** 16.6 deg C ( 61.88 deg F)

**Autoignition Temperature:** 363 deg C ( 685.40 deg F)

**Explosion Limits, Lower:** 3.3 vol %

**Upper:** 19.0 vol %

**NFPA Rating:** (estimated) Health: 2; Flammability: 3; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Use only in a well-ventilated area. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Avoid

ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area. Do not store near perchlorates, peroxides, chromic acid or nitric acid.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Ethanol	1000 ppm TWA	1000 ppm TWA; 1900 mg/m <sup>3</sup> TWA 3300 ppm IDLH	1000 ppm TWA; 1900 mg/m <sup>3</sup> TWA

**OSHA Vacated PELs:** Ethanol: 1000 ppm TWA; 1900 mg/m<sup>3</sup> TWA

### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Clear liquid

**Appearance:** colorless

**Odor:** Mild, rather pleasant, like wine or whis

**pH:** Not available.

**Vapor Pressure:** 59.3 mm Hg @ 20 deg C

**Vapor Density:** 1.59

**Evaporation Rate:** Not available.

**Viscosity:** 1.200 cP @ 20 deg C

**Boiling Point:** 78 deg C

**Freezing/Melting Point:** -114.1 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Miscible.

**Specific Gravity/Density:** 0.790 @ 20°C

**Molecular Formula:** C<sub>2</sub>H<sub>5</sub>OH

**Molecular Weight:** 46.0414

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Incompatible materials. Ignition sources. excess heat. oxidizers.

**Incompatibilities with Other Materials:** Strong oxidizing agents, acids, alkali metals, ammonia, hydrazine, peroxides, sodium, acid anhydrides, calcium hypochlorite, chromyl chloride, nitrosyl perchlorate, bromine pentafluoride, perchloric acid, silver nitrate, mercuric nitrate, potassium-tert-butoxide, magnesium perchlorate, acid chlorides, platinum, uranium hexafluoride, silver oxide, iodine heptafluoride, acetyl bromide, disulfuryl difluoride, tetrachlorosilane + water, acetyl chloride, permanganic acid, ruthenium (VIII) oxide, uranyl perchlorate, potassium dioxide.

**Hazardous Decomposition Products:** Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 64-17-5: KQ6300000

**LD50/LC50:**

CAS# 64-17-5:

- Draize test, rabbit, eye: 500 mg Severe;
- Draize test, rabbit, eye: 500 mg/24H Mild;
- Draize test, rabbit, skin: 20 mg/24H Moderate;
- Inhalation, mouse: LC50 = 39 gm/m<sup>3</sup>/4H;
- Inhalation, rat: LC50 = 20000 ppm/10H;
- Oral, mouse: LD50 = 3450 mg/kg;
- Oral, rabbit: LD50 = 6300 mg/kg;
- Oral, rat: LD50 = 7060 mg/kg;
- Oral, rat: LD50 = 9000 mg/kg;

**Carcinogenicity:**

CAS# 64-17-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** Ethanol has been shown to produce fetotoxicity in the embryo or fetus of laboratory animals. Prenatal exposure to ethanol is associated with a distinct pattern of congenital malformations that have collectively been termed the "fetal alcohol syndrome".

**Teratogenicity:** Oral, Human - woman: TDLo = 41 gm/kg (female 41 week(s) after conception) Effects on Newborn - Apgar score (human only) and Effects on Newborn - other neonatal measures or effects and Effects on Newborn - drug dependence.

**Reproductive Effects:** Intrauterine, Human - woman: TDLo = 200 mg/kg (female 5 day(s) pre-mating) Fertility - female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated).

**Neurotoxicity:** No information available.

**Mutagenicity:** DNA Inhibition: Human, Lymphocyte = 220 mmol/L.; Cytogenetic Analysis: Human, Lymphocyte = 1160 gm/L.; Cytogenetic Analysis: Human, Fibroblast = 12000 ppm.; Cytogenetic Analysis: Human, Leukocyte = 1 pph/72H (Continuous).; Sister Chromatid Exchange: Human, Lymphocyte = 500 ppm/72H (Continuous).

**Other Studies:** Standard Draize Test (Skin, rabbit) = 20 mg/24H (Moderate) Standard Draize Test: Administration into the eye (rabbit) = 500 mg (Severe).

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Rainbow trout: LC50 = 12900-15300 mg/L; 96 Hr; Flow-through @ 24-24.3°C Fish: Rainbow trout: LC50 = 11200 mg/L; 24 Hr; Fingerling (Unspecified) Bacteria: Phytobacterium phosphoreum: EC50 = 34900 mg/L; 5-30 min; Microtox test When spilled on land it is apt to volatilize, biodegrade, and leach into the ground water, but no data on the rates of these processes could be found. Its fate in ground water is unknown. When released into water it will volatilize and probably

biodegrade. It would not be expected to adsorb to sediment or bioconcentrate in fish.

**Environmental:** When released to the atmosphere it will photodegrade in hours (polluted urban atmosphere) to an estimated range of 4 to 6 days in less polluted areas. Rainout should be significant.

**Physical:** No information available.

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	Not reviewed.	No information available.
<b>Hazard Class:</b>		
<b>UN Number:</b>		
<b>Packing Group:</b>		

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 64-17-5 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 64-17-5: acute, chronic, flammable.

**Section 313** No chemicals are reportable under Section 313.

#### Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 64-17-5 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**California Prop 65**

WARNING: This product contains Ethanol, a chemical known to the state of California to cause developmental reproductive toxicity.

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

F

**Risk Phrases:**

R 11 Highly flammable.

**Safety Phrases:**

S 16 Keep away from sources of ignition - No smoking.

S 33 Take precautionary measures against static discharges.

S 7 Keep container tightly closed.

S 9 Keep container in a well-ventilated place.

**WGK (Water Danger/Protection)**

CAS# 64-17-5: 0

**Canada - DSL/NDSL**

CAS# 64-17-5 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B2, D2A.

**Canadian Ingredient Disclosure List**

CAS# 64-17-5 is listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 7/27/1999

**Revision #4 Date:** 3/18/2003

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MSDS Number: **B1356** \* \* \* \* \* Effective Date: **05/19/08** \* \* \* \* \* Supersedes: **08/24/05**

<b>MSDS</b>	<b>Material Safety Data Sheet</b>		24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
			National Response in Canada CANUTEC: 613-996-6666
			Outside U.S. and Canada Chemtec: 703-527-3887
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		 	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.			

# BENZOIC ACID

## 1. Product Identification

**Synonyms:** Benzenecarboxylic acid; benzeneformic acid; phenyl carboxylic acid, phenyl formic acid, dracylic acid.

**CAS No.:** 65-85-0

**Molecular Weight:** 122.12

**Chemical Formula:** C<sub>6</sub>H<sub>5</sub>COOH

**Product Codes:**

J.T. Baker: 0076, 0080, 0081

Mallinckrodt: 0108

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Benzoic Acid	65-85-0	100%	Yes

## 3. Hazards Identification

### Emergency Overview

**WARNING! CAUSES EYE IRRITATION. MAY CAUSE IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY FORM COMBUSTIBLE DUST CONCENTRATIONS IN AIR.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 1 - Slight

Flammability Rating: 2 - Moderate

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: Green (General Storage)

### Potential Health Effects

#### Inhalation:

May cause irritation to the respiratory tract, (nose and throat); symptoms may include coughing and sore throat.

#### Ingestion:

Large oral doses may cause abdominal pain, sore throat, nausea, and vomiting.

#### Skin Contact:

If allowed to remain on skin, may cause irritation with redness and pain.

#### Eye Contact:

Causes irritation with redness and pain.

#### Chronic Exposure:

No information found.

#### Aggravation of Pre-existing Conditions:

No information found.

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. Get medical attention for any breathing difficulty.

**Ingestion:**

Give several glasses of water to drink to dilute. If large amounts were swallowed, get medical advice.

**Skin Contact:**

Wash exposed area with soap and water. Get medical advice if irritation develops.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 121C (250F) CC

Autoignition temperature: 570C (1058F)

**Explosion:**

Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. Minimum explosible concentration 0.011 g/l. Vapor may explode if ignited in an enclosed area. Vapor from molten benzoic acid may form explosive mixture with air.

**Fire Extinguishing Media:**

Water spray, dry chemical, alcohol foam, or carbon dioxide.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

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## 6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

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## 7. Handling and Storage

Keep in a well closed container stored under cold to warm conditions, 2 to 40 C, (36 to 104F). Protect against physical damage. Isolate from any source of heat or ignition. Isolate from oxidizing materials. Isolate from flammable materials.

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## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

None established.

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear protective gloves and clean body-covering clothing.

**Eye Protection:**

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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## 9. Physical and Chemical Properties

**Appearance:**

White, needle-like crystals.

**Odor:**

Faint pleasant odor.

**Solubility:**

0.29 g / 100 ml. water; sinks in water.

**Density:**

1.32

**pH:**

2.8 (saturated solution @ 25 0C)

**% Volatiles by volume @ 21C (70F):**

0

**Boiling Point:**

249C (480F)

**Melting Point:**

122C (252F)

**Vapor Density (Air=1):**

4.2

**Vapor Pressure (mm Hg):**

1 @ 96C (205F)

**Evaporation Rate (BuAc=1):**

No information found.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Emits toxic vapors and gas including phenol, benzene, and carbon monoxide when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Oxidizing agents, bases, and metals. Water solutions can react with metals to produce hydrogen gas.

**Conditions to Avoid:**

Heat, flame, ignition sources, dusting and incompatibles.

## 11. Toxicological Information

Oral rat LD50: 1700 mg/kg; LC50 rat &gt; 26,000mg/L/Hr.; irritation skin rabbit: 500 mg/24H mild; eye rabbit: 100 mg severe; investigated as a mutagen.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Benzoic Acid (65-85-0)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material may leach into groundwater. When released into the soil, this material is expected to readily biodegrade. When released into the water, this material is expected to have a half-life between 1 and 10 days. When released into water, this material is not expected to evaporate significantly. This material has a log octanol-water partition coefficient of less than 3.0. This material may bioaccumulate to some extent. When released into the air, this material is expected to be moderately removed from the atmosphere by wet deposition. When released to the air, this material is subject to removal from the atmosphere by gravitational settling.

**Environmental Toxicity:**

No information found.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

Not regulated.

## 15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Benzoic Acid (65-85-0)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----				

--Canada--

Ingredient	Korea	DSL	NDSL	Phil.
Benzoic Acid (65-85-0)	Yes	Yes	No	No

-----\Federal, State &amp; International Regulations - Part 1\-----

Ingredient	-SARA 302-		-SARA 313-	
	RQ	TPQ	List	Chemical Catg.
Benzoic Acid (65-85-0)	No	No	No	No

-----\Federal, State &amp; International Regulations - Part 2\-----

Ingredient	CERCLA	-RCRA-		-TSCA-	
		261.33	8 (d)		
Benzoic Acid (65-85-0)	5000	No	No		

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No  
 SARA 311/312: Acute: Yes Chronic: No Fire: Yes Pressure: No  
 Reactivity: No (Pure / Solid)

**Australian Hazchem Code:** None allocated.

**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 2 Flammability: 1 Reactivity: 0

**Label Hazard Warning:**

WARNING! CAUSES EYE IRRITATION. MAY CAUSE IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY FORM COMBUSTIBLE DUST CONCENTRATIONS IN AIR.

**Label Precautions:**

Avoid contact with eyes, skin and clothing.

Avoid breathing dust.

Wash thoroughly after handling.

Keep container closed.

Avoid dust cloud in presence of an ignition source.

Maintain adequate ventilation.

**Label First Aid:**

In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

\*\*\*\*\*

**Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy.**

**This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product.**

**Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose.**

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**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

# Material Safety Data Sheet

## Isopropanol

ACC# 95533

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Isopropanol

**Catalog Numbers:** AC149320000, AC149320050, AC149320100, AC149320200, AC167880000, AC184130000, AC184130025, AC184130051, AC184130250, AC326960000, AC326960010, AC326961000, AC326962500, AC327270000, AC327270010, AC327930000, AC327930010, AC364400000, AC364400010, AC364401000, AC383910000, AC383910010, AC383910025, AC383920000, AC383920025, AC389710000, AC389710025, AC389710100, AC389710250, AC412790000, AC412790040, AC423830000, AC611110040, 14932-0010, 14932-0025, 14932-0250, 16788-0010, 18413-0010, 41279-5000, 42383-0010, 42383-0040, 42383-0200, 42383-5000, 61008-0040, 61043-1000, A415-20, A415-4, A416-1, A416-20, A416-200, A416-200LC, A416-4, A416-4LC, A416-500, A416FB-115, A416FB-19, A416FB-200, A416FB-50, A416J-500, A416P-4, A416RB-115, A416RB-200, A416RB-50, A416RS-115, A416RS-200, A416RS-28, A416RS-50, A416S-4, A416SK-4, A416SS-115, A416SS-200, A416SS-28, A416SS-50, A417-1, A417-4, A419-1, A419-4, A419RS-115, A419RS-200, A419RS-28, A419SS-115, A419SS-200, A419SS-28, A419SS-50, A426P-4, A426PJ4, A426S-20, A426S-200, A426S-4, A451-1, A451-4, A451CU50, A451J1, A451N219, A451POP19, A451RS-115, A451RS-19, A451RS-200, A451RS-50, A451SK-1, A451SK-4, A451SS-200, A464-4, A464-4LC, A464J4, A464RS-200, A464SK-4, A516-20, A516-200, A516-4, A516-500, A519-4, A520-4, A520RS-200, A520SS-115, A520SS-200, A520SS-28, A520SS-50, A522-20, A522-4, A522SAM1, A522SAM2, A522SAM3, BP2621100, BP2632-4, NC9135800, NC9284977, NC9349372, NC9386241, NC9445090, NC9535770, NC9535771, NC9557098, NC9562752, NC9670945, NC9846796, S77795HPLC, S77795SPEC

**Synonyms:** Isopropanol; Dimethylcarbinol; sec-Propyl alcohol; Rubbing alcohol; Petrohol; 1-Methylethanol; 1-Methylethyl alcohol; 2-Hydroxypropane; 2-Propyl alcohol; Isopropyl alcohol; Propan-2-ol; IPA; 2-Propanol.

**Company Identification:**

Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410

**For information, call:** 201-796-7100

**Emergency Number:** 201-796-7100

**For CHEMTREC assistance, call:** 800-424-9300

**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
67-63-0	2-Propanol	>= 99.5	200-661-7

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: colorless liquid. Flash Point: 11.7 deg C.

**Warning! Flammable liquid and vapor.** Causes respiratory tract irritation. Breathing vapors may

cause drowsiness and dizziness. Causes eye irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. Prolonged or repeated contact causes defatting of the skin with irritation, dryness, and cracking. This material has been reported to be susceptible to autoxidation and therefore should be classified as peroxidizable. May cause central nervous system depression. May form explosive peroxides. Hygroscopic (absorbs moisture from the air).

**Target Organs:** Central nervous system, respiratory system, eyes, skin.

### Potential Health Effects

**Eye:** Produces irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury. May cause transient corneal injury. In the eyes of a rabbit, 0.1 ml of 70% isopropyl alcohol caused conjunctivitis, iritis, and corneal opacity.

**Skin:** May cause irritation with pain and stinging, especially if the skin is abraded. Isopropanol has a low potential to cause allergic skin reactions; however, rare cases of allergic contact dermatitis have been reported. May be absorbed through intact skin. Dermal absorption has been considered toxicologically insignificant. The cases of deep coma associated with skin contact are thought to be a consequence of gross isopropanol vapor inhalation in rooms with inadequate ventilation, rather than being attributable to percutaneous absorption of isopropanol per se.

**Ingestion:** Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause kidney damage. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. The probable oral lethal dose in humans is 240 ml (2696 mg/kg), but ingestion of only 20 ml (224 mg/kg) has caused poisoning.

**Inhalation:** Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. May cause narcotic effects in high concentration. Causes upper respiratory tract irritation. Inhalation of vapors may cause drowsiness and dizziness.

**Chronic:** Prolonged or repeated skin contact may cause defatting and dermatitis.

## Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

**Skin:** In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

**Ingestion:** Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.

**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Urine acetone test may be helpful in diagnosis. Hemodialysis should be considered in severe intoxication. Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. May form explosive peroxides. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

**Extinguishing Media:** Water may be ineffective. Do NOT use straight streams of water. For large

fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. For small fires, use carbon dioxide, dry chemical, dry sand, or alcohol-resistant foam. Cool containers with flooding quantities of water until well after fire is out.

**Flash Point:** 11.7 deg C ( 53.06 deg F)

**Autoignition Temperature:** > 350 deg C (> 662.00 deg F)

**Explosion Limits, Lower:**2.0 vol %

**Upper:** 12.7 @ 93°C

**NFPA Rating:** (estimated) Health: 1; Flammability: 3; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Use water spray to dilute spill to a non-flammable mixture. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Take precautionary measures against static discharges. Keep container tightly closed. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Avoid breathing vapor or mist. Do not allow to evaporate to near dryness.

**Storage:** Keep away from heat, sparks, and flame. Do not store in direct sunlight. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area. After opening, purge container with nitrogen before reclosing. Periodically test for peroxide formation on long-term storage. Addition of water or appropriate reducing materials will lessen peroxide formation. Store protected from moisture. Containers should be dated when opened and tested periodically for the presence of peroxides. Should crystals form in a peroxidizable liquid, peroxidation may have occurred and the product should be considered extremely dangerous. In this instance, the container should only be opened remotely by professionals. All peroxidizable substances should be stored away from heat and light and be protected from ignition sources.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
2-Propanol	200 ppm TWA; 400 ppm STEL	400 ppm TWA; 980 mg/m <sup>3</sup> TWA 2000 ppm IDLH (10% LEL)	400 ppm TWA; 980 mg/m <sup>3</sup> TWA

**OSHA Vacated PELs:** 2-Propanol: 400 ppm TWA; 980 mg/m<sup>3</sup> TWA

### Personal Protective Equipment

**Eyes:** Wear chemical splash goggles.

**Skin:** Wear appropriate gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** colorless

**Odor:** alcohol-like

**pH:** Not available.

**Vapor Pressure:** 33 mm Hg @ 20 deg C

**Vapor Density:** 2.1 (Air=1)

**Evaporation Rate:**1.7 (n-butyl acetate=1)

**Viscosity:** 2.27 mPas @ 20C

**Boiling Point:** 82 deg C @ 760 mmHg

**Freezing/Melting Point:**-88 deg C

**Decomposition Temperature:**Not available.

**Solubility:** Miscible.

**Specific Gravity/Density:**0.7850 (water=1)

**Molecular Formula:**C<sub>3</sub>H<sub>8</sub>O

**Molecular Weight:**60.1

## Section 10 - Stability and Reactivity

**Chemical Stability:** Under normal storage conditions, peroxidizable compounds can form and accumulate peroxides which may explode when subjected to heat or shock. This material is most hazardous when peroxide levels are concentrated by distillation or evaporation. Isopropanol is susceptible to autoxidation and therefore should be classified as peroxidizable.

**Conditions to Avoid:** Light, ignition sources, excess heat, exposure to moist air or water.

**Incompatibilities with Other Materials:** Strong oxidizing agents, strong acids, strong bases, amines, ammonia, ethylene oxide, isocyanates, acetaldehyde, chlorine, phosgene, Attacks some forms of plastics, rubbers, and coatings., aluminum at high temperatures.

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS# 67-63-0:** NT8050000

**LD50/LC50:**

**CAS# 67-63-0:**

Draize test, rabbit, eye: 100 mg Severe;

Draize test, rabbit, eye: 10 mg Moderate;

Draize test, rabbit, eye: 100 mg/24H Moderate;

Draize test, rabbit, skin: 500 mg Mild;

Inhalation, mouse: LC50 = 53000 mg/m<sup>3</sup>;

Inhalation, rat: LC50 = 16000 ppm/8H;

Inhalation, rat: LC50 = 72600 mg/m<sup>3</sup>;  
 Oral, mouse: LD50 = 3600 mg/kg;  
 Oral, mouse: LD50 = 3600 mg/kg;  
 Oral, rabbit: LD50 = 6410 mg/kg;  
 Oral, rat: LD50 = 5045 mg/kg;  
 Oral, rat: LD50 = 5000 mg/kg;  
 Skin, rabbit: LD50 = 12800

**Carcinogenicity:**

CAS# 67-63-0: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information found

**Teratogenicity:** A rat & rabbit developmental toxicity study showed no teratogenic effects at doses that were clearly maternally toxic. In a separate rat study, no evidence of developmental neurotoxicity was associated with gestational exposures to IPA up to 1200 mg/kg/d.

**Reproductive Effects:** See actual entry in RTECS for complete information.

**Mutagenicity:** See actual entry in RTECS for complete information.

**Neurotoxicity:** In rats exposed to isopropanol by inhalation, acute neurotoxicity was noted at 1 and 6 hours at 5000 ppm, but only minimal effects were seen at 1500 ppm and the animals recovered within 5 hours. No toxicity was noted at 500 ppm.

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Fathead Minnow: >1000 ppm; 96h; LC50Daphnia: >1000 ppm; 96h; LC50Fish: Gold orfe: 8970-9280 ppm; 48h; LC50 IPA has a high biochemical oxygen demand and a potential to cause oxygen depletion in aqueous systems, a low potential to affect aquatic organisms, a low potential to affect secondary waste treatment microbial metabolism, a low potential to affect the germination of some plants, a high potential to biodegrade (low persistence) with unacclimated microorganisms from activated sludge.

**Environmental:** No information available.

**Physical:** THOD: 2.40 g oxygen/gCOD: 2.23 g oxygen/gBOD-5: 1.19-1.72 g oxygen/g

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	ISOPROPANOL	ISOPROPANOL
<b>Hazard Class:</b>	3	3
<b>UN Number:</b>	UN1219	UN1219
<b>Packing Group:</b>	II	II

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 67-63-0 is listed on the TSCA inventory.

#### Health & Safety Reporting List

CAS# 67-63-0: Effective 12/15/86, Sunset 12/15/96

#### Chemical Test Rules

CAS# 67-63-0: 40 CFR 799.2325

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 67-63-0: immediate, delayed, fire.

#### Section 313

This material contains 2-Propanol (CAS# 67-63-0, >= 99.5%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 67-63-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

#### California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

### European/International Regulations

#### European Labeling in Accordance with EC Directives

#### Hazard Symbols:

XI F

#### Risk Phrases:

R 11 Highly flammable.

R 36 Irritating to eyes.

R 67 Vapours may cause drowsiness and dizziness.

#### Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.

S 24/25 Avoid contact with skin and eyes.

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 7 Keep container tightly closed

3.7. Keep container tightly closed.

**WGK (Water Danger/Protection)**

CAS# 67-63-0: 1

**Canada - DSL/NDSL**

CAS# 67-63-0 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B2, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 67-63-0 is listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 7/27/1999

**Revision #17 Date:** 2/18/2008

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# Material Safety Data Sheet

## Acetone

ACC# 00140

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Acetone

**Catalog Numbers:** AC167645000, AC176800000, AC176800026, AC176800050, AC176800051, AC176800250, AC176805000, AC177170000, AC177170050, AC177170100, AC177170250, AC177179090, AC268310000, AC268310010, AC296780000, AC296782500, AC326570000, AC326570010, AC326570025, AC326700000, AC326700010, AC326700025, AC326740000, AC326740010, AC326740025, AC326800000, AC326800010, AC326801000, AC326802500, AC327840000, AC327840010, AC400100000, AC400100010, AC400100040, AC400105000, AC423240000, AC611010040, AC9642971, 16764-0000, 16764-0025, 17680-0010, 17680-0025, 17717-0010, 17717-0025, 26831-0025, 26831-0040, 32784-0040, 40010-0025, 42324-0010, 42324-0040, 42324-5000, A11-1, A11-20, A11-200, A11-4, A11S-4, A16F-1GAL, A16P-1GAL, A16P-4, A16S-20, A16S-4, A18-1, A18-20, A18-200, A18-200LC, A18-4, A18-500, A18FB-115, A18FB-19, A18FB-200, A18FB-50, A18J-500, A18P-4, A18POP-19, A18POP-200, A18POP-50, A18POPB-19, A18POPB-200, A18POPB-50, A18RB-115, A18RB-19, A18RB-200, A18RB-50, A18RS-115, A18RS-200, A18RS-28, A18RS-50, A18S-4, A18SK-4, A18SS-115, A18SS-19, A18SS-200, A18SS-28, A18SS-50, A19-1, A19-4, A19RS-115, A19RS-200, A40-4, A40-4LC, A9-20, A9-200, A9-4, A928-4, A929-1, A929-4, A929J4, A929RS-19, A929RS-200, A929RS-50, A929SK-4, A929SS-115, A929SS-200, A929SS-50, A929SS28, A946-4, A9464LC, A946FB19, A946FB200, A946FB50, A946POPB19, A946POPB200, A946POPB50, A946RB115, A946RB19, A946RB200, A946RB50, A949-1, A949-4, A9491LC, A949CU50, A949J1, A949J4, A949N-119, A949N-219, A949POP-19, A949POP-200, A949POP-50, A949POPN-19, A949RS-115, A949RS-28, A949RS-50, A949SK-1, A949SK-4, A949SK4LC, A949SS-115, A949SS-19, A949SS-200, A949SS-28, A949SS-50, BP2401-1, BP2403-1, BP2403-20, BP2403-4, BP2403-500, BP2404-1, BP2404-4, BP2404SK-1, BP2404SK-4, HC3001GAL, NC9060899, NC9120377, NC9173151, NC9410335, NC9410661, NC9614315, NC9651790, NC9670953, PS03488, PS03489, S70091, S70091HPLC, S70091SPEC

**Synonyms:** Dimethylketone; 2-Propanone.**Company Identification:**

Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
67-64-1	Acetone	>99	200-662-2

### Section 3 - Hazards Identification

## EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: -20 deg C.

**Danger!** Extremely flammable liquid and vapor. Vapor may cause flash fire. Causes eye irritation. Breathing vapors may cause drowsiness and dizziness. Causes respiratory tract irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. Prolonged or repeated contact may dry the skin and cause irritation.

**Target Organs:** Central nervous system, respiratory system, eyes, skin.

### Potential Health Effects

**Eye:** Produces irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury. Vapors cause eye irritation.

**Skin:** May be absorbed through the skin. Repeated or prolonged exposure may cause drying and cracking of the skin.

**Ingestion:** May cause irritation of the digestive tract. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.

**Inhalation:** Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Causes respiratory tract irritation. May cause motor incoordination and speech abnormalities.

**Chronic:** Prolonged or repeated skin contact may cause dermatitis. Chronic inhalation may cause effects similar to those of acute inhalation. Matsushita et al. exposed human volunteers 6 hours/day for 6 days at 500 ppm acetone and found hematologic changes including significantly increased leukocyte and eosinophil counts and decreased neutrophil phagocytic activity.

## Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

**Skin:** In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

**Ingestion:** Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.

**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Extremely flammable liquid and vapor. Vapor may cause flash fire. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

**Extinguishing Media:** Use dry chemical, carbon dioxide, or appropriate foam. Water may be ineffective because it will not cool material below its flash point.

**Flash Point:** -20 deg C ( -4.00 deg F)

**Autoignition Temperature:** 465 deg C ( 869.00 deg F)

**Explosion Limits, Lower:**2.5%

**Upper:** 12.8%**NFPA Rating:** (estimated) Health: 1; Flammability: 3; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Wear appropriate protective clothing to minimize contact with skin. Remove all sources of ignition. Provide ventilation. A vapor suppressing foam may be used to reduce vapors. Water spray may reduce vapor but may not prevent ignition in closed spaces. Use only non-sparking tools and equipment.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Avoid breathing vapor.**Storage:** Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Ventilation fans and other electrical service must be non-sparking and have an explosion-proof design.**Exposure Limits**

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Acetone	500 ppm TWA; 750 ppm STEL	250 ppm TWA; 590 mg/m <sup>3</sup> TWA 2500 ppm IDLH (10% LEL)	1000 ppm TWA; 2400 mg/m <sup>3</sup> TWA

**OSHA Vacated PELs:** Acetone: 750 ppm TWA; 1800 mg/m<sup>3</sup> TWA**Personal Protective Equipment****Eyes:** Wear chemical splash goggles.**Skin:** Wear butyl rubber gloves, apron, and/or clothing.**Clothing:** Wear appropriate protective clothing to prevent skin exposure.**Respirators:** A NIOSH/MSHA approved or European Standard EN 149 air purifying respirator with an organic vapor cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless  
**Odor:** sweetish odor  
**pH:** 7  
**Vapor Pressure:** 231 mm Hg @ 25 deg C  
**Vapor Density:** 2.0 (Air=1)  
**Evaporation Rate:**5.6 (n-Butyl acetate=1)  
**Viscosity:** 0.32 cps @ 20 deg C  
**Boiling Point:** 56.5 deg C  
**Freezing/Melting Point:**-94 deg C  
**Decomposition Temperature:**Not available.  
**Solubility:** Soluble.  
**Specific Gravity/Density:**0.788 @ 25°C  
**Molecular Formula:**C<sub>3</sub>H<sub>6</sub>O  
**Molecular Weight:**58.08

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable at room temperature in closed containers under normal storage and handling conditions.

**Conditions to Avoid:** High temperatures, ignition sources, confined spaces.

**Incompatibilities with Other Materials:** Strong oxidizing agents, strong reducing agents, strong bases, nitric acid, hexachloromelamine, sulfur dichloride, potassium tert-butoxide.

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 67-64-1: AL3150000

**LD50/LC50:**

CAS# 67-64-1:

Dermal, guinea pig: LD50 = >9400 uL/kg;  
Draize test, rabbit, eye: 20 mg Severe;  
Draize test, rabbit, eye: 20 mg/24H Moderate;  
Draize test, rabbit, eye: 10 uL Mild;  
Draize test, rabbit, skin: 500 mg/24H Mild;  
Inhalation, mouse: LC50 = 44 gm/m<sup>3</sup>/4H;  
Inhalation, rat: LC50 = 50100 mg/m<sup>3</sup>/8H;  
Oral, mouse: LD50 = 3 gm/kg;  
Oral, rabbit: LD50 = 5340 mg/kg;  
Oral, rat: LD50 = 5800 mg/kg;

**Carcinogenicity:**

CAS# 67-64-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** In a series of studies, no statistically significant differences in causes of death or clinical laboratory results were observed in 948 employees exposed to up to 1070 ppm acetone over 23 years.

**Teratogenicity:** Animal studies have only shown harmful effects in the offspring of animals exposed to doses which also produced significant maternal toxicity.

**Reproductive Effects:** During the Stewart et al. study, four adult female volunteers were exposed

7.5 hours to acetone vapor at a nominal concentration of 1000 ppm. Three of the four women experienced premature menstrual periods which were attributed to the acetone exposure.

**Mutagenicity:** Sex chromosome loss and nondisjunction (Yeast - *Saccharomyces cerevisiae*) = 47600 ppm; Cytogenetic analysis (Rodent - hamster Fibroblast) = 40 gm/L.

**Neurotoxicity:** No information found

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Rainbow trout: 5540 mg/l; 96-hr; LC50 Fish: Bluegill/Sunfish: 8300 mg/l; 96-hr; LC50 No data available.

**Environmental:** Volatilizes, leeches, and biodegrades when released to soil. **TERRESTRIAL FATE:** If released on soil, acetone will both volatilize and leach into the ground. Acetone readily biodegrades and there is evidence suggesting that it biodegrades fairly rapidly in soils. **AQUATIC FATE:** If released into water, acetone will probably biodegrade. It is readily biodegradable in screening tests, although data from natural water are lacking. It will also be lost due to volatilization (estimated half-life 20 hr from a model river). Adsorption to sediment should not be significant.

**Physical:** **ATMOSPHERIC FATE:** In the atmosphere, acetone will be lost by photolysis and reaction with photochemically produced hydroxyl radicals. Half-life estimates from these combined processes are 79 and 13 days in January and June, respectively, for an overall annual average of 22 days. Therefore considerable dispersion should occur. Being miscible in water, wash out by rain should be an important removal process. This process has been confirmed around Lake Shinsei-ko in Japan. There acetone was found in the air and rain as well as the lake.

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 67-64-1: waste number U002 (Ignitable waste).

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	ACETONE	ACETONE
<b>Hazard Class:</b>	3	3
<b>UN Number:</b>	UN1090	UN1090
<b>Packing Group:</b>	II	II

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 67-64-1 is listed on the TSCA inventory.

**Health & Safety Reporting List**

None of the chemicals are on the Health & Safety Reporting List.

**Chemical Test Rules**

CAS# 67-64-1: 40 CFR 799.5000

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

CAS# 67-64-1: 5000 lb final RQ; 2270 kg final RQ

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**SARA Codes**

CAS # 67-64-1: immediate, fire.

**Section 313** No chemicals are reportable under Section 313.

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 67-64-1 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XI F

**Risk Phrases:**

R 11 Highly flammable.

R 36 Irritating to eyes.

R 66 Repeated exposure may cause skin dryness or cracking.

R 67 Vapours may cause drowsiness and dizziness.

**Safety Phrases:**

S 16 Keep away from sources of ignition - No smoking.

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 9 Keep container in a well-ventilated place.

**WGK (Water Danger/Protection)**

CAS# 67-64-1: 0

**Canada - DSL/NDSL**

CAS# 67-64-1 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B2, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products  
fscimage.fishersci.com/msds/00140.htm

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 67-64-1 is listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 7/26/1999

**Revision #22 Date:** 2/28/2008

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*



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**WWW: <http://www.2spi.com>**  
**Manufacturer's CAGE: 1P573**

# Material Safety Data Sheet

**SPI #02520-AA and 02520-AB Chloroform**

## Section 1: Identification

Date Effective..... January 8, 2009  
 (most recent revision)

Chemical Name/Synonyms... Chloroform

Emergencies  
 Contacting CHEMTREC:

24 Hour Emergency Use Only #'s...  
 Worldwide phone: 1-(703)-527-3887  
 Worldwide FAX: 1-(703)-741-6090  
 Toll-free phone: 1-(800)-424-9300 USA only

Product or Trade Name.... SPI # 02520-AA and 02520-AB Chloroform

Synonyms..... Methenyl chloride, Refrigerant 20,  
 trichloroform, trichloromethane,  
 methane trichloride



<b>Hazardous                  Material                  Information                  System                  USA</b>	Health	2	<b>National Fire                  Protection                  Association                  USA</b>	
	Fire Hazard	0		
	Reactivity	0		
	Personal Protection			

**NFPA Rating:**

Health=2, Flammability=0, Reactivity=0

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## Section 2 Composition

Component Name	CAS #	Percent	EINECS/ELINCS
Chloroform	67-66-3	>99	200-663-8

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## Section 3: Hazard Identification

**Emergency overview:**

Appearance: clear, colorless.

**Warning!**

Light sensitive. Cancer suspect agent. May cause central nervous system depression.

Aspiration hazard.

May cause eye and skin irritation.

May cause respiratory and digestive tract irritation.

May cause cardiac disturbances.

May cause reproductive and fetal effects.

May cause cancer based on animal studies.

Target Organs: Kidneys, heart, central nervous system, liver, gastrointestinal system, excretory system.

**Potential Health Effects****Eye:**

Contact with liquid or vapor causes severe burns and possible irreversible eye damage. Vapors may cause eye irritation. Contact produces irritation, tearing, and burning pain. May cause conjunctivitis. Causes redness and pain.

**Skin:**

Causes irritation with burning pain, itching, and redness.

**Ingestion:**

Aspiration hazard. May cause central nervous system depression, kidney damage, and liver damage. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause cardiac disturbances. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.

**Inhalation:**

Inhalation of high concentrations may cause central nervous system effects characterized by headache, dizziness, unconsciousness and coma. Causes respiratory tract irritation. May cause liver and kidney damage. May cause cardiac sensitization and possible failure.

**Chronic:**

Over-exposure may cause delayed kidney injury. Possible cancer hazard based on tests with laboratory animals. Chronic ingestion may cause liver damage. Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated exposure may cause adverse reproductive effects. May cause fetal effects. Chronic exposure has been associated with an increased incidence of kidney, liver, rectal, bladder, colon, brain, and lymph node cancer. Toxicity may be increased by exposure to alcohol, steroids, and ketones.

---

## Section 4: First Aid Measures

**Eyes:**

Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids. Get medical aid immediately. Do *not* allow victim to rub or keep eyes closed.

**Skin:**

Get medical aid immediately. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Discard contaminated clothing in a manner which limits further exposure.

**Ingestion:**

Do *not* induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Possible aspiration hazard. Get medical aid immediately.

**Inhalation:**

Get medical aid immediately. Remove from exposure to fresh air immediately. If breathing is difficult, give oxygen.

**Notes to Physician:**

Causes cardiac sensitization to endogenous catecholamines which may lead to cardiac arrhythmias. Do *not* use adrenaline-derivative agents such as

epinephrine or pseudoepinephrine.

---

## Section 5: Fire Fighting Measures

### General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Substance is noncombustible.

### Extinguishing Media:

In case of fire, use water fog, dry chemical, carbon dioxide, or regular foam.

### Autoignition Temperature:

Not available.

### Flash Point:

Not available.

### Explosion Limits:

Lower: Not available.

Upper: Not available.

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## Section 6: Accidental Release Measures

### General Information:

Use proper personal protective equipment as indicated in Section 8.

### Spills/Leaks:

Absorb spill with inert material, (e.g., dry sand or earth), then place into a chemical waste container.

---

## Section 7: Handling and Storage

### Handling:

Wash thoroughly after handling. Use only in a well ventilated area. Avoid contact with eyes, skin, and clothing. Avoid ingestion and inhalation.

**Storage:**

Do not store in direct sunlight. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

---

## Section 8: Exposure Controls and Personal Protection

**Engineering Controls:**

Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

**Exposure Limits:**

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Chloroform	10 ppm; 49 mg/m <sup>3</sup>	500 ppm IDHL	500 ppm Ceiling 240 mg/m <sup>3</sup> Ceiling

**OSHA Vacated PELs:**

Chloroform: 2 ppm TWA; 9.78 mg/m<sup>3</sup> TWA

**Personal Protective Equipment****Eyes:**

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:**

Wear appropriate protective gloves to prevent skin exposure.

**Clothing:**

Wear appropriate protective clothing to prevent skin exposure.

**Respirators:**

Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

---

## Section 9: Physical and Chemical Properties

**Physical State:** Liquid  
**Appearance:** Clear, colorless  
**Odor:** Sweet.  
**pH:** Not available.  
**Vapor Pressure:** 160 mm Hg  
**Vapor Density:** 4.12 (Air=1)

**Evaporation Rate:** Not known  
**Viscosity:** 0.58 @ 20 °C (68°F)  
**Boiling Point:** 61° C/142° F  
**Freezing/Melting Point:** -63°C (-81.4°F)  
**Decomposition Temperature:** Not available.  
**Solubility in water:** Slightly soluble.

**Specific Gravity/Density:** 1.50 g/cm<sup>3</sup>  
**Molecular Formula:** CHCl<sub>3</sub>  
**pH:** Not applicable

---

## Section 10: Stability and Reactivity

### Chemical Stability:

Stable at room temperature in closed containers under normal storage and handling conditions.

### Conditions to Avoid:

High temperatures, light.

### Incompatibility with Other Materials:

Acetone, alkalis, aluminum, disilane, lithium, magnesium, dinitrogen dioxide, nitrogen tetroxide, perchloric acid, phosphorus pentoxide, potassium, potassium hydroxide, methyl alcohol, potassium tert-butoxide, sodium, sodium hydroxide, sodium methylate, sodium-potassium alloy, triisopropylphosphine, calcium hydroxide, fluorine, and any strong oxidizers.

### Hazardous Decomposition of Products:

Hydrogen chloride, carbon monoxide, carbon dioxide, chlorine, phosgene gas.

**Hazardous Polymerization:** Has not been reported.

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## Section 11: Toxicological Information

**CAS #:** 67-66-3

**LD<sub>50</sub>/LC<sub>50</sub> Information:**

CAS #: 67-66-3

Inhalation, rat: LC<sub>50</sub>=47702 mg/m<sup>3</sup>/4HOral, mouse: LD<sub>50</sub> = 36 mg/kgOral, rat: LD<sub>50</sub> = 908 mg/kgSkin, rabbit: LD<sub>50</sub> = >20 gm/kg**Carcinogenicity:**

CAS #67-66-3:

**ACGIH:** A3 - Animal Carcinogen**California:** carcinogen - initial date 10/1/87**NIOSH:** occupational carcinogen**NTP:** Suspect carcinogen**OSHA:** Possible Select carcinogen**IARC:** Group 2B carcinogen**Epidemiology:** Please see IARC volume 20 for a detailed discussion.**Teratogenicity:**

Effects on newborn: Biochemical and Metabolic, Growth statistics  
(reduced weight gain), Oral-mouse, TDLo=2177 mg/kg  
(male 3W pre) Embryo or Fetus: Death, Ihl-rat, TCLo=20100 ug/m<sup>3</sup>/1H  
(female 7-14D post); Stunted fetus, Oral-rat, TDLo=1260 mg/kg (6-15D preg)

Developmental abnormalities: Craniofacial, Ihl-mouse, TCLo=100 ppm/7H  
(female 6-15D post); Musculoskeletal, Oral-rat, TDLo=1260 mg/kg (6-15D preg)

**Reproductive Effects:**

**Fertility:** Female index, Ihl-mouse, TCLo=100 ppm/7H  
(female 1-7D post)

**Neurotoxicity:** No information available.

**Mutagenicity:**

**DNA Damage:** Mammal lymphocyte, 1mmol/L Sister

**Chromatid Exchange:** Human lymphocyte, 10 mmol/L

**Other Studies:** None known.

---

## Section 12: Ecological Information

**Exotoxicity:**

Rainbow trout, LC50=2030 ug/L

Bluegill, LC50=100,000 ug/L/96H

Large mouth bass, LC50=51 ppm/96H

Fish: 10 mg/l

**Fish-toxicity:**

LC50: 162 mg/l

Pseudomonas putida: 125 mg/l

Scenedesmus quadricanda: 1100 mg/l

Microcystis aeruginosa: 185 mg/l

Entosiphonsulcatum: 6560 mg/l

**Environmental Fate:**

If released to land, most evaporates rapidly while some leaches to ground-water. If released to water, substance evaporates rapidly.

**Bioaccumulation:**

Substance photodegrades with  $T_{1/2}$  of 80 days.

---

## Section 13: Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

**RCRA D-Series Maximum Concentration of Contaminants:**

**CAS# 67-66-3:** waste number D022; regulatory level = 6.0 mg/L.

**RCRA D-Series Chronic Toxicity Reference Levels:**

**CAS# 67-66-3:** chronic toxicity reference level = 0.06 mg/L.

**RCRA F-Series:** None listed.

**RCRA P-Series:** None listed.

**RCRA U-Series:** CAS# 67-66-3: waste number U044.

---

## Section 14: Transport Information

**US DOT Hazard Class:**

Shipping Name: Chloroform

Hazard Class: 6.1

UN Number: UN1888

Packing Group: III

**IATA (for international shipments)**

Shipping Name: Chloroform

Hazard Class: 6.1

UN Number: UN1888

Packing Group: III

**SHIP/ATA**

Shipping Name: Chloroform  
Hazard Class: 6.1 (15C)  
UN Number: UN1888  
Packing Group: N/A

**IMO**

Shipping Name: Chloroform  
Hazard Class: 6.1  
UN Number: UN1888  
Packing Group: III

**Canada TDG**

Shipping Name: Chloroform  
Hazard Class: 6.1 (9.2)  
UN Number: UN1888  
Packing Group: II

---

## Section 15: Regulatory Information

**US FEDERAL****TSCA**

CAS# 67-66-3 is listed on the TSCA inventory.

**Health & Safety Reporting List**

CAS# 67-66-3: Effective Date: June 1, 1987; Sunset Date: June 1, 1997

**Chemical Test Rules**

None of the chemicals in this product are under a Chemical Test Rule.

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**SARA****Section 302 (RQ)**

CAS #67-66-3: final RQ = 10 pounds (4.54 kg)

**Section 302 (TPQ)**

CAS# 67-66-3: TPQ = 10,000 pounds; RQ = 10 pounds (does not meet toxicity criteria but because of high production volume and recognized toxicity is considered a chemical of concern)

**SARA Codes**

CAS #67-66-3: acute, chronic.

**Section 313**

This material contains Chloroform (CAS# 67-66-3, 99%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

**Clean Air Act:**

CAS #67-66-3 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

CAS #67-66-3 is listed as a Hazardous Substance under the CWA.  
CAS #67-66-3 is listed as a Priority Pollutant under the Clean Water Act.  
CAS #67-66-3 is listed as a Toxic Pollutant under the Clean Water Act.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE BY STATE IN THE USA:**

CAS #67-66-3 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts. The following statement(s) is(are) made in order to comply with the

**California Safe Drinking Water Act:**

**WARNING:** This product contains Chloroform, a chemical known to the state of California to cause cancer.

**California No Significant Risk Level:**

CAS #67-66-3:  
ingestion: no significant risk level = 20 ug/day;  
inhalation: no significant risk level = 40 ug/day

**European/International Regulations****European Labeling in Accordance with EC Directives**

**Hazard Symbols:** XN

**Risk Phrases:**

R 22 Harmful if swallowed.  
R 38 Irritating to skin.  
R 40 Possible risks of irreversible effects.  
R 48/20/22 Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.

**Safety Phrases:**

S 36/37 Wear suitable protective clothing and gloves.

**WGK (Water Danger/Protection)**

CAS #67-66-3: 3

**Canada**

CAS #67-66-3 is listed on Canada's DSL/NDSL List.  
 This product does not have a WHMIS classification.  
 CAS #67-66-3 is not listed on Canada's Ingredient Disclosure List.

### Exposure Limits

CAS #67-66-3: OEL-ARAB Republic of Egypt: TWA 10 ppm (50 mg/m3)  
 OEL- AUSTRALIA: TWA 10 ppm (50 mg/m3); Carcinogen OEL-AUSTRIA: TWA  
 10 ppm (50 mg/m3) OEL-BELGIUM: TWA 10 ppm (49 mg/m3); Carcinogen JAN9  
 OEL-CZECHO SLOVAKIA: TWA 10 mg/m3; STEL 20 mg/m3 OEL-DENMARK: TWA 2  
 ppm (10 mg/m3); Carcinogen OEL-FINLAND: TWA 10 ppm (50 mg/m3); STEL  
 20 ppm; Skin; CAR OE L-FRANCE: TWA 5 ppm (25 mg/m3); STEL 50 ppm  
 (250 mg/m3); CAR OEL-GERMANY: TWA 10 ppm (50 mg/m3); Carcinogen  
 JAN9 OEL-HUNGARY: STEL 10 mg/m3 OEL - INDIA: TWA 10 ppm (50 mg/m3);  
 Carcinogen OEL-JAPAN:TWA 50 ppm (240 mg/m3); Carcinogen OEL-THE NETHERLANDS:  
 TWA 10 ppm (50 mg/m3) OEL-THE PHI LIPPINES: TWA 50 ppm (240 mg/m3)  
 OEL-POLAND: TWA 50 mg/m3 OEL-RUSSIA: T WA 50 ppm OEL-SWEDEN: TWA 2 ppm  
 (10 mg/m3); STEL 5 ppm (25 mg/m3); CAR OEL-SWITZERLAND: TWA 10 ppm  
 (50 mg/m3); STEL 20 ppm (100 mg/m3) OEL-THA ILAND: TWA 50 ppm (240 mg/m3)  
 OEL-TURKEY: TWA 50 ppm (240 mg/m3) OEL-U NITED KINGDOM: TWA 10 ppm  
 (50 mg/m3); STEL 50 ppm (225 mg/m3) OEL IN BU LGARIA, COLOMBIA, JORDAN,  
 KOREA check ACGIH TLV OEL IN NEW ZEALAND, S INGAPORE, VIETNAM  
 check ACGI TLV

### California Prop. 65:

Proposition 65 requires manufacturers or distributors of consumer products into the State of California to provide a warning statement if the product contains ingredients for which the State has found to cause cancer, birth defects or other reproductive harm. If this product contains an ingredient listed by the State of California to cause cancer or reproductive toxicity, it will be listed below:

Chloroform CAS #67-66-3

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## Section 16: Other Information

### Disclaimer of Liability:

Caution! Do not use SPI Supplies products or materials in applications involving implantation within the body; direct or indirect contact with the blood pathway; contact with bone, tissue, tissue fluid, or blood; or prolonged contact with mucous membranes. Products offered by SPI Supplies are not designed or manufactured for use in implantation in the human body or in contact with internal body fluids or tissues. SPI Supplies will not provide to customers making devices for such applications any notice, certification, or information necessary for such medical device use required by US FDA (Food and Drug Administration) regulation or any other statute. SPI Supplies and Structure Probe, Inc. make no representation, promise.

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\*\*\*\*\*

The information and recommendations set forth above are taken from sources believed to be accurate as of the date hereof, however SPI Supplies and Structure Probe, Inc. make no warranty with respect to the accuracy of the information or the suitability of the recommendations, and assume no liability to any user thereof. The information contained in this sheet does not constitute a hazard assessment and should not be used in place of the user's own assessment of work place risks as required by other health and safety legislation. Be aware of the Structure Probe, Inc. [Copyright Policy](#). Structure Probe, Inc. grants a nonexclusive license to make unlimited copies of this safety sheet for internal use only. Quite obviously, this information would pertain only to this material when purchased from SPI Supplies as product from other sources, with other ingredients and impurity levels could have substantially different properties.

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Tuesday May 10, 2011

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## \*\*\*\* SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS \*\*\*\*

CAS#	Chemical Name	%	EINECS#
7005-72-3	4-Chlorodiphenyl ether	99	230-281-7

Hazard Symbols: None Listed.

Risk Phrases: None Listed.

## \*\*\*\* SECTION 3 - HAZARDS IDENTIFICATION \*\*\*\*

## EMERGENCY OVERVIEW

The toxicological properties of this material have not been fully investigated.

## Potential Health Effects

## Eye:

May cause eye irritation. The toxicological properties of this material have not been fully investigated.

## Skin:

May cause skin irritation. The toxicological properties of this material have not been fully investigated.

## Ingestion:

May cause irritation of the digestive tract. The toxicological properties of this substance have not been fully investigated.

## Inhalation:

May cause respiratory tract irritation. The toxicological properties of this substance have not been fully investigated.

## Chronic:

No information found.

## \*\*\*\* SECTION 4 - FIRST AID MEASURES \*\*\*\*

## Eyes:

Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

## Skin:

Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

## Ingestion:

Never give anything by mouth to an unconscious person. Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water. Wash mouth out with water.

## Inhalation:

Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

## Notes to Physician:

## \*\*\*\* SECTION 5 - FIRE FIGHTING MEASURES \*\*\*\*

## General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.

## Extinguishing Media:

Use agent most appropriate to extinguish fire. Use water spray, dry chemical, carbon dioxide, or appropriate foam.

## \*\*\*\* SECTION 6 - ACCIDENTAL RELEASE MEASURES \*\*\*\*

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:

Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Provide ventilation.

\*\*\*\* SECTION 7 - HANDLING and STORAGE \*\*\*\*

Handling:

Wash thoroughly after handling. Use with adequate ventilation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed.

Avoid ingestion and inhalation.

Storage:

Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

\*\*\*\* SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION \*\*\*\*

Engineering Controls:

Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

CAS# 7005-72-3:

Personal Protective Equipment

Eyes:

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:

Wear appropriate protective gloves to prevent skin exposure.

Clothing:

Wear appropriate protective clothing to prevent skin exposure.

Respirators:

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.

\*\*\*\* SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES \*\*\*\*

Physical State: Liquid

Color: pale yellow

Odor: ethereal odor

pH: Not available.

Vapor Pressure: Not available.

Viscosity: Not available.

Boiling Point: 284 deg C

Freezing/Melting Point: -8 deg C

Autoignition Temperature: Not available.

Flash Point: > 110 deg C (> 230.00 deg F)

Explosion Limits, lower: N/A

Explosion Limits, upper: N/A

Decomposition Temperature:

Solubility in water: Slightly soluble.

Specific Gravity/Density: 1.1930g/cm3

Molecular Formula: C<sub>12</sub>H<sub>10</sub>O<sub>2</sub>

Molecular Weight: 204.66

\*\*\*\* SECTION 10 - STABILITY AND REACTIVITY \*\*\*\*

Chemical Stability:

Stable at room temperature in closed containers under normal storage and handling conditions.

Conditions to Avoid:

Incompatible materials, excess heat, oxidizers.

Incompatibilities with Other Materials:

Oxidizing agents.

Hazardous Decomposition Products:

Hydrogen chloride, carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.

Hazardous Polymerization: Has not been reported

\*\*\*\* SECTION 11 - TOXICOLOGICAL INFORMATION \*\*\*\*

RTECS#:

CAS# 7005-72-3 unlisted.

LD50/LC50:

Not available.

Carcinogenicity:

4-Chlorodiphenyl ether -

Not listed by ACGIH, IARC, or NTP.

\*\*\*\* SECTION 12 - ECOLOGICAL INFORMATION \*\*\*\*

Other

No information available.

\*\*\*\* SECTION 13 - DISPOSAL CONSIDERATIONS \*\*\*\*

Dispose of in a manner consistent with federal, state, and local regulations.

\*\*\*\* SECTION 14 - TRANSPORT INFORMATION \*\*\*\*

IATA

Not regulated as a hazardous material.

IMO

Not regulated as a hazardous material.

RID/ADR

Not regulated as a hazardous material.

USA RQ: CAS# 7005-72-3: 5000 lb final RQ; 2270 kg final RQ

\*\*\*\* SECTION 15 - REGULATORY INFORMATION \*\*\*\*

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: Not available.

Risk Phrases:

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

S 28A After contact with skin, wash immediately with plenty of water.

S 37 Wear suitable gloves.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)

CAS# 7005-72-3: No information available.

Canada

CAS# 7005-72-3 is listed on Canada's NDSL List.

CAS# 7005-72-3 is not listed on Canada's Ingredient Disclosure List.

US FEDERAL  
TSCA

CAS# 7005-72-3 is listed on the TSCA inventory.

\*\*\*\* SECTION 16 - ADDITIONAL INFORMATION \*\*\*\*

MSDS Creation Date: 11/10/1998 Revision #3 Date: 2/02/2004

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

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# Material Safety Data Sheet

## Benzene

ACC# 02610

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Benzene

**Catalog Numbers:** AC167660000, AC167660010, AC167660025, AC167660250, AC167665000, AC168650250, AC295330000, AC295330010, AC295330025, AC295330250, AC296880000, AC296880010, AC296880025, AC296880250, AC610230010, AC610231000, AC611001000, B243-4, B245-4, B245-500, B411-1, B411-4, B412-1, S79920ACS

**Synonyms:** Benzol; Cyclohexatriene; Phenyl hydride.**Company Identification:**

Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
71-43-2	Benzene	> 99	200-753-7

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear colorless liquid. Flash Point: -11 deg C.

**Danger!** Extremely flammable liquid and vapor. Vapor may cause flash fire. Harmful if swallowed, inhaled, or absorbed through the skin. Causes eye, skin, and respiratory tract irritation. Contains benzene. Benzene can cause cancer. Aspiration hazard if swallowed. Can enter lungs and cause damage. May cause blood abnormalities. May cause central nervous system effects.

**Target Organs:** Blood, central nervous system, respiratory system, eyes, bone marrow, immune system, skin.

#### Potential Health Effects

**Eye:** Causes eye irritation.

**Skin:** Causes skin irritation. Harmful if absorbed through the skin. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis.

**Ingestion:** May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. May cause effects similar to those for inhalation exposure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.

**Inhalation:** Causes respiratory tract irritation. May cause drowsiness, unconsciousness, and central

nervous system depression. Exposure may lead to irreversible bone marrow injury. Exposure may lead to aplastic anemia. Potential symptoms of overexposure by inhalation are dizziness, headache, vomiting, visual disturbances, staggering gait, hilarity, fatigue, and other symptoms of CNS depression.

**Chronic:** May cause bone marrow abnormalities with damage to blood forming tissues. May cause anemia and other blood cell abnormalities. Chronic exposure to benzene has been associated with an increased incidence of leukemia and multiple myeloma (tumor composed of cells of the type normally found in the bone marrow). Immunodepressive effects have been reported. This substance has caused adverse reproductive and fetal effects in laboratory animals.

## Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

**Skin:** In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

**Ingestion:** Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.

**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Extremely flammable liquid and vapor. Vapor may cause flash fire. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. This liquid floats on water and may travel to a source of ignition and spread fire. May accumulate static electricity.

**Extinguishing Media:** Use water spray, dry chemical, carbon dioxide, or appropriate foam.

**Flash Point:** -11 deg C ( 12.20 deg F)

**Autoignition Temperature:** 498 deg C ( 928.40 deg F)

**Explosion Limits, Lower:** 1.3 vol %

**Upper:** 7.1 vol %

**NFPA Rating:** (estimated) Health: 2; Flammability: 3; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Remove all sources of ignition. Provide ventilation. Approach spill from upwind. Use water spray to cool and disperse vapors, protect personnel, and dilute spills to form nonflammable mixtures.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Take precautionary measures against static discharges. Keep container tightly closed. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Avoid breathing vapor.

**Storage:** Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. See 29CFR 1910.1028 for the regulatory requirements for the control of employee exposure to benzene.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Benzene	0.5 ppm TWA; 2.5 ppm STEL; Skin - potential significant contribution to overall exposure by the cutaneous route	0.1 ppm TWA 500 ppm IDLH	1 ppm TWA; 10 ppm TWA (applies to industry segments exempt from the benzene standard at 29 CFR 1910.1028); 25 ppm Ceiling (applies to industry segments exempt from the 1 ppm TWA and 5 ppm STEL of the benzene standard); 0.5 ppm Action Level; 1 ppm TWA; 5 ppm STEL (Cancer hazard, Flammable - see 29 CFR 1910.1028)

**OSHA Vacated PELs:** Benzene: 10 ppm TWA (unless specified in 1910.1028)

### Personal Protective Equipment

**Eyes:** Wear chemical splash goggles.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear colorless

**Odor:** sweetish odor - aromatic odor

**pH:** Not applicable.

**Vapor Pressure:** 75 mm Hg @ 20 deg C

**Vapor Density:** 2.8 (air=1)  
**Evaporation Rate:** Not available.  
**Viscosity:** 0.647mPa @ 20 deg C  
**Boiling Point:** 80.1 deg C  
**Freezing/Melting Point:** 5.5 deg C  
**Decomposition Temperature:** Not available.  
**Solubility:** 0.180 g/100 ml @ 25°C  
**Specific Gravity/Density:** 0.8765 @ 20°C  
**Molecular Formula:** C<sub>6</sub>H<sub>6</sub>  
**Molecular Weight:** 78.11

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.  
**Conditions to Avoid:** Ignition sources, excess heat, confined spaces.  
**Incompatibilities with Other Materials:** Strong oxidizing agents.  
**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.  
**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 71-43-2: CY1400000

**LD50/LC50:**

**CAS#** 71-43-2:

Dermal, guinea pig: LD50 = >9400 uL/kg;  
Draize test, rabbit, eye: 88 mg Moderate;  
Draize test, rabbit, eye: 2 mg/24H Severe;  
Draize test, rabbit, skin: 20 mg/24H Moderate;  
Inhalation, mouse: LC50 = 9980 ppm;  
Inhalation, mouse: LC50 = 24 mL/kg/2H;  
Inhalation, rat: LC50 = 10000 ppm/7H;  
Inhalation, rat: LC50 = 34 mL/kg/2H;  
Inhalation, rat: LC50 = 6.5 mL/kg/4H;  
Oral, mouse: LD50 = 4700 mg/kg;  
Oral, rat: LD50 = 930 mg/kg;  
Oral, rat: LD50 = 1 mL/kg;

Oral, rat: LD50 = 1800 Benzene is considered very toxic; probable human oral lethal dose would be 50-500 mg/kg. Human inhalation of approximately 20,000 ppm (2% in air) was fatal in 5-10 minutes. While percutaneous absorption of liquid benzene through intact human skin can be limited (e.g., 0.05% of the applied dose), the absorbed dose via direct dermal contact combined with that received from body surface exposure to benzene in workplace air is such that a substantial fraction (20-40%) of the total exposure is due to skin absorption.

**Carcinogenicity:**

**CAS#** 71-43-2:

- **ACGIH:** A1 - Confirmed Human Carcinogen
- **California:** carcinogen, initial date 2/27/87
- **NTP:** Known carcinogen
- **IARC:** Group 1 carcinogen

**Epidemiology:** IARC has concluded that epidemiological studies have established the relationship between benzene exposure and the development of acute myelogenous leukemia, and that there is sufficient evidence that benzene is carcinogenic to humans.

**Teratogenicity:** Inhalation, rat: TCLO = 50 ppm/24H (female 7-14 day(s) after conception) Effects on Embryo or Fetus - extra-embryonic structures (e.g., placenta, umbilical cord) and Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus).; Inhalation, mouse: TCLO = 5 ppm (female 6-15 day(s) after conception) Effects on Embryo or Fetus - cytological changes (including somatic cell genetic material) and Specific Developmental Abnormalities - blood and lymphatic systems (including spleen and marrow).

**Reproductive Effects:** Inhalation, rat: TCLO = 670 mg/m<sup>3</sup>/24H (female 15 day(s) pre-mating and female 1-22 day(s) after conception) female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated).; Oral, mouse: TDLo = 12 gm/kg (female 6-15 day(s) after conception) Fertility - post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants).

**Mutagenicity:** DNA Inhibition: Human, Leukocyte = 2200 umol/L.; DNA Inhibition: Human, HeLa cell = 2200 umol/L.; Mutation Test Systems - not otherwise specified: Human, Lymphocyte = 5 umol/L.; Cytogenetic Analysis: Inhalation, Human = 125 ppm/1Y.; Cytogenetic Analysis: Human, Leukocyte = 1 mmol/L/72H.; Cytogenetic Analysis: Human, Lymphocyte = 1 mg/L.

**Neurotoxicity:** See actual entry in RTECS for complete information.

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Mosquito Fish: TLm = 395 mg/L; 24 Hr; Unspecified Fish: Goldfish: LC50 = 46 mg/L; 24 Hr; Modified ASTM D 1345 Fish: Fathead Minnow: LC50 = 15.1 mg/L; 96 Hr; Flow-through at 25°C (pH 7.9-8.0) Fish: Rainbow trout: LC50 = 5.3 mg/L; 96 Hr; Flow-through at 25°C (pH 7.9-8.0) Fish: Bluegill/Sunfish: LD50 = 20 mg/L; 24-48 Hr; Unspecified If benzene is released to soil, it will be subject to rapid volatilization near the surface and that which does not evaporate will be highly to very highly mobile in the soil and may leach to groundwater. If benzene is released to water, it will be subject to rapid volatilization. It will not be expected to significantly adsorb to sediment, bioconcentrate in aquatic organisms or hydrolyze. It may be subject to biodegradation.

**Environmental:** If benzene is released to the atmosphere, it will exist predominantly in the vapor phase. Gas-phase benzene will not be subject to direct photolysis but it will react with photochemically produced hydroxyl radicals with a half-life of 13.4 days. The reaction time in polluted atmospheres which contain nitrogen oxides or sulfur dioxide is accelerated with the half-life being reported as 4-6 hours. Benzene is fairly soluble in water and is removed from the atmosphere in rain.

**Physical:** Products of photooxidation include phenol, nitrophenols, nitrobenzene, formic acid, and peroxyacetyl nitrate.

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 71-43-2: waste number U019 (Ignitable waste, Toxic waste).

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	BENZENE	BENZENE
<b>Hazard Class:</b>	3	3
<b>UN Number:</b>	UN1114	UN1114
<b>Packing Group:</b>	II	II
<b>Additional Info:</b>		FLASHPOINT -11 C

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 71-43-2 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 71-43-2: 10 lb final RQ (received an adjusted RQ of 10 lbs based on potential carcinogeni

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPO.

#### SARA Codes

CAS # 71-43-2: immediate, delayed, fire.

#### Section 313

This material contains Benzene (CAS# 71-43-2, > 99%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

CAS# 71-43-2 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

CAS# 71-43-2 is listed as a Hazardous Substance under the CWA. CAS# 71-43-2 is listed as a Priority Pollutant under the Clean Water Act. CAS# 71-43-2 is listed as a Toxic Pollutant under the Clean Water Act.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 71-43-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

#### California Prop 65

#### The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Benzene, a chemical known to the state of California to cause cancer. WARNING: This product contains Benzene, a chemical known to the state of California to cause male reproductive toxicity.

California No Significant Risk Level: CAS# 71-43-2: 6.4 æg/day NSRL (oral); 13 æg/day NSRL (inhalation)

## European/International Regulations

### European Labeling in Accordance with EC Directives

#### Hazard Symbols:

T F

#### Risk Phrases:

- R 11 Highly flammable.
- R 36/38 Irritating to eyes and skin.
- R 45 May cause cancer.
- R 46 May cause heritable genetic damage.
- R 48/23/24/25 Toxic : danger of serious damage to health by prolonged exposure through inhalation, contact with skin and if swallowed.
- R 65 Harmful: may cause lung damage if swallowed.

#### Safety Phrases:

- S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
- S 53 Avoid exposure - obtain special instructions before use.

#### WGK (Water Danger/Protection)

CAS# 71-43-2: 3

#### Canada - DSL/NDSL

CAS# 71-43-2 is listed on Canada's DSL List.

#### Canada - WHMIS

This product has a WHMIS classification of B2, D2A, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

#### Canadian Ingredient Disclosure List

CAS# 71-43-2 is listed on the Canadian Ingredient Disclosure List.

## Section 16 - Additional Information

**MSDS Creation Date:** 6/11/1999

**Revision #8 Date:** 9/11/2008

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*



From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

24 Hour Emergency Telephone: 908-859-2151  
CHEMTREC: 1-800-424-9300  
National Response in Canada  
CANUTEC: 613-996-6666  
Outside U.S. And Canada  
Chemtree: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

# 1,1,1-TRICHLOROETHANE

## 1. Product Identification

**Synonyms:** Methyl chloroform; trichloroethane; chloroetene

**CAS No.:** 71-55-6

**Molecular Weight:** 133.40

**Chemical Formula:** CH<sub>3</sub>CCl<sub>3</sub>

**Product Codes:** 9435, 9437, W509, W510

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Methyl Chloroform	71-55-6	96 - 100%	Yes
Dioxane	123-91-1	< 3%	Yes
1,2-Epoxybutane	106-88-7	< 0.5%	Yes
Actual concentrations proprietary			

## 3. Hazards Identification

### Emergency Overview

**WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER, KIDNEYS, AND CARDIOVASCULAR SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. POSSIBLE CANCER HAZARD. CONTAINS DIOXANE WHICH MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.**

SAF-T-DATA<sup>(tm)</sup> Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Cancer Causing)

Flammability Rating: 1 - Slight

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe (Life)

Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

Storage Color Code: Blue (Health)

### Potential Health Effects

#### Inhalation:

Inhalation of vapors will irritate the respiratory tract. Affects the central nervous system. Symptoms include headache, dizziness, weakness, nausea. Higher levels of exposure (> 5000 ppm) can cause irregular heart beat, kidney and liver damage, fall in blood pressure, unconsciousness and even death.

#### Ingestion:

Harmful if swallowed. Symptoms similar to inhalation will occur along with nausea, vomiting. Aspiration of material into the lungs can cause chemical pneumonitis which can be fatal. If aspirated, may be rapidly absorbed through the lungs and result in injury to other body systems.

#### Skin Contact:

Causes mild irritation and redness, especially on prolonged contact. Repeated contact may cause drying or flaking of the skin.

#### Eye Contact:

Liquids and vapors cause irritation. Symptoms include tearing, redness, stinging, swelling.

#### Chronic Exposure:

Prolonged or repeated skin contact may cause dermatitis. Chronic exposure may affect the kidneys and liver. Dioxane is a suspected human carcinogen based on animal data.

**Aggravation of Pre-existing Conditions:**

Personnel with CNS, kidney, liver or heart disease may be more susceptible to the effects of this substance. Use of alcoholic beverages may aggravate symptoms.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Ingestion:**

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Autoignition temperature: 500C (932F)

Flammable limits in air % by volume:

lcl: 7.0; ucl: 16.0

Vapors in containers can explode if subjected to high energy source.

Dioxane has a flash point below 16C (60F).

**Explosion:**

Can react with strong caustic, such as potash to form a flammable or explosive material. Air/vapor mixtures may explode when heated. Vapors can flow along surfaces to distant ignition source and flash back. Sealed containers may rupture when heated.

**Fire Extinguishing Media:**

Use any means suitable for extinguishing surrounding fire.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Combustion by-products include phosgene and hydrogen chloride gases. Structural firefighters' clothing provides only limited protection to the combustion products of this material.

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## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! Do not use aluminum, magnesium or zinc metal for storage container. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do not use aluminum equipment or storage containers. Contact with aluminum parts in a pressurized fluid system may cause violent reactions.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):

350 ppm (TWA) for trichloroethane

100 ppm (TWA) skin for dioxane

-ACGIH Threshold Limit Value (TLV):

350 ppm (TWA), 450 ppm (STEL) for trichloroethane

20 ppm (TWA) skin, A3 - Animal Carcinogen for dioxane

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airtight hood, or full-facepiece self-contained

breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). This substance has questionable warning properties. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Viton is a recommended material for personal protective equipment.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Mild chloroform-like odor.

**Solubility:**

4,400 ppm in water @ 20C (68F)

**Specific Gravity:**

1.34 @ 20C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

74C (165F)

**Melting Point:**

-32C (-26F)

**Vapor Density (Air=1):**

4.63

**Vapor Pressure (mm Hg):**

100 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

12.8

## 10. Stability and Reactivity

**Stability:**

Requires inhibitor content to prevent corrosion of metals. Slowly hydrolyzes in water to form hydrochloric and acetic acid.

**Hazardous Decomposition Products:**

May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition. Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Hazardous polymerization can occur in contact with aluminum trichloride.

**Incompatibilities:**

Open flames, welding arcs, nitrogen tetroxide, oxygen, liquid oxygen, sodium, sodium hydroxide, and sodium-potassium alloy, strong alkalis, oxidizers, aluminum and other reactive metals.

**Conditions to Avoid:**

Insufficient inhibitor, incompatibles, heat, flame and ignition sources

## 11. Toxicological Information

Oral rat LD50: 9600 mg/kg; inhalation rat LC50: 18000 ppm/4H; investigated as a mutagen, tumorigen, reproductive effector; irritation eye rabbit, Standard Draize, 2mg/24H severe.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Methyl Chloroform (71-55-6)	No	No	3
Dioxane (123-91-1)	No	Yes	2B
1,2-Epoxybutane (106-88-7)	No	No	2B

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material is not expected to biodegrade. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. This material is not expected to significantly bioaccumulate. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition. When released to the atmosphere, this material has an average global half-life of 6.0 - 6.9 years. When released into the air, this material may adversely affect the ozone layer.

**Environmental Toxicity:**

This material is expected to be slightly toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

**13. Disposal Considerations**

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

**14. Transport Information****Domestic (Land, D.O.T.)**

**Proper Shipping Name:** 1,1,1-TRICHLOROETHANE

**Hazard Class:** 6.1

**UN/NA:** UN2831

**Packing Group:** III

**Information reported for product/size:** 20L

**15. Regulatory Information**

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Methyl Chloroform (71-55-6)	Yes	Yes	Yes	Yes
Dioxane (123-91-1)	Yes	Yes	Yes	Yes
1,2-Epoxybutane (106-88-7)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	--Canada--			
	Korea	DSL	NDSL	Phil.
Methyl Chloroform (71-55-6)	Yes	Yes	No	Yes
Dioxane (123-91-1)	Yes	Yes	No	Yes
1,2-Epoxybutane (106-88-7)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----				
Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Methyl Chloroform (71-55-6)	No	No	Yes	No
Dioxane (123-91-1)	No	No	Yes	No
1,2-Epoxybutane (106-88-7)	No	No	Yes	No

-----\Federal, State & International Regulations - Part 2\-----			
Ingredient	CERCLA	-RCRA-	
		261.33	-TSCA- 8(d)
Methyl Chloroform (71-55-6)	1000	U226	No
Dioxane (123-91-1)	100	U108	No
1,2-Epoxybutane (106-88-7)	100	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No  
 SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No  
 Reactivity: No (Mixture / Liquid)

**WARNING:**

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

**Australian Hazchem Code:** 2[Z]

**Poison Schedule:** S6

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

**16. Other Information**

**NFPA Ratings:** Health: 2 Flammability: 1 Reactivity: 0

**Label Hazard Warning:**

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER, KIDNEYS, AND CARDIOVASCULAR SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. POSSIBLE CANCER HAZARD. CONTAINS DIOXANE WHICH MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.

**Label Precautions:**

Avoid breathing vapor.

Keep container closed.  
Use only with adequate ventilation.  
Wash thoroughly after handling.  
Avoid contact with eyes, skin and clothing.

**Label First Aid:**

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

MSDS Section(s) changed since last revision of document include: 3.

**Disclaimer:**

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

## Composition/Information on Ingredient

**Cas:**

72-20-8

**Code:**

M

**RTECS:**

IO1575000

**Code:**

M

**Name:**

ENDRIN

**Other REC Limits:**

N/K

**OSHA PEL:**

0.1 MG/CUM

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

0.1 MG/CUM (SKIN)

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

N/K

**Ventilation:**

N/K

**Protective Gloves:**

RECOMMENDED

**Eye Protection:**

RECOMMENDED

**Other Protective Equipment:**

Equipment USE APPROPRIATE OSHA/MSHA SAFETY EQUIPMENT.

**Work Hygienic Practices:**

N/K

**Supplemental Safety and Health:**

N/K

## Health Hazards Data

**LD50LC50Mixture:**

ORAL (RAT) LD50: 5000 MG/KG (TOLUENE)

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

EYES/SKIN/INHALATION/INGESTION: IRRITATION.

**Explanation Of Carcinogenicity:**

LINDANE, DDT ISOMERS, & DIELDRIN ARE SUSPECTED HUMAN CARCINOGENS. HEPTACHLOR IS AN A2 CARCINOGEN.

**Signs And Symptoms Of Overexposure:**

EYES/SKIN/INGESTION/INHALATION: TOXIC & IRRITATION.

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES/SKIN: FLUSH W/COPIOUS AMOUNTS OF WATER. INHALATION: REMOVE TO FRESH AIR. GIVE OXYGEN IF NECESSARY. OBTAIN MEDICAL ATTENTION IN ALL CASES.

**Spill Release Procedures:**

DUE TO THE SMALL QUANTITY INVOLVED, SPILLS OR LEAKS SHOULD NOT POSE A SIGNIFICANT PROBLEM. A LEAKING BOTTLE MAY BE PLACED IN A PLASTIC BAG & NORMAL DISPOSAL PROCEDURES FOLLOWED. LIQUID SAMPLES MAY BE ABSORBED ON VERMICULITE OR SAND.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCUBBER. OBSERVE ALL FEDERAL, STATE, & LOCAL LAWS CONCERNING DISPOSAL.

**Handling And Storage Precautions:**

AVOID CONTACT W/EYES, SKIN, & CLOTHING. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE.

**Other Precautions:**

THIS MATERIAL SHOULD ONLY BE USED BY THOSE PERSONS TRAINED IN THE SAFE HANDLING OF HAZARDOUS CHEMICALS.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P 6

**Flash Point:****Flash Point Text:**

COMBUSTIBLE

**Autoignition Temp:****Autoignition Temp Text:**

N/A

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

CO2, DRY CHEMICAL POWDER, OR WATER SPRAY

**Fire Fighting Procedures:**

N/K

**Unusual Fire/Explosion Hazard:**

COMBUSTIBLE.

## Physical/Chemical Properties

**HCC:****NRC/State LIC No:****Net Prop WT For Ammo:****Boiling Point:****B.P. Text:**

N/K

**Melt/Freeze Pt:****M.P/F.P Text:**

N/K

**Decomp Temp:****Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

N/K

**Volatile Org Content %:**

**Spec Gravity:**

N/K 7

**VOC Pounds/Gallon:**

**PH:** N/K

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

N/K

**Appearance and Odor:**

LIQUID W/BENZENE-LIKE ODOR.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/K

**Materials To Avoid:**

STRONG OXIDIZERS

**Hazardous Decomposition Products:**

N/R

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

**Information:**N/P

## MSDS Transport Information

**Information:**N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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### 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. Lookchem 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.

# Composition/Information on Ingredient

**Cas:**

72-43-5

**Code:**

M

**RTECS:**

KJ3675000

**Code:**

M

**Name:**

METHOXYCHLOR

**Other REC Limits:**

N/K

**OSHA PEL:**

15 MG/M3 TDUST

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

10 MG/M3; 9293

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

N/K

**Ventilation:**

N/K

**Protective Gloves:**

RECOMMENDED

**Eye Protection:**

RECOMMENDED

**Other Protective Equipment:**

Equipment USE APPROPRIATE OSHA/MSHA SAFETY EQUIPMENT.

**Work Hygienic Practices:**

N/K

**Supplemental Safety and Health:**

N/K

## Health Hazards Data

**LD50LC50Mixture:**

ORAL (RAT) LD50: 5000 MG/KG (TOLUENE)

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

EYES/SKIN/INHALATION/INGESTION: IRRITATION.

**Explanation Of Carcinogenicity:**

LINDANE, DDT ISOMERS, & DIELDRIN ARE SUSPECTED HUMAN CARCINOGENS.  
HEPTACHLOR IS AN A2 CARCINOGEN.

**Signs And Symptoms Of Overexposure:**

EYES/SKIN/INGESTION/INHALATION: TOXIC &amp; IRRITATION.

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES/SKIN: FLUSH W/COPIOUS AMOUNTS OF WATER. INHALATION: REMOVE TO FRESH AIR. GIVE OXYGEN IF NECESSARY. OBTAIN MEDICAL ATTENTION IN ALL CASES.

**Spill Release Procedures:**

DUE TO THE SMALL QUANTITY INVOLVED, SPILLS OR LEAKS SHOULD NOT POSE A SIGNIFICANT PROBLEM. A LEAKING BOTTLE MAY BE PLACED IN A PLASTIC BAG & NORMAL DISPOSAL PROCEDURES FOLLOWED. LIQUID SAMPLES MAY BE ABSORBED ON VERMICULITE OR SAND.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCUBBER. OBSERVE ALL FEDERAL, STATE, & LOCAL LAWS CONCERNING DISPOSAL.

**Handling And Storage Precautions:**

AVOID CONTACT W/EYES, SKIN, & CLOTHING. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE.

**Other Precautions:**

THIS MATERIAL SHOULD ONLY BE USED BY THOSE PERSONS TRAINED IN THE SAFE HANDLING OF HAZARDOUS CHEMICALS.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P 6

**Flash Point:****Flash Point Text:**

COMBUSTIBLE

**Autoignition Temp:**

**Autoignition Temp Text:**

N/A

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

CO2, DRY CHEMICAL POWDER, OR WATER SPRAY

**Fire Fighting Procedures:**

N/K

**Unusual Fire/Explosion Hazard:**

COMBUSTIBLE.

## Physical/Chemical Properties

**HCC:**

**NRC/State LIC No:**

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

N/K

**Melt/Freeze Pt:**

**M.P/F.P Text:**

N/K

**Decomp Temp:**

**Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

N/K

**Volatile Org Content %:**

**Spec Gravity:**

N/K 7

**VOC Pounds/Gallon:**

PH: N/K

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

N/K

**Appearance and Odor:**

LIQUID W/BENZENE-LIKE ODOR.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/K

**Materials To Avoid:**

STRONG OXIDIZERS

**Hazardous Decomposition Products:**

N/R

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

**Sara Title III Information:** N/P**Federal Regulatory Information:** N/P**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P[www.lookchem.com](http://www.lookchem.com)

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**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. Lookchem 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.

# Composition/Information on Ingredient

**Cas:**

72-54-8

**Code:**

M

**RTECS:**

KI0700000

**Code:**

M

**Name:**

DDD (SARA III)

**Other REC Limits:**

1 MG/CUM

**OSHA PEL:**

NOT ESTABLISHED

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

NOT ESTABLISHED

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

USE APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT.

**Ventilation:**

HANDLE ONLY IN A HOOD

**Protective Gloves:**

AS REQUIRED

**Eye Protection:**

EYE SHIELDS

**Other Protective Equipment:**

Equipment N/K

**Work Hygienic Practices:**

REMOVE/WASH CONTAMINATED CLOTHING BEFORE REUSE. ONLY TRAINED PERSONNEL SHOULD HANDLE THIS CHEMICAL OR ITS CONTAINER.

**Supplemental Safety and Health:**

FIRST AID; INGESTION: IF PATIENT IS VOMITING WATCH CLOSELY TO MAKE SURE AIRWAY DOESN'T BECOME OBSTRUCTED BY VOMIT.

## Health Hazards Data

**LD50LC50Mixture:**

LD50 (RAT OR MOUSE): 113 MG/KG.

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

YES

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

SKIN: FATAL IF ABSORBED. INGESTION: FATAL. INHALATION: NERVOUS SYSTEM & LIVER INJURY, FATAL.

**Explanation Of Carcinogenicity:**

TDE IS A SUSPECTED A2 ANIMAL CARCINOGEN.

**Signs And Symptoms Of Overexposure:**

SKIN: FATAL IF ABSORBED. INGESTION: FATAL. INHALATION: NERVOUS SYSTEM & LIVER INJURY, FATAL.

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES/SKIN: FLUSH W/WATER FOR 15-20 MINS. USE SOAP & WATER TO CLEANSE SKIN IF NO BURNS. INHALATION: REMOVE TO FRESH AIR, GIVE OXYGEN IF BREATHING DIFFICULTY. ADMINISTER CPR IF CARDIAC ARREST OCCURS. IF EXHIBITING SIGNS OF SHOCK- KEEP WARM & QUIET. INGESTION: INDUCE VOMITING. DON'T ADMINISTER LIQUIDS/INDUCE VOMITING TO AN UNCONSCIOUS/CONVULSING PERSON. OBTAIN MEDICAL ATTENTION IN ALL CASES. SEE SUPP.

**Spill Release Procedures:**

EVACUATE AREA. WEAR APPROPRIATE EQUIPMENT. VENTILATE AREA. SWEEP UP & PLACE IN AN APPROPRIATE CONTAINER. HOLD FOR DISPOSAL. WASH CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER. DISPOSE OF IN ACCORDANCE W/FEDERAL, STATE, & LOCAL REGULATIONS.

**Handling And Storage Precautions:**

KEEP CLOSED IN A COOL DRY PLACE. STORE ONLY W/COMPATIBLE CHEMICALS. FOR LABORATORY USE ONLY. DON'T WEAR CONTACT LENSES.

**Other Precautions:**

DON'T USE AS DRUGS, COSMETICS, AGRICULTURAL OR PESTICIDAL PRODUCTS,  
FOOD ADDITIVES OR AS HOUSEHOLD CHEMICALS.  
AVOID DIRECT PHYSICAL CONTACT. AVOID CONTACT W/SKIN, EYES & CLOTHING.

2

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P

**Flash Point:**

**Flash Point Text:**

N/K

**Autoignition Temp:**

**Autoignition Temp Text:**

N/A

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

CO2, DRY CHEMICAL POWDER OR SPRAY.

**Fire Fighting Procedures:**

N/K

**Unusual Fire/Explosion Hazard:**

N/K

## Physical/Chemical Properties

**HCC:**

**NRC/State LIC No:**

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

N/K 3

**Melt/Freeze Pt:**

**M.P/F.P Text:**

228-230F

**Decomp Temp:**

**Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

N/K

**Volatile Org Content %:**

**Spec Gravity:**

N/K

**VOC Pounds/Gallon:**

**PH:** N/K

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

INSOLUBLE

**Appearance and Odor:**

CRYSTALLINE SOLID

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/K

**Materials To Avoid:**

STRONG OXIDIZING AGENTS

**Hazardous Decomposition Products:**

TOXIC FUMES

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

**Sara Title III Information:** N/P**Federal Regulatory Information:** N/P**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P[www.lookchem.com](http://www.lookchem.com)

For R&amp;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. Lookchem 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.

## Composition/Information on Ingredient

**Cas:**

72-55-9

**Code:**

M

**RTECS:**

KV9450000

**Code:**

M

**Name:**

DDE (CERCLA)

**Other REC Limits:**

NONE RECOMMENDED

**OSHA PEL:**

NOT ESTABLISHED

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

NOT ESTABLISHED

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

NONE REQUIRED FOR NORMAL USE W/ADEQUATE VENTILATION. IN POORLY VENTILATED AREAS, USE NIOSH/MSHA APPROVED ORGANIC VAPOR RESPIRATOR.

**Ventilation:**

LOCAL EXHAUST IS RECOMMENDED FOR CONFINED AREAS. GENERAL MECHANICAL VENTILATION IS ADEQUATE FOR NORMAL USE. 7

**Protective Gloves:**

CHEMICAL RESIST GLOVES, (PVC).

**Eye Protection:**

SAFETY GLASSES. SPLASH PROOF GOGGLES.

**Other Protective Equipment:**

Equipment EYE BATH AND SAFETY SHOWER.

**Work Hygienic Practices:**

FOLLOW CURRENT H.M.I.S. REGULATIONS.

**Supplemental Safety and Health:**

NONE

## Health Hazards Data

**LD50LC50Mixture:**

ORAL LD50 (RAT) IS UNKNOWN

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

YES

**IARC:**

YES

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

ACUTE: EYES-MODERATE IRRITANT. SKIN-MODERATE IRRITANT. INHALATION-HIGH CONCENTRATIONS OF VAPORS MAY PRODUCE

IRRITATION OF THE RESPIRATORY TRACT, HEADACHE, DIZZINESS, AND NAUSEA. INGESTION-SIMILAR TO INHALATION.

CHRONIC:PROLONGED REPEATED OVEREXPOSURE TO THIS PRODUCT MAY LEAD TO SKIN SENSITIZATION OR DERMATITIS.

**Explanation Of Carcinogenicity:**

CHROMIUM: IARC MONOGRAPHS, VOL 49, PG 49, 1990:GRP 1. NTP 6TH ANNUAL RPT ON CARCINS, 1991:KNOWN TO BE CARCIN. (SUPP DATA)

**Signs And Symptoms Of Overexposure:**

INHALATION-HIGH CONCENTRATIONS OF VAPORS MAY PRODUCE IRRITATION OF THE RESPIRATORY TRACT, HEADACHE, DIZZINESS, & NAUSEA. SKIN-MODERATE IRRITATION. INGESTION-NAUSEA AND VOMITING.

**Medical Cond Aggravated By Exposure:**

SKIN DISORDERS, RESPIRATORY DISORDERS.

**First Aid:**

EYES: FLUSH WELL W/WATER FOR AT LEAST 15 MINUTES. CONTACT A PHYSICIAN IF IRRITATION PERSISTS. SKIN: WASH W/SOAP &

WATER. INHALE: REMOVE PATIENT TO FRESH AIR. IF BREATHING IS DIFFICULT, ADMINISTER OXYG EN. INGEST: DO NOT INDUCE

VOMITING. CONTACT A PHYSICIAN. IF VOMITING OCCURS, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO LUNGS.

**Spill Release Procedures:**

PREVENT SKIN & EYE CONTACT. USE NON-COMBUSTIBLE MATERIAL TO CONFINE &/OR ABSORB.

ELIMINATE IGNITION SOURCES.

VENTILATE AREA.

**Neutralizing Agent:**

NONE SPECIFIED BY MANUFACTURER.

**Waste Disposal Methods:**

6 REMOVE TO A WASTE DISPOSAL FACILITY OPERATING IN COMPLIANCE W/FEDERAL, STATE & LOCAL REGULATIONS. HAZ WASTE

CODES: D001 (IGNITABILITY); U031 (BUTYL ALCOHOL). RQ: 100 LBS.

**Handling And Storage Precautions:**

"EMPTY" CONTAINER RETAIN RESIDUE (LIQUID AND/OR VAPOR) AND CAN BE DANGEROUS.

**Other Precautions:**

DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND/EXPOSE SUCH CONTAINERS TO HEAT, SPARKS, FLAMES, STATIC

ELECTRICITY OR OTHER SOURCES OF IGNIT.

## Fire and Explosion Hazard Information

**Flash Point Method:**

OC

**Flash Point:****Flash Point Text:**

-156F,-104C

**Autoignition Temp:****Autoignition Temp Text:**

N/K

**Lower Limits:**

1.38%

**Upper Limits:**

36.5%

**Extinguishing Media:**

CARBON DIOXIDE, DRY CHEMICAL, FOAM.

**Fire Fighting Procedures:**

FIRE FIGHTERS SHOULD WEAR SELF-CONTAINED BREATHING APPARATUS IN CONFINED AREAS.

**Unusual Fire/Explosion Hazard:**

VAPORS ARE HEAVIER THAN AIR & MAY TRAVEL ALONG GROUND, OR BE MOVED BY VENTILATION & BE IGNITED BY IGNITION SOURCE.

## Physical/Chemical Properties

**HCC:**

V3

**NRC/State LIC No:**

N/R

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

10F-275F

**Melt/Freeze Pt:**

**M.P/F.P Text:**

N/K

**Decomp Temp:**

**Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

>1

**Volatile Org Content %:**

**Spec Gravity:**

0.86 (H2O=1)

**VOC Pounds/Gallon:**

**PH:** N/K

**VOC Grams/Liter:**

**Viscosity:**

N/R

**Evaporation Rate & Reference:**

>1 (BUTYL ACETATE=1)

**Solubility in Water:**

APPRECIABLE 8

**Appearance and Odor:**

BLUE OPAQUE LOW VISCOSITY LIQUID W/SWEET SOLVENT ODOR.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

HEAT, SPARKS OPEN FLAMES.

**Materials To Avoid:**

STRONG OXIDIZING AGENTS.

**Hazardous Decomposition Products:**

OXIDES OF CARBON.

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

NOT RELEVANT

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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### WARRANTY

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# Material Safety Data Sheet

## Aluminum (Metallic, Powder)

ACC# 01000

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Aluminum (Metallic, Powder)**Catalog Numbers:** S79891, S79891-1, S798911, A559-500**Synonyms:** None.**Company Identification:**

Fisher Scientific

1 Reagent Lane

Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7429-90-5	Aluminum	100	231-072-3

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

**Appearance:** silver-gray powder.**Danger!** Dust may form flammable or explosive mixture with air, especially when damp. Reacts violently and/or explosively with water, steam or moisture. May ignite or explode on contact with moist air. May cause eye and skin irritation. May cause respiratory tract irritation. Air sensitive.**Target Organs:** Lungs, eyes, skin.

#### Potential Health Effects

**Eye:** May cause eye irritation.**Skin:** May cause skin irritation. Low hazard for usual industrial handling. No sensitizing effects known.**Ingestion:** May cause gastrointestinal irritation with nausea, vomiting and diarrhea.**Inhalation:** May cause respiratory tract irritation. May cause respiratory difficulty and coughing.**Chronic:** Aluminum may be implicated in Alzheimer's disease. Inhalation of aluminum containing dusts may cause pulmonary disease.

### Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.**Skin:** In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes.

Get medical aid if irritation develops and persists. Wash clothing before reuse.

**Ingestion:** If swallowed, do not induce vomiting unless directed to do so by medical personnel.

Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water reactive. Material will react with water and may release a flammable and/or toxic gas. Dust can be an explosion hazard when exposed to heat or flame. May ignite or explode on contact with steam or moist air. Aluminum powder may evolve hydrogen gas in contact with water and finely divided dust may be ignited by naked lights or sparks. Polished aluminum powders which have been treated with oils or wax for printing or paint purposes are not generally dangerous. Bulk dust when damp with water may heat spontaneously. Hazard greater as fineness increases.

**Extinguishing Media:** DO NOT USE WATER! Do NOT get water inside containers. Contact professional fire-fighters immediately. Do NOT use CO<sub>2</sub> or halogenated extinguishing agents. Smother with dry sand, dry clay, dry ground limestone (CaCO<sub>3</sub>), or use approved Class D extinguishers.

**Flash Point:** Not applicable.

**Autoignition Temperature:** 760 deg C ( 1,400.00 deg F)

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 0; Flammability: 3; Instability: 1; Special Hazard: -W-

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. Do not expose spill to water. Vacuum or sweep up material and place into a suitable, dry disposal container.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Do not allow water to get into the container because of violent reaction. Minimize dust generation and accumulation. Avoid contact with skin and eyes. Avoid ingestion and inhalation. Do not allow contact with water. Keep from contact with moist air and steam. Use only with adequate ventilation.

**Storage:** Keep away from sources of ignition. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from water. Flammables-area. Keep containers tightly closed. Keep away from acidic, alkaline, combustible and oxidizing materials. Separate from halogenated compounds.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

#### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Aluminum	10 mg/m <sup>3</sup> TWA (metal dust)	10 mg/m <sup>3</sup> TWA (total dust); 5 mg/m <sup>3</sup> TWA (respirable dust)	15 mg/m <sup>3</sup> TWA (total dust); 5 mg/m <sup>3</sup> TWA (respirable fraction)

**OSHA Vacated PELs:** Aluminum: 15 mg/m<sup>3</sup> TWA (total dust); 5 mg/m<sup>3</sup> TWA (respirable fraction)

#### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Powder

**Appearance:** silver-gray

**Odor:** odorless

**pH:** Not available.

**Vapor Pressure:** Negligible

**Vapor Density:** Not available.

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 2467 deg C @ 760 mmHg

**Freezing/Melting Point:** 660 deg C

**Decomposition Temperature:** > 2400 deg C

**Solubility:** insoluble

**Specific Gravity/Density:** 2.7020g/cm<sup>3</sup>

**Molecular Formula:** Al

**Molecular Weight:** 26.98

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures. Aluminum powder may evolve hydrogen gas in contact with water, and finely divided dust may be ignited by naked lights or sparks. Polished aluminum powders which have been treated with oils or wax for printing or paint purposes are not generally dangerous. Uncoated aluminum powder reacts with strong acid and strong alkalis to release hydrogen gas.

**Conditions to Avoid:** Ignition sources, dust generation, exposure to air, excess heat, exposure to moist air or water.

**Incompatibilities with Other Materials:** Acids, alkalis, acid chlorides, halogenated agents, metal salts, strong oxidizing agents, Contact with water liberates highly flammable gases., ammonium nitrate, ammonium persulfate, antimony, arsenic oxides, barium bromate, barium chlorate, barium iodate.

**Hazardous Decomposition Products:** Hydrogen gas, aluminum oxide, aluminum fumes.

**Hazardous Polymerization:** Has not been reported

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 7429-90-5: BD0330000; BD1020000

**LD50/LC50:**

Not available.

**Carcinogenicity:**

CAS# 7429-90-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.

**Teratogenicity:** No information available.

**Reproductive Effects:** No information available.

**Mutagenicity:** No information available.

**Neurotoxicity:** Chronic exposure to aluminum has produced numbness in fingers and (in one case) brain effects.

**Other Studies:**

## Section 12 - Ecological Information

No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	ALUMINUM POWDER, UNCOATED	ALUMINUM POWDER, UNCOATED
<b>Hazard Class:</b>	4.3	4.3
<b>UN Number:</b>	UN1396	UN1396
<b>Packing Group:</b>	II	II

## Section 15 - Regulatory Information

**US FEDERAL****TSCA**

CAS# 7429-90-5 is listed on the TSCA inventory.

**Health & Safety Reporting List**

None of the chemicals are on the Health & Safety Reporting List.

**Chemical Test Rules**

None of the chemicals in this product are under a Chemical Test Rule.

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

None of the chemicals in this material have an RQ.

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPO.

**SARA Codes**

CAS # 7429-90-5: immediate, delayed.

**Section 313**

This material contains Aluminum (CAS# 7429-90-5, 100%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 7429-90-5 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

F

**Risk Phrases:**

R 15 Contact with water liberates extremely flammable gases.

R 17 Spontaneously flammable in air.

**Safety Phrases:**

S 7/8 Keep container tightly closed and dry.

S 43A In case of fire, use dry chemical (never use water).

**WGK (Water Danger/Protection)**

CAS# 7429-90-5: 0

**Canada - DSL/NDSL**

CAS# 7429-90-5 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B6, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 7429-90-5 is listed on the Canadian Ingredient Disclosure List.

## Section 16 - Additional Information

**MSDS Creation Date:** 6/25/1999

**Revision #6 Date:** 6/06/2006

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

# Composition/Information on Ingredient

**Cas:**

7439-89-6

**Code:**

M

**RTECS:**

NO4565500

**Code:**

M

**Name:**

IRON

**Other REC Limits:**

N/R

**OSHA PEL:**

N/R

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

N/R

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

USE RESPIRABLE FUME RESPIRATORY OR AIR SUPPLIED RESPIRATOR WHEN WELDING IN A CONFINED SPACE OR WHERE LOCAL EXHAUST OR VENTILATION DOES NOT KEEP EXPOSURE BELOW TLV.

**Ventilation:**

USE ADEQUATE GENERAL VENTILATION & LOCAL EXHAUST AT THE ARC. 10

**Protective Gloves:**

WELDER'S GLOVES

**Eye Protection:**

HELMET/FACE SHEILD WITH FILTER LENS.

**Other Protective Equipment:**

Equipment WEAR PROTECTIVE CLOTHING.

**Work Hygienic Practices:**

N/P

**Supplemental Safety and Health:**

N/P

## Health Hazards Data

**LD50LC50Mixture:**

N/K

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

NO

**Ingestion:**

NO

**Carcinogenicity Inds - NTP:**

YES

**IARC:**

YES

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

ACUTE:MAY RESULT IN DISCOMFORT SUCH AS DIZZINESS,NAUSEA,DRYNESS OR IRRITATION OF NOSE,THROAT OR EYES,TIGHTNESS IN CHEST,FEVER & ALLERGIC REACTIONS. CHRONIC:MAY LEAD TO SIDEROSIS & IS BELIEVED BY SOME INVESTIGATORS TO AFFECT PULMONARY FUNCTION.

**Explanation Of Carcinogenicity:**

CHROMIUM (CR+6) IS LISTED AS CARCINOGENIC.

**Signs And Symptoms Of Overexposure:**

SEE "HEALTH HAZARDS".

**Medical Cond Aggravated By Exposure:**

N/P

**First Aid:**

REMOVE TO FRESH AIR,IF BREATHING IS DIFFICULT,ADMINISTER OXYGEN,IF BREATHING HAS SPED,APPLY ARTIFICIAL RESPIRATOR; GET MEDICAL HELP.

**Spill Release Procedures:**

SWEEP UP OR SCOOP UP.

**Neutralizing Agent:**

N/P 9

**Waste Disposal Methods:**

DISCARD ANY PRODUCT RESIDUE,DISPOSABLE CONTAINER OR LINER IN AN ENVIRONMENTALLY ACCEPTABLE MANNER.

**Handling And Storage Precautions:**

USE EXHAUST SYSTEM TO CLEAR WELDING FUMES.

**Other Precautions:**

N/P

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P

**Flash Point:****Flash Point Text:**

N/R

**Autoignition Temp:**

**Autoignition Temp Text:**

N/A

**Lower Limits:**

N/R

**Upper Limits:**

N/R

**Extinguishing Media:**

NONE

**Fire Fighting Procedures:**

NONE

**Unusual Fire/Explosion Hazard:**

WELDING ARC AND SPARKS CAN IGNITE COMBUSTIBLES AND FLAMMABLES.

## Physical/Chemical Properties

**HCC:**

N1

**NRC/State LIC No:**

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

N/K

**Melt/Freeze Pt:**

**M.P/F.P Text:**

N/A

**Decomp Temp:**

**Decomp Text:**

N/A

**Vapor Pres:**

N/K

**Vapor Density:**

N/K

**Volatile Org Content %:**

**Spec Gravity:**

N/K

**VOC Pounds/Gallon:**

PH: N/P

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

N/K 11

**Appearance and Odor:**

SOLID WIRE OR ROD

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/P

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

NONE

**Materials To Avoid:**

NONE

**Hazardous Decomposition Products:**

DIFFICULT TO DETERMINE.VARIES GREATLY.

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/P

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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terms and conditions of sale.

<b>MSDS</b>	<b>Material Safety Data Sheet</b>		24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
			National Response in Canada CANUTEC: 613-996-6666
			Outside U.S. and Canada Chemtrec: 703-527-3887
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		 	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.			

## LEAD METAL

### 1. Product Identification

**Synonyms:** Granular lead, pigment metal; C.I. 77575

**CAS No.:** 7439-92-1

**Molecular Weight:** 207.19

**Chemical Formula:** Pb

**Product Codes:**

J.T. Baker: 2256, 2266

Mallinckrodt: 5668

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Lead	7439-92-1	95 - 100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**POISON! DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. NEUROTOXIN. AFFECTS THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Cancer Causing)

Flammability Rating: 3 - Severe (Flammable)

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate (Life)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: Red (Flammable)

#### Potential Health Effects

##### Inhalation:

Lead can be absorbed through the respiratory system. Local irritation of bronchia and lungs can occur and, in cases of acute exposure, symptoms such as metallic taste, chest and abdominal pain, and increased lead blood levels may follow. See also Ingestion.

##### Ingestion:

**POISON!** The symptoms of lead poisoning include abdominal pain and spasms, nausea, vomiting, headache. Acute poisoning can lead to muscle weakness, "lead line" on the gums, metallic taste, definite loss of appetite, insomnia, dizziness, high lead levels in blood and urine with shock, coma and death in extreme cases.

##### Skin Contact:

Lead and lead compounds may be absorbed through the skin on prolonged exposure; the symptoms of lead poisoning described for ingestion exposure may occur.

Contact over short periods may cause local irritation, redness and pain.

##### Eye Contact:

Absorption can occur through eye tissues but the more common hazards are local irritation or abrasion.

**Chronic Exposure:**

Lead is a cumulative poison and exposure even to small amounts can raise the body's content to toxic levels. The symptoms of chronic exposure are like those of ingestion poisoning: restlessness, irritability, visual disturbances, hypertension and gray facial color may also be noted.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing kidney, nerve or circulatory disorders or with skin or eye problems may be more susceptible to the effects of this substance.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Not considered to be a fire hazard. Powder/dust is flammable when heated or exposed to flame.

**Explosion:**

Not considered to be an explosion hazard.

**Fire Extinguishing Media:**

Use any means suitable for extinguishing surrounding fire. Do not allow water runoff to enter sewers or waterways.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Can produce toxic lead fumes at elevated temperatures and also react with oxidizing materials.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Areas in which exposure to lead metal or lead compounds may occur should be identified by signs or appropriate means, and access to the area should be limited to authorized persons. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

For lead, metal and inorganic dusts and fumes, as Pb:

-OSHA Permissible Exposure Limit (PEL): 0.05 mg/m<sup>3</sup> (TWA)

For lead, elemental and inorganic compounds, as Pb:

-ACGIH Threshold Limit Value (TLV): 0.05 mg/m<sup>3</sup> (TWA), A3 animal carcinogen

ACGIH Biological Exposure Indices (BEI): 30 ug/100ml, notation B (see actual Indices for more information).

For lead, inorganic:

-NIOSH Recommended Exposure Limit (REL): 0.1 mg/m<sup>3</sup> (TWA)

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a half-face high efficiency particulate respirator (NIOSH type N100 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece high efficiency particulate respirator (NIOSH type N100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

**Other Control Measures:**

Eating, drinking, and smoking should not be permitted in areas where solids or liquids containing lead compounds are handled, processed, or stored. See OSHA substance-specific standard for more information on personal protective equipment, engineering and work practice controls, medical surveillance, record keeping, and reporting requirements. (29 CFR 1910.1025).

## 9. Physical and Chemical Properties

**Appearance:**

Small, white to blue-gray metallic shot or granules.

**Odor:**

Odorless.

**Solubility:**

Insoluble in water.

**Density:**

11.34

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

0

**Boiling Point:**

1740C (3164F)

**Melting Point:**

327.5C (622F)

**Vapor Density (Air=1):**

No information found.

**Vapor Pressure (mm Hg):**

1.77 @ 1000C (1832F)

**Evaporation Rate (BuAc=1):**

No information found.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Does not decompose but toxic lead or lead oxide fumes may form at elevated temperatures.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Ammonium nitrate, chlorine trifluoride, hydrogen peroxide, sodium azide, zirconium, disodium acetylide, sodium acetylide and oxidants.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

**Toxicological Data:**

Investigated as a tumorigen, mutagen, reproductive effector.

**Reproductive Toxicity:**

Lead and other smelter emissions are human reproductive hazards. (Chemical Council on Environmental Quality; Chemical Hazards to Human Reproduction, 1981).

**Carcinogenicity:**

EPA / IRIS classification: Group B2 - Probable human carcinogen, sufficient animal evidence.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Lead (7439-92-1)	No	No	2B

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material is not expected to leach into groundwater. This material may bioaccumulate to some extent.

**Environmental Toxicity:**

No information found.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

Not regulated.

## 15. Regulatory Information

```
-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  EC   Japan  Australia
-----
Lead (7439-92-1)                             Yes   Yes   Yes    Yes
```

```
-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     Korea DSL   NDSL  Phil.
-----
Lead (7439-92-1)                             Yes   Yes   No    Yes
```

```
-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-
RQ   TPQ   List  Chemical Catg.
-----
Lead (7439-92-1)                             No    No    Yes   No
```

```
-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     CERCLA  -RCRA-  -TSCA-
                                     10      261.33  8(d)
-----
Lead (7439-92-1)                             10     No     No
```

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No  
 SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No  
 Reactivity: No (Pure / Solid)

### WARNING:

THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

**Australian Hazchem Code:** None allocated.

**Poison Schedule:** S6

### WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 3 Flammability: 1 Reactivity: 0

### Label Hazard Warning:

POISON! DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. NEUROTOXIN. AFFECTS THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.

### Label Precautions:

Do not get in eyes, on skin, or on clothing.

Do not breathe dust.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

### Label First Aid:

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

### Product Use:

Laboratory Reagent.

### Revision Information:

No Changes.

### Disclaimer:

\*\*\*\*\*

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy.

**This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose.**

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety  
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **M0088** \* \* \* \* \* *Effective Date: 11/02/01* \* \* \* \* \* *Supersedes: 11/17/99***MSDS****Material Safety Data Sheet**

From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 908-859-2151  
CHEMTREC: 1-800-424-9300

National Response in Canada  
CANUTEC: 613-996-6666

Outside U.S. and Canada  
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

# MAGNESIUM METAL, POWDER

## 1. Product Identification

**Synonyms:** Magnesium powder

**CAS No.:** 7439-95-4

**Molecular Weight:** 24.30

**Chemical Formula:** Mg

**Product Codes:** Product Codes: 5894

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Magnesium Metal	7439-95-4	99 - 100%	Yes

## 3. Hazards Identification

### Emergency Overview

**WARNING! FLAMMABLE SOLID. DANGEROUS WHEN WET. HIGHLY REACTIVE. MAY IGNITE SPONTANEOUSLY ON CONTACT WITH WATER OR DAMP MATERIALS MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.**

### Potential Health Effects

#### Inhalation:

Inhalation of dusts or fumes may irritate the respiratory tract and may cause metal fume fever. Symptoms may include coughing, chest pain, fever, and leukocytosis.

#### Ingestion:

Magnesium metal does not have well-characterized toxicity. May cause abdominal pain and diarrhea.

**Skin Contact:**

Particles embedded in the skin may cause eruptions. Molten magnesium may cause serious skin burns.

**Eye Contact:**

High concentrations of dust may cause mechanical irritation. Watching a magnesium fire can cause eye injury.

**Chronic Exposure:**

No information found.

**Aggravation of Pre-existing Conditions:**

Existing wounds contaminated with magnesium are very slow to heal.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. Get medical attention for any breathing difficulty.

**Ingestion:**

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

**Skin Contact:**

Remove any contaminated clothing. Wash skin with soap or mild detergent and water for at least 15 minutes. Get medical attention if irritation develops or persists.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.

---

## 5. Fire Fighting Measures

**Fire:**

Autoignition temperature: 473C (883F)

When heated in air to a temperature near its melting point, magnesium may ignite and burn. Dangerous in the form of dust or flakes, and when exposed to flame or by violent chemical reaction with oxidizing agents. Magnesium may react with moisture or acids to evolve hydrogen gas, which is a highly dangerous fire or explosion hazard.

Autoignition temperature is for Magnesium turnings or ribbon.

**Explosion:**

Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. Minimum explosible concentration 0.030 grams/liter. Water used on molten magnesium will produce hydrogen gas and may cause an explosion.

**Fire Extinguishing Media:**

Use metal extinguishing powders such as G-1® graphite powder, Met-L-X® powder, powdered talc, dry graphite, powdered sodium chloride, soda ash, or dry sand. Warning! Do not use foam, chlorinated products such as Halon®, carbon dioxide, or water to extinguish magnesium fires, because dangerous reactions will occur. Use of water on molten magnesium will produce hydrogen gas and may cause an explosion.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Fire fighters should protect their eyes and skin from flying particles. In order to prevent eye injury, do not look directly at magnesium fires.

---

## 6. Accidental Release Measures

Remove all sources of ignition. Ventilate the area of the spill or leak. Wear appropriate personal protective equipment as specified in Section 8. Collect the spilled material and transfer to a clean, dry metal covered container for recovery or

disposal. Do not use water in the collection process. If the spilled magnesium has come into contact with water, proceed with caution. Hydrogen gas may be generated, which may cause a fire or explosion. Evacuate the area, put on fire fighting protective equipment and proceed as with a metal fire.

---

## 7. Handling and Storage

Keep in tightly closed container. Store in a cool, dry, ventilated area. Protect against physical damage. Store finely divided powder, chips or shavings in detached fire-resistant building, protected from moisture and away from oxidizers, chlorine, bromine, iodine, acids, and all possible sources of ignition. Heavier sections may be stored in the open. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

### **Airborne Exposure Limits:**

None established.

### **Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

### **Personal Respirators (NIOSH Approved):**

For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

### **Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

### **Eye Protection:**

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

## 9. Physical and Chemical Properties

### **Appearance:**

Silver solid.

### **Odor:**

Odorless.

### **Solubility:**

Insoluble in water.

### **Specific Gravity:**

1.74 @ 20C (68F) (solid)

### **pH:**

No information found.

### **% Volatiles by volume @ 21C (70F):**

0

### **Boiling Point:**

1100C (2012F)

**Melting Point:**

649C (1200F)

**Vapor Density (Air=1):**

No information found.

**Vapor Pressure (mm Hg):**

1.0 @ 621C (1150F)

**Evaporation Rate (BuAc=1):**

No information found.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage. Slowly oxidizes in moist air.

**Hazardous Decomposition Products:**

Toxic gases and vapors may be released if involved in a fire.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Magnesium reacts dangerously with many substances, including oxidizers, carbonates, cyanides, chlorinated hydrocarbons, sulfates, acids, and other metals. Please refer to the NFPA publication "Fire Protection Guide on Hazardous Materials" most recent edition for details. Reacts with acids to form hydrogen gas.

**Conditions to Avoid:**

Moisture, heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Magnesium Metal (7439-95-4)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

No information found.

**Environmental Toxicity:**

No information found.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

### Domestic (Land, D.O.T.)

-----  
**Proper Shipping Name:** MAGNESIUM, POWDER

**Hazard Class:** 4.3, 4.2

**UN/NA:** UN1418

**Packing Group:** II

**Information reported for product/size:** 500G

### International (Water, I.M.O.)

-----  
**Proper Shipping Name:** MAGNESIUM POWDER

**Hazard Class:** 4.3, 4.2

**UN/NA:** UN1418

**Packing Group:** II

**Information reported for product/size:** 500G

## 15. Regulatory Information

```
-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA   EC     Japan  Australia
-----
Magnesium Metal (7439-95-4)                   Yes   Yes   No     Yes
```

```
-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     Korea  DSL   NDSL   Phil.
-----
Magnesium Metal (7439-95-4)                   Yes   Yes   No     Yes
```

```
-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-
RQ   TPQ   List  Chemical Catg.
-----
Magnesium Metal (7439-95-4)                   No    No    No     No
```

```
-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     CERCLA  -RCRA-  -TSCA-
                                     CERCLA  261.33  8(d)
-----
Magnesium Metal (7439-95-4)                   No      No      No
```

Chemical Weapons Convention: No      TSCA 12(b): No      CDTA: No  
 SARA 311/312: Acute: Yes      Chronic: No      Fire: Yes      Pressure: No  
 Reactivity: Yes      (Pure / Solid)

**Australian Hazchem Code:** 4[Y]

**Poison Schedule:** None allocated.

### WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

# 16. Other Information

**NFPA Ratings:** Health: 0 Flammability: 1 Reactivity: 2

**Label Hazard Warning:**

WARNING! FLAMMABLE SOLID. DANGEROUS WHEN WET. HIGHLY REACTIVE. MAY IGNITE SPONTANEOUSLY ON CONTACT WITH WATER OR DAMP MATERIALS MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.

**Label Precautions:**

- Keep away from heat, sparks and flame.
- Do not allow contact with water, acids, or moisture.
- Avoid contact with eyes, skin and clothing.
- Avoid breathing dust.
- Keep container closed.
- Use with adequate ventilation.
- Wash thoroughly after handling.

**Label First Aid:**

If inhaled, remove to fresh air. Get medical attention for any breathing difficulty. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

MSDS Section(s) changed since last revision of document include: 8.

**Disclaimer:**

\*\*\*\*\*

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety  
 Phone Number: (314) 654-1600 (U.S.A.)

# Composition/Information on Ingredient

**Cas:**

7439-96-5

**Code:**

M

**RTECS:**

OO9275000

**Code:**

M

**Name:**

MANGANESE (SARA III)

**Other REC Limits:**

NONE RECOMMENDED 3

**OSHA PEL:**

(C) 5 MG/M3 DUST

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

5 MG/M3 DUST 9293

**Code:**

M

**ACGIHSTEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

7 USE NIOSH/MSHA APPROVED RESPIRATOR FOR WELDING FUMES OR SUPPLIED AIR RESPIRATOR IN CONFINED SPACES OR WHERE FUME CONCENTRATION EXCEEDS REGULATORY LIMITS.

**Ventilation:**

USE MECHANICAL OR LOCAL EXHAUST OR BOTH TO MAINTAIN LEVELS OF FUMES BELOW REGULATORY LIMITS.

**Protective Gloves:**

WELDERS WORK GLOVES

**Eye Protection:**

WELDERS HELMET WITH CORRECT LENSES

**Other Protective Equipment:**

Equipment CLOTHING TO PROTECT ENTIRE BODY FROM SPARKS.

**Work Hygienic Practices:**

WASH HANDS AFTER USE AND BEFORE EATING, DRINKING, OR SMOKING. LAUNDRER CONTAMINATED CLOTHING BEFORE REUSE.

**Supplemental Safety and Health:**

N/R

## Health Hazards Data

**LD50LC50Mixture:**

ORAL LD50 (RAT) IS UNKNOWN

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

NO

**Ingestion:**

NO

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

ACUTE: INHALATION OF WELDING FUMES MAY CAUSE NERVOUS SYSTEM AND MUSCLE IRREGULARITIES, IRRITATION OF EYES, NOSE, THROAT, AND RESPIRATORY SYSTEM, METAL FUME FEVER. CHRONIC: PROLONGED OR REPEATED INHALATION OF FUMES MAY CAUSE SIDEROSIS, FLUOROSIS AND AFFECT LUNG FUNCTION.

**Explanation Of Carcinogenicity:**

NO INGREDIENT OF A CONCENTRATION OF 0.1% OR GREATER IS LISTED AS A CARCINOGEN OR SUSPECTED CARCINOGEN.

**Signs And Symptoms Of Overexposure:**

INHALATION: NAUSEA, DIZZINESS, DRYNESS OF NOSE AND THROAT, COUGHING, WHEEZING AND SHORTNESS OF BREATH. EYES: REDNESS, TEARING, BLURRED VISION.

**Medical Cond Aggravated By Exposure:**

NONE SPECIFIED BY MANUFACTURER.

**First Aid:**

INHALATION: REMOVE TO FRESH AIR. RESUSCITATE IF NEEDED. EYES: FLUSH WITH PLENTY OF WATER FOR 15 MINUTES. SEE DOCTOR.  
SKIN: WASH WITH SOAP AND WATER. INGESTION: DO NOT INDUCE VOMITING. SEE DOCTOR. 6

**Spill Release Procedures:**

PICK UP RODS. SWEEP UP OR MOP. PLACE RESIDUE IN A CONTAINER FOR DISPOSAL.

**Neutralizing Agent:**

NONE SPECIFIED BY MANUFACTURER.

**Waste Disposal Methods:**

DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

**Handling And Storage Precautions:**

REMOVE ANY COMBUSTIBLES FROM WORK AREA: SPARKS OR WELDING ARC COULD IGNITE NEARBY COMBUSTIBLES.

**Other Precautions:**

NONE SPECIFIED BY MANUFACTURER.

# Fire and Explosion Hazard Information

**Flash Point Method:**

N/P

**Flash Point:**

**Flash Point Text:**

NOT APPLICABLE

**Autoignition Temp:**

**Autoignition Temp Text:**

N/A

**Lower Limits:**

N/R

**Upper Limits:**

N/R

**Extinguishing Media:**

USE MEDIA APPROPRIATE FOR SURROUNDING FIRE.

**Fire Fighting Procedures:**

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE GEAR.

**Unusual Fire/Explosion Hazard:**

NON-FLAMMABLE; BUT SPARKS AND WELDING ARC MAY IGNITE COMBUSTIBLES DURING USE.

# Physical/Chemical Properties

**HCC:**

N1

**NRC/State LIC No:**

N/R

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

UNKNOWN

**Melt/Freeze Pt:**

**M.P/F.P Text:**

UNKNOWN

**Decomp Temp:**

**Decomp Text:**

UNKNOWN

**Vapor Pres:**

UNKNOWN

**Vapor Density:**

UNKNOWN

**Volatile Org Content %:**

**Spec Gravity:**

UNKNOWN 8

**VOC Pounds/Gallon:**

PH: N/K

**VOC Grams/Liter:**

**Viscosity:**

N/R

**Evaporation Rate & Reference:**

UNKNOWN

**Solubility in Water:**

INSOLUBLE

**Appearance and Odor:**

SOLID ROD

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

UNKNOWN

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

NONE SPECIFIED BY MANUFACTURER.

**Materials To Avoid:**

NONE SPECIFIED BY MANUFACTURER.

**Hazardous Decomposition Products:**

METAL FUMES, FLUORIDES.

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

NONE SPECIFIED BY MANUFACTURER.

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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**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. Lookchem 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.

# Material Safety Data Sheet

## Mercury, 99.999%

ACC# 96252

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Mercury, 99.999%**Catalog Numbers:** AC193480000, AC193480500**Synonyms:** Colloidal mercury; Hydrargyrum; Metallic mercury; Quick silver; Liquid silver**Company Identification:**Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7439-97-6	Mercury	99.999	231-106-7

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: silver liquid.

**Danger!** Corrosive. Harmful if inhaled. May be absorbed through intact skin. Causes eye and skin irritation and possible burns. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns. May cause liver and kidney damage. May cause central nervous system effects. This substance has caused adverse reproductive and fetal effects in animals. Inhalation of fumes may cause metal-fume fever. Possible sensitizer.

**Target Organs:** Blood, kidneys, central nervous system, liver, brain.

#### Potential Health Effects

**Eye:** Exposure to mercury or mercury compounds can cause discoloration on the front surface of the lens, which does not interfere with vision. Causes eye irritation and possible burns. Contact with mercury or mercury compounds can cause ulceration of the conjunctiva and cornea.

**Skin:** May be absorbed through the skin in harmful amounts. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. Causes skin irritation and possible burns. May cause skin rash (in milder cases), and cold and clammy skin with cyanosis or pale color.

**Ingestion:** May cause severe and permanent damage to the digestive tract. May cause perforation of the digestive tract. May cause effects similar to those for inhalation exposure. May cause systemic effects.

**Inhalation:** Causes chemical burns to the respiratory tract. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. May cause central nervous system effects including vertigo, anxiety, depression, muscle incoordination, and emotional instability.

Aspiration may lead to pulmonary edema. May cause systemic effects. May cause respiratory sensitization.

**Chronic:** May cause liver and kidney damage. May cause reproductive and fetal effects. Effects may be delayed. Chronic exposure to mercury may cause permanent central nervous system damage, fatigue, weight loss, tremors, personality changes. Chronic ingestion may cause accumulation of mercury in body tissues. Prolonged or repeated exposure may cause inflammation of the mouth and gums, excessive salivation, and loosening of the teeth.

## Section 4 - First Aid Measures

**Eyes:** Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).

**Skin:** Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.

**Ingestion:** Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately. Wash mouth out with water.

**Inhalation:** Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

**Notes to Physician:** The concentration of mercury in whole blood is a reasonable measure of the body-burden of mercury and thus is used for monitoring purposes. Treat symptomatically and supportively. Persons with kidney disease, chronic respiratory disease, liver disease, or skin disease may be at increased risk from exposure to this substance.

**Antidote:** The use of d-Penicillamine as a chelating agent should be determined by qualified medical personnel. The use of Dimercaprol or BAL (British Anti-Lewisite) as a chelating agent should be determined by qualified medical personnel.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

**Extinguishing Media:** Substance is nonflammable; use agent most appropriate to extinguish surrounding fire. Use water spray, dry chemical, carbon dioxide, or appropriate foam.

**Flash Point:** Not applicable.

**Autoignition Temperature:** Not applicable.

**Explosion Limits, Lower:** Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 3; Flammability: 0; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills

immediately, observing precautions in the Protective Equipment section. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Keep container tightly closed. Do not get on skin or in eyes. Do not ingest or inhale. Use only in a chemical fume hood. Discard contaminated shoes. Do not breathe vapor.

**Storage:** Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from metals. Store protected from azides.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Mercury	0.025 mg/m <sup>3</sup> TWA; Skin - potential significant contribution to overall exposure by the cutaneous route	0.05 mg/m <sup>3</sup> TWA (vapor) 10 mg/m <sup>3</sup> IDLH	0.1 mg/m <sup>3</sup> Ceiling

**OSHA Vacated PELs:** Mercury: 0.05 mg/m<sup>3</sup> TWA (vapor)

### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** silver

**Odor:** odorless

**pH:** Not available.

**Vapor Pressure:** 0.002 mm Hg @ 25C

**Vapor Density:** 7.0

**Evaporation Rate:** Not available.

**Viscosity:** 15.5 mP @ 25 deg C

**Boiling Point:** 356.72 deg C

**Freezing/Melting Point:** -38.87 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:** 13.59 (water=1)

**Molecular Formula:**Hg  
**Molecular Weight:**200.59

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** High temperatures, incompatible materials.

**Incompatibilities with Other Materials:** Metals, aluminum, ammonia, chlorates, copper, copper alloys, ethylene oxide, halogens, iron, nitrates, sulfur, sulfuric acid, oxygen, acetylene, lithium, rubidium, sodium carbide, lead, nitromethane, peroxyformic acid, calcium, chlorine dioxide, metal oxides, azides, 3-bromopropyne, alkynes + silver perchlorate, methylsilane + oxygen, tetracarbonylnickel + oxygen, boron diiodophosphide.

**Hazardous Decomposition Products:** Mercury/mercury oxides.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 7439-97-6: OV4550000

**LD50/LC50:**

Not available.

**Carcinogenicity:**

CAS# 7439-97-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** Intraperitoneal, rat: TDLo = 400 mg/kg/14D-I (Tumorigenic - equivocal tumorigenic agent by RTECS criteria - tumors at site of application).

**Teratogenicity:** Inhalation, rat: TCLo = 1 mg/m<sup>3</sup>/24H (female 1-20 day(s) after conception) Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus).

**Reproductive Effects:** Inhalation, rat: TCLo = 890 ng/m<sup>3</sup>/24H (male 16 week(s) pre-mating) Paternal Effects - spermatogenesis (incl. genetic material, sperm morphology, motility, and count).; Inhalation, rat: TCLo = 7440 ng/m<sup>3</sup>/24H (male 16 week(s) pre-mating) Fertility - post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants).

**Mutagenicity:** Cytogenetic Analysis: Unreported, man = 150 ug/m<sup>3</sup>.

**Neurotoxicity:** The brain is the critical organ in humans for chronic vapor exposure; in severe cases, spontaneous degeneration of the brain cortex can occur as a late sequela to past exposure.

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Rainbow trout: LC50 = 0.16-0.90 mg/L; 96 Hr; UnspecifiedFish: Bluegill/Sunfish: LC50 = 0.16-0.90 mg/L; 96 Hr; UnspecifiedFish: Channel catfish: LC50 = 0.35 mg/L; 96 Hr; UnspecifiedWater flea Daphnia: EC50 = 0.01 mg/L; 48 Hr; Unspecified In aquatic systems, mercury appears to bind to dissolved matter or fine particulates, while the transport of mercury bound to dust particles in the atmosphere or bed sediment particles in rivers and lakes is generally less substantial. The conversion, in aquatic environments, of inorganic mercury compd to methyl mercury implies that recycling of mercury from sediment to water to air and back could be a rapid process.

**Environmental:** Mercury bioaccumulates and concentrates in food chain (concentration may be as much as 10,000 times that of water). Bioconcentration factors of 63,000 for freshwater fish and

10,000 for salt water fish have been found. Much of the mercury deposited on land, appears to revaporize within a day or two, at least in areas substantially heated by sunlight.

**Physical:** All forms of mercury (Hg) (metal, vapor, inorganic, or organic) are converted to methyl mercury. Inorganic forms are converted by microbial action in the atmosphere to methyl mercury.

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 7439-97-6: waste number U151.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	DOT regulated - small quantity provisions apply (see 49CFR173.4)	MERCURY
<b>Hazard Class:</b>		8
<b>UN Number:</b>		UN2809
<b>Packing Group:</b>		III

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 7439-97-6 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

CAS# 7439-97-6: Section 5

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 7439-97-6: 1 lb final RQ; 0.454 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPO.

#### SARA Codes

CAS # 7439-97-6: immediate, delayed.

#### Section 313

This material contains Mercury (CAS# 7439-97-6, 99.999%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

CAS# 7439-97-6 (listed as Mercury compounds) is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 7439-97-6 is listed as a Priority Pollutant under the Clean Water Act. CAS# 7439-97-6 is listed as a Toxic Pollutant under the Clean Water Act.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 7439-97-6 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**California Prop 65**

WARNING: This product contains Mercury, a chemical known to the state of California to cause developmental reproductive toxicity.

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

T

**Risk Phrases:**

R 23 Toxic by inhalation.

R 33 Danger of cumulative effects.

**Safety Phrases:**

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 7 Keep container tightly closed.

**WGK (Water Danger/Protection)**

CAS# 7439-97-6: 3

**Canada - DSL/NDSL**

CAS# 7439-97-6 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D2A, E.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 7439-97-6 is listed on the Canadian Ingredient Disclosure List.

## Section 16 - Additional Information

**MSDS Creation Date:** 6/15/1999

**Revision #5 Date:** 3/16/2007

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

# Composition/Information on Ingredient

**Cas:**

7440-02-0

**Code:**

M

**RTECS:**

QR5950000

**Code:**

M

**Name:**

NICKEL (SARA III)

**Other REC Limits:**

N/P

**OSHA PEL:**

1 MG/M3

**Code:**

M

**OSHA STEL:**

ACGIH TLV: 1 MG/M3; 9192

**Code:**

2 OSHA STEL:

**ACGIH TLV:**

1 MG/M3; 9192

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

DURING SPRAYING OPERATIONS:USE NIOSH/MSHA METAL FUME MASK OR SUPPLIED AIR RESPIRATOR. AT OTHER TIMES:NONE IS EXPECTED TO BE NECESSARY. 4

**Ventilation:**

LOCAL EXHAUST DURING SPRAYING OPERATIONS SUFFICIENT TO MAINTAIN EXPOSURE BELOW PEL/TLV. OTHER TIMES NOT NECESSARY.

**Protective Gloves:**

AS NEEDED FOR BURN PROTECTION.

**Eye Protection:**

SAFETY GLASSES PLUS ANSI WELDERS LENSES.

**Other Protective Equipment:**

Equipment EYE WASH STATION. APRON ETC FOR THERMAL BURN PROTECTION. ANSI WELDERS LENS GOGGLES AND/OR FACESHIELD DURING SPRAYING.

**Work Hygienic Practices:**

USE GOOD INDUSTRIAL HYGIENE PRACTICE.

**Supplemental Safety and Health:**

MSDS NO 50-215.

## Health Hazards Data

**LD50LC50Mixture:**

N/K

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

NO

**Ingestion:**

NO

**Carcinogenicity Inds - NTP:**

YES

**IARC:**

YES

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

PRODUCT DOES NOT POSE A HAZARD UNTIL UTILIZED IN A SPRAY OPERATION, THEN THE HAZARDS ARE THERMAL BURNS, RETINAL BURNS, METALLIC VAPOR INHALATION, EXCESSIVE SOUND LEVELS.

**Explanation Of Carcinogenicity:**

NICKEL AND NICKEL COMPOUNDS ARE LISTED BY IARC AND NTP. SEE REPORTS FOR DETAILS.

**Signs And Symptoms Of Overexposure:**

EYE: PHYSICAL IRRITATION, RETINA DAMAGE FROM UV EXPOSURE. SKIN: THERMAL BURNS FROM HOT MATERIAL. INHALED: RESPIRATORY IRRITATION, PULMONARY DAMAGE FROM PARTICULATES, SHIVERS DISEASE. INGESTED: NOT REPORTED.

**Medical Cond Aggravated By Exposure:**

NONE REPORTED.

**First Aid:**

EYE: FLUSH WITH WATER 15 MIN. SKIN: REMOVE CONTAMINATED CLOTHING. WASH AREA WITH SOAP AND WATER. LAUNDRY CLOTHING BEFORE REUSE. INHALED: REMOVE FROM EXPOSURE. GIVE ARTIFICIAL RESPIRATION OR OXYGEN IF NEEDED. INGESTED: DO NOT INDUCE VOMITING. GIVE WATER OR MILK. (NOTHING BY MOUTH IF UNCONSCIOUS) GET IMMEDIATE MEDICAL CARE. IF SYMPTOMS PERSIST OR ARE SEVERE, GET MEDICAL CARE.

**Spill Release Procedures:**

SWEEP UP RESIDUE OR PICK UP PIECES. 3

**Neutralizing Agent:**

NONE

**Waste Disposal Methods:**

DISPOSE I/A/W FEDERAL, STATE, LOCAL REGULATIONS. HMIS SUGGESTS RECLAIM IF POSSIBLE, IF NOT, LANDFILL. NOTE: NICKEL HAS AN

RQ AND QUALIFIES AS HAZARDOUS WASTE IN SOME CASES.

**Handling And Storage Precautions:**

STORE IN A COOL, DRY, WELL VENTILATED AREA.

**Other Precautions:**

AVOID CONTACT WITH EYES AND SKIN; DO NOT BREATHE VAPORS/MIST/FUMES.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P

**Flash Point:**

**Flash Point Text:**

NONE

**Autoignition Temp:**

**Autoignition Temp Text:**

N/K

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

NOT FLAMMABLE. USE MEDIA APPROPRIATE FOR SURROUNDING FIRE. SHOULD WIRE BURN USE SAND OR OTHER AGENT FOR METAL FIRE.

**Fire Fighting Procedures:**

FIRE FIGHTERS SHOULD USE NIOSH APPROVED SCBA & FULL PROTECTIVE EQUIPMENT WHEN FIGHTING CHEMICAL FIRE. USE WATER SPRAY TO COOL NEARBY CONTAINERS EXPOSED TO FIRE.

**Unusual Fire/Explosion Hazard:**

MODERATE FIRE HAZARDS IF EXPOSED TO FLAMES

## Physical/Chemical Properties

**HCC:**

N1

**NRC/State LIC No:**

N/R

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

N/K

**Melt/Freeze Pt:**

**M.P/F.P Text:**

1300-2500

**Decomp Temp:**

**Decomp Text:**

UNKNOWN

**Vapor Pres:**

N/K

**Vapor Density:**

N/K

**Volatile Org Content %:**

**Spec Gravity:**

N/K

**VOC Pounds/Gallon:**

PH: N/K 5

**VOC Grams/Liter:****Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

NEGLIGIBLE

**Appearance and Odor:**

WIRE-NO ODOR.

**Percent Volatiles by Volume:**

NIL

**Corrosion Rate:**

UNKNOWN

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

NONE

**Materials To Avoid:**

ALKALIS.

**Hazardous Decomposition Products:**

NONE

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/R

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

Sara Title III Information: N/P

Federal Regulatory Information: N/P

State Regulatory Information: N/P

## Other Information

Other Information:N/P

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WARRANTY

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## Section 1 - Chemical Product and Company Identification

**MSDS Name:** Potassium Metal

**Catalog Numbers:** P168I-50

**Synonyms:** None

**Company Identification:**

Fisher Scientific

1 Reagent Lane

Fair Lawn, NJ 07410

**For information, call:** 201-796-7100

**Emergency Number:** 201-796-7100

**For CHEMTREC assistance, call:** 800-424-9300

**For International CHEMTREC assistance, call:** 703-527-3887

## Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7440-09-7	Potassium	>98%	231-119-8

## Section 3 - Hazards Identification

### EMERGENCY OVERVIEW

Appearance: silver solid.

**Danger!** Reacts violently with water liberating highly flammable gases. Causes eye and skin burns. Causes digestive and respiratory tract burns. May ignite or explode on contact with moist air. May form unstable peroxides.

**Target Organs:** Eyes, skin, mucous membranes.

#### Potential Health Effects

**Eye:** Causes eye burns.

**Skin:** Causes skin burns. Reacts with moisture in the skin to form potassium hydroxide and hydrogen with much heat.

**Ingestion:** Causes gastrointestinal tract burns.

**Inhalation:** May cause irritation of the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. Causes chemical burns to the respiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema.

**Chronic:** No information found.

## Section 4 - First Aid Measures

**Eyes:** Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).

**Skin:** Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.

**Ingestion:** Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

**Inhalation:** Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Reacts with water to form explosive hydrogen gas. May ignite or explode on contact with steam or moist air.

**Extinguishing Media:** Use dry sand or earth to smother fire. Do NOT use carbon dioxide. Use approved class D extinguishing agents or smother with dry sand, clay, or sodium bicarbonate. DO NOT USE WATER! Contact professional fire-fighters immediately.

**Flash Point:** Not available.

**Autoignition Temperature:** Not available.

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:**(estimated) Health: 3; Flammability: 2; Instability: 2; Special Hazard: -W-

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. Do not expose spill to water.

## Section 7 - Handling and Storage

**Handling:** Do not allow water to get into the container because of violent reaction. Use spark-proof tools and explosion proof equipment. Do not breathe dust, vapor, mist, or gas. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Use with adequate ventilation. Store protected from air. Use and store under nitrogen. Do not allow contact with water. Container should be opened by a technically qualified person. Discard contaminated shoes. Keep from contact with moist air and steam.

**Storage:** Keep away from sources of ignition. Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from water. Water free area. Store in inert atmospheres, such as argon or nitrogen, under liquids that are oxygen free, such as toluene or kerosene, or in glass capsules that have been filled under vacuum or inert atmosphere.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Potassium	none listed	none listed	none listed

**OSHA Vacated PELs:** Potassium: No OSHA Vacated PELs are listed for this chemical.

**Personal Protective Equipment**

**Eyes:** Wear chemical splash goggles and face shield.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Solid

**Appearance:** silver

**Odor:** odorless

**pH:** Basic in water (>7)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not applicable.

**Evaporation Rate:**Not applicable.

**Viscosity:** Not applicable.

**Boiling Point:** 770 deg C

**Freezing/Melting Point:**63 deg C

**Decomposition Temperature:**Not available.

**Solubility:** Reacts violently in water.

**Specific Gravity/Density:**0.862

**Molecular Formula:**K

**Molecular Weight:**39.0983

## Section 10 - Stability and Reactivity

**Chemical Stability:** Combines vigorously or explosively with water. Potassium metal will form the peroxide and the superoxide at room temperature even when stored under mineral oil; may explode violently when handled or cut. Oxide-coated potassium should be destroyed by burning.

**Conditions to Avoid:** Exposure to air, contact with water, exposure to moist air or water.

**Incompatibilities with Other Materials:** Water, oxidizing agents.

**Hazardous Decomposition Products:** Hydrogen gas, peroxides, oxides of potassium.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 7440-09-7:TS6460000

**LD50/LC50:**

Not available.

**Carcinogenicity:**

CAS# 7440-09-7: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:**No information found

**Teratogenicity:**No information found

**Reproductive Effects:**No information found

**Mutagenicity:**No information found

**Neurotoxicity:**No information found

**Other Studies:**

## Section 12 - Ecological Information

No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	POTASSIUM	POTASSIUM
<b>Hazard Class:</b>	4.3	4.3
<b>UN Number:</b>	UN2257	UN2257
<b>Packing Group:</b>	I	I

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 7440-09-7 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 7440-09-7: immediate, fire, reactive.

**Section 313** No chemicals are reportable under Section 313.

#### Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 7440-09-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

F C

**Risk Phrases:**

R 14/15 Reacts violently with water liberating extremely flammable gases.

R 34 Causes burns.

**Safety Phrases:**

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 8 Keep container dry.

S 5B Keep contents under liquids which are oxygen-free, e.g. kerosene, toluene, etc.

**WGK (Water Danger/Protection)**

CAS# 7440-09-7: 2

**Canada - DSL/NDSL**

CAS# 7440-09-7 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B6, E.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

## Section 16 - Additional Information

**MSDS Creation Date:** 12/12/1997

**Revision #5 Date:** 6/22/2006

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# Material Safety Data Sheet

## Silver

ACC# 20770

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Silver**Catalog Numbers:** S163-10**Synonyms:** Argentum.**Company Identification:**

Fisher Scientific

1 Reagent Lane

Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7440-22-4	Silver	100	231-131-3

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: white solid.

**Caution!** May cause respiratory and digestive tract irritation. May cause eye and skin irritation.

Danger of cumulative effects.

**Target Organs:** Kidneys.

#### Potential Health Effects

**Eye:** May cause eye irritation.**Skin:** May cause skin irritation. May cause skin discoloration.**Ingestion:** May cause irritation of the digestive tract. Effects may be cumulative. Ingestion of silver compounds may cause abdominal pain, rigidity, convulsions and shock.**Inhalation:** May cause respiratory tract irritation. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count.**Chronic:** Chronic inhalation or ingestion of silver salts may cause argyria characterized by a permanent blue-gray discoloration of the eyes, skin, mucous membranes, and internal organs. This malady results from the accumulation of silver in the body.

### Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation develops, get medical aid.

**Skin:** Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.

**Ingestion:** Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water. Wash mouth out with water. Get medical aid if irritation or symptoms occur.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.

**Extinguishing Media:** Substance is noncombustible; use agent most appropriate to extinguish surrounding fire. Use water spray, dry chemical, carbon dioxide, or appropriate foam.

**Flash Point:** Not applicable.

**Autoignition Temperature:** Not applicable.

**Explosion Limits, Lower:** Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 1; Flammability: 0; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Wash thoroughly after handling. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Use with adequate ventilation.

**Storage:** Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. No special precautions indicated.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
		0.01 mg/m <sup>3</sup> TWA (dust)	

Silver

0.1 mg/m<sup>3</sup> TWA10 mg/m<sup>3</sup> IDLH (dust)0.01 mg/m<sup>3</sup> TWA**OSHA Vacated PELs:** Silver: 0.01 mg/m<sup>3</sup> TWA**Personal Protective Equipment****Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.**Clothing:** Wear appropriate protective clothing to minimize contact with skin.**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Solid**Appearance:** white**Odor:** none reported**pH:** Not available.**Vapor Pressure:** 100 mm Hg @ 1865 C**Vapor Density:** Not available.**Evaporation Rate:** Not applicable.**Viscosity:** Not available.**Boiling Point:** 2212 deg C**Freezing/Melting Point:** 961 deg C**Decomposition Temperature:** Not available.**Solubility:** Insoluble in water.**Specific Gravity/Density:** 10.5**Molecular Formula:** Ag**Molecular Weight:** 107.8682

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.**Conditions to Avoid:** Incompatible materials, exposure to air.**Incompatibilities with Other Materials:** Strong acids, strong bases, ethyleneimine.**Hazardous Decomposition Products:** Irritating and toxic fumes and gases, silver fumes.**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:****CAS#** 7440-22-4: VW3500000**LD50/LC50:**

Not available.

**Carcinogenicity:**

CAS# 7440-22-4: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** IARC Group 4: Substance nonclassifiable with regard to carcinogenicity. Tumorigenic

: See RTECS

**Teratogenicity:** No information found

**Reproductive Effects:** No information found

**Mutagenicity:** No information found

**Neurotoxicity:** No information found

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. No information available.

**Environmental:** Aquatic Fate: Sorption and precipitation processes are effective in reducing the concn of dissolved silver and result in higher concn in the bed sediments than in the overlying waters. Sorption by manganese dioxide and precipitation with halides are probably the dominant controls on the mobility of silver in the aquatic environment.

**Physical:** Algae, daphnia, fresh water mussels, and fathead minnows were all found capable of accumulating silver; but the food chain was not an important route of silver accumulation for animals at higher trophic levels, suggesting no food chain magnification.

**Other:** For more information, see "HANDBOOK OF ENVIRONMENTAL FATE AND EXPOSURE DATA."

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	Not regulated as a hazardous material	No information available.
<b>Hazard Class:</b>		
<b>UN Number:</b>		
<b>Packing Group:</b>		

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 7440-22-4 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

CAS# 7440-22-4: 1000 lb final RQ (no reporting of releases of this hazardous substance is required)

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**SARA Codes**

CAS # 7440-22-4: delayed, fire.

**Section 313**

This material contains Silver (CAS# 7440-22-4, 100%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 7440-22-4 is listed as a Priority Pollutant under the Clean Water Act. CAS# 7440-22-4 is listed as a Toxic Pollutant under the Clean Water Act.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 7440-22-4 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

Not available.

**Risk Phrases:**

R 33 Danger of cumulative effects.

**Safety Phrases:**

S 37 Wear suitable gloves.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 28A After contact with skin, wash immediately with plenty of water

**WGK (Water Danger/Protection)**

CAS# 7440-22-4: 0

**Canada - DSL/NDSL**

CAS# 7440-22-4 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 7440-22-4 is listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 12/12/1997

**Revision #8 Date:** 2/15/2008

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# Material Safety Data Sheet

## Sodium Metal

ACC# 92022

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Sodium Metal**Catalog Numbers:** AC611144540**Synonyms:** Natrium.**Company Identification:**

Acros Organics N.V.

One Reagent Lane

Fair Lawn, NJ 07410

**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7440-23-5	Sodium	100	231-132-9

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: light silver solid.

**Danger!** May ignite spontaneously on exposure to moist air. Combustible solid. Causes eye burns. Causes digestive tract burns. Corrosive. Water-reactive. Contact with skin causes irritation and possible burns, especially if the skin is wet or moist. Causes respiratory tract burns.**Target Organs:** Eyes, skin, mucous membranes.

#### Potential Health Effects

**Eye:** May cause irreversible eye injury. Contact with eyes may cause severe irritation, and possible eye burns.**Skin:** Causes skin burns. May cause deep, penetrating ulcers of the skin.**Ingestion:** Causes gastrointestinal tract burns.**Inhalation:** May cause severe irritation of the respiratory tract with sore throat, coughing, shortness of breath and delayed lung edema.**Chronic:** Chronic inhalation and ingestion may cause effects similar to those of acute inhalation and ingestion.

### Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.**Skin:** Immediately flush skin with plenty of water for at least 15 minutes while removing

contaminated clothing and shoes. Get medical aid if irritation develops or persists.

**Ingestion:** Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Reacts violently with water giving off flammable gas which may explode. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Flammable solid. May react violently or explosively on contact with water. May be ignited by heat, sparks, and flame. May re-ignite after fire is extinguished.

**Extinguishing Media:** DO NOT USE WATER! Do NOT use CO<sub>2</sub> or halogenated extinguishing agents. Smother with dry sand, dry clay, dry ground limestone (CaCO<sub>3</sub>), or use approved Class D extinguishers.

**Flash Point:** Not applicable.

**Autoignition Temperature:** 250 deg F ( 121.11 deg C)

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 3; Flammability: 3; Instability: 2; Special Hazard: -W-

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Remove all sources of ignition. Provide ventilation. Do not expose spill to water.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Do not get in eyes, on skin, or on clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Do not ingest or inhale. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from water.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use adequate ventilation to keep airborne concentrations low.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Sodium	none listed	none listed	none listed

**OSHA Vacated PELs:** Sodium: No OSHA Vacated PELs are listed for this chemical.

**Personal Protective Equipment**

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Solid

**Appearance:** light silver

**Odor:** odorless

**pH:** Not applicable.

**Vapor Pressure:** 1 mm Hg @ 440 deg C

**Vapor Density:** Not available.

**Evaporation Rate:**Not available.

**Viscosity:** 0.680cp @ 100C

**Boiling Point:** 1621 deg F

**Freezing/Melting Point:**208 deg F

**Decomposition Temperature:**Not available.

**Solubility:** Reacts violently with water

**Specific Gravity/Density:**0.9684 @ 20 C

**Molecular Formula:**Na

**Molecular Weight:**22.99

## Section 10 - Stability and Reactivity

**Chemical Stability:** Reacts violently with water. Reacts violently with a broad range of materials.

**Conditions to Avoid:** Dust generation, exposure to moist air or water.

**Incompatibilities with Other Materials:** Water, strong oxidizing agents, strong acids, halogens, chloroform, sulfur dioxide.

**Hazardous Decomposition Products:** Irritating and toxic fumes and gases, sodium oxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 7440-23-5: VY0686000

**LD50/LC50:**

Not available.

**Carcinogenicity:**

CAS# 7440-23-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.

**Teratogenicity:** No information available.

**Reproductive Effects:** No information available.

**Mutagenicity:** No information available.

**Neurotoxicity:** No information available.

**Other Studies:**

## Section 12 - Ecological Information

No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	SODIUM	No information available.
<b>Hazard Class:</b>	4.3	
<b>UN Number:</b>	UN1428	
<b>Packing Group:</b>	I	

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 7440-23-5 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 7440-23-5: 10 lb final RQ; 4.54 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 7440-23-5: immediate, fire, reactive.

**Section 313** No chemicals are reportable under Section 313.

#### Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

CAS# 7440-23-5 is listed as a Hazardous Substance under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 7440-23-5 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

F C

**Risk Phrases:**

R 14/15 Reacts violently with water liberating extremely flammable gases.

R 34 Causes burns.

**Safety Phrases:**

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 5 Keep contents under ... (appropriate liquid to be specified by the manufacturer).

S 8 Keep container dry.

S 43H In case of fire, use dry chemical, soda ash, lime or sand. (Do not use water or foam).

**WGK (Water Danger/Protection)**

CAS# 7440-23-5: 2

**Canada - DSL/NDSL**

CAS# 7440-23-5 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B4, E, F.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 11/07/2001

**Revision #5 Date:** 10/03/2005

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MSDS : Thallium  
CAS : 7440-28-0  
SYNONYMS : \* Ramor  
          \* Thallium

\*\*\* CHEMICAL IDENTIFICATION \*\*\*

RTECS NUMBER : XG3425000  
CHEMICAL NAME : Thallium  
CAS REGISTRY NUMBER : 7440-28-0  
LAST UPDATED : 199712  
DATA ITEMS CITED : 29  
MOLECULAR FORMULA : Tl  
MOLECULAR WEIGHT : 204.37  
WISWESSER LINE NOTATION : .TL  
COMPOUND DESCRIPTOR : Human  
SYNONYMS/TRADE NAMES :  
    \* Ramor  
    \* Thallium

\*\*\* HEALTH HAZARD DATA \*\*\*

\*\* ACUTE TOXICITY DATA \*\*

TYPE OF TEST : TDLo - Lowest published toxic dose  
ROUTE OF EXPOSURE : Oral  
SPECIES OBSERVED : Human - man  
DOSE/DURATION : 5714 ug/kg  
TOXIC EFFECTS :

    Peripheral Nerve and Sensation - structural change in nerve or sheath

    Sense Organs and Special Senses (Eye) - changes in extra-ocular muscles

    Skin and Appendages - hair

REFERENCE :

    ATXKA8 Archiv fuer Toxikologie. (Berlin, Fed. Rep. Ger.) V.15-31, 1954-74.

    For publisher information, see ARTODN. Volume(issue)/page/year: 19,65,1961

TYPE OF TEST : LDLo - Lowest published lethal dose  
ROUTE OF EXPOSURE : Unreported  
SPECIES OBSERVED : Human - man  
DOSE/DURATION : 4412 ug/kg  
TOXIC EFFECTS :

    Details of toxic effects not reported other than lethal dose value

REFERENCE :

    85DCAI "Poisoning; Toxicology, Symptoms, Treatments," 2nd ed., Arena, J.M.,

    Springfield, IL, C.C. Thomas, 1970 Volume(issue)/page/year: 2,73,1970

\*\*\* REVIEWS \*\*\*

ACGIH TLV-TWA 0.1 mg/m3 (skin)

DTLVS\* The Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs) booklet issues by American Conference of Governmental Industrial Hygienists (ACGIH), Cincinnati, OH, 1996 Volume(issue)/page/year: TLV/BEI,1997

\*\*\* U.S. STANDARDS AND REGULATIONS \*\*\*

MSHA STANDARD-air:TWA 0.1 mg/m3 (skin)  
DTLVS\* The Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs) booklet issues by American Conference of Governmental Industrial Hygienists (ACGIH), Cincinnati, OH, 1996 Volume(issue)/page/year: 3,256,1971

OSHA PEL (Gen Indu):8H TWA 0.1 mg(Tl)/m3 (skin)  
CFRGR Code of Federal Regulations. (U.S. Government Printing Office, Supt. of Documents, Washington, DC 20402) Volume(issue)/page/year: 29,1910.1000,1994

OSHA PEL (Construc):8H TWA 0.1 mg(Tl)/m3 (skin)  
CFRGR Code of Federal Regulations. (U.S. Government Printing Office, Supt. of Documents, Washington, DC 20402) Volume(issue)/page/year: 29,1926.55,1994

OSHA PEL (Shipyard):8H TWA 0.1 mg(Tl)/m3  
CFRGR Code of Federal Regulations. (U.S. Government Printing Office, Supt. of Documents, Washington, DC 20402) Volume(issue)/page/year: 29,1915.1000,1993

OSHA PEL (Fed Cont):8H TWA 0.1 mg(Tl)/m3  
CFRGR Code of Federal Regulations. (U.S. Government Printing Office, Supt. of Documents, Washington, DC 20402) Volume(issue)/page/year: 41,50-204.50,1994

\*\*\* OCCUPATIONAL EXPOSURE LIMITS \*\*\*

OEL-AUSTRALIA:TWA 0.1 mg/m3;Skin JAN 1993  
OEL-BELGIUM:TWA 0.1 mg/m3;Skin JAN 1993  
OEL-DENMARK:TWA 0.1 mg/m3;Skin JAN 1993  
OEL-FINLAND:TWA 0.1 mg/m3;Skin JAN 1993  
OEL-FRANCE:TWA 0.1 mg/m3 JAN 1993  
OEL-GERMANY:TWA 0.1 mg/m3 JAN 1993  
OEL-THE NETHERLANDS:TWA 0.1 mg/m3;Skin JAN 1993

OEL-THE PHILIPPINES:TWA 0.1 mg/m3;Skin JAN 1993

OEL-SWITZERLAND:TWA 0.1 mg/m3;Skin JAN 1993

OEL-THAILAND:TWA 0.1 mg/m3 JAN 1993

OEL-TURKEY:TWA 0.1 mg/m3;Skin JAN 1993

OEL-UNITED KINGDOM:TWA 0.1 mg/m3;Skin JAN 1993

OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV

OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGIH TLV

\*\*\* NIOSH STANDARDS DEVELOPMENT AND SURVEILLANCE DATA \*\*\*

NIOSH RECOMMENDED EXPOSURE LEVEL (REL) :

NIOSH REL TO THALLIUM, soluble compounds-air:10H TWA 0.1 mg/m3 (Sk)

REFERENCE :

NIOSH\* National Institute for Occupational Safety and Health, U.S.  
Dept. of

Health, Education, and Welfare, Reports and Memoranda.

Volume(issue)/page/year: DHHS #92-100,1992

NIOSH OCCUPATIONAL EXPOSURE SURVEY DATA :

NOES - National Occupational Exposure Survey (1983)

NOES Hazard Code - X3172

No. of Facilities: 158 (estimated)

No. of Industries: 3

No. of Occupations: 5

No. of Employees: 1662 (estimated)

No. of Female Employees: 1308 (estimated)

\*\*\* STATUS IN U.S. \*\*\*

EPA TSCA Section 8(b) CHEMICAL INVENTORY

EPA TSCA Section 8(d) unpublished health/safety studies

EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JUNE 1998

NIOSH Analytical Method, 1994: Elements by ICP, 7300

NIOSH Analytical Method, 1994: Elements in blood or tissue, 8005

\*\*\* END OF RECORD \*\*\*

MSDS Number: **A7152** \* \* \* \* \* *Effective Date: 08/02/00* \* \* \* \* \* *Supercedes: 09/08/97*

From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 908-859-2151  
CHEMTREC: 1-800-424-9300  
National Response in Canada  
CANUTEC: 613-996-6666  
Outside U.S. And Canada  
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

## Antimony

### 1. Product Identification

**Synonyms:** Stibium, C.I. 77050

**CAS No.:** 7440-36-0

**Molecular Weight:** 121.75

**Chemical Formula:** Sb

**Product Codes:** 0848

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Antimony	7440-36-0	90 - 100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**POISON! DANGER! MAY BE FATAL IF INHALED. CAUSES IRRITATION. TARGET ORGAN(S):**  
**Respiratory system, cardiovascular system, eyes, skin.**

**J.T. Baker SAF-T-DATA<sup>(tm)</sup> Ratings** (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)

Flammability Rating: 1 - Slight

Reactivity Rating: 2 - Moderate

Contact Rating: 1 - Slight

Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

Storage Color Code: Blue (Health)

## Potential Health Effects

---

**Inhalation:**

Is harmful may be fatal.

**Ingestion:**

None identified.

**Skin Contact:**

Prolonged contact may cause dermatitis.

**Eye Contact:**

None identified.

**Chronic Exposure:**

Kidney damage, liver damage.

**Aggravation of Pre-existing Conditions:**

No information found.

---

## 4. First Aid Measures

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Prompt action is essential.

**Ingestion:**

If large amounts were swallowed, give water to drink and get medical advice.

**Skin Contact:**

In case of contact, flush skin with water.

**Eye Contact:**

In case of eye contact, immediately flush with plenty of water for at least 15 minutes.

---

## 5. Fire Fighting Measures

**Fire:**

Not expected to be a fire hazard.

**Explosion:**

Can be an explosion hazard, especially when heated.

**Fire Extinguishing Media:**

Use extinguishing media appropriate for surrounding fire.

**Special Information:**

No information found.

---

## 6. Accidental Release Measures

Wear self-contained breathing apparatus and full protective clothing. With clean shovel, carefully place material into clean, dry container and cover; remove from area. Flush spill area with water.

---

## 7. Handling and Storage

Keep container tightly closed. Store in secure poison area. Keep product out of light. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

### **Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):

0.5 mg/m<sup>3</sup> (TWA)

-ACGIH Threshold Limit Value (TLV):

0.5 mg/m<sup>3</sup> (TWA)

### **Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

### **Personal Respirators (NIOSH Approved):**

For conditions of use where exposure to the substance is apparent, consult an industrial hygienist. For emergencies, or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator.

WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

### **Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

### **Eye Protection:**

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

## 9. Physical and Chemical Properties

### **Appearance:**

Silvery-white metal.

### **Odor:**

No information found.

### **Solubility:**

Negligible (< 0.1%)

### **Specific Gravity:**

6.68

### **pH:**

No information found.

### **% Volatiles by volume @ 21C (70F):**

0

### **Boiling Point:**

1635C (2975F)

### **Melting Point:**

630C (1166F)

### **Vapor Density (Air=1):**

4.2

### **Vapor Pressure (mm Hg):**

Not applicable.

### **Evaporation Rate (BuAc=1):**

No information found.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

No information found.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Strong oxidizing agents, strong acids, halogen acids, chlorine, fluorine.

**Conditions to Avoid:**

Heat, Light.

## 11. Toxicological Information

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Antimony (7440-36-0)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

No information found.

**Environmental Toxicity:**

No information found.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

Not regulated.

## 15. Regulatory Information

Ingredient	-----\Chemical Inventory Status - Part 1\-----			
	TSCA	EC	Japan	Australia
Antimony (7440-36-0)	Yes	Yes	No	Yes

-----\Chemical Inventory Status - Part 2\-----

--Canada--

Ingredient	Korea	DSL	NDSL	Phil.
Antimony (7440-36-0)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----

Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Antimony (7440-36-0)	No	No	Yes	Antimony com

-----\Federal, State & International Regulations - Part 2\-----

Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8(d)
Antimony (7440-36-0)	5000	No	No

Chemical Weapons Convention: No      TSCA 12(b): No      CDTA: No  
 SARA 311/312: Acute: Yes      Chronic: Yes      Fire: No      Pressure: No  
 Reactivity: No      (Pure / Solid)

**Australian Hazchem Code:** None allocated.

**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**Label Hazard Warning:**

POISON! DANGER! MAY BE FATAL IF INHALED. CAUSES IRRITATION. TARGET ORGAN(S):  
 Respiratory system, cardiovascular system, eyes, skin.

**Label Precautions:**

Avoid contact with eyes, skin, clothing.  
 Do not breathe dust. Keep in tightly closed container. Use with adequate ventilation. Wash thoroughly after handling.

**Label First Aid:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Prompt action is essential. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No changes.

**Disclaimer:**

\*\*\*\*\*

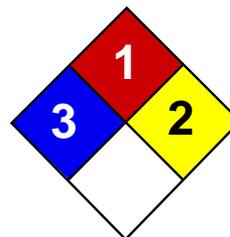
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**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)



Health	3
Fire	1
Reactivity	2
Personal Protection	E

## Material Safety Data Sheet Arsenic MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Arsenic

**Catalog Codes:** SLA1006

**CAS#:** 7440-38-2

**RTECS:** CG0525000

**TSCA:** TSCA 8(b) inventory: Arsenic

**CI#:** Not applicable.

**Synonym:**

**Chemical Name:** Arsenic

**Chemical Formula:** As

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Arsenic	7440-38-2	100

**Toxicological Data on Ingredients:** Arsenic: ORAL (LD50): Acute: 763 mg/kg [Rat]. 145 mg/kg [Mouse].

### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant).

**Potential Chronic Health Effects:**

**CARCINOGENIC EFFECTS:** Classified A1 (Confirmed for human.) by ACGIH. **MUTAGENIC EFFECTS:** Not available.

**TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to kidneys, lungs, the nervous system, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

**Skin Contact:** Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

**Serious Skin Contact:** Not available.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

### Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** Some metallic oxides.

**Fire Hazards in Presence of Various Substances:** Flammable in presence of open flames and sparks, of heat, of oxidizing materials.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:**

Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits highly toxic fumes.

**Special Remarks on Explosion Hazards:** Not available.

### Section 6: Accidental Release Measures

**Small Spill:** Use appropriate tools to put the spilled solid in a convenient waste disposal container.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

### Section 7: Handling and Storage

**Precautions:**

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids, moisture.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:** Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

### Exposure Limits:

TWA: 0.01 from ACGIH (TLV) [United States] [1995] Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid. (Lustrous solid.)

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 74.92 g/mole

**Color:** Silvery.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** Not available.

**Melting Point:** Sublimation temperature: 615°C (1139°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 5.72 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:** Insoluble in cold water, hot water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Reactive with oxidizing agents, acids, moisture.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Inhalation. Ingestion.

**Toxicity to Animals:** Acute oral toxicity (LD50): 145 mg/kg [Mouse].

**Chronic Effects on Humans:**

**CARCINOGENIC EFFECTS:** Classified A1 (Confirmed for human.) by ACGIH. Causes damage to the following organs: kidneys, lungs, the nervous system, mucous membranes.

**Other Toxic Effects on Humans:**

Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:** Not available.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are as toxic as the original product.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

## Section 14: Transport Information

**DOT Classification:** CLASS 6.1: Poisonous material.

**Identification:** : Arsenic UNNA: UN1558 PG: II

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Arsenic California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Arsenic Pennsylvania RTK: Arsenic Massachusetts RTK: Arsenic TSCA 8(b) inventory: Arsenic

**Other Regulations:** OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

**Other Classifications:****WHMIS (Canada):**

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**

R22- Harmful if swallowed. R45- May cause cancer.

**HMIS (U.S.A.):**

**Health Hazard:** 3

**Fire Hazard:** 1

**Reactivity:** 2

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 3

**Flammability:** 1

**Reactivity:** 2

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

**Section 16: Other Information****References:**

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Liste des produits purs tératogènes, mutagènes, cancérigènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité international Ltée. 1986.

**Other Special Considerations:** Not available.

**Created:** 10/09/2005 04:16 PM

**Last Updated:** 11/01/2010 12:00 PM

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## Composition/Information on Ingredient

**Cas:**

7440-39-3

**Code:**

M

**RTECS:**

CQ8370000

**Code:**

M

**Name:**

BARIUM (SARA 313)

**Other REC Limits:**

N/K

**OSHA PEL:**

0.5 MG/M3

**Code:**

M

**OSHA STEL:**

**Code:**

3

**ACGIH TLV:**

N/K (FP N)

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

IF PERSONAL EXPOS CANNOT BE CONTROLLED BELOW APPLIC LIMITS VY BENT, WEAR NIOSH APPRVD, PROPERLY FITTED ORGANIC VAPOR/PARTICULATE RESP. WHEN SANDING OR ABRADING DRIED FILM, WEAR DUST/MIST RESP APPRVD B Y NIOSH FOR PROT AGAINST NON-VOLATILE MATERIALS IN INGREDIENT SECTION.

**Ventilation:**

LOC EXHST PREF. GEN EXHST ACCEPTABLE IF EXPOS MAINTAINED BELOW APPLIC LIMS. REFER TO OSHA STDS 1910.98, 107, 108.

**Protective Gloves:**

CHEMICAL RESISTANT GLOVES.

**Eye Protection:**

ANSI APPRVD CHEM WORKERS GOGGLES (FP N).

**Other Protective Equipment:**

Equipment ANSI APPROVED EYE WASH & DELUGE SHOWER (FP N).

**Work Hygienic Practices:**

NONE SPECIFIED BY MANUFACTURER.

**Supplemental Safety and Health:**

OTHER PREC: LEVELS ONLY DURING SANDING OR ABRADING OF DRIED FILM. IF NO SPECIFIC DUSTS ARE LISTED, THE APPLIC LIMITS FOR NUISANCE DUSTS ARE ACGIH TLV 10 MG/M3 (TDUST), OSHA PEL 15 MG/M3 (TDUST), 5 MG /M3 (RESPIRABLE FRACTION). 5

## Health Hazards Data

**LD50LC50Mixture:**

NONE SPECIFIED BY MANUFACTURER.

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

NO

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

IRRIT OF EYES, SKIN & RESP SYS. MAY CAUSE NERVOUS SYS DEPRESS. EXTREME OVEREXP MAY RSLT IN UNCON & POSS DEATH. HDCH, DIZZ, NAUS & LOSS OF COORD ARE INDICATIONS OF EXCESSIVE EXPOS TO VAPORS OR SPRAY MI STS. REDNESS & ITCHING OR BURNING SENSATION MAY INDICATE EYE OR EXCESSIVE SKIN EXPOSURE. PRLNGD OVEREXP TO HEXANE MAY CAUSE DMG TO NERVE TISSUES OF ARMS & LEGS (PERIPHERAL NEUROPATHY), RESULTING IN MUSCULAR WEAK & LOSS OF COORDINATION. THIS EFT MAY BE INCREASED BY PRESENCE OF METHYL ETHYL K

**Explanation Of Carcinogenicity:**

NOT RELEVANT

**Signs And Symptions Of Overexposure:**

HLTH HAZ: REPORTS HAVE ASSOC RPTD & PRLNGD OVEREXP TO SOLVENTS W/PERMANENT BRAIN & NERVOUS SYSTEM DMG.

**Medical Cond Aggravated By Exposure:**

NONE GENERALLY RECOGNIZED.

**First Aid:**

INHAL: IF AFFECTED, REMOVE FROM EXPOSURE. RESTORE BRTHG. KEEP WARM & QUIET. SKIN: WASH AFFECTED AREA THOROUGHLY W/SOAP & WATER. REMOVE CONTAMINATED CLOTHING & LAUNDER BEFORE REUSE. EYES: FLUSH EYES W/ LARGE AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. GET MED ATTN. INGEST: NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. DO NOT INDUCE VOMITING. GIVE SEVERAL GLASSES OF WATER. SEEK MED ATTN.

**Spill Release Procedures:**

REMOVE ALL SOURCES OF IGNITION. VENTILATE AND REMOVE WITH INERT ABSORBENT.

**Neutralizing Agent:**

NONE SPECIFIED BY MANUFACTURER.

**Waste Disposal Methods:**

WASTE FROM THIS PROD MAY BE HAZ AS DEFINED UNDER RCRA 40 CFR 261. WASTE MUST BE TESTED FOR IGNITABILITY TO DETERMINE APPLIC EPA HAZ WASTE NUMBERS. DO NOT INCINERATE. DEPRESSURIZE CNTNR. DISPOSE OF I/A /W FED, STATE & LOCAL REGS REGARDING POLLUTION.

**Handling And Storage Precautions:**

CONTENTS ARE EXTREMELY FLAM. KEEP AWAY FROM HEAT, SPKS & OPEN FLAME. VAPS WILL ACCUMULATE READILY & MAY IGNITE EXPLOSIVELY. DURING USE & UNTIL ALL VAPS ARE GONE: KEEP AREA VENTD - DO NOT SMOKE - EXTIN G ALL FLAMES, PILOT LIGHTS & HEATERS - TURN OFF STOVES, ELEC TOOLS & APPLIANCES & ANY(OTHER INFO)

**Other Precautions:**

INTENTIONAL MISUSE BY DELIB CONC & INHALING CONTENTS CAN BE HARMFUL/FATAL. USE ONLY W/ADEQ VENT. AVOID BRTHG VAP & SPRAY MIST. AVOID CONTACT W/SKIN & EYES. WASH HANDS AFTER 4 USING. THESE COATINGS MAY C ONTAIN MATLS CLASSIFIED AS NUISANCE PARTICULATES (LISTED "AS DUST" IN INGRED SECTION) WHICH MAY BE P RESENT AT HAZ (SUPP)

## Fire and Explosion Hazard Information

**Flash Point Method:**

PMCC

**Flash Point:****Flash Point Text:**

&lt;0F, &lt;-18C

**Autoignition Temp:****Autoignition Temp Text:**

N/A

**Lower Limits:**

0.9%

**Upper Limits:**

13.1%

**Extinguishing Media:**

CARBON DIOXIDE, DRY CHEMICAL, FOAM.

**Fire Fighting Procedures:**

USE NIOSH APPRVD SCBA &amp; FULL PROT EQUIP (FP N). WATER SPRAY MAY BE INEFTIVE. IF WATER IS USED, FOG NOZZS ARE PREF.

WATER MAY BE USED TO COOL CLSD CNTNRS TO PVNT PRESS BUILD-UP &amp; POSS AUTOIGNIT OR EXPL O WHEN EXPOSED TO EXTREME HEAT.

**Unusual Fire/Explosion Hazard:**

ISOLATE FROM HEAT, ELEC EQUIP, SPARKS &amp; OPEN FLAME. CLOSED CNTNRS MAY EXPLODE WHEN EXPOSED TO EXTREME HEAT.

APPLICATION TO HOT SURFS REQS SPECIAL PRECS. DURING EMER CNDTNS OVEREXP TO DECOMP PRODS MAY CAUSE A HLTH HAZ.

SYMPS MAY NOT BE IMMED APPARENT. OBTAIN MED ATTN.

## Physical/Chemical Properties

**HCC:****NRC/State LIC No:****Net Prop WT For Ammo:****Boiling Point:****B.P. Text:**

&lt;0F, &lt;-18C

**Melt/Freeze Pt:****M.P/F.P Text:**

N/A

**Decomp Temp:****Decomp Text:**

N/K

**Vapor Pres:**

SEE OTHER INFO

**Vapor Density:**

HVR/AIR

**Volatile Org Content %:****Spec Gravity:**

0.857 (FP N)

**VOC Pounds/Gallon:**

3.77

**PH: N/K****VOC Grams/Liter:****Viscosity:**

N/P

**Evaporation Rate & Reference:**

FASTER THAN ETHER

**Solubility in Water:**

N/A

**Appearance and Odor:**

NONE SPECIFIED BY MANUFACTURER.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

NONE SPECIFIED BY MANUFACTURER.

**Materials To Avoid:**

NONE KNOWN.

**Hazardous Decomposition Products:**

BY FIRE: CARBON DIOXIDE, CARBON MONOXIDE.

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

NOT RELEVANT

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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**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. Lookchem 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.

## Composition/Information on Ingredient

**Cas:**

7440-41-7

**Code:**

M

**RTECS:**

DS1750000

**Code:**

M

**Name:**

BERYLLIUM (SARA 313) (CERCLA). PERCENTAGE (WT):<0

**Other REC Limits:**

N/K

**OSHA PEL:**

0.002 MG/M3, Z-2

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

.002 MG/M3, A2

**Code:**

M

**ACGIHSTEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

NIOSH/MSHA APPROVED DUST RESPIRATOR.

**Ventilation:**

LOCAL EXHAUST:PROVIDE ADEQUATE EXHAUST VENT TO MEET TLV REQUIREMENTS. 6

**Protective Gloves:**

LEATHER OR RUBBER GLOVES.

**Eye Protection:**

ANSI APPROVED CHEM SAFETY GOGGLES (FP N)

**Other Protective Equipment:**

Equipment EYEWASH STATION.

**Work Hygienic Practices:**

GOOD PERSONAL HYGIENE TO BE FOLLOWED AT ALL TIMES.

**Supplemental Safety and Health:**

EXPLAN OF CARCIN:ANTIC TO BE CARCINOGEN.

## Health Hazards Data

**LD50LC50Mixture:**

NONE SPECIFIED BY MANUFACTURER.

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

YES

**IARC:**

YES

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

ACUTE: INHALATION OF DUST MAY CAUSE MECHANICAL IRRITATION TO RESPIRATORY TRACT. SKIN AND EYE CONTACT MAY CAUSE MECHANICAL ABRASION IRRITATION. CHRONIC: LONG TERM OVEREXPOSURE TO SILICA CAUSES SILICOSIS, A FORM OF PULMONARY FIBROSIS. CONTINUED EXPOSURE TO SILICA CAN LEAD TO CARDIOPULMONARY IMPAIRMENT.

**Explanation Of Carcinogenicity:**

SILICA, CRYSTALLINE-QUARTZ: IARC MONO, SUPP. VOL 7, PG 341, 1987: GROUP 2A. NTP 7TH ANNUAL RPT ON CARCIN, 1994: (SUPDAT)

**Signs And Symptoms Of Overexposure:**

SEE HEALTH HAZARDS.

**Medical Cond Aggravated By Exposure:**

EXCESSIVE EXPOSURE ABOVE TLV CAN GIVE MILD PULMONARY IRRITATION.

**First Aid:**

SKIN: WASH WITH SOAP & WATER. EYES: FLUSH OUT W/ GENEROUS AMTS OF WATER FOR @ LEAST 15 MINUTES. SEE PHYS IF IRRIT

PERSISTS. INHAL: REMOVE TO FRESH AIR. CONT PHYS IF BRTHG IS DFCLT. INGEST: IF CONSCIOUS GIV E LARGE QUANTITIES OF WATER TO INDUCE VOMITING. GET MEDICAL ATTENTION.

**Spill Release Procedures:**

VACUUM OR SCOOP UP SPILLED MATERIAL FOR RECOVERY OR DISPOSAL, AVOID DUSTY CONDITIONS, USE GOOD VENTILATION.

WETTING SPILL WITH WATER SPRAY WILL KEEP DUST LEVEL DOWN.

**Neutralizing Agent:**

NONE SPECIFIED BY MANUFACTURER. 5

**Waste Disposal Methods:**

DISPOSAL TO BE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS. DISCARDED MATERIAL WOULD BE CLASSIFIED AS NON-HAZARDOUS. (RCRA)

**Handling And Storage Precautions:**

ENGINEERING CONTROLS SHOULD BE USED TO MAINTAIN FREE SILICA DUST BELOW TLV. ALUMINUM OXIDE IS REPORTABLE UNDER SARA TITLE III, SECTION 313.

**Other Precautions:**

NONE.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P

**Flash Point:**

NON-FLAMMABLE

**Flash Point Text:**

NON-FLAMMABLE

**Autoignition Temp:**

N/A

**Lower Limits:**

N/A

**Upper Limits:**

N/A

**Extinguishing Media:**

AS APPROPRIATE FOR SURROUNDING COMBUSTIBLES. DOES NOT BURN OR SUPPORT COMBUSTION.

**Fire Fighting Procedures:**

USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N).

**Unusual Fire/Explosion Hazard:**

NO FIRE OR EXPLOSION HAZARD.

## Physical/Chemical Properties

**HCC:**

**NRC/State LIC No:**

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

N/A

**Melt/Freeze Pt:**  
**M.P/F.P Text:**  
N/A  
**Decomp Temp:**  
**Decomp Text:**  
N/K  
**Vapor Pres:**  
N/A  
**Vapor Density:**  
N/A  
**Volatile Org Content %:**  
**Spec Gravity:**  
4.9-5.1(H\*2O=1)  
**VOC Pounds/Gallon:**  
**PH:** N/K  
**VOC Grams/Liter:**  
**Viscosity:**  
N/P  
**Evaporation Rate & Reference:**  
0 (BUTYL ACETATE =1)  
**Solubility in Water:**  
INSOLUBLE 7  
**Appearance and Odor:**  
REDDISH BROWN POWDER - NO ODOR  
**Percent Volatiles by Volume:**  
N/K  
**Corrosion Rate:**  
N/K

## Reactivity Data

**Stability Indicator:**  
YES  
**Stability Condition To Avoid:**  
NONE.  
**Materials To Avoid:**  
NONE.  
**Hazardous Decomposition Products:**  
NONE.  
**Hazardous Polymerization Indicator:**  
NO  
**Conditions To Avoid Polymerization:**  
NOT RELEVANT.

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

**Sara Title III Information:** N/P  
**Federal Regulatory Information:** N/P  
**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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# Material Safety Data Sheet

## Cadmium metal, granular

ACC# 03720

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Cadmium metal, granular**Catalog Numbers:** 61213-5000, C3-500**Synonyms:** None.**Company Identification:**

Fisher Scientific

1 Reagent Lane

Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7440-43-9	Cadmium	100	231-152-8

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

**Appearance:** silver white granules.**Danger!** Flammable solid. May be fatal if inhaled. Harmful if swallowed. Causes eye, skin, and respiratory tract irritation. Contains cadmium. Cancer hazard. Avoid creating dust. Can cause lung and kidney disease. Inhalation of fumes may cause metal-fume fever. Air sensitive. May cause reproductive and fetal effects.**Target Organs:** Blood, kidneys, liver, lungs, skeletal structures, prostate.

#### Potential Health Effects

**Eye:** Causes eye irritation.**Skin:** Causes skin irritation.**Ingestion:** Harmful if swallowed. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Ingestion may produce fluid loss, acute renal failure, and cardiopulmonary depression.**Inhalation:** May be fatal if inhaled. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. Damage may be delayed. May cause nausea, vomiting, abdominal pain, diarrhea, chest tightness, weakness, and delayed pulmonary edema. In humans inhalation causes proteinuria, an excess of protein in the urine.**Chronic:** May cause respiratory tract cancer. Repeated inhalation may cause chronic bronchitis. Chronic inhalation may cause nasal septum ulceration and perforation. Cadmium and compounds may cause lung, liver and kidney damage and lung and prostate cancer in humans. May cause loss of smell, emphysema, anemia, bone demineralization, and lung fibrosis. The primary target organ for

chronic cadmium disease is clearly the kidney.

## Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

**Ingestion:** Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

**Inhalation:** POISON material. If inhaled, get medical aid immediately. Remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Attempt rescue only after notifying at least one other person of the emergency and putting into effect established emergency procedures. Do not become a casualty yourself.

**Notes to Physician:** Administration of calcium disodium EDTA may be useful in acute poisoning with its use at the discretion of qualified medical personnel. Persons with kidney disease, chronic respiratory disease, liver disease, or skin disease may be at increased risk from exposure to this substance.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Material can spontaneously ignite (pyrophoric) when exposed to air at normal or slightly elevated temperatures. Dust can be an explosion hazard when exposed to heat or flame. Flammable solid. May burn rapidly with flare burning effect. May re-ignite after fire is extinguished. Dangerous fire hazard in the form of dust when exposed to heat or flame.

**Extinguishing Media:** Use dry sand, graphite powder, dry sodium chloride-based extinguishers.

**Flash Point:** Not available.

**Autoignition Temperature:** Not available.

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 4; Flammability: 2; Instability: 1

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. Place under an inert atmosphere.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Use spark-proof tools and explosion proof equipment. Avoid contact with skin and eyes. Do not breathe dust, mist, or vapor. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep

away from heat, sparks and flame. Do not ingest or inhale. Handle under an inert atmosphere. Store protected from air. Use only in a chemical fume hood. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from heat and flame. Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Do not expose to air. Store under an inert atmosphere.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood. See 29CFR 1910.1027 for regulations applying to all occupational exposures to cadmium and cadmium compounds, in all forms.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Cadmium	0.01 mg/m <sup>3</sup> TWA; 0.002 mg/m <sup>3</sup> TWA (respirable fraction)	9 mg/m <sup>3</sup> IDLH (dust)	5 æg/m <sup>3</sup> TWA; 0.1 mg/m <sup>3</sup> TWA (fume, applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect); 0.2 mg/m <sup>3</sup> TWA (dust, applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect); 0.3 mg/m <sup>3</sup> Ceiling (fume, applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect); 0.6 mg/m <sup>3</sup> Ceiling (dust, applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect); 2.5 æg/m <sup>3</sup> Action Level; 5 æg/m <sup>3</sup> TWA (Do not eat, drink or chew to bacco or gum or apply cosmetics in regulated areas. Carcinogen - dust can cause lung and kidney disease. See 29 CFR 1910.1027)

**OSHA Vacated PELs:** Cadmium: No OSHA Vacated PELs are listed for this chemical.

### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Granules

**Appearance:** silver white

**Odor:** odorless

**pH:** Not available.

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Evaporation Rate:** Not applicable.

**Viscosity:** Not applicable.

**Boiling Point:** 765 deg C @ 760 mmHg

**Freezing/Melting Point:** 321 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:** 8.64 @ 25°C

**Molecular Formula:** Cd

**Molecular Weight:** 112.40

## Section 10 - Stability and Reactivity

**Chemical Stability:** Oxidizes when exposed to air. Easily tarnishes in moist air. Powder or liquid is pyrophoric. Contact with acid liberates gas.

**Conditions to Avoid:** Ignition sources, dust generation, excess heat, prolonged exposure to air.

**Incompatibilities with Other Materials:** Strong oxidizing agents, acids, sulfur, zinc, selenium, tellurium.

**Hazardous Decomposition Products:** Toxic cadmium oxide fumes.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 7440-43-9: EU9800000

**LD50/LC50:**

CAS# 7440-43-9:

Inhalation, rat: LC50 = 25 mg/m<sup>3</sup>/30M;

Oral, mouse: LD50 = 890 mg/kg;

Oral, rat: LD50 = 2330 mg/kg;

**Carcinogenicity:**

CAS# 7440-43-9:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 10/1/87
- **NTP:** Known carcinogen
- **IARC:** Group 1 carcinogen

**Epidemiology:** Occupational exposure to cadmium has been implicated in a significant increase in prostate and respiratory tract cancer. There is evidence of a significant excess of respiratory cancer

deaths among a cohort of cadmium production workers, and concluded that cadmium and its compounds are potential carcinogens.

**Teratogenicity:** Oral, rat: TDLo = 155 mg/kg (male 13 week(s) pre-mating and female 13 week(s) pre-mating - 3 week(s) after conception) Effects on Newborn - growth statistics (e.g.%, reduced weight gain) and Effects on Newborn - behavioral.; Oral, rat: TDLo = 23 mg/kg (female 1-22 day(s) after conception) Specific Developmental Abnormalities - blood and lymphatic systems (including spleen and marrow).; Oral, mouse: TDLo = 1700 mg/kg (female 8-12 day(s) after conception) Effects on Newborn - viability index (e.g., # alive at day 4 per # born alive) and Effects on Newborn - growth status

**Reproductive Effects:** Oral, rat: TDLo = 21500 ug/kg (multigenerations) Fertility - pre-implantation mortality (e.g. reduction in number of implants per female; total number of implants per corpora lutea).; Intraperitoneal, rat: TDLo = 1124 ug/kg (male 1 day(s) pre-mating) Paternal Effects - spermatogenesis (incl. genetic material, sperm morphology, motility, and count).

**Mutagenicity:** Micronucleus Test: Mouse, Embryo = 6 umol/L.; Cytogenetic Analysis: Hamster, Ovary = 1 umol/L.

**Neurotoxicity:** No information found

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Rainbow trout: TLm = 30 ppm; 24 Hr; Hard waterFish: Striped bass: LC50 = 0.001 ppm; 24-48 Hr; Static bioassayFish: Fathead Minnow: TL50 = 7.2 ppm; 96 Hr; UnspecifiedFish: Bluegill/Sunfish: LCO = 0.08 ppm; 96 Hr; Static bioassay (Hard water) No data available.

**Environmental:** Cadmium can enter the air from natural sources.

**Physical:** No information available.

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	TOXIC SOLIDS, FLAMMABLE, ORGANIC, N.O.S.	Toxic Solid, Flammable, Organic, N.O.S. (CADMIUM METAL)
<b>Hazard Class:</b>	6.1	6.1
<b>UN Number:</b>	UN2930	UN2930
<b>Packing Group:</b>	I	I

## Section 15 - Regulatory Information

### US FEDERAL

**TSCA**

CAS# 7440-43-9 is listed on the TSCA inventory.

**Health & Safety Reporting List**

None of the chemicals are on the Health & Safety Reporting List.

**Chemical Test Rules**

None of the chemicals in this product are under a Chemical Test Rule.

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

CAS# 7440-43-9: 10 lb final RQ (no reporting of releases of this hazardous substance is required)

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPO.

**SARA Codes**

CAS # 7440-43-9: immediate, delayed, fire.

**Section 313**

This material contains Cadmium (CAS# 7440-43-9, 100%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

**Clean Air Act:**

CAS# 7440-43-9 (listed as Cadmium compounds) is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 7440-43-9 is listed as a Priority Pollutant under the Clean Water Act. CAS# 7440-43-9 is listed as a Toxic Pollutant under the Clean Water Act.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 7440-43-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**California Prop 65****The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:**

WARNING: This product contains Cadmium, a chemical known to the state of California to cause cancer. WARNING: This product contains Cadmium, a chemical known to the state of California to cause male reproductive toxicity.

California No Significant Risk Level: CAS# 7440-43-9: 0.05 æg/day NSRL (inhalation)

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

T + F

**Risk Phrases:**

R 11 Highly flammable.

R 25 Toxic if swallowed.

R 26 Very toxic by inhalation.

R 45 May cause cancer.

**Safety Phrases:**

S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)

immediately (show the label where possible).

S 53 Avoid exposure - obtain special instructions before use.

**WGK (Water Danger/Protection)**

CAS# 7440-43-9: No information available.

**Canada - DSL/NDSL**

CAS# 7440-43-9 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D1A, B4.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 7440-43-9 is listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
--

**MSDS Creation Date:** 6/28/1999

**Revision #7 Date:** 2/13/2008

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## Composition/Information on Ingredient

**Cas:**

7440-47-3

**Code:**

M

**RTECS:**

GB4200000

**Code:**

M

**Name:**

CHROMIUM (SARA III)

**Other REC Limits:**

N/P

**OSHA PEL:**

1 MG/M3

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

0.5 MG/M3; 9192

**Code:**

M

**ACGIHSTEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

ORGANIC VAP CANISTER WHERE OXYGE CONTENT IS ADEQ & VAP CONCENTRA IS

**Ventilation:**

LOC. EXHAUST-YES MECHANICAL-YES 5

**Protective Gloves:**

RUBBER GLOVES

**Eye Protection:**

GOGGLES

**Other Protective Equipment:**

Equipment N/P

**Work Hygienic Practices:**

N/P

**Supplemental Safety and Health:**

ADDTIL HAZARD INGRED:METHYL ETHYL,KETONE, XS5250000,5.50%,  
100PPM;ISOPROPYL ALCOHOL, NT8050000,  
2.75%, 400 PPM;METHYL ISOBUTYL KETONE, PO6125000, 6.70% 50 PPM

## Health Hazards Data

**LD50LC50Mixture:**

N/P

**Route Of Entry Inds - Inhalation:**

N/P

**Skin:**

N/P

**Ingestion:**

N/P

**Carcinogenicity Inds - NTP:**

N/P

**IARC:**

N/P

**OSHA:**

N/P

**Health Hazards Acute And Chronic:**

N/P

**Explanation Of Carcinogenicity:**

N/P

**Signs And Symptoms Of Overexposure:**

SYSTEM TOXIC EFFECTS MAY ALSO RESULT FR SKIN ABSORPTION.IRRIT TO EYES,NOSE & THROAT NEAR OR ABOVE

**Medical Cond Aggravated By Exposure:**

N/P

**First Aid:**

IF INHALED,REMOV TO FRESH AIR.IF NOT BREATHING,GIVE ARTIFICIAL RESPIRATION,PREFERABLY MOUTH TO MOUTH.CALL A DR. IN

CASE OF SKIN CONTACT WASH THOROUGHLY W/SOAP & WATER;FOR EYES,FLUSH IMMED.W/WATER FOR 15 MIN. & CONTACT A DR.

WASH CONT

**Spill Release Procedures:**

REMOVE ALL SOURCES OF IGNITION (FLAME) ELECTRICAL,STATIC OR FRICTIONAL SPARKS;HOT SURFACES,ETC).AVOID BREATHING

VAPORS.VENTILATE AREA.CONTAIN & SCOOP UP SPILL W/NON-SPARKING TOOLS,RAGS,ETC.USE INERT A BSORBENT MATERIALS ON

SMALL SPILLS OR ON RESIDUALS

**Neutralizing Agent:**

N/P 4

**Waste Disposal Methods:**

DISPOSE OF IAW LOCAL APPLICABLE REGS.

**Handling And Storage Precautions:**

KEEP CONTAINERS CLOSED &amp; UPRIGHT TO PREVENT LEAKAGE.AVD

FLAMES,WELDING,SMOKING,SPARKS,OPEN,LIGHTS,ETC.AVOID

BREATHING OF VAP OR SPRAY MIST.AVD EYE &amp; S

**Other Precautions:**

MAINTAIN GOOD PERSONAL HYGIENE.DO NOT USE IN CONFINED AREAS, TANK OR PIT W/O ADEQ. VENTILATIONS.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P

**Flash Point:****Flash Point Text:**

23 F TCC -5 C

**Autoignition Temp:****Autoignition Temp Text:**

N/A

**Lower Limits:****Upper Limits:****Extinguishing Media:**

FOAM, DRY CHEMICAL,WATER SPRAY FOG OR CO\*2

**Fire Fighting Procedures:**

USE AIR SUPPLIED EQMT FOR ENCL AREAS.COOL EXPOS CONTAINERS

**Unusual Fire/Explosion Hazard:**

KEEP AWAY FR HEAT,SPARKS &amp; FLAME.

## Physical/Chemical Properties

**HCC:**

F2

**NRC/State LIC No:****Net Prop WT For Ammo:****Boiling Point:****B.P. Text:**

N/A

**Melt/Freeze Pt:****M.P/F.P Text:**

N/A

**Decomp Temp:**  
**Decomp Text:**  
N/A  
**Vapor Pres:**  
N/P  
**Vapor Density:**  
HEAV  
**Volatile Org Content %:**  
**Spec Gravity:**  
GL 7.9  
**VOC Pounds/Gallon:**  
**PH:** N/P  
**VOC Grams/Liter:**  
**Viscosity:**  
N/P  
**Evaporation Rate & Reference:**  
N. BUTYL ACET-FAST 6  
**Solubility in Water:**  
NEGLIGIBLE  
**Appearance and Odor:**  
VISCIOUS RED LIQUID W/TYPICAL SOLVENT ODOR  
**Percent Volatiles by Volume:**  
76.2  
**Corrosion Rate:**  
N/P

## Reactivity Data

**Stability Indicator:**  
YES  
**Stability Condition To Avoid:**  
N/P  
**Materials To Avoid:**  
N/P  
**Hazardous Decomposition Products:**  
N/P  
**Hazardous Polymerization Indicator:**  
NO  
**Conditions To Avoid Polymerization:**  
N/P

## Toxicological Information

**Information:**N/P

## MSDS Transport Information

**Information:**N/P

## Regulatory Information

**Sara Title III Information:** N/P  
**Federal Regulatory Information:** N/P  
**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P  
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## Composition/Information on Ingredient

**Cas:**

7440-48-4

**Code:**

M

**RTECS:**

GF8750000

**Code:**

M

**Name:**

COBALT (SARA III)

**Other REC Limits:**

N/P

**OSHA PEL:**

0.1 MG/M3;AS CO

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

0.05 MG/M3;DUST 9293

**Code:**

M

**ACGIHSTEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

SCBA IF INVOLVED IN FIRE, OTHERWISE GAS MASK.

**Ventilation:**

PROVIDE MECHAN(GEN/LOCAL EXHAUST)VENT TO MAINTN

**Protective Gloves:**

IMPERVIOUS

**Eye Protection:**

SAFETY GLASSES

**Other Protective Equipment:**

Equipment EYE WASH STATION. APRONS. SPECIAL IMPERVIOUS CLOTHING.

**Work Hygienic Practices:**

N/P

**Supplemental Safety and Health:**

SOURCE OF DATA-MIL HANDBOOK 600-1 SEP 76.SAFETY & HEALTH DATA DEVELOPED BY DGSC-STF.

## Health Hazards Data

**LD50LC50Mixture:**

N/P

**Route Of Entry Inds - Inhalation:**

N/P

**Skin:**

N/P

**Ingestion:**

N/P

**Carcinogenicity Inds - NTP:**

N/P

**IARC:**

N/P

**OSHA:**

N/P

**Health Hazards Acute And Chronic:**

N/P

**Explanation Of Carcinogenicity:**

N/P

**Signs And Symptions Of Overexposure:**

2 HAZ DEGREE DEPENDS ON TYPE/QUANT OF RADIATION. LATENT EFFECTS:SOMATIC/GENETIC DAMAGE.

**Medical Cond Aggravated By Exposure:**

N/P

**First Aid:**

USE FIRST AID. CALL MEDICAL EMERGENCY CARE. REMOVE/ISOLATE COMTAMINATED

CLOTHING.SHOWER VICTIM(S) W. SOAP & H\*2O.

DETAIN PERSONNEL/EQUIPMENT EXPOSED. ADVISE MEDICAL PERSONNEL THAT VICTIM(S) MAY BE CON TAMINATED.

**Spill Release Procedures:**

HANDLE BROKEN DEVICE WITH GLOVES AND FORCEPS.

**Neutralizing Agent:**

N/P

**Waste Disposal Methods:**

CONTROLLED DISPOSAL REQUIRED-IN ACCORDANCE WITH DOD REGULATIONS AND FEDERAL,STATE & LOCAL REGULATIONS.

**Handling And Storage Precautions:**

SHIELD ACCORDING TO EMITTED RADIATION. PROTECT FROM FILM/FILM PLATES. KEEP CONTAINERS

CLOSED. STORE IN AREA FOR

RADIOACTIVE MATERIALS.

**Other Precautions:**

N/P

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P

**Flash Point:**

**Flash Point Text:**

N/A

**Autoignition Temp:**

**Autoignition Temp Text:**

N/A

**Lower Limits:**

**Upper Limits:**

**Extinguishing Media:**

3 EXTINGUISH W. AGENT SUITABLE FOR SURROUNDING FIRE.

**Fire Fighting Procedures:**

WEAR CHEMICAL PROTECTIVE SUIT WITH SELF CONTD BRTHG APP.

**Unusual Fire/Explosion Hazard:**

SOME OF MATL MAY BURN. CONT MAY EXPLODE IN HEAT OF FIRE.

## Physical/Chemical Properties

**HCC:**

A2

**NRC/State LIC No:**

4

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

N/A

**Melt/Freeze Pt:**

**M.P/F.P Text:**

N/A

**Decomp Temp:**

**Decomp Text:**

N/A

**Vapor Pres:**

N/P

**Vapor Density:**

N/P

**Volatile Org Content %:**

**Spec Gravity:**

N/P

**VOC Pounds/Gallon:**

**PH:** N/P

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/P

**Solubility in Water:**

N/P

**Appearance and Odor:**

**Percent Volatiles by Volume:**

N/P

**Corrosion Rate:**

N/P

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/P

**Materials To Avoid:**

ISOLATE, SEGREGATE FROM MOST OTHER TYPE MATERIAL

**Hazardous Decomposition Products:**

DEPENDS ON CHEMICAL COMPOSITION; FISSION PRODUCTS

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/P

## Toxicological Information

**Information:** N/P

## MSDS Transport Information

**Information:** N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:** N/P

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WARRANTY

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# Composition/Information on Ingredient

**Cas:**

7440-50-8

**Code:**

M

**RTECS:**

GL5325000

**Code:**

M

**Name:**

COPPER (SARA 313) (CERCLA)

**Other REC Limits:**

N/K

**OSHA PEL:**

0.1MG/M3 FUME;1 DUST

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

0.2 MG/M3 FUME

**Code:**

M

**ACGIHSTEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

4 NONE NORMALLY REQUIRED UNDER GENERAL VENT. IF EXPOSURE LEVELS ARE UNKNOWN, IF LEVELS EXCEED TLV/PEL, OR IF EFFECTS OCCUR, USE NIOSH APPROVED DUST/MIST RESPIRATOR I/A/W APPLICABLE HEALTH & SAFETY REGULATIONS & MFR'S RECOMMENDATIONS.

**Ventilation:**

GENERAL VENTILATION USUALLY ADEQUATE.

**Protective Gloves:**

CLOTH OR SYNTHETIC GLOVES.

**Eye Protection:**

ANSI APPROVED CHEM WORKERS GOGGGS (FP N).

**Other Protective Equipment:**

Equipment EYE WASH FOUNTAIN & DELUGE SHOWER WHICH MEET ANSI DESIGN CRITERIA (FP N). CLEAN CLOTHING TO COVER SKIN.

**Work Hygienic Practices:**

WASH HANDS BEFORE EATING.

**Supplemental Safety and Health:**

EFTS OF OVEREXP:METAL OF CURED CMPD/COATED SURF.  
RPTD/PRLNG OVEREXP TO METAL DUST MAY CAUSE  
METAL-FUME FEVER, METALLIC TASTE & DISCOLORATION OF SKIN &  
HAIR. REFER TO PROT EQUIP SECTION FOR  
APPROP PROT MEASURES.

## Health Hazards Data

**LD50LC50Mixture:**

NONE SPECIFIED BY MANUFACTURER.

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

YES

**IARC:**

YES

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

ACUTE:EYE CONT:SLIGHTLY IRRIT BUT DOES NOT INJURE TISS. AT ELEVATED  
TEMPS MAY CAUSE IRRIT. SKIN CONT:PRLNG/RPTD CONT  
MAY CAUSE IRRIT.INHAL:AT ELEVATED TEMPS MAY CAUSE IRRIT OF RESP TRACT.  
INHAL OF DUS T AT LEVELS ABOVE RELS MAY CAUSE  
METALLIC/SWEET TASTE, IRRIT OF PHARYNX&POSS ULCERATION W/ HLTH  
HAZ:PERFORATION OF NASAL SEPTUM. INGEST:HARMFUL IF  
SWALLOWED. MOD TOX.IRRIT TO MOUTH, THROAT&STOM, W/NAU S.  
CHRONIC:RPTD & PRLNG INHAL OF GRAPHITE/CARBON DUSTS  
MAY CAUSE PULM FIBROSIS, EMPHYSEMA &

**Explanation Of Carcinogenicity:**

SILICA, CRYSTALLINE-QUARTZ:IARC MONOGRAPHS, VOL 68, 1997:GRP 1. NTP 7TH  
ANNUAL RPT ON CARCINS, 1994:ANTIC TO BE  
CARCIN.

**Signs And Symptoms Of Overexposure:**

THIS PROD CONTAINS ENCAPSULATED SILICON DIOXIDE (QUARTZ, SILICA). NO  
EXPOS TO FREE RESPIRABLE SILICA IS ANTIC DURING  
NORMAL USE OF THIS PROD. INHAL OF FREE RESPIRABLE SILICA MAY CAUSE  
SILICOSIS/OTHER SERIOUS DELAYED LUNG INJURY. SILICA  
MAY BE RELS BY GRINDING/MACHINING OF COATED MATLS. USE NIOSH APPRVD  
DUST/MIST RESP WHEN GRINDING/MACHINING  
COATING/COATED ITEMS. THIS PROD :CONTAINS ENCAPSULATED ME TAL  
POWDER WHICH CONTAINS COPPER & ZINC. NO EXPOS TO  
FREE METAL POWDER IS ANTIC DURING NORM

**Medical Cond Aggravated By Exposure:**

PREEXISTING PULMONARY & DERMATOLOGICAL DISORDERS MAY BE  
AGGRAVATED BY EXPOSURE TO HAZARDOUS COMPONENTS.

**First Aid:**

EYES:IMMED FLUSH W/PLENTY OF WATER FOR AT LST 15 MINS. GET MED ATTN, IF IRRIT PERSISTS. SKIN:WASH W/SOAP & WATER. GET MED ATTN IF IRRIT DEVELS/PERSISTS. INHAL:REMOVE TO FRESH AIR & GET MED ATTN IF COUGH/OTHER SYMPS DEVEL. INGEST:DO NOT INDUCE VOMIT. GIVE VICTIM GLASS OF WATER/MILK. CALL MD/POIS CTL CTR IMMED. NEVER GIVE ANYTHING BY MOUTH TO UNCON PERS. NOTES TO MD:NO INFORMATION.

**Spill Release Procedures:**

RECLAIM CLEAN MATERIAL. CONTAMINATED MATERIAL SHOULD BE SWEEPED OR SHOVELED INTO APPROPRIATE WASTE CONTAINER & DISPOSED OF I/A/W APPLICABLE FEDERAL, STATE & LOCAL REGULATIONS.

**Neutralizing Agent:**

NONE SPECIFIED BY MANUFACTURER.

**Waste Disposal Methods:**

REVIEW ALL CURRENT FEDERAL, STATE & LOCAL REGULATIONS REGARDING HEALTH & DISPOSAL FOR APPROPRIATE DISPOSAL PROCEDURES. INCINERATION PREFERRED.

**Handling And Storage Precautions:**

AVOID PROLONGED OR REPEATED CONTACT W/SKIN. DO NOT TAKE INTERNALLY. FOR INDUSTRIAL USE ONLY. STORE AWAY FROM HEAT. KEEP OUT OF THE REACH OF CHILDREN.

**Other Precautions:**

FOLLOW GENERAL INDUSTRIAL SAFETY PRACTICES DURING USE. DO NOT REUSE EMPTY CONTAINERS W/OUT COMMERCIAL CLEAN OR RECONDITION. FOLLOW ALL MSDS/LABEL PRECAUTIONS EVEN AFTER CONTAINER IS EMPTIED.

## Fire and Explosion Hazard Information

**Flash Point Method:**

PMCC

**Flash Point:****Flash Point Text:**

300F,149C

**Autoignition Temp:****Autoignition Temp Text:**

N/A

**Lower Limits:**

N/A

**Upper Limits:**

N/A

**Extinguishing Media:**

CO\*2, DRY CHEMICAL, FOAM, WATER FOG.

**Fire Fighting Procedures:**

USE NIOSH APPRVD SCBA & FULL PROT EQUIP(FP N). USE WATER TO COOL EXPOS CNTNRS. WATER STREAM DIRECTED INTO FIRE MAY CAUSE FROTHING W/SUBSEQUENT SPREAD OF FLAMES.

**Unusual Fire/Explosion Hazard:**

FINELY DIVIDED DUST IN AIR MAY PRESENT EXPLO HAZ. PVNT DUST BUILDUP.  
CLSD CNTNRS MAY RUPTURE/EXPLODE (DUE TO PRESS  
BUILD UP) WHEN EXPOS TO EXTREME HEAT IRRIT &/OR TOX GASES/FUMES MAY  
BE GENERATED BY THERMAL DECOMP/COMBUST.

## Physical/Chemical Properties

**HCC:**

**NRC/State LIC No:**

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

>550F, >288C

**Melt/Freeze Pt:**

**M.P/F.P Text:**

N/A

**Decomp Temp:**

**Decomp Text:**

N/K

**Vapor Pres:**

N/A

**Vapor Density:**

HVR/AIR

**Volatile Org Content %:**

**Spec Gravity:**

1.3017

**VOC Pounds/Gallon:**

**PH:** N/A

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

SLOWER THAN BUTYL ACETATE

**Solubility in Water:**

INSOLUBLE

**Appearance and Odor:**

HIGH VISCOSITY, COPPER COLORED PASTE; SLIGHT PETROLEUM ODOR.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

PROLONGED EXPOSURE TO HEAT.

**Materials To Avoid:**

STRONG LEWIS/MINERAL ACIDS. STRONG BASES/OXIDANTS. NITRATES,  
NITRITES, CHLORINATED HYDROCARBONS, CHLORIDES,

PALLADIUM, SELENIUM, MANGANESE, MAGNESIUM + POTASSIUM CHLORATE, 5  
SODIUM CARBONATE, SULFATES, DIBORANE.

**Hazardous Decomposition Products:**

OXIDES OF CARBON. VARIOUS HYDROCARBONS.

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

NOT RELEVANT

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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### WARRANTY

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only as a guide. The information in this document is based on the present state of our knowledge and is

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# Material Safety Data Sheet

## Vanadium, Powder, -325 Mesh, 99.5%

ACC# 99091

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Vanadium, Powder, -325 Mesh, 99.5%**Catalog Numbers:** AC318010000, AC318010100**Synonyms:** None.**Company Identification:**

Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410

**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7440-62-2	Vanadium	99.5	231-171-1

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: light gray-white lustrous powder.

**Warning!** Causes eye, skin, and respiratory tract irritation. The toxicological properties of this material have not been fully investigated.

**Target Organs:** Respiratory system, eyes, skin.

#### Potential Health Effects

**Eye:** Causes severe eye irritation.

**Skin:** Causes skin irritation.

**Ingestion:** May cause gastrointestinal irritation with nausea, vomiting and diarrhea. The toxicological properties of this substance have not been fully investigated.

**Inhalation:** The toxicological properties of this substance have not been fully investigated. Causes severe respiratory tract irritation.

**Chronic:** No information found.

### Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

**Ingestion:** Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-

4 cupfuls of milk or water.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively. Green coloration of the tongue, resulting from the deposition of vanadium salts is an indicator of exposure; however, may be absent even in prolonged exposure..

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Flammable in dust form from heat, flame or sparks.

**Extinguishing Media:** Use agent most appropriate to extinguish fire. Use water spray, dry chemical, carbon dioxide, or appropriate foam.

**Flash Point:** Not available.

**Autoignition Temperature:** Not available.

**Explosion Limits, Lower:** Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 2; Flammability: 1; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Use with adequate ventilation. Wash clothing before reuse.

**Storage:** Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Vanadium	none listed	1 mg/m <sup>3</sup> TWA (dust, listed under Ferrovandium dust)	0.5 mg/m <sup>3</sup> Ceiling (respirable dust, as V <sub>2</sub> O <sub>5</sub> ); 0.1 mg/m <sup>3</sup> Ceiling (fume, as V <sub>2</sub> O <sub>5</sub> )

**OSHA Vacated PELs:** Vanadium: 0.05 mg/m<sup>3</sup> TWA (respirable dust, as V<sub>2</sub>O<sub>5</sub>); 0.05 mg/m<sup>3</sup> TWA (fume, as V<sub>2</sub>O<sub>5</sub>)

**Personal Protective Equipment**

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Lusturous powder

**Appearance:** light gray-white

**Odor:** Not available.

**pH:** Not available.

**Vapor Pressure:** Not available.

**Vapor Density:** Not available.

**Evaporation Rate:**Not available.

**Viscosity:** Not available.

**Boiling Point:** 3380 deg C

**Freezing/Melting Point:**1917 deg C

**Decomposition Temperature:**Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:**6.11 @ 18.7C

**Molecular Formula:**V

**Molecular Weight:**50.94

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable at room temperature in closed containers under normal storage and handling conditions. Oxidizes readily above 600°C.

**Conditions to Avoid:** Incompatible materials, dust generation, excess heat.

**Incompatibilities with Other Materials:** Violent reaction with BrF<sub>3</sub>, Cl<sub>2</sub>, lithium, nitryl fluoride, oxidants..

**Hazardous Decomposition Products:** Excess heat, vanadium oxide (VO<sub>x</sub>) gases.

**Hazardous Polymerization:** Has not been reported

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 7440-62-2: YW1355000

**LD50/LC50:**

Not available.

**Carcinogenicity:**

**CAS#** 7440-62-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information found

**Teratogenicity:** Teratogenic effects have occurred in experimental animals.

**Reproductive Effects:** No information found

**Mutagenicity:** No information found

**Neurotoxicity:** No information found

**Other Studies:**

## Section 12 - Ecological Information

No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	Not regulated as a hazardous material	No information available.
<b>Hazard Class:</b>		
<b>UN Number:</b>		
<b>Packing Group:</b>		

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 7440-62-2 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### Section 313

This material contains Vanadium (CAS# 7440-62-2, 99.5%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 7440-62-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XI

**Risk Phrases:**

R 36/37/38 Irritating to eyes, respiratory system and skin.

**Safety Phrases:**

S 24/25 Avoid contact with skin and eyes.

S 37 Wear suitable gloves.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 28A After contact with skin, wash immediately with plenty of water

**WGK (Water Danger/Protection)**

CAS# 7440-62-2: No information available.

**Canada - DSL/NDSL**

CAS# 7440-62-2 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 7440-62-2 is listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
--

**MSDS Creation Date:** 5/05/1999

**Revision #5 Date:** 11/20/2008

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# Composition/Information on Ingredient

**Cas:**

7440-66-6

**Code:**

T

**RTECS:**

ZG8600000

**Code:**

T

**Name:**

ZINC % low Wt: 11. Code: M % high Wt: 16. Code:

**Other REC Limits:**

N/P

**OSHA PEL:**

N/P

**Code:**

**OSHA STEL:**

N/P

**Code:**

**ACGIH TLV:**

N/P

**Code:**

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

AS IN ANY FIRE SITUATION, USE SELF-CONTAINED BREATHING APPARATUS (SCBA).

**Ventilation:**

N/A.

**Protective Gloves:**

3 WHEN HANDLING LEAKING BATTERIES.

**Eye Protection:**

N/A.

**Other Protective Equipment:**

Equipment N/A.

**Work Hygienic Practices:**

NONE SPECIFIED BY MANUFACTURER.

**Supplemental Safety and Health:**

NONE SPECIFIED BY MANUFACTURER.

## Health Hazards Data

**LD50LC50Mixture:**

NONE SPECIFIED BY MANUFACTURER.

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

THESE CHEMICALS ARE CONTAINED IN A SEALED CAN. RISK OF EXPOSURE OCCURS ONLY IF THE BATTERY IS MECHANICALLY OR ELECTRICALLY ABUSED. MOST LIKELY, RISK IS WHEN A CELL LEAKS. KOH (POTASSIUM HYDROXIDE) IS CAUSTIC AND SKIN CONTACT CAN CAUSE IRRITATION OR BURNS. EYE CONTACT W/KOH MAY CAUSE PERMANENT INJURY.

**Explanation Of Carcinogenicity:**

NONE SPECIFIED BY MANUFACTURER.

**Signs And Symptoms Of Overexposure:**

SKIN-IRRITATION, BURNS. EYES-PERMANENT INJURY.

**Medical Cond Aggravated By Exposure:**

2 AN ACUTE EXPOSURE WILL NOT GENERALLY AGGRAVATE ANY MEDICAL CONDITION.

**First Aid:**

IF LEAKAGE FROM CELLS CONTACTS: SKIN-FLUSH WITH WATER AND WASH WITH SOAP AND WATER. EYES-FLUSH WITH COPIOUS AMOUNTS OF WATER FOR 15 MINUTES THEN SEE PHYSICIAN AT ONCE.

**Spill Release Procedures:**

AVOID SKIN AND EYE CONTACT. DO NOT INHALE VAPORS. COLLECT ALL RELEASED MATERIAL IN PLASTIC BAG FOR WASTE DISPOSAL.

**Neutralizing Agent:**

NONE SPECIFIED BY MANUFACTURER. DLA-HMIS STAFF: 5% ACETIC ACID SOLUTION.

**Waste Disposal Methods:**

IN SMALL QUANTITIES, BATTERIES MAY BE DISPOSED OF WITH HOUSEHOLD TRASH. DO NOT INCINERATE! DISPOSE OF LARGE QUANTITIES IN ACCORDANCE WITH LOCAL REGULATIONS.

**Handling And Storage Precautions:**

STORE IN A DRY PLACE. DO NOT RECHARGE. DO NOT SHORT CIRCUIT.

**Other Precautions:**

USE BATTERY ONLY IN PROPER EQUIPMENT. OBSERVE CORRECT POLARITY WHEN INSTALLING INTO EQUIPMENT. DO NOT ATTEMPT TO RECHARGE.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/A

**Flash Point:**

**Flash Point Text:**

NA

**Autoignition Temp:**

**Autoignition Temp Text:**

NA

**Lower Limits:**

N/A

**Upper Limits:**

N/A

**Extinguishing Media:**

N/A

**Fire Fighting Procedures:**

FIRE FIGHTERS SHOULD USE SELF-CONTAINED BREATHING APPARATUS WHEN A LARGE NUMBER OF CELLS ARE INVOLVED.

**Unusual Fire/Explosion Hazard:**

CELLS MAY RUPTURE WHEN HEATED EXCESSIVELY.

## Physical/Chemical Properties

**HCC:**

Z7

**NRC/State LIC No:**

N/P

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

KOH (1320) MNO2 N/A ZN

**Melt/Freeze Pt:**

**M.P/F.P Text:**

KOH (360) MNO2 (535) ZN

**Decomp Temp:**

**Decomp Text:**

N/P

**Vapor Pres:**

KOH MNO2 (NA) ZN (1)@487C

**Vapor Density:**

NA

**Volatile Org Content %:**

**Spec Gravity:**

KOH (2.0) MNO2 (5.0) ZN

**VOC Pounds/Gallon:**

PH: N/P

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

KOH MNO2, ZN (NA)

**Solubility in Water:**

KOH (50%), MNO2 (0%), ZN

**Appearance and Odor:**

KOH (CLEAR LIQUID), MNO2 (BLACK POWDER), ZN (GREY POWDER).

**Percent Volatiles by Volume:**

N/P

**Corrosion Rate:**

N/P

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

DO NOT HEAT, DISASSEMBLE, OR RECHARGE. DO NOT SHORT CIRCUIT.

**Materials To Avoid:**

N/A.

**Hazardous Decomposition Products:**

WHEN HEATED, CELLS MAY EMIT HAZARDOUS VAPORS OF CAUSTIC KOH.

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/A.

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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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. Lookchem 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.



From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

24 Hour Emergency Telephone: 908-859-2151  
CHEMTREC: 1-800-424-9300  
National Response in Canada  
CANUTEC: 613-996-6666  
Outside U.S. And Canada  
Chemtree: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

## CALCIUM METAL

### 1. Product Identification

**Synonyms:** Calcium metal crystalline  
**CAS No.:** 7440-70-2  
**Molecular Weight:** 40.08  
**Chemical Formula:** Ca  
**Product Codes:** 1262

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Calcium	7440-70-2	90 - 100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**DANGER! FLAMMABLE SOLID. WATER REACTIVE. CORROSIVE. HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. CONTACT MAY CAUSE BURNS TO ALL BODY TISSUE.**

SAF-T-DATA<sup>(tm)</sup> Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate

Flammability Rating: 3 - Severe (Flammable)

Reactivity Rating: 3 - Severe (Water Reactive)

Contact Rating: 3 - Severe (Corrosive)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS D EXTINGUISHER

Storage Color Code: Red Stripe (Store Separately)

#### Potential Health Effects

##### Inhalation:

Inhalation produces damaging effects on the mucous membranes and upper respiratory tract. Symptoms may include irritation of the nose and throat, and labored breathing. May cause lung edema, a medical emergency.

##### Ingestion:

Irritant due to formation of caustic lime by reaction with moisture. Large amounts may have a corrosive effect. Abdominal pain or stricture, possible nausea, vomiting, diarrhea are symptoms.

##### Skin Contact:

Corrosive. Symptoms of redness, pain, and severe burn can occur.

##### Eye Contact:

Corrosive. Causes redness, pain; possible burns and damage to eye tissues.

##### Chronic Exposure:

Prolonged inhalation of dust or fume may cause severe mucous membrane irritation, chemical pneumonitis.

##### Aggravation of Pre-existing Conditions:

No information found.

## 4. First Aid Measures

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Keep patient quiet in half upright position. Get medical attention immediately.

**Ingestion:**

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

**Skin Contact:**

Wipe off excess material from skin then immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flammable solid, water reactive. Can react vigorously with water, steam, acids to release flammable/explosive hydrogen. Dangerous in presence of oxidants. Liquid calcium can react violently.

**Explosion:**

Possible explosion hazard from generated hydrogen or intimate contact with strong oxidizers. Contact with alkali hydroxides or carbonates may cause detonation.

**Fire Extinguishing Media:**

Use dry soda ash, dry salt, sand, graphite powder or metal-fire-extinguishing dry powder such as Met-L-X®. Do not use water, foam, carbon dioxide, dry chemical, or chlorinated fire extinguishers.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Water spray may be used to keep fire exposed containers cool. Do not allow contact of calcium with water. Finely divided calcium exposed to moist air may ignite spontaneously.

---

## 6. Accidental Release Measures

Collect spilled material quickly and transfer to a container of kerosene, light oil or similar hydrocarbon fluid for recovery. Minimize exposure to air. Do not use water on metal.

If the spilled calcium has come into contact with water, proceed cautiously. The reaction can rapidly proceed to self-ignition of hydrogen and spattering of molten calcium. Evacuate the area, put on protective equipment and proceed as with a metal fire.

Waste calcium should be packaged under a hydrocarbon fluid and sent to an approved disposal facility.

---

## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Keep away from water or locations where water may be needed for fire. Avoid high temperatures. Store under nitrogen or kerosene. Never store under halogenated hydrocarbons. A detached fire-resistive building is recommended for quantity storage. Isolate from air, acids, and oxidizing materials. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

None established.

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

For conditions of use where exposure to the dust or mist is apparent, a full-face respirator with particulate cartridges (NIOSH type N95 or better) should be worn. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

## 9. Physical and Chemical Properties

**Appearance:**

Silver-gray granules or lumps.

**Odor:**

Odorless.

**Solubility:**

Reacts with water with evolution of hydrogen.

**Density:**

1.54

**pH:**

Water solution alkaline (pH &gt; 7).

**% Volatiles by volume @ 21C (70F):**

0

**Boiling Point:**

1440C (2624F)

**Melting Point:**

850C (1562F)

**Vapor Density (Air=1):**

1.4

**Vapor Pressure (mm Hg):**

10 @ 983C (1801F)

**Evaporation Rate (BuAc=1):**

Not applicable.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage. Water reactive.

**Hazardous Decomposition Products:**

Hydrogen, caustic calcium oxide and calcium hydroxide.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Air, asbestos cement, halogens, lead dichloride phosphorus pentoxide, silicon, sodium, mixed oxides, sulfur, water, acids, alcohols. Contact with alkali hydroxides or carbonates may cause detonation.

**Conditions to Avoid:**

Air, heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Calcium (7440-70-2)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

No information found.

**Environmental Toxicity:**

No information found.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

**Domestic (Land, D.O.T.)****Proper Shipping Name:** CALCIUM**Hazard Class:** 4.3**UN/NA:** UN1401**Packing Group:** II

Information reported for product/size: 500G

**International (Water, I.M.O.)**

-----  
**Proper Shipping Name:** CALCIUM, METAL

**Hazard Class:** 4.3

**UN/NA:** UN1401

**Packing Group:** II

Information reported for product/size: 500G

**International (Air, I.C.A.O.)**

-----  
**Proper Shipping Name:** CALCIUM, METAL

**Hazard Class:** 4.3

**UN/NA:** UN1401

**Packing Group:** II

Information reported for product/size: 500G

## 15. Regulatory Information

```
-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  EC   Japan  Australia
-----
Calcium (7440-70-2)                            Yes  Yes  No     Yes
```

```
-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     --Canada--
                                     Korea  DSL   NDSL  Phil.
-----
Calcium (7440-70-2)                            Yes   Yes  No     Yes
```

```
-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-   -SARA 313-----
                                     RQ   TPQ       List  Chemical Catg.
-----
Calcium (7440-70-2)                            No    No    No     No
```

```
-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     -RCRA-      -TSCA-
                                     261.33     8(d)
-----
Calcium (7440-70-2)                            No         No     No
```

Chemical Weapons Convention: No    TSCA 12(b): No    CDTA: No  
 SARA 311/312: Acute: Yes    Chronic: Yes    Fire: Yes    Pressure: No  
 Reactivity: Yes    (Pure / Solid)

**Australian Hazchem Code:** 4W

**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 3 Flammability: 1 Reactivity: 2 Other: **Water reactive**

**Label Hazard Warning:**

DANGER! FLAMMABLE SOLID. WATER REACTIVE. CORROSIVE. HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. CONTACT MAY CAUSE BURNS TO ALL BODY TISSUE.

**Label Precautions:**

Do not get in eyes, on skin, or on clothing.

Do not breathe dust.

Use only with adequate ventilation.

Store in a tightly closed container.

Wash thoroughly after handling.

Remove and wash contaminated clothing promptly.

Do not allow contact with water, acids, or moisture.

Keep away from heat, sparks and flame.

**Label First Aid:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, wipe off excess material from skin then immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In all cases get medical attention immediately.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

MSDS Section(s) changed since last revision of document include: 3.

**Disclaimer:**

\*\*\*\*\*

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

**SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION**

Company: AccuStandard, Inc.  
 125 Market Street  
 New Haven, CT 06513

Date MSDS Printed: 5/23/2008  
 Preparation Date: 5/23/2008  
 Information Phone Number: 203-786-5290  
 Emergency Phone Number: 203-786-5290  
 Hours: Mon. to Fri. 8am-5pm

Catalog Number: **APP-9-032**  
 Product Name: Bromomethane  
 Synonyms: N/A  
 Formula: N/A

Molecular Weight: N/A

**SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS**

Component(s)	( 2 )	CAS #	Appr. %	ACGIH-TLV (mg/m3)		OSHA-PEL (mg/m3)	
				TWA	STEL skin	TWA	STEL skin
Bromomethane		74-83-9	0.01	39		x	x
Methanol		67-56-1	99.99	262	328	x	260

**SECTION 3 - HAZARDS IDENTIFICATION****Health and Environmental Hazards/Symptoms of Exposure:**

Over exposure may cause dizziness, nausea, muscle weakness, narcosis and respiratory failure.

After ingestion or inhalation, initial symptoms may be only that of mild intoxication, but may become severe after 12 or 18 hours.

May cause eye, kidney, liver, and skin damage.

May cause central nervous system damage.

POISON: May be fatal or cause blindness if swallowed.

Fetal development abnormalities and effects on embryo or fetus have been reported from prolonged exposure to methanol in laboratory tests involving pregnant rats.

**Potential Health Effects:**

Irritating to eyes.

Irritating to skin.

Toxic if absorbed through skin.

Irritating to mucous membrane and upper respiratory system.

Toxic if inhaled.

Toxic if swallowed.

**Routes of Entry:**

Inhalation, ingestion or skin contact.

**Carcinogenicity:**

This product is or contains a component that is not listed (ACGIH, IARC, NTP, OSHA) as a cancer causing agent.

**SECTION 4 - FIRST AID MEASURES****Emergency First Aid:**

Get medical assistance for all cases of overexposure.

Skin contact: Immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

Eye contact: Immediately flush with plenty of water. After initial flushing, remove and contact lenses and continue flushing for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention.

Ingestion: Do NOT induce vomiting. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

**SECTION 5 - FIRE FIGHTING MEASURES****Flammable Properties:**

Flash Point: 52 °F (11 °C) (tcc)

Flammable Limits LEL (%): 6.7

Flammable Limits UEL (%): 36.5

Autoignition Temperature: 385 °C

Dangerous fire and explosive hazard.

HMIS® III

\* 3 3 0

NFPA

1 3 0

Containers can build up pressure if exposed to heat.

Vapors can travel to a source of ignition and flash back.

During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

**Extinguishing Media:**

Use alcohol foam, carbon dioxide, dry chemical, or water spray when fighting fires involving this material.

**Fire Fighting Procedures:**

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

**SECTION 6 - ACCIDENTAL RELEASE MEASURES****Spill Response:**

Wear suitable protective equipment listed under Exposure Controls / Personal Protection. Eliminate any ignition sources until the area is determined to be free from explosion or fire hazards. Contain the release and eliminate its source, if this can be done without risk. Dispose as hazardous waste. Comply with Federal, State and local regulations.

**SECTION 7 - HANDLING AND STORAGE**

Store in a tightly closed container.  
Keep refrigerated.  
Avoid breathing vapors or mists.  
Use with adequate ventilation.  
Do not get in eyes, on skin or clothing.  
Avoid prolonged or repeated exposure.  
This product should only be used by persons trained in the safe handling of hazardous chemicals.

## **SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION**

---

### **Engineering Controls and Personal Protection Equipment (PPE):**

Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your safety equipment supplier). Engineering and/or administrative controls should be implemented to reduce exposure.

Material should be handled or transferred in an approved fume hood or with adequate ventilation.

Protective gloves must be worn to prevent skin contact.

(Chloroprene, natural rubber, nitrile, or equivalent)

Safety glasses with side shields must be worn at all times.

### **General Hygiene Considerations:**

Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available.

## **SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**

---

Appearance: Clear liquid  
Odor: N/A  
pH: N/A  
Vapor Pressure: 97 mmHg (20 °C)  
Vapor Density (Air = 1): 1.1 g/L  
Boiling Point: 65 °C  
Melting Point: -93.9 °C  
Solubility in Water (%): Very soluble  
Specific Gravity (H<sub>2</sub>O = 1): 0.791 g/cm<sup>3</sup>  
Flash Point: 52 °F (11 °C) (tcc)  
Explosion Limits (%): 6.7 to 36.5  
Autoignition Temperature: 385 °C  
Percent Volatile: 99.9+  
Evaporation Rate (BuAc = 1): 5.9

Molecular Weight: N/A

Molecular Formula: N/A

---

**SECTION 10 - STABILITY AND REACTIVITY**

Stability: Stable

Conditions To Avoid: Heat; Contact with ignition sources

Materials To Avoid: Acids  
Oxidizers

Alkali metals; Reducing agents

Hazardous Decomposition: Oxides of carbon; Formaldehyde

Hazardous Polymerization: Will not occur

---

**SECTION 11 - TOXICOLOGICAL INFORMATION**

See section 3 for specific toxicological information for the ingredients of this product.

---

**SECTION 12 - ECOLOGICAL INFORMATION**

By complying with sections 6 and 7 there will be no release to the environment.

---

**SECTION 13 - DISPOSAL CONSIDERATIONS**

Recycle or incinerate at any EPA approved facility or dispose in compliance with Federal, State and local regulations. Empty containers must be triple-rinsed prior to disposal.

---

**SECTION 14 - TRANSPORT INFORMATION**

**DOT** UN Number: UN1230 Shipping Class: 3 Packing Group: II FLAMMABLE

---

**SECTION 15 - REGULATORY INFORMATION**

In addition to Federal and state regulations, local regulations may apply. Check with your local regulatory authorities.

All components are listed on the TSCA Inventory. For laboratory, reasearch and development use only. Not for manufacturing or commercial purposes.

WARNING: This product contains chemicals known to the state of California to cause birth defects or other reproductive harm.

---

**SECTION 16 - OTHER INFORMATION**

This document has been designed to meet the requirements of OSHA, ANSI and CHIPs regulations.

The statements contained herein are offered for informational purposes only and are based on technical data that we believe to be accurate. It is intended for use only by persons having the necessary technical skill and at their own discretion and risk. Since conditions and manner of use are outside our control, we make  
NO WARRANTY, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE.

Legend : N/A = Not Available ND = Not Determined NR = Not Regulated

\*\*\* End of Document \*\*\*



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Customer P.O. No. 4500153939

## Material Safety Data Sheet

Date Printed: 05/14/2008

Date Updated: 01/01/2006

### Section 1 - Product and Company Information

**Catalog Number:** 48622 (Reorder Product by this No.)  
**Product Name:** CHLOROMETHANE  
**Street Address:** 595 North Harrison Road  
**City, State, Zip, Country:** Bellefonte, PA 16823-0048 USA  
**Fax (MSDS Dept.):** 814-359-5930  
**Emergency Phone:** 800-521-8956 EXT 2143  
**CHEMTREC:** 800-424-9300

### Section 2 - Composition/Information on Ingredient(s)

**Substance Name:** CHLOROMETHANE  
**CAS#:** N/A  
**SARA 313:** No  
**Ingredients:**

Ingredient Name	CAS #	% OR Conc.	OSHA PEL	ACGIH TLV	SARA	LD50	Codes
CHLOROMETHANE	74-87-3	0.02	50 ppm	50 ppm	Yes	1800 mg/kg	OR
METHANOL	67-56-1	99.98	N/A	N/A	Yes	5628 mg/kg	OR

**CODES:** OR (Oral Rat), OM (Oral Mouse), OB (Oral Rabbit),  
IR (Intraperitoneal Rat), IM (Intraperitoneal Mouse), IB (Intraperitoneal Rabbit)  
VR (Intravenous Rat), VM (Intravenous Mouse), VB (Intravenous Rabbit),  
SR (Subcutaneous Rat), SM (Subcutaneous Mouse), SB (Subcutaneous Rabbit)

**Formula:** MIXTURE

**Chemical Name:**

**Synonym(s):**

ANALYTICAL STANDARD IN METHANOL

**RTECS Number:** N/A

**MSDS Dictionary:**

CAS=Chemical Abstract Service; %=Percentage of Composition; TLV=Threshold  
Limit Value; SARA=Superfund Amendments and Reauthorization Act of 1986;  
TSCA=Toxic Substances Control Act; N/A=Not Available.

### Section 3 - Hazards Identification

#### Emergency Overview:

Stable.

Harmful if inhaled.

May be fatal if swallowed.

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

See Section 11 for toxicological data.

---

## Section 4 - First Aid Measures

---

### Oral Exposure:

Immediately contact a physician.  
Never give anything by mouth to an unconscious person.  
Never try to make an unconscious person vomit.  
Give 2 tablespoons of baking soda in a glass of water.  
Press fingers to back of tongue to induce vomiting.

### Inhalation Exposure:

Immediately move to fresh air.  
Contact a physician.  
If breathing stops, give artificial respiration.

### Dermal Exposure:

Flush skin with large volumes of water.

### Eye Exposure:

Contact a physician.  
Flush eyes with water for 15 minutes.

### Additional Information:

---

## Section 5 - Fire Fighting Measures

---

### Flammable Hazards:

### Explosion Hazards:

### Thermal Decomposition Components:

N/A

### Extinguishing Media:

#### Suitable:

CO2.  
Dry chemical.  
Alcohol foam.

### Firefighting

#### Protective Equipment:

Wear self-contained breathing apparatus when fighting a chemical fire.

#### Specific Hazard(s):

Flash Point (F):	Value: 50° F	Method:
Autoignition Temperature:		
Explosion Limits:	Lower: 6.0%	Upper: 36.5%

### Additional Information:

---

## Section 6 - Accidental Release Measures

---

### Procedure to be followed in case of Leak or Spill:

Ventilate area.  
Take up with absorbent material.  
Eliminate all ignition sources.

### Procedure(s) of Personal Precaution(s):

Avoid eye or skin contact.  
Avoid breathing vapors.  
Wear protective glasses.  
Wear rubber gloves.  
Wear face mask with organic vapor canister.

### Methods for Cleaning Up:

### Additional Information:

---

## Section 7 - Handling and Storage

---

### Handling

#### User Exposure:

Avoid eye or skin contact.  
Avoid breathing vapors.

### Storage

#### Suitable:

Refrigerate in sealed container.

---

## Section 7 - Handling and Storage

---

Keep away from oxidizers.

Keep away from ignition sources.

Additional Information:

---

## Section 8 - Exposure Controls/PPE

---

### Engineering Controls:

Use only in well-ventilated area.

### Personal Protective Equipment

#### Respiratory:

Wear face mask with organic vapor canister.

#### Hand:

Wear rubber gloves.

#### Eye:

Wear protective glasses.

#### Additional Equipment:

### General Hygiene Measures:

Avoid eye or skin contact.

Avoid breathing vapors.

Additional Information:

---

## Section 9 - Physical and Chemical Properties

---

### Appearance:

Clear colorless liquid

### Odor:

Molecular Weight:

N/A

pH:

Value:

Method:

Boiling Point Range:

65° C

N/A

Melting Point Range:

-98° C

Vapor Pressure:

100 mmHg

Vapor Density:

1.10

(Air=1)

Volatile %:

100

Specific Gravity/Density:

.790 g/cm<sup>3</sup> or g/ml (Water=1)

Evaporation Rate:

>1

(Ether=1)

Flash Point (F):

Value:

Method:

50° F

Explosion Limits:

6.0%

Upper:

36.5%

Solubility in Water:

100

Refractive Index:

Autoignition Temperature:

Additional Information:

N/A = Not Available

---

## Section 10 - Stability and Reactivity

---

### Stability:

Stable:

Stable.

### Materials to Avoid:

Oxidizing agents.

Chromic anhydride, lead perchlorate, perchloric acids.

### Conditions to Avoid:

N/A

### Hazardous Decomposition Products:

N/A

### Hazardous Polymerization:

Will not occur.

Additional Information:

---

---

## Section 11 - Toxicological Information

---

### Route of Exposure

Skin Contact:

Skin Absorption:

Eye Contact:

Inhalation:

Harmful if inhaled.

Ingestion:

May be fatal if swallowed.

### Critical Effects:

Blindness.

### Additional Possible Effects:

### Target Organ(s) or System(s):

Gastrointestinal disturbances.

### Signs and Symptoms of Exposure:

Headache.

Nausea.

### Conditions Aggravated by Exposure:

### Additional Information:

Toxicity Data (LD50): 5628 mg/kg Oral Rat

---

## Section 12 - Ecological Information

---

### Ecotoxicity:

No Data Available.

---

## Section 13 - Disposal Information

---

### Appropriate Method of Disposal of Substance or Preparation:

Comply with all applicable federal, state, or local regulations.

Contact a licensed professional waste disposal service to dispose of this material.

---

## Section 14 - Transport Information

---

### DOT

Proper Shipping Name: Methanol  
UN#: 1230  
Class: 3.0  
Packing Group: II  
Hazard Label: Excepted Qty  
PIH: N/A

### IATA

Proper Shipping Name: METHANOL (Methyl Alcohol)  
IATA UN Number: 1230  
Hazard Class: 3.0 6.1  
Packing Group: II  
Hazard Label: Excepted Qty  
PIH: N/A

---

## Section 15 - Regulatory Information

---

### EU Directives Classification

Symbol of Danger: F T

Indication of Danger:

Highly flammable

Toxic

Risk Statements: R: 11 23 25

Highly flammable.

---

## Section 15 - Regulatory Information

---

Toxic by inhalation and if swallowed.

**Safety Statements:** S: 16 24

Keep away from sources of ignition - No smoking.

Avoid contact with skin.

### US Classification and Label Text

**Indication of Danger:**

**Risk Statements:**

**Safety Statements:**

**US Statements:**

### United States Regulatory Information

**SARA Listed:** No

**Deminimis:**

**Notes:**

**TSCA Inventory Item:** Yes

### United States - State Regulatory Information

**California Prop-65:**

### Canada Regulatory Information

**WHMIS Classification:**

Class B - Division 2 - Flammable liquids (CPR 35).

Class D - Division 1 - Poisonous and infectious materials.

**DSL:**

**NDSL:**

**Additional Information:**

---

## 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. Supelco, shall not be held liable for any damage resulting from handling or from contact with the above product. Copyright 2008 Supelco. License granted to make unlimited paper copies for internal use only.



Health	2
Fire	0
Reactivity	0
Personal Protection	H

## Material Safety Data Sheet

### Methylene bromide MSDS

#### Section 1: Chemical Product and Company Identification

**Product Name:** Methylene bromide

**Catalog Codes:** SLM3166

**CAS#:** 74-95-3

**RTECS:** PA7350000

**TSCA:** TSCA 8(b) inventory: Methylene bromide

**CI#:** Not applicable.

**Synonym:** Dibromomethane

**Chemical Name:** Methylene bromide

**Chemical Formula:** CH<sub>2</sub>Br<sub>2</sub>

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**  
1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

#### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Methylene bromide	74-95-3	100

**Toxicological Data on Ingredients:** Methylene bromide: ORAL (LD50): Acute: 108 mg/kg [Rat]. 1000 mg/kg [Rabbit]. DERMAL (LD50): Acute: >4000 mg/kg [Rabbit]. VAPOR (LC50): Acute: 3977.9 ppm 4 hour(s) [Rat].

#### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Hazardous in case of eye contact (irritant). Slightly hazardous in case of skin contact (irritant). Severe over-exposure can result in death.

**Potential Chronic Health Effects:**

**CARCINOGENIC EFFECTS:** Not available. **MUTAGENIC EFFECTS:** Mutagenic for mammals. Mutagenic for bacteria and/or yeast. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to blood, lungs, the nervous system, digestive system, gastrointestinal tract. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

#### Section 4: First Aid Measures

**Eye Contact:** Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

**Skin Contact:**

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention.

**Serious Skin Contact:** Not available.

**Inhalation:** Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

**Ingestion:**

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** Non-flammable.

**Auto-Ignition Temperature:** Not applicable.

**Flash Points:** Not applicable.

**Flammable Limits:** Not applicable.

**Products of Combustion:** Not available.

**Fire Hazards in Presence of Various Substances:** Not applicable.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:** Not applicable.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

## Section 6: Accidental Release Measures

**Small Spill:** Absorb with an inert material and put the spilled material in an appropriate waste disposal.

**Large Spill:** Absorb with an inert material and put the spilled material in an appropriate waste disposal.

## Section 7: Handling and Storage

**Precautions:**

Keep locked up Do not ingest. Do not breathe gas/fumes/ vapour/spray. Avoid contact with eyes Wear suitable protective clothing If ingested, seek medical advice immediately and show the container or the label.

**Storage:**

Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

### Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:** Not available.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid.

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 173.85 g/mole

**Color:** Colorless.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 96.95°C (206.5°F)

**Melting Point:** -52.5°C (-62.5°F)

**Critical Temperature:** 310°C (590°F)

**Specific Gravity:** 2.497 (Water = 1)

**Vapor Pressure:** 40 mm of Hg (@ 20°C)

**Vapor Density:** 6.05 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water, methanol, diethyl ether, acetone.

### Solubility:

Partially soluble in methanol, diethyl ether, acetone. Insoluble in cold water, hot water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Slightly reactive to reactive with metals.

**Corrosivity:** Not available.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Not available.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Eye contact. Ingestion.

**Toxicity to Animals:**

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 108 mg/kg [Rat]. Acute dermal toxicity (LD50): >4000 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 3977.9 ppm 4 hour(s) [Rat].

**Chronic Effects on Humans:**

MUTAGENIC EFFECTS: Mutagenic for mammals. Mutagenic for bacteria and/or yeast. The substance is toxic to blood, lungs, the nervous system, digestive system, gastrointestinal tract.

**Other Toxic Effects on Humans:** Slightly hazardous in case of skin contact (irritant).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:** Not available.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are as toxic as the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

## Section 14: Transport Information

**DOT Classification:** CLASS 6.1: Poisonous material.

**Identification:** : Dibromomethane : UN2664 PG: III

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**

Pennsylvania RTK: Methylene bromide Massachusetts RTK: Methylene bromide New Jersey: Methylene bromide TSCA 8(b) inventory: Methylene bromide TSCA 8(a) IUR: Methylene bromide TSCA 12(b) annual export notification: Methylene bromide SARA 313 toxic chemical notification and release reporting: Methylene bromide CERCLA: Hazardous substances.: Methylene bromide: 1000 lbs. (453.6 kg)

**Other Regulations:** OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

**Other Classifications:****WHMIS (Canada):**

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**

R36- Irritating to eyes. R48/25- Toxic: danger of serious damage to health in case of prolonged exposure if swallowed.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 0

**Reactivity:** 0

**Personal Protection:** h

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 0

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

**Section 16: Other Information**

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 10:43 AM

**Last Updated:** 11/01/2010 12:00 PM

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# Material Safety Data Sheet

## Bromochloromethane

ACC# 49355

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Bromochloromethane**Catalog Numbers:** AC159130000, AC159130010, AC159130050, AC159132500**Synonyms:** Chlorobromomethane; Methylene chlorobromide; Mono-chloro-mono-bromo-methane; Methane, bromochloro-; Chloromethyl bromide**Company Identification:**Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
74-97-5	Bromochloromethane	98	200-826-3

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless clear liquid.

**Warning!** Causes eye and skin irritation. Causes digestive and respiratory tract irritation. May cause central nervous system depression. May cause liver and kidney damage. Light sensitive.**Target Organs:** Kidneys, central nervous system, liver, respiratory system, eyes, skin.**Potential Health Effects****Eye:** Causes eye irritation. May cause eye injury.**Skin:** Causes skin irritation. May cause dermatitis.**Ingestion:** Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause liver and kidney damage. May cause central nervous system depression.**Inhalation:** Causes respiratory tract irritation. May cause chemical bronchitis with coughing and difficulty in breathing. Vapors may cause dizziness or suffocation.**Chronic:** May cause liver and kidney damage. Prolonged exposure may produce a narcotic effect. Laboratory experiments have resulted in mutagenic effects.

### Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.**Skin:** Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while

removing contaminated clothing and shoes. Wash clothing before reuse.

**Ingestion:** If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. Material will not burn. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Water may be ineffective. Material is lighter than water and a fire may be spread by the use of water. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.

**Extinguishing Media:** Substance is noncombustible; use agent most appropriate to extinguish surrounding fire. For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray.

**Flash Point:** 400 deg C ( 752.00 deg F)

**Autoignition Temperature:** Not available.

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 1; Flammability: 1; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Use with adequate ventilation. Store protected from light. Not compatible with some forms of plastics and coatings.

**Storage:** Do not store in direct sunlight. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Store protected from light.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

### **Exposure Limits**

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Bromochloromethane	200 ppm TWA	200 ppm TWA; 1050 mg/m <sup>3</sup> TWA 2000 ppm IDLH	200 ppm TWA; 1050 mg/m <sup>3</sup> TWA

**OSHA Vacated PELs:** Bromochloromethane: 200 ppm TWA; 1050 mg/m<sup>3</sup> TWA

#### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Clear liquid

**Appearance:** clear, colorless

**Odor:** Sweet chloroform-like odor.

**pH:** Not available.

**Vapor Pressure:** 117 mm Hg @ 20 C

**Vapor Density:** 4.46

**Evaporation Rate:** Not available.

**Viscosity:** 0.667 cP 25 deg C

**Boiling Point:** 68 deg C @ 760.00mm Hg

**Freezing/Melting Point:** -88 deg C

**Decomposition Temperature:** 400 deg C

**Solubility:** Insoluble.

**Specific Gravity/Density:** 1.9910g/cm<sup>3</sup>

**Molecular Formula:** CH<sub>2</sub>BrCl

**Molecular Weight:** 129.38

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures. May discolor on exposure to light. Light sensitive.

**Conditions to Avoid:** Incompatible materials, light, excess heat.

**Incompatibilities with Other Materials:** Strong oxidizing agents, strong bases, magnesium, zinc, calcium, powdered aluminum.

**Hazardous Decomposition Products:** Hydrogen chloride, phosgene, carbon monoxide, carbon dioxide, hydrogen bromide.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 74-97-5: PA5250000

**LD50/LC50:**

**CAS# 74-97-5:**Inhalation, mouse: LC50 = 12030 mg/m<sup>3</sup>/7H;

Oral, mouse: LD50 = 4300 mg/kg;

Oral, rat: LD50 = 5 gm/kg;

Skin, rabbit: LD50 = &gt;20 gm/kg;

**Carcinogenicity:**

CAS# 74-97-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.**Teratogenicity:** No information available.**Reproductive Effects:** No information available.**Mutagenicity:** Mutation in Microorganisms: Salmonella typhimurium = 10 mg/plate. Mutation in Microorganisms: Salmonella typhimurium = 10 ug/plate. Cytogenetic analysis: Hamster lung = 1 umol/L. Sister Chromatid Exchange: Hamster lung = 5 umol/L.**Neurotoxicity:** No information available.**Other Studies:**

Section 12 - Ecological Information
-------------------------------------

**Ecotoxicity:** No data available. Estimated BCF values = 3 and 7. These values suggest that bioconcentration in fish and aquatic organisms will not occur to any significant extent. Estimated Koc values = 21 and 139. Leaching may occur.**Environmental:** Bromochloromethane will display high to very high mobility in soil. Direct photochemical degradation in the atmosphere or water is unlikely.**Physical:** No information available.**Other:** No information available.

Section 13 - Disposal Considerations
--------------------------------------

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3.

Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.**RCRA U-Series:** None listed.

Section 14 - Transport Information
------------------------------------

	US DOT	Canada TDG
<b>Shipping Name:</b>	BROMOCHLOROMETHANE	BROMOCHLOROMETHANE
<b>Hazard Class:</b>	6.1	6.1
<b>UN Number:</b>	UN1887	UN1887
<b>Packing Group:</b>	III	III

Section 15 - Regulatory Information
-------------------------------------

## US FEDERAL

### TSCA

CAS# 74-97-5 is listed on the TSCA inventory.

### Health & Safety Reporting List

CAS# 74-97-5: Effective 6/1/87, Sunset 12/19/95

### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

### Section 12b

None of the chemicals are listed under TSCA Section 12b.

### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

### CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPO.

### SARA Codes

CAS # 74-97-5: immediate, delayed.

**Section 313** No chemicals are reportable under Section 313.

### Clean Air Act:

This material does not contain any hazardous air pollutants. CAS# 74-97-5 is listed as a Class 1 ozone depletor with an 0.12 ODP

This material does not contain any Class 2 Ozone depletors.

### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

### STATE

CAS# 74-97-5 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

### California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

## European/International Regulations

### European Labeling in Accordance with EC Directives

#### Hazard Symbols:

XI

#### Risk Phrases:

R 36/37/38 Irritating to eyes, respiratory system and skin.

#### Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 37/39 Wear suitable gloves and eye/face protection.

### WGK (Water Danger/Protection)

CAS# 74-97-5: 2

### Canada - DSL/NDSL

CAS# 74-97-5 is listed on Canada's DSL List.

### Canada - WHMIS

This product has a WHMIS classification of D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations

regulations and the MSDS contains all of the information required by these regulations.

**Canadian Ingredient Disclosure List**

CAS# 74-97-5 is listed on the Canadian Ingredient Disclosure List.

## Section 16 - Additional Information

**MSDS Creation Date:** 2/18/1999

**Revision #5 Date:** 11/05/2008

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

For R&D use only. Not for drug, household or other uses.  
Click <http://www.lookchem.com/cas-75/75-00-3.html> for suppliers of this product.

## Composition/Information on Ingredient

**Cas:**

75-00-3

**Code:**

M

**RTECS:**

KH7525000

**Code:**

M

**Name:**

ETHYL CHLORIDE (SARA III)

**Other REC Limits:**

2600 MG/CUM

**OSHA PEL:**

1000 PPM

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

1000 PPM; 9192

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

IN DUSTY ATMOSPHERES, USE AN APPROVED DUST RESPIRATOR.

**Ventilation:**

PROVIDE MECHANICAL & LOCAL EXHAUST VENTILATION TO CONTROL AIRBORNE LEVELS TO KEEP

**Protective Gloves:**

N/K

**Eye Protection:**

SAFETY GLASSES, CHEMICAL GOGGLES

**Other Protective Equipment:**

Equipment N/K

**Work Hygienic Practices:**

USE CLEAN BODY-COVERING CLOTHING.

**Supplemental Safety and Health:**

GAS FIRED RECIRCULATING AIR FURNANCES OR HEATERS/GAS WATER HEATER, ETC., DRAWING AIR FROM AREAS

WHERE THERE MAY BE A PRESENCE OF ETHYL CHLORIDE GAS FROM STORAGE/FABRICATION OF EXPANDED

POLYSTYRENE FOAM, CAN HAVE RUST/CORROSION PROBLEMS AS A RESULT OF THE THERMAL DECOMPOSITION OF ETHYL CHLORIDE TO HYDROGEN CHLORIDE.

## Health Hazards Data

**LD50LC50Mixture:**

N/K

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

EYES: SOLID OR DUST MAY CAUSE IRRITATION OR CORNEAL INJURY DUE TO MECHANICAL ACTION.

SKIN: NON-IRRITATING/INJURY ONLY.

INGESTION: PHYSICAL INJURY & MAY CAUSE CHOKING. INHALATION: DUST MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT.

**Explanation Of Carcinogenicity:**

NONE

**Signs And Symptoms Of Overexposure:**

EYES: SOLID OR DUST MAY CAUSE IRRITATION OR CORNEAL INJURY DUE TO MECHANICAL ACTION.

SKIN: NON-IRRITATING/INJURY ONLY.

INGESTION: PHYSICAL INJURY ONLY & MAY CAUSE CHOKING. INHALATION: DUST MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT.

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES: FLUSH W/WATER FOR AT LEAST 5 MINUTES. INHALATION: REMOVE TO FRESH AIR & CONSULT PHYSICIAN.

**Spill Release Procedures:**

PICK UP OR IF DUST OR IN SMALL PIECES, SWEEP UP & PLACE IN SUITABLE CONTAINER FOR DISPOSAL.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURY IN AN APPROVED LANDFILL OR BURN IN AN ADEQUATE INCINERATOR W/EXCESS OXYGEN, IN ACCORDANCE W/ALL LOCAL, STATE & FEDERAL REGULATIONS.

**Handling And Storage Precautions:**

STORAGE OF LARGE QUANTITIES OF FOAM IN CONFINED, VIRTUALLY AIRTIGHT SPACES SHOULD BE AVOIDED TO PREVENT BUILDUP OF COMBUSTIBLE VAPORS.

**Other Precautions:**

EXPANDED POLYSTYRENE INSULATION IS COMBUSTIBLE & MAY CONSTITUTE A FIRE HAZARD IF IMPROPERLY USED OR INSTALLED. THIS INSULATION CONTAINS A FLAME RETARDANT ADDITIVE TO INHIBIT ACCIDENTAL IGNITION FROM SMALL FIRE SOURCES.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P

**Flash Point:**

**Flash Point Text:**

N/R 3

**Autoignition Temp:**

**Autoignition Temp Text:**

N/A

**Lower Limits:**

N/R

**Upper Limits:**

N/R

**Extinguishing Media:**

WATER FOG

**Fire Fighting Procedures:**

WEAR POSITIVE-PRESSURE, SELF-CONTAINED BREATHING APPARATUS. APPLY LARGE VOLUMES OF WATER DIRECTLY ON FLAME OR

BURNING SURFACE.

**Unusual Fire/Explosion Hazard:**

EMITS DENSE, BLACK SMOKE WHEN BURNED. GRINDING OR CUTTING MAY LEAD TO A BUILD-UP OF DUST SUSPENDED IN AIR WHICH CAN CAUSE A DUST EXPLOSION IF IGNITED.

## Physical/Chemical Properties

**HCC:**

**NRC/State LIC No:**

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

N/R

**Melt/Freeze Pt:**

**M.P/F.P Text:**

N/K

**Decomp Temp:**

**Decomp Text:**

N/K

**Vapor Pres:**

N/R

**Vapor Density:**

N/R 4

**Volatile Org Content %:**

**Spec Gravity:**

0.027-0.064

**VOC Pounds/Gallon:**

**PH:** N/K

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

NONE

**Appearance and Odor:**

RIGID CELLULAR FOAM BOARD W/NO ODOR.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

HIGH TEMPERATURES >572F, FLAME, &IGNITION SOURCES. TEMPS >300C WILL RELEASE COMBUSTIBLE GASES.

**Materials To Avoid:**

AROMATIC HYDROCARBONS, HIGHER ALIPHATIC HYDROCARBONS, ESTERS, AMINES, HIGHER ALDEHYDES.

**Hazardous Decomposition Products:**

CO, CO<sub>2</sub>, CARBON, SMALL AMOUNTS OF HYDROGEN BROMIDE/AROMATIC HYDROCARBONS, STYRENE/ETHYLBENZENE. ETHYL/HYDROGEN CHLORIDE

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

Information:N/P

# MSDS Transport Information

Information: N/P

# Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

# Other Information

**Other Information:** N/P

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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. Lookchem 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.

# SAFETY DATA SHEET



## VINYL CHLORIDE (MONOMER)

MSDS No.: M9192

Rev. Date: 2009-Oct-07

Rev. Num.:02

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**Company Identification:** Occidental Chemical Corporation  
5005 LBJ Freeway  
P.O. Box 809050  
Dallas, Tx  
75380-9050

**24 Hour Emergency Telephone Number:** 1-800-733-3665 or 1-972-404-3228 (U.S.); 32.3.575.55.55 (Europe); 1800-033-111 (Australia)

**To Request an MSDS:** MSDS@oxy.com or 1-972-404-3245

**Customer Service:** 1-800-752-5151 or 1-972-404-3700

**Synonyms:** VCM, Monochloroethylene, Chloroethene, Ethylene, chloro-, Vinyl chloride monomer

**Product Use:** PVC Manufacturing

### 2. HAZARDS IDENTIFICATION

\*\*\*\*\*

#### EMERGENCY OVERVIEW:

**Color:** Colorless  
**Physical State:** Compressed, liquefied gas  
**Odor:** Sweet  
**Signal Word:** DANGER

**MAJOR HEALTH HAZARDS:** LIQUID MAY CAUSE FROSTBITE TO EYES AND SKIN. MAY CAUSE CENTRAL NERVOUS SYSTEM EFFECTS. CONTAINS VINYL CHLORIDE, A KNOWN HUMAN CANCER AGENT. CAUSES DAMAGE TO LIVER AND PERIPHERAL NERVOUS SYSTEM THROUGH PROLONGED OR REPEATED EXPOSURE. CAUSES DAMAGE TO LUNGS THROUGH PROLONGED OR REPEATED EXPOSURE BY INHALATION. SUSPECTED OF CAUSING GENETIC DEFECTS. REPRODUCTIVE HAZARD.

**PHYSICAL HAZARDS:** Extremely flammable gas under pressure.

**PRECAUTIONARY STATEMENTS:** Keep away from heat, sparks and flame. Wash thoroughly after handling. Avoid contact with eyes, skin and clothing. Do not breathe vapors or spray mist. Do not eat, drink or smoke in areas where this material is used. Use only outdoors or in a well-ventilated area. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Store in well-ventilated place. Keep container tightly closed.

# VINYL CHLORIDE (MONOMER)

MSDS No.: M9192

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## POTENTIAL HEALTH EFFECTS:

**Inhalation:** Several minutes of exposure to high, but attainable concentrations (over 1000 ppm) may cause central nervous system depression with effects such as dizziness, drowsiness, disorientation, tingling, numbness or burning sensation of the hands and feet, impaired vision, nausea, headache, difficulty breathing, cardiac arrhythmias, unconsciousness, or even death.

**Skin contact:** May cause irritation. Rapid evaporation of the material may cause frostbite.

**Eye contact:** May cause irritation. Rapid evaporation of the material may cause frostbite.

**Ingestion:** Not a likely route of exposure.

**Chronic Effects:** Causes damage to the liver, musculoskeletal system, and peripheral nervous system through prolonged or repeated exposure.

**Interaction with Other Chemicals Which Enhance Toxicity:** Alcohol may enhance toxic effects

**Medical Conditions Aggravated by Exposure:** Hepatitis B infection

See Section 11: TOXICOLOGICAL INFORMATION

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	Percentage	CAS Number
Vinyl chloride	99 - 100	75-01-4

## 4. FIRST AID MEASURES

**INHALATION:** If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. If respiration or pulse has stopped, have a trained person administer basic life support (Cardio-Pulmonary Resuscitation and/or Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY.

**SKIN CONTACT:** If frostbite or freezing occur, immediately flush with plenty of lukewarm water (100-105 F, 38-41 C). GET MEDICAL ATTENTION IMMEDIATELY.

**EYE CONTACT:** Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

**INGESTION:** Not a likely route of exposure.

**Notes to Physician:** Cardiac stimulants such as epinephrine should not be given to persons overexposed to chlorinated hydrocarbons.

# VINYL CHLORIDE (MONOMER)

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## 5. FIRE-FIGHTING MEASURES

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**Fire Hazard:** Severe fire hazard. Vapor/air mixtures are explosive. Vapors or gases may ignite at distant sources and flash back. Containers may rupture or explode if exposed to heat.

**Extinguishing Media:** Stop flow of gas before extinguishing fire. Use carbon dioxide, regular dry chemical, foam or water. Use water spray to keep containers cool.

**Fire Fighting:** Move container from fire area if it can be done without risk. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this can't be done, then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Stop leak if possible without personal risk. Let burn unless leak can be stopped immediately. Wear NIOSH approved positive-pressure self-contained breathing apparatus operated in pressure demand mode.

**Sensitivity to Mechanical Impact:** Not sensitive.

**Sensitivity to Static Discharge:** Electrostatic charges may build up during handling and may form ignitable vapor-air mixtures in storage containers. Ground equipment in accordance with industry standards and best practices such as NFPA 77 [Recommended Practices on Static Electricity (2007)] and American Petroleum Institute (API) RP Recommended Practice 2003 [Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents (2008)].

**Lower Flammability Level (air):** 3.6 %  
**Upper Flammability Level (air):** 33.0 %  
**Flash point:** -108 F (-78 C)  
**Autoignition Temperature:** 882 F (472 C)

**Hazardous Combustion Products:** Oxides of carbon, Hydrogen chloride, Phosgene

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## 6. ACCIDENTAL RELEASE MEASURES

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**Occupational Release:**

Remove sources of ignition. Ventilate closed spaces before entering. Stop leak if possible without personal risk. Vapors or gases may ignite at distant ignition sources and flash back. Reduce vapors with water spray. Keep unnecessary people away, isolate hazard area and deny entry. Keep out of water supplies and sewers. Wear appropriate personal protective equipment recommended in Section 8 of the SDS. Releases should be reported, if required, to appropriate agencies.

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## 7. HANDLING AND STORAGE

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**Storage Conditions:** Store and handle in accordance with all current regulations and standards. Keep container tightly closed and properly labeled. Store in a cool, dry area. Store in a well-ventilated area. Do not enter confined spaces unless adequately ventilated. Avoid heat, flames, sparks and other sources of ignition. May be subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Keep separated from incompatible substances (see Section 10 of SDS).

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# VINYL CHLORIDE (MONOMER)

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## 7. HANDLING AND STORAGE

**Handling Procedures:** Avoid breathing vapor or mist. Avoid contact with skin, eyes and clothing. Keep away from heat, sparks and flame. Ground any equipment used in handling. Use non-sparking tools and equipment. All energized electrical equipment must be designed in accordance with the electrical classification of the area.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

### Regulatory Exposure limit(s):

Component	CAS Number	OSHA Final PEL TWA	OSHA Final PEL STEL	OSHA Final PEL Ceiling
Vinyl chloride	75-01-4	1 ppm	5 ppm	-----

**OEL:** Occupational Exposure Level; **OSHA:** United States Occupational Safety and Health Administration; **PEL:** Permissible Exposure Limit; **TWA:** Time Weighted Average; **STEL:** Short Term Exposure Limit

### Non-Regulatory Exposure Limit(s):

- The Non-Regulatory United States Occupational Safety and Health Administration (OSHA) limits shown in the table are the Vacated 1989 PEL's (vacated by 58 FR 35338, June 30, 1993).
- The American Conference of Governmental Industrial Hygienists (ACGIH) is a voluntary organization of professional industrial hygiene personnel in government or educational institutions in the United States. The ACGIH develops and publishes recommended occupational exposure limits each year called Threshold Limit Values (TLVs) for hundreds of chemicals, physical agents, and biological exposure indices.

Component	CAS Number	ACGIH TWA	ACGIH STEL	ACGIH Ceiling	OSHA TWA (Vacated)	OSHA STEL (Vacated)	OSHA Ceiling (Vacated)
Vinyl chloride	75-01-4	1 ppm	-----	-----	-----	-----	-----

**ENGINEERING CONTROLS:** Use closed systems when possible. Provide local exhaust ventilation where vapor may be generated. Ensure compliance with applicable exposure limits.

### PERSONAL PROTECTIVE EQUIPMENT:

**Eye Protection:** Wear safety glasses with side-shields. If eye contact is likely, wear chemical resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

**Skin and Body Protection:** Wear appropriate chemical resistant clothing.

**Hand Protection:** Wear appropriate chemical resistant gloves

**Protective Material Types:** Butyl rubber, Nitrile, Silver Shield®, Viton®

**Respiratory Protection:** Refer to 29 CFR 1910.1017 for selection of respirators for vinyl chloride. A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Physical State:** Compressed, liquefied gas

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Color:</b>	Colorless
<b>Odor:</b>	Sweet
<b>Odor Threshold:</b>	Not reliable to prevent excessive exposure
<b>Molecular Weight:</b>	62.5
<b>Molecular Formula:</b>	C <sub>2</sub> H <sub>3</sub> Cl
<b>Flash point:</b>	-108 F (-78 C)
<b>Lower Flammability Level (air):</b>	3.6 %
<b>Upper Flammability Level (air):</b>	33.0 %
<b>Boiling Point/Range:</b>	7 F (-14 C)
<b>Freezing Point/Range:</b>	No data available
<b>Vapor Pressure:</b>	2660 mmHg @ 25 C
<b>Vapor Density (air=1):</b>	2.15
<b>Specific Gravity (water=1):</b>	0.91 @ 25/25 C
<b>Water Solubility:</b>	2.7 g/L
<b>pH:</b>	Not applicable
<b>Volatility:</b>	100%
<b>VOC Content(%):</b>	100%
<b>Evaporation Rate (ether=1):</b>	>15
<b>Partition Coefficient (n-octanol/water):</b>	Log Kow = 1.36

## 10. STABILITY AND REACTIVITY

<b>Reactivity/ Stability:</b>	Stable at normal temperatures and pressures.
<b>Conditions to Avoid:</b>	Avoid air and sunlight. Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.
<b>Incompatibilities/ Materials to Avoid:</b>	Oxidizing agents, Oxides of nitrogen, Metals, Aluminum, Aluminum alloys, Copper, Metal alkyl complexes and alkali metals such as sodium, potassium and their alloys
<b>Hazardous Decomposition Products:</b>	Oxides of carbon, Chlorine, Hydrogen chloride, Phosgene
<b>Hazardous Polymerization:</b>	Polymerization can occur. Avoid elevated temperatures, oxidizing agents, oxides of nitrogen, oxygen, peroxides, other polymerization catalysts/initiators, air and sunlight.

## 11. TOXICOLOGICAL INFORMATION

### TOXICITY DATA:

Component	LD50 Oral	LC50 Inhalation	LD50 Dermal
Vinyl chloride	500 mg/kg (Rat)	-----	-----

# VINYL CHLORIDE (MONOMER)

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**CHRONIC TOXICITY:** Occupational overexposure has produced a specific cancer (angiosarcoma of the liver) and is associated with hepatocellular cancer. Occupational exposure has also resulted in changes in bones and skin, especially in the extremities such as the fingers (acroosteolysis). Additionally, repeated exposure may result in dose-related sensory disorders, peripheral nervous system effects, blood system damage, lymphatic system changes, liver malfunction, and pulmonary insufficiency.

**CARCINOGENICITY:** This material is classified as follows:

Component	NTP:	IARC (GROUP 1):	IARC (GROUP 2):	OSHA:
Vinyl chloride	Known Carcinogen	Group 1	Not listed	Listed

**MUTAGENIC DATA:** Mutagenic in bacteria studies. Genetic studies in animals were negative in some cases and positive in others.

**REPRODUCTIVE TOXICITY:** Reproductive effects and testes damage occurred in rats exposed to vinyl chloride. These endpoints, however, were generally noted at concentrations greater than those necessary to cause liver damage.

## 12. ECOLOGICAL INFORMATION

**Aquatic Toxicity:**

This material is believed to be practically non-toxic to fish on an acute basis (LC50>100 mg/L)

**FATE AND TRANSPORT:**

**BIODEGRADATION:** Vinyl chloride may degrade under anaerobic conditions.

**PERSISTENCE:** Tropospheric half-life is estimated to be 23 hours. If released to air, this material will remain in the gas phase. If released to soil, volatilization will occur, but material that does not volatilize may be highly mobile. If released to water, evaporation will occur.

**BIOCONCENTRATION:** Bioconcentration potential is low (BCF <100 or log Kow <3).

## 13. DISPOSAL CONSIDERATIONS

Reuse or reprocess, if possible. Dispose in accordance with all applicable regulations. May be subject to disposal regulations: U.S. EPA 40 CFR 261. Hazardous Waste Number(s): D001, U043.

## 14. TRANSPORT INFORMATION

**U.S.DOT 49 CFR 172.101:**

**PROPER SHIPPING NAME:** Vinyl chloride, stabilized  
**UN NUMBER:** UN1086  
**HAZARD CLASS/ DIVISION:** 2.1  
**LABELING** 2.1  
**REQUIREMENTS:**  
**DOT RQ (lbs):** RQ 1 Lbs. (Vinyl chloride)

# VINYL CHLORIDE (MONOMER)

MSDS No.: M9192

Rev. Date: 2009-Oct-07

Rev. Num.:02

## 14. TRANSPORT INFORMATION

### CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

**SHIPPING NAME:** Vinyl chloride, stabilized

**UN NUMBER:** UN1086

**CLASS OR DIVISION:** 2.1

## 15. REGULATORY INFORMATION

### U.S. REGULATIONS

**OSHA REGULATORY STATUS:** This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200) (US)

**CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):** If a release is reportable under CERCLA section 103, notify the state emergency response commission and local emergency planning committee. In addition, notify the National Response Center at (800) 424-8802 or (202) 426-2675.

Component	CERCLA Reportable Quantities:
Vinyl chloride	1 lb (final RQ)

**EPCRA EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):** Not regulated

**EPCRA SECTIONS 311/312 HAZARD CATEGORIES (40 CFR 370.21):**

Fire Hazard, Reactive Hazard, Sudden Release of Pressure, Acute Health Hazard, Chronic Health Hazard

**EPCRA SECTION 313 (40 CFR 372.65):** The following chemicals are listed in 40 CFR 372.65 and may be subject to Community Right-to Know Reporting requirements

Component	Status:
Vinyl chloride	Listed

**OSHA SPECIFICALLY REGULATED SUBSTANCES:** OSHA 29 CFR 1910.1017 (Vinyl chloride); The U.S. Department of Labor, Occupational Safety and Health Administration specifically regulates manufacturing, handling and processing of vinyl chloride. Such regulations have been published at 29 CFR 1910.1017.

**OSHA PROCESS SAFETY (PSM) (29 CFR 1910.119):** The PSM standard may apply to processes which involve a flammable liquid or gas in a quantity of 10,000 pounds (4535.9 kg) or more.

### NATIONAL INVENTORY STATUS

**U.S. INVENTORY STATUS: Toxic Substance Control Act (TSCA):** All components are listed or exempt

**TSCA 12(b):** This product is not subject to export notification

**Canadian Chemical Inventory:** All components are listed

### STATE REGULATIONS

Component	Vinyl chloride
California Proposition 65 Cancer WARNING:	Listed
Massachusetts Right to Know Hazardous Substance List	Listed

# VINYL CHLORIDE (MONOMER)

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	<b>New Jersey Right to Know Hazardous Substance List</b>	Listed
	<b>New Jersey Special Health Hazards Substance List</b>	Listed
	<b>New Jersey - Environmental Hazardous Substance List</b>	Listed
	<b>Pennsylvania Right to Know Hazardous Substance List</b>	Listed
	<b>Pennsylvania Right to Know Special Hazardous Substances</b>	Listed
	<b>Pennsylvania Right to Know Environmental Hazard List</b>	Listed
	<b>Rhode Island Right to Know Hazardous Substance List</b>	Listed

## CANADIAN REGULATIONS

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

**WHMIS Classification:** A, B1, D2A, D2B, F

## 16. OTHER INFORMATION

**Prepared by:** OxyChem Corporate HESS - Health Risk Management

**HMIS: (SCALE 0-4)** (Rated using National Paint & Coatings Association HMIS: Rating Instructions, 2nd Edition)

**Health:** 2\*      **Flammability:** 4      **Reactivity:** 2

**NFPA 704 - Hazard Identification Ratings (SCALE 0-4)**

**Health:** 2      **Flammability:** 4      **Reactivity:** 2

### IMPORTANT:

The information presented herein, while not guaranteed, was prepared by technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTY OR GUARANTY OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, SAFETY, SUITABILITY, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling, storage, disposal and other factors that may involve other or additional legal, environmental, safety or performance considerations, and OxyChem assumes no liability whatsoever for the use of or reliance upon this information. While our technical personnel will be happy to respond to questions, safe handling and use of the product remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as, a recommendation to infringe any existing patents or to violate any Federal, State, local or foreign laws.

OSHA Standard 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Material Safety Data Sheet available to your employees.

# Material Safety Data Sheet

## Acetonitrile

ACC# 00170

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Acetonitrile

**Catalog Numbers:** AC149520000, AC149520010, AC149520025, AC149520050, AC149520250, AC149525000, AC167650000, AC258560000, AC258560010, AC258560025, AC258560051, AC268260000, AC268260010, AC268270000, AC268270010, AC325730000, AC325730010, AC325730025, AC326680000, AC326680010, AC326680025, AC326750000, AC326750010, AC326750025, AC326810000, AC326810010, AC326811000, AC326812500, AC364310000, AC364310010, AC364311000, AC364315000, AC400130000, AC400132500, AC423250000, AC423250010, AC423255000, AC610130040, AC61022019, AC61022019, AC61022050, AC61022115, AC61022115, AC61022200, AC61022200, AC610500190, AC610500500, AC610501150, AC610502000, AC610700190, AC610700500, AC610701150, AC610702000, 16765-0010, 16765-2500, 26826-0025, 26827-0025, 26827-0040, 61001-0040, 61022-0010, 61022-1000, 61096-1000, 61110-0500, 61514-0025, A21-1, A21-20, A21-200, A21-4, A21200LC, A21FB115, A21FB19, A21FB200, A21FB50, A21RB115, A21RS-50, A21RS115, A21RS19, A21RS200, A21RS28, A955-1, A955-4, A9931, A993RS-19, A996-1, A996-4, A9964LC, A996J1, A996N2-19, A996RS-115, A996RS-200, A996RS-28, A996RS-50, A996SK-4, A996SS-115, A996SS-19, A996SS-200, A996SS28, A996SS50, A998-1, A998-212, A998-4, A99818, A9984LC, A998J1, A998N1-19, A998N2-19, A998POP-50, A998RS-115, A998RS-19, A998RS-200, A998RS-28, A998RS-50, A998SK-1, A998SK-4, A998SS-115, A998SS-200, A998SS-28, A998SS-50, A999-4, BP1165-50, BP1170-4, BP1170-450, BP1170N1-19, BP1170N2-19, BP1170POP-200, BP1170POP-50, BP1170POP20, BP1170RS-115, BP1170RS-1350, BP1170RS-19, BP1170RS-200, BP1170RS-28, BP1170RS-50, BP1170SS-115, BP1170SS-1350, BP1170SS-200, BP1170SS-30, BP1170SS-50, BP2405-1, BP2405-4, BP2405SK-1, BP2405SK-4, BP2600-100, NC9173153, NC9229342, NC9234885, NC9239862, NC9445091, NC9574352, NC9585208, NC9638863, NC9647795, NC9677816, NC9708859, O1034-500, PS03490, PS03491

**Synonyms:** Cyanomethane; Ethanenitrile; Ethyl nitrile; Methyl cyanide; Methanecarbonitrile.**Company Identification:**

Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
75-05-8	Acetonitrile	100	200-835-2

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: 2 deg C.

**Warning! Flammable liquid and vapor.** Causes eye irritation. May be harmful if swallowed, inhaled, or absorbed through the skin. May cause skin and respiratory tract irritation. Metabolized to cyanide in the body, which may cause headache, dizziness, weakness, unconsciousness, convulsions, coma and possible death. May cause liver and kidney damage.

**Target Organs:** Kidneys, central nervous system, liver, respiratory system, cardiovascular system, eyes.

### Potential Health Effects

**Eye:** Causes eye irritation. Lachrymator (substance which increases the flow of tears). May produce superficial reversible injury.

**Skin:** Causes mild skin irritation. If absorbed, causes symptoms similar to those of inhalation. May be harmful if absorbed through the skin. May be metabolized to cyanide which in turn acts by inhibiting cytochrome oxidase impairing cellular respiration. A Skin notation is recommended based upon the case report of child poisoning from dermal contact. A LD50 >2000 mg/kg was obtained in a well-conducted acute dermal toxicity study in rabbits.

**Ingestion:** May cause tissue anoxia, characterized by weakness, headache, dizziness, confusion, cyanosis (bluish skin due to deficient oxygenation of the blood), weak and irregular heart beat, collapse, unconsciousness, convulsions, coma and death. Metabolism may release cyanide, which may result in headache, dizziness, weakness, collapse, unconsciousness and possible death. Different animal species and individuals of the same species varied widely in susceptibility to acetonitrile in single-dose toxicity studies by various routes. The range of oral LD50 values for acetonitrile in mammals is between 140 - 6762 mg/kg body weight. Mouse and guinea pig seem to be the most sensitive species. In a well-conducted study in mice, the oral LD50 of acetonitrile was calculated to be 617 mg/kg.

**Inhalation:** May cause respiratory tract irritation. May cause lung damage. May be harmful if inhaled. Acetonitrile breaks down slowly in the body to release the cyanide ion. Exposure to very high concentrations of acetonitrile can result in cyanide poisoning. Symptoms are usually delayed several hours after exposure. Early symptoms include weakness, headache, giddiness, dizziness, confusion, anxiety, nausea and vomiting. In severe cases, breathing is rapid, then becomes slow and gasping. The victim may feel an irregular heart beat and tightness in the chest.

**Chronic:** May be metabolized to cyanide which in turn acts by inhibiting cytochrome oxidase impairing cellular respiration. Exposure to small amounts of cyanide compounds over long periods of time is reported to cause loss of appetite, headache, weakness, nausea, dizziness, and symptoms of irritation of the upper respiratory tract and eyes. Animal studies indicate that the product may affect the liver and kidneys. Animal evidence for acetonitrile and other cyanide compounds clearly indicates that toxic effects would be expected in the fetus at exposure levels which are toxic to the

## Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

**Skin:** In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.

**Ingestion:** If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Exposure should be treated as a cyanide poisoning. Effects may be delayed. For methemoglobinemia, administer oxygen alone or with Methylene Blue depending on the methemoglobin concentration in the blood. May be partially metabolized to cyanide in the body.

**Antidote:** Always have a cyanide antidote kit on hand when working with cyanide compounds. Get medical advice to use. Methylene blue, alone or in combination with oxygen is indicated as a treatment in nitrite induced methemoglobinemia.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

**Extinguishing Media:** Use water spray, dry chemical, carbon dioxide, or appropriate foam.

**Flash Point:** 2 deg C ( 35.60 deg F)

**Autoignition Temperature:** 524 deg C ( 975.20 deg F)

**Explosion Limits, Lower:**3.0 vol %

**Upper:** 16.00 vol %

**NFPA Rating:** (estimated) Health: 2; Flammability: 3; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Provide ventilation. Evacuate unnecessary personnel. Approach spill from upwind.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Avoid breathing vapor or mist.

**Storage:** Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area. Store protected from moisture.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Acetonitrile	20 ppm TWA; Skin - potential significant contribution to overall exposure by the cutaneous route	20 ppm TWA; 34 mg/m <sup>3</sup> TWA 500 ppm IDLH	40 ppm TWA; 70 mg/m <sup>3</sup> TWA

**OSHA Vacated PELs:** Acetonitrile: 40 ppm TWA; 70 mg/m<sup>3</sup> TWA

### Personal Protective Equipment

**Eyes:** Wear chemical splash goggles.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless

**Odor:** sweetish odor - ethereal odor

**pH:** Not available.

**Vapor Pressure:** 88.8 mm Hg @ 25 deg C

**Vapor Density:** 1.42 (air=1)

**Evaporation Rate:** 5.79 (Butyl acetate=1)

**Viscosity:** 0.36 cP 20 deg C

**Boiling Point:** 81.6 deg C @ 760 mmHg

**Freezing/Melting Point:** -45 deg C

**Decomposition Temperature:** > 500 deg C

**Solubility:** Soluble.

**Specific Gravity/Density:** .7810g/cm<sup>3</sup>

**Molecular Formula:** C<sub>2</sub>H<sub>3</sub>N

**Molecular Weight:** 41.05

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Ignition sources, excess heat, exposure to moist air or water.

**Incompatibilities with Other Materials:** Strong oxidizing agents, strong reducing agents, strong acids.

**Hazardous Decomposition Products:** Hydrogen cyanide, nitrogen oxides, carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 75-05-8: AL7700000

**LD50/LC50:**

CAS# 75-05-8:

Draize test, rabbit, eye: 100 uL/24H Moderate;

Inhalation, mouse: LC50 = 2693 ppm/1H;

Inhalation, rabbit: LC50 = 2828 ppm/4H;

Inhalation, rat: LC50 = 7551 ppm/8H;

Oral, mouse: LD50 = 269 mg/kg;

Oral, rabbit: LD50 = 50 mg/kg;

Oral, rat: LD50 = 2460 mg/kg;

Skin, rabbit: LD50 = >2 gm/kg;

In a well-conducted study in mice, the oral LD50 of acetonitrile was calculated to be 617 mg/kg.

**Carcinogenicity:**

CAS# 75-05-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** Three volunteers were exposed for 4 hours at 40, 80, or 160 ppm acetonitrile. At 40 ppm, odor was detected, after which olfactory fatigue was noted. At this concentration, 2 persons had no signs of response, including no appreciable blood or urinary cyanide or thiocyanate. The third person experienced slight tightness in the chest that evening. A sensation of cooling in the lungs was observed and persisted for 24 hours. Traces of urinary thiocyanate were recorded.

**Teratogenicity:** In most of the available assays, teratogenicity was associated with maternal toxicity. In a well-conducted study, rats exposed by inhalation to acetonitrile did not result in significant fetal effects, even at concentrations which were overtly toxic to the dam. In this study, a maternal NOAEL of 1200 ppm and NOAEL of 1200 ppm with respect to developmental toxicity were established. A case-control study of pregnancy outcome among Finnish lab workers revealed no association between exposure to acetonitrile and increased risk of spontaneous abortion in mothers, or malformation and birth weight in their children.

**Reproductive Effects:** In relation to fertility, there is no information available in humans and there are no animal studies specifically investigating such effects. However, no changes were seen in weight of the right cauda or right testis and no effect on sperm motility in rats or mice exposed for 13 weeks with 100, 200 and 400 ppm to acetonitrile.

**Mutagenicity:** See actual entry in RTECS for complete information.

**Neurotoxicity:** No information available.

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Fathead Minnow: 1150 ppm; 24 Hr; TLm (hard water) Fish: Fathead Minnow: 1000 mg/L; 96 Hr; TLm (soft water) Fish: Bluegill/Sunfish: 1850 mg/L; 96 Hr; TLm (soft water) Fish: Fathead Minnow: 1640 mg/L; 96 Hr; LC50 (flow-bioassay) Fish: Fathead Minnow: 1640 mg/L; 96 Hr; EC50 (flow-bioassay) No data available.

**Environmental:** Estimated Koc value = 16. Acetonitrile is expected to weakly adsorb to most soils based on the Koc value. Volatilization from soil surfaces and leaching into ground water is expected to be significant. Estimated BCF value = 0.3. This value indicates that acetonitrile will not significantly bioconcentrate in aquatic organisms or adsorb to suspended solids and sediments in water. Acetonitrile is unreactive towards photochemically-generated free radicals and direct photolysis in the gaseous phase.

**Physical:** No information available.

**Other:** Biodegradable.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 75-05-8: waste number U003 (Ignitable waste, Toxic waste).

## Section 14 - Transport Information

<b>Shipping Name:</b>	ACETONITRILE	ACETONITRILE
<b>Hazard Class:</b>	3	3
<b>UN Number:</b>	UN1648	UN1648
<b>Packing Group:</b>	II	II
<b>Additional Info:</b>		FLASHPOINT 6 C

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 75-05-8 is listed on the TSCA inventory.

#### Health & Safety Reporting List

CAS# 75-05-8: Effective 10/4/82, Sunset 10/4/92

#### Chemical Test Rules

CAS# 75-05-8: 40 CFR 799.5115

#### Section 12b

CAS# 75-05-8: Section 4, 1 % de minimus concentration

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 75-05-8: 5000 lb final RQ; 2270 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPO.

#### SARA Codes

CAS # 75-05-8: immediate, delayed, fire.

#### Section 313

This material contains Acetonitrile (CAS# 75-05-8, 100%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

CAS# 75-05-8 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 75-05-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

#### California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

### European/International Regulations

#### European Labeling in Accordance with EC Directives

#### Hazard Symbols:

XN F

#### Risk Phrases:

R 11 Highly flammable.

R 20/21/22 Harmful by inhalation, in contact with skin and if swallowed.

R 36 Irritating to eyes.

**Safety Phrases:**

S 16 Keep away from sources of ignition - No smoking.

S 36/37 Wear suitable protective clothing and gloves.

**WGK (Water Danger/Protection)**

CAS# 75-05-8: 2

**Canada - DSL/NDSL**

CAS# 75-05-8 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B2, D1B, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 75-05-8 is listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
--

**MSDS Creation Date:** 4/23/1999

**Revision #16 Date:** 2/28/2008

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From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

24 Hour Emergency Telephone: 908-859-2151  
CHEMTREC: 1-800-424-9300  
National Response in Canada  
CANUTEC: 613-996-6666  
Outside U.S. And Canada  
Chemtree: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

## METHYLENE CHLORIDE

### 1. Product Identification

**Synonyms:** MC; Dichloromethane (DCM); Methylene dichloride; Methylene bichloride; Methane dichloride

**CAS No.:** 75-09-2

**Molecular Weight:** 84.93

**Chemical Formula:** CH<sub>2</sub>Cl<sub>2</sub>

**Product Codes:** 9235, 9264, 9266, 9295, 9315, 9324, 9329, 9330, 9348, 9350, 9965, Q480

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Methylene Chloride	75-09-2	> 99%	Yes

### 3. Hazards Identification

#### Emergency Overview

**WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER, CARDIOVASCULAR SYSTEM, AND BLOOD. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Cancer Causing)

Flammability Rating: 1 - Slight

Reactivity Rating: 2 - Moderate

Contact Rating: 3 - Severe

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: Blue (Health)

#### Potential Health Effects

##### Inhalation:

Causes irritation to respiratory tract. Has a strong narcotic effect with symptoms of mental confusion, light-headedness, fatigue, nausea, vomiting and headache. Causes formation of carbon monoxide in blood which affects cardiovascular system and central nervous system. Continued exposure may cause increased light-headedness, staggering, unconsciousness, and even death. Exposure may make the symptoms of angina (chest pains) worse.

##### Ingestion:

May cause irritation of the gastrointestinal tract with vomiting. If vomiting results in aspiration, chemical pneumonia could follow. Absorption through gastrointestinal tract may produce symptoms of central nervous system depression ranging from light headedness to unconsciousness.

##### Skin Contact:

Causes irritation, redness and pain. Prolonged contact can cause burns. Liquid degreases the skin. May be absorbed through skin.

##### Eye Contact:

Vapors can cause eye irritation. Contact can produce pain, inflammation and temporal eye damage.

##### Chronic Exposure:

Can cause headache, mental confusion, depression, liver effects, kidney effects, bronchitis, loss of appetite, nausea, lack of balance, and visual disturbances. Can cause

dermatitis upon prolonged skin contact. Methylene chloride may cause cancer in humans.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin disorders, eye problems, impaired liver, kidney, respiratory or cardiovascular function may be more susceptible to the effects of this substance.

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## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:**

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

**Skin Contact:**

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Autoignition temperature: 556C (1033F)

Flammable limits in air % by volume:

lfl: 12; uel: 23

Forms flammable vapor-air mixtures above 100C (212F).

**Explosion:**

Concentrated can be ignited by a high intensity ignition source. Vapor may form flammable mixture in atmosphere that contains a high percentage of oxygen. Sealed containers may rupture when heated.

**Fire Extinguishing Media:**

Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Combustion by-products include phosgene and hydrogen chloride gases. Structural firefighters' clothing provides only limited protection to the combustion products of this material.

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## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Outside or detached storage is recommended. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. To minimize decomposition, all storage containers should be galvanized or lined with a phenolic coating. This material may corrode plastic and rubber. Wear special protective equipment (Sec. 8) for maintenance break-in or where exposures may exceed established exposure levels. Wash hands, face, forearms and neck when exiting restricted areas. Shower, dispose of outer clothing, change to clean garments at the end of the day. Avoid cross-contamination of street clothes. Wash hands before eating and do not eat, drink, or smoke in workplace. Odor Threshold: 205 - 307 ppm. The odor threshold only serves as a warning of exposure; not smelling it does not mean you are not being exposed.

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## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

Methylene Chloride (Dichloromethane):

- OSHA Permissible Exposure Limit (PEL) -

25 ppm (TWA), 125 ppm (STEL), 12.5 ppm (8-hour TWA - Action Level)

- ACGIH Threshold Limit Value (TLV) -

50 ppm (TWA), A3 - suspected human carcinogen.

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. The cartridges recommended for this material have a predicted service of less than 30 minutes at concentrations of ten times (10x) the exposure limits. Actual service life will vary considerably, depending on concentration levels, temperature, humidity, and work rate. This substance has poor warning properties.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Neoprene is a recommended material for personal protective equipment. Natural rubber and polyvinyl chloride ARE NOT recommended materials for personal protective equipment.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

**Other Control Measures:**

Do not use closed circuit rebreathing system employing soda lime or other carbon dioxide absorber because of formation of toxic compounds capable of producing cranial nerve paralysis. See OSHA Standard for medical surveillance, record keeping, and reporting requirements for methylene chloride (29 CFR 1910.1052).

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Chloroform-like odor.

**Solubility:**

1.32 gm/100 gm water @ 20C.

**Specific Gravity:**

1.318 @ 25C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

39.8C (104F)

**Melting Point:**

-97C (-143F)

**Vapor Density (Air=1):**

2.9

**Vapor Pressure (mm Hg):**

350 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

27.5

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Emits highly toxic fumes of phosgene when heated to decomposition. Decomposes in a flame or hot surface to form toxic gas phosgene and corrosive mists of hydrochloric acid. Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Strong oxidizers, strong caustics, plastics, rubber, nitric acid, water + heat, and chemically active metals, such as aluminum and magnesium powder, sodium, potassium, and lithium. Avoid contact with open flames and electrical arcs. Liquid methylene chloride will attack some forms of plastics, rubber, and coatings.

**Conditions to Avoid:**

Moisture, heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

**Toxicological Data:**

Dichloromethane: Oral rat LD50: 1600 mg/kg; inhalation rat LC50: 52 gm/m<sup>3</sup>; investigated as a tumorigen, mutagen, reproductive effector.

**Reproductive Toxicity:**

Dichloromethane has been linked to spontaneous abortions in humans.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Methylene Chloride (75-09-2)	No	Yes	2B

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material may leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released into

water, this material may biodegrade to a moderate extent. When released to water, this material is expected to quickly evaporate. This material has a log octanol-water partition coefficient of less than 3.0. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of greater than 30 days. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition.

**Environmental Toxicity:**

The LC50/96-hour values for fish are over 100 mg/l. This material is not expected to be toxic to aquatic life.

### 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

### 14. Transport Information

**Domestic (Land, D.O.T.)**

-----  
**Proper Shipping Name:** DICHLOROMETHANE  
**Hazard Class:** 6.1  
**UN/NA:** UN1593  
**Packing Group:** III  
**Information reported for product/size:** 52L

**International (Water, I.M.O.)**

-----  
**Proper Shipping Name:** DICHLOROMETHANE  
**Hazard Class:** 6.1  
**UN/NA:** UN1593  
**Packing Group:** III  
**Information reported for product/size:** 52L

**International (Air, I.C.A.O.)**

-----  
**Proper Shipping Name:** DICHLOROMETHANE  
**Hazard Class:** 6.1  
**UN/NA:** UN1593  
**Packing Group:** III  
**Information reported for product/size:** 52L

### 15. Regulatory Information

```

-----\Chemical Inventory Status - Part 1\-----
Ingredient                TSCA  EC   Japan  Australia
-----
Methylene Chloride (75-09-2)  Yes  Yes  Yes    Yes
    
```

```

-----\Chemical Inventory Status - Part 2\-----
Ingredient                Korea  DSL   NDSL   Phil.
-----
Methylene Chloride (75-09-2)  Yes   Yes   No     Yes
    
```

```

-----\Federal, State & International Regulations - Part 1\-----
Ingredient                -SARA 302-  -SARA 313-----
                        RQ   TPQ   List  Chemical Catg.
-----
Methylene Chloride (75-09-2)  No   No    Yes    No
    
```

```

-----\Federal, State & International Regulations - Part 2\-----
Ingredient                CERCLA  -RCRA-  -TSCA-
                        1000   261.33  8(d)
-----
Methylene Chloride (75-09-2)  1000   U080    No
    
```

Chemical Weapons Convention: No    TSCA 12(b): No    CDTA: No  
SARA 311/312: Acute: Yes    Chronic: Yes    Fire: No    Pressure: No  
Reactivity: No    (Pure / Liquid)

**WARNING:**  
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

**Australian Hazchem Code:** 2Z  
**Poison Schedule:** S5  
**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: **2** Flammability: **1** Reactivity: **0**

**Label Hazard Warning:**

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER, CARDIOVASCULAR SYSTEM, AND BLOOD. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

**Label Precautions:**

Do not breathe vapor.  
Keep container closed.  
Use only with adequate ventilation.  
Wash thoroughly after handling.  
Keep away from heat and flame.  
Do not get in eyes, on skin, or on clothing.

**Label First Aid:**

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

\*\*\*\*\*  
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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

<b>MSDS</b>	<b>Material Safety Data Sheet</b>		24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
			National Response in Canada CANUTEC: 613-996-6666
			Outside U.S. and Canada Chemtrec: 703-527-3887
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		 	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.			

## CARBON DISULFIDE

### 1. Product Identification

**Synonyms:** Carbon bisulfide  
**CAS No.:** 75-15-0  
**Molecular Weight:** 76.1  
**Chemical Formula:** CS<sub>2</sub>  
**Product Codes:**  
 J.T. Baker: 9172, E350  
 Mallinckrodt: 8831

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Carbon Disulfide	75-15-0	90 - 100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. MAY BE FATAL IF SWALLOWED OR INHALED. HARMFUL IF ABSORBED THROUGH SKIN. AFFECTS THE CENTRAL AND PERIPHERAL NERVOUS SYSTEMS. A DEVELOPMENTAL AND REPRODUCTIVE HAZARD. AFFECTS CARDIOVASCULAR SYSTEM, LIVER AND KIDNEYS.**

SAF-T-DATA<sup>(tm)</sup> Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)

Flammability Rating: 3 - Severe (Flammable)

Reactivity Rating: 2 - Moderate

Contact Rating: 3 - Severe (Life)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

#### Potential Health Effects

##### Inhalation:

Vapors cause irritation to the respiratory tract, followed by symptoms of headache, dizziness, fatigue, garlic breath, nausea, vomiting, and abdominal pains. Affects the central nervous system and peripheral nervous system. Overexposure may produce hallucinations, narcosis, unconsciousness, convulsions, and even death.

##### Ingestion:

TOXIC! Symptoms parallel those of inhalation. May cause permanent disabilities described below in Chronic Exposure.

##### Skin Contact:

May produce reddening and burning, cracking and peeling. Contact with liquid for several minutes may result in a second-degree burn. Skin absorption can occur even in the presence of vapors, with toxic effects paralleling inhalation.

##### Eye Contact:

Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.

##### Chronic Exposure:

Kidney and liver damage, reproductive disorders, central and peripheral nervous system damage, vision problems, psychosis, and cardiovascular effects are associated

with chronic exposure to Carbon Disulfide.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance. Affects the developing fetus.

---

## 4. First Aid Measures

FOLLOWING ANY ROUTE OF EXPOSURE GET MEDICAL ATTENTION IMMEDIATELY.

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

**Note to Physician:**

Since effects may be delayed, keep victim under observation. The iodide-azide test is useful in detecting degree of exposure and hyposusceptibility of exposed workers. I.V. urea 0.5 to 1.5 g/kg is recommended to inactivate free carbon disulfide in the blood. Vitamin B6 in large doses is recommended. Obtain CBC, EKG, urinalysis, and electrolyte balance.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: -30C (-22F) CC

Autoignition temperature: 90C (194F)

Flammable limits in air % by volume:

lcl: 1.3; ucl: 50

Extremely Flammable Liquid and Vapor. Contact with strong oxidizers may cause fire. May ignite on contact with hot surfaces such as light bulbs, steam pipes, or engine exhaust pipes.

**Explosion:**

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Vapors can flow along surfaces to distant ignition source and flash back. Sealed containers may rupture when heated. Sensitive to static discharge.

**Fire Extinguishing Media:**

Dry chemical, foam or carbon dioxide. Fluoroprotein and protein foams are recommended over other types for carbon disulfide. Water spray may be used to keep fire exposed containers cool. Do not allow water runoff to enter sewers or waterways.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. This highly flammable liquid must be kept from sparks, open flame, hot surfaces, and all sources of heat and ignition. Flush area with water spray to cool containers and prevent reignition.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

---

## 7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Prepare safe grounding routes for lightning strikes in storage area. Electrical installations and heating facilities must be prohibited in or near storage areas. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

OSHA Z-2 TWA, 8 hour 20 ppm;

30 ppm Ceiling; 100 ppm Peak Concentration; Maximum Duration 30 minutes

ACGIH Threshold Limit Value (TLV):

1 ppm (TWA) (skin)

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Nearly odorless when pure, but most material has a strong garlic-type odor.

**Solubility:**

0.2 gm/100 ml water.

**Density:**

1.26

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

46C (115F)

**Melting Point:**

-100C (-148F)

**Vapor Density (Air=1):**

2.6

**Vapor Pressure (mm Hg):**

300 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

22.6

## 10. Stability and Reactivity

**Stability:**

Stable at room temperature in sealed containers. Heat and sunlight can contribute to instability. Containers may burst when heated.

**Hazardous Decomposition Products:**

Burning may produce carbon monoxide, carbon dioxide, sulfur oxides.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Contact with strong oxidizers and chemically active metals (such as Potassium, Zinc), chlorine, nitrogen oxides, azides, and organic amines may cause fire and explosions.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

**Toxicological Data:**

Inhalation rat LC50: 25 gm/m<sup>3</sup>/2H. Investigated as a mutagen, reproductive effector.

**Reproductive Toxicity:**

Carbon disulfide is a known human reproductive hazard. Menstrual disorders, spontaneous abortions and premature births are reported in cases of chronic exposure.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Carbon Disulfide (75-15-0)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material may biodegrade to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. When released into the water, this material is expected to have a half-life of less than 1 day. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.

**Environmental Toxicity:**

No information found.

---

### 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

### 14. Transport Information

**Domestic (Land, D.O.T.)**

-----  
**Proper Shipping Name:** CARBON DISULFIDE  
**Hazard Class:** 3, 6.1  
**UN/NA:** UN1131  
**Packing Group:** I  
**Information reported for product/size:** 2.5L

**International (Water, I.M.O.)**

-----  
**Proper Shipping Name:** CARBON DISULPHIDE  
**Hazard Class:** 3, 6.1  
**UN/NA:** UN1131  
**Packing Group:** I  
**Information reported for product/size:** 2.5L

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### 15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Carbon Disulfide (75-15-0)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	Korea	--Canada--		
		DSL	NDSL	Phil.
Carbon Disulfide (75-15-0)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----				
Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Carbon Disulfide (75-15-0)	100	10000	Yes	No

-----\Federal, State & International Regulations - Part 2\-----			
Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8(d)
Carbon Disulfide (75-15-0)	100	P022	Yes

Chemical Weapons Convention: No TSCA 12(b): Yes CDTA: No  
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No  
Reactivity: No (Pure / Liquid)

**WARNING:**

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

**Australian Hazchem Code:** 3WE

**Poison Schedule:** S6

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: **3** Flammability: **4** Reactivity: **0**

**Label Hazard Warning:**

DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. MAY BE FATAL IF SWALLOWED OR INHALED. HARMFUL IF ABSORBED THROUGH SKIN. AFFECTS THE CENTRAL AND PERIPHERAL NERVOUS SYSTEMS. A DEVELOPMENTAL AND REPRODUCTIVE HAZARD. AFFECTS CARDIOVASCULAR SYSTEM, LIVER AND KIDNEYS.

**Label Precautions:**

Keep away from heat, sparks and flame.

Do not breathe vapor.

Keep container closed.

Do not get in eyes, on skin, or on clothing.

Use only with adequate ventilation.

Wash thoroughly after handling.

**Label First Aid:**

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

\*\*\*\*\*

**Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy.**

**This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product.**

**Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose.**

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 75-25-2****Date: 03/09/2001**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: **BROMOFORM**

SYNONYMS: Tribromomethane, Methyl Tribromide, Methenyl Tribromide.

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	ACGIH TLV	Exposure Limits (PPM)		
					OSHA PEL	MAC	Other STEL
BROMOFORM	CHBR3	75-25-2	99+%	.5	.5	.5	NE

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIANT

## 3. HAZARD IDENTIFICATION

**\* \* \* EMERGENCY OVERVIEW \* \* \***

Poisonous liquid and vapor.

May cause irritation to eyes, skin, and respiratory tract.

Central nervous system depressant.

### POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation , Ingestion , Skin

ACUTE EFFECTS: If inhaled, may be irritating to mucous membrane and upper respiratory tract. Overexposure may cause nausea, headache, dizziness, vomiting and weakness. It is a metabolic poison and causes lachrymation. Acts as a central nervous system depressant. May damage liver and kidney. Can be absorbed through the skin. Severe exposure may lead to narcosis and coma.

CHRONIC EFFECTS: None known

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Existing problems with CNS, kidneys, liver, and lungs may be worsened.

OTHER EFFECTS OF OVEREXPOSURE: None

CARCINOGENICITY (US ONLY):

NTP - NO

IARC MONOGRAPHS - NO

OSHA REGULATED - NO

**4. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration.

**EYE CONTACT:** Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes.

**SKIN CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes while removing contaminated clothing.

**INGESTION:** DO NOT INDUCE VOMITING. Have victim drink 8 to 10 oz. (240 to 300 ml.) of water to dilute material in stomach. If vomiting occurs naturally, have victim lean forward to reduce the risk of aspiration to the victim. Never give anything by mouth to an unconscious person.



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 75-27-4****Date: 03/09/2001**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: **BROMODICHLOROMETHANE**SYNONYMS: **Methane-bromodichloro, BDCM, Monobromodichloromethane.**

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	Exposure Limits (PPM)			
				ACGIH TLV	OSHA PEL	MAC	Other STEL
<b>BROMODICHLOROMETHANE</b>	CHBRCL2	75-27-4	99+%	NE	NE	NE	NE

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIANT

## 3. HAZARD IDENTIFICATION

**\*\*\* EMERGENCY OVERVIEW \*\*\*****Nonflammable liquid and vapor.****May cause irritation to eyes, skin, and mucous membranes.****May cause respiratory tract and central nervous system depression.**

### POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: **Inhalation , Skin**ACUTE EFFECTS: **Inhalation can cause irritation to the eyes, mucous membranes, and respiratory tract. Can be absorbed through the skin. This material is narcotic in high concentrations. Prolonged exposure can cause nausea, dizziness and headaches. Acts as a central nervous system depressant.**CHRONIC EFFECTS: **None known Suspected human carcinogen.**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: **None known**OTHER EFFECTS OF OVEREXPOSURE: **None**

CARCINOGENICITY (US ONLY):

NTP - **Yes**IARC MONOGRAPHS - **Yes**

OSHA REGULATED - No

**4. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration.

**EYE CONTACT:** Do not allow victim to rub or keep eyes tightly shut. Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes.

**SKIN CONTACT:** Immediately remove contaminated clothing. Rinse the affected area with flooding amounts of water and then wash it with soap and water.

**INGESTION:** Never give anything by mouth to an unconscious person. Contact a poison control center. Unless the poison control center advises otherwise, have the conscious and alert person drink 1 to 2 glasses of water to dilute.

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: None

**5. FIRE FIGHTING MEASURES**

**FLASH POINT:** Nonflammable

**AUTOIGNITION TEMPERATURE:** N/Ap

**FLAMMABLE LIMITS:** Nonflammable

LOWER:

UPPER:

**EXTINGUISHING MEDIA:** Use what is appropriate for surrounding fire.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide, chlorine, phosgene, and bromine gases.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Emits toxic fumes under fire conditions.

**6. ACCIDENTAL RELEASE MEASURES**

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Absorb with sand or vermiculite and place in closed containers for disposal.

**SPECIALIZED EQUIPMENT:** None

**7. HANDLING AND STORAGE**

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation.

EYE / FACE PROTECTION: Goggles. A safety shower and eyewash station should be readily available.

SKIN PROTECTION: Protective gloves. Wear suitable protective clothing.

RESPIRATORY PROTECTION: Use a self-contained breathing apparatus in case of emergency or non-routine use.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

APPEARANCE: Colorless

ODOR: Unknown.

PHYSICAL PRESSURE: Liquid

VAPOR PRESSURE: @20 deg. C: 50 mmHg

VAPOR DENSITY (AIR=1): N/Av

BOILING POINT (C): 90.6

SOLUBILITY IN WATER: 4,500 mg/L

SPECIFIC GRAVITY (H<sub>2</sub>O=1): @20 deg. C: 1.980

EVAPORATION RATE: N/Av

ODOR THRESHOLD: 1680 mg/m<sup>3</sup>

**10. STABILITY AND REACTIVITY**

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage near a heat source.

MATERIALS TO AVOID: Bases. Oxidizing agents. Magnesium.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: Fumes of carbon monoxide, hydrogen chloride gas and hydrogen bromide gas.

## 11. TOXICOLOGICAL INFORMATION

LETHAL CONCENTRATION (LC50): NONE ESTABLISHED

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

## 12. ECOLOGICAL INFORMATION

No adverse ecological effects are expected.

## 13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Return cylinders to supplier with any valve outlet plugs or caps secured and valve protection cap in place. Follow federal, state and local regulations. Non-returnable cylinders must not be refilled. Dispose of non-refillable cylinders in accordance with federal, state, and local regulations.

## 14. TRANSPORT INFORMATION

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Environmentally hazardous substances, liquid, n.o.s.

HAZARD CLASS: 9, Packing group III.

IDENTIFICATION NUMBER: UN3082

REPORTABLE QUANTITIES: None

LABELING: CLASS 9

ADR / RID (EU Only): N/Av

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

## 15. REGULATORY INFORMATION

**15. REGULATORY INFORMATION**

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 200-856-7

NUMBER IN ANNEX 1 OF DIR 67/548: Not listed in annex 1.

EU CLASSIFICATION: N/Av

R: 45,46,20/21/22,36/37/38

S: 45,26,28,27,36/37/39

**16. OTHER INFORMATION**

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 75-34-3****Date: 03/09/2001**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: 1,1-DICHLOROETHANE

SYNONYMS: Ethylidene chloride, Ethylidene Dichloride

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	ACGIH TLV	Exposure Limits (PPM)		
					OSHA PEL	MAC	Other STEL
1,1-DICHLOROETHANE	C <sub>2</sub> H <sub>4</sub> Cl <sub>2</sub>	75-34-3	99+%	100	100	100	NE

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIANT

## 3. HAZARD IDENTIFICATION

\* \* \* EMERGENCY OVERVIEW \* \* \*

Flammable liquid and vapor.

Can form explosive mixtures with air.

Can cause irritation to eyes, skin and respiratory tract.

## POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation , Skin , Ingestion

ACUTE EFFECTS: Moderately toxic by inhalation and ingestion. Overexposure may cause nausea, headache, dizziness, vomiting and weakness. Skin exposure may cause irritation, itching, erythema, swelling, burning and pain. Can be absorbed through the skin. Liquid contact with the eye causes severe corneal injury.

CHRONIC EFFECTS: Kidney and liver damage.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None known

OTHER EFFECTS OF OVEREXPOSURE: None

CARCINOGENICITY (US ONLY):

NTP - No

IARC MONOGRAPHS - No

OSHA REGULATED - No

**4. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

**EYE CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes.

**SKIN CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes while removing contaminated clothing.

**INGESTION:** Never give anything by mouth to an unconscious person. Have conscious and alert person drink 1 to 2 glasses of water.

**IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN**

**NOTE TO PHYSICIAN:** None

**5. FIRE FIGHTING MEASURES**

**FLASH POINT:** -5.6 deg. celsius

**AUTOIGNITION TEMPERATURE:** 458 deg. C

**FLAMMABLE LIMITS:** Vol. %

LOWER: 5.6

UPPER: NONE ESTABLISHED

**EXTINGUISHING MEDIA:** Carbon dioxide, foam, or dry chemical.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray. Water is ineffective except for keeping containers cool. Use blanketing effect to smother fires. Extinguish only if flow can be stopped. Dangerous fire hazard and moderate explosion hazard when heated.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide, hydrogen chloride and phosgene.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Cylinder rupture may occur under fire conditions. Emits toxic fumes under fire conditions. Vapors may travel a considerable distance to the source of ignition and flash back.

**6. ACCIDENTAL RELEASE MEASURES**

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Remove leaking cylinder to exhaust hood or safe outdoor area. Shut off source if possible and remove source of heat. Absorb with sand or vermiculite and place in closed containers for disposal.

**SPECIALIZED EQUIPMENT:** None

## 7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders. Use only in a well-ventilated area.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use. Store away from oxidizers, combustible materials, and source of ignition or heat.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentrations below exposure and flammable limits.

EYE / FACE PROTECTION: Goggles. A safety shower and eyewash station should be readily available.

SKIN PROTECTION: Impervious gloves, coveralls, boots, and/or other resistant protective clothing.

RESPIRATORY PROTECTION: Use a self-contained breathing apparatus in case of emergency or non-routine use.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless

ODOR: Mild aromatic odor.

PHYSICAL PRESSURE: Liquid

VAPOR PRESSURE: @25 deg.C: 230 mm Hg

VAPOR DENSITY (AIR=1): 3.44

BOILING POINT (C): 57.3

SOLUBILITY IN WATER: Slight

SPECIFIC GRAVITY (H2O=1): @20 deg.C: 1.174

EVAPORATION RATE: N/Av

ODOR THRESHOLD: N/Av

## 10. STABILITY AND REACTIVITY

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas. Storage near a heat source.

MATERIALS TO AVOID: Oxidizing agents. Alkali or alkaline earth metals, aluminum. Bases.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: HCl gas, phosgene gas, CO and oxides of chlorine.

## 11. TOXICOLOGICAL INFORMATION

LETHAL CONCENTRATION (LC50): None Established

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

## 12. ECOLOGICAL INFORMATION

No adverse ecological effects are expected.

## 13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place. Waste can be burned in an approved incinerator equipped with an afterburner and scrubber.

## 14. TRANSPORT INFORMATION

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: 1,1-Dichloroethane  
HAZARD CLASS: 3 (flammable), Packing Group II  
IDENTIFICATION NUMBER: UN2362  
REPORTABLE QUANTITIES: 1000 lb.  
LABELING: FLAMMABLE LIQUID

ADR / RID (EU Only): Class 3, 3(b)

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

## 15. REGULATORY INFORMATION

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 200-863-5

NUMBER IN ANNEX 1 OF DIR 67/548: Material is listed in annex 1.

EU CLASSIFICATION: N/Av

R: 11-22-36/37

S: 16-23

## 16. OTHER INFORMATION

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 75-35-4****Date: 05/31/2006**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: 1,1-DICHLOROETHYLENE

SYNONYMS: Vinylidene Chloride

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

<u>Ingredient Name</u>	<u>Formula</u>	<u>CAS #</u>	<u>Concentration</u>	<u>Exposure Limits (PPM)</u>			
				<u>ACGIH TLV</u>	<u>OSHA PEL</u>	<u>MAC</u>	<u>Other STEL</u>
1,1-DICHLOROETHYLENE	C <sub>2</sub> H <sub>2</sub> Cl <sub>2</sub>	75-35-4	99+%	5	1	5	100

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIANT

## 3. HAZARD IDENTIFICATION

\* \* \* EMERGENCY OVERVIEW \* \* \*

Flammable liquid and vapor.

Can form explosive mixtures with air.

May be fatal if inhaled.

May cause heart, liver and kidney damage.

May cause irritation to the respiratory tract and skin.

## POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation, Ingestion, Skin

ACUTE EFFECTS: Inhalation causes irritation of the respiratory tract. Symptoms include shortness of breath, headache, confusion, nausea, dizziness, and unconsciousness. Severe exposure may cause unconsciousness and death. Eye contact may cause irritation, redness, or blurred vision. Skin contact can cause defatting and dermatitis. Can be absorbed through the skin. Ingestion irritates the digestive tract and may cause partial paralysis, unconsciousness and kidney damage.

CHRONIC EFFECTS: Kidney and liver damage. Heart damage. Alteration of genetic material.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None known

OTHER EFFECTS OF OVEREXPOSURE: None

CARCINOGENICITY (US ONLY):

NTP - No

IARC MONOGRAPHS - No

OSHA REGULATED - No

**4. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

**EYE CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes.

**SKIN CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes while removing contaminated clothing.

**INGESTION:** Never give anything by mouth to an unconscious person. Have conscious and alert person drink 1 to 2 glasses of water. Induce vomiting after victim drinks water.

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: None

**5. FIRE FIGHTING MEASURES**

**FLASH POINT:** -17.8 deg. C

**AUTOIGNITION TEMPERATURE:** 570 deg. C

**FLAMMABLE LIMITS:** Vol. %

LOWER: 7.3

UPPER: 16

**EXTINGUISHING MEDIA:** Carbon dioxide, foam, or dry chemical.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray. If possible, stop the product flow.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide, hydrogen chloride and phosgene.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Emits toxic fumes under fire conditions. Cylinder rupture may occur under fire conditions.

**6. ACCIDENTAL RELEASE MEASURES**

**CLEAN UP PROCEDURES:** Remove leaking cylinder to exhaust hood or safe outdoor area if this can be done safely. Evacuate and ventilate area. Use a self-contained breathing apparatus in case of emergency or non-routine use. Shut off source if possible and remove source of heat. Absorb with sand or vermiculite and place in closed containers for disposal.

SPECIALIZED EQUIPMENT: None

## 7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders. Use only in a well-ventilated area.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use. Store away from heat, flame, and sparks.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentrations below exposure and flammable limits.

EYE / FACE PROTECTION: Goggles.

SKIN PROTECTION: Impervious gloves, coveralls, boots, and/or other resistant protective clothing.

RESPIRATORY PROTECTION: Use a self-contained breathing apparatus in case of emergency or non-routine use.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless

ODOR: Sweet chloroform odor.

PHYSICAL PRESSURE: Liquid

VAPOR PRESSURE: @20 deg. celsius: 500 mm Hg

VAPOR DENSITY (AIR=1): 3.25

BOILING POINT (C): 31.9

SOLUBILITY IN WATER: Insoluble

SPECIFIC GRAVITY (H2O=1): @20 deg. celsius: 1.218

EVAPORATION RATE: N/Av

ODOR THRESHOLD: 500ppm

## 10. STABILITY AND REACTIVITY

**10. STABILITY AND REACTIVITY**

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas. Storage near a heat source. Exposure to light, moisture, and ignition sources.

MATERIALS TO AVOID: Powdered alkali or alkaline earth metals, strong oxidizing agents.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: HCl gas, phosgene gas, CO and oxides of chlorine.

**11. TOXICOLOGICAL INFORMATION**

LETHAL CONCENTRATION (LC50): NONE ESTABLISHED

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

**12. ECOLOGICAL INFORMATION**

No adverse ecological effects are expected.

**13. DISPOSAL CONSIDERATIONS**

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place. Waste can be burned in an approved incinerator equipped with an afterburner and scrubber.

**14. TRANSPORT INFORMATION**

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Vinylidene chloride, inhibited  
HAZARD CLASS: 3 (flammable), Packing Group I  
IDENTIFICATION NUMBER: UN1303  
REPORTABLE QUANTITIES: 100 lb.  
LABELING: FLAMMABLE LIQUID

ADR / RID (EU Only): Class 3, 1A

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

## 15. REGULATORY INFORMATION

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 200-864-0

NUMBER IN ANNEX 1 OF DIR 67/548: Material is listed in annex 1.

EU CLASSIFICATION: N/Av

R: 12-20-40

S: 7-16-29

## 16. OTHER INFORMATION

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.

**MATERIAL SAFETY DATA SHEET****PRODUCT NAME: HALOCARBON 11****1. Chemical Product and Company Identification**

**BOC Gases,  
Division of  
The BOC Group, Inc.  
575 Mountain Avenue  
Murray Hill, NJ 07974**

**BOC Gases  
Division of  
BOC Canada Limited  
5975 Falbourne Street, Unit 2  
Mississauga, Ontario L5R 3W6**

**TELEPHONE NUMBER: (908) 464-8100****24-HOUR EMERGENCY TELEPHONE NUMBER:  
CHEMTREC (800) 424-9300****TELEPHONE NUMBER: (905) 501-1700****24-HOUR EMERGENCY TELEPHONE NUMBER:  
(905) 501-0802****EMERGENCY RESPONSE PLAN NO: 20101****PRODUCT NAME: HALOCARBON 11****CHEMICAL NAME: Trichlorofluoromethane****COMMON NAMES/SYNONYMS: Fluorocarbon 11, Freon (R) 11, Trichlorofluoromethane****TDG (Canada) CLASSIFICATION: Not Regulated****WHMIS CLASSIFICATION: A, D2B****PREPARED BY: Loss Control (908)464-8100/(905)501-1700****PREPARATION DATE: 6/1/95****REVIEW DATES: 6/7/96****2. Composition, Information on Ingredients**

INGREDIENT	% VOLUME	PEL-OSHA <sup>1</sup>	TLV-ACGIH <sup>2</sup>	LD <sub>50</sub> or LC <sub>50</sub> Route/Species
Trichlorofluoromethane FORMULA: CCl <sub>3</sub> F CAS: 75-69-4 RTECS #: PB6125000	>99.0	Not Available	1000 ppm TWA	LC <sub>50</sub> 130,000 ppm/ 15min (rat)

<sup>1</sup> As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)<sup>2</sup> As stated in the ACGIH 1994-95 Threshold Limit Values for Chemical Substances and Physical Agents**3. Hazards Identification****EMERGENCY OVERVIEW**

This product does not contain oxygen and may cause asphyxia if released in a confined area. Chlorofluorocarbons can cause irritation, central nervous system depression and irregular heart beat at high concentrations. Nonflammable but decomposes to toxic gases, including phosgene, under fire conditions.

**ROUTE OF ENTRY:**

Skin Contact Yes	Skin Absorption No	Eye Contact Yes	Inhalation Yes	Ingestion No
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**PRODUCT NAME: HALOCARBON 11**

**HEALTH EFFECTS:**

Exposure Limits Yes	Irritant Yes	Sensitization No
Teratogen No	Reproductive Hazard No	Mutagen No
Synergistic Effects None Reported		

Carcinogenicity: -- NTP: No IARC: No OSHA: No

**EYE EFFECTS:**

Persons with potential exposure should not wear contact lenses. Contact may cause tissue damage and cryogenic burns similar to skin contact. Seek medical treatment as soon as possible.

**SKIN EFFECTS:**

Contact with the rapidly evaporating liquid may cause frostbite. Frostbite effects appear as a change in color of the skin to grey or white, possibly followed by blistering.

**INGESTION EFFECTS:**

Ingestion is not likely.

**INHALATION EFFECTS:**

Product is relatively nontoxic. CFCs can irritate the eyes, mucous membranes and respiratory system.

Inhalation of high concentrations may cause dizziness, disorientation, incoordination, narcosis, nausea or vomiting leading to unconsciousness.. At high concentrations narcotic effects may be produced and may cause the heart to beat irregularly and stop.

Oxygen deficiency may occur in the presence of high concentrations resulting in asphyxiation. Maintain oxygen levels above 19.5% at sea level. Effects of oxygen deficiency resulting from simple asphyxiants may include: rapid breathing, diminished mental alertness, impaired muscular coordination, faulty judgement, depression of all sensations, emotional instability, and fatigue. As asphyxiation progresses, nausea, vomiting, prostration, and loss of consciousness may result, eventually leading to convulsions, coma, and death.

Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:**

Pre-existing heart condition.

**NFPA HAZARD CODES**

Health: 1  
Flammability: 0  
Reactivity: 0

**HMIS HAZARD CODES**

Health: 1  
Flammability: 0  
Reactivity: 0

**RATINGS SYSTEM**

0 = No Hazard  
1 = Slight Hazard  
2 = Moderate Hazard  
3 = Serious Hazard  
4 = Severe Hazard

**MSDS: G-41**

**Revised: 6/7/96**

#### 4. First Aid Measures

**EYES:**

Never introduce ointment or oil into the eyes without medical advice! If pain is present, refer the victim to an ophthalmologist for treatment and follow up. If the victim cannot tolerate light, protect the eyes with a light bandage.

**SKIN:**

Remove contaminated clothing and flush affected areas with lukewarm water. If irritation persists, seek medical attention.

**INGESTION:**

None anticipated. Product is a gas.

**INHALATION:**

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Remove victim to fresh air. Administer artificial respiration if breathing has stopped and supplement with oxygen by a trained individual. Further treatment should be symptomatic and supportive. Seek medical attention as soon as possible for follow up treatment. Remove to fresh air. If necessary, give oxygen or provide artificial respiration. Call a physician.

NOTE TO PHYSICIAN: A patient adversely affected by exposure to this product should not be given adrenalin (epinephrine) or similar heart stimulant since these would increase the risk of cardiac arrhythmias.

#### 5. Fire Fighting Measures

Conditions of Flammability: Nonflammable		
Flash point: None	Method: Not Applicable	Autoignition Temperature: None
LEL(%): None		UEL(%): None
Hazardous combustion products: None. Decomposes to toxic gases at fire temperatures		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: None		

**FIRE AND EXPLOSION HAZARDS:**

If involved in a fire, product may decompose yielding toxic products, which may include phosgene, hydrochloric and hydrofluoric acids.

**EXTINGUISHING MEDIA:**

None required. Use media appropriate for surrounding flammable substances.

**FIRE FIGHTING INSTRUCTIONS:**

Positive-pressure, self-contained respiratory equipment for fires involving large quantities of this material.

## 6. Accidental Release Measures

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest BOC location.

## 7. Handling and Storage

Product is noncorrosive and may be used with any common structural material. Silver and carbon bearing alloys can act as catalysts for decomposing the product at high temperatures. Alloys containing more than 2% magnesium should not be used if water is present.

Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<150 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Protect cylinders from physical damage.

Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time. For additional handling recommendations, consult Compressed Gas Association Pamphlet P-1. Handle with reasonable care. Store in a cool, dry place.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

## 8. Exposure Controls, Personal Protection

### EXPOSURE LIMITS<sup>1</sup>:

INGREDIENT	% VOLUME	PEL-OSHA <sup>2</sup>	TLV-ACGIH <sup>3</sup>	LD <sub>50</sub> or LC <sub>50</sub> Route/Species
Trichlorofluoromethane FORMULA: CCl <sub>3</sub> F CAS: 75-69-4 RTECS #: PB6125000	>99.0	Not Available	1000 ppm TWA	LC <sub>50</sub> 130,000 ppm/ 15min (rat)

<sup>1</sup> Refer to individual state of provincial regulations, as applicable, for limits which may be more stringent than those listed here.

<sup>2</sup> As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)

<sup>3</sup> As stated in the ACGIH 1994-1995 Threshold Limit Values for Chemical Substances and Physical Agents.

### ENGINEERING CONTROLS:

Hood with forced ventilation; provide local exhaust to prevent accumulation above the exposure limit.

### EYE/FACE PROTECTION:

Chemical splash goggles or faceshield recommended to prevent contact with cryogenic liquid.

**SKIN PROTECTION:**

Neoprene rubber gloves. If contact with the liquid phase may occur, gloves should provide sufficient insulation to protect against frostbite and cold burns.

**RESPIRATORY PROTECTION:**

A Type C respirator with full-face piece equipped with an escape bottle or a self-contained breathing apparatus should be available for emergency use. Operate this equipment in the positive pressure demand mode.

**OTHER/GENERAL PROTECTION:**

Safety shoes, eyewash "fountain."

**9. Physical and Chemical Properties**

<b>PARAMETER</b>	<b>VALUE</b>	<b>UNITS</b>
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure at 70 °F	: 635.9	psia
Vapor density (Air = 1)	: Not Available	
Evaporation point	: Not Available	
Boiling point	: 74.8	°F
	: 23.8	°C
Freezing point	: -168	°F
	: -111.1	°C
pH	: Not Available	
Specific gravity	: 4.87	
Oil/water partition coefficient	: Not Available	
Solubility (H2O)	: Slight	
Odor threshold	: Not Available	
Odor and appearance	: Slight ethereal odor at concentrations greater than 20% by volume. Water white volatile liquid.	

**10. Stability and Reactivity**

**STABILITY:**

Stable

**INCOMPATIBLE MATERIALS:**

May react violently with chemically active metals such as sodium, potassium and barium, powdered magnesium, powdered aluminum and organometallics.

**HAZARDOUS DECOMPOSITION PRODUCTS:**

Decomposes at fire temperatures to hydrochloric and hydrofluoric acids, carbonyl fluoride and phosgene.

**HAZARDOUS POLYMERIZATION:**

Will not occur.

## 11. Toxicological Information

Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

No chronic effects data given in the Registry of Toxic Effects of Chemical Substances (RTECS) or Sax, Dangerous Properties of Industrial Materials, 7th ed.

## 12. Ecological Information

No data given.

## 13. Disposal Considerations

Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to BOC Gases or authorized distributor for proper disposal.

## 14. Transport Information

PARAMETER	United States DOT	Canada TDG
PROPER SHIPPING NAME:	Compressed gases, n.o.s. (Trichlorofluoromethane)	Compressed gases, n.o.s. (Trichlorofluoromethane)
HAZARD CLASS:	2.2	2.2
IDENTIFICATION NUMBER:	UN1956	UN1956
SHIPPING LABEL:	NONFLAMMABLE GAS	NONFLAMMABLE GAS

**Additional Marking Requirement:** If net weight of product in a single container  $\geq$  5000 pounds, the container must be marked with the letters "RQ".

**Additional Shipping Paper Description Requirement:** If net weight of product in a single container  $\geq$  5000 pounds, the shipping papers must be marked with the letters "RQ".

## 15. Regulatory Information

### SARA TITLE III NOTIFICATIONS AND INFORMATION

Releases of trichlorofluoromethane in quantities equal to or greater than the reportable quantity (RQ) of 5,000 pounds are subject to reporting to the National Response Center under CERCLA, Section 304 SARA Title III.

### SARA TITLE III - HAZARD CLASSES:

Acute Health Hazard

Sudden Release of Pressure Hazard

### SARA TITLE III - SECTION 313 SUPPLIER NOTIFICATION:

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

CAS NUMBER	INGREDIENT NAME	PERCENT BY VOLUME
75-69-4	Trichlorofluoromethane	> 99.0

This information must be included on all MSDSs that are copied and distributed for this material.

## 16. Other Information

Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

### **DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES:**

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).



**AIR LIQUIDE**

# MATERIAL SAFETY DATA SHEET

*Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards*

## 1. PRODUCT AND COMPANY INFORMATION

**CHEMICAL NAME; CLASS: DICHLORODIFLUOROMETHANE**

**SYNONYMS:** Fluorocarbon 12; Refrigerant 12; Propellant 12; Halon 12; Freon 12; FC 12; F-12

**CHEMICAL FAMILY NAME:** Halogenated Aliphatic Hydrocarbon

**FORMULA:** CCl<sub>2</sub>F<sub>2</sub>

**PRODUCT USE:**

Document Number: 20044

Refrigerant; blowing agent; aerosol propellant solvent; degreasing agent; monomer for resins; leak-detecting agent; preparation of frozen tissue sections.

**MANUFACTURED/SUPPLIED FOR:**

**ADDRESS:**



2700 Post Oak Drive  
Houston, TX 77056-8229

**EMERGENCY PHONE:**

CHEMTREC: 1-800-424-9300

**BUSINESS PHONE:**

General MSDS Information 1-713/896-2896  
Fax on Demand: 1-800/231-1366

## 2. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:** Dichlorodifluoromethane is a colorless, non-flammable, liquefied gas with a slightly ethereal odor. Dichlorodifluoromethane can cause central nervous system depression after inhalation exposures. Symptoms of such over-exposure can include drowsiness, fatigue, and weakness. At high concentrations, the gas can act as an asphyxiant, by displacing oxygen. Therefore, exposure to high concentrations of this gas can be fatal. Frostbite can be caused by contact with rapidly expanding gases or the liquefied gas. This gas is not flammable and not reactive in normal emergency response situations. However, if involved in a fire, this product can decompose to produce toxic gases (i.e. hydrogen fluoride, phosgene).

**SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE:** The most significant route of over-exposure for this gas is by inhalation.

Exposures to high concentrations of this gas (above 10,000 ppm) may cause central nervous system depression and cause irritation of the nose, throat and upper respiratory system. Effects of such over-exposure can include light-headedness, giddiness, shortness of breath and in extreme cases, irregular heartbeats, cardiac arrest, and death. At concentrations of 40,000 ppm symptoms of exposure include slurred speech, a tingling sensation, humming in the ears, and apprehension. At 100,000 ppm, symptoms of incoordination can appear. All symptoms all more pronounced as the concentration of Dichlorodifluoromethane increases.

Deliberate abuse of Dichlorodifluoromethane by aerosol "sniffing" and use or misuse of bronchodilator aerosols have resulted in death. The cause of death is usually related to irregular heartbeat leading to cardiac arrest. These effects have not been reported in the workplace.

High concentrations of this gas can also cause an oxygen-deficient environment. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The following effects associated with various levels of oxygen are as follows:

<u>CONCENTRATION</u>	<u>SYMPTOM OF EXPOSURE</u>
12-16% Oxygen:	Breathing and pulse rate increased, muscular coordination slightly disturbed.
10-14% Oxygen:	Emotional upset, abnormal fatigue, disturbed respiration.
6-10% Oxygen:	Nausea and vomiting, collapse or loss of consciousness.
Below 6%:	Convulsive movements, possible respiratory collapse, and death.

**OTHER POTENTIAL HEALTH EFFECTS:** Contact with liquid or rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact can quickly subside.

**HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms.** Over-exposure to may cause the following health effects:

**ACUTE:** The most significant hazard associated with this product is inhalation of high concentrations of Dichlorodifluoromethane. Such over-exposure can cause central nervous system depression and can cause oxygen deficiency. Symptoms of oxygen deficiency include respiratory difficulty, ringing in ears, headaches, shortness of breath, wheezing, headache, dizziness, indigestion, nausea, and, at high concentrations, unconsciousness or death may occur. The skin of a victim of over-exposure may have a blue color.

**CHRONIC:** This gas can cause moderate cardiac sensitization in test animals. Refer to Section 11 (Toxicology Information) for additional data.

**TARGET ORGANS:** Respiratory system, central nervous system.

### 3. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA			OTHER
			TLV ppm	STEL ppm	PEL ppm	STEL ppm	IDLH ppm	
DICHLORODIFLUOROMETHANE	75-71-8	100	1000, A4 (Not Classifiable as a Human Carcinogen)	NE	1000	NE	NE	NIOSH REL: 1000 ppm TWA DFG MAK: 1000 ppm

**This material is classified as hazardous under OSHA regulations in the United States and the WHMIS in Canada.**

NE = Not Established

C = Ceiling Limit

See Section 16 for Definitions of Terms Used.

NOTE: all WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-2004 format.

### 4 FIRST-AID MEASURES

**RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS PRODUCT WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus should be worn.**

Remove victim(s) to fresh air, as quickly as possible. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Only trained personnel should administer supplemental oxygen.

**SKIN EXPOSURE:** Contact with the liquid or rapidly expanding gases can cause frostbite. In the event of frostbite, medical attention must be sought. Frozen tissue is painless and appears waxy, with a possible yellow color. Frozen tissue will become swollen, painful and prone to infection when thawed. If the frozen part of the body has been thawed by the time medical attention has been obtained, cover the area with a dry sterile dressing and a large bulky protective covering.

**EYE EXPOSURE:** If liquid is splashed into eyes, or if irritation of the eye develops after exposure to liquid or gas, open victim's eyes while under gentle running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Seek medical assistance immediately, preferably an ophthalmologist.

Victim(s) must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to physician or other health professional with victim(s).

### 5. FIRE-FIGHTING MEASURES

**FLASH POINT:** Not applicable.

**AUTOIGNITION TEMPERATURE:** Not applicable.

**FLAMMABLE LIMITS (in air by volume, %):**

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

**FIRE EXTINGUISHING MATERIALS:** Non-flammable, inert gas. Use extinguishing media appropriate for surrounding fire.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** When involved in a fire, this material may decompose and produce toxic gases (i.e. phosgene, hydrogen fluoride, hydrogen chloride, and carbonyl fluoride). Dichlorodifluoromethane does not burn; however, containers, when involved in fire, may rupture or burst in the heat of the fire.

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

**SPECIAL FIRE-FIGHTING PROCEDURES:** Structural fire-fighters must wear Self-Contained Breathing Apparatus and full protective equipment.

## 6. ACCIDENTAL RELEASE MEASURES

**LEAK RESPONSE:** Evacuate immediate area. Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a leak, clear the affected area, protect people, and respond with trained personnel.

Minimum Personal Protective Equipment should be: **Level B: Self-Contained Breathing Apparatus.** Locate and seal the source of the leaking gas. Colorimetric tubes are available to detect the presence of Dichlorodifluoromethane.

Readings should be below levels listed in Section 2 (Composition and Information on Ingredients ) and the area should be monitored for oxygen levels. The atmosphere must have at least 19.5 percent oxygen before personnel can be allowed in the area without Self-Contained Breathing Apparatus.

If leaking incidentally from the cylinder or its valve, contact your supplier.

## 7. HANDLING AND STORAGE

**WORK PRACTICES AND HYGIENE PRACTICES:** Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of this product could occur without any significant warning symptoms, due to oxygen deficiency.

**STORAGE AND HANDLING PRACTICES:** Cylinders should be stored upright and be firmly secured to prevent falling or being knocked-over. Cylinders can be stored in the open, but in such cases, should be protected against extremes of weather and from the dampness of the ground to prevent rusting. Cylinders should be stored in dry, well-ventilated areas away from sources of heat, ignition and direct sunlight.

Keep storage area clear of materials which can burn. Do not allow area where cylinders are stored to exceed 52°C (125°F). Store containers away from heavily trafficked areas and emergency exits. Store away from process and production areas, away from elevators, building and room exits or main aisles leading to exits. Protect cylinders against physical damage. Use only storage containers and equipment (pipes, valves, fittings to relieve pressure, etc.) designed for the temperatures and pressures for the use and storage of Liquid Dichlorodifluoromethane.

Use a check valve or other protective device in the discharge line to prevent hazardous backflow. Never tamper with pressure relief valves and cylinders.

Keep the smallest amount necessary on-site at any one time. Full and empty cylinders should be segregated. Use a first-in, first-out inventory systems to prevent full containers from being stored for long periods of time.

**SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS:** Compressed gases can present significant safety hazards. The following rules are applicable to work situations in which cylinders are being used.

**Before Use:** Move cylinders with a suitable hand-truck. Do not drag, slide or roll cylinders. Do not drop cylinders or permit them to strike each other. Secure cylinders firmly. Leave the valve protection cap (where provided) in-place until cylinder is ready for use.

**During Use:** Use designated CGA fittings and other support equipment. Do not use adapters. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder. Do not use oils or grease on gas-handling fittings or equipment. Immediately contact the supplier if there are any difficulties associated with operating cylinder valve. Never insert an object (e.g wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing a leak to occur. Use an adjustable strap wrench to remove over-tight or rusted caps. Never strike an arc, on a compressed gas cylinder or make a cylinder part of an electric circuit.

**After Use:** Close main cylinder valve. Valves should be closed tightly. Replace valve protection cap. Mark empty cylinders "EMPTY".

**NOTE:** Use only DOT or ASME code containers designed for gas storage. Close valve after each use and when empty.

**STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:** Use the proper CGA connections, DO NOT USE ADAPTERS:

<u>THREADED:</u>	0-3000 psig - CGA 660
	0 - 500 psig - CGA 165 (limited standard)
	0 - 500 psig - CGA 182 (limited standard)
<u>PIN-INDEXED YOKE:</u>	Not Applicable.
<u>ULTRA HIGH INTEGRITY:</u>	716

## 7. HANDLING AND STORAGE (Continued)

**PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT:** Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely. Always use product in areas where adequate ventilation is provided.

## 8. EXPOSURE CONTROLS - PERSONAL PROTECTION

**VENTILATION AND ENGINEERING CONTROLS:** Use with adequate ventilation. Local exhaust ventilation is preferred, because it prevents gas dispersion into the work place by eliminating it at its source. If appropriate, install automatic monitoring equipment to detect the level of oxygen.

**RESPIRATORY PROTECTION:** Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection if oxygen levels are below 19.5% or during emergency response to a release of this product. If respiratory protection is required, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), or equivalent State standards.

**EYE PROTECTION:** Splash goggles or safety glasses. Face-shields should be worn if contact with the liquefied gas is anticipated.

**HAND PROTECTION:** Wear leather gloves or glove protection appropriate to the specific operation for which this product is used.

**BODY PROTECTION:** Use body protection appropriate for task. Transfer of large quantities under pressure may require protective equipment appropriate to protect employees from splashes of liquefied product. Safety shoes are recommended when handling cylinders.

## 9. PHYSICAL and CHEMICAL PROPERTIES

**GAS DENSITY @ 21.1°C (70°F) and 1 atm:** 0.319 lb/ft<sup>3</sup> (5.110 kg/m<sup>3</sup>)

**BOILING POINT @ 1 atm:** -29.79°C (-21.2°F)

**FREEZING/MELTING POINT @ 1 atm:** -158°C (-252°F)

**SPECIFIC GRAVITY (air = 1) @ 21.1°C (70°F):** 4.32

**SOLUBILITY IN WATER weight % @ 25°C (77°F):** 0.028%

**EVAPORATION RATE (nBuAc = 1):** Not applicable.

**ODOR THRESHOLD:** Not applicable.

**VAPOR PRESSURE @ 21.1°C (70°F):** 70.2

**COEFFICIENT WATER/OIL DISTRIBUTION:** Not applicable.

**APPEARANCE AND COLOR:** Colorless, odorless, non-flammable gas. At high concentrations, this gas may have a sweetish odor.

**HOW TO DETECT THIS SUBSTANCE (warning properties):** There are no distinct warning properties. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.

**pH:** Not applicable.

**MOLECULAR WEIGHT:** 120.93

**EXPANSION RATIO:** Not applicable.

**SPECIFIC VOLUME (ft<sup>3</sup>/lb):** 3.1348

## 10. STABILITY and REACTIVITY

**STABILITY:** Normally stable.

**DECOMPOSITION PRODUCTS:** If product is exposed to fire, it may decompose yielding toxic products (i.e. hydrogen fluoride, phosgene, hydrogen chloride, carbonyl fluoride).

**MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:** The following materials are not compatible with this product: alkaline, alkaline earth metals, and other reactive chemicals, (i.e. sodium, potassium, calcium, magnesium, powdered aluminum, and zinc). Silver and copper-bearing alloys can act as catalysts for decomposition of this product at high temperatures.

**HAZARDOUS POLYMERIZATION:** Will not occur.

**CONDITIONS TO AVOID:** Avoid contact with incompatible materials and avoid exposing cylinders to extremely high temperatures, which could cause the cylinders to rupture or burst.

## 11. TOXICOLOGICAL INFORMATION

**TOXICITY DATA:** The following information is available for Dichlorodifluoromethane.

TCLo (inhalation, human) = 200,000 ppm/30 minutes; eye, pulmonary, liver

LC50 (inhalation, rat) = 80 pph/30 minutes

LC50 (inhalation, mouse) = 76 pph/30 minutes

LC50 (inhalation, rabbit) = 80 pph/30 minutes

LC50 (inhalation, guinea pig) = 80 pph/30 minutes

**SHORT-TERM INHALATION:** Dichlorodifluoromethane has very low acute toxicity and acts a weak narcotic. Deaths occurred in rats, but not in guinea pigs after 2-hour exposure at 60% Dichlorodifluoromethane. In various other experiments, rats, guinea pigs, and cats all survived exposures to concentrations as high as 30%-8-% for several hours. It was found that this product produced respiratory-circulatory effects including respiratory depression, bronchio-constriction and tachycardia (abnormal rapidity of heart action) in concentrations of 5-10%. No pathologic changes were observed in guinea pigs, rats, cats, and dogs following four weeks of 3.5 hour exposures at 10%. Mice exposed at 4% 30 minutes a day for 3-6 weeks showed some weak pathology.

**SKIN IRRITATION:** No significant irritation was observed in rats and rabbits treated with a 30/70 mixture of Dichlorodifluoromethane and trichloromethane.

**EYE IRRITATION:** No significant irritation was observed in rabbits treated with a 30/70 mixture of Dichlorodifluoromethane and trichloromethane.

**EFFECTS ON CARDIOVASCULAR SYSTEM:** The cardiac sensitization potential of this product is considered moderate. Five out of 12 dogs exposed to 5% for 5 minutes showed evidence of cardiac arrhythmia. Cardiac sensitization can be induced with endogenous epinephrine at levels of 10-80%. Concentrations of 5-25% cause rapid heartbeat, and high blood pressure in dogs and monkeys.

**LONG-TERM INHALATION:** Rats, monkeys, dogs, rabbits, and guinea pigs were exposed to 810 ppm Dichlorodifluoromethane 24 hours/day for 90 days. There were no deaths and the only pathologic changes observed was in the liver of exposed guinea pigs. At exposure levels of 20%, there was an occurrence of generalized tremors, slight blood changes, and signs of mild narcosis.

**SUSPECTED CANCER AGENT:** Dichlorodifluoromethane is not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC, and therefore is not considered to be, nor suspected to be a cancer-causing agent by these agencies. This gas is classified as follows: ACGIH-A4 (Not Classifiable as a Human Carcinogen).

**IRRITANCY OF PRODUCT:** Dichlorodifluoromethane may be slightly irritating to the nose, throat, and tissues of the upper respiratory system. Contact with rapidly expanding gases can cause frostbite to exposed tissue.

**SENSITIZATION OF PRODUCT:** Dichlorodifluoromethane is not known to cause sensitization in humans. This gas can cause moderate cardiac sensitization in test animals.

**REPRODUCTIVE TOXICITY INFORMATION:** Listed below is information concerning the effects Dichlorodifluoromethane on the human reproductive system.

**Mutagenicity:** No mutagenicity effects on humans have been described for Dichlorodifluoromethane. The following information has been obtained during clinical studies: Dichlorodifluoromethane was produced negative results in bacterial tests and cultured mammalian cells.

**Embryotoxicity:** This product has not been reported to cause embryotoxic effects; see following paragraph for further information.

**Teratogenicity:** No teratogenicity effects on humans have been described for Dichlorodifluoromethane. The following information has been obtained during clinical studies. Tetrology studies in rats and rabbits were negative.

**Reproductive Toxicity:** No reproductive toxicity effects on humans have been described for Dichlorodifluoromethane.

*A **mutagen** is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An **embryotoxin** is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A **teratogen** is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A **reproductive toxin** is any substance which interferes in any way with the reproductive process.*

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Pre-existing respiratory conditions, central nervous system disorders, and cardio-vascular conditions may be aggravated by over-exposure to this product.

**RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and reduce over-exposure. Note: Epinephrine increases the toxicity of Dichlorodifluoromethane on the heart.

**BIOLOGICAL EXPOSURE INDICES (BEIs):** Currently, Biological Exposure Indices (BEIs) are not applicable for Dichlorodifluoromethane.

## 12. ECOLOGICAL INFORMATION

**ENVIRONMENTAL STABILITY:** The gas will be dissipated rapidly in well-ventilated areas. Dichlorodifluoromethane is a chlorofluorocarbon (CFC) compound. Chlorofluorocarbon compounds have been implicated in the possible depletion of the stratospheric ozone, via a series of complex chemical reactions which occur in the upper atmosphere. Atmospheric ozone is essential in protecting plants and animals from potentially harmful ultraviolet-light exposures. All work practice must be directed at eliminating environmental contamination.

## 12. ECOLOGICAL INFORMATION (Continued)

**EFFECT OF MATERIAL ON PLANTS or ANIMALS:** Any adverse effect on animals would be related to adverse effects on the cardiovascular system and to exposure to oxygen deficient environments. The symptoms experienced by over-exposed animals would be similar to those described for exposed humans. No adverse effect is anticipated to occur to plant-life, except for frost produced in the presence of rapidly expanding gases.

**EFFECT OF CHEMICAL ON AQUATIC LIFE:** No evidence is currently available on this product's effects on aquatic life.

## 13. DISPOSAL CONSIDERATIONS

**PREPARING WASTES FOR DISPOSAL:** Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Return cylinders with any residual product to Air Liquide. Do not dispose of locally.

## 14. TRANSPORTATION INFORMATION

**THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.**

**PROPER SHIPPING NAME:** Dichlorodifluoromethane  
**HAZARD CLASS NUMBER and DESCRIPTION:** 2.2 (Non-Flammable Gas)  
**UN IDENTIFICATION NUMBER:** UN 1028  
**PACKING GROUP:** Not applicable.  
**DOT LABEL(S) REQUIRED:** Non-Flammable Gas  
**NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996):** 126  
**MARINE POLLUTANT:** Dichlorodifluoromethane is not classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B).

**SPECIAL SHIPPING INFORMATION:** Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles present serious safety hazards and should be discouraged.

**NOTE:** Shipment of compressed gas cylinders which have not been filled with the owners consent is a violation of Federal law (49 CFR, Part 173.301 (b)).

**TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:** THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian Shipments.

## 15. REGULATORY INFORMATION

**SARA REPORTING REQUIREMENTS:** Dichlorodifluoromethane is subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act., as follows:

COMPONENT	SARA 302	SARA 304	SARA 313
Dichlorodifluoromethane	NO	YES	YES

**SARA THRESHOLD PLANNING QUANTITY:** Not applicable.

**TSCA INVENTORY STATUS:** Dichlorodifluoromethane is listed on the TSCA Inventory.

**CERCLA REPORTABLE QUANTITIES (RQ):** 5000 lbs.

**CALIFORNIA PROPOSITION 65:** Dichlorodifluoromethane is not on the California Proposition 65 lists.

**STATE REGULATORY INFORMATION:** Dichlorodifluoromethane is covered under the following specific State regulations:

**Alaska - Designated Toxic and Hazardous Substances:** Dichlorodifluoromethane.

**California - Permissible Exposure Limits for Chemical Contaminants:** Dichlorodifluoromethane

**Florida - Substance List:** Dichlorodifluoromethane

**Illinois - Toxic Substance List:** No.

**Kansas - Section 302/313 List:** No.

**Massachusetts - Substance List:** Dichlorodifluoromethane.

**Minnesota - List of Hazardous Substances:** Dichlorodifluoromethane.

**Missouri - Employer Information/Toxic Substance List:** Dichlorodifluoromethane.

**New Jersey - Right to Know Hazardous Substance List:** Dichlorodifluoromethane.

**North Dakota - List of Hazardous Chemicals, Reportable Quantities:** No.

**Pennsylvania - Hazardous Substance List:** Dichlorodifluoromethane.

**Rhode Island - Hazardous Substance List:** Dichlorodifluoromethane.

**Texas - Hazardous Substance List:** No.

**West Virginia - Hazardous Substance List:** No.

**Wisconsin - Toxic and Hazardous Substances:** No.

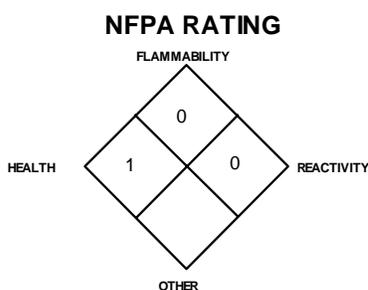
## 15. REGULATORY INFORMATION (Continued)

### OTHER U.S. FEDERAL REGULATIONS:

- Dichlorodifluoromethane is not listed in Appendix A as a highly hazardous chemical, per 29 CFR 1910.119: Process Safety Management of Highly Hazardous Chemicals.  
Dichlorodifluoromethane is subject to the reporting requirements of CFR 29 1910.1000.
- Dichlorodifluoromethane is subject to the reporting requirements under Title VI of the Clean Air Act Amendments of 1990: "Stratospheric Ozone Protection". Dichlorodifluoromethane is listed as a Class II ozone-depleting chemical. This product may be required to bear the following label:  
**Warning:** Contains Dichlorodifluoromethane, a substance which harms public health and environment by destroying ozone in the upper atmosphere.
- This gas is not subject to the reporting requirements of Section 112(r) of the Clean Air Act.
- Dichlorodifluoromethane is not listed as a Regulated Substance, per 40 CFR, Part 68, of the Risk Management for Chemical Accidental Release Prevention.

**OTHER CANADIAN REGULATIONS:** Dichlorodifluoromethane is categorized as a Controlled Product, Hazard Class A, as per the Controlled Product Regulations.

## 16. OTHER INFORMATION



HAZARDOUS MATERIAL INFORMATION SYSTEM		
<b>HEALTH</b>	(BLUE)	1
<b>FLAMMABILITY</b>	(RED)	0
<b>REACTIVITY</b>	(YELLOW)	0
<b>PROTECTIVE EQUIPMENT</b>		B
EYES	RESPIRATORY	HANDS
BODY		
See Section 8		
For routine industrial applications		

**MIXTURES:** When two or more gases or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

Further information can be found in the following pamphlets published by: Compressed Gas Association Inc. (CGA), 4221 Walney Road 5<sup>th</sup> floor, Chantilly, VA 20151-2923. Telephone: (703) 788-2700.

- P-1            "Safe Handling of Compressed Gases in Containers"
- P-14          "Accident Prevention in Oxygen-Rich, Oxygen-Deficient Atmospheres"
- SB-2          "Oxygen Deficient Atmospheres"
- AV-1          "Safe Handling and Storage of Compressed Gases"
- "Handbook of Compressed Gases"

## 16. OTHER INFORMATION (Continued)

**PREPARED BY:**

CHEMICAL SAFETY ASSOCIATES, Inc.  
9163 Chesapeake Drive, San Diego, CA 92123-1002  
619/565-0302

Fax on Demand: 1-800/231-1366



This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

MSDS Number: **T5100** \* \* \* \* \* Effective Date: 08/03/05 \* \* \* \* \* Supersedes: 05/08/03

<b>MSDS</b>	<b>Material Safety Data Sheet</b>		24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
			National Response in Canada CANUTEC: 613-996-6666
			Outside U.S. and Canada Chemtec: 703-527-3887
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		 	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.			

# 1,1,2-TRICHLORO- 1,2,2-TRIFLUOROETHANE

## 1. Product Identification

**Synonyms:** Freon® TF Solvent; Freon® 113; Fluorocarbon 113; 1,1,2-Trichlorotrifluoroethane  
**CAS No.:** 76-13-1  
**Molecular Weight:** 187.38  
**Chemical Formula:** CCl<sub>2</sub>FCClF<sub>2</sub>  
**Product Codes:**  
 J.T. Baker: 491D, 9347, W591  
 Mallinckrodt: 2793

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	90 - 100%	Yes

## 3. Hazards Identification

### Emergency Overview

**WARNING! HARMFUL IF INHALED. AFFECTS CARDIOVASCULAR AND CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. MAY CAUSE IRRITATION TO SKIN.**

SAF-T-DATA<sup>(tm)</sup> Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)  
 Flammability Rating: 0 - None  
 Reactivity Rating: 2 - Moderate  
 Contact Rating: 2 - Moderate  
 Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES  
 Storage Color Code: Green (General Storage)

### Potential Health Effects

#### Inhalation:

Causes irritation to upper respiratory tract. Symptoms may include coughing, chest pain, and difficult breathing. Acts as an anesthetic. Inhalation of high concentrations can produce asphyxiation. Air concentrations above 2500 ppm may cause interference with psychological and psychomotor functions expressed as excitement and incoordination. Fatal cardiac arrhythmias are possible at high concentrations.

#### Ingestion:

Large oral doses may cause irritation to the gastrointestinal tract.

#### Skin Contact:

May cause irritation with redness and pain.

#### Eye Contact:

Causes irritation, redness, and pain.

#### Chronic Exposure:

Repeated or prolonged skin contact may have a defatting action and produce a dermatitis. Chronic exposure may have central nervous system effects.

#### Aggravation of Pre-existing Conditions:

Persons with pre-existing skin, central nervous system or cardiovascular system disorders may be more susceptible to the effects of this substance.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.

**Skin Contact:**

Immediately flush skin with plenty of water for at least 15 minutes. Call a physician if irritation develops.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

**Note to Physician:**

Do not give epinephrine or adrenergic activator as they will further sensitize the heart to development of arrhythmias.

---

## 5. Fire Fighting Measures

**Fire:**

Not considered to be a fire hazard. When involved in fire, however, emits suffocating and toxic decomposition products.

**Explosion:**

Not considered to be an explosion hazard.

**Fire Extinguishing Media:**

Use any means suitable for extinguishing surrounding fire. Water spray may be used to keep fire exposed containers cool.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

## 6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer!

---

## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Isolate from incompatible substances. Store below boiling point. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):  
1000 ppm (TWA)

-ACGIH Threshold Limit Value (TLV):  
1000 ppm (TWA), 1250 ppm (STEL)

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded, wear a supplied air, full-facepiece respirator, airtight hood, or full-facepiece self-contained breathing apparatus. The cartridges recommended for this material have a predicted service of less than 30 minutes at concentrations of ten times (10x) the exposure limits. Actual service life will vary considerably, depending on concentration levels, temperature, humidity, and work rate.

**Skin Protection:**

Wear protective gloves and clean body-covering clothing.

**Eye Protection:**

Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

---

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Slight ethereal odor.

**Solubility:**

Insoluble in water.

**Specific Gravity:**

1.56 @ 25C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

47 - 48C (117 - 118F)

**Melting Point:**

-35C (-31F)

**Vapor Density (Air=1):**

6.5

**Vapor Pressure (mm Hg):**

284 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

1.3 (Ether = 1)

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Hydrogen fluoride, hydrogen chloride, phosgene, carbonyl fluoride, chloride and fluoride gases may be released when this material is heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Alkali or alkaline earth metals, powdered aluminum, zinc, beryllium, magnesium, other chemically active metals, acids, heat and open flame.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

Oral rat LD50: 43 gm/Kg; Inhalation rat LC50: 110pph/5-hour.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
1,1,2-Trichloro-1,2,2-trifluoroethane (76-13-1)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. This material has an estimated bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released to the atmosphere, this material remains inert for decades.

**Environmental Toxicity:**

No information found.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

Not regulated.

## 15. Regulatory Information

```

-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  EC   Japan  Australia
-----
1,1,2-Trichloro-1,2,2-trifluoroethane (76-13-1)  Yes  Yes  Yes    Yes

```

```

-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     --Canada--
Korea  DSL  NDSL  Phil.
-----
1,1,2-Trichloro-1,2,2-trifluoroethane (76-13-1)  Yes  Yes  No    Yes

```

```

-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-----
RQ  TPQ  List  Chemical Catg.
-----
1,1,2-Trichloro-1,2,2-trifluoroethane (76-13-1)  No  No  Yes   No

```

```

-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     -RCRA-  -TSCA-
CERCLA  261.33  8(d)
-----
1,1,2-Trichloro-1,2,2-trifluoroethane (76-13-1)  No  No  No

```

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No  
 SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No  
 Reactivity: No (Pure / Liquid)

**Australian Hazchem Code:** None allocated.

**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 2 Flammability: 0 Reactivity: 0

**Label Hazard Warning:**

WARNING! HARMFUL IF INHALED. AFFECTS CARDIOVASCULAR AND CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. MAY CAUSE IRRITATION TO SKIN.

**Label Precautions:**

Avoid breathing vapor.  
 Keep container closed.  
 Use only with adequate ventilation.  
 Avoid contact with eyes, skin and clothing.  
 Wash thoroughly after handling.

**Label First Aid:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician. In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes while lifting lower and upper eyelids. Call a physician. In case of skin contact, immediately flush skin with plenty of water for at least 15 minutes. Call a physician if irritation develops. NOTE TO PHYSICIAN: Do not use epinephrine or adrenergic activators.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

MSDS Section(s) changed since last revision of document include: 3.

**Disclaimer:**

\*\*\*\*\*

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

**CFC-114, R-114**

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**SECTION 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : Genetron 114  
MSDS Number : 000000009900  
Product Use Description : Aerosol propellant, Refrigerant, Carrier gas

Company : Honeywell International, Inc.  
101 Columbia Road  
Morristown, NJ 07962-1057

For more information call : 800-522-8001  
(Monday-Friday, 9:00am-5:00pm)

**In case of emergency call : Medical: 1-800-498-5701**  
: **Transportation: 1-800-424-9300 or 703-527-3887**  
: (24 hours/day, 7 days/week)

**SECTION 2. HAZARDS IDENTIFICATION****Emergency Overview**

Form : Liquefied gas

Color : colourless

Odor : slight

Hazard Summary : Warning! Container under pressure. This product is not flammable at ambient temperatures and atmospheric pressure. Gas reduces oxygen available for breathing. Causes asphyxiation in high concentrations. The victim will not realize that he/she is suffocating. Inhalation may cause central nervous system effects. May cause cardiac arrhythmia. May cause drowsiness and dizziness. Do not breathe vapour. Irritating to eyes and skin. Avoid contact with skin, eyes and clothing. At higher temperatures, (>250°C), decomposition products may include hydrochloric acid (HCl), hydrofluoric acid (HF) and carbonyl halides. The ACGIH Threshold Limit Values (2007) for Hydrogen Fluoride are TLV-TWA 0.5 ppm and Ceiling Exposure Limit 2 ppm.

**Potential Health Effects**

Skin : Avoid skin contact with leaking liquid (danger of frostbite).  
May cause frostbite.  
Irritating to skin.

Eyes : Causes severe eye irritation.  
May cause frostbite.

Ingestion : Unlikely route of exposure.

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Effects due to ingestion may include:  
Gastrointestinal discomfort

Inhalation : Gas reduces oxygen available for breathing.  
Causes asphyxiation in high concentrations. The victim will not realize that he/she is suffocating.  
Inhalation may cause central nervous system effects.  
May cause cardiac arrhythmia.  
Vapours may cause drowsiness and dizziness.

Chronic Exposure : None known.

**Carcinogenicity**

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, IARC, or OSHA.

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Component	CAS-No.	Weight %
Cryofluorane	76-14-2	100.00

**SECTION 4. FIRST AID MEASURES**

Inhalation : Move to fresh air. If breathing is irregular or stopped, administer artificial respiration. If breathing is difficult, give oxygen. Use oxygen as required, provided a qualified operator is present. Call a physician. Do not give drugs from adrenaline-ephedrine group.

Skin contact : After contact with skin, wash immediately with plenty of water. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. If symptoms persist, call a physician.

Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In case of frostbite water should be lukewarm, not hot. If symptoms persist, call a physician.

Ingestion : Unlikely route of exposure. As this product is a gas, refer to the inhalation section. Do not induce vomiting without medical advice. Call a physician immediately.

**Notes to physician**

Treatment : Because of the possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should be used with special caution and only in situations of emergency life support. Treatment of overexposure should be directed at the control of

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symptoms and the clinical conditions. Treat frost-bitten areas as needed.

**SECTION 5. FIRE-FIGHTING MEASURES**

- Flash point : not applicable
- Lower explosion limit : None
- Upper explosion limit : None
- Suitable extinguishing media : The product is not flammable.  
ASHRAE 34  
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.  
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Specific hazards during fire fighting : Contents under pressure.  
This product is not flammable at ambient temperatures and atmospheric pressure.  
However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources.  
Container may rupture on heating.  
Cool closed containers exposed to fire with water spray.  
Do not allow run-off from fire fighting to enter drains or water courses.  
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.  
Rapid evaporation of the liquid may cause frostbite.  
In case of fire hazardous decomposition products may be produced such as:  
Carbon monoxide  
Carbon dioxide (CO<sub>2</sub>)  
Carbonyl halides  
Hydrogen fluoride  
Gaseous hydrogen chloride (HCl).
- Special protective equipment for fire-fighters : In the event of fire and/or explosion do not breathe fumes.  
Wear self-contained breathing apparatus and protective suit.  
No unprotected exposed skin areas.

**SECTION 6. ACCIDENTAL RELEASE MEASURES**

- Personal precautions : Immediately evacuate personnel to safe areas.  
Keep people away from and upwind of spill/leak.  
Wear personal protective equipment. Unprotected persons must be kept away.  
Remove all sources of ignition.  
Avoid skin contact with leaking liquid (danger of frostbite).  
Ventilate the area.

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After release, disperses into the air.  
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.  
Unprotected personnel should not return until air has been tested and determined safe.  
Ensure that the oxygen content is  $\geq 19.5\%$ .

Environmental precautions : Prevent further leakage or spillage if safe to do so.  
The product evaporates readily.

Methods for cleaning up : Ventilate the area.

**SECTION 7. HANDLING AND STORAGE****Handling**

Handling : Handle with care.  
Avoid inhalation of vapour or mist.  
Do not get in eyes, on skin, or on clothing.  
Wear personal protective equipment.  
Use only in well-ventilated areas.  
Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C.  
Follow all standard safety precautions for handling and use of compressed gas cylinders.  
Use authorized cylinders only.  
Protect cylinders from physical damage.  
Do not puncture or drop cylinders, expose them to open flame or excessive heat.  
Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material.  
Do not remove screw cap until immediately ready for use.  
Always replace cap after use.

Advice on protection against fire and explosion : The product is not flammable.  
Can form a combustible mixture with air at pressures above atmospheric pressure.

**Storage**

Requirements for storage areas and containers : Pressurized container: Protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use.  
Keep containers tightly closed in a dry, cool and well-ventilated place.  
Storage rooms must be properly ventilated.  
Ensure adequate ventilation, especially in confined areas.  
Protect cylinders from physical damage.  
Store away from incompatible substances.

**SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

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- Protective measures : Do not breathe vapour.  
Avoid contact with skin, eyes and clothing.  
Ensure that eyewash stations and safety showers are close to the workstation location.
- Engineering measures : General room ventilation is adequate for storage and handling.  
Perform filling operations only at stations with exhaust ventilation facilities.
- Eye protection : Wear as appropriate:  
Safety glasses with side-shields  
If splashes are likely to occur, wear:  
Goggles or face shield, giving complete protection to eyes
- Hand protection : Leather gloves  
In case of contact through splashing:  
Protective gloves  
Neoprene gloves  
Polyvinyl alcohol or nitrile- butyl-rubber gloves
- Skin and body protection : Avoid skin contact with leaking liquid (danger of frostbite).  
Wear cold insulating gloves/face shield/eye protection.
- Respiratory protection : In case of insufficient ventilation wear suitable respiratory equipment.  
Wear a positive-pressure supplied-air respirator.  
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.  
For rescue and maintenance work in storage tanks use self-contained breathing apparatus.
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.  
Ensure adequate ventilation, especially in confined areas.  
Avoid contact with skin, eyes and clothing.  
Remove and wash contaminated clothing before re-use.  
Keep working clothes separately.

**Exposure Guidelines**

1,2-Dichloro-1,1,2,2-tetrafluoroethane	76-14-2	ACGIH	TWA		1,000 ppm
		NIOSH	REL	1,000 ppm	7,000 mg/m3
		US CA OEL	TWA PEL	1,000 ppm	7,000 mg/m3
		OSHA Z1	PEL	1,000 ppm	7,000 mg/m3
		OSHA Z1A	TWA	1,000 ppm	7,000 mg/m3

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**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

Form	: Liquefied gas
Color	: colourless
Odor	: slight
Molecular Weight	: 170.92 g/mol
Melting point/range	: -94 °C (-137 °F)
Boiling point/boiling range	: 4 °C (39 °F)
Vapor pressure	: 1.9 kPa at 20 °C (68 °F)
Relative vapour density	: 6
Density	: 1.5 g/cm <sup>3</sup>
Water solubility	: 0.13 g/l
Partition coefficient: n-octanol/water	: log Pow: 2.82  The product is more soluble in octanol.
Solubility in other solvents	: Medium: Methanol partly soluble  : Medium: Diethylether partly soluble

**SECTION 10. STABILITY AND REACTIVITY**

Conditions to avoid	: Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C. Decomposes under high temperature. Some risk may be expected of corrosive and toxic decomposition products. Can form a combustible mixture with air at pressures above atmospheric pressure. Do not mix with oxygen or air above atmospheric pressure.
Materials to avoid	: Finely divided aluminium Potassium Calcium Powdered metals Aluminium Magnesium Zinc

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- Hazardous decomposition products : Halogenated compounds  
Hydrogen fluoride  
Carbonyl halides  
Carbon oxides
- Thermal decomposition : >260 °C
- Hazardous reactions : Hazardous polymerisation does not occur.  
Stable under normal conditions.

**SECTION 11. TOXICOLOGICAL INFORMATION**

- Acute inhalation toxicity : LC50 rat  
Dose: > 600000 ppm  
Exposure time: 2 h
- Repeated dose toxicity : rat  
NOEL: 10000 ppm
- Additional advice : May cause cardiac arrhythmia.  
Cardiac sensitisation threshold (dog): 45000 ppm.

**SECTION 12. ECOLOGICAL INFORMATION**

- Additional ecological information : This product contains greenhouse gases which may contribute to global warming. Do NOT vent to the atmosphere. To comply with provisions of the U.S. Clean Air Act, any residual must be recovered.  
This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82.  
Section 611 requires the following label text on all shipments of this product:  
Warning: Contains Dichlorotetrafluoroethane (CFC-114), a substance which harms public health and environment by destroying ozone in the upper atmosphere.

**SECTION 13. DISPOSAL CONSIDERATIONS**

Waste Information: Avoid contact of spilled material and runoff with soil and surface waterways. Consult an environmental professional to determine if local, regional or national regulations would classify spilled or contaminated materials as hazardous waste. Use only approved transporters, recyclers, treatment, storage or disposal facilities. Dispose of according to all federal, state and local applicable regulations.

Other Disposal Considerations: Observe all Federal, State, and Local Environmental regulations.

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The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

Additional advice : This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling.

**SECTION 14. TRANSPORT INFORMATION**

<b>DOT</b>	Proper shipping name	: 1,2-Dichloro-1,1,2,2-tetrafluoroethane
	UN-Number	: 1958
	Class	: 2.2
	Packing group	:
<b>IATA</b>	UN Number	: 1958
	Description of the goods	: 1,2-Dichloro-1,1,2,2-tetrafluoroethane
	Class	: 2.2
	Hazard Label	: 2.2
	Packing instruction (cargo aircraft)	: 200
	Packing instruction (passenger aircraft)	: 200
<b>IMDG</b>	Substance No.	: UN 1958
	Description of the goods	: 1,2-Dichloro-1,1,2,2-tetrafluoroethane
	Class	: 2.2
	Hazard Label	: 2.2
	EmS Number	: F-C
	Marine pollutant	: no

**SECTION 15. REGULATORY INFORMATION****Inventories**

EU. EINECS	: On or in compliance with the inventory
US. Toxic Substances Control Act	: On TSCA Inventory
Australia. AICS	: On or in compliance with the inventory
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL). (Can. Gaz. Part II, Vol. 133)	: All components of this product are on the Canadian DSL list.
Japan. ENCS	: On or in compliance with the inventory
Korea. KECI	: On or in compliance with the inventory
Philippines. PICCS	: On or in compliance with the inventory

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China. IECSC : On or in compliance with the inventory

**National regulatory information**

**SARA 313 Components** : 1,2-Dichloro-1,1,2,2-tetrafluoroethane 76-14-2

**SARA 311/312 Hazards** : Acute Health Hazard  
Sudden Release of Pressure Hazard

**California Prop. 65** : This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

**Massachusetts RTK** : 1,2-Dichloro-1,1,2,2-tetrafluoroethane 76-14-2

**New Jersey RTK** : 1,2-Dichloro-1,1,2,2-tetrafluoroethane 76-14-2

**Pennsylvania RTK** : 1,2-Dichloro-1,1,2,2-tetrafluoroethane 76-14-2

**WHMIS Classification** : A

**Global warming potential** : 9,000

**Ozone depletion potential (ODP)** : 1

**SECTION 16. OTHER INFORMATION**

	<b>HMIS III</b>	<b>NFPA</b>
Health Hazard	: 1	2
Flammability	: 1	1
Physical Hazard	: 0	
Instability	:	0

For R&D use only. Not for drug, household or other uses.

Click <http://www.lookchem.com/cas-76/76-44-8.html> for suppliers of this product.

Composition/Information on Ingredient

**Cas:**

76-44-8

**Code:**

M

**RTECS:**

PC0700000

**Code:**

M

**Name:**

HEPTACHLOR INTENDED CHANGE (IC)

**Other REC Limits:**

N/K 3

**OSHA PEL:**

0.5 MG/CUM (SKIN)

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

0.5 MG/CUM (SKIN) A2

**Code:**

M

**ACGIHSTEL:**

N/P

**Code:**

Control Measures

**Respiratory Protection:**

N/K

**Ventilation:**

N/K

**Protective Gloves:**

RECOMMENDED

**Eye Protection:**

RECOMMENDED

**Other Protective Equipment:**

Equipment USE APPROPRIATE OSHA/MSHA SAFETY EQUIPMENT.

**Work Hygienic Practices:**

N/K

**Supplemental Safety and Health:**

N/K

Health Hazards Data

**LD50LC50Mixture:**

ORAL (RAT) LD50: 5000 MG/KG (TOLUENE)

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

EYES/SKIN/INHALATION/INGESTION: IRRITATION.

**Explanation Of Carcinogenicity:**

LINDANE, DDT ISOMERS, & DIELDRIN ARE SUSPECTED HUMAN CARCINOGENS. HEPTACHLOR IS AN A2 CARCINOGEN.

**Signs And Symptoms Of Overexposure:**

EYES/SKIN/INGESTION/INHALATION: TOXIC & IRRITATION.

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES/SKIN: FLUSH W/COPIOUS AMOUNTS OF WATER. INHALATION: REMOVE TO FRESH AIR. GIVE OXYGEN IF NECESSARY. OBTAIN MEDICAL ATTENTION IN ALL CASES.

**Spill Release Procedures:**

DUE TO THE SMALL QUANTITY INVOLVED, SPILLS OR LEAKS SHOULD NOT POSE A SIGNIFICANT PROBLEM. A LEAKING BOTTLE MAY BE PLACED IN A PLASTIC BAG & NORMAL DISPOSAL PROCEDURES FOLLOWED. LIQUID SAMPLES MAY BE ABSORBED ON VERMICULITE OR SAND.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCUBBER. OBSERVE ALL FEDERAL, STATE, & LOCAL LAWS CONCERNING DISPOSAL.

**Handling And Storage Precautions:**

AVOID CONTACT W/EYES, SKIN, & CLOTHING. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE.

**Other Precautions:**

THIS MATERIAL SHOULD ONLY BE USED BY THOSE PERSONS TRAINED IN THE SAFE HANDLING OF HAZARDOUS CHEMICALS.

Fire and Explosion Hazard Information

**Flash Point Method:**

N/P 6

**Flash Point:**

**Flash Point Text:**

COMBUSTIBLE

**Autoignition Temp:**

**Autoignition Temp Text:**

N/A

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

CO<sub>2</sub>, DRY CHEMICAL POWDER, OR WATER SPRAY

**Fire Fighting Procedures:**

N/K

**Unusual Fire/Explosion Hazard:**

COMBUSTIBLE.

Physical/Chemical Properties

**HCC:**

**NRC/State LIC No:**

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

N/K

**Melt/Freeze Pt:**

**M.P/F.P Text:**

N/K

**Decomp Temp:**

**Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

N/K

**Volatile Org Content %:****Spec Gravity:**

N/K 7

**VOC Pounds/Gallon:**

PH: N/K

**VOC Grams/Liter:****Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

N/K

**Appearance and Odor:**

LIQUID W/BENZENE-LIKE ODOR.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/K

**Materials To Avoid:**

STRONG OXIDIZERS

**Hazardous Decomposition Products:**

N/R

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

Toxicological Information

**Information:**N/P

MSDS Transport Information

**Information:**N/P

Regulatory Information

**Sara Title III Information:** N/P**Federal Regulatory Information:** N/P**State Regulatory Information:** N/P

Other Information

**Other Information:**N/P[www.lookchem.com](http://www.lookchem.com)

For R&amp;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. Lookchem 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.

# Material Safety Data Sheet

## Hexachlorocyclopentadiene

ACC# 73038

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Hexachlorocyclopentadiene**Catalog Numbers:** AC120440000, AC120440010, AC120442500**Synonyms:** 1,2,3,4,5,5-Hexachloro-1,3-cyclopentadiene; Perchlorocyclopentadiene.**Company Identification:**Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
77-47-4	Hexachlorocyclopentadiene	98+	201-029-3

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear yellow liquid.

**Danger!** Toxic if absorbed through the skin. May be fatal if inhaled. Causes burns by all exposure routes. Harmful if swallowed. Lachrymator (substance which increases the flow of tears). Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. May cause allergic skin reaction. May cause central nervous system effects. May cause liver and kidney damage.

**Target Organs:** Blood, kidneys, central nervous system, liver, spleen, respiratory system, gastrointestinal system, eyes, skin.

#### Potential Health Effects

**Eye:** Causes eye burns. Lachrymator (substance which increases the flow of tears).

**Skin:** Causes skin burns. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. Toxic in contact with skin.

**Ingestion:** Harmful if swallowed. Causes gastrointestinal tract burns. May cause liver and kidney damage.

**Inhalation:** May be fatal if inhaled. Causes chemical burns to the respiratory tract. May cause central nervous system effects.

**Chronic:** Repeated exposure may cause damage to the spleen. Adverse reproductive effects have been reported in animals. Laboratory experiments have resulted in mutagenic effects. Chronic exposure may cause blood effects. Repeated or prolonged exposure may cause allergic reactions in sensitive individuals.

### Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

**Skin:** Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

**Ingestion:** Do not induce vomiting. Get medical aid immediately. Call a poison control center.

**Inhalation:** Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. SPEED IS ESSENTIAL, OBTAIN MEDICAL AID IMMEDIATELY. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Substance may react with water, and may release corrosive and/or toxic gases.

**Extinguishing Media:** Do NOT use water directly on fire. Use foam, dry chemical, or carbon dioxide.

**Flash Point:** 109 deg C ( 228.20 deg F)

**Autoignition Temperature:** Not applicable.

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 4; Flammability: 1; Instability: 1

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Provide ventilation. Do not expose spill to water. Do not get water inside containers. Evacuate unnecessary personnel. Do not let this chemical enter the environment.

## Section 7 - Handling and Storage

**Handling:** Do not get in eyes, on skin, or on clothing. Do not ingest or inhale. Do not allow contact with water. Container should be opened by a technically qualified person. Use only in a chemical fume hood. Keep from contact with moist air and steam.

**Storage:** Store in a cool, dry place. Store in a tightly closed container. Corrosives area. Store protected from moisture. Store protected from light.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.

**Exposure Limits**

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Hexachlorocyclopentadiene	0.01 ppm TWA	0.01 ppm TWA; 0.1 mg/m <sup>3</sup> TWA	none listed

**OSHA Vacated PELs:** Hexachlorocyclopentadiene: 0.01 ppm TWA; 0.1 mg/m<sup>3</sup> TWA

**Personal Protective Equipment**

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear yellow

**Odor:** Pungent odor.

**pH:** Not available.

**Vapor Pressure:** 0.1 mbar @ 20 deg C

**Vapor Density:** 9.42 (air=1)

**Evaporation Rate:** Not available.

**Viscosity:** 5.6 cPs 30 deg C

**Boiling Point:** 239 deg C @ 753.00 mmHg

**Freezing/Melting Point:** -10 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:** 1.702

**Molecular Formula:** C<sub>5</sub>Cl<sub>6</sub>

**Molecular Weight:** 272.76

## Section 10 - Stability and Reactivity

**Chemical Stability:** May decompose on exposure to moist air or water. Light sensitive.

**Conditions to Avoid:** Incompatible materials, light, excess heat, exposure to moist air or water.

**Incompatibilities with Other Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Hydrogen chloride, carbon monoxide, carbon dioxide, hydrogen gas.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS# 77-47-4:** GY1225000

**LD50/LC50:**

**CAS# 77-47-4:**

Draize test, rabbit, eye: 20 mg/24H Moderate;

Draize test, rabbit, eye: 100 mg/5M Severe;  
 Draize test, rabbit, skin: 500 mg/4H Severe;  
 Draize test, rabbit, skin: 500 uL/24H Severe;  
 Inhalation, rat: LC50 = 1600 ppb/4H;  
 Inhalation, rat: LC50 = 23 mg/m<sup>3</sup>/2H;  
 Oral, mouse: LD50 = 505 mg/kg;  
 Oral, rat: LD50 = 200 mg/kg;  
 Skin, rabbit: LD50 = 430 mg/kg;

**Carcinogenicity:**

CAS# 77-47-4: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information found

**Teratogenicity:** No information found

**Reproductive Effects:** Adverse reproductive effects have occurred in experimental animals.

**Mutagenicity:** Mutagenic effects have occurred in experimental animals.

**Neurotoxicity:** No information found

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. LC50(fathead minnows, early juvenile): 6.7 µg/L/30 days

LC50(fathead minnows, larval): 7 µg/L/96H Water danger/protection: WGK=2

**Environmental:** No information available.

**Physical:** No information available.

**Other:** Do not empty into drains.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 77-47-4: waste number U130.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	HEXACHLOROCYCLOPENTADIENE	HEXACHLOROCYCLOPENTADIENE
<b>Hazard Class:</b>	6.1	6.1
<b>UN Number:</b>	UN2646	UN2646
<b>Packing Group:</b>	I	I

## Section 15 - Regulatory Information

## US FEDERAL

### TSCA

CAS# 77-47-4 is listed on the TSCA inventory.

### Health & Safety Reporting List

CAS# 77-47-4: Effective 10/4/82, Sunset 10/4/92

### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

### Section 12b

None of the chemicals are listed under TSCA Section 12b.

### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

### CERCLA Hazardous Substances and corresponding RQs

CAS# 77-47-4: 10 lb final RQ; 4.54 kg final RQ

### SARA Section 302 Extremely Hazardous Substances

CAS# 77-47-4: 100 lb TPQ

### Section 313

This material contains Hexachlorocyclopentadiene (CAS# 77-47-4, 98+%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40

### Clean Air Act:

CAS# 77-47-4 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

### Clean Water Act:

CAS# 77-47-4 is listed as a Hazardous Substance under the CWA. CAS# 77-47-4 is listed as a Priority Pollutant under the Clean Water Act. CAS# 77-47-4 is listed as a Toxic Pollutant under the Clean Water Act.

### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

### STATE

CAS# 77-47-4 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

### California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

## European/International Regulations

### European Labeling in Accordance with EC Directives

#### Hazard Symbols:

T + N

#### Risk Phrases:

R 22 Harmful if swallowed.

R 24 Toxic in contact with skin.

R 26 Very toxic by inhalation.

R 34 Causes burns.

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

#### Safety Phrases:

S 25 Avoid contact with eyes.

S 39 Wear eye/face protection.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 53 Avoid exposure - obtain special instructions before use.

S 60 This material and its container must be disposed of as hazardous waste

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 77-47-4: 3

**Canada - DSL/NDSL**

CAS# 77-47-4 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D1A, D2B, E.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 77-47-4 is listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 9/02/1997

**Revision #7 Date:** 5/22/2008

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## MATERIAL SAFETY DATA SHEET

# Selenium

MSDS Number : 001

Effective Date : 01/20/09

### I. Product Identification

Trade Name : Selenium  
 Synonyms : Elemental Selenium; Selen  
 Chemical Formula : Se  
 Molecular Weight : 78.96  
 Manufacturer : Pacific Rare Specialty Metals And Chemicals, Inc. (PRSMCI)  
 Lot 6 Blk 1, Phase II, West Avenue, Cavite Economic Zone,  
 Rosario, Cavite, Philippines, 4106  
 Emergency Phone : (+63-02) 784 - 4000  
 Web Site : [www.pacificrarespecialty.com](http://www.pacificrarespecialty.com)

### II. Composition / Information on Components

Selenium (CAS# 7782-49-2); 100%  
**Identification number(s):**  
 EINECS Number: 231-957-4  
 EU Number: 034-001-00-2

### III. Hazard Identification

Flammability Rating : 0 (Not combustible)  
 Reactivity Rating : 0 (Not reactive when mixed with water)  
 Health Rating : 1 (Maybe harmful if swallowed)  
 Contact Rating : 1 (Causes eye irritation)  
 Lab Protective Equip : Goggles, Lab coat, Gloves

### IV. First –Aid Measures

**Inhalation** : Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.  
**Ingestion** : DO NOT induce vomiting. Give large amounts of water. Never give anything by mouth to an unconscious person. Get medical attention.

- Skin Contact** : Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
- Eye Contact** : Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

#### V. Fire Fighting Measures

- Fire** : Not considered to be a fire hazard.
- Explosion** : Not considered to be an explosion hazard.
- Fire Extinguishing Media:** Use any means suitable for extinguishing surrounding fire.
- Special Information** : In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

#### VI. Accidental Release Measures

Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.

#### VII. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

#### VIII. Exposure Controls / Personal Protection

- Airborne Exposure Limits** : OSHA PEL : 0.2 mg/m<sup>3</sup>, Se Compounds, as Se  
ACGIH TLV : 0.2 mg/m<sup>3</sup>, Se Compounds, as Se
- Ventilation System** : Local exhaust ventilation is preferred to control emissions at the source.
- Respiratory Protection** : NIOSH Approved Gas / Vapor respirators
- Skin Protection** : Wear chemical resistant clothing, boots, gloves, lab coat, apron or coveralls
- Eye Protection** : safety glasses or goggles, full face shields
- Work / Hygienic Practices** : No food should be allowed in the work area.

Maintain eye wash fountain and quick-drench facilities in work area.

#### IX. Physical and Chemical Properties

- |            |                      |                  |          |
|------------|----------------------|------------------|----------|
| Form       | : Solid              | Specific Gravity | : 4.79   |
| Color      | : Grey               | Melting Point    | : 217 °C |
| Odor       | : Odorless           | Boiling Point    | : 685 °C |
| Solubility | : Insoluble in Water |                  |          |

#### X. Stability and Reactivity

- Stability** : Stable under ordinary conditions of use and storage.
- Hazardous Decomposition Products:** Toxic oxides of selenium form when heated to decomposition.
- Hazardous Polymerization** : Will not occur.
- Incompatibilities** : Strong oxidizers, strong acids, and a wide range of other

**Conditions to Avoid** : materials.  
Moisture and incompatibles.

#### XI. Toxicological Information

**Toxicological Data** : Oral Rat LD50: > 5000 mg/kg. Investigated as a tumorigen and a reproductive effector.  
**Carcinogenicity** : EPA / IRIS classification: Group D1 - Not classifiable as a human carcinogen.

#### XII. Ecological Information

No information found.

*General Note : Do not allow material to be released to the environment without proper governmental permits.*

#### XIII. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to an approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

#### XIV. Transport Information

Not a hazardous material for transportation.

DOT regulations Hazard Class : None  
Land transport ADR / RID class : None  
Maritime Transport IMDG Class : None  
Air transport ICAO-TI and IATA-DGR Class : None

#### XV. Regulatory Information

##### Chemical Inventory Status - Part 1

<u>Ingredient</u>	<u>TSCA</u>	<u>EC</u>	<u>Japan</u>	<u>Australia</u>
Selenium (7782-49-2)	Yes	Yes	No	Yes

##### Chemical Inventory Status - Part 2

<u>Ingredient</u>	<u>Korea</u>	<u>Canada</u> <u>DSL</u>	<u>NDSL</u>	<u>Phil.</u>
Selenium (7782-49-2)	Yes	Yes	No	Yes

##### Federal, State & International Regulations - Part 1

<u>Ingredient</u>	<u>SARA 302</u>		<u>SARA 313</u>	
	<u>RQ</u>	<u>TPQ</u>	<u>List</u>	<u>Chemical Catg.</u>
Selenium (7782-49-2)	No	No	No	Selenium cmp

##### Federal, State & International Regulations - Part 2

<u>Ingredient</u>	<u>CERCLA</u>	<u>RCRA</u> <u>261.33</u>	<u>TSCA</u> <u>8 (d)</u>
Selenium (7782-49-2)	100	No	No

Chemical Weapons Convention: No TSCA 12 (b): No CDTA: No  
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No  
Reactivity: No Pure / Solid)

**Australian Hazchem Code:** 2Z  
**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR

**XVI. Other Information**

**NFPA Ratings:** Health: **2** Flammability: **0** Reactivity: **0**

**Disclaimer:**

\*\*\*\*\*

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# COSMOS PLASTICS & CHEMICALS

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## Material Safety Data Sheet Isophorone

ACC# 23994

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Isophorone

**Catalog Numbers:** AC122640000, AC122640010, AC122640025, AC122640050,  
AC122640200, AC122645000 AC122645000

**Synonyms:** 3,5,5-Trimethyl-2-cyclohexene-1-one.

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
78-59-1	Isophorone	98	201-126-0

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear pale yellow liquid. Flash Point: 84 deg C.

**Warning!** Causes eye and respiratory tract irritation. **Combustible liquid and vapor.** May be harmful if swallowed or absorbed through the skin. May cause cancer based on animal studies.

**Target Organs:** Central nervous system, respiratory system, eyes.

#### Potential Health Effects

**Eye:** Contact with eyes may cause severe irritation, and possible eye burns. Lachrymator (substance which increases the flow of tears).

**Skin:** May cause skin irritation. May be harmful if absorbed through the skin.

**Ingestion:** Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May be harmful if swallowed.

**Inhalation:** Causes narcotic effects including headache, dizziness, weakness, unconsciousness.

**Chronic:** Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated exposure may cause adverse reproductive effects.

## Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.

**Ingestion:** Never give anything by mouth to an unconscious person. Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.

**Inhalation:** Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Containers may explode when heated. Combustible liquid and vapor.

**Extinguishing Media:** In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam. Use water spray to cool fire-exposed containers.

**Flash Point:** 84 deg C ( 183.20 deg F)

**Autoignition Temperature:** Not applicable.

**Explosion Limits, Lower:**0.8

**Upper:** 3.8

**NFPA Rating:** (estimated) Health: 2; Flammability: 2; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Scoop up with a nonsparking tool, then place into a suitable container for disposal. Remove all sources of ignition. Provide ventilation. Clean up residual material by washing area with a 2-5% solution of soda ash.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Use only in a well-ventilated area. Avoid contact with skin and eyes. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Isophorone	5 ppm Ceiling	4 ppm TWA; 23 mg/m <sup>3</sup> TWA 200 ppm IDLH	25 ppm TWA; 140 mg/ m <sup>3</sup> TWA

**OSHA Vacated PELs:** Isophorone: 4 ppm TWA; 23 mg/m<sup>3</sup> TWA

### Personal Protective Equipment

**Eyes:** Wear chemical splash goggles.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear pale yellow

**Odor:** peppermint odor - camphor

**pH:** Not available.

**Vapor Pressure:** Not available.

**Vapor Density:** 4.8 (air=1)

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 213-214 deg C

**Freezing/Melting Point:** -8 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Slightly soluble in water.

**Specific Gravity/Density:** 0.9200

**Molecular Formula:** C<sub>9</sub>H<sub>14</sub>O

**Molecular Weight:** 138.21

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Ignition sources, excess heat, confined spaces.

**Incompatibilities with Other Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 78-59-1: GW7700000

**LD50/LC50:**

CAS# 78-59-1:

Draize test, rabbit, eye: 920 ug Severe;

Draize test, rabbit, eye: 100 mg/24H Moderate;

Draize test, rabbit, skin: 100 mg/24H Mild;

Draize test, rabbit, skin: 0.5 mL/24H Moderate;

Inhalation, rat: LC50 = 7 gm/m<sup>3</sup>;

Oral, mouse: LD50 = 2690 mg/kg;

Oral, rabbit: LD50 = 1420 mg/kg;

Oral, rat: LD50 = 1870 mg/kg;

Skin, rabbit: LD50 = 1500 uL/kg;

Skin, rat: LD50 = 1390 mg/kg;

**Carcinogenicity:**

CAS# 78-59-1:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** Not listed.
- **NTP:** Not listed.
- **IARC:** Not listed.

**Epidemiology:** No information available.

**Teratogenicity:** No information available.

**Reproductive Effects:** No information available.

**Mutagenicity:** No information available.

**Neurotoxicity:** No information available.

**Other Studies:**

## Section 12 - Ecological Information

No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	Not regulated as a hazardous material	MERCURIC IODIDE
<b>Hazard Class:</b>		6.1
<b>UN Number:</b>		UN1638
<b>Packing Group:</b>		II

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 78-59-1 is listed on the TSCA inventory.

#### Health & Safety Reporting List

CAS# 78-59-1: Effective 10/4/82, Sunset 10/4/92

#### Chemical Test Rules

CAS# 78-59-1: Testing required by manufacturers, processors

#### Section 12b

CAS# 78-59-1: Section 4

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 78-59-1: 5000 lb final RQ; 2270 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 78-59-1: immediate, delayed, fire, reactive.

**Section 313** No chemicals are reportable under Section 313.

#### Clean Air Act:

CAS# 78-59-1 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 78-59-1 is listed as a Priority Pollutant under the Clean Water Act. CAS# 78-59-1 is listed as a Toxic Pollutant under the Clean Water Act.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 78-59-1 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

#### California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations**  
**European Labeling in Accordance with EC Directives**  
**Hazard Symbols:**

XN

**Risk Phrases:**

R 21/22 Harmful in contact with skin and if swallowed.  
R 36/37 Irritating to eyes and respiratory system.  
R 40 Limited evidence of a carcinogenic effect.

**Safety Phrases:**

S 13 Keep away from food, drink and animal feeding stuffs.  
S 23 Do not inhale gas/fumes/vapour/spray.  
S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.  
S 46 If swallowed, seek medical advice immediately and show this container or label.

**WGK (Water Danger/Protection)**

CAS# 78-59-1: 1

**Canada - DSL/NDSL**

CAS# 78-59-1 is listed on Canada's DSL List.

**Canada - WHMIS**

WHMIS: Not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 78-59-1 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

**MSDS Creation Date:** 3/16/1999

**Revision #4 Date:** 10/03/2005



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 78-87-5****Date: 04/18/2006**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: 1,2-DICHLOROPROPANE

SYNONYMS: Propylene dichloride, propylene chloride

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	Exposure Limits (PPM)			
				ACGIH TLV	OSHA PEL	MAC	Other STEL
1,2-DICHLOROPROPANE	C3H6Cl2	78-87-5	99+%	10	75	75	110

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIANT

## 3. HAZARD IDENTIFICATION

**\*\*\* EMERGENCY OVERVIEW \*\*\***

Flammable liquid and vapor.

Can cause Central Nervous System depression.

May cause liver, kidney and heart damage.

May cause irritation to the eyes, skin and respiratory tract.

### POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation, Ingestion

ACUTE EFFECTS: Irritation to the eyes, mucous membranes, and upper respiratory tract. Skin contact may cause irritation. Skin contact can cause defatting and dermatitis. Overexposure may cause nausea, headache, dizziness, vomiting and weakness. Central nervous system (CNS) depression and pulmonary edema may occur. Material may also cause damages to liver, kidney and heart.

CHRONIC EFFECTS: Possible dermatitis from skin contact. Kidney and liver damage. Heart damage.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Liver, kidney, skin, and central nervous system diseases or disorders.

OTHER EFFECTS OF OVEREXPOSURE: None

CARCINOGENICITY (US ONLY):

NTP - No

IARC MONOGRAPHS - No

OSHA REGULATED - No

#### 4. FIRST AID MEASURES

**INHALATION:** Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

**EYE CONTACT:** Do not allow victim to rub or keep eyes tightly shut. Flush with large amounts of water lifting upper and lower lids.

**SKIN CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes while removing contaminated clothing.

**INGESTION:** Never give anything by mouth to an unconscious person. Have conscious and alert person drink 1 to 2 glasses of water. Induce vomiting after victim drinks water.

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: None

#### 5. FIRE FIGHTING MEASURES

**FLASH POINT:** 16 deg.C

**AUTOIGNITION TEMPERATURE:** 557 deg.C

**FLAMMABLE LIMITS:** Vol. %

LOWER: 3.4

UPPER: 14.5

**EXTINGUISHING MEDIA:** Carbon dioxide, foam, or dry chemical. Water spray or fog.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide, hydrogen chloride, phosgene, and chlorine gas.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Vapors may travel a considerable distance to the source of ignition and flash back. Cylinder rupture may occur under fire conditions. Emits toxic fumes under fire conditions.

#### 6. ACCIDENTAL RELEASE MEASURES

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Remove all sources of ignition. Use a self-contained breathing apparatus in case of emergency or non-routine use. Absorb with sand or vermiculite and place in closed containers for disposal.

SPECIALIZED EQUIPMENT: Use non-sparking tools.

## 7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING: Keep in a cool, well ventilated place. Use spark-proof tool and explosion-proof equipment. Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use. Store away from heat, flame, and sparks.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentrations below exposure and flammable limits.

EYE / FACE PROTECTION: Goggles. A safety shower and eyewash station should be readily available.

SKIN PROTECTION: Wear suitable protective clothing.

RESPIRATORY PROTECTION: Use a self-contained breathing apparatus in case of emergency or non-routine use.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless

ODOR: Sweet chloroform odor.

PHYSICAL PRESSURE: Liquid

VAPOR PRESSURE: @19.4 deg.C: 40 mm Hg

VAPOR DENSITY (AIR=1): 3.9

BOILING POINT (C): 96.8

SOLUBILITY IN WATER: @20 deg.C: 0.26% by wt.

SPECIFIC GRAVITY (H<sub>2</sub>O=1): @20 deg.C: 1.159

EVAPORATION RATE: (BuAc=1): >1

ODOR THRESHOLD: N/A

**10. STABILITY AND REACTIVITY**

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Exposure to heat, ignition sources, and incompatibles.

MATERIALS TO AVOID: Strong acids, oxidizers, and active metals. Reacts with aluminum to form aluminum chloride and this reaction, when confined, leads to a violent explosion.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: HCl gas, phosgene gas, CO and oxides of chlorine.

**11. TOXICOLOGICAL INFORMATION**

LETHAL CONCENTRATION (LC50): 8,558 ppm, Rat 1 hour

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

**12. ECOLOGICAL INFORMATION**

No adverse ecological effects are expected.

**13. DISPOSAL CONSIDERATIONS**

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place.

**14. TRANSPORT INFORMATION**

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Propylene dichloride  
HAZARD CLASS: 3 (flammable), Packing Group II  
IDENTIFICATION NUMBER: UN1279  
REPORTABLE QUANTITIES: 1000 lb.  
LABELING: FLAMMABLE LIQUID

ADR / RID (EU Only): Class 3, 3B

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

## 15. REGULATORY INFORMATION

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 201-152-2

NUMBER IN ANNEX 1 OF DIR 67/548: Not listed in annex 1.

EU CLASSIFICATION: N/Av

R: 11-20/22

S: 16-24

## 16. OTHER INFORMATION

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Av - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.

<b>MSDS</b>	<b>Material Safety Data Sheet</b>		24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
			National Response in Canada CANUTEC: 613-996-6666
			Outside U.S. and Canada Chemtrec: 703-527-3887
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		 	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.			

# METHYL ETHYL KETONE

## 1. Product Identification

**Synonyms:** 2-Butanone; ethyl methyl ketone; MEK; Methyl acetone

**CAS No.:** 78-93-3

**Molecular Weight:** 72.11

**Chemical Formula:** CH<sub>3</sub>COCH<sub>2</sub>CH<sub>3</sub>

**Product Codes:**

J.T. Baker: 5385, 9214, 9319, 9323, 9414, Q531

Mallinckrodt: 6206, 6233, 6240, 6243

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Methyl Ethyl Ketone	78-93-3	99 - 100%	Yes

## 3. Hazards Identification

### Emergency Overview

**DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)

Flammability Rating: 3 - Severe (Flammable)

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

### Potential Health Effects

#### Inhalation:

Causes irritation to the nose and throat. Concentrations above the TLV may cause headache, dizziness, nausea, shortness of breath, and vomiting. Higher concentrations may cause central nervous system depression and unconsciousness.

#### Ingestion:

May produce abdominal pain, nausea. Aspiration into lungs can produce severe lung damage and is a medical emergency. Other symptoms expected to parallel inhalation.

#### Skin Contact:

Causes irritation to skin. Symptoms include redness, itching, and pain. May be absorbed through the skin with possible systemic effects.

#### Eye Contact:

Vapors are irritating to the eyes. Splashes can produce painful irritation and eye damage.

#### Chronic Exposure:

Prolonged skin contact may defat the skin and produce dermatitis. Chronic exposure may cause central nervous system effects.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:**

Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately.

**Skin Contact:**

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: -9C (16F) CC

Autoignition temperature: 404C (759F)

Flammable limits in air % by volume:

lcl: 1.4; ucl: 11.4

Extremely Flammable.

**Explosion:**

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Vapors can flow along surfaces to distant ignition source and flash back.

Contact with strong oxidizers may cause fire. Sealed containers may rupture when heated. Sensitive to static discharge.

**Fire Extinguishing Media:**

Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. This highly flammable liquid must be kept from sparks, open flame, hot surfaces, and all sources of heat and ignition.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

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## 7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):

200 ppm (TWA)

-ACGIH Threshold Limit Value (TLV):

200 ppm (TWA), 300 ppm (STEL)

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details. Use explosion-proof equipment.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece respirator with organic vapor cartridge may be worn up to 50 times the

exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. **WARNING:** Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Butyl rubber is a suitable material for personal protective equipment.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Sharp mint-like odor.

**Solubility:**

29 g in 100 g of water.

**Specific Gravity:**

0.81 @ 20C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

80C (176F)

**Melting Point:**

-86C (-123F)

**Vapor Density (Air=1):**

2.5

**Vapor Pressure (mm Hg):**

78 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

2.7 (Ether = 1)

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Oxidizing materials, caustics, amines, ammonia, strong bases, chloroform, chlorosulfonic acid, oleum, potassium-t-butoxide, heat or flame, hydrogen peroxide, nitric acid. Can attack many plastics, resins and rubber.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

**Toxicological Data:**

Oral rat LD50: 2737 mg/kg; inhalation rat LC50: 23,500 mg/m<sup>3</sup>/8-hr; skin rabbit LD50: 6480 mg/kg; investigated as a mutagen, reproductive effector.

**Reproductive Toxicity:**

Has shown teratogenic effects in laboratory animals.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Methyl Ethyl Ketone (78-93-3)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material may leach into groundwater. When released into the soil, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material is expected to have a half-life between 10 and 30 days. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.

**Environmental Toxicity:**

This material is not expected to be toxic to aquatic life. The LC50/96-hour values for fish are over 100 mg/l.

### 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

### 14. Transport Information

#### Domestic (Land, D.O.T.)

-----  
**Proper Shipping Name:** ETHYL METHYL KETONE  
**Hazard Class:** 3  
**UN/NA:** UN1193  
**Packing Group:** II  
**Information reported for product/size:** 366LB

#### International (Water, I.M.O.)

-----  
**Proper Shipping Name:** ETHYL METHYL KETONE  
**Hazard Class:** 3  
**UN/NA:** UN1193  
**Packing Group:** II  
**Information reported for product/size:** 366LB

### 15. Regulatory Information

F, Xi  
 R11 - Highly flammable  
 R36 - Irritating to eyes  
 R66 - Repeated exposure may cause skin drying or cracking  
 R67 - Vapours may cause drowsiness or dizziness  
 S2 - Keep out of the reach of children  
 S9 - Keep container in a well-ventilated place  
 S16 - Keep away from sources of ignition - No smoking

```
-----\Chemical Inventory Status - Part 1\-----
Ingredient                TSCA  EC   Japan  Australia
-----
Methyl Ethyl Ketone (78-93-3)  Yes  Yes  Yes    Yes
```

```
-----\Chemical Inventory Status - Part 2\-----
Ingredient                Korea  DSL  NDSL  Phil.
-----
Methyl Ethyl Ketone (78-93-3)  Yes   Yes  No    Yes
```

```
-----\Federal, State & International Regulations - Part 1\-----
-SARA 302-  -SARA 313-
Ingredient  RQ  TPQ  List  Chemical Catg.
-----
Methyl Ethyl Ketone (78-93-3)  No  No   Yes   No
```

```
-----\Federal, State & International Regulations - Part 2\-----
-RCRA-  -TSCA-
Ingredient  CERCLA  261.33  8(d)
-----
Methyl Ethyl Ketone (78-93-3)  5000    U159    No
```

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes  
 SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No  
 Reactivity: No (Pure / Liquid)

**Australian Hazchem Code:** 2[Y]E

**Poison Schedule:** S5

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

### 16. Other Information

**NFPA Ratings:** Health: **1** Flammability: **3** Reactivity: **0**

**Label Hazard Warning:**

DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

**Label Precautions:**

- Keep away from heat, sparks and flame.
- Keep container closed.
- Use only with adequate ventilation.
- Wash thoroughly after handling.
- Avoid breathing vapor.
- Avoid contact with eyes, skin and clothing.

**Label First Aid:**

Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases, get medical attention.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

MSDS Section(s) changed since last revision of document include: 3, 15.

**Disclaimer:**

\*\*\*\*\*

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety  
Phone Number: (314) 654-1600 (U.S.A.)



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 79-00-5****Date: 03/09/2001**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: 1,1,2-TRICHLOROETHANE

SYNONYMS: Ethane Trichloride, B-Trichloroethane, Vinyl Trichloride

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	Exposure Limits (PPM)			
				ACGIH TLV	OSHA PEL	MAC	Other STEL
1,1,2-TRICHLOROETHANE	C <sub>2</sub> H <sub>3</sub> CL <sub>3</sub>	79-00-5	99+%	10	10	10	NE

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIAN

## 3. HAZARD IDENTIFICATION

**\*\*\* EMERGENCY OVERVIEW \*\*\***

Flammable liquid and vapor.

Can form explosive mixtures with air.

May cause central nervous system damage.

Can cause damage to eyes, skin, and respiratory tract.

## POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation , Skin , Ingestion

ACUTE EFFECTS: Vapor exposure can cause irritation of the eyes, nose, throat and respiratory tract. Skin exposure may cause irritation, itching, erythema, swelling, burning and pain. Eye contact may cause irritation, redness, or blurred vision. Possible central nervous system depression. Symptoms include shortness of breath, headache, confusion, nausea, dizziness, and unconsciousness. Can be absorbed through the skin.

CHRONIC EFFECTS: Kidney and liver damage.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Respiratory problems.

OTHER EFFECTS OF OVEREXPOSURE: None

CARCINOGENICITY (US ONLY):

NTP - No

IARC MONOGRAPHS - No

OSHA REGULATED - No

**4. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

**EYE CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes. Do not allow victim to rub or keep eyes tightly shut.

**SKIN CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes while removing contaminated clothing.

**INGESTION:** Never give anything by mouth to an unconscious person. Have conscious and alert person drink 1 to 2 glasses of water.

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: None

**5. FIRE FIGHTING MEASURES**

**FLASH POINT:** N/Av

**AUTOIGNITION TEMPERATURE:** 460 deg. C

**FLAMMABLE LIMITS:** Vol. %

LOWER: 8.4

UPPER: 13.3

**EXTINGUISHING MEDIA:** Extinguish with water spray, water fog, dry chemical, or carbon dioxide.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide, hydrogen chloride and phosgene.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Cylinder rupture may occur under fire conditions. Emits toxic fumes under fire conditions. Vapors may travel a considerable distance to the source of ignition and flash back.

**6. ACCIDENTAL RELEASE MEASURES**

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Remove leaking cylinder to exhaust hood or safe outdoor area. Shut off source if possible and remove source of heat. Absorb with sand or vermiculite and place in closed containers for disposal.

SPECIALIZED EQUIPMENT: None

## 7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders. Use only in a well-ventilated area.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use. Store away from oxidizers, combustible materials, and source of ignition or heat.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentrations below exposure and flammable limits.

EYE / FACE PROTECTION: Safety glasses

SKIN PROTECTION: Impervious gloves, coveralls, boots, and/or other resistant protective clothing.

RESPIRATORY PROTECTION: Use a self-contained breathing apparatus in case of emergency or non-routine use.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless

ODOR: Sweet odor.

PHYSICAL PRESSURE: Liquid

VAPOR PRESSURE: @35 deg. C: 40 mm Hg

VAPOR DENSITY (AIR=1): 4.6

BOILING POINT (C): 114

SOLUBILITY IN WATER: Slight

SPECIFIC GRAVITY (H<sub>2</sub>O=1): @20 deg. C: 1.44

EVAPORATION RATE: N/Av

ODOR THRESHOLD: N/Av

## 10. STABILITY AND REACTIVITY

**10. STABILITY AND REACTIVITY**

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas. Storage near a heat source.

MATERIALS TO AVOID: Potassium, powdered aluminum, magnesium, zinc, oxidizing agents, amines and amides.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: HCl gas, phosgene gas, CO and oxides of chlorine.

**11. TOXICOLOGICAL INFORMATION**

LETHAL CONCENTRATION (LC50): 4051 ppm, Rat 1 hour.

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

**12. ECOLOGICAL INFORMATION**

No adverse ecological effects are expected.

**13. DISPOSAL CONSIDERATIONS**

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place.

**14. TRANSPORT INFORMATION**

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Flammable liquid, n.o.s.

HAZARD CLASS: 3 (flammable), Packing Group 1

IDENTIFICATION NUMBER: UN1993

REPORTABLE QUANTITIES: 100 lbs.

LABELING: FLAMMABLE LIQUID

ADR / RID (EU Only): Class 3, 1A

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

## 15. REGULATORY INFORMATION

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 201-166-9

NUMBER IN ANNEX 1 OF DIR 67/548: Not listed in annex 1.

EU CLASSIFICATION: N/Av

R: 20-21-22

S: 9

## 16. OTHER INFORMATION

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.

<b>MSDS</b>	<b>Material Safety Data Sheet</b>		24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
			National Response in Canada CANUTEC: 613-996-6666
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From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		 	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.			

# TRICHLOROETHYLENE

## 1. Product Identification

**Synonyms:** Trichloroethene; TCE; acetylene trichloride; Ethinyl trichloride

**CAS No.:** 79-01-6

**Molecular Weight:** 131.39

**Chemical Formula:** C<sub>2</sub>HCl<sub>3</sub>

**Product Codes:**

J.T. Baker: 5376, 9454, 9458, 9464, 9473

Mallinckrodt: 8600, 8633

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Trichloroethylene	79-01-6	100%	Yes

## 3. Hazards Identification

### Emergency Overview

**WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Poison)

Flammability Rating: 1 - Slight

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: Blue (Health)

### Potential Health Effects

#### Inhalation:

Vapors can irritate the respiratory tract. Causes depression of the central nervous system with symptoms of visual disturbances and mental confusion, incoordination, headache, nausea, euphoria, and dizziness. Inhalation of high concentrations could cause unconsciousness, heart effects, liver effects, kidney effects, and death.

#### Ingestion:

Cases irritation to gastrointestinal tract. May also cause effects similar to inhalation. May cause coughing, abdominal pain, diarrhea, dizziness, pulmonary edema, unconsciousness. Kidney failure can result in severe cases. Estimated fatal dose is 3-5 ml/kg.

#### Skin Contact:

Cause irritation, redness and pain. Can cause blistering. Continued skin contact has a defatting action and can produce rough, dry, red skin resulting in secondary infection.

#### Eye Contact:

Vapors may cause severe irritation with redness and pain. Splashes may cause eye damage.

#### Chronic Exposure:

Chronic exposures may cause liver, kidney, central nervous system, and peripheral nervous system effects. Workers chronically exposed may exhibit central nervous system depression, intolerance to alcohol, and increased cardiac output. This material is linked to mutagenic effects in humans. This material is also a suspect carcinogen.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin disorders, cardiovascular disorders, impaired liver or kidney or respiratory function, or central or peripheral nervous system disorders may be more susceptible to the effects of the substance.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.

**Skin Contact:**

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

**Note to Physician:**

Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

---

## 5. Fire Fighting Measures

**Fire:**

Autoignition temperature: 420C (788F)

Flammable limits in air % by volume:

lcl: 8; ucl: 12.5

**Explosion:**

A strong ignition source, e. g., a welding torch, can produce ignition. Sealed containers may rupture when heated.

**Fire Extinguishing Media:**

Use water spray to keep fire exposed containers cool. If substance does ignite, use CO<sub>2</sub>, dry chemical or foam.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Combustion by-products include phosgene and hydrogen chloride gases. Structural firefighters' clothing provides only limited protection to the combustion products of this material.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

Trichloroethylene:

-OSHA Permissible Exposure Limit (PEL):

100 ppm (TWA), 200 ppm (Ceiling),

300 ppm/5min/2hr (Max)

-ACGIH Threshold Limit Value (TLV):

10 ppm (TWA) 25 ppm (STEL); A2 Suspected Human Carcinogen.

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airtight hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). This substance has poor warning properties. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Neoprene is a recommended material for personal protective equipment.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Chloroform-like odor.

**Solubility:**

Practically insoluble in water. Readily miscible in organic solvents.

**Specific Gravity:**

1.47 @ 20C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

87C (189F)

**Melting Point:**

-73C (-99F)

**Vapor Density (Air=1):**

4.5

**Vapor Pressure (mm Hg):**

57.8 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

No information found.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage. Will slowly decompose to hydrochloric acid when exposed to light and moisture.

**Hazardous Decomposition Products:**

May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Strong caustics and alkalis, strong oxidizers, chemically active metals, such as barium, lithium, sodium, magnesium, titanium and beryllium, liquid oxygen.

**Conditions to Avoid:**

Heat, flame, ignition sources, light, moisture, incompatibles

## 11. Toxicological Information

**Toxicological Data:**

Trichloroethylene: Oral rat LD50: 5650 mg/kg; investigated as a tumorigen, mutagen, reproductive effector.

**Reproductive Toxicity:**

This material has been linked to mutagenic effects in humans.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Trichloroethylene (79-01-6)	No	Yes	2A

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material may leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.

**Environmental Toxicity:**

The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be slightly toxic to aquatic life.

### 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

### 14. Transport Information

#### Domestic (Land, D.O.T.)

-----  
**Proper Shipping Name:** TRICHLOROETHYLENE

**Hazard Class:** 6.1

**UN/NA:** UN1710

**Packing Group:** III

**Information reported for product/size:** 4L

#### International (Water, I.M.O.)

-----  
**Proper Shipping Name:** TRICHLOROETHYLENE

**Hazard Class:** 6.1

**UN/NA:** UN1710

**Packing Group:** III

**Information reported for product/size:** 4L

### 15. Regulatory Information

```
-----\Chemical Inventory Status - Part 1\-----
Ingredient                               TSCA  EC   Japan  Australia
-----
Trichloroethylene (79-01-6)              Yes  Yes  Yes    Yes
```

```
-----\Chemical Inventory Status - Part 2\-----
Ingredient                               --Canada--
                               Korea  DSL  NDSL  Phil.
-----
Trichloroethylene (79-01-6)              Yes   Yes  No    Yes
```

```
-----\Federal, State & International Regulations - Part 1\-----
Ingredient                               -SARA 302-  -SARA 313-----
                               RQ   TPQ   List  Chemical Catg.
-----
Trichloroethylene (79-01-6)              No    No    Yes   No
```

```
-----\Federal, State & International Regulations - Part 2\-----
Ingredient                               -RCRA-      -TSCA-
                               CERCLA      261.33     8(d)
-----
Trichloroethylene (79-01-6)              100        U228       No
```

Chemical Weapons Convention: No    TSCA 12(b): No    CDTA: No  
 SARA 311/312: Acute: Yes    Chronic: Yes    Fire: No    Pressure: No  
 Reactivity: No    (Pure / Liquid)

#### WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

**Australian Hazchem Code:** None allocated.

**Poison Schedule:** S6

#### WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

### 16. Other Information

**NFPA Ratings:** Health: 2 Flammability: 1 Reactivity: 0

#### Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

#### Label Precautions:

Do not get in eyes, on skin, or on clothing.

Do not breathe vapor.

Keep container closed.  
Use only with adequate ventilation.  
Wash thoroughly after handling.  
Keep away from heat and flame.

**Label First Aid:**

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician. Note to physician: Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

\*\*\*\*\*  
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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety  
Phone Number: (314) 654-1600 (U.S.A.)



From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

24 Hour Emergency Telephone: 908-859-2151  
CHEMTREC: 1-800-424-9300  
National Response in Canada  
CANUTEC: 613-996-6666  
Outside U.S. And Canada  
Chemtree: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

## 1,1,2,2-TETRACHLOROETHANE

### 1. Product Identification

**Synonyms:** Ethane, 1,1,2,2-tetrachloro-; s-tetrachloroethane; acetylene tetrachloride

**CAS No.:** 79-34-5

**Molecular Weight:** 167.85

**Chemical Formula:** C<sub>2</sub>H<sub>2</sub>Cl<sub>4</sub>

**Product Codes:** V398

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
1,1,2,2-Tetrachloroethane	79-34-5	100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS LIVER, KIDNEYS, CENTRAL NERVOUS SYSTEM AND GASTROINTESTINAL TRACT. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Poison)

Flammability Rating: 0 - None

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe (Life)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: Blue (Health)

#### Potential Health Effects

Generally considered the most toxic of the common chlorinated hydrocarbons.

#### Inhalation:

Highly toxic. Strong irritant of the mucous membranes and upper respiratory tract. Initial symptoms may include irritation of the nose and throat, salivation. Continued exposure may produce restlessness, dizziness, nausea, vomiting and narcosis. Symptoms may progress to a more serious illness with jaundice, liver tenderness, lung edema, and possibly convulsions and coma before death.

#### Ingestion:

Highly toxic via ingestion. Symptoms parallel those from inhalation. Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea.

#### Skin Contact:

Causes irritation to skin. Symptoms include redness, itching, and pain. May be absorbed through the skin with possible systemic effects.

#### Eye Contact:

Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.

#### Chronic Exposure:

Chronic exposure can produce the same life threatening health effects noted for inhalation exposure above. Chronic exposure may also affect liver, gastrointestinal tract and blood-forming organs.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin, eye or central nervous system disorders, or impaired liver, kidney, or pulmonary function may be more susceptible to the effects of this substance.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician immediately.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician immediately.

**Eye Contact:**

Immediately flush eyes with gentle but large stream of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Call a physician immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Not considered to be a fire hazard.

**Explosion:**

Not considered to be an explosion hazard.

**Fire Extinguishing Media:**

Use any means suitable for extinguishing surrounding fire.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit

5 ppm (TWA) skin

-ACGIH Threshold Limit Value (TLV):

1 ppm (TWA) skin, A3 - Confirmed animal carcinogen

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded, wear a supplied air, full-facepiece respirator, airtight hood, or full-facepiece self-contained breathing apparatus. This substance has poor warning properties.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

**Other Control Measures:**

There is insufficient data in the published literature to assign complete numerical SAF-T-DATA\* ratings and laboratory protective equipment for this product. Special precautions must be used in storage, use and handling. Protective equipment for laboratory bench use should be chosen using professional judgment based on the size and type of reaction or test to be conducted and the available ventilation, with overriding consideration to minimize contact with the chemical.

---

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Chloroform-like odor.

**Solubility:**

Slight, 0.3 g/100g water @ 25C (77F)

**Specific Gravity:**

1.59 @ 20C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

147C (297F)

**Melting Point:**

-43C (-45F)

**Vapor Density (Air=1):**

5.8

**Vapor Pressure (mm Hg):**

8 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

0.65

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage. Unusual exposure to light in the presence of air may form small amounts of phosgene.

**Hazardous Decomposition Products:**

May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Reacts with chemically active metals, fuming sulfuric acid and strong caustics. Attacks most plastics and rubber.

**Conditions to Avoid:**

No information found.

## 11. Toxicological Information

Oral rat LD50: 250 mg/kg; investigated as a tumorigen, mutagen.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
1,1,2,2-Tetrachloroethane (79-34-5)	No	No	3

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material may leach into groundwater. When released into the soil, this material may evaporate to a moderate extent. When released to water, this material is expected to quickly evaporate. When released into water, this material is expected to have a half-life between 10 and 30 days. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material is not expected to react with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of greater than 30 days.

**Environmental Toxicity:**

This material may be toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l. The EC50/48-hour values for daphnia are between 1 and 10 mg/l.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

**Domestic (Land, D.O.T.)**

-----  
**Proper Shipping Name:** 1,1,2,2-TETRACHLOROETHANE  
**Hazard Class:** 6.1  
**UN/NA:** UN1702  
**Packing Group:** II  
**Information reported for product/size:** 1KG

**International (Water, I.M.O.)**

-----  
**Proper Shipping Name:** 1,1,2,2-TETRACHLOROETHANE  
**Hazard Class:** 6.1  
**UN/NA:** UN1702  
**Packing Group:** II  
**Information reported for product/size:** 1KG

**International (Air, I.C.A.O.)**

-----  
**Proper Shipping Name:** 1,1,2,2-TETRACHLOROETHANE  
**Hazard Class:** 6.1  
**UN/NA:** UN1702  
**Packing Group:** II  
**Information reported for product/size:** 1KG

**15. Regulatory Information**

-----\Chemical Inventory Status - Part 1\-----  
Ingredient TSCA EC Japan Australia  
-----  
1,1,2,2-Tetrachloroethane (79-34-5) Yes Yes Yes Yes

-----\Chemical Inventory Status - Part 2\-----  
Ingredient Korea DSL NDSL Phil.  
-----  
1,1,2,2-Tetrachloroethane (79-34-5) Yes Yes No Yes

-----\Federal, State & International Regulations - Part 1\-----  
Ingredient -SARA 302- -SARA 313-----  
RQ TPQ List Chemical Catg.  
-----  
1,1,2,2-Tetrachloroethane (79-34-5) No No Yes No

-----\Federal, State & International Regulations - Part 2\-----  
Ingredient CERCLA -RCRA- -TSCA-  
261.33 8(d)  
-----  
1,1,2,2-Tetrachloroethane (79-34-5) 100 U209 No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes  
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No  
Reactivity: No (Pure / Liquid)

**WARNING:**

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

**Australian Hazchem Code:** 2XE

**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

**16. Other Information**

**NFPA Ratings:** Health: 3 Flammability: 0 Reactivity: 0

**Label Hazard Warning:**

DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS LIVER, KIDNEYS, CENTRAL NERVOUS SYSTEM AND GASTROINTESTINAL TRACT. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT.

**Label Precautions:**

Do not breathe vapor.  
Do not get in eyes, on skin, or on clothing.  
Keep container closed.  
Use only with adequate ventilation.  
Wash thoroughly after handling.

**Label First Aid:**

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician immediately.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

# Composition/Information on Ingredient

**Cas:**

8001-35-2

**Code:**

M

**RTECS:**

XW5250000

**Code:**

M

**Name:**

CHLORINATED CAMPHENE (SARA III)

**Other REC Limits:**

N/K

**OSHA PEL:**

S,0.5MG/M3/1STEL

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

S,0.5MG/M3/1 STEL;93

**Code:**

M

**ACGIHSTEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

USE APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT.

**Ventilation:**

HANDLE ONLY IN A HOOD

**Protective Gloves:**

AS REQUIRED

**Eye Protection:**

EYE SHIELDS

**Other Protective Equipment:**

Equipment N/K

**Work Hygienic Practices:**

REMOVE/WASH CONTAMINATED CLOTHING BEFORE REUSE. ONLY TRAINED PERSONNEL SHOULD HANDLE THIS CHEMICAL OR ITS CONTAINER.

**Supplemental Safety and Health:**

N/K

## Health Hazards Data

**LD50LC50Mixture:**

LD50 (RAT OR MOUSE): 69 MG/KG.

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

YES

**IARC:**

YES

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

SKIN: HARMFUL & FATAL IF ABSORBED. INHALATION: HARMFUL, LIVER/KIDNEY/NERVOUS SYSTEM INJURY, & FATAL. INGESTION: FATAL.

**Explanation Of Carcinogenicity:**

TOXAPHENE/CAMPHECLOR IS A SUSPECTED HUMAN CARCINOGEN.

**Signs And Symptoms Of Overexposure:**

SKIN: HARMFUL & FATAL IF ABSORBED. INHALATION: HARMFUL, LIVER/KIDNEY/NERVOUS SYSTEM INJURY, & FATAL. INGESTION: FATAL.

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES/SKIN: FLUSH W/WATER FOR 15-20 MINS. IF NO BURNS HAVE OCCURED-USE SOAP & WATER TO CLEANSE SKIN. INHALATION:

REMOVE TO FRESH AIR. ADMINISTER OXYGEN IF BREATHING DIFFICULTY.

ADMINISTER CPR IF CARDIA C ARREST OCCURS. IF SHOWING

SIGNS OF SHOCK, KEEP WARM/QUIET. INGESTION: INDUCE VOMITING. IF

VOMITING, MAKE SURE AIRWAY DOESN'T BECOME

OBSTRUCTED BY VOMIT. OBTAIN MEDICAL ATTENTION IN ALL CASES.

**Spill Release Procedures:**

EVACUATE AREA. WEAR APPROPRIATE EQUIPMENT. VENTILATE AREA. SWEEP UP & PLACE IN AN APPROPRIATE CONTAINER. HOLD FOR

DISPOSAL. WASH CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER &

SCRUBBER. DISPOSE OF IN ACCORDANCE W/FEDERAL, STATE, &

LOCAL REGULATIONS.

**Handling And Storage Precautions:**

KEEP CLOSED IN A COOL DRY PLACE. STORE ONLY W/COMPATIBLE CHEMICALS.

FOR LABORATORY USE ONLY. DON'T WEAR CONTACT

LENSES.

**Other Precautions:**

DON'T USE AS DRUGS, COSMETICS, AGRICULTURAL OR PESTICIDAL PRODUCTS, FOOD ADDITIVES OR AS HOUSEHOLD CHEMICALS.

AVOID DIRECT PHYSICAL CONTACT. AVOID CONTACT W/SKIN, EYES & CLOTHING.

2

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P

**Flash Point:**

**Flash Point Text:**

N/K

**Autoignition Temp:**

**Autoignition Temp Text:**

N/A

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

CO<sub>2</sub>, DRY CHEMICAL POWDER OR SPRAY.

**Fire Fighting Procedures:**

N/K

**Unusual Fire/Explosion Hazard:**

N/K

## Physical/Chemical Properties

**HCC:**

**NRC/State LIC No:**

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

311F 3

**Melt/Freeze Pt:**

**M.P/F.P Text:**

149-194F

**Decomp Temp:**

**Decomp Text:**

N/K

**Vapor Pres:**

0.2-0.4

**Vapor Density:**

N/K

**Volatile Org Content %:**

**Spec Gravity:**

N/K

**VOC Pounds/Gallon:**

**PH:** N/K

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

INSOLUBLE

**Appearance and Odor:**

YELLOW WAXY SOLID W/FRUITY/PLEASANT ODOR.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

SENSITIVE TO HEAT, LIGHT, AIR, &amp;MOISTURE.

**Materials To Avoid:**IRON, ZINC, OTHER LIGHT METALS, COPPER, MERCURY OR ALKALINE PESTICIDES,  
&STRONG BASES.**Hazardous Decomposition Products:**

N/K

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

**Sara Title III Information:** N/P**Federal Regulatory Information:** N/P**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P[www.lookchem.com](http://www.lookchem.com)

For R&amp;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. Lookchem 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.



Health	1
Fire	3
Reactivity	0
Personal Protection	J

## Material Safety Data Sheet Alpha-Pinene MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Alpha-Pinene

**Catalog Codes:** SLP3301

**CAS#:** 80-56-8

**RTECS:** DT7000000

**TSCA:** TSCA 8(b) inventory: Alpha-Pinene

**CI#:** Not available.

**Synonym:** 2,6,6-Trimethylbicyclo[3,1,1]hept-2-ene

**Chemical Name:** Not available.

**Chemical Formula:** C<sub>10</sub>H<sub>16</sub>

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call: 1-703-527-3887**

**For non-emergency assistance, call: 1-281-441-4400**

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
{Alpha-}Pinene	80-56-8	100

**Toxicological Data on Ingredients:** Alpha-Pinene: ORAL (LD50): Acute: 3700 mg/kg [Rat].

### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

**Potential Chronic Health Effects:**

Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

### Section 4: First Aid Measures

**Eye Contact:** Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

**Skin Contact:**

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

**Serious Skin Contact:** Not available.

**Inhalation:** Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

**Ingestion:**

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** Flammable.

**Auto-Ignition Temperature:** 255°C (491°F)

**Flash Points:** CLOSED CUP: 33°C (91.4°F).

**Flammable Limits:** Not available.

**Products of Combustion:** These products are carbon oxides (CO, CO<sub>2</sub>).

**Fire Hazards in Presence of Various Substances:** Highly flammable in presence of open flames and sparks.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

**Special Remarks on Fire Hazards:** Explosive in the form of vapor when exposed to heat or flame.

**Special Remarks on Explosion Hazards:** Not available.

## Section 6: Accidental Release Measures

**Small Spill:** Absorb with an inert material and put the spilled material in an appropriate waste disposal.

**Large Spill:**

Flammable liquid, insoluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal.

## Section 7: Handling and Storage

**Precautions:**

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label.

**Storage:**

Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:** Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:** Not available.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid.

**Odor:** Strong.

**Taste:** Not available.

**Molecular Weight:** 136.23 g/mole

**Color:** Colorless.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 156°C (312.8°F)

**Melting Point:** -55°C (-67°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 0.8592 (Water = 1)

**Vapor Pressure:** Not available.

**Vapor Density:** 4.7 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water, methanol, diethyl ether.

### Solubility:

Soluble in methanol, diethyl ether. Insoluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Not available.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** No.

### Section 11: Toxicological Information

**Routes of Entry:** Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:** Acute oral toxicity (LD50): 3700 mg/kg [Rat].

**Chronic Effects on Humans:** Not available.

**Other Toxic Effects on Humans:**

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:** Not available.

### Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are more toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

### Section 13: Disposal Considerations

**Waste Disposal:**

### Section 14: Transport Information

**DOT Classification:** Class 3: Flammable liquid.

**Identification:** : alpha-Pinene : UN2368 PG: III

**Special Provisions for Transport:** Not available.

### Section 15: Other Regulatory Information

**Federal and State Regulations:**

Pennsylvania RTK: Alpha-Pinene Massachusetts RTK: Alpha-Pinene TSCA 8(b) inventory: Alpha-Pinene

**Other Regulations:** OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

**Other Classifications:**

**WHMIS (Canada):** CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).

**DSCL (EEC):**

R10- Flammable. R36- Irritating to eyes.

**HMIS (U.S.A.):**

**Health Hazard:** 1

**Fire Hazard:** 3

**Reactivity:** 0

**Personal Protection:** j

**National Fire Protection Association (U.S.A.):**

**Health:** 1

**Flammability:** 3

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Not applicable. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

**Section 16: Other Information**

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 11:28 AM

**Last Updated:** 11/01/2010 12:00 PM

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Material Safety Data Sheet  
Methyl methacrylate, stabilized, 99%

### Section 1 - Chemical Product and Company Identification

MSDS Name:	Methyl methacrylate, stabilized, 99%	
Catalog Numbers:	12714-0000, 12714-0010, 12714-0025, 12714-0250	
Synonyms:	MMAMethyl 2-methylpropenoate	
Company Identification:		Acros Organics BVBA Janssen Pharmaceuticaaan 3a 2440 Geel, Belgium
Company Identification: (USA)		Acros Organics One Reagent Lane Fair Lawn, NJ 07410
For information in the US, call:		800-ACROS-01
For information in Europe, call:		+32 14 57 52 11
Emergency Number, Europe:		+32 14 57 52 99
Emergency Number US:		201-796-7100
CHEMTREC Phone Number, US:		800-424-9300
CHEMTREC Phone Number, Europe:		703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name:	%	EINECS#
80-62-6	Methyl methacrylate	99%	201-297-1

Hazard Symbols:

XI F



Risk Phrases:

11 37/38 43

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Highly flammable. Irritating to respiratory system and skin. May cause sensitization by skin contact.

#### Potential Health Effects

**Eye:** Causes eye irritation. Lachrymator (substance which increases the flow of tears).

**Skin:** Causes skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. May be absorbed through the skin redness and pain.

**Ingestion:** May cause severe gastrointestinal tract irritation with nausea, vomiting and possible burns. May cause effects similar to those for inhalation exposure. Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Causes respiratory irritation. May cause irritation of the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. May cause asthmatic attacks due to allergic sensitization of the respiratory tract. May cause narcotic effects in high concentration. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema.

**Chronic:** Prolonged or repeated skin contact may cause dermatitis. May cause liver and kidney damage. May cause lung damage.

### Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.

**Ingestion:** Do not induce vomiting. Get medical aid. Wash mouth out with water.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:**

### Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may be explosive mixture with air. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Containers may explode in the heat of a fire.

**Extinguishing Media:** Use water spray to cool fire-exposed containers. Use water fog, dry chemical, carbon dioxide, or regular foam.

## Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Use a spark-proof tool.

## Section 7 - Handling and Storage

Handling: Use spark-proof tools and explosion proof equipment. Avoid breathing dust, vapor, mist, or gas. Avoid contact with skin and eyes. Use only in a chemical fume hood.

Storage: Keep away from sources of ignition. Store in a cool, dry place. Store in a tightly closed container. Refrigerator/flammables.

## Section 8 - Exposure Controls, Personal Protection

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

CAS# 80-62-6:

United Kingdom, WEL - TWA: 50 ppm TWA; 208 mg/m<sup>3</sup> TWA United Kingdom, WEL - STEL: 100 ppm STEL; 416 mg/m<sup>3</sup> STEL

United States OSHA: 100 ppm TWA; 410 mg/m<sup>3</sup> TWA

Belgium - TWA: 100 ppm VLE; 416 mg/m<sup>3</sup> VLE

France - VME: 100 ppm VME; 410 mg/m<sup>3</sup> VME France - VLE: 200 ppm VLE; 820 mg/m<sup>3</sup> VLE

Germany: 50 ppm TWA; 210 mg/m<sup>3</sup> TWA

Malaysia: 100 ppm TWA; 410 mg/m<sup>3</sup> TWA

Netherlands: 50 ppm MAC; 100 mg/m<sup>3</sup> MAC

Russia: 10 mg/m<sup>3</sup> TWA (vapour)

Spain: 50 ppm VLA-ED; 208 mg/m<sup>3</sup> VLA-ED Spain: 100 ppm VLA-EC; 416 mg/m<sup>3</sup> VLA-EC

Personal Protective Equipment

Eyes: Wear chemical splash goggles.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear a chemical apron.

Respirators: 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.

## Section 9 - Physical and Chemical Properties

Physical State: Clear liquid

Color: APHA: 10 max

Odor: sharp odor

pH: Not available

Vapor Pressure: 28 mm Hg @ 20 deg C

Viscosity: 0.6 mPas 20 deg C

Boiling Point: 100 deg C @ 760.00mm Hg ( 212.00°F)

Freezing/Melting Point: -48 deg C ( -54.40°F)

Autoignition Temperature: 430 deg C ( 806.00 deg F)

Flash Point: 8 deg C ( 46.40 deg F)

Explosion Limits: Lower: 2.10 vol %

Explosion Limits: Upper: 12.50 vol %

Decomposition Temperature: Not available

Solubility in water: 15 g/l (20°C)

Specific Gravity/Density: .9360g/cm<sup>3</sup>

Molecular Formula: H<sub>2</sub>C=C(CH<sub>3</sub>)CO<sub>2</sub>CH<sub>3</sub>

Molecular Weight: 100.12

## Section 10 - Stability and Reactivity

Chemical Stability:

Stable under normal temperatures and pressures.

Conditions to Avoid:

High temperatures, incompatible materials, light, ignition sources.

Incompatibilities with Other Materials

Oxidizing agents, reducing agents, acids, bases, amines, halogens, peroxides, carbon.

Hazardous Decomposition Products

Carbon monoxide, carbon dioxide.

Hazardous Polymerization

May occur.

## Section 11 - Toxicological Information

RTECS#:

CAS# 80-62-6: OZ5075000

RTECS:

**CAS# 80-62-6:** Draize test, rabbit, eye: 150 mg;

Inhalation, mouse: LC50 = 18500 mg/m<sup>3</sup>/2H;

Inhalation, rat: LC50 = 78000 mg/m<sup>3</sup>/4H;

LD50/LC50:

Oral, mouse: LD50 = 3625 mg/kg;

Oral, rabbit: LD50 = 8700 mg/kg;

Oral, rat: LD50 = 7872 mg/kg;  
Skin, rabbit: LD50 = >5 gm/kg;

Other:

Carcinogenicity: Methyl methacrylate - IARC: Group 3 (not classifiable)

Other: See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Ecotoxicity: Not available

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

	IATA	IMO	RID/ADR
Shipping Name:	METHYL METHACRYLATE MONOMER, STABILIZED	METHYL METHACRYLATE, MONOMER, STABILIZED	METHYL METHACRYLATE MONOMER, STABILIZED
Hazard Class:	3	3	3
UN Number:	1247	1247	1247
Packing Group:	II	II	II

USA RQ: CAS# 80-62-6: 1000 lb final RQ; 454 kg final RQ

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XI F

Risk Phrases:

- R 11 Highly flammable.
- R 37/38 Irritating to respiratory system and skin.
- R 43 May cause sensitization by skin contact.

Safety Phrases:

- S 24 Avoid contact with skin.
- S 37 Wear suitable gloves.
- S 46 If swallowed, seek medical advice immediately and show this container or label.

WGK (Water Danger/Protection)

CAS# 80-62-6: 1

Canada

CAS# 80-62-6 is listed on Canada's DSL List

US Federal

TSCA

CAS# 80-62-6 is listed on the TSCA Inventory.

Section 16 - Other Information

MSDS Creation Date: 7/16/1996

Revision #1 Date 7/05/2002

Revisions were made in Sections: General revision.

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.

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From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

24 Hour Emergency Telephone: 908-859-2151  
CHEMTREC: 1-800-424-9300  
National Response in Canada  
CANUTEC: 613-996-6666  
Outside U.S. And Canada  
Chemtree: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

## DIETHYL PHTHALATE

### 1. Product Identification

**Synonyms:** 1,2-Benzenedicarboxylic acid, diethyl ester; Diethyl terephthalate; Ethyl phthalate; Phthalic acid, diethyl ester

**CAS No.:** 84-66-2

**Molecular Weight:** 222.24

**Chemical Formula:** C<sub>6</sub>H<sub>4</sub>(CO<sub>2</sub>C<sub>2</sub>H<sub>5</sub>)<sub>2</sub>

**Product Codes:** H944

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Diethyl Phthalate	84-66-2	99 - 100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO EYES AND RESPIRATORY TRACT.**

SAF-T-DATA<sup>(tm)</sup> Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate

Flammability Rating: 1 - Slight

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

Storage Color Code: Green (General Storage)

#### Potential Health Effects

##### Inhalation:

Low vapor pressure indicates a low inhalation hazard unless this material is heated or misted. If heated, inhalation may cause irritation to respiratory tract. Symptoms may include coughing, chest pain and shortness of breath. Higher exposures may cause central nervous system effects.

##### Ingestion:

Large oral doses may cause irritation to the gastrointestinal tract.

##### Skin Contact:

Not expected to be a health hazard from skin exposure.

##### Eye Contact:

May cause irritation, redness and pain.

##### Chronic Exposure:

No information found.

##### Aggravation of Pre-existing Conditions:

No information found.

### 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Wash exposed area with soap and water. Get medical advice if irritation develops.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 161C (322F) CC

Autoignition temperature: 457C (855F)

Flammable limits in air % by volume:

lcl: 0.7

Lower explosive limit applicable @ 186C (368F).

**Explosion:**

Above the flash point, explosive vapor-air mixtures may be formed.

**Fire Extinguishing Media:**

Water spray, dry chemical, alcohol foam, or carbon dioxide. Water or foam may cause frothing. Water spray may be used to keep fire exposed containers cool.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

## 6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Contain and recover liquid when possible. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-ACGIH Threshold Limit Value (TLV): 5 mg/m<sup>3</sup> (TWA), A4 - Not Classifiable as a Human Carcinogen

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type P95 or R95 filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece particulate respirator (NIOSH type P100 or R100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. Please note that N filters are not recommended for this material. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear protective gloves and clean body-covering clothing.

**Eye Protection:**

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Slight aromatic odor.

**Solubility:**

Insoluble in water.

**Specific Gravity:**

1.23 @ 14C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

298 - 299C (568 - 570F)

**Melting Point:**

-40C (-40F)

**Vapor Density (Air=1):**

7.66

**Vapor Pressure (mm Hg):**

No information found.

**Evaporation Rate (BuAc=1):**

No information found.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Strong oxidizers. Will attack some forms of plastics, rubber and coatings.

**Conditions to Avoid:**

Incompatibles.

## 11. Toxicological Information

Oral rat LD50: 8600 mg/kg. Investigated as a mutagen, reproductive effector.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Diethyl Phthalate (84-66-2)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material may biodegrade to a moderate extent. When released into the soil, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into water, this material is not expected to evaporate significantly. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition. When released into the air, this material is expected to have a half-life of less than 1 day.

**Environmental Toxicity:**

This material may be toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l. The LC50/96-hour values for fish are over 100 mg/l.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

Not regulated.

## 15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----

Ingredient	TSCA	EC	Japan	Australia
Diethyl Phthalate (84-66-2)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----

Ingredient	Korea	DSL	NDSL	Phil.
Diethyl Phthalate (84-66-2)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----

Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Diethyl Phthalate (84-66-2)	No	No	No	No

-----\Federal, State & International Regulations - Part 2\-----

Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8(d)
Diethyl Phthalate (84-66-2)	1000	U088	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No  
 SARA 311/312: Acute: Yes Chronic: No Fire: No Pressure: No  
 Reactivity: No (Pure / Liquid)

**Australian Hazchem Code:** None allocated.

**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 0 Flammability: 1 Reactivity: 0

**Label Hazard Warning:**

CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO EYES AND RESPIRATORY TRACT.

**Label Precautions:**

- Avoid breathing vapor.
- Avoid contact with eyes.
- Keep container closed.
- Use only with adequate ventilation.
- Wash thoroughly after handling.

**Label First Aid:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention. If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention. In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

\*\*\*\*\*

**Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.**

\*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **D2056** \* \* \* \* \* *Effective Date: 09/15/09* \* \* \* \* \* *Supersedes: 07/10/07*

<b>MSDS</b>	<b>Material Safety Data Sheet</b>		24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
			National Response in Canada CANUTEC: 613-996-6666
			Outside U.S. and Canada Chemtrec: 703-527-3887
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		 	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.			

## DIBUTYL PHTHALATE

### 1. Product Identification

**Synonyms:** 1,2-Benzenedicarboxylic acid dibutyl ester; n-Butyl phthalate; Phthalic acid, dibutyl ester

**CAS No.:** 84-74-2

**Molecular Weight:** 278.35

**Chemical Formula:** C<sub>6</sub>H<sub>4</sub>(CO<sub>2</sub>C<sub>4</sub>H<sub>9</sub>)<sub>2</sub>

**Product Codes:**

J.T. Baker: G811

Mallinckrodt: 1829

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Di-n-butyl Phthalate	84-74-2	99 - 100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**WARNING! HARMFUL IF SWALLOWED. CAUSES SEVERE EYE IRRITATION. CAUSES SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY CAUSE RESPIRATORY TRACT IRRITATION. MAY BE HARMFUL IF INHALED.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)

Flammability Rating: 1 - Slight

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe (Life)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: Green (General Storage)

#### Potential Health Effects

##### Inhalation:

Inhalation of vapors or mists is not expected unless this material is heated or misted. If inhaled, material may cause irritation to respiratory tract.

##### Ingestion:

Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea. Accidental ingestion of 10 g (ca. 40 mg/kg) in one person produced nausea and vomiting, dizziness, light sensitivity, swelling of the eyelids, watering of the eyes, and kidney effects (red and white blood cells and oxalate crystals in the urine).

##### Skin Contact:

Irritation and contact burns are possible, but do not occur frequently. Allergic dermatitis has been reported after using antiperspirants and contact with plastics containing dibutyl phthalate (such as a watchband).

##### Eye Contact:

Vapor or mist causes eye irritation. Splashes cause severe irritation with stinging pain and tears.

##### Chronic Exposure:

Workers in the artificial leather industry were studied and it was found that exposure to 1.7 to 66 mg/m<sup>3</sup> over a period of 19 years showed central nervous system

toxicity after 6 to 7 years. Symptoms included pain, numbness, weakness and spasms in the extremities. Because there was concurrent exposure to other phthalates and a few adipates and sebacates, dibutyl phthalate cannot be singled out as the direct cause.

**Aggravation of Pre-existing Conditions:**

No information found.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. Get medical attention for any breathing difficulty.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Immediately flush skin with plenty of soap and water. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 157C (315F) CC

Autoignition temperature: 402C (756F)

Flammable limits in air % by volume:

lel: 0.5; uel: 2.5

Slight fire hazard when exposed to heat or flame. Lower explosive limit was measured at 235C (456F).

**Explosion:**

Above flash point, vapor-air mixtures are explosive within flammable limits noted above.

**Fire Extinguishing Media:**

Dry chemical or carbon dioxide. Water or foam may cause frothing.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

## 6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Contain and recover liquid when possible. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

## 7. Handling and Storage

Keep in a tightly closed container. Store in a cool, dry, ventilated area away from sources of heat or ignition. Protect against physical damage. Store separately from reactive or combustible materials, and out of direct sunlight. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL): 5 mg/m<sup>3</sup> (TWA)

-ACGIH Threshold Limit Value (TLV): 5 mg/m<sup>3</sup> (TWA)

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded, a half-face respirator with an organic vapor cartridge and particulate filter (NIOSH type P95 or R95 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an organic vapor cartridge and particulate filter (NIOSH P100 or R100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. Please note that N series filters are not recommended for this material. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. This compound possibly exists in both particulate and vapor phase. A gas/vapor cartridge should be used in addition to the particulate filter (NIOSH type P95 or better filter). If the vapor concentration alone exceeds the exposure limits, use a supplied air respirator, because warning properties are unknown for these compounds. Breathing air quality must meet the requirements of the OSHA respiratory protection standard

(29CFR1910.134).

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Polyvinyl alcohol, butyl rubber and nitrile rubber are suitable materials to use for personal protective equipment.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Colorless to yellow oily liquid.

**Odor:**

Slight aromatic odor.

**Solubility:**

Insoluble in water.

**Specific Gravity:**

1.05 @ 20C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

340C (644F)

**Melting Point:**

-35C (-31F)

**Vapor Density (Air=1):**

9.6

**Vapor Pressure (mm Hg):**

< 0.01 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

ca. 0.0

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

May also produce 1-butene, butanol and phthalic anhydride. Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Oxidizing agents, acids, chlorine, nitrates, bases and alkalis.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

**Toxicological Data:**

Oral rat LD50: 8000 mg/kg; inhalation rat LC50: 4250 mg/m<sup>3</sup>; skin rabbit LD50: > 20 mL/kg. Investigated as a tumorigen, mutagen, reproductive effector.

**Reproductive Toxicity:**

Women working where phthalates are used had higher incidence of miscarriages, menstrual disorders, and reduced gestation periods.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Di-n-butyl Phthalate (84-74-2)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material may biodegrade to a moderate extent. When released into the soil, this material may leach into groundwater. When released into water, this material is expected to readily biodegrade. When released into water, this material is expected to have a half-life between 10 and 30 days. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material may be removed from the atmosphere to a moderate extent by dry deposition.

**Environmental Toxicity:**

96 Hr LC50 fathead minnow: 0.85 mg/L (flow-through);

96 Hr LC50 rainbow trout: 1.24 mg/L (flow-through);

96 Hr LC50 bluegill: 0.42 mg/L (flow-through)

Dangerous to the environment. Very toxic to aquatic organisms.

### 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

### 14. Transport Information

#### Domestic (Land, D.O.T.)

**Proper Shipping Name:** RQ, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (DI-N-BUTYL PHTHALATE)

**Hazard Class:** 9

**UN/NA:** UN3082

**Packing Group:** III

**Information reported for product/size:** 20L

#### International (Water, I.M.O.)

**Proper Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (DI-N-BUTYL PHTHALATE)

**Hazard Class:** 9

**UN/NA:** UN3082

**Packing Group:** III

**Information reported for product/size:** 20L

#### International (Air, I.C.A.O.)

**Proper Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (DI-N-BUTYL PHTHALATE)

**Hazard Class:** 9

**UN/NA:** UN3082

**Packing Group:** III

**Information reported for product/size:** 20L

### 15. Regulatory Information

```
-----\Chemical Inventory Status - Part 1\-----
Ingredient                               TSCA  EC   Japan  Australia
-----
Di-n-butyl Phthalate (84-74-2)          Yes  Yes  Yes    Yes
```

```
-----\Chemical Inventory Status - Part 2\-----
Ingredient                               Korea  DSL  NDSL  Phil.
-----
Di-n-butyl Phthalate (84-74-2)          Yes   Yes  No    Yes
```

```
-----\Federal, State & International Regulations - Part 1\-----
Ingredient                               -SARA 302-  -SARA 313-----
RQ  TPQ  List  Chemical Catg.
-----
Di-n-butyl Phthalate (84-74-2)          No   No   Yes   No
```

```
-----\Federal, State & International Regulations - Part 2\-----
Ingredient                               -RCRA-  -TSCA-
CERCLA  261.33  8(d)
-----
Di-n-butyl Phthalate (84-74-2)          10     U069   No
```

Chemical Weapons Convention: No    TSCA 12(b): No    CDTA: Yes  
 SARA 311/312: Acute: Yes    Chronic: Yes    Fire: No    Pressure: No  
 Reactivity: No    (Pure / Liquid)

#### WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

**Australian Hazchem Code:** None allocated.

**Poison Schedule:** None allocated.

#### WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

### 16. Other Information

**NFPA Ratings:** Health: 2 Flammability: 1 Reactivity: 0

**Label Hazard Warning:**

WARNING! HARMFUL IF SWALLOWED. CAUSES SEVERE EYE IRRITATION. CAUSES SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY CAUSE RESPIRATORY TRACT IRRITATION. MAY BE HARMFUL IF INHALED.

**Label Precautions:**

- Avoid breathing vapor or mist.
- Avoid contact with eyes, skin and clothing.
- Keep container closed.
- Use with adequate ventilation.
- Wash thoroughly after handling.

**Label First Aid:**

In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention. If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention. In case of skin contact, immediately flush skin with plenty of soap and water. Remove contaminated clothing and shoes. Wash clothing before reuse. Get medical attention. If inhaled, remove to fresh air. Get medical attention for any breathing difficulty.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

\*\*\*\*\*

**Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.**

\*\*\*\*\*

**Prepared by:** Environmental Health & Safety  
Phone Number: (314) 654-1600 (U.S.A.)

### 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Benzyl butyl phthalate

Product Number : 36927

Brand : Fluka

Company : Sigma-Aldrich  
3050 Spruce Street  
SAINT LOUIS MO 63103  
USA

Telephone : +18003255832

Fax : +18003255052

Emergency Phone # : (314) 776-6555

### 2. HAZARDS IDENTIFICATION

#### Emergency Overview

##### OSHA Hazards

No known OSHA hazards

##### Target Organs

Liver, pancreas

##### GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H303

May be harmful if swallowed.

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.

P273

Avoid release to the environment.

P308 + P313

IF exposed or concerned: Get medical advice/attention.

P501

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

#### HMIS Classification

Health hazard:

0

Chronic Health Hazard:

\*

Flammability:

1

Physical hazards:

0

#### NFPA Rating

Health hazard:

1

Fire:

1

Reactivity Hazard:

0

#### Potential Health Effects

**Inhalation**

May be harmful if inhaled. May cause respiratory tract irritation.

**Skin**

May be harmful if absorbed through skin. May cause skin irritation.

**Eyes**

May cause eye irritation.

**Ingestion**

May be harmful if swallowed.

---

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C<sub>19</sub>H<sub>20</sub>O<sub>4</sub>  
Molecular Weight : 312.36 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
<b>Benzyl butyl phthalate</b>			
85-68-7	201-622-7	607-430-00-3	-

---

### 4. 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

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.

---

### 5. FIRE-FIGHTING MEASURES

#### Suitable extinguishing media

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

#### Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

---

### 6. ACCIDENTAL RELEASE MEASURES

#### Personal precautions

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

#### 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.

#### 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.

---

### 7. HANDLING AND STORAGE

#### Precautions for safe handling

Avoid inhalation of vapour or mist.  
Normal measures for preventive fire protection.

#### Conditions for safe storage

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.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

### Personal protective equipment

#### 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).

#### Hand protection

For prolonged or repeated contact use protective gloves.

#### Eye protection

Safety glasses with side-shields conforming to EN166

#### Skin and body protection

Choose body protection according to the amount and concentration of the dangerous substance at the work place.

#### Hygiene measures

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

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### Appearance

Form                      liquid

### Safety data

pH	no data available
Melting point	no data available
Boiling point	no data available
Flash point	113.0 °C (235.4 °F) - closed cup
Ignition temperature	232 °C (450 °F)
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	19.2 hPa (14.4 mmHg) at 250.0 °C (482.0 °F) 0.3 hPa (0.2 mmHg) at 150.0 °C (302.0 °F)
Density	1.1 g/cm <sup>3</sup> at 25 °C (77 °F)
Water solubility	no data available

---

## 10. STABILITY AND REACTIVITY

### Chemical stability

Stable under recommended storage conditions.

### Conditions to avoid

no data available

### Materials to avoid

Strong oxidizing agents, Strong bases

### Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.

---

## 11. TOXICOLOGICAL INFORMATION

**Acute toxicity**

LD50 Oral - rat - 2,330 mg/kg

LD50 Dermal - rabbit - &gt; 10,000 mg/kg

**Skin corrosion/irritation**

no data available

**Serious eye damage/eye irritation**

no data available

**Respiratory or skin sensitization**

no data available

**Germ cell mutagenicity**

no data available

**Carcinogenicity**

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

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Benzyl butyl phthalate)

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

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

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

**Reproductive toxicity**

Presumed human reproductive toxicant

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

**Specific target organ toxicity - single exposure (GHS)**

no data available

**Specific target organ toxicity - repeated exposure (GHS)**

no data available

**Aspiration hazard**

no data available

**Potential health effects**

<b>Inhalation</b>	May be harmful if inhaled. May cause respiratory tract irritation.
<b>Ingestion</b>	May be harmful if swallowed.
<b>Skin</b>	May be harmful if absorbed through skin. May cause skin irritation.
<b>Eyes</b>	May cause eye irritation.

**Additional Information**

RTECS: TH9990000

---

**12. ECOLOGICAL INFORMATION****Toxicity**

Toxicity to fish LC50 - Lepomis macrochirus (Bluegill) - 1.7 mg/l - 96.0 h  
NOEC - Oncorhynchus mykiss (rainbow trout) - 0.48 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates. EC50 - Daphnia magna (Water flea) - 1.70 mg/l - 48 h

#### **Persistence and degradability**

Biodegradability Biotic/Aerobic  
Result: 88 % - Readily biodegradable.

#### **Bioaccumulative potential**

Bioaccumulation Lepomis macrochirus (Bluegill) - 21 d  
Bioconcentration factor (BCF): 663

#### **Mobility in soil**

no data available

#### **PBT and vPvB assessment**

no data available

#### **Other adverse effects**

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Avoid release to the environment.

---

### **13. DISPOSAL CONSIDERATIONS**

#### **Product**

Observe all federal, state, and local environmental regulations.

#### **Contaminated packaging**

Dispose of as unused product.

---

### **14. TRANSPORT INFORMATION**

#### **DOT (US)**

UN-Number: 3082 Class: 9 Packing group: III  
Proper shipping name: Environmentally hazardous substances, liquid, n.o.s. (Benzyl butyl phthalate)  
Reportable Quantity (RQ): 100 lbs  
Marine pollutant: Marine pollutant  
Poison Inhalation Hazard: No

#### **IMDG**

UN-Number: 3082 Class: 9 Packing group: III EMS-No: F-A, S-F  
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Benzyl butyl phthalate)  
Marine pollutant: Marine pollutant

#### **IATA**

UN-Number: 3082 Class: 9 Packing group: III  
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Benzyl butyl phthalate)

---

### **15. REGULATORY INFORMATION**

#### **OSHA Hazards**

No known OSHA hazards

#### **DSL Status**

All components of this product are on the Canadian DSL list.

#### **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**

No SARA Hazards

**Massachusetts Right To Know Components**

	CAS-No.	Revision Date
Benzyl butyl phthalate	85-68-7	2007-03-01

**Pennsylvania Right To Know Components**

	CAS-No.	Revision Date
Benzyl butyl phthalate	85-68-7	2007-03-01

**New Jersey Right To Know Components**

	CAS-No.	Revision Date
Benzyl butyl phthalate	85-68-7	2007-03-01

**California Prop. 65 Components**

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Benzyl butyl phthalate	85-68-7	2007-09-28

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**16. OTHER INFORMATION****Further information**

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# Composition/Information on Ingredient

**Cas:**

86-30-6

**Code:**

M

**RTECS:**

JJ9800000

**Code:**

M

**Name:**

N-NITROSODIPHENYLAMINE (SARA III)

**Other REC Limits:**

NONE RECOMMENDED

**OSHA PEL:**

NOT ESTABLISHED

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

NOT ESTABLISHED

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

RESPIRATORY PROTECTION NOT NORMALLY NEEDED. IF SIGNIFICANT DUSTING OCCURS, WEAR A NIOSH/MSHA APPROVED DUST RESPIRATOR WITH HIGH EFFICIENCY FILTERS.

**Ventilation:**

LOCAL EXHAUST VENTILATION IS RECOMMENDED IF SIGNIFICANT DUSTING OCCURS. OTHERWISE, USE GENERAL EXHAUST VENTILATION.

**Protective Gloves:**

IMPERMEABLE GLOVES

**Eye Protection:**

SAFETY GLASSES WITH SIDE SHIELDS.

**Other Protective Equipment:**

Equipment IMPERVIOUS BOOT, APRON, PROTECTIVE SUIT AND HARD HAT.

**Work Hygienic Practices:**

UPON CONTACT WITH SKIN OR EYES, WASH OFF WITH WATER. REMOVE CONTAMINATED CLOTHING IMMEDIATELY BEFORE LAUNDER BEFORE REUSE.

**Supplemental Safety and Health:**

CONTRACT DAAA09-91-C-0494.BULK DENSITY:0.5-1 G/CC.FIRE FIGHT PROC:OR EXPLOSIVE RESISTANT BUNKER.SPILL PROC:OVERFLOW DAM W/ FILTRATION CAPABILITIES TO RETAIN MATL.DIVERT WATER FLOW OR S IF POSSIBLE. GATHER WET MATL.KEEP MATL DAMP.OTHER PREC:SHELF LIFE INDEFINITE WHEN KEPT UNDER 100F.

## Health Hazards Data

**LD50LC50Mixture:**

NOT KNOWN

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

DIPHENYLAMINE MAY CAUSE KIDNEY DAMAGE.THE LOW CONCENTRATION OF THIS MATERIAL IN,AND NATURE OF,THE PRODUCT WOULD PRECLUDE DEVELOPMENT OF SUCH AN EFFECT.

**Explanation Of Carcinogenicity:**

NONE

**Signs And Symptions Of Overexposure:**

EYES:IRRITATION WITH INFLAMMATION OF CONJUNCTIVA.SKIN:IRRITATION.INGESTION:IRRITATION TO GI TRACT.INHALATION:IRRITATION TO NOSE,MOUTH,THROAT,LUNGS.NITROGLYCERIN MAY CAUSE DILATION OF BLOOD VESSELS W/ DROP IN BLOOD PRESSURE,HEADACHE,CYCNOISIS,MENTAL CONFUSION.NAUSEA,VOMITING & ABDOMINAL PAIN MAY ALSO OCCUR.

**Medical Cond Aggravated By Exposure:**

ANEMIA AND CARDIOVASCULAR DISEASE.

**First Aid:**

EYES:IMMED FLUSH W/ LGE AMTS OF WATER FOR AT LEAST 15 MIN.IF IRRIT DEVELOPS,CALL MD. SKIN:IMMED FLUSH W/ WATER FOR 15 MIN.CALL MD. INGESTION:IMMED DRINK LGE QTIES OF WATER.INDUCE VOMITING.CALL MD.DO N OT GIVE ANYTHING BY MOUTH IF UNCON OR IF HAVING 8 CONVL. INHALATION:REMOVE TO FRESH AIR.IF BREATHING IS DIFFICULT,ADMIN O\*2,KEEP PATIENT WARM & AT REST.CALL MD.IF UNCON,ARTF RESP SHOULD BE GIVEN IMMED.

**Spill Release Procedures:**

PROD MAY REPRESENT EXPLO HAZ.REMOVE SOURCES OF IGNIT.S SPILL & NOTIFY APPROP PERS.WET SPILL MATL PRIOR TO CLEAN UP.USE NON-SPARKING/PLASTIC UTENSILS.WEAR FLAME RETARDANT CLOTHING & SELF-CONTAINED BREATHING APPRATUS.WATER RELEASE:CREATE (SEE SUPP)

**Neutralizing Agent:**

NOT KNOWN

**Waste Disposal Methods:**

DISP MUST BE IAW FED,STATE,& LOC REGS.COORDINATE W/ SUPPORTING INSTALLATION/MACOM ENVIRON OFFICE PRIOR TO DISP (FP A).HAZ WASTE NO.D003.CAN BE DISP BY CONTROLLED OPEN BURNING IN SMALL QTIES.SPREAD MAT L IN THIN LAYERS & IGNITE FROM REMOTE LOCATION.

**Handling And Storage Precautions:**

STORE IN A COOL,DRY,WELL-VENTILATED PLACE AWAY FROM ALL SOURCES OF IGNIT.DO NOT STORE AT TEMP >38C,SUBJECT TO MECH SHOCK,EXPOSE TO DIRECT LIGHT.

**Other Precautions:**

STORE IN ORIGINAL SHIPPING CONTAINERS FOR EXPLOSION VENTING PURPOSES.CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THIS MATERIAL.DO NOT TAKE INTERNALLY.AVOID CONTACT WITH SKIN,EYES,AND CLOTHING. (SEE SUPP DATA)

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P

**Flash Point:**

**Flash Point Text:**

NOT APPLICABLE

**Autoignition Temp:**

**Autoignition Temp Text:**

N/A

**Lower Limits:**

N/A

**Upper Limits:**

N/A

**Extinguishing Media:**

USE EXTINGUISHING MEDIA COMPATIBLE FOR SURROUNDING PRODUCTS.IF MATERIAL ITSELF IS ON FIRE,DELUGE WITH WATER.

**Fire Fighting Procedures:**

IN CASE OF FIRE,USE NORMAL FIRE FIGHTING EQUIP.RESPONSE TO MATL REQUIRES USE OF SELF-CONTAINED BREATHING APPARATUS.FIGHT FIRES FROM REMOTE LOCATION (SEE SUPP) 9

**Unusual Fire/Explosion Hazard:**

CAN IGNITE DUE TO IMPACT OR STATIC DISCHARGE.

## Physical/Chemical Properties

**HCC:**

**NRC/State LIC No:**

N/R

**Net Prop WT For Ammo:**

10

**Boiling Point:**

**B.P. Text:**

N/A

**Melt/Freeze Pt:**

**M.P/F.P Text:**

NOT KNOWN

**Decomp Temp:**

**Decomp Text:**

>122F, >50C

**Vapor Pres:**

<1 MMHG

**Vapor Density:**

N/A

**Volatile Org Content %:**

**Spec Gravity:**

1.2-1.6

**VOC Pounds/Gallon:**

**PH:** N/A

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

NEGLIGIBLE

**Solubility in Water:**

NEGLIGIBLE

**Appearance and Odor:**

ODORLESS, GRANULAR SOLID.

**Percent Volatiles by Volume:**

<2

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

TEMP ABOVE 120C, IMPACT, STATIC DISCHARGE, DIRECT SUNLIGHT, OPEN FLAME.

**Materials To Avoid:**

STRONG ACIDS, BASES, AMINES, OXIDIZERS.

**Hazardous Decomposition Products:**

CARBON MONOXIDE, CARBON DIOXIDE, OXIDES OF NITROGEN.

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

WILL NOT OCCUR.

## Toxicological Information

Information:N/P

## MSDS Transport Information

Information:N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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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

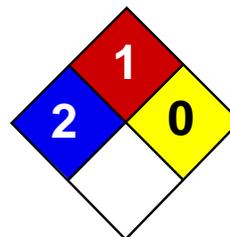
only as a guide. The information in this document is based on the present state of our knowledge and is

applicable to the product with regard to appropriate safety precautions. It does not represent any

guarantee of the properties of the product. Lookchem 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.



Health	2
Fire	1
Reactivity	0
Personal Protection	E

## Material Safety Data Sheet Carbazole MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Carbazole

**Catalog Codes:** SLC4801

**CAS#:** 86-74-8

**RTECS:** FE3150000

**TSCA:** TSCA 8(b) inventory: Carbazole

**CI#:** Not available.

**Synonym:** 9-Azafluorene; 9H-Carbazole; Dibenzo(b,d)pyrrole; Dibenzopyrrole; Diphenyleneimine; Diphenylenimide; Diphenylenimine

**Chemical Name:** Carbazole

**Chemical Formula:** C<sub>12</sub>H<sub>9</sub>N

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Carbazole	86-74-8	100

**Toxicological Data on Ingredients:** Not applicable.

### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Hazardous in case of ingestion. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation.

**Potential Chronic Health Effects:**

CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

**Skin Contact:** Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

**Serious Skin Contact:** Not available.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

**Serious Ingestion:** Not available.

### Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** These products are carbon oxides (CO, CO<sub>2</sub>).

**Fire Hazards in Presence of Various Substances:**

Slightly flammable to flammable in presence of heat. Non-flammable in presence of shocks.

**Explosion Hazards in Presence of Various Substances:**

Slightly explosive in presence of open flames and sparks. Non-explosive in presence of shocks.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:**

As with most organic solids, fire is possible at elevated temperatures. When heated to decomposition it emits toxic fumes of nitrogen oxides

**Special Remarks on Explosion Hazards:**

Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

### Section 6: Accidental Release Measures

**Small Spill:**

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

### Section 7: Handling and Storage

**Precautions:**

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:** Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:** Not available.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid. (Crystals solid.)

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 167.21 g/mole

**Color:** White.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 355°C (671°F)

**Melting Point:** 245°C (473°F)

**Critical Temperature:** Not available.

**Specific Gravity:** Density: 1.1 @ 18 deg. C(Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water, acetone.

### Solubility:

Partially soluble in acetone. Very slightly soluble in diethyl ether. Insoluble in cold water, hot water. 1 gram is soluble in 3 ml Quinoline, 6 ml Pyridine, 9 ml Acetone, 2 ml Acetone @ 50 deg. C., 35 ml Ether, 120 ml Benzene, 135 ml absolute alcohol. Slightly soluble in Petroleum Ether, chlorinated hydrocarbons, Acetic acid, Carbon Disulfide. Soluble in hot Chloroform, Toluene.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Excess heat, incompatible materials, dust generation

**Incompatibility with various substances:** Reactive with oxidizing agents.

**Corrosivity:** Not available.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Inhalation. Ingestion.

**Toxicity to Animals:** Acute oral toxicity (LD50): >5000 mg/kg [Rat].

**Chronic Effects on Humans:** CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC.

**Other Toxic Effects on Humans:**

Hazardous in case of ingestion. Slightly hazardous in case of skin contact (irritant), of inhalation.

**Special Remarks on Toxicity to Animals:**

Lowest Published Lethal Dose: LDL [Rat] - Route: Oral; Dose: 500 mg/kg Lethal Dose/Conc 50% Kill: LD50 [Mouse] - Intraperitoneal; Dose: 200 mg/kg Lethal Dose/Conc: LD [Mouse] - Route: Oral; Dose: >400 mg/kg

**Special Remarks on Chronic Effects on Humans:**

May affect genetic material (mutagenic). May cause cancer based on animal test data.

**Special Remarks on other Toxic Effects on Humans:**

Acute Potential Health Effects: Skin: May cause skin irritation. Eyes: May cause eye irritation. Inhalation: May cause respiratory tract irritation. Ingestion: May cause gastrointestinal tract irritation with nausea, vomiting and diarrhea. Chronic Potential Health Effects: Ingestion: Prolonged or repeated ingestion may affect the liver and cause weight loss.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The product itself and its products of degradation are not toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

## Section 14: Transport Information

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Not applicable.

## Section 15: Other Regulatory Information

### Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Carbazole California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Carbazole California Director's List of Hazardous Substances: Carbazole TSCA 8(b) inventory: Carbazole TSCA 8(d) H and S data reporting: Carbazole: Effective date: 3/07/86; Sunset date: 3/07/96

**Other Regulations:** EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

### Other Classifications:

**WHMIS (Canada):** Not controlled under WHMIS (Canada).

### DSCL (EEC):

R40- Limited evidence of carcinogenic effect S24/25- Avoid contact with skin and eyes.

### HMIS (U.S.A.):

**Health Hazard:** 2

**Fire Hazard:** 1

**Reactivity:** 0

**Personal Protection:** E

### National Fire Protection Association (U.S.A.):

**Health:** 2

**Flammability:** 1

**Reactivity:** 0

**Specific hazard:**

### Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/09/2005 04:34 PM

**Last Updated:** 11/01/2010 12:00 PM

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**1,2,4-Trichlorobenzene (348)**

Version 1

Revision Date 02/21/2008

Print Date 02/21/2008

**SECTION 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : 1,2,4-Trichlorobenzene  
MSDS Number : 000000011217  
Product Use Description : Solvent

Company : Honeywell International Inc.  
1953 South Harvey Street  
Muskegon, MI 49442

For more information call : 1-800-368-0050  
(Monday-Friday, 9:00am-5:00pm)

**In case of emergency call : Medical: 1-800-498-5701**  
: **Transportation: 1-800-424-9300 or 703-527-3887**  
: (24 hours/day, 7 days/week)

**SECTION 2. HAZARDS IDENTIFICATION****Emergency Overview**

Form : liquid, clear

Color : colourless

Odor : aromatic

Hazard Summary : Harmful by inhalation. May be harmful if swallowed. Irritating to eyes, respiratory system and skin. May cause irritation of the gastrointestinal tract. Repeated exposure may cause skin dryness or cracking. Do not swallow. Avoid breathing vapors, mist or gas. Avoid contact with skin, eyes and clothing.

**Potential Health Effects**

Skin : Irritating to skin.  
May cause burns or external ulcers.  
Prolonged or repeated skin contact with liquid may cause defatting resulting in drying, redness and possible blistering.

Eyes : Irritating to eyes.  
Causes itching, burning, redness and tearing.

Ingestion : May be harmful if swallowed.  
Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

**1,2,4-Trichlorobenzene (348)**

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Revision Date 02/21/2008

Print Date 02/21/2008

- Inhalation : Harmful by inhalation.  
Irritating to respiratory system.
- Chronic Exposure : Prolonged or repeated skin contact with liquid may cause defatting resulting in drying, redness and possible blistering. Repeated or prolonged exposure to the substance can produce liver damage. Repeated or prolonged exposure to the substance can produce kidney damage.
- Aggravated Medical Condition : Skin disorders  
Liver disorders  
Kidney disorders  
Respiratory disorders
- Target Organs : Skin  
Eyes  
Respiratory system  
Liver  
Kidney

**Carcinogenicity**

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, IARC, or OSHA.

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Component	CAS-No.	Weight %
1,2,4-Trichlorobenzene	120-82-1	98.00
1,3,5-Trichlorobenzene	108-70-3	<2.00
1,2,3-Trichlorobenzene	87-61-6	<2.00

**SECTION 4. FIRST AID MEASURES**

- Inhalation : Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Use oxygen as required, provided a qualified operator is present. Call a physician.
- Skin contact : Wash off immediately with plenty of water for at least 15 minutes. Take off contaminated clothing and shoes immediately. Wash contaminated clothing before re-use. Call a physician.
- Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician.

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Ingestion : Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Call a physician.

**Notes to physician**

Treatment : Treat symptomatically.

**SECTION 5. FIRE-FIGHTING MEASURES**

Flash point : 105 °C (221 °F)  
closed cup

Ignition temperature : 571 °C (1,060 °F)

Lower explosion limit : 2.5 %(V)

Upper explosion limit : 6.6 %(V)

Suitable extinguishing media : Carbon dioxide (CO<sub>2</sub>)  
Dry chemical  
Foam

Specific hazards during fire fighting : Cool closed containers exposed to fire with water spray. Do not allow run-off from fire fighting to enter drains or water courses.  
In case of fire hazardous decomposition products may be produced such as:  
Carbon monoxide  
Carbon dioxide (CO<sub>2</sub>)  
Gaseous hydrogen chloride (HCl).

Special protective equipment for fire-fighters : In the event of fire and/or explosion do not breathe fumes. Wear self-contained breathing apparatus and protective suit.

**SECTION 6. ACCIDENTAL RELEASE MEASURES**

Personal precautions : Immediately evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Wear personal protective equipment. Unprotected persons must be kept away. Ensure adequate ventilation. Remove all sources of ignition. Do not swallow. Avoid breathing vapors, mist or gas. Avoid contact with skin, eyes and clothing.

**1,2,4-Trichlorobenzene (348)**

Version 1

Revision Date 02/21/2008

Print Date 02/21/2008

- Environmental precautions : Discharge into the environment must be avoided.  
Prevent further leakage or spillage if safe to do so.  
Do not flush into surface water or sanitary sewer system.  
Prevent product from entering drains.
- Methods for cleaning up : Ventilate the area.  
Contain and collect spillage with non-combustible absorbent materials, e.g. sand, earth, vermiculite, diatomaceous earth and place in container for disposal according to local regulations (see section 13).

**SECTION 7. HANDLING AND STORAGE****Handling**

- Handling : Handle with care.  
Wear personal protective equipment.  
Use only in well-ventilated areas.  
Keep container tightly closed.  
Containers which are opened must be carefully resealed and kept upright to prevent leakage.  
Keep away from fire, sparks and heated surfaces.  
Do not smoke.  
Do not swallow.  
Avoid contact with skin, eyes and clothing.  
Avoid breathing vapors, mist or gas.

- Advice on protection against fire and explosion : Normal measures for preventive fire protection.

**Storage**

- Requirements for storage areas and containers : Storage rooms must be properly ventilated.  
Keep containers tightly closed in a dry, cool and well-ventilated place.  
Containers should be protected against falling down.  
Containers which are opened must be carefully resealed and kept upright to prevent leakage.  
Keep away from heat and sources of ignition.  
Keep away from direct sunlight.  
Store away from incompatible substances.

**SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

- Protective measures : Ensure that eyewash stations and safety showers are close to the workstation location.  
Do not swallow.  
Avoid breathing vapors, mist or gas.

**1,2,4-Trichlorobenzene (348)**

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Revision Date 02/21/2008

Print Date 02/21/2008

- Avoid contact with skin, eyes and clothing.
- Engineering measures : Use with local exhaust ventilation.  
 Prevent vapor buildup by providing adequate ventilation during and after use.
- Eye protection : Do not wear contact lenses.  
 Wear as appropriate:  
 Safety glasses with side-shields  
 If splashes are likely to occur, wear:  
 Goggles or face shield, giving complete protection to eyes
- Hand protection : Solvent-resistant gloves  
 Gloves must be inspected prior to use.  
 Replace when worn.
- Skin and body protection : Wear as appropriate:  
 Solvent-resistant apron and boots  
 If splashes are likely to occur, wear:  
 Protective suit
- Respiratory protection : When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.  
 For rescue and maintenance work in storage tanks use self-contained breathing apparatus.  
 Use NIOSH approved respiratory protection.
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.  
 When using, do not eat, drink or smoke.  
 Wash hands before breaks and immediately after handling the product.  
 Keep working clothes separately.  
 Remove and wash contaminated clothing before re-use.  
 Do not swallow.  
 Avoid breathing vapors, mist or gas.  
 Avoid contact with skin, eyes and clothing.

**Exposure Guidelines**

1,2,4-Trichlorobenzene	120-82-1	ACGIH	Ceiling		5 ppm
		NIOSH	Ceil_Time	5 ppm	40 mg/m3
		OSHA Z1A	Ceiling	5 ppm	40 mg/m3
		US CA OEL	Ceiling	5 ppm	40 mg/m3
		TX ESL	ST ESL	50 ppm	400 ug/m3
		TX ESL	AN ESL	5 ppm	40 ug/m3

**1,2,4-Trichlorobenzene (348)**

Version 1

Revision Date 02/21/2008

Print Date 02/21/2008

**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

Form	: liquid, clear
Color	: colourless
Odor	: aromatic
Molecular Weight	: 181.46 g/mol
pH	: not applicable
Melting point/range	: 17 °C (63 °F)
Boiling point/boiling range	: 213.5 °C (416.3 °F)
Vapor pressure	: 1.33 hPa at 20 °C (68 °F)
Relative vapour density	: 6.25 (Air = 1.0)
Density	: 1.454 g/cm <sup>3</sup> at 20 °C (68 °F)
Water solubility	: 31.3 mg/l negligible
Partition coefficient: n-octanol/water	: log Pow: 4.02

**SECTION 10. STABILITY AND REACTIVITY**

Conditions to avoid	: Heat, flames and sparks. Keep away from direct sunlight. Protect from extreme heat and cold.
Materials to avoid	: Oxidizing agents Acids Steam
Hazardous decomposition products	: In case of fire hazardous decomposition products may be produced such as: Carbon monoxide Carbon dioxide (CO <sub>2</sub> ) Gaseous hydrogen chloride (HCl).
Hazardous reactions	: Hazardous polymerisation does not occur.

**1,2,4-Trichlorobenzene (348)**

Version 1

Revision Date 02/21/2008

Print Date 02/21/2008

Stable under normal conditions.

**SECTION 11. TOXICOLOGICAL INFORMATION**

Acute oral toxicity	:	LD50 rat Dose: 756 mg/kg
Acute oral toxicity	:	LD50 mouse Dose: 300 mg/kg
Acute dermal toxicity	:	LD50 rat Dose: 6,139 mg/kg

**SECTION 12. ECOLOGICAL INFORMATION**

Toxicity to fish	:	flow-through test LC50 Species: Pimephales promelas (fathead minnow) Dose: 2.990 mg/l Exposure time: 96 h
Toxicity to fish	:	LC50 Species: Oncorhynchus mykiss (rainbow trout) Dose: 1.95 mg/l Exposure time: 48 h

**SECTION 13. DISPOSAL CONSIDERATIONS**

Waste Information: Observe all Federal, State, and Local Environmental regulations.

**SECTION 14. TRANSPORT INFORMATION**

<b>DOT</b>	UN-Number	:	2321
	Proper shipping name	:	Trichlorobenzenes, liquid
	Class	:	6.1
	Packing group	:	III
	Hazard Label	:	6.1
<b>IATA</b>	UN Number	:	2321
	Description of the goods	:	Trichlorobenzenes, liquid
	Class	:	6.1
	Packaging group	:	III
	Hazard Label	:	6.1

**1,2,4-Trichlorobenzene (348)**

Version 1

Revision Date 02/21/2008

Print Date 02/21/2008

Packing instruction (cargo aircraft) : 618  
 Packing instruction (passenger aircraft) : 611  
 Packing instruction (passenger aircraft) : Y611

**IMDG** Substance No. : UN 2321  
 Description of the goods : Trichlorobenzenes, liquid  
 Class : 6.1  
 Packaging group : III  
 Hazard Label : 6.1  
 EmS Number : F-A  
 Marine pollutant : yes

**SECTION 15. REGULATORY INFORMATION**
**Inventories**

EU. EINECS : On or in compliance with the inventory

US. Toxic Substances Control Act : On TSCA Inventory

Australia. Industrial Chemical (Notification and Assessment) Act : On or in compliance with the inventory

Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL). (Can. Gaz. Part II, Vol. 133) : All components of this product are on the Canadian DSL list.

Japan. Kashin-Hou Law List : On or in compliance with the inventory

Korea. Toxic Chemical Control Law (TCCL) List : On or in compliance with the inventory

Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act : On or in compliance with the inventory

China. Inventory of Existing Chemical Substances : On or in compliance with the inventory

New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New : On or in compliance with the inventory

**1,2,4-Trichlorobenzene (348)**

Version 1

Revision Date 02/21/2008

Print Date 02/21/2008

Zealand

**National regulatory information**
**SARA 313 Components** : 1,2,4-Trichlorobenzene 120-82-1

**CERCLA Reportable Quantity** : 100 lbs

**California Prop. 65** : This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

**Massachusetts RTK** : 1,2,3-Trichlorobenzene 87-61-6  
: 1,2,4-Trichlorobenzene 120-82-1

**New Jersey RTK** : 1,2,4-Trichlorobenzene 120-82-1  
: 1,3,5-Trichlorobenzene 108-70-3  
: 1,2,3-Trichlorobenzene 87-61-6

**Pennsylvania RTK** : 1,2,4-Trichlorobenzene 120-82-1  
: 1,3,5-Trichlorobenzene 108-70-3  
: 1,2,3-Trichlorobenzene 87-61-6

**WHMIS Classification** : D1B  
D2B

**SECTION 16. OTHER INFORMATION**

	<b>HMIS III</b>	<b>NFPA</b>
Health Hazard	: -	2
Flammability	: -	1
Physical Hazard	: -	
Instability	:	0



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 87-68-3****Date: 03/09/2001**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: **HEXACHLORO-1,3-BUTADIENE**      SYNONYMS: Hexachlorobutadiene, perchlorobutadiene

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

<u>Ingredient Name</u>	<u>Formula</u>	<u>CAS #</u>	<u>Concentration</u>	<u>Exposure Limits (PPM)</u>			
				<u>ACGIH TLV</u>	<u>OSHA PEL</u>	<u>MAC</u>	<u>Other STEL</u>
HEXACHLORO-1,3-BUTADIENE	C4CL6	87-68-3	99+%	.02	NE	.02	NE

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIANT

## 3. HAZARD IDENTIFICATION

**\*\*\* EMERGENCY OVERVIEW \*\*\***

Poisonous, flammable liquid and vapor.

May be fatal by inhalation.

May irritate eyes, nose, throat and respiratory tract.

May cause kidney and central nervous system damage.

### POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation , Skin , Ingestion

ACUTE EFFECTS: Extremely destructive of the tissue of the mucous membranes and upper respiratory tract. Skin and eye irritation may occur. Can be absorbed through the skin. Inhalation of vapors may cause pulmonary edema, circulatory collapse, damage to upper respiratory tract, coughing, difficulty breathing and choking. Symptoms include burning sensation, coughing, wheezing, shortness of breath, headache, nausea, and vomiting.

CHRONIC EFFECTS: Bronchitis. Cardiac disease , Hepatitis .

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None known

OTHER EFFECTS OF OVEREXPOSURE: None

CARCINOGENICITY (US ONLY):

NTP - No

IARC MONOGRAPHS - No  
OSHA REGULATED - No

#### 4. FIRST AID MEASURES

**INHALATION:** Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

**EYE CONTACT:** Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes. Do not allow victim to rub or keep eyes tightly shut.

**SKIN CONTACT:** Immediately flush with copious amounts of water for at least 15 minutes while removing contaminated clothing.

**INGESTION:** Never give anything by mouth to an unconscious person. Have conscious and alert person drink 1 to 2 glasses of water. Induce vomiting after victim drinks water. Contact a poison control center.

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: None

#### 5. FIRE FIGHTING MEASURES

**FLASH POINT:** N/Av

**AUTOIGNITION TEMPERATURE:** 610 deg.C

**FLAMMABLE LIMITS:** N/Av

LOWER: N/Av

UPPER: N/Av

**EXTINGUISHING MEDIA:** Dry chemical, carbon dioxide, or alcohol foam.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Keep fire exposed cylinders cool with water spray.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide and hydrogen chloride may be given off.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Cylinder rupture may occur under fire conditions. Emits toxic fumes under fire conditions.

#### 6. ACCIDENTAL RELEASE MEASURES

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Remove leaking cylinder to exhaust hood or safe outdoor area. Remove sources of ignition and combustibles. Absorb with sand or vermiculite and place in closed containers for disposal.

SPECIALIZED EQUIPMENT: Use non-sparking tools.

## 7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders. Use only in a well-ventilated area.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentrations below exposure and flammable limits.

EYE / FACE PROTECTION: Goggles. A safety shower and eyewash station should be readily available.

SKIN PROTECTION: Impervious gloves, coveralls, boots, and/or other resistant protective clothing.

RESPIRATORY PROTECTION: Use a self-contained breathing apparatus in case of emergency or non-routine use.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless

ODOR: Mild turpentine

PHYSICAL PRESSURE: Liquid

VAPOR PRESSURE: @ 0 deg.C:.05 mm Hg

VAPOR DENSITY (AIR=1): 8.99

BOILING POINT (C): 215

SOLUBILITY IN WATER: Insoluble

SPECIFIC GRAVITY (H2O=1): @20 deg.C: 1.682

EVAPORATION RATE: N/Av

ODOR THRESHOLD: 1 ppm

## 10. STABILITY AND REACTIVITY

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas. Storage near a heat source.

MATERIALS TO AVOID: Strong oxidizers.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: Toxic carbon monoxide and hydrogen chloride.

## 11. TOXICOLOGICAL INFORMATION

LETHAL CONCENTRATION (LC50): NONE ESTABLISHED

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

## 12. ECOLOGICAL INFORMATION

No adverse ecological effects are expected.

## 13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place.

## 14. TRANSPORT INFORMATION

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Hexachlorobutadiene

HAZARD CLASS: 6.1, Packing Group III

IDENTIFICATION NUMBER: UN2279

REPORTABLE QUANTITIES: 1 lb.

LABELING: KEEP AWAY FROM FOOD

ADR / RID (EU Only): [Class 6.1, 15\(c\)](#)

SPECIAL PRECAUTIONS: [Cylinders should be transported in a secure upright position in a well ventilated truck.](#)

## 15. REGULATORY INFORMATION

OSHA: [Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.](#)

TSCA: [Material is listed in TSCA inventory.](#)

SARA: [The threshold planning quantity for material is 10,000 lbs.](#)

EU NUMBER: [201-765-5](#)

NUMBER IN ANNEX 1 OF DIR 67/548: [Not listed in annex 1.](#)

EU CLASSIFICATION: [N/Av](#)

R: [N/Av](#)

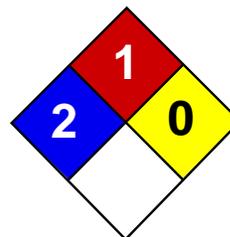
S: [N/Av](#)

## 16. OTHER INFORMATION

OTHER PRECAUTIONS: [Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law \(49 CFR\).](#)

ABBREVIATIONS: [N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established](#)

DISCLAIMER: [Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.](#)



Health	2
Fire	1
Reactivity	0
Personal Protection	E

## Material Safety Data Sheet 2,4,6-Trichlorophenol MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** 2,4,6-Trichlorophenol

**Catalog Codes:** SLT3727

**CAS#:** 88-06-2

**RTECS:** SN1575000

**TSCA:** TSCA 8(b) inventory: 2,4,6-Trichlorophenol

**CI#:** Not available.

**Synonym:** Dowcide 2S, Dowicide 2S, OMAL, Phenchlor,;

**Chemical Name:** Phenol, 2,4,6-trichloro-

**Chemical Formula:** C<sub>6</sub>H<sub>3</sub>Cl<sub>3</sub>O

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
{2,4,6-}Trichlorophenol	88-06-2	100

**Toxicological Data on Ingredients:** 2,4,6-Trichlorophenol: ORAL (LD50): Acute: 820 mg/kg [Rat]. 1000 mg/kg [Guinea pig].

### Section 3: Hazards Identification

**Potential Acute Health Effects:** Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

**Potential Chronic Health Effects:**

**CARCINOGENIC EFFECTS:** Classified 2 (Some evidence.) by NTP. IARC: IARC Agent Not Assigned an Overall Evaluation; IARC Evidence of Carcinogenicity in Animal is L (Limited data). **MUTAGENIC EFFECTS:** Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance may be toxic to blood, the nervous system, liver, bone marrow. Repeated or prolonged exposure to the substance can produce target organs damage.

### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

**Serious Skin Contact:**

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

### Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** CLOSED CUP: 99°C (210.2°F).

**Flammable Limits:** Not available.

**Products of Combustion:** These products are carbon oxides (CO, CO<sub>2</sub>), halogenated compounds.

**Fire Hazards in Presence of Various Substances:**

Slightly flammable to flammable in presence of heat. Non-flammable in presence of shocks.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

### Section 6: Accidental Release Measures

**Small Spill:**

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

### Section 7: Handling and Storage

**Precautions:**

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

### Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:** Not available.

## Section 9: Physical and Chemical Properties

### Physical state and appearance:

Solid. (Crystalline solid. Crystalline granules solid.)

**Odor:** Phenolic (Strong.)

**Taste:** Not available.

**Molecular Weight:** Not available.

**Color:** Off-white. Beige. (Light.)

**pH (1% soln/water):** Not available.

**Boiling Point:** 246°C (474.8°F) @ 760 mmHg

**Melting Point:** 69°C (156.2°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 1.4901 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** The product is more soluble in oil;  $\log(\text{oil/water}) = 3.7$

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water, methanol, diethyl ether, acetone.

### Solubility:

Easily soluble in methanol, diethyl ether, acetone. Partially soluble in hot water. Very slightly soluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Excess heat, incompatible materials

**Incompatibility with various substances:** Reactive with oxidizing agents.

**Corrosivity:** Not available.

**Special Remarks on Reactivity:** Incompatible with oxidizing materials, acid chlorides, acid anhydrides

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Inhalation. Ingestion.

**Toxicity to Animals:** Acute oral toxicity (LD50): 820 mg/kg [Rat].

**Chronic Effects on Humans:**

CARCINOGENIC EFFECTS: Classified 2 (Some evidence.) by NTP; IARC: IARC Agent Not Assigned an Overall Evaluation; IARC Evidence of Carcinogenicity in Animal is L (Limited data). MUTAGENIC EFFECTS : Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: blood, the nervous system, liver, bone marrow.

**Other Toxic Effects on Humans:** Hazardous in case of skin contact (irritant), of ingestion, of inhalation.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:**

May cause adverse reproductive effects. May cause cancer. May affect genetic material (mutagenic).

**Special Remarks on other Toxic Effects on Humans:**

Acute Potential Health Effects: Skin: Causes moderate skin irritation. Eyes: Causes severe eye irritation. May cause chemical conjunctivitis and corneal injury, and iritis. Inhalation: Causes respiratory tract (nose, throat, lungs), and mucous membrane irritation. Symptoms may include coughing, wheezing, and/or shortness of breath. Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation with nausea, vomiting, diarrhea. May affect behavior/central nervous system/nervous system (tremor, convulsions, restlessness, shaking, weakness), and respiration (dyspnea, increased rate of respiration). Chronic Potential Health Effects: Skin: Prolonged skin contact may cause mild to moderate chemical burns of the skin. Ingestion: Prolonged or repeated ingestion may affect the liver, blood (leukocytosis, monocytosis), bone marrow (hyperplasia of bone marrow), urinary system (bladder), and behavior/central nervous system/nervous system (symptoms similar to that of acute ingestion) Inhalation: Prolonged or repeated exposure may cause bronchitis to develop with cough, phlegm, and/or shortness of breath.

## Section 12: Ecological Information

**Ecotoxicity:**

Ecotoxicity in water (LC50): 0.7 ppm 24 hours [Fish (Blue Gill)]. 0.3 ppm 96 hours [Fish (Blue Gill)]. 10 ppm 24 hours [Fish (Goldfish)]. 9.2ppm any hours [Fish (Flathead Minnow)]. 4.5 ppm any hours [Fish (Flathead Minnow)]. 2.8 mg/l 96 hours [Fish (Flathead Minnow)].

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are as toxic as the product itself.

**Special Remarks on the Products of Biodegradation:**

Terrestrial Fate: It is expected to dissociate somewhat in moist soil. It is expected to have low mobility in soil. Volatilization is expected to be slow from moist soil surfaces. It is not expected to volatilize from dry soil surfaces given its vapor pressure of 0.008 mm Hg at 25 deg. C. This compound is expected to biodegrade in soils with aerobic and anaerobic biodegradation half-lives of about 5 and 20 days, respectively. Aquatic Fate: It is expected to dissociate somewhat to 2,4,6-trichlorophenolate in water. It is expected to volatilize from water surfaces. Estimated volatilization half-lives for a model river and model lake are 20 and 150 days, respectively. It is expected to undergo photolysis in surface waters based on an aqueous photodegradation half-life of 2.1 hours when irradiated with light at environmentally relevant wavelengths. The potential for bioconcentration in aquatic organisms is considered high based upon BCF values of 250-310 measured in fish. It is expected to biodegrade in water based on a biodegradation half-life of 6.3 days determined from a river die-away test. Atmospheric Fate: It is expected to exist solely as a vapor in the ambient atmosphere. Vapor-phase 2,4,6-trichlorophenol is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals. The half-life for this reaction in air is estimated to be about 26 days. 2,4,6-trichlorophenol exhibits a UV maximum absorbance at 311 nm; therefore, degradation by natural sunlight is possible.

### Section 13: Disposal Considerations

**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

### Section 14: Transport Information

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Not applicable.

### Section 15: Other Regulatory Information

**Federal and State Regulations:**

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: 2,4,6-Trichlorophenol California prop. 65 (no significant risk level): 2,4,6-Trichlorophenol: 0.01 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: 2,4,6-Trichlorophenol Connecticut hazardous material survey.: 2,4,6-Trichlorophenol Illinois toxic substances disclosure to employee act: 2,4,6-Trichlorophenol Illinois chemical safety act: 2,4,6-Trichlorophenol New York release reporting list: 2,4,6-Trichlorophenol Rhode Island RTK hazardous substances: 2,4,6-Trichlorophenol

**Other Regulations:**

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):**

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**

R22- Harmful if swallowed. R36/38- Irritating to eyes and skin. R40- Limited evidence of a carcinogenic effect. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S36/37- Wear suitable protective clothing and gloves. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 1

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 1

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

### Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 12:08 AM

**Last Updated:** 11/01/2010 12:00 PM

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# Material Safety Data Sheet

## 2-Nitroaniline, 98%

ACC# 71554

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** 2-Nitroaniline, 98%**Catalog Numbers:** AC128350000, AC128350050, AC128351000, AC128355000**Synonyms:** 1-amino-2-nitrobenzene; CI 37025; Azoic Diazo Component 6; Fast Orange O Base; O-nitraniline; Orange Base CIBA II; o-Nitroaniline**Company Identification:**Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
88-74-4	2-Nitroaniline	98	201-855-4

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: yellow orange crystals.

**Caution!** Causes eye and skin irritation. May be harmful if swallowed, inhaled, or absorbed through the skin. Causes digestive and respiratory tract irritation. May cause eye and skin irritation. May cause respiratory and digestive tract irritation. May cause methemoglobinemia.**Target Organs:** Blood, liver, blood forming organs.

#### Potential Health Effects

**Eye:** May cause eye irritation.**Skin:** May cause skin irritation. If absorbed, causes symptoms similar to those of ingestion. Substance is readily absorbed through the skin.**Ingestion:** May cause irritation of the digestive tract. May cause methemoglobinemia, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), convulsions, and death. May be harmful if swallowed.**Inhalation:** May cause respiratory tract irritation. May cause methemoglobinemia, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), convulsions, tachycardia, dyspnea (labored breathing), and death. The toxicological properties of this substance have not been fully investigated.**Chronic:** Chronic ingestion may cause liver damage. May cause methemoglobinemia, which is characterized by chocolate-brown colored blood, headache, weakness, dizziness, breath shortness, cyanosis (bluish skin due to deficient oxygenation of blood), rapid heart rate, unconsciousness and possible death.

## Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

**Skin:** Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

**Ingestion:** Never give anything by mouth to an unconscious person. Get medical aid immediately. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.

**Inhalation:** Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

**Notes to Physician:** Effects may be delayed. Treat symptomatically and supportively. For methemoglobinemia, administer oxygen alone or with Methylene Blue depending on the methemoglobin concentration in the blood.

**Antidote:** Methylene blue, alone or in combination with oxygen is indicated as a treatment in nitrite induced methemoglobinemia.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. May polymerize explosively when involved in a fire. May decompose explosively when heated or involved in a fire. Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated. Combustible material; may burn but does not ignite readily.

**Extinguishing Media:** Cool containers with flooding quantities of water until well after fire is out. Use water spray, dry chemical, carbon dioxide, or alcohol-resistant foam.

**Flash Point:** 168 deg C ( 334.40 deg F)

**Autoignition Temperature:** Not applicable.

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 2; Flammability: 1; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Use only in a chemical fume hood.

**Storage:** Store in a cool, dry, well-ventilated area away from incompatible substances. Poison room locked. Keep containers tightly closed.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
2-Nitroaniline	none listed	none listed	none listed

**OSHA Vacated PELs:** 2-Nitroaniline: No OSHA Vacated PELs are listed for this chemical.

### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Crystals

**Appearance:** yellow orange

**Odor:** None reported.

**pH:** Not available.

**Vapor Pressure:** Not available.

**Vapor Density:** 4.76

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 284 deg C

**Freezing/Melting Point:** 71.0 - 73.0 deg C

**Decomposition Temperature:** 280 deg C

**Solubility:** 1.1 g/l (20 c)

**Specific Gravity/Density:** Not available.

**Molecular Formula:** C<sub>6</sub>H<sub>6</sub>N<sub>2</sub>O<sub>2</sub>

**Molecular Weight:** 138.13

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures. May explode when heated.

**Conditions to Avoid:** High temperatures, incompatible materials, dust generation.

**Incompatibilities with Other Materials:** Acids, nitric acid, sulfuric acid, acetylene, chloroformates, acid chlorides.

**Hazardous Decomposition Products:** Nitrogen oxides, carbon monoxide, carbon dioxide, nitrogen gas.

**Hazardous Polymerization:** Has not been reported

## Section 11 - Toxicological Information

**RTECS#:****CAS#** 88-74-4: BY6650000**LD50/LC50:**

CAS# 88-74-4:

Inhalation, rat: LC50 = >2529 mg/m<sup>3</sup>/4H;

Oral, mouse: LD50 = 1070 mg/kg;

Oral, rat: LD50 = 1600 mg/kg;

**Carcinogenicity:**

CAS# 88-74-4: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information found**Teratogenicity:** No information found**Reproductive Effects:** No information found**Mutagenicity:** No information found**Neurotoxicity:** No information found**Other Studies:**

## Section 12 - Ecological Information

No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3.

Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	NITROANILINES	O NITROANILINE
<b>Hazard Class:</b>	6.1	6.1
<b>UN Number:</b>	UN1661	UN1661
<b>Packing Group:</b>	II	II

## Section 15 - Regulatory Information

**US FEDERAL****TSCA**

CAS# 88-74-4 is listed on the TSCA inventory.

**Health & Safety Reporting List**

None of the chemicals are on the Health & Safety Reporting List.

**Chemical Test Rules**

None of the chemicals in this product are under a Chemical Test Rule.

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

None of the chemicals in this material have an RQ.

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**SARA Codes**

CAS # 88-74-4: immediate, delayed, reactive.

**Section 313** No chemicals are reportable under Section 313.

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 88-74-4 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

T

**Risk Phrases:**

R 23/24/25 Toxic by inhalation, in contact with skin and if swallowed.

R 33 Danger of cumulative effects.

R 52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Safety Phrases:**

S 36/37 Wear suitable protective clothing and gloves.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 28B After contact with skin, wash immediately with plenty of water and soap.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 88-74-4: 2

**Canada - DSL/NDSL**

CAS# 88-74-4 is listed on Canada's DSL List.

**Canada - WHMIS**

not available

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 88-74-4 is listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
--

**MSDS Creation Date:** 9/11/1998

**Revision #5 Date:** 9/26/2007

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

MSDS Number: **N5980** \* \* \* \* \* *Effective Date: 11/17/99* \* \* \* \* \* *Supersedes: 12/08/96*

From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 908-859-2151  
CHEMTREC: 1-800-424-9300

National Response in Canada  
CANUTEC: 613-996-6666

Outside U.S. and Canada  
Chemtrec: 703-527-3887

**NOTE:** CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

## 2-NITROPHENOL

### 1. Product Identification

**Synonyms:** o-Nitrophenol; 2-hydroxynitrobenzene

**CAS No.:** 88-75-5

**Molecular Weight:** 139.11

**Chemical Formula:** C<sub>6</sub>H<sub>5</sub>NO<sub>3</sub>

**Product Codes:** Product Codes: 2607

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Phenol, 2-nitro-	88-75-5	90 - 100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. ABSORPTION INTO THE BODY LEADS TO FORMATION OF METHEMOGLOBIN.**

#### Potential Health Effects

Information on the human health effects from exposure to this substance is limited.

#### Inhalation:

Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. Can be a route of absorption by the body with symptoms like ingestion.

**Ingestion:**

Toxic. Harmful if swallowed. Can cause formation of methemoglobin, resulting in cyanosis (blue lips), headaches, dizziness and collapse. Exposure to high concentrations may cause breathing trouble, a slow pulse, fall in blood pressure, convulsions and even death.

**Skin Contact:**

Causes irritation to skin. Symptoms include redness, itching, and pain. May be absorbed through the skin with possible systemic effects.

**Eye Contact:**

Causes irritation, redness, and pain.

**Chronic Exposure:**

Chronic exposure may damage the liver and kidneys.

**Aggravation of Pre-existing Conditions:**

No information found.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Not considered to be a fire hazard.

**Explosion:**

Not considered to be an explosion hazard. Sealed containers may rupture when heated.

**Fire Extinguishing Media:**

Dry chemical, alcohol foam or carbon dioxide. Do not allow water runoff to enter sewers or waterways.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

### **Airborne Exposure Limits:**

None established.

### **Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

### **Personal Respirators (NIOSH Approved):**

For conditions of use where exposure to the dust or mist is apparent, a half-face dust/mist respirator may be worn. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

### **Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

### **Eye Protection:**

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

## 9. Physical and Chemical Properties

### **Appearance:**

Light yellow crystals.

### **Odor:**

Aromatic odor.

### **Solubility:**

Soluble in water.

### **Specific Gravity:**

1.49

### **pH:**

No information found.

### **% Volatiles by volume @ 21C (70F):**

0

### **Boiling Point:**

214 - 216C (417 - 421F)

### **Melting Point:**

44 - 45C (111 - 113F)

### **Vapor Density (Air=1):**

No information found.

### **Vapor Pressure (mm Hg):**

1 @ 49.3C (120F)

### **Evaporation Rate (BuAc=1):**

No information found.

---

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Burning may produce carbon monoxide, carbon dioxide, nitrogen oxides.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Halogen acids and strong oxidizing agents. In liquid/molten state, reacts violently with potassium hydroxide.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

Oral rat LD50: 334 mg/Kg; Skin rabbit LD50: > 7940 mg/Kg.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Phenol, 2-nitro- (88-75-5)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material may biodegrade to a moderate extent. When released into the soil, this material may leach into groundwater. When released into the soil, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material may be moderately degraded by photolysis.

**Environmental Toxicity:**

No information found.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

**Domestic (Land, D.O.T.)**

**Proper Shipping Name:** NITROPHENOLS

**Hazard Class:** 6.1

**UN/NA:** UN1663

**Packing Group:** III

**Information reported for product/size: 1KG**

**International (Water, I.M.O.)**

**Proper Shipping Name: NITROPHENOLS**

**Hazard Class: 6.1**

**UN/NA: UN1663**

**Packing Group: III**

**Information reported for product/size: 1KG**

## 15. Regulatory Information

```

-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  EC   Japan  Australia
-----
Phenol, 2-nitro- (88-75-5)                   Yes   Yes   Yes    Yes
  
```

```

-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     Korea  DSL   NDSL   Phil.
-----
Phenol, 2-nitro- (88-75-5)                   Yes   Yes   No     Yes
  
```

```

-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-
RQ      TPQ      List  Chemical Catg.
-----
Phenol, 2-nitro- (88-75-5)                   No     No     Yes    No
  
```

```

-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     -RCRA-      -TSCA-
CERCLA  261.33     8(d)
-----
Phenol, 2-nitro- (88-75-5)                   100        No        No
  
```

Chemical Weapons Convention: No      TSCA 12(b): No      CDTA: No  
 SARA 311/312: Acute: Yes      Chronic: Yes      Fire: No      Pressure: No  
 Reactivity: No      (Pure / Solid)

**Australian Hazchem Code: 2X**

**Poison Schedule: S6**

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: **3** Flammability: **0** Reactivity: **0**

**Label Hazard Warning:**

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. ABSORPTION INTO THE BODY LEADS TO FORMATION OF METHEMOGLOBIN.

**Label Precautions:**

- Avoid breathing dust.
- Avoid contact with eyes, skin and clothing.
- Keep container closed.
- Use only with adequate ventilation.
- Wash thoroughly after handling.

**Label First Aid:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No changes.

**Disclaimer:**

\*\*\*\*\*

**Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.**

\*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

<b>MSDS</b>	<b>Material Safety Data Sheet</b>		24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
			National Response in Canada CANUTEC: 613-996-6666
			Outside U.S. and Canada Chemtec: 703-527-3887
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		 	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.			

# NAPHTHALENE

## 1. Product Identification

**Synonyms:** Naphthene; mothballs; tar camphor; naphthaliin; white-tar

**CAS No.:** 91-20-3

**Molecular Weight:** 128.16

**Chemical Formula:** C<sub>10</sub>H<sub>8</sub>

**Product Codes:**

J.T. Baker: 2718

Mallinckrodt: 6348

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Naphthalene	91-20-3	90 - 100%	Yes

## 3. Hazards Identification

### Emergency Overview

**WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN REACTION. MAY AFFECT LIVER, KIDNEY, BLOOD AND CENTRAL NERVOUS SYSTEM. COMBUSTIBLE.**

**J.T. Baker SAF-T-DATA<sup>(tm)</sup> Ratings** (Provided here for your convenience)

Health Rating: 2 - Moderate

Flammability Rating: 2 - Moderate

Reactivity Rating: 0 - None

Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES; LAB COAT

Storage Color Code: Red (Flammable)

### Potential Health Effects

#### Inhalation:

Inhalation of dust or vapors can cause headache, nausea, vomiting, extensive sweating, and disorientation. The predominant reaction is delayed intravascular hemolysis with symptoms of anemia, fever, jaundice, and kidney or liver damage.

#### Ingestion:

Toxic. Can cause headache, profuse perspiration, listlessness, dark urine, nausea, vomiting and disorientation. Intravascular hemolysis may also occur with symptoms similar to those noted for inhalation. Severe cases may produce coma with or without convulsions. Death may result from renal failure.

#### Skin Contact:

Can irritate the skin and, on prolonged contact, may cause rashes and allergy. "Sensitized" individuals may suffer a severe dermatitis.

#### Eye Contact:

Vapors and solid causes irritation, redness and pain. Very high exposures can damage the nerves of the eye.

#### Chronic Exposure:

Has led to cataract formation in eyes. May cause skin allergy.

#### Aggravation of Pre-existing Conditions:

Persons with pre-existing skin, blood or vascular disorders or impaired respiratory function may be more susceptible to the effects of the substance. Particularly susceptible individuals are found in the general population, most commonly in dark skinned races.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Ingestion:**

Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Wash skin with soap or mild detergent and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 87C (189F) CC

Autoignition temperature: 526C (979F)

Combustible. May be ignited by heat, sparks or flame. May burn rapidly with flare-burning effect. Fire may produce irritating or poisonous gases.

**Explosion:**

Explosive limits, volume % in air: lel: 0.9; uel: 5.9. Above flashpoint, vapor-air mixtures are explosive within flammable limits noted above. Closed containers exposed to heat may explode. Contact with strong oxidizers may cause fire or explosion.

**Fire Extinguishing Media:**

Dry chemical, foam, water or carbon dioxide. Foam or direct water spray on molten naphthalene may cause extensive foaming. Molten naphthalene spatters in contact with water; apply water from as far a distance as possible.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

---

## 6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Keep away from moisture and oxidizers. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

- OSHA Permissible Exposure Limit (PEL):

10 ppm, 50 mg/m<sup>3</sup>.

- ACGIH Threshold Limit Value (TLV):

TWA= 10 ppm, 52 mg/m<sup>3</sup>

STEL= 15 ppm, 79 mg/m<sup>3</sup>.

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded, a half-face respirator with an organic vapor cartridge and particulate filter (NIOSH type P95 or R95 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an organic vapor cartridge and particulate filter (NIOSH P100 or R100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. Please note that N series filters are not recommended for this material. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

---

**Eye Protection:**

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

**9. Physical and Chemical Properties****Appearance:**

White crystals.

**Odor:**

Strong coal tar odor (moth balls).

**Solubility:**

Insoluble in water.

**Specific Gravity:**

1.2

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

No information found.

**Boiling Point:**

218C (424F)

**Melting Point:**

80C (176F)

**Vapor Density (Air=1):**

4.4

**Vapor Pressure (mm Hg):**

1 @ 53C (127F)

**Evaporation Rate (BuAc=1):**

< 1

**10. Stability and Reactivity****Stability:**

Stable at room temperature in sealed containers. Sublimes appreciably at temperatures above melting point.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Strong oxidizers, strong alkalis and strong mineral acids, mixtures of aluminum trichloride and benzoyl chloride. Reacts violently with chromic anhydride. Melted naphthalene will attack some forms of plastics, rubber, and coatings.

**Conditions to Avoid:**

Avoid heat, sparks, flames and other ignition sources and incompatibles.

**11. Toxicological Information**

Oral rat LD50: 490 mg/kg;

Inhalation rat LC50: 340 mg/m<sup>3</sup>, 1 hour;

Skin rabbit LD50: > 20 g/kg;

Irritation data: skin (open Draize) rabbit 495 mg, mild; eye (standard Draize) rabbit 100 mg, mild;

Investigated as a tumorigen, mutagen and reproductive effector.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Naphthalene (91-20-3)	No	No	None

**12. Ecological Information****Environmental Fate:**

When released into the soil, this material may biodegrade to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. When released into water, this material may biodegrade to a moderate extent. When released into the water, this material is expected to have a half-life between 1 and 10 days. This material may bioaccumulate to some extent. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day.

**Environmental Toxicity:**

No information found.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

### Domestic (Land, D.O.T.)

-----  
**Proper Shipping Name:** NAPHTHALENE, REFINED  
**Hazard Class:** 4.1  
**UN/NA:** UN1334  
**Packing Group:** III  
**Information reported for product/size:** 1KG

### International (Water, I.M.O.)

-----  
**Proper Shipping Name:** NAPHTHALENE, REFINED  
**Hazard Class:** 4.1  
**UN/NA:** UN1334  
**Packing Group:** III  
**Information reported for product/size:** 1KG

### International (Air, I.C.A.O.)

-----  
**Proper Shipping Name:** NAPHTHALENE, REFINED  
**Hazard Class:** 4.1  
**UN/NA:** UN1334  
**Packing Group:** III  
**Information reported for product/size:** 1KG

## 15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Naphthalene (91-20-3)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	Korea	--Canada--		
		DSL	NDSL	Phil.
Naphthalene (91-20-3)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----				
Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Naphthalene (91-20-3)	No	No	Yes	No

-----\Federal, State & International Regulations - Part 2\-----			
Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8(d)
Naphthalene (91-20-3)	100	U165	No

Chemical Weapons Convention: No    TSCA 12(b): No    CDTA: No  
 SARA 311/312: Acute: Yes    Chronic: Yes    Fire: Yes    Pressure: No  
 Reactivity: No    (Pure / Solid)

**Australian Hazchem Code:** 2Z

**Poison Schedule:** S6

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 2 Flammability: 2 Reactivity: 0

**Label Hazard Warning:**

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE

ALLERGIC SKIN REACTION. MAY AFFECT LIVER, KIDNEY, BLOOD AND CENTRAL NERVOUS SYSTEM. COMBUSTIBLE.

**Label Precautions:**

- Avoid contact with eyes, skin and clothing.
- Avoid prolonged or repeated contact with skin.
- Avoid breathing dust.
- Avoid breathing vapor.
- Keep container closed.
- Use only with adequate ventilation.
- Wash thoroughly after handling.
- Keep away from heat, sparks and flame.

**Label First Aid:**

In all cases call a physician. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, give large amounts of water to drink. Never give anything by mouth to an unconscious person.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

\*\*\*\*\*

**Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose.**

**MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.**

\*\*\*\*\*

**Prepared by:** Environmental Health & Safety  
Phone Number: (314) 654-1600 (U.S.A.)

# SIGMA-ALDRICH

sigma-aldrich.com

## Material Safety Data Sheet

Version 4.0  
Revision Date 08/05/2010  
Print Date 10/18/2010

### 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : 3,3'-Dichlorobenzidine

Product Number : 48525  
Brand : Supelco

Company : Sigma-Aldrich  
3050 Spruce Street  
SAINT LOUIS MO 63103  
USA

Telephone : +18003255832  
Fax : +18003255052  
Emergency Phone # : (314) 776-6555

### 2. HAZARDS IDENTIFICATION

#### Emergency Overview

##### OSHA Hazards

Carcinogen, Target Organ Effect, Harmful by skin absorption., Skin sensitiser

##### Target Organs

Bladder, Liver

##### GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H312 Harmful in contact with skin.  
H317 May cause an allergic skin reaction.  
H350 May cause cancer.  
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.  
P273 Avoid release to the environment.  
P280 Wear protective gloves/ protective clothing.  
P308 + P313 IF exposed or concerned: Get medical advice/ attention.  
P501 Dispose of contents/ container to an approved waste disposal plant.

#### HMIS Classification

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

#### NFPA Rating

Health hazard: 2  
Fire: 0  
Reactivity Hazard: 0

#### Potential Health Effects

##### Inhalation

May be harmful if inhaled. May cause respiratory tract irritation.

**Skin** May cause skin irritation.  
**Eyes** May cause eye irritation.  
**Ingestion** May be harmful if swallowed.

---

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C<sub>12</sub>H<sub>10</sub>Cl<sub>2</sub>N<sub>2</sub>  
Molecular Weight : 253.13 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
<b>3,3'-Dichlorobenzidine</b>			
91-94-1	202-109-0	612-068-00-4	-

---

### 4. 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

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

---

### 5. FIRE-FIGHTING MEASURES

#### Suitable extinguishing media

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

#### Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

---

### 6. ACCIDENTAL RELEASE MEASURES

#### Personal precautions

Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

#### Environmental precautions

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

#### 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.

---

### 7. HANDLING AND STORAGE

#### Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

#### Conditions for safe storage

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



**Acute toxicity**

no data available

**Skin corrosion/irritation**

no data available

**Serious eye damage/eye irritation**

no data available

**Respiratory or skin sensitization**

May cause sensitization by skin contact.

**Germ cell mutagenicity**

May alter genetic material.

**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 (3,3'-Dichlorobenzidine)

NTP: Reasonably anticipated to be a human carcinogenThe reference note has been added by TD based on the background information of the NTP. (3,3'-Dichlorobenzidine)

**Reproductive toxicity**

no data available

**Specific target organ toxicity - single exposure (Globally Harmonized System)**

no data available

**Specific target organ toxicity - repeated exposure (Globally Harmonized System)**

no data available

**Aspiration hazard**

no data available

**Potential health effects**

<b>Inhalation</b>	May be harmful if inhaled. May cause respiratory tract irritation.
<b>Ingestion</b>	May be harmful if swallowed.
<b>Skin</b>	May cause skin irritation.
<b>Eyes</b>	May cause eye irritation.

**Additional Information**

RTECS: DD0525000

---

**12. ECOLOGICAL INFORMATION****Toxicity**

Toxicity to daphnia and other aquatic invertebrates. mortality EC50 - Daphnia magna (Water flea) - 1.05 mg/l - 48 h

**Persistence and degradability**

According to the results of tests of biodegradability this product is not readily biodegradable.

**Bioaccumulative potential**

Bioaccumulation Leuciscus idus (Golden orfe) - 3 d  
Bioconcentration factor (BCF): 610

**Mobility in soil**

no data available

**PBT and vPvB assessment**

no data available

**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**

**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. (3,3'-Dichlorobenzidine)  
Reportable Quantity (RQ): 1 lbs  
Marine pollutant: No  
Poison Inhalation Hazard: No

**IMDG**

UN-Number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A  
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (3,3'-Dichlorobenzidine)  
Marine pollutant: No

**IATA**

UN-Number: 2811 Class: 6.1 Packing group: III  
Proper shipping name: Toxic solid, organic, n.o.s. (3,3'-Dichlorobenzidine)

---

**15. REGULATORY INFORMATION**

**OSHA Hazards**

Carcinogen, Target Organ Effect, Harmful by skin absorption., Skin sensitiser

**DSL Status**

This product contains the following components listed on the Canadian NDSL list. All other components are on the Canadian DSL list.

3,3'-Dichlorobenzidine	CAS-No. 91-94-1
------------------------	--------------------

**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**

3,3'-Dichlorobenzidine	CAS-No. 91-94-1	Revision Date 2007-07-01
------------------------	--------------------	-----------------------------

**SARA 311/312 Hazards**

Acute Health Hazard, Chronic Health Hazard

**Massachusetts Right To Know Components**

3,3'-Dichlorobenzidine	CAS-No. 91-94-1	Revision Date 2007-07-01
------------------------	--------------------	-----------------------------

**Pennsylvania Right To Know Components**

CAS-No.	Revision Date
---------	---------------

3,3'-Dichlorobenzidine

91-94-1

2007-07-01

**New Jersey Right To Know Components**

3,3'-Dichlorobenzidine

CAS-No.  
91-94-1

Revision Date  
2007-07-01

**California Prop. 65 Components**

WARNING! This product contains a chemical known to the State of California to cause cancer.

3,3'-Dichlorobenzidine

CAS-No.  
91-94-1

Revision Date  
2007-09-28

---

**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 Co., 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.

---



From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865

**MBI**

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

24 Hour Emergency Telephone: 908-859-2151  
CHEMTREC: 1-800-424-9300  
National Response in Canada  
CANUTEC: 613-996-6666  
Outside U.S. And Canada  
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

## BIPHENYL

### 1. Product Identification

**Synonyms:** Diphenol; 1,1'biphenyl; phenylbenzene

**CAS No.:** 92-52-4

**Molecular Weight:** 154.21

**Chemical Formula:** C<sub>12</sub>H<sub>10</sub>

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Biphenyl	92-52-4	90 - 100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY AFFECT LIVER, CENTRAL AND PERIPHERAL NERVOUS SYSTEMS. MAY CAUSE ALLERGIC SKIN REACTION.**

#### Potential Health Effects

##### Inhalation:

Inhalation of dust or vapors can irritate the mucous membranes and respiratory tract. Other symptoms may parallel those from ingestion exposure.

##### Ingestion:

Exerts toxic effects on the central nervous system and liver. Symptoms may include headache, diffuse gastro-intestinal pain, nausea, numbness, body aches, and general fatigue.

##### Skin Contact:

May cause irritation. May be absorbed through the skin with symptoms paralleling those from ingestion exposure. May cause allergic reaction in sensitive individuals.

##### Eye Contact:

Vapors and dust cause eye irritation.

##### Chronic Exposure:

Chronic exposure may cause peripheral nerve damage and liver injury.

##### Aggravation of Pre-existing Conditions:

No information found.

### 4. First Aid Measures

#### Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

#### Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

#### Skin Contact:

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

#### Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

## 5. Fire Fighting Measures

**Fire:**

Flash point: 113C (235F) CC  
Autoignition temperature: 540C (1004F)  
Flammable limits in air % by volume:  
lfl: 0.6; uel: 5.8

**Explosion:**

Above the flash point, explosive vapor-air mixtures may be formed. Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

**Fire Extinguishing Media:**

Water spray, dry chemical, alcohol foam, or carbon dioxide. Water or foam may cause frothing.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

## 6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):  
0.2 ppm (TWA).  
-ACGIH Threshold Limit Value (TLV):  
0.2 ppm (TWA)

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a half-face respirator with an organic vapor cartridge and particulate filter (NIOSH type N95 or better filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an organic vapor cartridge and particulate filter (NIOSH N 100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P particulate filter. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

White crystals.

**Odor:**

Pleasant, peculiar odor.

**Solubility:**

Insoluble in water.

**Specific Gravity:**

1.041

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

0

**Boiling Point:**

254 - 255C (489 - 491F)

**Melting Point:**

69 - 70C (156 - 158F)

**Vapor Density (Air=1):**

5.31

**Vapor Pressure (mm Hg):**

0.005 @ 20.4C (68F)

**Evaporation Rate (BuAc=1):**

No information found.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Strong oxidizers.

**Conditions to Avoid:**

Heat, flame, ignition sources, dusting and incompatibles.

## 11. Toxicological Information

**Toxicological Data:**

Oral rat LD50 2400 mg/kg; Skin rabbit LD50: &gt; 5010 mg/kg; Irritation (std Draize) rabbit: eye = 100 mg, mild. Investigated as a tumorigen and mutagen.

**Carcinogenicity:**

EPA / IRIS classification: Group D1 - Not classifiable as a human carcinogen.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Biphenyl (92-52-4)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

No information found.

**Environmental Toxicity:**

No information found.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

**International (Water, I.M.O.)****Proper Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. (DIPHENYL)**Hazard Class:** 9**UN/NA:** UN3077**Packing Group:** III**Information reported for product/size:** 1KG**International (Air, I.C.A.O.)****Proper Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. (DIPHENYL)**Hazard Class:** 9**UN/NA:** UN3077**Packing Group:** III**Information reported for product/size:** 1KG

## 15. Regulatory Information

```

-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  EC   Japan  Australia
-----
Biphenyl (92-52-4)                             Yes  Yes  Yes    Yes

```

```

-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     --Canada--
Korea  DSL  NDSL  Phil.
-----
Biphenyl (92-52-4)                             Yes  Yes  No     Yes

```

```

-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-----
RQ  TPQ  List  Chemical Catg.
-----
Biphenyl (92-52-4)                             No   No   Yes    No

```

```

-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     -RCRA-  -TSCA-
CERCLA  261.33  8(d)
-----
Biphenyl (92-52-4)                             100     No     No

```

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes  
 SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No  
 Reactivity: No (Pure / Solid)

**Australian Hazchem Code:** None allocated.

**Poison Schedule:** None allocated.

### WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 2 Flammability: 1 Reactivity: 0

### Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY AFFECT LIVER, CENTRAL AND PERIPHERAL NERVOUS SYSTEMS. MAY CAUSE ALLERGIC SKIN REACTION.

### Label Precautions:

Avoid contact with eyes, skin and clothing.

Avoid breathing dust.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

### Label First Aid:

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. In all cases, get medical attention.

### Product Use:

Laboratory Reagent.

### Revision Information:

MSDS Section(s) changed since last revision of document include: 8.

### Disclaimer:

\*\*\*\*\*  
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 \*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)



From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

24 Hour Emergency Telephone: 908-859-2151  
CHEMTREC: 1-800-424-9300  
National Response in Canada  
CANUTEC: 613-996-6666  
Outside U.S. And Canada  
Chemtree: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

## O-XYLENE

### 1. Product Identification

**Synonyms:** o-Dimethyl benzene; 1,2 dimethyl benzene; 1,2 xylene; o-xylol  
**CAS No.:** 95-47-6  
**Molecular Weight:** 106.18  
**Chemical Formula:** C<sub>6</sub>H<sub>4</sub>(CH<sub>3</sub>)<sub>2</sub>  
**Product Codes:** X518

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
o-Xylene	95-47-6	90 - 100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND VAPOR.**

SAF-T-DATA<sup>(tm)</sup> Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)

Flammability Rating: 2 - Moderate

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

#### Potential Health Effects

##### Inhalation:

Inhalation of vapors may be irritating to the nose and throat. Inhalation of high concentrations may result in nausea, vomiting, headache, ringing in the ears, and severe breathing difficulties which may be delayed in onset. Substernal pain, cough, and hoarseness are also reported. High vapor concentrations are anesthetic and central nervous system depressants.

##### Ingestion:

Ingestion causes burning sensation in mouth and stomach, nausea, vomiting and salivation. Minute amounts aspirated into the lungs can produce a severe hemorrhagic pneumonitis with severe pulmonary injury or death.

##### Skin Contact:

Skin contact results in loss of natural oils and often results in a characteristic dermatitis. May be absorbed through the skin.

##### Eye Contact:

Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.

##### Chronic Exposure:

Chronic inhalation can cause headache, loss of appetite, nervousness and pale skin. Repeated or prolonged skin contact may cause a skin rash. Repeated exposure of the eyes to high concentrations of vapor may cause reversible eye damage. Repeated exposure can damage bone marrow, causing low blood cell count. May damage the liver and kidneys.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney, blood, or respiratory function may be more susceptible to the effects of the substance.

---

## 4. First Aid Measures

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Ingestion:**

Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately. If vomiting occurs, keep head below hips to prevent aspiration into lungs.

**Skin Contact:**

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 32C (90F) CC

Autoignition temperature: ca. 463C (ca. 865F)

Flammable limits in air % by volume:

lcl: 1.0; ucl: 7.0

Flammable.

**Explosion:**

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire. Sensitive to static discharge.

**Fire Extinguishing Media:**

Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

---

## 7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

---

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limits (Xylene)

100 ppm (TWA)

-ACGIH Threshold Limit Value (TLV):

100 ppm (TWA), 150 ppm (STEL)

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details. Use explosion-proof equipment.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Characteristic odor.

**Solubility:**

Insoluble in water.

**Specific Gravity:**

0.88 @ 20C / 4 C

**pH:**

Not applicable.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

144C (291F)

**Melting Point:**

-25C (-13F)

**Vapor Density (Air=1):**

3.7

**Vapor Pressure (mm Hg):**

7 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

1

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Involvement in a fire causes formation of carbon monoxide and unidentified organic components.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Strong oxidizing agents and strong acids.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

**Toxicological Data:**

O-Xylene:investigated as a reproductive effector.

Mixed Xylenes: Oral rat LD50: 4300 mg/kg; Inhalation rat LC50: 5000 ppm/4H; Skin Rabbit LD50: > 1700 mg/kg; Irritation, skin rabbit: 500 mg/24-hour, moderate (Standard Draize); Irritation, eye rabbit 87 mg, mild (Standard Draize). Investigated as a tumorigen, mutagen, reproductive effector.

**Reproductive Toxicity:**

May cause teratogenic effects.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
o-Xylene (95-47-6)	No	No	3

## 12. Ecological Information

**Environmental Fate:**

Following data for xylene: When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate

extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. (mixed xylenes: octanol / water partition coefficient 3.1 - 3.2; bioconcentration factor = 1.3, eels)

**Environmental Toxicity:**

For xylene: This material is expected to be slightly toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

**13. Disposal Considerations**

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

**14. Transport Information****Domestic (Land, D.O.T.)**

Proper Shipping Name: XYLENES

Hazard Class: 3

UN/NA: UN1307

Packing Group: III

Information reported for product/size: 4L

**International (Water, I.M.O.)**

Proper Shipping Name: XYLENES

Hazard Class: 3

UN/NA: UN1307

Packing Group: III

Information reported for product/size: 4L

**International (Air, I.C.A.O.)**

Proper Shipping Name: XYLENES

Hazard Class: 3

UN/NA: UN1307

Packing Group: III

Information reported for product/size: 4L

**15. Regulatory Information**

```

-----\Chemical Inventory Status - Part 1\-----
Ingredient                TSCA  EC   Japan  Australia
-----
o-Xylene (95-47-6)       Yes   Yes   Yes    Yes
  
```

```

-----\Chemical Inventory Status - Part 2\-----
Ingredient                Korea  DSL   NDSL   Phil.
-----
o-Xylene (95-47-6)       Yes   Yes   No     Yes
  
```

```

-----\Federal, State & International Regulations - Part 1\-----
Ingredient                -SARA 302-  -SARA 313-
RQ   TPQ   List  Chemical Catg.
-----
o-Xylene (95-47-6)       No    No    Yes    No
  
```

```

-----\Federal, State & International Regulations - Part 2\-----
Ingredient                CERCLA    261.33    -TSCA-
                        1000      No        8(d)
-----
o-Xylene (95-47-6)       1000      No        No
  
```

Chemical Weapons Convention: No    TSCA 12(b): No    CDTA: No  
 SARA 311/312: Acute: Yes    Chronic: Yes    Fire: Yes    Pressure: No  
 Reactivity: No    (Pure / Liquid)

**Australian Hazchem Code:** 3[Y]

**Poison Schedule:** S6

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 2 Flammability: 3 Reactivity: 0

**Label Hazard Warning:**

DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND VAPOR.

**Label Precautions:**

Keep away from heat, sparks and flame.  
Avoid contact with eyes, skin and clothing.  
Keep container closed.  
Use only with adequate ventilation.  
Avoid breathing vapor.  
Wash thoroughly after handling.

**Label First Aid:**

Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

\*\*\*\*\*  
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**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

# Material Safety Data Sheet

## o-Cresol

ACC# 95809

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** o-Cresol**Catalog Numbers:** AC110550010, AC110550050, AC110555000, AC110560010, C536-250, C536-500, NC9231111**Synonyms:** 2-Methylphenol; 2-Hydroxytoluene; 2-Cresol; o-Cresylic acid.**Company Identification:**

Fisher Scientific

1 Reagent Lane

Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
95-48-7	o-Cresol	>99	202-423-8

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: white to pale yellow solid. Flash Point: 81 deg C.

**Danger!** Causes eye and skin burns. Causes digestive and respiratory tract burns. May be fatal if inhaled. Harmful if absorbed through the skin. Harmful if swallowed. May cause allergic skin reaction. May cause liver and kidney damage. Material is a solid at room temperature that melts upon moderate heating into a combustible liquid with a flash point below 200°F(93.3°C). Light sensitive. Hygroscopic (absorbs moisture from the air).

**Target Organs:** Kidneys, central nervous system, liver.

#### Potential Health Effects

**Eye:** May result in corneal injury. Causes eye irritation and burns. May cause conjunctivitis and keratitis.

**Skin:** May be absorbed through the skin in harmful amounts. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. Causes severe skin irritation and burns. Initial contact may cause prickling and intense burning. Affected tissue may initially show white discoloration, wrinkling, and softening, which subsequently may become gangrenous.

**Ingestion:** Causes gastrointestinal irritation with nausea, vomiting and diarrhea. Causes gastrointestinal tract burns. May cause vascular collapse and damage. May cause kidney, liver and spleen damage. Rapidly absorbed from the gastrointestinal tract. Cresols may cause abnormalities of the central nervous system, respiratory system, spleen and pancreas.

**Inhalation:** May be fatal if inhaled. Causes severe irritation of upper respiratory tract with coughing,

burns, breathing difficulty, and possible coma. May cause headache. May cause nausea and possible vomiting. Exposure to vapors or aerosols produced by high temperature processes may cause systemic absorption. If sufficient amounts are absorbed vascular collapse, shock, hypothermia, unconsciousness and respiratory failure are possible.

**Chronic:** May cause liver and kidney damage. Repeated exposure may cause sensitization dermatitis. May cause appetite loss, diarrhea, skin abnormalities, and digestive tract disturbances.

## Section 4 - First Aid Measures

**Eyes:** Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).

**Skin:** Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Discard contaminated clothing in a manner which limits further exposure. Destroy contaminated shoes.

**Ingestion:** Never give anything by mouth to an unconscious person. Get medical aid immediately. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.

**Inhalation:** Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors can travel to a source of ignition and flash back. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Material is a solid at room temperature that melts upon moderate heating into a combustible liquid with a flash point below 200°F (93.3°C).

**Extinguishing Media:** For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray.

**Flash Point:** 81 deg C ( 177.80 deg F)

**Autoignition Temperature:** 555 deg C ( 1,031.00 deg F)

**Explosion Limits, Lower:** 1.4 vol %

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 3; Flammability: 2; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Provide ventilation. Evacuate unnecessary personnel.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Ground and bond containers when transferring material. Do not get

in eyes, on skin, or on clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Do not ingest or inhale. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Keep away from heat and flame.

**Storage:** Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Corrosives area. If the water content is below approximately 0.3% and the temperature exceeds 268°F (120°C), violent corrosion of aluminum and its alloys may occur.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
o-Cresol	5 ppm TWA; Skin - potential significant contribution to overall exposure by the cutaneous route	2.3 ppm TWA; 10 mg/m <sup>3</sup> TWA 250 ppm IDLH	5 ppm TWA; 22 mg/m <sup>3</sup> TWA (listed under Cresol).

**OSHA Vacated PELs:** o-Cresol: No OSHA Vacated PELs are listed for this chemical.

### Personal Protective Equipment

**Eyes:** Wear chemical splash goggles.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Solid

**Appearance:** white to pale yellow

**Odor:** Phenolic.

**pH:** Not available.

**Vapor Pressure:** .25 mm Hg @ 25 deg C

**Vapor Density:** 3.72 (air=1)

**Evaporation Rate:** Not available.

**Viscosity:** 4.75 cP 35 deg C

**Boiling Point:** 191 deg C @ 760 mmHg

**Freezing/Melting Point:** 30 - 32 deg C

**Decomposition Temperature:** Not available.

**Solubility:** 30.8 g/L @ 40°C

**Specific Gravity/Density:** 1.04g/cm<sup>3</sup>

**Molecular Formula:** C<sub>7</sub>H<sub>8</sub>O

**Molecular Weight:** 108.14

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures. Low melting point solid.

**Conditions to Avoid:** High temperatures, light, ignition sources, excess heat.

**Incompatibilities with Other Materials:** Strong oxidizing agents, strong acids, bases, active metals, nitric acid, aliphatic amines, chlorosulfonic acid, oleum.

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 95-48-7: GO6300000

**LD50/LC50:**

**CAS#** 95-48-7:

Draize test, rabbit, eye: 105 mg Severe;  
Draize test, rabbit, skin: 524 mg/24H Severe;  
Inhalation, mouse: LC50 = 179 mg/m<sup>3</sup>/2H;  
Inhalation, mouse: LC50 = 179 mg/m<sup>3</sup>;  
Inhalation, rat: LC50 = >1220 mg/m<sup>3</sup>/1H;  
Inhalation, rat: LC50 = 29 mg/m<sup>3</sup>;  
Oral, mouse: LD50 = 344 mg/kg;  
Oral, mouse: LD50 = 344 mg/kg;  
Oral, rabbit: LD50 = 940 mg/kg;  
Oral, rat: LD50 = 121 mg/kg;  
Oral, rat: LD50 = 1350 mg/kg;  
Skin, rabbit: LD50 = 890 mg/kg;  
Skin, rabbit: LD50 = 890 mg/kg;  
Skin, rat: LD50 = 620

**Carcinogenicity:**

**CAS#** 95-48-7: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.

**Teratogenicity:** No information available.

**Reproductive Effects:** No information available.

**Mutagenicity:** No information available.

**Neurotoxicity:** No information available.

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. Goldfish (soft water) TLm=49.1-19ppm/24-96H Bluegill (soft water) TLm=22.2-20.8ppm/24-96H Fathead minnow (hard water) TLm=18-13.4ppm/24-96H Guppy (hard water) TLm=18-50ppm/24-96H

**Environmental:** In air, substance will react with photochemically-produced hydroxyl radicals (day) and nitrate radicals (night). In water, substance will biodegrade within days. Substance is mobile in most soils and will biodegrade.

**Physical:** No information available.

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	CRESOLS, SOLID	CRESOLS, SOLID
<b>Hazard Class:</b>	6.1	6.1(8)
<b>UN Number:</b>	UN3455	UN3455
<b>Packing Group:</b>	II	II

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 95-48-7 is listed on the TSCA inventory.

#### Health & Safety Reporting List

CAS# 95-48-7: Effective 10/4/82, Sunset 10/4/92

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 95-48-7: 100 lb final RQ; 45.4 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

CAS# 95-48-7: 1000 lb TPQ (lower threshold); 10000 lb TPQ (upper threshold)

#### SARA Codes

CAS # 95-48-7: immediate, fire.

#### Section 313

This material contains o-Cresol (CAS# 95-48-7, >99%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

CAS# 95-48-7 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

CAS# 95-48-7 is listed as a Hazardous Substance under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 95-48-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Cresol), Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

T C

**Risk Phrases:**

R 34 Causes burns.

R 24/25 Toxic in contact with skin and if swallowed.

**Safety Phrases:**

S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

**WGK (Water Danger/Protection)**

CAS# 95-48-7: 2

**Canada - DSL/NDSL**

CAS# 95-48-7 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D1B, E, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 95-48-7 is listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
--

**MSDS Creation Date:** 7/20/2001

**Revision #5 Date:** 6/07/2006

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

# Material Safety Data Sheet

## 2-Chlorotoluene

ACC# 90988

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** 2-Chlorotoluene**Catalog Numbers:** AC150200000, AC150200010, AC150200025, AC150200050, AC150205000**Synonyms:** OCT, 1-Chloro-2-methylbenzene.**Company Identification:**

Acros Organics N.V.

One Reagent Lane

Fair Lawn, NJ 07410

**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
95-49-8	2-Chlorotoluene	98	202-424-3

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: APHA: 15 max liquid. Flash Point: 49 deg C.

**Warning! Flammable liquid and vapor.** Causes eye irritation. Harmful if inhaled. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. May cause skin and respiratory tract irritation. May cause central nervous system effects.**Target Organs:** Kidneys, central nervous system, liver, eyes.**Potential Health Effects****Eye:** Causes eye irritation.**Skin:** May cause skin irritation. May be harmful if absorbed through the skin.**Ingestion:** May cause irritation of the digestive tract. May be harmful if swallowed. May cause central nervous system effects.**Inhalation:** Harmful if inhaled. May cause respiratory tract irritation. May cause central nervous system effects.**Chronic:** May cause liver and kidney damage.

### Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.**Skin:** Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.

**Ingestion:** Do not induce vomiting. Get medical aid.

**Inhalation:** Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Containers may explode in the heat of a fire. Flammable liquid and vapor.

**Extinguishing Media:** Use water spray to cool fire-exposed containers. Use water spray, dry chemical, carbon dioxide, or chemical foam.

**Flash Point:** 49 deg C ( 120.20 deg F)

**Autoignition Temperature:** > 600 deg C (> 1,112.00 deg F)

**Explosion Limits, Lower:**1.0 vol %

**Upper:** 12.6 vol %

**NFPA Rating:** (estimated) Health: 2; Flammability: 2; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Remove all sources of ignition. Use a spark-proof tool. Do not let this chemical enter the environment.

## Section 7 - Handling and Storage

**Handling:** Use spark-proof tools and explosion proof equipment. Do not get in eyes, on skin, or on clothing. Take precautionary measures against static discharges. Keep away from heat, sparks and flame. Do not ingest or inhale. Use only in a chemical fume hood.

**Storage:** Keep away from sources of ignition. Store in a cool, dry place. Store in a tightly closed container. Flammables-area.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
2-Chlorotoluene	50 ppm TWA	50 ppm TWA; 250 mg/m <sup>3</sup> TWA	none listed

**OSHA Vacated PELs:** 2-Chlorotoluene: 50 ppm TWA; 250 mg/m<sup>3</sup> TWA

**Personal Protective Equipment**

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless - APHA: 15 max

**Odor:** none reported

**pH:** Not available.

**Vapor Pressure:** 3.5 mbar @ 20 deg C

**Vapor Density:** Not available.

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 157 - 159 deg C @ 760 mmHg

**Freezing/Melting Point:** -36 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Slightly soluble.

**Specific Gravity/Density:** 1.080

**Molecular Formula:** C<sub>7</sub>H<sub>7</sub>Cl

**Molecular Weight:** 126.59

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Incompatible materials, ignition sources, excess heat.

**Incompatibilities with Other Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Hydrogen chloride, carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 95-49-8: XS9000000

**LD50/LC50:**

CAS# 95-49-8:

Draize test, rabbit, eye: 50 uL Moderate;

Oral, mouse: LD50 = 2500 mg/kg;

Oral, rat: LD50 = 3900 mg/kg;

Oral, Rat: LD50 = 3900

**Carcinogenicity:**

CAS# 95-49-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information found.  
**Teratogenicity:** No information found.  
**Reproductive Effects:** No information found.  
**Mutagenicity:** No information found.  
**Neurotoxicity:** No information found.  
**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. BCF values from 20-112, measured in carp, indicate that 2-chlorotoluene may moderately bioconcentrate in aquatic organisms according to a recommended classification scheme.

**Environmental:** Estimated half-lives for a model river and a model lake are 4 hours and 5 days.

**Physical:** 2-chlorotoluene is inert to chemical hydrolysis under environmental conditions.

**Other:** Do not empty into drains.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	CHLOROTOLUENES	CHLOROTOLUENES
<b>Hazard Class:</b>	3	3
<b>UN Number:</b>	UN2238	UN2238
<b>Packing Group:</b>	III	III
<b>Additional Info:</b>		FLASHPOINT 49 C

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 95-49-8 is listed on the TSCA inventory.

#### Health & Safety Reporting List

CAS# 95-49-8: Effective 4/29/83, Sunset 4/29/93

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

None of the chemicals in this material have an RQ.

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**SARA Codes**

CAS # 95-49-8: immediate, fire.

**Section 313** No chemicals are reportable under Section 313.

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 95-49-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XN N

**Risk Phrases:**

R 20 Harmful by inhalation.

R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Safety Phrases:**

S 24/25 Avoid contact with skin and eyes.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 95-49-8: 2

**Canada - DSL/NDSL**

CAS# 95-49-8 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B3, D1B, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 95-49-8 is listed on the Canadian Ingredient Disclosure List.

**Section 16 - Additional Information**

**MSDS Creation Date:** 11/04/1998

**Revision #5 Date:** 6/24/2008

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 95-50-1****Date: 03/09/2001**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: 1,2-DICHLOROBENZENE

SYNONYMS: Orthodichlorobenzene, o-Dichlorobenzene  
Dizene, o-Dichlor Benzol, Chloroben

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	Exposure Limits (PPM)			
				ACGIH TLV	OSHA PEL	MAC	Other STEL
1,2-DICHLOROBENZENE	C6H4CL2	95-50-1	99+%	50	50	50	50

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIANT

## 3. HAZARD IDENTIFICATION

**\*\*\* EMERGENCY OVERVIEW \*\*\***

Poisonous, flammable liquid and vapor.

May cause damage to liver, kidneys, skin, and eyes.

May cause central nervous system depression.

### POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation , Skin , Ingestion

**ACUTE EFFECTS:** If inhaled, severe irritation of the nose, throat and upper respiratory tract will result. May cause irritation of the eyes and mucous membranes. Can be absorbed through the skin. Liquid contact with skin causes irritation, prolonged contact may lead to the formation of blisters. Ingestion causes burning pain in the stomach, nausea, vomiting, and diarrhea. May cause allergic reaction. May damage liver and kidney.

**CHRONIC EFFECTS:** Suspected human carcinogen. May lead to anorexia, weight loss, jaundice, and cirrhosis.

**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** Toxic effects can include hematological (blood) disorders, and liver and kidney damage.

OTHER EFFECTS OF OVEREXPOSURE: NONE

CARCINOGENICITY (US ONLY):

NTP - NO

IARC MONOGRAPHS - NO

OSHA REGULATED - NO

**4. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

**EYE CONTACT:** Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes.

**SKIN CONTACT:** Immediately remove contaminated clothing. Rinse the affected area with flooding amounts of water and then wash it with soap and water.

**INGESTION:** If ingested have conscious person drink 2 to 3 glasses of milk or water. Do not induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce the risk of aspiration to the victim. Contact physician immediately.

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: There is a chemical aspiration hazard if vomiting is induced; treat symptomatically.

**5. FIRE FIGHTING MEASURES**

FLASH POINT: 66 deg.C

AUTOIGNITION TEMPERATURE: 648 deg.C

FLAMMABLE LIMITS: Vol. %

LOWER: 2.20

UPPER: 9.20

EXTINGUISHING MEDIA: Water spray. Carbon dioxide, foam, or dry chemical.

SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT: Use water spray to cool fire and exposed cylinders, disperse vapors, and to flush spill away from exposures.

HAZARDOUS COMBUSTION PRODUCTS: Toxic carbon monoxide, hydrogen chloride gas, phosgene, and chloro carbons.

UNUSUAL FIRE AND EXPLOSION HAZARDS: May form explosive mixture in air. Emits toxic fumes under fire conditions.

**6. ACCIDENTAL RELEASE MEASURES**

CLEAN UP PROCEDURES: Wear SCBA, rubber boots, and heavy rubber gloves. Evacuate and ventilate area. Remove  
[scotecatalog.com/msds.nsf/.../95-50-...](http://scotecatalog.com/msds.nsf/.../95-50-...)

all sources of ignition. Absorb with sand or vermiculite and place in closed containers for disposal. Prevent release of material to surface water or sewers.

SPECIALIZED EQUIPMENT: NONE

## 7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING: Use only in a chemical fume hood. Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

PRECAUTIONS TO BE TAKEN IN STORAGE: Keep in a cool, well ventilated place. Store away from heat, flame, and sparks. Keep away from oxidizing agents.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentrations below exposure and flammable limits.

EYE / FACE PROTECTION: Goggles. A safety shower and eyewash station should be readily available.

SKIN PROTECTION: Impervious gloves, coveralls, boots, and/or other resistant protective clothing.

RESPIRATORY PROTECTION: Use a self-contained breathing apparatus in case of emergency or non-routine use.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless to pale yellow

ODOR: Pleasant aromatic odor

PHYSICAL PRESSURE: Liquid

VAPOR PRESSURE: @20 deg.C: 1.2 mm Hg

VAPOR DENSITY (AIR=1): 5.1

BOILING POINT (C): 180.5

SOLUBILITY IN WATER: Practically insoluble

SPECIFIC GRAVITY (H2O=1): 1.3

EVAPORATION RATE: (BuAC=1): <1

ODOR THRESHOLD: 2-4 ppm

**10. STABILITY AND REACTIVITY**

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas. Storage near a heat source.

MATERIALS TO AVOID: Oxidizing agents. Heated aluminums and aluminum alloys.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: Oxides of carbon, hydrogen chloride, and chlorine.

**11. TOXICOLOGICAL INFORMATION**

LETHAL CONCENTRATION (LC50): NONE ESTABLISHED

LETHAL DOSE 50 (LD50): N/AV

TERATOGENICITY: N/AV

REPRODUCTIVE EFFECTS: N/AV

MUTAGENICITY: N/AV

**12. ECOLOGICAL INFORMATION**

No adverse ecological effects are expected.

**13. DISPOSAL CONSIDERATIONS**

WASTE DISPOSAL METHOD: Non-returnable cylinders must not be refilled. Dispose of non-refillable cylinders in accordance with federal, state, and local regulations. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection cap in place. Waste can be burned in a chemical incinerator. Follow federal, state and local regulations.

**14. TRANSPORT INFORMATION**

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: o-DICHLOROBENZENE

HAZARD CLASS: 6.1 (poison), Packing Group III

IDENTIFICATION NUMBER: UN1591

REPORTABLE QUANTITIES: 100

LABELING: KEEP AWAY FROM FOOD

ADR / RID (EU Only): 6.1, 15(c)

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

## 15. REGULATORY INFORMATION

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 202-425-9

NUMBER IN ANNEX 1 OF DIR 67/548: Not listed in annex 1.

EU CLASSIFICATION: N/AV

R: 22-36/37/38

S: 23

## 16. OTHER INFORMATION

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.



Health	2
Fire	2
Reactivity	0
Personal Protection	H

## Material Safety Data Sheet o-Chlorophenol MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** o-Chlorophenol

**Catalog Codes:** SLC2281

**CAS#:** 95-57-8

**RTECS:** SK2625000

**TSCA:** TSCA 8(b) inventory: o-Chlorophenol

**CI#:** Not available.

**Synonym:** 2-Chlorophenol

**Chemical Name:** o-Chlorophenol

**Chemical Formula:** C<sub>6</sub>H<sub>5</sub>Cl-O

**Contact Information:**

Scienlab.com, Inc.  
14025 Smith Rd.  
Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**  
1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
{o-}Chlorophenol	95-57-8	100

**Toxicological Data on Ingredients:** o-Chlorophenol: ORAL (LD50): Acute: 40 mg/kg [Rat]. 345 mg/kg [Mouse].

### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of eye contact (irritant). Severe over-exposure can result in death.

**Potential Chronic Health Effects:**

**CARCINOGENIC EFFECTS:** Not available. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Classified Development toxin [POSSIBLE]. The substance may be toxic to kidneys, liver, upper respiratory tract, skin, central nervous system (CNS), legs. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

**Serious Skin Contact:**

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

**Ingestion:**

If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** Combustible.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** CLOSED CUP: 64°C (147.2°F).

**Flammable Limits:** Not available.

**Products of Combustion:** These products are carbon oxides (CO, CO<sub>2</sub>), halogenated compounds.

**Fire Hazards in Presence of Various Substances:** Highly flammable in presence of open flames and sparks, of heat.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

## Section 6: Accidental Release Measures

**Small Spill:** Absorb with an inert material and put the spilled material in an appropriate waste disposal.

**Large Spill:**

Combustible material. Poisonous liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal.

## Section 7: Handling and Storage

**Precautions:**

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

**Storage:**

Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:**

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:** Not available.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid.

**Odor:** Unpleasant.

**Taste:** Not available.

**Molecular Weight:** 128.6 g/mole

**Color:** Yellow. (Light.)

**pH (1% soln/water):** Not available.

**Boiling Point:** 174.9°C (346.8°F)

**Melting Point:** 9.8 (49.6°F)

**Critical Temperature:** Not available.

**Specific Gravity:** Not available.

**Vapor Pressure:** 0.3 kPa (@ 20°C)

**Vapor Density:** 4.4 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** 1.24 ppm

**Water/Oil Dist. Coeff.:** The product is more soluble in oil;  $\log(\text{oil/water}) = 2.1$

**Ionicity (in Water):** Not available.

**Dispersion Properties:**

Dispersed in methanol. Partially dispersed in diethyl ether. See solubility in water, methanol, diethyl ether.

**Solubility:**

Soluble in methanol. Partially soluble in diethyl ether.

### Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Reactive with oxidizing agents.

**Corrosivity:** Not available.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

### Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:** Acute oral toxicity (LD50): 40 mg/kg [Rat].

**Chronic Effects on Humans:**

**DEVELOPMENTAL TOXICITY:** Classified Development toxin [POSSIBLE]. May cause damage to the following organs: kidneys, liver, upper respiratory tract, skin, central nervous system (CNS), legs.

**Other Toxic Effects on Humans:** Very hazardous in case of skin contact (irritant), of ingestion, of inhalation.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:** Not available.

### Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are as toxic as the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

### Section 13: Disposal Considerations

**Waste Disposal:**

### Section 14: Transport Information

**DOT Classification:** CLASS 6.1: Poisonous material.

**Identification:** : Chlorophenols, liquid UNNA: 2021 PG: III

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

### Federal and State Regulations:

Pennsylvania RTK: o-Chlorophenol Minnesota: o-Chlorophenol Massachusetts RTK: o-Chlorophenol New Jersey: o-Chlorophenol TSCA 8(b) inventory: o-Chlorophenol TSCA 8(d) H and S data reporting: o-Chlorophenol: June 1999

### Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

### Other Classifications:

### WHMIS (Canada):

CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC).

### DSCL (EEC):

R25- Toxic if swallowed. R36/38- Irritating to eyes and skin. R40- Possible risks of irreversible effects. R63- Possible risk of harm to the unborn child.

### HMIS (U.S.A.):

**Health Hazard:** 2

**Fire Hazard:** 2

**Reactivity:** 0

**Personal Protection:** h

### National Fire Protection Association (U.S.A.):

**Health:** 3

**Flammability:** 2

**Reactivity:** 0

**Specific hazard:**

### Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/09/2005 04:53 PM

**Last Updated:** 11/01/2010 12:00 PM

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## Material Safety Data Sheet

### 1. Product and Company Identification

Catalog Numbers: 2CF2-0  
 Product Name  
 Trade Name: 1,2,4-Trimethylbenzene  
 Synonyms: asym-Trimethylbenzene;Pseudocumene

### Manufacturer & Distributor

Company Name: Reagent World, Inc.  
 Address: 2048 E. Francis Street  
 City: Ontario  
 State: California  
 Postal Code: 91761  
 Country: USA

### Business/Emergency

Phone: 909-947-7779  
 Fax: 909-947-9595  
 URL: <http://www.ReagentWorld.com>

### 2. Hazards Identification

Emergency Overview: Flammable. Irritating to eyes, respiratory system and skin. Harmful by inhalation. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

### Potential Health Effects

Eye: Causes eye irritation. Causes redness and pain.  
 Skin: Causes skin irritation. Causes redness and pain. May be harmful if absorbed through the skin.  
 Ingestion: May cause irritation of the digestive tract. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. May be harmful if swallowed. May cause central nervous system depression  
 Inhalation: Harmful if inhaled. Causes respiratory tract irritation. May cause drowsiness, unconsciousness, and central nervous system depression.  
 Chronic: Prolonged or repeated skin contact may cause dermatitis. May cause anemia and other blood cell abnormalities. Prolonged exposure may produce a narcotic effect. Prolonged or repeated exposure may cause nausea, dizziness, and headache.

### 3. Composition/Information on Ingredients

Chemical Name: 1,2,4-Trimethylbenzene  
 Molecular Formula: C<sub>9</sub>H<sub>12</sub>  
 Molecular Weight: 120.19  
 Content: 98%  
 CAS Number: 95-63-6  
 EINECS NO. [EC No]: 202-436-9

### 4. First Aid Measures

Eye: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.  
 Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.  
 Ingestion: Do not induce vomiting. Get medical aid. Wash mouth out with water.  
 Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

### 5. Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Containers may explode in the heat of a fire. Flammable liquid and vapor.  
 Extinguishing: Use water spray to cool fire-exposed containers. Use water spray, dry chemical, carbon dioxide, or chemical foam.

### 6. Accidental Release Measures

General Information: Use proper personal protective equipment as listed in Section 8.  
 Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. Do not let this chemical enter the environment.

### 7. Handling and Storage

Handling: Refer to section 8  
 Storage: 1. Keep away from sources of ignition and combustible material  
 2. Keep container tightly closed  
 3. Keep away from heat, sparks, and flame

### 8. Exposure Controls/Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash and a safety shower facility.

### Personal Protective Equipment

Eyes: Wear chemical safety goggles.  
 Skin: Wear appropriate protective gloves.  
 Clothing: Wear appropriate protective clothing.  
 Respirator: Wear NIOSH/MSHA - approved respirator

refrigerator.	wear measurement approved respirator.
<b>9. Physical and Chemical Properties</b>	
Physical State:	Clear liquid
Color:	colorless
Odor:	aromatic odor
Boiling Point:	168
Melting Point :	-44
Vapor Pressure :	-
Specific Gravity :	0.88
PH:	-
Solubility in Water :	insoluble
Flash Point:	48 deg C ( 118.40 deg F)
Autoignition Temperature :	500 deg C ( 932.00 deg F)
Decomposition Temperature :	-
<b>10. Stability and Reactivity</b>	
Chemical Stability:	Stable under normal temperatures and pressures
Conditions to Avoid:	Incompatible materials, ignition sources.
Incompatibilities with Other:	Strong oxidizing agents
Hazardous Decomposition Products :	Carbon monoxide, carbon dioxide
Polymerization :	Will not occur
<b>11. Toxicological Information</b>	
RTECS#:	DC3325000
Toxicity Data[LD50/LC50]:	Inhalation, rat: LC50 = 18000 mg/m3/4H; Oral, mouse: LD50 = 6900 mg/kg; Oral, rat: LD50 = 5 gm/kg.
Carcinogenicity:	-
Other:	See actual entry in RTECS for complete information.
<b>12. Ecological Information</b>	
Ecotoxicity:	Fish: Fathead Minnow: LC50: 7.72 mg/L; 96h; .Daphnia: Daphnia: EC50: 3.6 mg/L; 48h; .Log Pow: 3.78
Other:	See "The dictionary of substances and their effects" (editor: M.L. Richardson) for more information.
<b>13. Disposal Considerations</b>	
Disposal considerations:	Contact a licensed professional waste disposal service to dispose of this material in a manner consistent with federal, state and local environmental regulations
<b>14. Transport Information</b>	
Shipping Name:	FLAMMABLE LIQUID, N.O.S.*
Hazard Class:	3
UN Number:	1993
Packing Group:	III
<b>15. Regulatory Information</b>	
European/International Regulations:	-
European Labeling in Accordance with EC Directives	
Hazard Symbols:	1.Xn 2.N
R-Phrases:	1.Flammable. 2.Harmful by inhalation. 3.Irritating to eyes. 4.Irritating to respiratory system. 5.Irritating to skin. 6.Toxic to aquatic organisms. 7.May cause long-term adverse effects in aquatic environment.
S-Phrases:	1.In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. 2.Avoid release to the environment. Refer to special instructions/Safety data sheets.
WGK(Water Danger/Protection):	3
US Federal TSCA:	CAS# 95-63-6 is listed on the TSCA inventory.
<b>16. Other Information</b>	
Other information:	The above information is believed to be accurate but does not suppose to be all inclusive and shall be used only as a guide. Reagent World makes no warranty of merchantability or any other warranty, express or implied, with respect to such information. Users should make their own investigations to determine the accountability of the information for their purposes in particular. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential of exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

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# Material Safety Data Sheet

## 1,2,4,5-Tetramethylbenzene

ACC# 75500

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** 1,2,4,5-Tetramethylbenzene**Catalog Numbers:** AC138370000, AC138370050, AC138372500, AC409390000, AC409390050, AC409391000 AC409391000, AC409395000**Synonyms:** Durene.**Company Identification:**Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
95-93-2	1,2,4,5-Tetramethylbenzene	98	202-465-7

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: brown crystals. Flash Point: 73 deg C.

**Danger!** Highly flammable. Flammable solid.**Target Organs:** None known.**Potential Health Effects****Eye:** May cause eye irritation.**Skin:** May cause skin irritation. May be harmful if absorbed through the skin.**Ingestion:** May cause irritation of the digestive tract. May be harmful if swallowed.**Inhalation:** May cause respiratory tract irritation. May be harmful if inhaled.**Chronic:** No information found.

### Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation develops, get medical aid.**Skin:** Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.**Ingestion:** Do not induce vomiting. Get medical aid if irritation or symptoms occur.**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Will burn if involved in a fire.

Flammable solid.

**Extinguishing Media:** Use water spray, dry chemical, carbon dioxide, or chemical foam.

**Flash Point:** 73 deg C ( 163.40 deg F)

**Autoignition Temperature:** Not applicable.

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 1; Flammability: 2; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Remove all sources of ignition. Use a spark-proof tool. Do not let this chemical enter the environment.

## Section 7 - Handling and Storage

**Handling:** Use with adequate ventilation. Minimize dust generation and accumulation. Use spark-proof tools and explosion proof equipment. Do not get in eyes, on skin, or on clothing. Keep away from heat, sparks and flame. Do not ingest or inhale.

**Storage:** Keep away from sources of ignition. Store in a cool, dry place. Store in a tightly closed container. Flammables-area.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
1,2,4,5-Tetramethylbenzene	none listed	none listed	none listed

**OSHA Vacated PELs:** 1,2,4,5-Tetramethylbenzene: No OSHA Vacated PELs are listed for this chemical.

### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant

respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Crystals

**Appearance:** white - brown

**Odor:** camphor

**pH:** Not available.

**Vapor Pressure:** 160 mm Hg @ 140 deg C

**Vapor Density:** 4.6 (air=1)

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 196 - 197 deg C @ 760 mmHg

**Freezing/Melting Point:** 78 - 82 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:** 0.838 g/cm<sup>3</sup>

**Molecular Formula:** C<sub>10</sub>H<sub>14</sub>

**Molecular Weight:** 134.22

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Incompatible materials, ignition sources, dust generation, excess heat.

**Incompatibilities with Other Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 95-93-2: DC0500000

**LD50/LC50:**

**CAS#** 95-93-2:

Oral, mouse: LD50 = 3400 mg/kg;

Oral, rat: LD50 = 6989 mg/kg;

Oral, rat: LD50 = 6700 mg/kg;

**Carcinogenicity:**

**CAS#** 95-93-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information found

**Teratogenicity:** No information found

**Reproductive Effects:** No information found

**Mutagenicity:** No information found

**Neurotoxicity:** No information found

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. No information available.

**Environmental:** No information available.

**Physical:** No information available.

**Other:** Do not empty into drains.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3.

Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	FLAMMABLE SOLIDS, ORGANIC, N.O.S.	FLAMMABLE SOLIDS, ORGANIC, N.O.S.
<b>Hazard Class:</b>	4.1	4.1
<b>UN Number:</b>	UN1325	UN1325
<b>Packing Group:</b>	III	III

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 95-93-2 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

#### SARA Codes

CAS # 95-93-2: fire.

**Section 313** No chemicals are reportable under Section 313.

#### Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 95-93-2 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

F

**Risk Phrases:**

R 11 Highly flammable.

**Safety Phrases:**

S 16 Keep away from sources of ignition - No smoking.

**WGK (Water Danger/Protection)**

CAS# 95-93-2: 1

**Canada - DSL/NDSL**

CAS# 95-93-2 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B4, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 8/24/1997

**Revision #5 Date:** 8/30/2007

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

## \*\*\*\*\* SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS \*\*\*\*\*

CAS#	Chemical Name	%	EINECS#
95-94-3	1,2,4,5-Tetrachlorobenzene	98	202-466-2

Hazard Symbols: XN

Risk Phrases: 22

## \*\*\*\*\* SECTION 3 - HAZARDS IDENTIFICATION \*\*\*\*\*

## EMERGENCY OVERVIEW

Harmful if swallowed.

## Potential Health Effects

## Eye:

May cause eye irritation.

## Skin:

May cause skin irritation.

## Ingestion:

May cause irritation of the digestive tract. May be harmful if swallowed.

## Inhalation:

May cause respiratory tract irritation.

## Chronic:

No information found.

## \*\*\*\*\* SECTION 4 - FIRST AID MEASURES \*\*\*\*\*

## Eyes:

Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

## Skin:

Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

## Ingestion:

If victim is conscious and alert, give 2-4 cupfuls of milk or water.

Never give anything by mouth to an unconscious person. Get medical aid immediately.

## Inhalation:

Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

## Notes to Physician:

Treat symptomatically and supportively.

## Antidote:

None reported.

## \*\*\*\*\* SECTION 5 - FIRE FIGHTING MEASURES \*\*\*\*\*

## General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Flammable when exposed to flame. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.

## Extinguishing Media:

In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam.

## \*\*\*\*\* SECTION 6 - ACCIDENTAL RELEASE MEASURES \*\*\*\*\*

General Information: Use proper personal protective equipment as indicated

in Section 8.

Spills/Leaks:

Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

\*\*\*\* SECTION 7 - HANDLING and STORAGE \*\*\*\*

Handling:

Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.

Storage:

Store in a cool, dry, well-ventilated area away from incompatible substances. Keep containers tightly closed.

\*\*\*\* SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION \*\*\*\*

Engineering Controls:

Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

CAS# 95-94-3:

Personal Protective Equipment

Eyes:

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:

Wear appropriate protective gloves to prevent skin exposure.

Clothing:

Wear appropriate protective clothing to prevent skin exposure.

Respirators:

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.

\*\*\*\* SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES \*\*\*\*

Physical State: Flakes

Color: white

Odor: None reported.

pH: Not available.

Vapor Pressure: 40 mm Hg @ 146C

Viscosity: Not available.

Boiling Point: 240 deg C @ 760.00mm Hg

Freezing/Melting Point: 138.0 - 140.0 deg C

Autoignition Temperature: Not available.

Flash Point: > 112 deg C (> 233.60 deg F)

Explosion Limits, lower: Not available.

Explosion Limits, upper: Not available.

Decomposition Temperature:

Solubility in water: 0.3 ppm in water @22C

Specific Gravity/Density: 1.734

Molecular Formula: C6H2Cl4

Molecular Weight: 215.89

## \*\*\*\* SECTION 10 - STABILITY AND REACTIVITY \*\*\*\*

## Chemical Stability:

Stable under normal temperatures and pressures.

## Conditions to Avoid:

Incompatible materials, dust generation.

## Incompatibilities with Other Materials:

Strong oxidizing agents - strong bases.

## Hazardous Decomposition Products:

Hydrogen chloride, carbon monoxide, carbon dioxide.

Hazardous Polymerization: Has not been reported.

## \*\*\*\* SECTION 11 - TOXICOLOGICAL INFORMATION \*\*\*\*

## RTECS#:

CAS# 95-94-3: DB9450000

## LD50/LC50:

CAS# 95-94-3: Oral, mouse: LD50 = 1035 mg/kg; Oral, rabbit: LD50 = 1500 mg/kg; Oral, rat: LD50 = 1500 mg/kg; Oral, rat: LD50 = 1727 mg/kg.

## Carcinogenicity:

1,2,4,5-Tetrachlorobenzene -

Not listed by ACGIH, IARC, or NTP.

## Other:

See actual entry in RTECS for complete information.

## \*\*\*\* SECTION 12 - ECOLOGICAL INFORMATION \*\*\*\*

## Ecotoxicity:

Fish: Bluegill/Sunfish: 5.69 mg/L; 24 hr.; unspecified bioassay

Goldfish: 0.30 ppm; 14 days.; unspecified bioassay

## \*\*\*\* SECTION 13 - DISPOSAL CONSIDERATIONS \*\*\*\*

Dispose of in a manner consistent with federal, state, and local regulations.

## \*\*\*\* SECTION 14 - TRANSPORT INFORMATION \*\*\*\*

## IATA

Not regulated as a hazardous material.

## IMO

Not regulated as a hazardous material.

## RID/ADR

Not regulated as a hazardous material.

USA RQ: CAS# 95-94-3: 5000 lb final RQ; 2270 kg final RQ

## \*\*\*\* SECTION 15 - REGULATORY INFORMATION \*\*\*\*

## European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XN

## Risk Phrases:

R 22 Harmful if swallowed.

## Safety Phrases:

WGK (Water Danger/Protection)

CAS# 95-94-3: 3

## Canada

CAS# 95-94-3 is listed on Canada's DSL List.

CAS# 95-94-3 is not listed on Canada's Ingredient Disclosure List.

## US FEDERAL

## TSCA

CAS# 95-94-3 is listed on the TSCA inventory.

## \*\*\*\* SECTION 16 - ADDITIONAL INFORMATION \*\*\*\*

MSDS Creation Date: 2/23/1999 Revision #3 Date: 3/18/2003

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.



Health	2
Fire	1
Reactivity	0
Personal Protection	E

## Material Safety Data Sheet 2,4,5-Trichlorophenol MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** 2,4,5-Trichlorophenol

**Catalog Codes:** SLT1144

**CAS#:** 95-95-4

**RTECS:** SN1400000

**TSCA:** TSCA 8(b) inventory: 2,4,5-Trichlorophenol

**CI#:** Not available.

**Synonym:**

**Chemical Name:** 2,4,5-Trichlorophenol

**Chemical Formula:** C<sub>6</sub>H<sub>3</sub>Cl<sub>3</sub>O

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**  
1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
{2,4,5-}Trichlorophenol	95-95-4	100

**Toxicological Data on Ingredients:** 2,4,5-Trichlorophenol: ORAL (LD50): Acute: 820 mg/kg [Rat]. 600 mg/kg [Mouse]. 1000 mg/kg [Guinea pig].

### Section 3: Hazards Identification

**Potential Acute Health Effects:** Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation (lung irritant).

**Potential Chronic Health Effects:**

**CARCINOGENIC EFFECTS:** Not available. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Classified Development toxin [POSSIBLE]. The substance may be toxic to gastrointestinal tract, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

**Serious Skin Contact:**

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** These products are carbon oxides (CO, CO<sub>2</sub>), halogenated compounds.

**Fire Hazards in Presence of Various Substances:** Not available.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

## Section 6: Accidental Release Measures

**Small Spill:**

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

## Section 7: Handling and Storage

**Precautions:**

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

### Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:** Not available.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid.

**Odor:** Phenolic-like.

**Taste:** Not available.

**Molecular Weight:** 197.45 g/mole

**Color:** White to Tan.

**pH (1% soln/water):** Not available.

**Boiling Point:** 248°C (478.4°F)

**Melting Point:** 68°C (154.4°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 1.678 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** The product is more soluble in oil;  $\log(\text{oil/water}) = 3.7$

**Ionicity (in Water):** Not available.

### Dispersion Properties:

Partially dispersed in methanol. Very slightly dispersed in cold water, hot water. See solubility in methanol, acetone.

### Solubility:

Partially soluble in methanol, acetone. Very slightly soluble in cold water, hot water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Slightly reactive to reactive with oxidizing agents, acids.

**Corrosivity:** Not available.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Eye contact. Inhalation.

**Toxicity to Animals:** Acute oral toxicity (LD50): 600 mg/kg [Mouse].

**Chronic Effects on Humans:**

**DEVELOPMENTAL TOXICITY:** Classified Development toxin [POSSIBLE]. May cause damage to the following organs: gastrointestinal tract, skin, central nervous system (CNS).

**Other Toxic Effects on Humans:** Hazardous in case of skin contact (irritant), of inhalation (lung irritant).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:** Not available.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are as toxic as the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

## Section 14: Transport Information

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:**

**Special Provisions for Transport:** Not applicable.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**

Rhode Island RTK hazardous substances: 2,4,5-Trichlorophenol Pennsylvania RTK: 2,4,5-Trichlorophenol Michigan critical material: 2,4,5-Trichlorophenol Massachusetts RTK: 2,4,5-Trichlorophenol New Jersey: 2,4,5-Trichlorophenol TSCA 8(b) inventory: 2,4,5-Trichlorophenol TSCA 8(d) H and S data reporting: 2,4,5-Trichlorophenol: June 1999 TSCA 12(b) one time export: 2,4,5-Trichlorophenol

**Other Regulations:** EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):** Not controlled under WHMIS (Canada).

**DSCL (EEC):**

R20/21/22- Harmful by inhalation, in contact with skin and if swallowed. R36/37/38- Irritating to eyes, respiratory system and skin. R45- May cause cancer.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 1

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 1

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles.

**Section 16: Other Information**

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/11/2005 12:48 PM

**Last Updated:** 11/01/2010 12:00 PM

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## Composition/Information on Ingredient

**Cas:**

959-98-8

**Code:**

M

**RTECS:**

RB9275100

**Code:**

M

**Name:**

ENDOSULFAN I

**Other REC Limits:**

N/K

**OSHA PEL:**

N/K

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

N/K

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

N/K

**Ventilation:**

N/K

**Protective Gloves:**

RECOMMENDED

**Eye Protection:**

RECOMMENDED

**Other Protective Equipment:**

Equipment USE APPROPRIATE OSHA/MSHA SAFETY EQUIPMENT.

**Work Hygienic Practices:**

N/K

**Supplemental Safety and Health:**

N/K

## Health Hazards Data

**LD50LC50Mixture:**

ORAL (RAT) LD50: 5000 MG/KG (TOLUENE)

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

YES

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

NO

**IARC:**

NO

**OSHA:**

NO

**Health Hazards Acute And Chronic:**

EYES/SKIN/INHALATION/INGESTION: IRRITATION.

**Explanation Of Carcinogenicity:**

LINDANE, DDT ISOMERS, & DIELDRIN ARE SUSPECTED HUMAN CARCINOGENS. HEPTACHLOR IS AN A2 CARCINOGEN.

**Signs And Symptoms Of Overexposure:**

EYES/SKIN/INGESTION/INHALATION: TOXIC & IRRITATION.

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES/SKIN: FLUSH W/COPIOUS AMOUNTS OF WATER. INHALATION: REMOVE TO FRESH AIR. GIVE OXYGEN IF NECESSARY. OBTAIN MEDICAL ATTENTION IN ALL CASES.

**Spill Release Procedures:**

DUE TO THE SMALL QUANTITY INVOLVED, SPILLS OR LEAKS SHOULD NOT POSE A SIGNIFICANT PROBLEM. A LEAKING BOTTLE MAY BE PLACED IN A PLASTIC BAG & NORMAL DISPOSAL PROCEDURES FOLLOWED. LIQUID SAMPLES MAY BE ABSORBED ON VERMICULITE OR SAND.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCUBBER. OBSERVE ALL FEDERAL, STATE, & LOCAL LAWS CONCERNING DISPOSAL.

**Handling And Storage Precautions:**

AVOID CONTACT W/EYES, SKIN, & CLOTHING. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE.

**Other Precautions:**

THIS MATERIAL SHOULD ONLY BE USED BY THOSE PERSONS TRAINED IN THE SAFE HANDLING OF HAZARDOUS CHEMICALS.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P 6

**Flash Point:****Flash Point Text:**

COMBUSTIBLE

**Autoignition Temp:****Autoignition Temp Text:**

N/A

**Lower Limits:**

N/K

**Upper Limits:**

N/K

**Extinguishing Media:**

CO2, DRY CHEMICAL POWDER, OR WATER SPRAY

**Fire Fighting Procedures:**

N/K

**Unusual Fire/Explosion Hazard:**

COMBUSTIBLE.

## Physical/Chemical Properties

**HCC:****NRC/State LIC No:****Net Prop WT For Ammo:****Boiling Point:****B.P. Text:**

N/K

**Melt/Freeze Pt:****M.P/F.P Text:**

N/K

**Decomp Temp:****Decomp Text:**

N/K

**Vapor Pres:**

N/K

**Vapor Density:**

N/K

**Volatile Org Content %:**

**Spec Gravity:**

N/K 7

**VOC Pounds/Gallon:**

**PH:** N/K

**VOC Grams/Liter:**

**Viscosity:**

N/P

**Evaporation Rate & Reference:**

N/K

**Solubility in Water:**

N/K

**Appearance and Odor:**

LIQUID W/BENZENE-LIKE ODOR.

**Percent Volatiles by Volume:**

N/K

**Corrosion Rate:**

N/K

## Reactivity Data

**Stability Indicator:**

YES

**Stability Condition To Avoid:**

N/K

**Materials To Avoid:**

STRONG OXIDIZERS

**Hazardous Decomposition Products:**

N/R

**Hazardous Polymerization Indicator:**

NO

**Conditions To Avoid Polymerization:**

N/K

## Toxicological Information

**Information:**N/P

## MSDS Transport Information

**Information:**N/P

## Regulatory Information

**Sara Title III Information:** N/P

**Federal Regulatory Information:** N/P

**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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## Composition/Information on Ingredient

**Cas:**

96-12-8

**Code:**

M

**RTECS:**

TX8750000

**Code:**

M

**Name:**

1,2-DIBROMO-3-CHLOROPROPANE (DBCP)

**Other REC Limits:**

0.1 MG/CUM NIOSH TWA

**OSHA PEL:**

0.001 PPM CANCER HAZ

**Code:**

M

**OSHA STEL:**

**Code:**

**ACGIH TLV:**

NONE

**Code:**

M

**ACGIH STEL:**

N/P

**Code:**

## Control Measures

**Respiratory Protection:**

WEAR FACE MASK W/ORGANIC VAPOR CANISTER.

**Ventilation:**

ADEQUATE

**Protective Gloves:**

RUBBER

**Eye Protection:**

PROTECTIVE GLASSES

**Other Protective Equipment:**

Equipment N/K

**Work Hygienic Practices:**

REMOVE & WASH CONTAMINATED CLOTHES BEFORE REUSE. WASH HANDS THOROUGHLY AFTER HANDLING.

**Supplemental Safety and Health:**

PRODUCT SHOULD BE HANDLED ONLY BY QUALIFIED PERSONS TRAINED IN LABORATORY PROCEDURES & GOOD SAFETY PRACTICES.

## Health Hazards Data

**LD50LC50 Mixture:**

LD50 ORAL (RAT): 5628 MG/KG METHANOL

**Route Of Entry Inds - Inhalation:**

YES

**Skin:**

NO

**Ingestion:**

YES

**Carcinogenicity Inds - NTP:**

YES

**IARC:**

YES

**OSHA:**

YES

**Health Hazards Acute And Chronic:**

INHALATION: HARMFUL, HEADACHE, NAUSEA & GASTROINTESTINAL DISTURBANCES. INGESTION: FATAL, BLINDNESS.

**Explanation Of Carcinogenicity:**

SEE INGREDIENTS

**Signs And Symptoms Of Overexposure:**

INGESTION: MAY CAUSE CANCER.

**Medical Cond Aggravated By Exposure:**

N/K

**First Aid:**

EYES: FLUSH W/WATER FOR AT LEAST 15 MINS. SKIN: WASH W/LARGE AMOUNTS OF WATER.

INHALATION: REMOVE TO FRESH AIR. IF

BREATHING SS, GIVE ARTIFICIAL RESPIRATION. INGESTION: NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. NEVER

TRY TOMAKE AN UNCONSCIOUS PERSON VOMIT. GIVE 2 TABLESPOONS OF BAKING SODA IN A GLASS OF WATER, PRESS FINGERS BACK

OF TONGUE TO INDUCE VOMIT. OBTAIN MEDICAL ATTENTION.

**Spill Release Procedures:**

TAKE UP W ABSORBENT MATERIAL. VENTILATE AREA. ELIMINATE ALL IGNITION SOURCES.

**Neutralizing Agent:**

N/K

**Waste Disposal Methods:**

DISPOSE OF IN ACCORDANCE W/FEDERAL, STATE & LOCAL REGULATIONS.

**Handling And Storage Precautions:**

STORE IN SEALED CONTAINERS IN COOL, DRY LOCATION. KEEP AWAY FROM OXIDIZERS. KEEP AWAY FROM IGNITION SOURCES.

**Other Precautions:**

AVOID EYE/SKIN CONTACT. AVOID BREATHING VAPORS.

## Fire and Explosion Hazard Information

**Flash Point Method:**

N/P 4

**Flash Point:**

**Flash Point Text:**

50F

**Autoignition Temp:**

**Autoignition Temp Text:**

N/A

**Lower Limits:**

6.0%

**Upper Limits:**

36.5%

**Extinguishing Media:**

CO2, DRY CHEMICAL, ALCOHOL FOAM

**Fire Fighting Procedures:**

WEAR SELF-CONTAINED BREATHING APPARATUS WHEN FIGHTING A CHEMICAL FIRE.

**Unusual Fire/Explosion Hazard:**

THE FOLLOWING TOXIC VAPORS ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.

HYDROCHLORIC ACID, HYDROGEN

BROMIDE.

## Physical/Chemical Properties

**HCC:**

**NRC/State LIC No:**

**Net Prop WT For Ammo:**

**Boiling Point:**

**B.P. Text:**

65C

**Melt/Freeze Pt:**

**M.P/F.P Text:**

-98C

**Decomp Temp:**  
**Decomp Text:**  
N/K  
**Vapor Pres:**  
100  
**Vapor Density:**  
1.15  
**Volatile Org Content %:**  
**Spec Gravity:**  
0.79  
**VOC Pounds/Gallon:**  
**PH:** N/K  
**VOC Grams/Liter:**  
**Viscosity:**  
N/P  
**Evaporation Rate & Reference:**  
(ETHER = 1) >1  
**Solubility in Water:**  
COMPLETE  
**Appearance and Odor:**  
CLEAR COLORLESS LIQUID  
**Percent Volatiles by Volume:**  
100  
**Corrosion Rate:**  
N/K

## Reactivity Data

**Stability Indicator:**  
YES  
**Stability Condition To Avoid:**  
ALL IGNITION SOURCES.  
**Materials To Avoid:**  
OXIDIZING AGENTS, CHROMIC ANHYDRIDE, LEAD PERCHLORATE, PERCHLORIC ACIDS.  
**Hazardous Decomposition Products:**  
HYDROCHLORIC ACID, HYDROGEN BROMIDE  
**Hazardous Polymerization Indicator:**  
NO  
**Conditions To Avoid Polymerization:**  
N/K

## Toxicological Information

**Information:**N/P

## MSDS Transport Information

**Information:**N/P

## Regulatory Information

**Sara Title III Information:** N/P  
**Federal Regulatory Information:** N/P  
**State Regulatory Information:** N/P

## Other Information

**Other Information:**N/P

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## Material Safety Data Sheet

### 1. Product and Company Identification

Catalog Numbers: 2CCF-0  
 Product Name  
 Trade Name: 1,2,3-Trichloropropane  
 Synonyms: Glycerol trichlorohydrin; Trichlorohydrin

#### Manufacturer & Distributor

Company Name: Reagent World, Inc.  
 Address: 2048 E. Francis Street  
 City: Ontario  
 State: California  
 Postal Code: 91761  
 Country: USA

#### Business/Emergency

Phone: 909-947-7779  
 Fax: 909-947-9595  
 URL: <http://www.ReagentWorld.com>

### 2. Hazards Identification

Emergency Overview: Harmful by inhalation, in contact with skin and if swallowed. May cause cancer. May impair fertility.

#### Potential Health Effects

Eye: May cause eye irritation. Causes redness and pain.  
 Skin: Harmful if absorbed through the skin. Causes redness and pain.  
 Ingestion: Harmful if swallowed. May cause severe irritation of the digestive tract. May cause central nervous system effects.  
 Inhalation: Harmful if inhaled. May cause nausea, dizziness, and headache.  
 Chronic: Possible cancer hazard based on tests with laboratory animals. May cause cancer in humans. Repeated exposure may cause damage to the spleen. Chronic exposure may cause lung damage. May impair fertility.

### 3. Composition/Information on Ingredients

Chemical Name: 1,2,3-Trichloropropane  
 Molecular Formula: CH<sub>2</sub>ClCHClCH<sub>2</sub>Cl  
 Molecular Weight: 147.43  
 Content: 99+%  
 CAS Number: 96-18-4  
 EINECS NO. [EC No]: 202-486-1

### 4. First Aid Measures

Eye: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.  
 Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.  
 Ingestion: Get medical aid. Wash mouth out with water.  
 Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

### 5. Fire Fighting Measures

General Information: wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Will burn if involved in a fire. Combustible liquid.  
 Extinguishing: Use water spray, dry chemical, carbon dioxide, or chemical foam.

### 6. Accidental Release Measures

General Information: Use proper personal protective equipment as listed in Section 8.  
 Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container.

### 7. Handling and Storage

Handling: Refer to section 8  
 Storage: 1. Keep in a cool, dry place  
 2. Keep container tightly closed  
 3. Keep away from heat, sparks, and flame

### 8. Exposure Controls/Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash and a safety shower facility.

#### Personal Protective Equipment

Eyes: Wear chemical safety goggles.  
 Skin: Wear appropriate protective gloves.  
 Clothing: Wear appropriate protective clothing.  
 Respirators: Wear NIOSH/MSHA - approved respirator

### 9. Physical and Chemical Properties

Physical State: Clear liquid  
 Color: light yellow  
 Odor: characteristic odor  
 Boiling Point: 150-152

Boiling Point:	152-156
Melting Point :	-14
Vapor Pressure :	-
Specific Gravity :	1.386
PH:	-
Solubility in Water :	2g/l(25degC)
Flash Point:	74degC(165.20degF)
Autoignition Temperature :	304degC(579.20degF)
Decomposition Temperature :	-
<b>10. Stability and Reactivity</b>	
Chemical Stability:	Stable under normal temperatures and pressures.
Conditions to Avoid:	Incompatible materials.
Incompatibilities with Other:	Oxidizing agents, strong bases, aluminum, plastics, metals as powders (e.g. hafnium, raney nickel).
Hazardous Decomposition Products :	Hydrogen chloride, phosgene, carbon monoxide, carbon dioxide.
Polymerization :	Will not occur.
<b>11. Toxicological Information</b>	
RTECS#:	TZ9275000
Toxicity Data[LD50/LC50]:	Draize test, rabbit, eye: 100 uL Moderate; Draize test, rabbit, skin: 500 uL/24H Mild: Inhalation, mouse: LC50 = 3400 mg/m <sup>3</sup> /2H; Oral, mouse: LD50 = 369 mg/kg; Oral, rabbit: LD50 = 380 mg/kg; Oral, rat: LD50 = 108 uL/kg; Skin, rabbit: LD50 = 372 uL/kg.
Carcinogenicity:	1,2,3-Trichloropropane - ACGIH: A3 - Confirmed animal carcinogen with unknown relevance to humans California: carcinogen, initial date 10/1/92 NTP: Suspect carcinogen IARC: Group 2A carcinogen
Other:	See actual entry in RTECS for complete information.
<b>12. Ecological Information</b>	
Ecotoxicity:	Log Pow: 2.3
Other:	-
<b>13. Disposal Considerations</b>	
Disposal considerations:	Contact a licensed professional waste disposal service to dispose of this material in a manner consistent with federal, state and local environmental regulations
<b>14. Transport Information</b>	
Shipping Name:	TOXIC LIQUID, ORGANIC, N.O.S.*
Hazard Class:	6.1
UN Number:	2810
Packing Group:	III
<b>15. Regulatory Information</b>	
European/International Regulations:	-
European Labeling in Accordance with EC Directives	
Hazard Symbols:	1.T 1.Harmful by inhalation. 2.Harmful in contact with skin.
R-Phrases:	3.Harmful if swallowed. 4.May cause cancer. 5.May impair fertility.
S-Phrases:	1.In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). 2.Avoid exposure - obtain special instructions before use.
WGK(Water Danger/Protection):	2
US Federal TSCA:	CAS# 96-18-4 is listed on the TSCA inventory.
<b>16. Other Information</b>	
Other information:	The above information is believed to be accurate but does not suppose to be all inclusive and shall be used only as a guide. Reagent World makes no warranty of merchantability or any other warranty, express or implied, with respect to such information. Users should make their own investigations to determine the accountability of the information for their purposes in particular. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

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# Material Safety Data Sheet

## Tert.-Butylbenzene, 99%

ACC# 23143

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Tert.-Butylbenzene, 99%**Catalog Numbers:** AC107870000, AC107870010, AC107870250, AC107871000, AC107875000**Synonyms:** 2-Methyl-2-phenylpropane; (1,1-Dimethylethyl)benzene**Company Identification:**Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
98-06-6	Tert-Butylbenzene	99	202-632-4

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless clear liquid. Flash Point: 60 deg C.

**Warning! Flammable liquid and vapor.** May cause eye and skin irritation. May cause respiratory and digestive tract irritation. The toxicological properties of this material have not been fully investigated.**Target Organs:** None known.

#### Potential Health Effects

**Eye:** May cause eye irritation. The toxicological properties of this material have not been fully investigated.**Skin:** May cause skin irritation. The toxicological properties of this material have not been fully investigated.**Ingestion:** May cause gastrointestinal irritation with nausea, vomiting and diarrhea. The toxicological properties of this substance have not been fully investigated.**Inhalation:** May cause respiratory tract irritation. The toxicological properties of this substance have not been fully investigated. Vapors may cause dizziness or suffocation.**Chronic:** No information found.

### Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

**Skin:** Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

**Ingestion:** Never give anything by mouth to an unconscious person. Get medical aid immediately. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Will burn if involved in a fire. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. Flammable liquid and vapor. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.

**Extinguishing Media:** For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. Do NOT use straight streams of water.

**Flash Point:** 60 deg C ( 140.00 deg F)

**Autoignition Temperature:** 450 deg C ( 842.00 deg F)

**Explosion Limits, Lower:**0.7

**Upper:** 5.7

**NFPA Rating:** 1 - health, 3 - flammability, 0 - instability

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Use with adequate ventilation. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use adequate ventilation to keep airborne concentrations low. Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels.

#### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Tert-Butylbenzene	none listed	none listed	none listed

**OSHA Vacated PELs:** Tert-Butylbenzene: No OSHA Vacated PELs are listed for this chemical.

#### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use. 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Clear liquid

**Appearance:** clear, colorless

**Odor:** benzene-like

**pH:** Not available.

**Vapor Pressure:** 5.7 mm Hg @ 38C

**Vapor Density:** 4.6

**Evaporation Rate:** Not available.

**Viscosity:** 1.15 mPas 20 deg C

**Boiling Point:** 169 deg C @ 760.00mm Hg

**Freezing/Melting Point:** -58 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:** .8670g/cm<sup>3</sup>

**Molecular Formula:** C<sub>10</sub>H<sub>14</sub>

**Molecular Weight:** 134.22

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Incompatible materials, ignition sources, excess heat, strong oxidants.

**Incompatibilities with Other Materials:** Oxidizing agents.

**Hazardous Decomposition Products:** Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 98-06-6: CY9120000

**LD50/LC50:**

CAS# 98-06-6:

Oral, mouse: LD50 = 8700 mg/kg;

Oral, rat: LD50 = 3045 mg/kg;

Oral, rat: LD50 = 6300 mg/kg;

**Carcinogenicity:**

CAS# 98-06-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.**Teratogenicity:** No information available.**Reproductive Effects:** No information available.**Mutagenicity:** No information available.**Neurotoxicity:** No information available.**Other Studies:**

Section 12 - Ecological Information
-------------------------------------

**Ecotoxicity:** No data available. No information available.**Environmental:** Rapidly volatilizes into the atmosphere.**Physical:** No information available.**Other:** No information available.

Section 13 - Disposal Considerations
--------------------------------------

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.**RCRA U-Series:** None listed.

Section 14 - Transport Information
------------------------------------

	US DOT	Canada TDG
<b>Shipping Name:</b>	BUTYL BENZENES	No information available.
<b>Hazard Class:</b>	3	
<b>UN Number:</b>	UN2709	
<b>Packing Group:</b>	III	

Section 15 - Regulatory Information
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**US FEDERAL****TSCA**

CAS# 98-06-6 is listed on the TSCA inventory.

**Health & Safety Reporting List**

CAS# 98-06-6: Effective 6/1/87, Sunset 12/19/95

**Chemical Test Rules**

None of the chemicals in this product are under a Chemical Test Rule.

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

None of the chemicals in this material have an RQ.

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**SARA Codes**

CAS # 98-06-6: immediate, fire.

**Section 313** No chemicals are reportable under Section 313.

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 98-06-6 can be found on the following state right to know lists: Pennsylvania, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

Not available.

**Risk Phrases:**

R 10 Flammable.

**Safety Phrases:**

S 16 Keep away from sources of ignition - No smoking.

S 33 Take precautionary measures against static discharges.

S 37 Wear suitable gloves.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 9 Keep container in a well-ventilated place.

S 28A After contact with skin, wash immediately with plenty of water

**WGK (Water Danger/Protection)**

CAS# 98-06-6: 1

**Canada - DSL/NDSL**

CAS# 98-06-6 is listed on Canada's DSL List.

**Canada - WHMIS**

not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations

regulations and the MSDS contains all of the information required by these regulations.

## Canadian Ingredient Disclosure List

### Section 16 - Additional Information

**MSDS Creation Date:** 4/14/1998

**Revision #3 Date:** 10/03/2005

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*



# Scott Specialty Gases



Material Safety Data Sheets

**MSDS No: 98-82-8****Date: 03/09/2001**

**SUPPLIER ADDRESS:** 6141 Easton Road, Bldg. 1  
PO Box 310  
Plumsteadville, PA 18949-0310

**EMERGENCY PHONE NUMBER:** (215) 766-8861

## 1. CHEMICAL PRODUCT

PRODUCT NAME: ISOPROPYL BENZENE

SYNONYMS: Cumene, Cumol, 2-phenyl propane

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredient Name	Formula	CAS #	Concentration	ACGIH TLV	Exposure Limits (PPM)		
					OSHA PEL	MAC	Other STEL
ISOPROPYL BENZENE	C9H12	98-82-8	99+%	50	50	50	NE

Note: NE = NONE ESTABLISHED

S/A = SIMPLE ASPHYXIANT

## 3. HAZARD IDENTIFICATION

\* \* \* EMERGENCY OVERVIEW \* \* \*

Flammable liquid and vapor.

Can cause irritation to eyes, skin, and respiratory tract.

Can form explosive mixtures with air.

## POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation , Skin , Ingestion

ACUTE EFFECTS: Irritation to the eyes, mucous membranes, and upper respiratory tract. Can be absorbed through the skin. Possible central nervous system depression. It is an aspiration hazard. This material is narcotic in high concentrations. Symptoms include irritation, dizziness, nausea, lack of coordination and narcosis. Skin contact can cause defatting and dermatitis. Ingestion of the liquid causes gastrointestinal irritation.

CHRONIC EFFECTS: Possible dermatitis from skin contact. Kidney and liver damage.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None known

OTHER EFFECTS OF OVEREXPOSURE: None

CARCINOGENICITY (US ONLY):

NTP - No

IARC MONOGRAPHS - No

OSHA REGULATED - No

**4. FIRST AID MEASURES**

**INHALATION:** Immediately remove victim to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration.

**EYE CONTACT:** Do not allow victim to rub or keep eyes tightly shut. Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes. Consult an ophthalmologist immediately if pain or irritation persist.

**SKIN CONTACT:** Immediately remove contaminated clothing. Rinse the affected area with flooding amounts of water and then wash it with soap and water. For reddened or blistered skin, consult a physician.

**INGESTION:** Never give anything by mouth to an unconscious person. Contact a poison control center. Unless the poison control center advises otherwise, have the conscious and alert person drink 1 to 2 glasses of water to dilute.

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: None

**5. FIRE FIGHTING MEASURES**

**FLASH POINT:** 44 deg. C

**AUTOIGNITION TEMPERATURE:** 424 deg. C

**FLAMMABLE LIMITS:** Vol.% in air

LOWER: .90

UPPER: 6.50

**EXTINGUISHING MEDIA:** Carbon dioxide, foam, or dry chemical. For large fires, use water spray, fog, or regular foam.

**SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT:** Wear self-contained breathing apparatus and full protective clothing. Move cylinders away from fire if this can be done safely. Keep fire exposed cylinders cool with water spray. Withdraw immediately if you hear a rising sound from venting safety device or notice any tank discoloration due to fire.

**HAZARDOUS COMBUSTION PRODUCTS:** Toxic carbon monoxide may be given off during combustion.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Vapors may travel a considerable distance to the source of ignition and flash back. May form explosive mixture in air. Poses an explosion hazard indoors, outdoors, and in sewers. Liquid can float on water and may travel to distant locations and/or spread fire.

**6. ACCIDENTAL RELEASE MEASURES**

**CLEAN UP PROCEDURES:** Evacuate and ventilate area. Shut off source if possible and remove source of heat.

Absorb with sand or vermiculite and place in closed containers for disposal.

SPECIALIZED EQUIPMENT: None

## 7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas. Keep valve protection cap on cylinders when not in use.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentrations below exposure and flammable limits.

EYE / FACE PROTECTION: Goggles. A safety shower and eyewash station should be readily available.

SKIN PROTECTION: Impervious gloves, coveralls, boots, and/or other resistant protective clothing.

RESPIRATORY PROTECTION: Use a self-contained breathing apparatus in case of emergency or non-routine use.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless

ODOR: Gasoline-like

PHYSICAL PRESSURE: Liquid

VAPOR PRESSURE: @20 deg. C: 30 mm Hg

VAPOR DENSITY (AIR=1): 4.1

BOILING POINT (C): 152

SOLUBILITY IN WATER: Insoluble

SPECIFIC GRAVITY (H<sub>2</sub>O=1): @20 deg. C: 0.864

EVAPORATION RATE: N/Av

ODOR THRESHOLD: 0.008-0.132 ppm

**10. STABILITY AND REACTIVITY**

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas. Storage near a heat source.

MATERIALS TO AVOID: Strong oxidizing agents.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: Toxic carbon monoxide.

**11. TOXICOLOGICAL INFORMATION**

LETHAL CONCENTRATION (LC50): 16,000 ppm, Rat 1 hour.

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

**12. ECOLOGICAL INFORMATION**

No adverse ecological effects are expected.

**13. DISPOSAL CONSIDERATIONS**

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place.

**14. TRANSPORT INFORMATION**

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Isopropylbenzene  
HAZARD CLASS: 3 (flammable), Packing group III  
IDENTIFICATION NUMBER: UN1918  
REPORTABLE QUANTITIES: 5,000 lbs  
LABELING: FLAMMABLE LIQUID

ADR / RID (EU Only): 3, 31 (c)

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

### 15. REGULATORY INFORMATION

OSHA: Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA: Material is listed in TSCA inventory.

SARA: The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 202-704-5

NUMBER IN ANNEX 1 OF DIR 67/548: Not listed in annex 1.

EU CLASSIFICATION: N/Av

R: 10-37

S: N/Av

### 16. OTHER INFORMATION

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

DISCLAIMER: Information included in this document is given to the best of our knowledge, however, no warranty is made that the information is accurate or complete. We do not accept any responsibility for damages by the use of the document.



From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

24 Hour Emergency Telephone: 908-859-2151  
CHEMTREC: 1-800-424-9300  
National Response in Canada  
CANUTEC: 613-996-6666  
Outside U.S. And Canada  
Chemtree: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

## ACETOPHENONE

### 1. Product Identification

**Synonyms:** Acetylbenzene; methyl phenyl ketone; 1-phenylethanone

**CAS No.:** 98-86-2

**Molecular Weight:** 120.15

**Chemical Formula:** C<sub>6</sub>H<sub>5</sub>COCH<sub>3</sub>

**Product Codes:** 9012

### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Ethanone, 1-phenyl-	98-86-2	100%	Yes

### 3. Hazards Identification

#### Emergency Overview

**WARNING! CAUSES EYE IRRITATION. MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY AFFECT CENTRAL NERVOUS SYSTEM. COMBUSTIBLE LIQUID AND VAPOR.**

SAF-T-DATA<sup>(tm)</sup> Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate

Flammability Rating: 2 - Moderate

Reactivity Rating: 0 - None

Contact Rating: 3 - Severe

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: Red (Flammable)

#### Potential Health Effects

##### Inhalation:

May cause irritation to the respiratory tract; symptoms may include sore throat, coughing, headache, and dizziness. Higher concentrations may cause narcosis.

##### Ingestion:

May cause sore throat, abdominal pain, nausea, coughing, headache, dizziness, anesthetic effects, and central nervous system effects.

##### Skin Contact:

May cause irritation with redness and pain.

##### Eye Contact:

May cause severe irritation, redness, pain, and transient corneal injury.

##### Chronic Exposure:

Prolonged or repeated skin exposure may cause dermatitis.

##### Aggravation of Pre-existing Conditions:

No information found.

### 4. First Aid Measures

**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Call a physician.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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## 5. Fire Fighting Measures

**Fire:**

Flash point: 77C (171F) CC

Autoignition temperature: 571C (1060F)

Combustible.

**Explosion:**

Above the flash point, explosive vapor-air mixtures may be formed.

**Fire Extinguishing Media:**

Dry chemical, foam, water or carbon dioxide.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

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## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

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## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Isolate from oxidizing materials. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

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## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

-ACGIH Threshold Limit Value (TLV): 10 ppm (TWA)

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, a respirator with an organic vapor cartridge may be worn for up to ten times the exposure limit. Since this compound has been identified as possibly existing in both vapor and particulate phase, a particulate prefilter (NIOSH type N95 or better filter) is recommended. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P particulate filter. For emergencies or instances where the exposure levels are not known, use a positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear protective gloves and clean body-covering clothing.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Pungent, floral odor.

**Solubility:**

Slightly soluble in water.

**Density:**

1.03

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

No information found.

**Boiling Point:**

198 - 204C (388 - 399F)

**Melting Point:**

20.5C (68F)

**Vapor Density (Air=1):**

4.1

**Vapor Pressure (mm Hg):**

0.4 @ 25C (77F)

**Evaporation Rate (BuAc=1):**

No information found.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Strong oxidizers.

**Conditions to Avoid:**

Heat, flame, other sources of ignition.

## 11. Toxicological Information

Oral Rat LD50: 815 mg/kg. Skin Rabbit LD50: 15,900 mg/kg. Irritation data: Skin Rabbit 515 mg, open, mild; Eye Rabbit 771 ug, severe. Investigated as a mutagen.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Ethanone, 1-phenyl- (98-86-2)	No	No	None

## 12. Ecological Information

**Environmental Fate:**

When released into the soil, this material may biodegrade to a moderate extent. When released into the soil, this material may evaporate to a moderate extent. When released into water, this material is expected to readily biodegrade. When released into the water, this material is expected to have a half-life between 1 and 10 days. This material has a log octanol-water partition coefficient of less than 3.0. This material is not expected to significantly bioaccumulate. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition.

**Environmental Toxicity:**

No information found.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

Not regulated.

## 15. Regulatory Information

Ingredient	-----\Chemical Inventory Status - Part 1\-----			
	TSCA	EC	Japan	Australia
Ethanone, 1-phenyl- (98-86-2)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	--Canada--			
	Korea	DSL	NDSL	Phil.
Ethanone, 1-phenyl- (98-86-2)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----				
Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Ethanone, 1-phenyl- (98-86-2)	No	No	Yes	No

-----\Federal, State & International Regulations - Part 2\-----				
Ingredient	-RCRA-		-TSCA-	
	CERCLA	261.33	8 (d)	
Ethanone, 1-phenyl- (98-86-2)	5000	U004	No	

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No  
 SARA 311/312: Acute: Yes Chronic: No Fire: Yes Pressure: No  
 Reactivity: No (Pure / Liquid)

**Australian Hazchem Code:** None allocated.

**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

**16. Other Information**

**NFPA Ratings:** Health: 1 Flammability: 2 Reactivity: 0

**Label Hazard Warning:**

WARNING! CAUSES EYE IRRITATION. MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY AFFECT CENTRAL NERVOUS SYSTEM. COMBUSTIBLE LIQUID AND VAPOR.

**Label Precautions:**

- Avoid breathing vapor.
- Keep container closed.
- Use with adequate ventilation.
- Avoid contact with eyes, skin and clothing.
- Wash thoroughly after handling.
- Keep away from heat and flame.

**Label First Aid:**

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

MSDS Section(s) changed since last revision of document include: 3.

**Disclaimer:**

\*\*\*\*\*  
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**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **N4530** \* \* \* \* \* Effective Date: **05/19/08** \* \* \* \* \* Supersedes: **08/16/05**

<b>MSDS</b>	<b>Material Safety Data Sheet</b>		24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
			National Response in Canada CANUTEC: 613-996-6666
			Outside U.S. and Canada Chemtrec: 703-527-3887
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		 	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.			

# NITROBENZENE

## 1. Product Identification

**Synonyms:** Nitrobenzol; benzene, nitro-; oil of mirbane; essence of mirbane

**CAS No.:** 98-95-3

**Molecular Weight:** 123.11

**Chemical Formula:** C<sub>6</sub>H<sub>5</sub>NO<sub>2</sub>

**Product Codes:**

J.T. Baker: 9325, 9326

Mallinckrodt: 6404, 6410

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Nitrobenzene	98-95-3	99 - 100%	Yes

## 3. Hazards Identification

### Emergency Overview

**DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE METHEMOGLOBINEMIA. AFFECTS, BLOOD, LIVER, KIDNEYS, AND REPRODUCTIVE SYSTEM. CAUSES IRRITATION TO EYES AND SKIN. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. COMBUSTIBLE LIQUID AND VAPOR.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)

Flammability Rating: 2 - Moderate

Reactivity Rating: 2 - Moderate

Contact Rating: 3 - Severe (Life)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

### Potential Health Effects

This material is so dangerous that personnel handling it should be trained to recognize the symptoms of methemoglobinemia.

#### Inhalation:

May be absorbed through inhalation of vapors. Symptoms parallel those following ingestion exposure.

#### Ingestion:

May cause headache, shallow respiration, dizziness, vomiting, weakness, and blood pressure fall. Forms methemoglobin in the blood, reducing oxygen transport and producing cyanosis, and anemia. Convulsions, coma and death may follow. Symptoms may be delayed from 1 to 4 hours, and workers developing fatal cases of methemoglobinemia may not immediately feel sick. Because of bitter almond odor, cyanide poisoning may be suspected, but cyanide acts much faster. Poisoning closely resembles that due to aniline. Estimated lethal dose 1 to 5 grams.

#### Skin Contact:

May be irritating and sensitizing to the skin. May be rapidly absorbed through the skin, with symptoms paralleling those following ingestion exposure.

#### Eye Contact:

Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.

**Chronic Exposure:**

Repeated or prolonged exposure through any route may cause damage to the central nervous system, liver, spleen, kidneys, and bone marrow. May also cause weight loss, anemia, jaundice, hemolysis, weakness, and irritability. A two year study titled "A Chronic Inhalation Toxicity Study of Nitrobenzene in B6CF1 Mice, Fischer 344 Rats and Sprague-Dawley Rats", was released by the Chemical Industry Institute of Toxicology (CIIT). The report indicates that Nitrobenzene has weak carcinogenic activity in rodents after chronic inhalation exposure and may express carcinogenic activity in humans. Based upon the result of this animal testing, Nitrobenzene should be handled as a potential carcinogen.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin or blood disorders or impaired liver, kidney, or cardiovascular function may be more susceptible to the effects of this substance. The influence of ethyl alcohol may aggravate the toxic effects of nitrobenzene.

---

## 4. First Aid Measures

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do not give mouth to mouth resuscitation. CALL A PHYSICIAN IMMEDIATELY.

**Ingestion:**

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician immediately.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician immediately. Thorough cleansing of the entire contaminated area of the body including scalp and nails is of the utmost importance.

**Eye Contact:**

Immediately flush eyes with gentle but large stream of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Call a physician immediately.

**Note to Physician:**

Consider methylene blue as an antidote.

---

## 5. Fire Fighting Measures

**Fire:**

Flash point: 88C (190F) CC

Autoignition temperature: 482C (900F)

Flammable limits in air % by volume:

l: 1.8

(l: 1 @ 93C )

**Explosion:**

Above the flash point, explosive vapor-air mixtures may be formed. Contact with strong oxidizers may cause fire. Vapors can flow along surfaces to distant ignition source and flash back. Forms explosive mixtures with aluminum chloride, aniline plus glycerine, nitric acid, nitrogen tetroxide, aromatic nitrogen compounds, urea perchlorate, sodium hydroxide, sulfuric acid, potassium, potassium/sodium alloys, and silver perchlorate.

**Fire Extinguishing Media:**

Water spray, dry chemical, alcohol foam, or carbon dioxide. Use water spray to blanket fire, cool fire exposed containers, and to flush non-ignited spills or vapors away from fire.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

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## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

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## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Separate from incompatibilities. Workers must carefully follow good hygienic practices, including no eating, drinking, or smoking in workplace. Proper use and maintenance of protective equipment is essential. Workers using this substance need preplacement and annual medical exams. Special training should be given to workers. Wash hands, face, forearms and neck when exiting restricted areas. Shower, dispose of outer clothing, change to clean garments at the end of the day. Avoid cross-contamination of street clothes. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

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## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**

Nitrobenzene:

-OSHA Permissible Exposure Limit (PEL): 1 ppm (TWA) skin

-ACGIH Threshold Limit Value (TLV): 1 ppm (TWA) skin, A3- Confirmed Animal Carcinogen with Unknown Relevance to Humans.

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded, a half-face organic vapor respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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## 9. Physical and Chemical Properties

**Appearance:**

Pale yellow to brown, oily liquid.

**Odor:**

Almond odor.

**Solubility:**

Practically insoluble in water.

**Specific Gravity:**

1.20 @ 20C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

No information found.

**Boiling Point:**

211C (412F)

**Melting Point:**

5.7C (43F)

**Vapor Density (Air=1):**

4.3

**Vapor Pressure (mm Hg):**

1.0 @ 44.4C (111F)

**Evaporation Rate (BuAc=1):**

No information found.

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## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage. Due to low electric conductivity, the substance can generate electrostatic charges as a result of flow, agitation, etc.

**Hazardous Decomposition Products:**

Burning may produce carbon monoxide, carbon dioxide, nitrogen oxides.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Reducing agents, oxidizing agents, aluminum chloride, aniline plus glycerine, nitric acid, nitrogen tetroxide, silver perchlorate, potassium, potassium/sodium alloys, aromatic nitrogen compounds, sodium hydroxide, sulfuric acid, tin, and zinc.

**Conditions to Avoid:**

Heat, flame, ignition sources, freezing, incompatibles

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## 11. Toxicological Information

**Toxicological Data:**

Oral rat LD50: 349 mg/kg; skin rat LD50: 2100 mg/kg; Inhalation rat LC50: 556 ppm/4H; investigated as a mutagen, reproductive effector.

**Reproductive Toxicity:**

In laboratory animals, this compound has caused both birth defects and damage to the reproductive system.

**Carcinogenicity:**

A two year study titled "A Chronic Inhalation Toxicity Study of Nitrobenzene in B6CF1 Mice, Fischer 344 Rats and Sprague-Dawley Rats", was released by the Chemical Industry Institute of Toxicology (CIIT). The report indicates that Nitrobenzene has weak carcinogenic activity in rodents after chronic inhalation exposure and may express carcinogenic activity in humans. Based upon the result of this animal testing, Nitrobenzene should be handled as a potential carcinogen.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Nitrobenzene (98-95-3)	No	No	2B

## 12. Ecological Information

### Environmental Fate:

When released into the soil, this material may leach into groundwater. When released into water, this material may evaporate to a moderate extent. When released into water, this material is expected to readily biodegrade. When released into the water, this material is expected to have a half-life between 1 and 10 days. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by photolysis. When released into the air, this material is expected to have a half-life of less than 1 day.

### Environmental Toxicity:

The EC50/48-hour values for daphnia are between 10 and 100 mg/l. The LC50/96-hour values for fish are over 100 mg/l. This material may be toxic to aquatic life.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

### Domestic (Land, D.O.T.)

**Proper Shipping Name:** NITROBENZENE

**Hazard Class:** 6.1

**UN/NA:** UN1662

**Packing Group:** II

**Information reported for product/size:** 4L

### International (Water, I.M.O.)

**Proper Shipping Name:** NITROBENZENE

**Hazard Class:** 6.1

**UN/NA:** UN1662

**Packing Group:** II

**Information reported for product/size:** 4L

### International (Air, I.C.A.O.)

**Proper Shipping Name:** NITROBENZENE

**Hazard Class:** 6.1

**UN/NA:** UN1662

**Packing Group:** II

**Information reported for product/size:** 4L

## 15. Regulatory Information

Ingredient	TSCA	EC	Japan	Australia
Nitrobenzene (98-95-3)	Yes	Yes	Yes	Yes

Ingredient	--Canada--			
	Korea	DSL	NDSL	Phil.
Nitrobenzene (98-95-3)	Yes	Yes	No	Yes

Ingredient	-SARA 302-		-SARA 313-	
	RQ	TPQ	List	Chemical Catg.
Nitrobenzene (98-95-3)	1000	10000	Yes	No

Ingredient	-RCRA-		-TSCA-
	CERCLA	261.33	8(d)
Nitrobenzene (98-95-3)	1000	U169	No

Chemical Weapons Convention: No    TSCA 12(b): No    CDTA: No

SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No  
Reactivity: No (Pure / Liquid)

**WARNING:**

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

**Australian Hazchem Code:** 2X

**Poison Schedule:** S6

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

**16. Other Information**

**NFPA Ratings:** Health: 3 Flammability: 2 Reactivity: 1

**Label Hazard Warning:**

DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE METHEMOGLOBINEMIA. AFFECTS, BLOOD, LIVER, KIDNEYS, AND REPRODUCTIVE SYSTEM. CAUSES IRRITATION TO EYES AND SKIN. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. COMBUSTIBLE LIQUID AND VAPOR.

**Label Precautions:**

- Do not breathe vapor.
- Do not get in eyes, on skin, or on clothing.
- Keep container closed.
- Use only with adequate ventilation.
- Wash thoroughly after handling.
- Keep away from heat and flame.

**Label First Aid:**

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. IF INHALED, remove to fresh air. If not breathing, give artificial respiration. DO NOT GIVE MOUTH-TO-MOUTH RESUSCITATION. If breathing is difficult, give oxygen. Keep patient warm and at rest. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician immediately.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

No Changes.

**Disclaimer:**

\*\*\*\*\*

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**Prepared by:** Environmental Health & Safety  
Phone Number: (314) 654-1600 (U.S.A.)

# Material Safety Data Sheet

## 3-Nitroaniline, 98%

ACC# 10194

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** 3-Nitroaniline, 98%**Catalog Numbers:** AC128360000, AC128360050, AC128361000, AC128365000**Synonyms:** m-Nitroaniline; 3-Nitrobenzenamine; 3-Nitrophenylamine.**Company Identification:**Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
99-09-2	3-Nitroaniline	98	202-729-1

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: yellow.

**Caution!** Possible risks of irreversible effects. Methemoglobin former - can cause cyanosis. May cause eye and skin irritation. May cause respiratory and digestive tract irritation. May be harmful if swallowed. This substance has caused adverse reproductive and fetal effects in animals.**Target Organs:** Blood, kidneys, liver, blood forming organs.

#### Potential Health Effects

**Eye:** May cause eye irritation. Vapors may cause eye irritation. May cause eye injury.**Skin:** May cause skin irritation. Substance is rapidly absorbed through the skin. If absorbed, may cause symptoms similar to those for ingestion.**Ingestion:** May cause methemoglobinemia, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), convulsions, and death. Effects may be delayed 2 to 4 hours.

Methemoglobinemia is characterized by dizziness, drowsiness, headache, shortness of breath, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), rapid heart rate and chocolate-brown colored blood. May be harmful if swallowed. Alcohol can intensify effects.

**Inhalation:** May cause respiratory tract irritation. May cause effects similar to those described for ingestion. Inhalation of aniline causes anoxia due to the formation of methemoglobin.**Chronic:** May cause liver and kidney damage. May cause bone marrow abnormalities with damage to blood forming tissues. May cause anemia and other blood cell abnormalities. Repeated exposure may cause central nervous system damage. Adverse reproductive effects have been reported in animals.

### Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

**Skin:** Get medical aid immediately. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

**Ingestion:** Call a poison control center. If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

**Notes to Physician:** Absorption of this product into the body may cause cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood). Moderate degrees of cyanosis need to be treated only by supportive measures: bed rest and oxygen inhalation. For methemoglobinemia, administer oxygen alone or with Methylene Blue depending on the methemoglobin concentration in the blood. Cleansing of the entire contaminated area of the body is of utmost importance.

**Antidote:** Methylene blue, alone or in combination with oxygen is indicated as a treatment in nitrite induced methemoglobinemia.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. May decompose explosively when heated or involved in a fire.

**Extinguishing Media:** In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam. Use agent most appropriate to extinguish fire.

**Flash Point:** Not applicable.

**Autoignition Temperature:** 521 deg C ( 969.80 deg F)

**Explosion Limits, Lower:**Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 3; Flammability: 1; Instability: 2

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Avoid generating dusty conditions. Remove all sources of ignition. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Keep container tightly closed. Do not get on skin or in eyes. Do not ingest or inhale.

**Storage:** Keep away from sources of ignition. Store in a cool, dry, well-ventilated area away from incompatible substances.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
3-Nitroaniline	none listed	none listed	none listed

**OSHA Vacated PELs:** 3-Nitroaniline: No OSHA Vacated PELs are listed for this chemical.

### Personal Protective Equipment

**Eyes:** 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:** Wear appropriate gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Solid

**Appearance:** yellow

**Odor:** Not available.

**pH:** Not available.

**Vapor Pressure:** Not available.

**Vapor Density:** 4.8

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 306 deg C

**Freezing/Melting Point:** 114 deg C

**Decomposition Temperature:** > 396 deg C

**Solubility:** Insoluble in water.

**Specific Gravity/Density:** Not available.

**Molecular Formula:** NO<sub>2</sub>C<sub>6</sub>H<sub>4</sub>NH<sub>2</sub>

**Molecular Weight:** 138.0542

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable. However, may decompose if heated.

**Conditions to Avoid:** High temperatures, ignition sources, dust generation, excess heat.

**Incompatibilities with Other Materials:** Strong acids, strong oxidizing agents, strong reducing agents.

**Hazardous Decomposition Products:** Nitrogen oxides, carbon monoxide, irritating and toxic fumes and gases, carbon dioxide, nitrogen.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:****CAS#** 99-09-2: BY6825000**LD50/LC50:**

CAS# 99-09-2:

Oral, mouse: LD50 = 308 mg/kg;

Oral, rat: LD50 = 535 mg/kg;

**Carcinogenicity:**

CAS# 99-09-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** Animal studies have demonstrated fetotoxicity (growth retardation) and teratogenicity (exencephaly, angulated ribs, dilated brain ventricles).**Teratogenicity:** No information available.**Reproductive Effects:** No information available.**Mutagenicity:** No information available.**Neurotoxicity:** No information available.**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. No information available.**Environmental:** No information available.**Physical:** No information available.**Other:** None.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	NITROANILINES	NITROANILINE
<b>Hazard Class:</b>	6.1	6.1
<b>UN Number:</b>	UN1661	UN1661
<b>Packing Group:</b>	II	II

## Section 15 - Regulatory Information

**US FEDERAL**

**TSCA**

CAS# 99-09-2 is listed on the TSCA inventory.

**Health & Safety Reporting List**

None of the chemicals are on the Health & Safety Reporting List.

**Chemical Test Rules**

None of the chemicals in this product are under a Chemical Test Rule.

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

None of the chemicals in this material have an RQ.

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**SARA Codes**

CAS # 99-09-2: immediate, delayed, reactive.

**Section 313** No chemicals are reportable under Section 313.

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 99-09-2 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

T

**Risk Phrases:**

R 23/24/25 Toxic by inhalation, in contact with skin and if swallowed.

R 33 Danger of cumulative effects.

R 52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Safety Phrases:**

S 28 After contact with skin, wash immediately with...

S 36/37 Wear suitable protective clothing and gloves.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 28B After contact with skin, wash immediately with plenty of water and soap.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 99-09-2: 2

**Canada - DSL/NDSL**

CAS# 99-09-2 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D1A, D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 99-09-2 is listed on the Canadian Ingredient Disclosure List.

## Section 16 - Additional Information

**MSDS Creation Date:** 11/05/1998

**Revision #4 Date:** 10/03/2005

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

# Material Safety Data Sheet

## p-Cymene, 98%

ACC# 95901

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** p-Cymene, 98%**Catalog Numbers:** AC111760000, AC111760010, AC111760025, AC111762500**Synonyms:** Dolcymene; p-isopropyltoluene; isopropyl methylbenzene**Company Identification:**Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
99-87-6	P-CYMENE	98	202-796-7

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: 47 deg C.

**Warning! Flammable liquid and vapor.** Causes eye, skin, and respiratory tract irritation. May be absorbed through intact skin. Aspiration hazard if swallowed. Can enter lungs and cause damage. May cause central nervous system effects.**Target Organs:** Central nervous system.

#### Potential Health Effects

**Eye:** May cause eye irritation.**Skin:** Causes skin irritation. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis. May be absorbed through the skin.**Ingestion:** May cause irritation of the digestive tract. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.**Inhalation:** Causes respiratory tract irritation. May cause narcotic effects in high concentration. May cause drowsiness, unconsciousness, and central nervous system depression.**Chronic:** Chronic inhalation may cause effects similar to those of acute inhalation. Prolonged or repeated skin contact may cause defatting and dermatitis.

### Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.

**Ingestion:** Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Possible aspiration hazard. Get medical aid immediately.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors can travel to a source of ignition and flash back. Containers may explode in the heat of a fire. Flammable liquid and vapor.

**Extinguishing Media:** Use water spray to cool fire-exposed containers. Water may be ineffective. Use water spray, dry chemical, carbon dioxide, or chemical foam.

**Flash Point:** 47 deg C ( 116.60 deg F)

**Autoignition Temperature:** 435 deg C ( 815.00 deg F)

**Explosion Limits, Lower:**.70 vol %

**Upper:** 5.60 vol %

**NFPA Rating:** 1 - health, 2 - flammability, 0 - instability

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Use with adequate ventilation. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use adequate ventilation to keep airborne concentrations low.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
P-CYMENE	none listed	none listed	none listed

**OSHA Vacated PELs:** P-CYMENE: No OSHA Vacated PELs are listed for this chemical.

**Personal Protective Equipment**

**Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** 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.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless

**Odor:** Lemon-type

**pH:** Not available.

**Vapor Pressure:** 1 mm Hg @17.3C

**Vapor Density:** 4.62 (air=1)

**Evaporation Rate:**Not available.

**Viscosity:** Not available.

**Boiling Point:** 176 - 178 deg C @ 760.00mm Hg

**Freezing/Melting Point:**-68 deg C

**Decomposition Temperature:**Not available.

**Solubility:** practically insoluble in water

**Specific Gravity/Density:**.8600g/cm<sup>3</sup>

**Molecular Formula:**C<sub>10</sub>H<sub>14</sub>

**Molecular Weight:**134.22

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Incompatible materials, ignition sources, excess heat.

**Incompatibilities with Other Materials:** Strong oxidizing agents

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS# 99-87-6:** GZ5950000

**LD50/LC50:**

**CAS# 99-87-6:**

Draize test, rabbit, skin: 500 mg/24H Moderate;

Inhalation, mouse: LC50 = 19500 mg/m<sup>3</sup>;

Oral, mouse: LD50 = 1695 mg/kg;

Oral, rat: LD50 = 4750 mg/kg;

Oral, rat: LD50 = 3669 mg/kg;

**Carcinogenicity:**

**CAS# 99-87-6:** Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.

**Teratogenicity:** No information available.

**Reproductive Effects:** No information available.

**Mutagenicity:** Genotoxicity: see The Dictionary of Substances and their Effects, 1992

**Neurotoxicity:** No information available.

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. Bioaccumulation: Readily biodegradable Abiotic removal: Evaporation rate relative to n-butyl-acetate which has been assigned a value of 1 at 25°C is 0.14 (The Dictionary of Substances and their Effects, 1992)

**Environmental:** No information available.

**Physical:** No information available.

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	CYMENES	No information available.
<b>Hazard Class:</b>	3	
<b>UN Number:</b>	UN2046	
<b>Packing Group:</b>	III	

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 99-87-6 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

None of the chemicals in this material have an RQ.

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**SARA Codes**

CAS # 99-87-6: immediate, fire.

**Section 313** No chemicals are reportable under Section 313.

**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 99-87-6 can be found on the following state right to know lists: Pennsylvania, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XI F

**Risk Phrases:**

R 10 Flammable.

R 37/38 Irritating to respiratory system and skin.

**Safety Phrases:**

S 16 Keep away from sources of ignition - No smoking.

**WGK (Water Danger/Protection)**

CAS# 99-87-6: No information available.

**Canada - DSL/NDSL**

CAS# 99-87-6 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B3, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 99-87-6 is listed on the Canadian Ingredient Disclosure List.

## Section 16 - Additional Information

**MSDS Creation Date:** 9/02/1997

**Revision #4 Date:** 11/20/2008

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the*

any special, indirect, incidental, consequential or exemplary damages, however arising, even if you have been advised of the possibility of such damages.

**Appendix C.**  
**Geophysical Investigation Report**



## **GEOPHYSICAL INVESTIGATION REPORT**

PERFORMED AT:

**583 Franklin Ave.  
Brooklyn, NY 11238**

PREPARED FOR:

**Christine Chen  
Airtek Environmental Corporation  
39-37 29th St.  
Long Island City, NY 11101**

PREPARED BY:

**Shan Wei  
Senior Geophysicist  
Enviroprobe Service, Inc.  
908 N. Lenola Rd.  
Moorestown, NJ 08057  
Phone: (856) 858-8584  
Toll Free: (800) 596-7472**

**July 10, 2014**

## 1.0 INTRODUCTION

Enviroprobe Service, Inc. (Enviroprobe) is an environmental investigation services firm which provides monitoring well installation (HSA), Geoprobe (DPT) drilling services and Environmental & Engineering Geophysics (EEG) services to the environmental consulting and engineering community.

Enviroprobe conducted a subsurface geophysical investigation at the subject property within client-specified areas of concern. Due to conditions and objectives, the investigation utilized a Geophysical Survey Systems, Inc (GSSI) SIR-3000 cart-mounted ground penetrating radar (GPR) unit with a 270 MHz antenna, a Radiodetection receiver, a Radiodetection transmitter and a Geonics EM61 metal detector.

GPR is a geophysical method that has been developed over the past thirty years for shallow, high-resolution, subsurface investigations of the earth. GPR uses high frequency pulsed electromagnetic waves (generally 10 MHz to 2,000 MHz) to acquire subsurface information. An EM wave is propagated downward into the ground by a transmitting antenna. Where abrupt changes in electrical properties occur in the subsurface, a portion of the energy is reflected back to the surface. This reflected wave is detected by a receiver antenna and transmitted to a control unit for real time processing and display. The penetration depth of the GPR unit varies from several inches to tens of feet according to site-specific conditions. The penetration depth decreases with increased soil conductivity. The penetration depth is the greatest in ice, dry sands, and fine gravels. Clayey, highly saline or saturated soils, areas covered by concrete, foundry slag, or other highly conductive materials greatly reduce GPR penetration. GPR is a method commonly used for environmental, engineering, archaeological, and other shallow investigations.

The Radiodetection (RD) transmitter and receiver are commonly used for pipe and cable locating. The multi-frequency transmitter can be directly connected, clamped, or used to induce a signal in a target line while the multi-frequency receiver is used to measure the signal from energized lines.

The EM61 is a time-domain metal detector which detects both ferrous and non-ferrous metals. A transmitter generates a pulsed primary magnetic field in the earth, which induces eddy currents in nearby metallic objects. The eddy current decay produces a secondary magnetic field measured by the receiver coil. By taking the measurement after the start of the current decay, the current induced in the ground has fully dissipated and only the current in the metal is still producing a secondary field. The responses are recorded and displayed by an integrated data logger.

## 2.0 SCOPE OF WORK

On July 8, 2014, a geophysicist from Enviroprobe Service Inc. was mobilized to the subject property to perform a geophysical investigation. The purpose of the investigation was to designate underground conduits/utilities and investigate proposed

drilling locations within client-specified areas of the property. The survey area included all accessible areas of the subject property (Figure 1). The ground surface of the survey area consisted of natural soil surfaces.

### **3.0 SURVEY RESULTS**

The utility survey was conducted using a cart-mounted GPR unit and a RD unit. The RD unit was used to trace common utilities from sources in and around the survey area. The RD receiver was also used in the passive mode to search for live underground electrical power cables and other utilities emitting 60Hz electromagnetic signals. The GPR survey was also performed in a grid pattern in at least two orthogonal directions to search for evident and non-evident underground utilities. No underground utilities were detected.

A EM61 survey was conducted. It was found that there were underground metallic objects throughout the survey area. They were suspected as scrap metal, reinforced concrete and debris, etc.

### **4.0 LIMITATIONS**

Due to surface conditions and subsurface content, the GPR penetration depth was estimated as about 3 feet in the majority of the survey area.

The EM61 survey was kept up to 6 feet away from aboveground objects containing metals depending on the sizes, shapes and positions of the metal objects. The EM61 survey was not effective in areas with reinforced concrete.

Due to the dielectric properties of the subsurface, plastic polymer and fiberglass utilities may not have been detected.

The underground utility survey was conducted in compliance with the industry standard of care guidelines found in ASCE 38-02 (Level B).

### **5.0 WARRANTIES**

The field observations and measurements reported herein are considered sufficient in detail and scope for this project. Enviroprobe Service, Inc. warrants that the findings and conclusions contained herein have been promulgated in accordance with generally accepted environmental engineering 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.

Enviroprobe represents that the services were performed in a manner consistent

with that level of care and skill ordinarily exercised by environmental 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.

Enviroprobe Service, Inc. believes that the information provided in this report is reliable. However, Enviroprobe 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 and/or drilling around underground structures and utilities since GPR data can only be used for estimation purposes and GPR data is subject to misinterpretation. Enviroprobe can not guarantee that utilities, post-tension cables, and/or rebar will not be incurred during drilling, cutting, coring, or excavating activities.

This report was prepared pursuant to the contract Enviroprobe has with the Client. That contractual relationship included an exchange of information about the property that was unique and between Enviroprobe and its client and serves as the basis upon which this report was prepared. Because of the importance of the communication between Enviroprobe 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 Enviroprobe.

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 Enviroprobe 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.



FIG.1. The survey area.

**Appendix D.**  
**Soil Boring Geologic Logs**





<b>Enviroprobe Service, Inc.</b> Project: 583 Franklin Avenue Location: Brooklyn, NY	<h1>SOIL BORING LOG</h1>	Boring # <u>SB-3</u>
	Airtek Environmental Corp	Job # 14-0526 Sheet <u>3</u> of <u>3</u>

Ground Water Data			
First Encountered			
Depth	Hour	Date	El. T
N/A			

Method of Advancing Boring		
DPT	From: Surface	To: 14'
	From	To

Driller: Brandon Carpenter
Helper:
Inspector:
Date Started: 7/8/14
Date Completed: 7/8/14

Depth	A	B	C	DESCRIPTION	REMARKS
0-2'				Urban fill material.	Soil samples S-3s at 0-2'; S-3d at 2'-4'; S-4 at 2'-4'.  Three attempts, each hit refusal at approx. 14' bgs.  Groundwater was not encountered.  Location of SB- 3: Approx. 8' from north border and 20' from east border.  VOCs detected with PID:  0-5: 2.5 ppm 5'-10': 0 ppm
3'-5'				Light brown medium to fine sand.	
5'-10'				Light brown medium to fine sand, trace of concrete fragments.	
10'-14'				Light brown medium to fine sand, trace of gravel.	

Notes: Notes: Drilling method - direct-push Geoprobe unit, 6620DT 1" PVC screen and 1" PVC casing	DRN. _____ CKD. <u>Christine Chen</u>
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**Appendix E.**  
**Soil Vapor Sampling Logs**

## Soil Vapor Sampling Log

Site Location: 583 Franklin Avenue, Brooklyn, NY

Sampler Name: Danaila Paspalanova

Soil Vapor Implant Location:

SV-1: Approx. 3 feet from south border and 15 feet from west border.

SV-2: Approx. 6 feet from north border and 30 feet from west border.

Weather Condition: Low 80 °F - High 80 °F, Sunny/Partial Cloudy. Humidity Low 60% to High 40%.

Sample ID	Date	Start Time	Stop Time	Sampling Depth	Sampling Method	Sampling Device	Moisture Content	Canister Pressure in Field ("Hg) Start	Canister Pressure in Field ("Hg) Stop
SG-1	7/8/2014	10:15	12:35	9'	TO-15	Summa Canister	Dry	-30.34	-12.5
SG-2	7/8/2014	10:08	12:40	9'	TO-15	Summa Canister	Dry	-30.9	-9.71

## **Appendix F.**

### **Laboratory Data Deliverable for Soil Analytical Data**



## ANALYTICAL REPORT

Lab Number:	L1415006
Client:	Airtek Environmental Corp. 39-37 29th Street Long Island City, NY 11101
ATTN:	Christine Chen
Phone:	(718) 937-3720
Project Name:	VACANT LOT
Project Number:	14-0526
Report Date:	07/16/14

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAO00065), ME (MA00086), PA (68-03671), USDA (Permit #P-330-11-00240), NC (666), TX (T104704476), DOD (L2217), US Army Corps of Engineers.

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Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

<b>Alpha Sample ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Sample Location</b>	<b>Collection Date/Time</b>	<b>Receive Date</b>
L1415006-01	S-1S	SOIL	583 FRANKLIN AVENUE, BROOKLYN	07/08/14 11:10	07/08/14
L1415006-02	S-1D	SOIL	583 FRANKLIN AVENUE, BROOKLYN	07/08/14 11:15	07/08/14
L1415006-03	S-2S	SOIL	583 FRANKLIN AVENUE, BROOKLYN	07/08/14 11:30	07/08/14
L1415006-04	S-2D	SOIL	583 FRANKLIN AVENUE, BROOKLYN	07/08/14 11:35	07/08/14
L1415006-05	S-3S	SOIL	583 FRANKLIN AVENUE, BROOKLYN	07/08/14 12:20	07/08/14
L1415006-06	S-3D	SOIL	583 FRANKLIN AVENUE, BROOKLYN	07/08/14 12:25	07/08/14
L1415006-07	S-4	SOIL	583 FRANKLIN AVENUE, BROOKLYN	07/08/14 12:30	07/08/14
L1415006-08	TRIP BLANK	WATER	583 FRANKLIN AVENUE, BROOKLYN	07/08/14 00:00	07/08/14

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. Performance criteria for CAM and RCP methods allow for some LCS compound failures to occur and still be within method compliance. In these instances, the specific failures are not narrated but are noted in the associated QC table. This information is also incorporated in the Data Usability format for our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

#### HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

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**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

### Case Narrative (continued)

#### Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

#### Volatile Organics

L1415006-08: The Trip Blank has a result for acetone present and was re-analyzed on dilution in order to quantitate it within the calibration range. The re-analysis on dilution was performed from the original compromised vial. A second re-analysis was performed undiluted from an uncompromised vial and confirmed the presence of this compound. The results of the original and re-analysis on dilution are reported.

#### Semivolatile Organics

L1415006-03 has elevated detection limits due to the dilution required by the matrix interferences encountered during the concentration of the sample and the analytical dilution required by the sample matrix.

#### Pesticides

L1415006-01 and -02 have elevated detection limits due to the dilutions required by the sample matrices. L1415006-01: The surrogate recoveries are below the acceptance criteria for 2,4,5,6-tetrachloro-m-xylene and decachlorobiphenyl (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

#### Metals

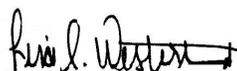
L1415006-01 through -07 have elevated detection limits for all elements, with the exception of mercury, due to the dilutions required by matrix interferences encountered during analysis.

L1415006-04 has elevated detection limits for beryllium due to the dilution required by non-target analyte spectral interferences encountered during analysis.

The WG704553-4 MS recovery, performed on L1415006-01, is outside the acceptance criteria for mercury (144%). A post digestion spike was performed and was within acceptance criteria.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Lisa Westerlind

Title: Technical Director/Representative

Date: 07/16/14

# ORGANICS

# VOLATILES

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-01  
**Client ID:** S-1S  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8260C  
**Analytical Date:** 07/10/14 10:39  
**Analyst:** BN  
**Percent Solids:** 86%

**Date Collected:** 07/08/14 11:10  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
Methylene chloride	8.9	J	ug/kg	15	1.6	1
1,1-Dichloroethane	ND		ug/kg	2.2	0.12	1
Chloroform	ND		ug/kg	2.2	0.54	1
Carbon tetrachloride	ND		ug/kg	1.5	0.31	1
1,2-Dichloropropane	ND		ug/kg	5.1	0.33	1
Dibromochloromethane	ND		ug/kg	1.5	0.45	1
1,1,2-Trichloroethane	ND		ug/kg	2.2	0.44	1
Tetrachloroethene	ND		ug/kg	1.5	0.20	1
Chlorobenzene	ND		ug/kg	1.5	0.51	1
Trichlorofluoromethane	ND		ug/kg	7.3	0.57	1
1,2-Dichloroethane	ND		ug/kg	1.5	0.16	1
1,1,1-Trichloroethane	ND		ug/kg	1.5	0.16	1
Bromodichloromethane	ND		ug/kg	1.5	0.25	1
trans-1,3-Dichloropropene	ND		ug/kg	1.5	0.18	1
cis-1,3-Dichloropropene	ND		ug/kg	1.5	0.17	1
1,3-Dichloropropene, Total	ND		ug/kg	1.5	0.17	1
1,1-Dichloropropene	ND		ug/kg	7.3	0.21	1
Bromoform	ND		ug/kg	5.8	0.34	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.5	0.15	1
Benzene	ND		ug/kg	1.5	0.17	1
Toluene	ND		ug/kg	2.2	0.28	1
Ethylbenzene	ND		ug/kg	1.5	0.19	1
Chloromethane	ND		ug/kg	7.3	0.43	1
Bromomethane	ND		ug/kg	2.9	0.49	1
Vinyl chloride	ND		ug/kg	2.9	0.17	1
Chloroethane	ND		ug/kg	2.9	0.46	1
1,1-Dichloroethene	ND		ug/kg	1.5	0.38	1
trans-1,2-Dichloroethene	ND		ug/kg	2.2	0.31	1
Trichloroethene	ND		ug/kg	1.5	0.18	1
1,2-Dichlorobenzene	ND		ug/kg	7.3	0.22	1

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-01

Date Collected: 07/08/14 11:10

Client ID: S-1S

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
1,3-Dichlorobenzene	ND		ug/kg	7.3	0.20	1
1,4-Dichlorobenzene	ND		ug/kg	7.3	0.20	1
Methyl tert butyl ether	ND		ug/kg	2.9	0.12	1
p/m-Xylene	ND		ug/kg	2.9	0.29	1
o-Xylene	ND		ug/kg	2.9	0.25	1
Xylene (Total)	ND		ug/kg	2.9	0.25	1
cis-1,2-Dichloroethene	ND		ug/kg	1.5	0.21	1
1,2-Dichloroethene (total)	ND		ug/kg	1.5	0.21	1
Dibromomethane	ND		ug/kg	15	0.24	1
Styrene	ND		ug/kg	2.9	0.45	1
Dichlorodifluoromethane	ND		ug/kg	15	0.28	1
Acetone	3.7	J	ug/kg	15	1.5	1
Carbon disulfide	ND		ug/kg	15	1.6	1
2-Butanone	ND		ug/kg	15	0.40	1
Vinyl acetate	ND		ug/kg	15	0.19	1
4-Methyl-2-pentanone	ND		ug/kg	15	0.36	1
1,2,3-Trichloropropane	ND		ug/kg	15	0.24	1
2-Hexanone	ND		ug/kg	15	0.97	1
Bromochloromethane	ND		ug/kg	7.3	0.40	1
2,2-Dichloropropane	ND		ug/kg	7.3	0.33	1
1,2-Dibromoethane	ND		ug/kg	5.8	0.25	1
1,3-Dichloropropane	ND		ug/kg	7.3	0.21	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	1.5	0.46	1
Bromobenzene	ND		ug/kg	7.3	0.30	1
n-Butylbenzene	ND		ug/kg	1.5	0.17	1
sec-Butylbenzene	ND		ug/kg	1.5	0.18	1
tert-Butylbenzene	ND		ug/kg	7.3	0.20	1
o-Chlorotoluene	ND		ug/kg	7.3	0.23	1
p-Chlorotoluene	ND		ug/kg	7.3	0.22	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	7.3	0.58	1
Hexachlorobutadiene	ND		ug/kg	7.3	0.33	1
Isopropylbenzene	ND		ug/kg	1.5	0.15	1
p-Isopropyltoluene	ND		ug/kg	1.5	0.18	1
Naphthalene	ND		ug/kg	7.3	0.20	1
Acrylonitrile	ND		ug/kg	15	0.75	1
n-Propylbenzene	ND		ug/kg	1.5	0.16	1
1,2,3-Trichlorobenzene	ND		ug/kg	7.3	0.22	1
1,2,4-Trichlorobenzene	ND		ug/kg	7.3	0.26	1
1,3,5-Trimethylbenzene	ND		ug/kg	7.3	0.21	1

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-01

Date Collected: 07/08/14 11:10

Client ID: S-1S

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
1,2,4-Trimethylbenzene	ND		ug/kg	7.3	0.21	1
1,4-Dioxane	ND		ug/kg	150	21.	1
1,4-Diethylbenzene	ND		ug/kg	5.8	0.23	1
4-Ethyltoluene	ND		ug/kg	5.8	0.18	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	5.8	0.19	1
Ethyl ether	ND		ug/kg	7.3	0.38	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	7.3	0.57	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	87		70-130
Dibromofluoromethane	104		70-130

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-02  
**Client ID:** S-1D  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8260C  
**Analytical Date:** 07/10/14 11:04  
**Analyst:** BN  
**Percent Solids:** 64%

**Date Collected:** 07/08/14 11:15  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
Methylene chloride	8.5	J	ug/kg	17	1.9	1
1,1-Dichloroethane	ND		ug/kg	2.5	0.14	1
Chloroform	ND		ug/kg	2.5	0.62	1
Carbon tetrachloride	ND		ug/kg	1.7	0.35	1
1,2-Dichloropropane	ND		ug/kg	5.9	0.38	1
Dibromochloromethane	ND		ug/kg	1.7	0.52	1
1,1,2-Trichloroethane	ND		ug/kg	2.5	0.51	1
Tetrachloroethene	ND		ug/kg	1.7	0.24	1
Chlorobenzene	ND		ug/kg	1.7	0.59	1
Trichlorofluoromethane	ND		ug/kg	8.4	0.66	1
1,2-Dichloroethane	ND		ug/kg	1.7	0.19	1
1,1,1-Trichloroethane	ND		ug/kg	1.7	0.19	1
Bromodichloromethane	ND		ug/kg	1.7	0.29	1
trans-1,3-Dichloropropene	ND		ug/kg	1.7	0.20	1
cis-1,3-Dichloropropene	ND		ug/kg	1.7	0.20	1
1,3-Dichloropropene, Total	ND		ug/kg	1.7	0.20	1
1,1-Dichloropropene	ND		ug/kg	8.4	0.24	1
Bromoform	ND		ug/kg	6.8	0.40	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.7	0.17	1
Benzene	ND		ug/kg	1.7	0.20	1
Toluene	ND		ug/kg	2.5	0.33	1
Ethylbenzene	ND		ug/kg	1.7	0.22	1
Chloromethane	ND		ug/kg	8.4	0.50	1
Bromomethane	ND		ug/kg	3.4	0.57	1
Vinyl chloride	ND		ug/kg	3.4	0.20	1
Chloroethane	ND		ug/kg	3.4	0.53	1
1,1-Dichloroethene	ND		ug/kg	1.7	0.44	1
trans-1,2-Dichloroethene	ND		ug/kg	2.5	0.36	1
Trichloroethene	ND		ug/kg	1.7	0.21	1
1,2-Dichlorobenzene	ND		ug/kg	8.4	0.26	1

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-02

Date Collected: 07/08/14 11:15

Client ID: S-1D

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
1,3-Dichlorobenzene	ND		ug/kg	8.4	0.23	1
1,4-Dichlorobenzene	ND		ug/kg	8.4	0.23	1
Methyl tert butyl ether	ND		ug/kg	3.4	0.14	1
p/m-Xylene	ND		ug/kg	3.4	0.33	1
o-Xylene	ND		ug/kg	3.4	0.29	1
Xylene (Total)	ND		ug/kg	3.4	0.29	1
cis-1,2-Dichloroethene	ND		ug/kg	1.7	0.24	1
1,2-Dichloroethene (total)	ND		ug/kg	1.7	0.24	1
Dibromomethane	ND		ug/kg	17	0.28	1
Styrene	ND		ug/kg	3.4	0.52	1
Dichlorodifluoromethane	ND		ug/kg	17	0.32	1
Acetone	ND		ug/kg	17	1.8	1
Carbon disulfide	ND		ug/kg	17	1.9	1
2-Butanone	ND		ug/kg	17	0.46	1
Vinyl acetate	ND		ug/kg	17	0.22	1
4-Methyl-2-pentanone	ND		ug/kg	17	0.41	1
1,2,3-Trichloropropane	ND		ug/kg	17	0.27	1
2-Hexanone	ND		ug/kg	17	1.1	1
Bromochloromethane	ND		ug/kg	8.4	0.47	1
2,2-Dichloropropane	ND		ug/kg	8.4	0.38	1
1,2-Dibromoethane	ND		ug/kg	6.8	0.29	1
1,3-Dichloropropane	ND		ug/kg	8.4	0.24	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	1.7	0.54	1
Bromobenzene	ND		ug/kg	8.4	0.35	1
n-Butylbenzene	ND		ug/kg	1.7	0.19	1
sec-Butylbenzene	ND		ug/kg	1.7	0.21	1
tert-Butylbenzene	ND		ug/kg	8.4	0.23	1
o-Chlorotoluene	ND		ug/kg	8.4	0.27	1
p-Chlorotoluene	ND		ug/kg	8.4	0.26	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	8.4	0.67	1
Hexachlorobutadiene	ND		ug/kg	8.4	0.38	1
Isopropylbenzene	ND		ug/kg	1.7	0.18	1
p-Isopropyltoluene	ND		ug/kg	1.7	0.21	1
Naphthalene	ND		ug/kg	8.4	0.23	1
Acrylonitrile	ND		ug/kg	17	0.87	1
n-Propylbenzene	ND		ug/kg	1.7	0.18	1
1,2,3-Trichlorobenzene	ND		ug/kg	8.4	0.25	1
1,2,4-Trichlorobenzene	ND		ug/kg	8.4	0.31	1
1,3,5-Trimethylbenzene	ND		ug/kg	8.4	0.24	1

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-02

Date Collected: 07/08/14 11:15

Client ID: S-1D

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
1,2,4-Trimethylbenzene	ND		ug/kg	8.4	0.24	1
1,4-Dioxane	ND		ug/kg	170	24.	1
1,4-Diethylbenzene	ND		ug/kg	6.8	0.27	1
4-Ethyltoluene	ND		ug/kg	6.8	0.21	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	6.8	0.22	1
Ethyl ether	ND		ug/kg	8.4	0.44	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	8.4	0.66	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	87		70-130
Dibromofluoromethane	105		70-130

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-03  
**Client ID:** S-2S  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8260C  
**Analytical Date:** 07/10/14 11:30  
**Analyst:** BN  
**Percent Solids:** 82%

**Date Collected:** 07/08/14 11:30  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
Methylene chloride	5.9	J	ug/kg	14	1.5	1
1,1-Dichloroethane	ND		ug/kg	2.1	0.12	1
Chloroform	ND		ug/kg	2.1	0.51	1
Carbon tetrachloride	ND		ug/kg	1.4	0.29	1
1,2-Dichloropropane	ND		ug/kg	4.8	0.32	1
Dibromochloromethane	ND		ug/kg	1.4	0.43	1
1,1,2-Trichloroethane	ND		ug/kg	2.1	0.42	1
Tetrachloroethene	ND		ug/kg	1.4	0.19	1
Chlorobenzene	ND		ug/kg	1.4	0.48	1
Trichlorofluoromethane	ND		ug/kg	6.9	0.54	1
1,2-Dichloroethane	ND		ug/kg	1.4	0.16	1
1,1,1-Trichloroethane	ND		ug/kg	1.4	0.15	1
Bromodichloromethane	ND		ug/kg	1.4	0.24	1
trans-1,3-Dichloropropene	ND		ug/kg	1.4	0.17	1
cis-1,3-Dichloropropene	ND		ug/kg	1.4	0.16	1
1,3-Dichloropropene, Total	ND		ug/kg	1.4	0.16	1
1,1-Dichloropropene	ND		ug/kg	6.9	0.20	1
Bromoform	ND		ug/kg	5.5	0.33	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.4	0.14	1
Benzene	ND		ug/kg	1.4	0.16	1
Toluene	ND		ug/kg	2.1	0.27	1
Ethylbenzene	ND		ug/kg	1.4	0.18	1
Chloromethane	ND		ug/kg	6.9	0.41	1
Bromomethane	ND		ug/kg	2.8	0.47	1
Vinyl chloride	ND		ug/kg	2.8	0.16	1
Chloroethane	ND		ug/kg	2.8	0.44	1
1,1-Dichloroethene	ND		ug/kg	1.4	0.36	1
trans-1,2-Dichloroethene	ND		ug/kg	2.1	0.29	1
Trichloroethene	ND		ug/kg	1.4	0.17	1
1,2-Dichlorobenzene	ND		ug/kg	6.9	0.21	1

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-03

Date Collected: 07/08/14 11:30

Client ID: S-2S

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
1,3-Dichlorobenzene	ND		ug/kg	6.9	0.19	1
1,4-Dichlorobenzene	ND		ug/kg	6.9	0.19	1
Methyl tert butyl ether	ND		ug/kg	2.8	0.12	1
p/m-Xylene	ND		ug/kg	2.8	0.27	1
o-Xylene	ND		ug/kg	2.8	0.24	1
Xylene (Total)	ND		ug/kg	2.8	0.24	1
cis-1,2-Dichloroethene	ND		ug/kg	1.4	0.20	1
1,2-Dichloroethene (total)	ND		ug/kg	1.4	0.20	1
Dibromomethane	ND		ug/kg	14	0.23	1
Styrene	ND		ug/kg	2.8	0.43	1
Dichlorodifluoromethane	ND		ug/kg	14	0.26	1
Acetone	ND		ug/kg	14	1.4	1
Carbon disulfide	ND		ug/kg	14	1.5	1
2-Butanone	ND		ug/kg	14	0.38	1
Vinyl acetate	ND		ug/kg	14	0.18	1
4-Methyl-2-pentanone	ND		ug/kg	14	0.34	1
1,2,3-Trichloropropane	ND		ug/kg	14	0.22	1
2-Hexanone	ND		ug/kg	14	0.92	1
Bromochloromethane	ND		ug/kg	6.9	0.38	1
2,2-Dichloropropane	ND		ug/kg	6.9	0.31	1
1,2-Dibromoethane	ND		ug/kg	5.5	0.24	1
1,3-Dichloropropane	ND		ug/kg	6.9	0.20	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	1.4	0.44	1
Bromobenzene	ND		ug/kg	6.9	0.29	1
n-Butylbenzene	ND		ug/kg	1.4	0.16	1
sec-Butylbenzene	ND		ug/kg	1.4	0.17	1
tert-Butylbenzene	ND		ug/kg	6.9	0.19	1
o-Chlorotoluene	ND		ug/kg	6.9	0.22	1
p-Chlorotoluene	ND		ug/kg	6.9	0.21	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	6.9	0.55	1
Hexachlorobutadiene	ND		ug/kg	6.9	0.32	1
Isopropylbenzene	ND		ug/kg	1.4	0.14	1
p-Isopropyltoluene	ND		ug/kg	1.4	0.17	1
Naphthalene	0.43	J	ug/kg	6.9	0.19	1
Acrylonitrile	ND		ug/kg	14	0.71	1
n-Propylbenzene	ND		ug/kg	1.4	0.15	1
1,2,3-Trichlorobenzene	ND		ug/kg	6.9	0.20	1
1,2,4-Trichlorobenzene	ND		ug/kg	6.9	0.25	1
1,3,5-Trimethylbenzene	0.45	J	ug/kg	6.9	0.20	1

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-03

Date Collected: 07/08/14 11:30

Client ID: S-2S

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
1,2,4-Trimethylbenzene	1.6	J	ug/kg	6.9	0.20	1
1,4-Dioxane	ND		ug/kg	140	20.	1
1,4-Diethylbenzene	1.3	J	ug/kg	5.5	0.22	1
4-Ethyltoluene	0.50	J	ug/kg	5.5	0.17	1
1,2,4,5-Tetramethylbenzene	0.60	J	ug/kg	5.5	0.18	1
Ethyl ether	ND		ug/kg	6.9	0.36	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	6.9	0.54	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	110		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	89		70-130
Dibromofluoromethane	105		70-130

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-04 D  
 Client ID: S-2D  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil  
 Analytical Method: 1,8260C  
 Analytical Date: 07/11/14 14:31  
 Analyst: MV  
 Percent Solids: 58%

Date Collected: 07/08/14 11:35  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
Methylene chloride	ND		ug/kg	12000	1300	10
1,1-Dichloroethane	ND		ug/kg	1800	100	10
Chloroform	ND		ug/kg	1800	450	10
Carbon tetrachloride	ND		ug/kg	1200	260	10
1,2-Dichloropropane	ND		ug/kg	4200	280	10
Dibromochloromethane	ND		ug/kg	1200	370	10
1,1,2-Trichloroethane	ND		ug/kg	1800	370	10
Tetrachloroethene	ND		ug/kg	1200	170	10
Chlorobenzene	ND		ug/kg	1200	420	10
Trichlorofluoromethane	ND		ug/kg	6100	470	10
1,2-Dichloroethane	ND		ug/kg	1200	140	10
1,1,1-Trichloroethane	ND		ug/kg	1200	130	10
Bromodichloromethane	ND		ug/kg	1200	210	10
trans-1,3-Dichloropropene	ND		ug/kg	1200	150	10
cis-1,3-Dichloropropene	ND		ug/kg	1200	140	10
1,3-Dichloropropene, Total	ND		ug/kg	1200	140	10
1,1-Dichloropropene	ND		ug/kg	6100	170	10
Bromoform	ND		ug/kg	4900	290	10
1,1,2,2-Tetrachloroethane	ND		ug/kg	1200	120	10
Benzene	ND		ug/kg	1200	140	10
Toluene	ND		ug/kg	1800	240	10
Ethylbenzene	3600		ug/kg	1200	150	10
Chloromethane	ND		ug/kg	6100	360	10
Bromomethane	ND		ug/kg	2400	410	10
Vinyl chloride	ND		ug/kg	2400	140	10
Chloroethane	ND		ug/kg	2400	380	10
1,1-Dichloroethene	ND		ug/kg	1200	320	10
trans-1,2-Dichloroethene	ND		ug/kg	1800	260	10
Trichloroethene	ND		ug/kg	1200	150	10
1,2-Dichlorobenzene	ND		ug/kg	6100	190	10

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-04 D  
 Client ID: S-2D  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Date Collected: 07/08/14 11:35  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
1,3-Dichlorobenzene	ND		ug/kg	6100	160	10
1,4-Dichlorobenzene	ND		ug/kg	6100	170	10
Methyl tert butyl ether	ND		ug/kg	2400	100	10
p/m-Xylene	9200		ug/kg	2400	240	10
o-Xylene	15000		ug/kg	2400	210	10
Xylene (Total)	24000		ug/kg	2400	210	10
cis-1,2-Dichloroethene	ND		ug/kg	1200	170	10
1,2-Dichloroethene (total)	ND		ug/kg	1200	170	10
Dibromomethane	ND		ug/kg	12000	200	10
Styrene	ND		ug/kg	2400	380	10
Dichlorodifluoromethane	ND		ug/kg	12000	230	10
Acetone	1400	J	ug/kg	12000	1200	10
Carbon disulfide	ND		ug/kg	12000	1300	10
2-Butanone	ND		ug/kg	12000	330	10
Vinyl acetate	ND		ug/kg	12000	160	10
4-Methyl-2-pentanone	ND		ug/kg	12000	300	10
1,2,3-Trichloropropane	1400	J	ug/kg	12000	200	10
2-Hexanone	ND		ug/kg	12000	810	10
Bromochloromethane	ND		ug/kg	6100	340	10
2,2-Dichloropropane	ND		ug/kg	6100	270	10
1,2-Dibromoethane	ND		ug/kg	4900	210	10
1,3-Dichloropropane	ND		ug/kg	6100	180	10
1,1,1,2-Tetrachloroethane	ND		ug/kg	1200	390	10
Bromobenzene	ND		ug/kg	6100	250	10
n-Butylbenzene	8400		ug/kg	1200	140	10
sec-Butylbenzene	6500		ug/kg	1200	150	10
tert-Butylbenzene	ND		ug/kg	6100	160	10
o-Chlorotoluene	ND		ug/kg	6100	190	10
p-Chlorotoluene	ND		ug/kg	6100	190	10
1,2-Dibromo-3-chloropropane	ND		ug/kg	6100	480	10
Hexachlorobutadiene	ND		ug/kg	6100	280	10
Isopropylbenzene	5200		ug/kg	1200	130	10
p-Isopropyltoluene	5200		ug/kg	1200	150	10
Naphthalene	20000		ug/kg	6100	170	10
Acrylonitrile	ND		ug/kg	12000	620	10
n-Propylbenzene	8200		ug/kg	1200	130	10
1,2,3-Trichlorobenzene	ND		ug/kg	6100	180	10
1,2,4-Trichlorobenzene	ND		ug/kg	6100	220	10
1,3,5-Trimethylbenzene	36000		ug/kg	6100	170	10

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-04 D  
 Client ID: S-2D  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Date Collected: 07/08/14 11:35  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
1,2,4-Trimethylbenzene	100000		ug/kg	6100	170	10
1,4-Dioxane	ND		ug/kg	120000	18000	10
1,4-Diethylbenzene	58000		ug/kg	4900	190	10
4-Ethyltoluene	37000		ug/kg	4900	150	10
1,2,4,5-Tetramethylbenzene	21000		ug/kg	4900	160	10
Ethyl ether	ND		ug/kg	6100	320	10
trans-1,4-Dichloro-2-butene	ND		ug/kg	6100	480	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	113		70-130
Dibromofluoromethane	94		70-130

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-05  
**Client ID:** S-3S  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8260C  
**Analytical Date:** 07/10/14 11:55  
**Analyst:** BN  
**Percent Solids:** 88%

**Date Collected:** 07/08/14 12:20  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
Methylene chloride	6.3	J	ug/kg	14	1.5	1
1,1-Dichloroethane	ND		ug/kg	2.1	0.12	1
Chloroform	ND		ug/kg	2.1	0.51	1
Carbon tetrachloride	ND		ug/kg	1.4	0.29	1
1,2-Dichloropropane	ND		ug/kg	4.8	0.31	1
Dibromochloromethane	ND		ug/kg	1.4	0.42	1
1,1,2-Trichloroethane	ND		ug/kg	2.1	0.42	1
Tetrachloroethene	ND		ug/kg	1.4	0.19	1
Chlorobenzene	ND		ug/kg	1.4	0.48	1
Trichlorofluoromethane	ND		ug/kg	6.9	0.54	1
1,2-Dichloroethane	ND		ug/kg	1.4	0.16	1
1,1,1-Trichloroethane	ND		ug/kg	1.4	0.15	1
Bromodichloromethane	ND		ug/kg	1.4	0.24	1
trans-1,3-Dichloropropene	ND		ug/kg	1.4	0.17	1
cis-1,3-Dichloropropene	ND		ug/kg	1.4	0.16	1
1,3-Dichloropropene, Total	ND		ug/kg	1.4	0.16	1
1,1-Dichloropropene	ND		ug/kg	6.9	0.20	1
Bromoform	ND		ug/kg	5.5	0.32	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.4	0.14	1
Benzene	ND		ug/kg	1.4	0.16	1
Toluene	ND		ug/kg	2.1	0.27	1
Ethylbenzene	ND		ug/kg	1.4	0.18	1
Chloromethane	ND		ug/kg	6.9	0.40	1
Bromomethane	ND		ug/kg	2.8	0.47	1
Vinyl chloride	ND		ug/kg	2.8	0.16	1
Chloroethane	ND		ug/kg	2.8	0.44	1
1,1-Dichloroethene	ND		ug/kg	1.4	0.36	1
trans-1,2-Dichloroethene	ND		ug/kg	2.1	0.29	1
Trichloroethene	ND		ug/kg	1.4	0.17	1
1,2-Dichlorobenzene	ND		ug/kg	6.9	0.21	1

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-05

Date Collected: 07/08/14 12:20

Client ID: S-3S

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
1,3-Dichlorobenzene	ND		ug/kg	6.9	0.19	1
1,4-Dichlorobenzene	ND		ug/kg	6.9	0.19	1
Methyl tert butyl ether	ND		ug/kg	2.8	0.12	1
p/m-Xylene	ND		ug/kg	2.8	0.27	1
o-Xylene	ND		ug/kg	2.8	0.24	1
Xylene (Total)	ND		ug/kg	2.8	0.24	1
cis-1,2-Dichloroethene	ND		ug/kg	1.4	0.20	1
1,2-Dichloroethene (total)	ND		ug/kg	1.4	0.20	1
Dibromomethane	ND		ug/kg	14	0.22	1
Styrene	ND		ug/kg	2.8	0.43	1
Dichlorodifluoromethane	ND		ug/kg	14	0.26	1
Acetone	ND		ug/kg	14	1.4	1
Carbon disulfide	ND		ug/kg	14	1.5	1
2-Butanone	ND		ug/kg	14	0.38	1
Vinyl acetate	ND		ug/kg	14	0.18	1
4-Methyl-2-pentanone	ND		ug/kg	14	0.34	1
1,2,3-Trichloropropane	ND		ug/kg	14	0.22	1
2-Hexanone	ND		ug/kg	14	0.92	1
Bromochloromethane	ND		ug/kg	6.9	0.38	1
2,2-Dichloropropane	ND		ug/kg	6.9	0.31	1
1,2-Dibromoethane	ND		ug/kg	5.5	0.24	1
1,3-Dichloropropane	ND		ug/kg	6.9	0.20	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	1.4	0.44	1
Bromobenzene	ND		ug/kg	6.9	0.29	1
n-Butylbenzene	ND		ug/kg	1.4	0.16	1
sec-Butylbenzene	ND		ug/kg	1.4	0.17	1
tert-Butylbenzene	ND		ug/kg	6.9	0.19	1
o-Chlorotoluene	ND		ug/kg	6.9	0.22	1
p-Chlorotoluene	ND		ug/kg	6.9	0.21	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	6.9	0.55	1
Hexachlorobutadiene	ND		ug/kg	6.9	0.31	1
Isopropylbenzene	ND		ug/kg	1.4	0.14	1
p-Isopropyltoluene	ND		ug/kg	1.4	0.17	1
Naphthalene	ND		ug/kg	6.9	0.19	1
Acrylonitrile	ND		ug/kg	14	0.71	1
n-Propylbenzene	ND		ug/kg	1.4	0.15	1
1,2,3-Trichlorobenzene	ND		ug/kg	6.9	0.20	1
1,2,4-Trichlorobenzene	ND		ug/kg	6.9	0.25	1
1,3,5-Trimethylbenzene	ND		ug/kg	6.9	0.20	1

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-05

Date Collected: 07/08/14 12:20

Client ID: S-3S

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
1,2,4-Trimethylbenzene	ND		ug/kg	6.9	0.20	1
1,4-Dioxane	ND		ug/kg	140	20.	1
1,4-Diethylbenzene	ND		ug/kg	5.5	0.22	1
4-Ethyltoluene	ND		ug/kg	5.5	0.17	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	5.5	0.18	1
Ethyl ether	ND		ug/kg	6.9	0.36	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	6.9	0.54	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	109		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	87		70-130
Dibromofluoromethane	106		70-130

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-06  
**Client ID:** S-3D  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8260C  
**Analytical Date:** 07/10/14 12:20  
**Analyst:** BN  
**Percent Solids:** 91%

**Date Collected:** 07/08/14 12:25  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
Methylene chloride	3.6	J	ug/kg	9.6	1.1	1
1,1-Dichloroethane	ND		ug/kg	1.4	0.08	1
Chloroform	ND		ug/kg	1.4	0.36	1
Carbon tetrachloride	ND		ug/kg	0.96	0.20	1
1,2-Dichloropropane	ND		ug/kg	3.4	0.22	1
Dibromochloromethane	ND		ug/kg	0.96	0.30	1
1,1,2-Trichloroethane	ND		ug/kg	1.4	0.29	1
Tetrachloroethene	ND		ug/kg	0.96	0.13	1
Chlorobenzene	ND		ug/kg	0.96	0.34	1
Trichlorofluoromethane	ND		ug/kg	4.8	0.37	1
1,2-Dichloroethane	ND		ug/kg	0.96	0.11	1
1,1,1-Trichloroethane	ND		ug/kg	0.96	0.11	1
Bromodichloromethane	ND		ug/kg	0.96	0.17	1
trans-1,3-Dichloropropene	ND		ug/kg	0.96	0.12	1
cis-1,3-Dichloropropene	ND		ug/kg	0.96	0.11	1
1,3-Dichloropropene, Total	ND		ug/kg	0.96	0.11	1
1,1-Dichloropropene	ND		ug/kg	4.8	0.14	1
Bromoform	ND		ug/kg	3.8	0.23	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.96	0.10	1
Benzene	ND		ug/kg	0.96	0.11	1
Toluene	ND		ug/kg	1.4	0.19	1
Ethylbenzene	ND		ug/kg	0.96	0.12	1
Chloromethane	0.35	J	ug/kg	4.8	0.28	1
Bromomethane	ND		ug/kg	1.9	0.32	1
Vinyl chloride	ND		ug/kg	1.9	0.11	1
Chloroethane	ND		ug/kg	1.9	0.30	1
1,1-Dichloroethene	ND		ug/kg	0.96	0.25	1
trans-1,2-Dichloroethene	ND		ug/kg	1.4	0.20	1
Trichloroethene	ND		ug/kg	0.96	0.12	1
1,2-Dichlorobenzene	ND		ug/kg	4.8	0.15	1

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-06

Date Collected: 07/08/14 12:25

Client ID: S-3D

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
1,3-Dichlorobenzene	ND		ug/kg	4.8	0.13	1
1,4-Dichlorobenzene	ND		ug/kg	4.8	0.13	1
Methyl tert butyl ether	ND		ug/kg	1.9	0.08	1
p/m-Xylene	0.33	J	ug/kg	1.9	0.19	1
o-Xylene	ND		ug/kg	1.9	0.16	1
Xylene (Total)	0.33	J	ug/kg	1.9	0.16	1
cis-1,2-Dichloroethene	ND		ug/kg	0.96	0.14	1
1,2-Dichloroethene (total)	ND		ug/kg	0.96	0.14	1
Dibromomethane	ND		ug/kg	9.6	0.16	1
Styrene	ND		ug/kg	1.9	0.30	1
Dichlorodifluoromethane	ND		ug/kg	9.6	0.18	1
Acetone	7.2	J	ug/kg	9.6	1.0	1
Carbon disulfide	ND		ug/kg	9.6	1.1	1
2-Butanone	1.6	J	ug/kg	9.6	0.26	1
Vinyl acetate	ND		ug/kg	9.6	0.13	1
4-Methyl-2-pentanone	ND		ug/kg	9.6	0.23	1
1,2,3-Trichloropropane	ND		ug/kg	9.6	0.16	1
2-Hexanone	ND		ug/kg	9.6	0.64	1
Bromochloromethane	ND		ug/kg	4.8	0.26	1
2,2-Dichloropropane	ND		ug/kg	4.8	0.22	1
1,2-Dibromoethane	ND		ug/kg	3.8	0.17	1
1,3-Dichloropropane	ND		ug/kg	4.8	0.14	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.96	0.31	1
Bromobenzene	ND		ug/kg	4.8	0.20	1
n-Butylbenzene	ND		ug/kg	0.96	0.11	1
sec-Butylbenzene	ND		ug/kg	0.96	0.12	1
tert-Butylbenzene	ND		ug/kg	4.8	0.13	1
o-Chlorotoluene	ND		ug/kg	4.8	0.15	1
p-Chlorotoluene	ND		ug/kg	4.8	0.15	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	4.8	0.38	1
Hexachlorobutadiene	ND		ug/kg	4.8	0.22	1
Isopropylbenzene	ND		ug/kg	0.96	0.10	1
p-Isopropyltoluene	ND		ug/kg	0.96	0.12	1
Naphthalene	0.57	J	ug/kg	4.8	0.13	1
Acrylonitrile	ND		ug/kg	9.6	0.49	1
n-Propylbenzene	ND		ug/kg	0.96	0.10	1
1,2,3-Trichlorobenzene	ND		ug/kg	4.8	0.14	1
1,2,4-Trichlorobenzene	ND		ug/kg	4.8	0.18	1
1,3,5-Trimethylbenzene	ND		ug/kg	4.8	0.14	1

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-06

Date Collected: 07/08/14 12:25

Client ID: S-3D

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
1,2,4-Trimethylbenzene	0.74	J	ug/kg	4.8	0.14	1
1,4-Dioxane	ND		ug/kg	96	14.	1
1,4-Diethylbenzene	0.76	J	ug/kg	3.8	0.15	1
4-Ethyltoluene	0.40	J	ug/kg	3.8	0.12	1
1,2,4,5-Tetramethylbenzene	0.43	J	ug/kg	3.8	0.12	1
Ethyl ether	ND		ug/kg	4.8	0.25	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	4.8	0.38	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	109		70-130
Toluene-d8	95		70-130
4-Bromofluorobenzene	87		70-130
Dibromofluoromethane	106		70-130

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-07  
**Client ID:** S-4  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8260C  
**Analytical Date:** 07/10/14 12:46  
**Analyst:** BN  
**Percent Solids:** 88%

**Date Collected:** 07/08/14 12:30  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
Methylene chloride	5.9	J	ug/kg	11	1.2	1
1,1-Dichloroethane	ND		ug/kg	1.6	0.09	1
Chloroform	ND		ug/kg	1.6	0.40	1
Carbon tetrachloride	ND		ug/kg	1.1	0.23	1
1,2-Dichloropropane	ND		ug/kg	3.8	0.24	1
Dibromochloromethane	ND		ug/kg	1.1	0.33	1
1,1,2-Trichloroethane	ND		ug/kg	1.6	0.33	1
Tetrachloroethene	ND		ug/kg	1.1	0.15	1
Chlorobenzene	ND		ug/kg	1.1	0.37	1
Trichlorofluoromethane	ND		ug/kg	5.4	0.42	1
1,2-Dichloroethane	ND		ug/kg	1.1	0.12	1
1,1,1-Trichloroethane	ND		ug/kg	1.1	0.12	1
Bromodichloromethane	ND		ug/kg	1.1	0.19	1
trans-1,3-Dichloropropene	ND		ug/kg	1.1	0.13	1
cis-1,3-Dichloropropene	ND		ug/kg	1.1	0.13	1
1,3-Dichloropropene, Total	ND		ug/kg	1.1	0.13	1
1,1-Dichloropropene	ND		ug/kg	5.4	0.15	1
Bromoform	ND		ug/kg	4.3	0.25	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.1	0.11	1
Benzene	ND		ug/kg	1.1	0.13	1
Toluene	ND		ug/kg	1.6	0.21	1
Ethylbenzene	ND		ug/kg	1.1	0.14	1
Chloromethane	ND		ug/kg	5.4	0.32	1
Bromomethane	ND		ug/kg	2.2	0.36	1
Vinyl chloride	ND		ug/kg	2.2	0.13	1
Chloroethane	ND		ug/kg	2.2	0.34	1
1,1-Dichloroethene	ND		ug/kg	1.1	0.28	1
trans-1,2-Dichloroethene	ND		ug/kg	1.6	0.23	1
Trichloroethene	ND		ug/kg	1.1	0.13	1
1,2-Dichlorobenzene	ND		ug/kg	5.4	0.16	1

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-07

Date Collected: 07/08/14 12:30

Client ID: S-4

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
1,3-Dichlorobenzene	ND		ug/kg	5.4	0.14	1
1,4-Dichlorobenzene	ND		ug/kg	5.4	0.15	1
Methyl tert butyl ether	ND		ug/kg	2.2	0.09	1
p/m-Xylene	ND		ug/kg	2.2	0.21	1
o-Xylene	ND		ug/kg	2.2	0.18	1
Xylene (Total)	ND		ug/kg	2.2	0.18	1
cis-1,2-Dichloroethene	ND		ug/kg	1.1	0.15	1
1,2-Dichloroethene (total)	ND		ug/kg	1.1	0.15	1
Dibromomethane	ND		ug/kg	11	0.18	1
Styrene	ND		ug/kg	2.2	0.33	1
Dichlorodifluoromethane	ND		ug/kg	11	0.20	1
Acetone	ND		ug/kg	11	1.1	1
Carbon disulfide	ND		ug/kg	11	1.2	1
2-Butanone	ND		ug/kg	11	0.29	1
Vinyl acetate	ND		ug/kg	11	0.14	1
4-Methyl-2-pentanone	ND		ug/kg	11	0.26	1
1,2,3-Trichloropropane	ND		ug/kg	11	0.18	1
2-Hexanone	ND		ug/kg	11	0.72	1
Bromochloromethane	ND		ug/kg	5.4	0.30	1
2,2-Dichloropropane	ND		ug/kg	5.4	0.24	1
1,2-Dibromoethane	ND		ug/kg	4.3	0.19	1
1,3-Dichloropropane	ND		ug/kg	5.4	0.16	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	1.1	0.34	1
Bromobenzene	ND		ug/kg	5.4	0.22	1
n-Butylbenzene	ND		ug/kg	1.1	0.12	1
sec-Butylbenzene	ND		ug/kg	1.1	0.13	1
tert-Butylbenzene	ND		ug/kg	5.4	0.14	1
o-Chlorotoluene	ND		ug/kg	5.4	0.17	1
p-Chlorotoluene	ND		ug/kg	5.4	0.16	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	5.4	0.43	1
Hexachlorobutadiene	ND		ug/kg	5.4	0.24	1
Isopropylbenzene	ND		ug/kg	1.1	0.11	1
p-Isopropyltoluene	ND		ug/kg	1.1	0.13	1
Naphthalene	ND		ug/kg	5.4	0.15	1
Acrylonitrile	ND		ug/kg	11	0.55	1
n-Propylbenzene	ND		ug/kg	1.1	0.12	1
1,2,3-Trichlorobenzene	ND		ug/kg	5.4	0.16	1
1,2,4-Trichlorobenzene	ND		ug/kg	5.4	0.20	1
1,3,5-Trimethylbenzene	ND		ug/kg	5.4	0.15	1

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-07

Date Collected: 07/08/14 12:30

Client ID: S-4

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
1,2,4-Trimethylbenzene	ND		ug/kg	5.4	0.15	1
1,4-Dioxane	ND		ug/kg	110	16.	1
1,4-Diethylbenzene	ND		ug/kg	4.3	0.17	1
4-Ethyltoluene	ND		ug/kg	4.3	0.13	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	4.3	0.14	1
Ethyl ether	ND		ug/kg	5.4	0.28	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.4	0.42	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	88		70-130
Dibromofluoromethane	104		70-130

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-08  
**Client ID:** TRIP BLANK  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Water  
**Analytical Method:** 1,8260C  
**Analytical Date:** 07/10/14 16:06  
**Analyst:** PD

**Date Collected:** 07/08/14 00:00  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by GC/MS - Westborough Lab</b>						
Methylene chloride	ND		ug/l	2.5	0.70	1
1,1-Dichloroethane	ND		ug/l	2.5	0.70	1
Chloroform	ND		ug/l	2.5	0.70	1
Carbon tetrachloride	ND		ug/l	0.50	0.13	1
1,2-Dichloropropane	ND		ug/l	1.0	0.13	1
Dibromochloromethane	ND		ug/l	0.50	0.15	1
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50	1
Tetrachloroethene	ND		ug/l	0.50	0.18	1
Chlorobenzene	ND		ug/l	2.5	0.70	1
Trichlorofluoromethane	ND		ug/l	2.5	0.70	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70	1
Bromodichloromethane	ND		ug/l	0.50	0.19	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	0.14	1
1,1-Dichloropropene	ND		ug/l	2.5	0.70	1
Bromoform	ND		ug/l	2.0	0.65	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.14	1
Benzene	ND		ug/l	0.50	0.16	1
Toluene	ND		ug/l	2.5	0.70	1
Ethylbenzene	ND		ug/l	2.5	0.70	1
Chloromethane	ND		ug/l	2.5	0.70	1
Bromomethane	ND		ug/l	2.5	0.70	1
Vinyl chloride	ND		ug/l	1.0	0.33	1
Chloroethane	ND		ug/l	2.5	0.70	1
1,1-Dichloroethene	ND		ug/l	0.50	0.14	1
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
Trichloroethene	ND		ug/l	0.50	0.17	1
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70	1

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-08

Date Collected: 07/08/14 00:00

Client ID: TRIP BLANK

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70	1
Methyl tert butyl ether	ND		ug/l	2.5	0.70	1
p/m-Xylene	ND		ug/l	2.5	0.70	1
o-Xylene	ND		ug/l	2.5	0.70	1
Xylenes, Total	ND		ug/l	2.5	0.70	1
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
1,2-Dichloroethene, Total	ND		ug/l	2.5	0.70	1
Dibromomethane	ND		ug/l	5.0	1.0	1
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70	1
Acrylonitrile	ND		ug/l	5.0	1.5	1
Styrene	ND		ug/l	2.5	0.70	1
Dichlorodifluoromethane	ND		ug/l	5.0	1.0	1
Acetone	380	E	ug/l	5.0	1.0	1
Carbon disulfide	ND		ug/l	5.0	1.0	1
2-Butanone	ND		ug/l	5.0	1.0	1
Vinyl acetate	ND		ug/l	5.0	1.0	1
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0	1
2-Hexanone	ND		ug/l	5.0	1.0	1
Bromochloromethane	ND		ug/l	2.5	0.70	1
2,2-Dichloropropane	ND		ug/l	2.5	0.70	1
1,2-Dibromoethane	ND		ug/l	2.0	0.65	1
1,3-Dichloropropane	ND		ug/l	2.5	0.70	1
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70	1
Bromobenzene	ND		ug/l	2.5	0.70	1
n-Butylbenzene	ND		ug/l	2.5	0.70	1
sec-Butylbenzene	ND		ug/l	2.5	0.70	1
tert-Butylbenzene	ND		ug/l	2.5	0.70	1
o-Chlorotoluene	ND		ug/l	2.5	0.70	1
p-Chlorotoluene	ND		ug/l	2.5	0.70	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70	1
Hexachlorobutadiene	ND		ug/l	2.5	0.70	1
Isopropylbenzene	ND		ug/l	2.5	0.70	1
p-Isopropyltoluene	ND		ug/l	2.5	0.70	1
Naphthalene	ND		ug/l	2.5	0.70	1
n-Propylbenzene	ND		ug/l	2.5	0.70	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70	1

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-08

Date Collected: 07/08/14 00:00

Client ID: TRIP BLANK

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by GC/MS - Westborough Lab</b>						
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,4-Dioxane	ND		ug/l	250	41.	1
p-Diethylbenzene	ND		ug/l	2.0	0.70	1
p-Ethyltoluene	ND		ug/l	2.0	0.70	1
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.65	1
Ethyl ether	ND		ug/l	2.5	0.70	1
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	84		70-130
Dibromofluoromethane	102		70-130

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-08 D  
 Client ID: TRIP BLANK  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Water  
 Analytical Method: 1,8260C  
 Analytical Date: 07/11/14 14:25  
 Analyst: PD

Date Collected: 07/08/14 00:00  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by GC/MS - Westborough Lab						
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Acetone	360		ug/l	50	10.	10
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	85		70-130
Dibromofluoromethane	101		70-130

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8260C  
**Analytical Date:** 07/10/14 09:23  
**Analyst:** BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 01-03,05-07 Batch: WG704694-3					
Methylene chloride	ND		ug/kg	10	1.1
1,1-Dichloroethane	ND		ug/kg	1.5	0.09
Chloroform	ND		ug/kg	1.5	0.37
Carbon tetrachloride	ND		ug/kg	1.0	0.21
1,2-Dichloropropane	ND		ug/kg	3.5	0.23
Dibromochloromethane	ND		ug/kg	1.0	0.31
2-Chloroethylvinyl ether	ND		ug/kg	20	0.62
1,1,2-Trichloroethane	ND		ug/kg	1.5	0.30
Tetrachloroethene	ND		ug/kg	1.0	0.14
Chlorobenzene	ND		ug/kg	1.0	0.35
Trichlorofluoromethane	ND		ug/kg	5.0	0.39
1,2-Dichloroethane	ND		ug/kg	1.0	0.11
1,1,1-Trichloroethane	ND		ug/kg	1.0	0.11
Bromodichloromethane	ND		ug/kg	1.0	0.17
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.12
cis-1,3-Dichloropropene	ND		ug/kg	1.0	0.12
1,3-Dichloropropene, Total	ND		ug/kg	1.0	0.12
1,1-Dichloropropene	ND		ug/kg	5.0	0.14
Bromoform	ND		ug/kg	4.0	0.24
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.0	0.10
Benzene	ND		ug/kg	1.0	0.12
Toluene	ND		ug/kg	1.5	0.19
Ethylbenzene	ND		ug/kg	1.0	0.13
Chloromethane	ND		ug/kg	5.0	0.29
Bromomethane	ND		ug/kg	2.0	0.34
Vinyl chloride	ND		ug/kg	2.0	0.12
Chloroethane	ND		ug/kg	2.0	0.32
1,1-Dichloroethene	ND		ug/kg	1.0	0.26
trans-1,2-Dichloroethene	ND		ug/kg	1.5	0.21

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8260C  
**Analytical Date:** 07/10/14 09:23  
**Analyst:** BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 01-03,05-07 Batch: WG704694-3					
Trichloroethene	ND		ug/kg	1.0	0.12
1,2-Dichlorobenzene	ND		ug/kg	5.0	0.15
1,3-Dichlorobenzene	ND		ug/kg	5.0	0.14
1,4-Dichlorobenzene	ND		ug/kg	5.0	0.14
Methyl tert butyl ether	ND		ug/kg	2.0	0.08
p/m-Xylene	ND		ug/kg	2.0	0.20
o-Xylene	ND		ug/kg	2.0	0.17
Xylene (Total)	ND		ug/kg	2.0	0.17
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.14
1,2-Dichloroethene (total)	ND		ug/kg	1.0	0.14
Dibromomethane	ND		ug/kg	10	0.16
Styrene	ND		ug/kg	2.0	0.31
Dichlorodifluoromethane	ND		ug/kg	10	0.19
Acetone	ND		ug/kg	10	1.0
Carbon disulfide	ND		ug/kg	10	1.1
2-Butanone	ND		ug/kg	10	0.27
Vinyl acetate	ND		ug/kg	10	0.13
4-Methyl-2-pentanone	ND		ug/kg	10	0.24
1,2,3-Trichloropropane	ND		ug/kg	10	0.16
2-Hexanone	ND		ug/kg	10	0.67
Bromochloromethane	ND		ug/kg	5.0	0.28
2,2-Dichloropropane	ND		ug/kg	5.0	0.23
1,2-Dibromoethane	ND		ug/kg	4.0	0.17
1,3-Dichloropropane	ND		ug/kg	5.0	0.14
1,1,1,2-Tetrachloroethane	ND		ug/kg	1.0	0.32
Bromobenzene	ND		ug/kg	5.0	0.21
n-Butylbenzene	ND		ug/kg	1.0	0.11
sec-Butylbenzene	ND		ug/kg	1.0	0.12
tert-Butylbenzene	ND		ug/kg	5.0	0.14

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260C  
Analytical Date: 07/10/14 09:23  
Analyst: BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 01-03,05-07 Batch: WG704694-3					
o-Chlorotoluene	ND		ug/kg	5.0	0.16
p-Chlorotoluene	ND		ug/kg	5.0	0.15
1,2-Dibromo-3-chloropropane	ND		ug/kg	5.0	0.40
Hexachlorobutadiene	ND		ug/kg	5.0	0.23
Isopropylbenzene	ND		ug/kg	1.0	0.10
p-Isopropyltoluene	ND		ug/kg	1.0	0.12
Naphthalene	ND		ug/kg	5.0	0.14
Acrylonitrile	ND		ug/kg	10	0.51
Isopropyl Ether	ND		ug/kg	4.0	0.14
tert-Butyl Alcohol	ND		ug/kg	60	2.9
n-Propylbenzene	ND		ug/kg	1.0	0.11
1,2,3-Trichlorobenzene	ND		ug/kg	5.0	0.15
1,2,4-Trichlorobenzene	ND		ug/kg	5.0	0.18
1,3,5-Trimethylbenzene	ND		ug/kg	5.0	0.14
1,2,4-Trimethylbenzene	ND		ug/kg	5.0	0.14
Methyl Acetate	ND		ug/kg	20	0.27
Ethyl Acetate	ND		ug/kg	20	0.92
Acrolein	ND		ug/kg	25	8.1
Cyclohexane	ND		ug/kg	20	0.15
1,4-Dioxane	ND		ug/kg	100	14.
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		ug/kg	20	0.27
1,4-Diethylbenzene	ND		ug/kg	4.0	0.16
4-Ethyltoluene	ND		ug/kg	4.0	0.12
1,2,4,5-Tetramethylbenzene	ND		ug/kg	4.0	0.13
Tetrahydrofuran	ND		ug/kg	20	1.0
Ethyl ether	ND		ug/kg	5.0	0.26
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.0	0.39
Methyl cyclohexane	ND		ug/kg	4.0	0.15
Ethyl-Tert-Butyl-Ether	ND		ug/kg	4.0	0.12

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8260C  
 Analytical Date: 07/10/14 09:23  
 Analyst: BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 01-03,05-07 Batch: WG704694-3					
Tertiary-Amyl Methyl Ether	ND		ug/kg	4.0	0.10

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	100		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	87		70-130
Dibromofluoromethane	97		70-130

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8260C  
**Analytical Date:** 07/10/14 10:33  
**Analyst:** PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 08 Batch: WG704748-3					
Methylene chloride	ND		ug/l	2.5	0.70
1,1-Dichloroethane	ND		ug/l	2.5	0.70
Chloroform	ND		ug/l	2.5	0.70
2-Chloroethylvinyl ether	ND		ug/l	10	0.70
Carbon tetrachloride	ND		ug/l	0.50	0.13
1,2-Dichloropropane	ND		ug/l	1.0	0.13
Dibromochloromethane	ND		ug/l	0.50	0.15
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50
Tetrachloroethene	ND		ug/l	0.50	0.18
Chlorobenzene	ND		ug/l	2.5	0.70
Trichlorofluoromethane	ND		ug/l	2.5	0.70
1,2-Dichloroethane	ND		ug/l	0.50	0.13
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70
Bromodichloromethane	ND		ug/l	0.50	0.19
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14
1,3-Dichloropropene, Total	ND		ug/l	0.50	0.14
1,1-Dichloropropene	ND		ug/l	2.5	0.70
Bromoform	ND		ug/l	2.0	0.65
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.14
Benzene	ND		ug/l	0.50	0.16
Toluene	ND		ug/l	2.5	0.70
Ethylbenzene	ND		ug/l	2.5	0.70
Chloromethane	ND		ug/l	2.5	0.70
Bromomethane	ND		ug/l	2.5	0.70
Vinyl chloride	ND		ug/l	1.0	0.33
Chloroethane	ND		ug/l	2.5	0.70
1,1-Dichloroethene	ND		ug/l	0.50	0.14
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8260C  
**Analytical Date:** 07/10/14 10:33  
**Analyst:** PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 08 Batch: WG704748-3					
Trichloroethene	ND		ug/l	0.50	0.17
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70
Methyl tert butyl ether	ND		ug/l	2.5	0.70
p/m-Xylene	ND		ug/l	2.5	0.70
o-Xylene	ND		ug/l	2.5	0.70
Xylenes, Total	ND		ug/l	2.5	0.70
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70
1,2-Dichloroethene, Total	ND		ug/l	2.5	0.70
Dibromomethane	ND		ug/l	5.0	1.0
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70
Acrylonitrile	ND		ug/l	5.0	1.5
Diisopropyl Ether	ND		ug/l	2.0	0.65
Tert-Butyl Alcohol	ND		ug/l	10	1.2
Styrene	ND		ug/l	2.5	0.70
Dichlorodifluoromethane	ND		ug/l	5.0	1.0
Acetone	ND		ug/l	5.0	1.0
Carbon disulfide	ND		ug/l	5.0	1.0
2-Butanone	ND		ug/l	5.0	1.0
Vinyl acetate	ND		ug/l	5.0	1.0
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0
2-Hexanone	ND		ug/l	5.0	1.0
Bromochloromethane	ND		ug/l	2.5	0.70
2,2-Dichloropropane	ND		ug/l	2.5	0.70
1,2-Dibromoethane	ND		ug/l	2.0	0.65
1,3-Dichloropropane	ND		ug/l	2.5	0.70
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70
Bromobenzene	ND		ug/l	2.5	0.70

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8260C  
**Analytical Date:** 07/10/14 10:33  
**Analyst:** PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 08 Batch: WG704748-3					
n-Butylbenzene	ND		ug/l	2.5	0.70
sec-Butylbenzene	ND		ug/l	2.5	0.70
tert-Butylbenzene	ND		ug/l	2.5	0.70
o-Chlorotoluene	ND		ug/l	2.5	0.70
p-Chlorotoluene	ND		ug/l	2.5	0.70
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70
Hexachlorobutadiene	ND		ug/l	2.5	0.70
Isopropylbenzene	ND		ug/l	2.5	0.70
p-Isopropyltoluene	ND		ug/l	2.5	0.70
Naphthalene	ND		ug/l	2.5	0.70
n-Propylbenzene	ND		ug/l	2.5	0.70
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70
Methyl Acetate	ND		ug/l	2.0	0.23
Ethyl Acetate	ND		ug/l	10	0.70
Cyclohexane	ND		ug/l	10	0.24
Ethyl-Tert-Butyl-Ether	ND		ug/l	2.5	0.70
Tertiary-Amyl Methyl Ether	ND		ug/l	2.0	0.28
1,4-Dioxane	ND		ug/l	250	41.
Freon-113	ND		ug/l	2.5	0.70
p-Diethylbenzene	ND		ug/l	2.0	0.70
p-Ethyltoluene	ND		ug/l	2.0	0.70
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.65
Tetrahydrofuran	ND		ug/l	5.0	1.5
Ethyl ether	ND		ug/l	2.5	0.70
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70
Iodomethane	ND		ug/l	5.0	5.0

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8260C  
 Analytical Date: 07/10/14 10:33  
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 08 Batch: WG704748-3					
Methyl cyclohexane	ND		ug/l	10	0.29

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	86		70-130
Dibromofluoromethane	102		70-130

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8260C  
**Analytical Date:** 07/11/14 10:16  
**Analyst:** PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 08 Batch: WG704748-6					
Methylene chloride	ND		ug/l	2.5	0.70
1,1-Dichloroethane	ND		ug/l	2.5	0.70
Chloroform	ND		ug/l	2.5	0.70
Carbon tetrachloride	ND		ug/l	0.50	0.13
1,2-Dichloropropane	ND		ug/l	1.0	0.13
Dibromochloromethane	ND		ug/l	0.50	0.15
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50
Tetrachloroethene	ND		ug/l	0.50	0.18
Chlorobenzene	ND		ug/l	2.5	0.70
Trichlorofluoromethane	ND		ug/l	2.5	0.70
1,2-Dichloroethane	ND		ug/l	0.50	0.13
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70
Bromodichloromethane	ND		ug/l	0.50	0.19
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14
1,3-Dichloropropene, Total	ND		ug/l	0.50	0.14
1,1-Dichloropropene	ND		ug/l	2.5	0.70
Bromoform	ND		ug/l	2.0	0.65
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.14
Benzene	ND		ug/l	0.50	0.16
Toluene	ND		ug/l	2.5	0.70
Ethylbenzene	ND		ug/l	2.5	0.70
Chloromethane	ND		ug/l	2.5	0.70
Bromomethane	ND		ug/l	2.5	0.70
Vinyl chloride	ND		ug/l	1.0	0.33
Chloroethane	ND		ug/l	2.5	0.70
1,1-Dichloroethene	ND		ug/l	0.50	0.14
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Trichloroethene	ND		ug/l	0.50	0.17

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8260C  
**Analytical Date:** 07/11/14 10:16  
**Analyst:** PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 08 Batch: WG704748-6					
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70
Methyl tert butyl ether	ND		ug/l	2.5	0.70
p/m-Xylene	ND		ug/l	2.5	0.70
o-Xylene	ND		ug/l	2.5	0.70
Xylenes, Total	ND		ug/l	2.5	0.70
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70
1,2-Dichloroethene, Total	ND		ug/l	2.5	0.70
Dibromomethane	ND		ug/l	5.0	1.0
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70
Acrylonitrile	ND		ug/l	5.0	1.5
Styrene	ND		ug/l	2.5	0.70
Dichlorodifluoromethane	ND		ug/l	5.0	1.0
Acetone	ND		ug/l	5.0	1.0
Carbon disulfide	ND		ug/l	5.0	1.0
2-Butanone	ND		ug/l	5.0	1.0
Vinyl acetate	ND		ug/l	5.0	1.0
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0
2-Hexanone	ND		ug/l	5.0	1.0
Bromochloromethane	ND		ug/l	2.5	0.70
2,2-Dichloropropane	ND		ug/l	2.5	0.70
1,2-Dibromoethane	ND		ug/l	2.0	0.65
1,3-Dichloropropane	ND		ug/l	2.5	0.70
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70
Bromobenzene	ND		ug/l	2.5	0.70
n-Butylbenzene	ND		ug/l	2.5	0.70
sec-Butylbenzene	ND		ug/l	2.5	0.70
tert-Butylbenzene	ND		ug/l	2.5	0.70

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8260C  
**Analytical Date:** 07/11/14 10:16  
**Analyst:** PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 08 Batch: WG704748-6					
o-Chlorotoluene	ND		ug/l	2.5	0.70
p-Chlorotoluene	ND		ug/l	2.5	0.70
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70
Hexachlorobutadiene	ND		ug/l	2.5	0.70
Isopropylbenzene	ND		ug/l	2.5	0.70
p-Isopropyltoluene	ND		ug/l	2.5	0.70
Naphthalene	ND		ug/l	2.5	0.70
n-Propylbenzene	ND		ug/l	2.5	0.70
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70
1,4-Dioxane	ND		ug/l	250	41.
p-Diethylbenzene	ND		ug/l	2.0	0.70
p-Ethyltoluene	ND		ug/l	2.0	0.70
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.65
Ethyl ether	ND		ug/l	2.5	0.70
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	86		70-130
Dibromofluoromethane	101		70-130

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8260C  
**Analytical Date:** 07/11/14 08:50  
**Analyst:** MV

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 04 Batch: WG705373-3					
Methylene chloride	ND		ug/kg	500	55.
1,1-Dichloroethane	ND		ug/kg	75	4.3
Chloroform	ND		ug/kg	75	18.
Carbon tetrachloride	ND		ug/kg	50	10.
1,2-Dichloropropane	ND		ug/kg	180	11.
Dibromochloromethane	ND		ug/kg	50	15.
2-Chloroethylvinyl ether	ND		ug/kg	1000	31.
1,1,2-Trichloroethane	ND		ug/kg	75	15.
Tetrachloroethene	ND		ug/kg	50	7.0
Chlorobenzene	ND		ug/kg	50	17.
Trichlorofluoromethane	ND		ug/kg	250	19.
1,2-Dichloroethane	ND		ug/kg	50	5.7
1,1,1-Trichloroethane	ND		ug/kg	50	5.5
Bromodichloromethane	ND		ug/kg	50	8.7
trans-1,3-Dichloropropene	ND		ug/kg	50	6.0
cis-1,3-Dichloropropene	ND		ug/kg	50	5.9
1,3-Dichloropropene, Total	ND		ug/kg	50	5.9
1,1-Dichloropropene	ND		ug/kg	250	7.1
Bromoform	ND		ug/kg	200	12.
1,1,2,2-Tetrachloroethane	ND		ug/kg	50	5.0
Benzene	ND		ug/kg	50	5.9
Toluene	17	J	ug/kg	75	9.7
Ethylbenzene	ND		ug/kg	50	6.4
Chloromethane	ND		ug/kg	250	15.
Bromomethane	22	J	ug/kg	100	17.
Vinyl chloride	ND		ug/kg	100	5.9
Chloroethane	ND		ug/kg	100	16.
1,1-Dichloroethene	ND		ug/kg	50	13.
trans-1,2-Dichloroethene	ND		ug/kg	75	11.

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8260C  
**Analytical Date:** 07/11/14 08:50  
**Analyst:** MV

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 04 Batch: WG705373-3					
Trichloroethene	ND		ug/kg	50	6.2
1,2-Dichlorobenzene	ND		ug/kg	250	7.7
1,3-Dichlorobenzene	ND		ug/kg	250	6.8
1,4-Dichlorobenzene	ND		ug/kg	250	6.9
Methyl tert butyl ether	ND		ug/kg	100	4.2
p/m-Xylene	ND		ug/kg	100	9.9
o-Xylene	ND		ug/kg	100	8.6
Xylene (Total)	ND		ug/kg	100	8.6
cis-1,2-Dichloroethene	ND		ug/kg	50	7.1
1,2-Dichloroethene (total)	ND		ug/kg	50	7.1
Dibromomethane	ND		ug/kg	500	8.2
Styrene	ND		ug/kg	100	15.
Dichlorodifluoromethane	ND		ug/kg	500	9.5
Acetone	ND		ug/kg	500	52.
Carbon disulfide	ND		ug/kg	500	55.
2-Butanone	ND		ug/kg	500	14.
Vinyl acetate	ND		ug/kg	500	6.6
4-Methyl-2-pentanone	ND		ug/kg	500	12.
1,2,3-Trichloropropane	ND		ug/kg	500	8.1
2-Hexanone	ND		ug/kg	500	33.
Bromochloromethane	ND		ug/kg	250	14.
2,2-Dichloropropane	ND		ug/kg	250	11.
1,2-Dibromoethane	ND		ug/kg	200	8.7
1,3-Dichloropropane	ND		ug/kg	250	7.3
1,1,1,2-Tetrachloroethane	ND		ug/kg	50	16.
Bromobenzene	ND		ug/kg	250	10.
n-Butylbenzene	ND		ug/kg	50	5.7
sec-Butylbenzene	ND		ug/kg	50	6.1
tert-Butylbenzene	ND		ug/kg	250	6.8

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8260C  
**Analytical Date:** 07/11/14 08:50  
**Analyst:** MV

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 04 Batch: WG705373-3					
o-Chlorotoluene	ND		ug/kg	250	8.0
p-Chlorotoluene	ND		ug/kg	250	7.7
1,2-Dibromo-3-chloropropane	ND		ug/kg	250	20.
Hexachlorobutadiene	ND		ug/kg	250	11.
Isopropylbenzene	ND		ug/kg	50	5.2
p-Isopropyltoluene	ND		ug/kg	50	6.2
Naphthalene	ND		ug/kg	250	6.9
Acrylonitrile	ND		ug/kg	500	26.
Isopropyl Ether	ND		ug/kg	200	7.0
tert-Butyl Alcohol	ND		ug/kg	3000	150
n-Propylbenzene	ND		ug/kg	50	5.5
1,2,3-Trichlorobenzene	ND		ug/kg	250	7.4
1,2,4-Trichlorobenzene	ND		ug/kg	250	9.1
1,3,5-Trimethylbenzene	ND		ug/kg	250	7.2
1,2,4-Trimethylbenzene	ND		ug/kg	250	7.1
Methyl Acetate	ND		ug/kg	1000	14.
Ethyl Acetate	ND		ug/kg	1000	46.
Acrolein	ND		ug/kg	1200	400
Cyclohexane	ND		ug/kg	1000	7.3
1,4-Dioxane	ND		ug/kg	5000	720
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		ug/kg	1000	14.
1,4-Diethylbenzene	ND		ug/kg	200	8.0
4-Ethyltoluene	ND		ug/kg	200	6.2
1,2,4,5-Tetramethylbenzene	ND		ug/kg	200	6.5
Tetrahydrofuran	ND		ug/kg	1000	50.
Ethyl ether	ND		ug/kg	250	13.
trans-1,4-Dichloro-2-butene	ND		ug/kg	250	20.
Methyl cyclohexane	ND		ug/kg	200	7.7
Ethyl-Tert-Butyl-Ether	ND		ug/kg	200	5.8

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8260C  
 Analytical Date: 07/11/14 08:50  
 Analyst: MV

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 04 Batch: WG705373-3					
Tertiary-Amyl Methyl Ether	ND		ug/kg	200	4.8

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	90		70-130

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 01-03,05-07 Batch: WG704694-1 WG704694-2								
Methylene chloride	99		98		70-130	1		30
1,1-Dichloroethane	102		103		70-130	1		30
Chloroform	110		111		70-130	1		30
Carbon tetrachloride	129		134	Q	70-130	4		30
1,2-Dichloropropane	98		98		70-130	0		30
Dibromochloromethane	107		108		70-130	1		30
2-Chloroethylvinyl ether	96		95		70-130	1		30
1,1,2-Trichloroethane	98		98		70-130	0		30
Tetrachloroethene	125		129		70-130	3		30
Chlorobenzene	108		111		70-130	3		30
Trichlorofluoromethane	120		126		70-139	5		30
1,2-Dichloroethane	108		107		70-130	1		30
1,1,1-Trichloroethane	123		126		70-130	2		30
Bromodichloromethane	109		108		70-130	1		30
trans-1,3-Dichloropropene	102		103		70-130	1		30
cis-1,3-Dichloropropene	106		106		70-130	0		30
1,1-Dichloropropene	115		118		70-130	3		30
Bromoform	102		100		70-130	2		30
1,1,2,2-Tetrachloroethane	90		88		70-130	2		30
Benzene	104		106		70-130	2		30
Toluene	104		107		70-130	3		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 01-03,05-07 Batch: WG704694-1 WG704694-2								
Ethylbenzene	110		113		70-130	3		30
Chloromethane	80		84		52-130	5		30
Bromomethane	103		104		57-147	1		30
Vinyl chloride	98		105		67-130	7		30
Chloroethane	105		108		50-151	3		30
1,1-Dichloroethene	106		111		65-135	5		30
trans-1,2-Dichloroethene	105		108		70-130	3		30
Trichloroethene	115		116		70-130	1		30
1,2-Dichlorobenzene	109		108		70-130	1		30
1,3-Dichlorobenzene	112		112		70-130	0		30
1,4-Dichlorobenzene	111		110		70-130	1		30
Methyl tert butyl ether	100		99		66-130	1		30
p/m-Xylene	113		117		70-130	3		30
o-Xylene	113		116		70-130	3		30
cis-1,2-Dichloroethene	107		110		70-130	3		30
Dibromomethane	104		103		70-130	1		30
Styrene	115		117		70-130	2		30
Dichlorodifluoromethane	104		109		30-146	5		30
Acetone	95		81		54-140	16		30
Carbon disulfide	96		101		59-130	5		30
2-Butanone	87		82		70-130	6		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 01-03,05-07 Batch: WG704694-1 WG704694-2								
Vinyl acetate	95		94		70-130	1		30
4-Methyl-2-pentanone	89		86		70-130	3		30
1,2,3-Trichloropropane	93		92		68-130	1		30
2-Hexanone	79		77		70-130	3		30
Bromochloromethane	112		112		70-130	0		30
2,2-Dichloropropane	119		122		70-130	2		30
1,2-Dibromoethane	101		103		70-130	2		30
1,3-Dichloropropane	97		98		69-130	1		30
1,1,1,2-Tetrachloroethane	113		115		70-130	2		30
Bromobenzene	107		107		70-130	0		30
n-Butylbenzene	114		116		70-130	2		30
sec-Butylbenzene	113		115		70-130	2		30
tert-Butylbenzene	114		116		70-130	2		30
o-Chlorotoluene	106		106		70-130	0		30
p-Chlorotoluene	106		106		70-130	0		30
1,2-Dibromo-3-chloropropane	92		90		68-130	2		30
Hexachlorobutadiene	124		127		67-130	2		30
Isopropylbenzene	118		122		70-130	3		30
p-Isopropyltoluene	116		118		70-130	2		30
Naphthalene	100		98		70-130	2		30
Acrylonitrile	89		88		70-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS		LCSD		%Recovery		RPD	RPD	
	%Recovery	Qual	%Recovery	Qual	Limits	Qual		Limits	
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 01-03,05-07 Batch: WG704694-1 WG704694-2									
Isopropyl Ether	95		94		66-130		1		30
tert-Butyl Alcohol	86		83		70-130		4		30
n-Propylbenzene	108		109		70-130		1		30
1,2,3-Trichlorobenzene	113		113		70-130		0		30
1,2,4-Trichlorobenzene	120		119		70-130		1		30
1,3,5-Trimethylbenzene	111		112		70-130		1		30
1,2,4-Trimethylbenzene	109		110		70-130		1		30
Methyl Acetate	79		79		51-146		0		30
Ethyl Acetate	84		82		70-130		2		30
Acrolein	90		90		70-130		0		30
Cyclohexane	110		116		59-142		5		30
1,4-Dioxane	100		98		65-136		2		30
1,1,2-Trichloro-1,2,2-Trifluoroethane	121		128		50-139		6		30
1,4-Diethylbenzene	134	Q	136	Q	70-130		1		30
4-Ethyltoluene	128		130		70-130		2		30
1,2,4,5-Tetramethylbenzene	129		128		70-130		1		30
Tetrahydrofuran	82		81		66-130		1		30
Ethyl ether	91		91		67-130		0		30
trans-1,4-Dichloro-2-butene	90		88		70-130		2		30
Methyl cyclohexane	119		126		70-130		6		30
Ethyl-Tert-Butyl-Ether	102		101		70-130		1		30

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 01-03,05-07 Batch: WG704694-1 WG704694-2								
Tertiary-Amyl Methyl Ether	103		102		70-130	1		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	103		102		70-130
Toluene-d8	95		97		70-130
4-Bromofluorobenzene	91		91		70-130
Dibromofluoromethane	106		105		70-130

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 08 Batch: WG704748-1 WG704748-2								
Methylene chloride	96		97		70-130	1		20
1,1-Dichloroethane	103		102		70-130	1		20
Chloroform	108		108		70-130	0		20
2-Chloroethylvinyl ether	85		86		70-130	1		20
Carbon tetrachloride	104		102		63-132	2		20
1,2-Dichloropropane	99		99		70-130	0		20
Dibromochloromethane	100		99		63-130	1		20
1,1,2-Trichloroethane	102		103		70-130	1		20
Tetrachloroethene	105		104		70-130	1		20
Chlorobenzene	101		100		75-130	1		20
Trichlorofluoromethane	109		106		62-150	3		20
1,2-Dichloroethane	102		104		70-130	2		20
1,1,1-Trichloroethane	109		108		67-130	1		20
Bromodichloromethane	100		99		67-130	1		20
trans-1,3-Dichloropropene	108		108		70-130	0		20
cis-1,3-Dichloropropene	86		87		70-130	1		20
1,1-Dichloropropene	107		105		70-130	2		20
Bromoform	89		91		54-136	2		20
1,1,2,2-Tetrachloroethane	89		90		67-130	1		20
Benzene	101		100		70-130	1		20
Toluene	104		103		70-130	1		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415006

Report Date: 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 08 Batch: WG704748-1 WG704748-2								
Ethylbenzene	107		105		70-130	2		20
Chloromethane	117		116		64-130	1		20
Bromomethane	98		99		39-139	1		20
Vinyl chloride	106		103		55-140	3		20
Chloroethane	123		122		55-138	1		20
1,1-Dichloroethene	104		102		61-145	2		20
trans-1,2-Dichloroethene	105		103		70-130	2		20
Trichloroethene	101		100		70-130	1		20
1,2-Dichlorobenzene	96		96		70-130	0		20
1,3-Dichlorobenzene	103		102		70-130	1		20
1,4-Dichlorobenzene	101		101		70-130	0		20
Methyl tert butyl ether	100		101		63-130	1		20
p/m-Xylene	113		112		70-130	1		20
o-Xylene	108		107		70-130	1		20
cis-1,2-Dichloroethene	105		103		70-130	2		20
Dibromomethane	95		96		70-130	1		20
1,2,3-Trichloropropane	103		105		64-130	2		20
Acrylonitrile	98		103		70-130	5		20
Diisopropyl Ether	101		101		70-130	0		20
Tert-Butyl Alcohol	94		97		70-130	3		20
Styrene	120		118		70-130	2		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 08 Batch: WG704748-1 WG704748-2								
Dichlorodifluoromethane	104		102		36-147	2		20
Acetone	119		115		58-148	3		20
Carbon disulfide	97		95		51-130	2		20
2-Butanone	91		92		63-138	1		20
Vinyl acetate	101		102		70-130	1		20
4-Methyl-2-pentanone	83		86		59-130	4		20
2-Hexanone	101		101		57-130	0		20
Bromochloromethane	103		103		70-130	0		20
2,2-Dichloropropane	110		108		63-133	2		20
1,2-Dibromoethane	99		101		70-130	2		20
1,3-Dichloropropane	102		103		70-130	1		20
1,1,1,2-Tetrachloroethane	115		116		64-130	1		20
Bromobenzene	78		78		70-130	0		20
n-Butylbenzene	108		106		53-136	2		20
sec-Butylbenzene	99		97		70-130	2		20
tert-Butylbenzene	92		90		70-130	2		20
o-Chlorotoluene	103		103		70-130	0		20
p-Chlorotoluene	97		96		70-130	1		20
1,2-Dibromo-3-chloropropane	98		99		41-144	1		20
Hexachlorobutadiene	95		94		63-130	1		20
Isopropylbenzene	76		75		70-130	1		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 08 Batch: WG704748-1 WG704748-2								
p-Isopropyltoluene	101		99		70-130	2		20
Naphthalene	87		89		70-130	2		20
n-Propylbenzene	90		89		69-130	1		20
1,2,3-Trichlorobenzene	90		93		70-130	3		20
1,2,4-Trichlorobenzene	100		100		70-130	0		20
1,3,5-Trimethylbenzene	107		106		64-130	1		20
1,2,4-Trimethylbenzene	101		100		70-130	1		20
Methyl Acetate	97		98		70-130	1		20
Ethyl Acetate	98		100		70-130	2		20
Cyclohexane	106		104		70-130	2		20
Ethyl-Tert-Butyl-Ether	102		102		70-130	0		20
Tertiary-Amyl Methyl Ether	97		98		66-130	1		20
1,4-Dioxane	90		90		56-162	0		20
Freon-113	111		108		70-130	3		20
p-Diethylbenzene	100		98		70-130	2		20
p-Ethyltoluene	97		95		70-130	2		20
1,2,4,5-Tetramethylbenzene	96		97		70-130	1		20
Ethyl ether	99		100		59-134	1		20
trans-1,4-Dichloro-2-butene	82		84		70-130	2		20
Iodomethane	87		86		70-130	1		20
Methyl cyclohexane	100		98		70-130	2		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
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Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 08 Batch: WG704748-1 WG704748-2

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	101		103		70-130
Toluene-d8	104		104		70-130
4-Bromofluorobenzene	83		84		70-130
Dibromofluoromethane	107		107		70-130

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415006

Report Date: 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 08 Batch: WG704748-4 WG704748-5								
Methylene chloride	94		95		70-130	1		20
1,1-Dichloroethane	104		105		70-130	1		20
Chloroform	109		110		70-130	1		20
Carbon tetrachloride	104		103		63-132	1		20
1,2-Dichloropropane	99		100		70-130	1		20
Dibromochloromethane	98		99		63-130	1		20
1,1,2-Trichloroethane	102		103		70-130	1		20
Tetrachloroethene	103		104		70-130	1		20
Chlorobenzene	100		102		75-130	2		20
Trichlorofluoromethane	108		109		62-150	1		20
1,2-Dichloroethane	103		104		70-130	1		20
1,1,1-Trichloroethane	108		108		67-130	0		20
Bromodichloromethane	99		100		67-130	1		20
trans-1,3-Dichloropropene	109		110		70-130	1		20
cis-1,3-Dichloropropene	87		88		70-130	1		20
1,1-Dichloropropene	107		106		70-130	1		20
Bromoform	90		90		54-136	0		20
1,1,2,2-Tetrachloroethane	90		90		67-130	0		20
Benzene	101		102		70-130	1		20
Toluene	103		104		70-130	1		20
Ethylbenzene	106		108		70-130	2		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415006

Report Date: 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 08 Batch: WG704748-4 WG704748-5								
Chloromethane	121		123		64-130	2		20
Bromomethane	91		100		39-139	9		20
Vinyl chloride	106		106		55-140	0		20
Chloroethane	120		122		55-138	2		20
1,1-Dichloroethene	105		105		61-145	0		20
trans-1,2-Dichloroethene	104		105		70-130	1		20
Trichloroethene	100		101		70-130	1		20
1,2-Dichlorobenzene	96		96		70-130	0		20
1,3-Dichlorobenzene	102		102		70-130	0		20
1,4-Dichlorobenzene	99		101		70-130	2		20
Methyl tert butyl ether	98		100		63-130	2		20
p/m-Xylene	113		114		70-130	1		20
o-Xylene	108		110		70-130	2		20
cis-1,2-Dichloroethene	102		103		70-130	1		20
Dibromomethane	94		96		70-130	2		20
1,2,3-Trichloropropane	105		106		64-130	1		20
Acrylonitrile	103		101		70-130	2		20
Styrene	121		122		70-130	1		20
Dichlorodifluoromethane	105		104		36-147	1		20
Acetone	92		94		58-148	2		20
Carbon disulfide	97		97		51-130	0		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 08 Batch: WG704748-4 WG704748-5								
2-Butanone	87		84		63-138	4		20
Vinyl acetate	102		103		70-130	1		20
4-Methyl-2-pentanone	82		83		59-130	1		20
2-Hexanone	93		92		57-130	1		20
Bromochloromethane	102		104		70-130	2		20
2,2-Dichloropropane	109		108		63-133	1		20
1,2-Dibromoethane	99		100		70-130	1		20
1,3-Dichloropropane	102		104		70-130	2		20
1,1,1,2-Tetrachloroethane	115		116		64-130	1		20
Bromobenzene	77		78		70-130	1		20
n-Butylbenzene	108		108		53-136	0		20
sec-Butylbenzene	98		98		70-130	0		20
tert-Butylbenzene	90		91		70-130	1		20
o-Chlorotoluene	103		104		70-130	1		20
p-Chlorotoluene	98		98		70-130	0		20
1,2-Dibromo-3-chloropropane	96		96		41-144	0		20
Hexachlorobutadiene	90		90		63-130	0		20
Isopropylbenzene	76		76		70-130	0		20
p-Isopropyltoluene	100		100		70-130	0		20
Naphthalene	85		84		70-130	1		20
n-Propylbenzene	90		91		69-130	1		20

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 08 Batch: WG704748-4 WG704748-5								
1,2,3-Trichlorobenzene	87		86		70-130	1		20
1,2,4-Trichlorobenzene	95		96		70-130	1		20
1,3,5-Trimethylbenzene	107		108		64-130	1		20
1,2,4-Trimethylbenzene	101		100		70-130	1		20
1,4-Dioxane	99		97		56-162	2		20
p-Diethylbenzene	98		98		70-130	0		20
p-Ethyltoluene	96		97		70-130	1		20
1,2,4,5-Tetramethylbenzene	95		96		70-130	1		20
Ethyl ether	100		101		59-134	1		20
trans-1,4-Dichloro-2-butene	90		89		70-130	1		20

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	102		102		70-130
Toluene-d8	104		104		70-130
4-Bromofluorobenzene	84		85		70-130
Dibromofluoromethane	105		105		70-130

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 04 Batch: WG705373-1 WG705373-2								
Methylene chloride	91		81		70-130	12		30
1,1-Dichloroethane	101		90		70-130	12		30
Chloroform	105		94		70-130	11		30
Carbon tetrachloride	114		103		70-130	10		30
1,2-Dichloropropane	104		95		70-130	9		30
Dibromochloromethane	109		100		70-130	9		30
2-Chloroethylvinyl ether	137	Q	129		70-130	6		30
1,1,2-Trichloroethane	108		99		70-130	9		30
Tetrachloroethene	112		102		70-130	9		30
Chlorobenzene	108		99		70-130	9		30
Trichlorofluoromethane	111		98		70-139	12		30
1,2-Dichloroethane	103		93		70-130	10		30
1,1,1-Trichloroethane	112		101		70-130	10		30
Bromodichloromethane	106		98		70-130	8		30
trans-1,3-Dichloropropene	107		98		70-130	9		30
cis-1,3-Dichloropropene	97		89		70-130	9		30
1,1-Dichloropropene	110		99		70-130	11		30
Bromoform	94		86		70-130	9		30
1,1,2,2-Tetrachloroethane	106		97		70-130	9		30
Benzene	106		95		70-130	11		30
Toluene	99		90		70-130	10		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 04 Batch: WG705373-1 WG705373-2								
Ethylbenzene	112		101		70-130	10		30
Chloromethane	98		81		52-130	19		30
Bromomethane	97		87		57-147	11		30
Vinyl chloride	101		88		67-130	14		30
Chloroethane	128		107		50-151	18		30
1,1-Dichloroethene	103		90		65-135	13		30
trans-1,2-Dichloroethene	101		90		70-130	12		30
Trichloroethene	109		99		70-130	10		30
1,2-Dichlorobenzene	108		101		70-130	7		30
1,3-Dichlorobenzene	113		104		70-130	8		30
1,4-Dichlorobenzene	112		103		70-130	8		30
Methyl tert butyl ether	98		90		66-130	9		30
p/m-Xylene	112		101		70-130	10		30
o-Xylene	97		90		70-130	7		30
cis-1,2-Dichloroethene	107		96		70-130	11		30
Dibromomethane	103		96		70-130	7		30
Styrene	96		88		70-130	9		30
Dichlorodifluoromethane	104		88		30-146	17		30
Acetone	97		88		54-140	10		30
Carbon disulfide	92		80		59-130	14		30
2-Butanone	86		80		70-130	7		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 04 Batch: WG705373-1 WG705373-2								
Vinyl acetate	84		77		70-130	9		30
4-Methyl-2-pentanone	83		81		70-130	2		30
1,2,3-Trichloropropane	102		95		68-130	7		30
2-Hexanone	85		84		70-130	1		30
Bromochloromethane	108		98		70-130	10		30
2,2-Dichloropropane	111		98		70-130	12		30
1,2-Dibromoethane	108		100		70-130	8		30
1,3-Dichloropropane	109		100		69-130	9		30
1,1,1,2-Tetrachloroethane	110		100		70-130	10		30
Bromobenzene	111		101		70-130	9		30
n-Butylbenzene	122		110		70-130	10		30
sec-Butylbenzene	121		109		70-130	10		30
tert-Butylbenzene	107		98		70-130	9		30
o-Chlorotoluene	116		107		70-130	8		30
p-Chlorotoluene	120		108		70-130	11		30
1,2-Dibromo-3-chloropropane	92		85		68-130	8		30
Hexachlorobutadiene	122		113		67-130	8		30
Isopropylbenzene	106		96		70-130	10		30
p-Isopropyltoluene	107		96		70-130	11		30
Naphthalene	108		103		70-130	5		30
Acrylonitrile	85		76		70-130	11		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 04 Batch: WG705373-1 WG705373-2								
Isopropyl Ether	98		89		66-130	10		30
tert-Butyl Alcohol	91		87		70-130	4		30
n-Propylbenzene	117		106		70-130	10		30
1,2,3-Trichlorobenzene	116		110		70-130	5		30
1,2,4-Trichlorobenzene	122		114		70-130	7		30
1,3,5-Trimethylbenzene	119		108		70-130	10		30
1,2,4-Trimethylbenzene	107		97		70-130	10		30
Methyl Acetate	85		79		51-146	7		30
Ethyl Acetate	81		76		70-130	6		30
Acrolein	81		72		70-130	12		30
Cyclohexane	96		87		59-142	10		30
1,4-Dioxane	88		85		65-136	3		30
1,1,2-Trichloro-1,2,2-Trifluoroethane	114		98		50-139	15		30
1,4-Diethylbenzene	106		95		70-130	11		30
4-Ethyltoluene	120		108		70-130	11		30
1,2,4,5-Tetramethylbenzene	101		92		70-130	9		30
Tetrahydrofuran	80		73		66-130	9		30
Ethyl ether	97		86		67-130	12		30
trans-1,4-Dichloro-2-butene	105		97		70-130	8		30
Methyl cyclohexane	107		96		70-130	11		30
Ethyl-Tert-Butyl-Ether	89		81		70-130	9		30

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 04 Batch: WG705373-1 WG705373-2								
Tertiary-Amyl Methyl Ether	94		86		70-130	9		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	99		97		70-130
Toluene-d8	100		98		70-130
4-Bromofluorobenzene	102		102		70-130
Dibromofluoromethane	102		101		70-130

# SEMIVOLATILES

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-01  
**Client ID:** S-1S  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8270D  
**Analytical Date:** 07/12/14 17:24  
**Analyst:** JB  
**Percent Solids:** 86%

**Date Collected:** 07/08/14 11:10  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 07/10/14 18:36

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Semivolatile Organics by GC/MS - Westborough Lab</b>						
Acenaphthene	ND		ug/kg	150	40.	1
1,2,4-Trichlorobenzene	ND		ug/kg	190	63.	1
Hexachlorobenzene	ND		ug/kg	120	36.	1
Bis(2-chloroethyl)ether	ND		ug/kg	170	54.	1
2-Chloronaphthalene	ND		ug/kg	190	63.	1
1,2-Dichlorobenzene	ND		ug/kg	190	63.	1
1,3-Dichlorobenzene	ND		ug/kg	190	61.	1
1,4-Dichlorobenzene	ND		ug/kg	190	59.	1
3,3'-Dichlorobenzidine	ND		ug/kg	190	51.	1
2,4-Dinitrotoluene	ND		ug/kg	190	42.	1
2,6-Dinitrotoluene	ND		ug/kg	190	50.	1
Fluoranthene	180		ug/kg	120	36.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	190	59.	1
4-Bromophenyl phenyl ether	ND		ug/kg	190	44.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	230	68.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	210	58.	1
Hexachlorobutadiene	ND		ug/kg	190	54.	1
Hexachlorocyclopentadiene	ND		ug/kg	550	120	1
Hexachloroethane	ND		ug/kg	150	35.	1
Isophorone	ND		ug/kg	170	51.	1
Naphthalene	ND		ug/kg	190	64.	1
Nitrobenzene	ND		ug/kg	170	46.	1
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	150	41.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	190	58.	1
Bis(2-Ethylhexyl)phthalate	100	J	ug/kg	190	51.	1
Butyl benzyl phthalate	ND		ug/kg	190	38.	1
Di-n-butylphthalate	ND		ug/kg	190	37.	1
Di-n-octylphthalate	ND		ug/kg	190	48.	1
Diethyl phthalate	ND		ug/kg	190	41.	1
Dimethyl phthalate	ND		ug/kg	190	49.	1

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-01

Date Collected: 07/08/14 11:10

Client ID: S-1S

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Benzo(a)anthracene	72	J	ug/kg	120	38.	1
Benzo(a)pyrene	72	J	ug/kg	150	47.	1
Benzo(b)fluoranthene	79	J	ug/kg	120	39.	1
Benzo(k)fluoranthene	37	J	ug/kg	120	37.	1
Chrysene	74	J	ug/kg	120	38.	1
Acenaphthylene	ND		ug/kg	150	36.	1
Anthracene	36	J	ug/kg	120	32.	1
Benzo(ghi)perylene	66	J	ug/kg	150	40.	1
Fluorene	ND		ug/kg	190	55.	1
Phenanthrene	150		ug/kg	120	38.	1
Dibenzo(a,h)anthracene	ND		ug/kg	120	37.	1
Indeno(1,2,3-cd)Pyrene	45	J	ug/kg	150	43.	1
Pyrene	150		ug/kg	120	38.	1
Biphenyl	ND		ug/kg	440	64.	1
4-Chloroaniline	ND		ug/kg	190	51.	1
2-Nitroaniline	ND		ug/kg	190	54.	1
3-Nitroaniline	ND		ug/kg	190	53.	1
4-Nitroaniline	ND		ug/kg	190	52.	1
Dibenzofuran	ND		ug/kg	190	64.	1
2-Methylnaphthalene	ND		ug/kg	230	62.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	190	60.	1
Acetophenone	ND		ug/kg	190	60.	1
2,4,6-Trichlorophenol	ND		ug/kg	120	36.	1
P-Chloro-M-Cresol	ND		ug/kg	190	56.	1
2-Chlorophenol	ND		ug/kg	190	58.	1
2,4-Dichlorophenol	ND		ug/kg	170	63.	1
2,4-Dimethylphenol	ND		ug/kg	190	58.	1
2-Nitrophenol	ND		ug/kg	420	60.	1
4-Nitrophenol	ND		ug/kg	270	63.	1
2,4-Dinitrophenol	ND		ug/kg	930	260	1
4,6-Dinitro-o-cresol	ND		ug/kg	500	71.	1
Pentachlorophenol	ND		ug/kg	150	41.	1
Phenol	ND		ug/kg	190	57.	1
2-Methylphenol	ND		ug/kg	190	62.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	280	63.	1
2,4,5-Trichlorophenol	ND		ug/kg	190	63.	1
Benzoic Acid	ND		ug/kg	630	200	1
Benzyl Alcohol	ND		ug/kg	190	60.	1
Carbazole	ND		ug/kg	190	42.	1

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-01

Date Collected: 07/08/14 11:10

Client ID: S-1S

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	85		25-120
Phenol-d6	79		10-120
Nitrobenzene-d5	75		23-120
2-Fluorobiphenyl	79		30-120
2,4,6-Tribromophenol	105		0-136
4-Terphenyl-d14	100		18-120

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-02  
**Client ID:** S-1D  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8270D  
**Analytical Date:** 07/12/14 17:52  
**Analyst:** JB  
**Percent Solids:** 64%

**Date Collected:** 07/08/14 11:15  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 07/10/14 18:36

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Semivolatile Organics by GC/MS - Westborough Lab</b>						
Acenaphthene	ND		ug/kg	200	52.	1
1,2,4-Trichlorobenzene	ND		ug/kg	250	82.	1
Hexachlorobenzene	ND		ug/kg	150	47.	1
Bis(2-chloroethyl)ether	ND		ug/kg	230	70.	1
2-Chloronaphthalene	ND		ug/kg	250	82.	1
1,2-Dichlorobenzene	ND		ug/kg	250	82.	1
1,3-Dichlorobenzene	ND		ug/kg	250	79.	1
1,4-Dichlorobenzene	ND		ug/kg	250	76.	1
3,3'-Dichlorobenzidine	ND		ug/kg	250	67.	1
2,4-Dinitrotoluene	ND		ug/kg	250	54.	1
2,6-Dinitrotoluene	ND		ug/kg	250	64.	1
Fluoranthene	3100		ug/kg	150	46.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	250	76.	1
4-Bromophenyl phenyl ether	ND		ug/kg	250	58.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	300	88.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	270	76.	1
Hexachlorobutadiene	ND		ug/kg	250	71.	1
Hexachlorocyclopentadiene	ND		ug/kg	720	160	1
Hexachloroethane	ND		ug/kg	200	46.	1
Isophorone	ND		ug/kg	230	67.	1
Naphthalene	3000		ug/kg	250	84.	1
Nitrobenzene	ND		ug/kg	230	60.	1
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	200	53.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	250	75.	1
Bis(2-Ethylhexyl)phthalate	1500		ug/kg	250	66.	1
Butyl benzyl phthalate	ND		ug/kg	250	49.	1
Di-n-butylphthalate	ND		ug/kg	250	48.	1
Di-n-octylphthalate	ND		ug/kg	250	62.	1
Diethyl phthalate	ND		ug/kg	250	53.	1
Dimethyl phthalate	ND		ug/kg	250	64.	1

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-02

Date Collected: 07/08/14 11:15

Client ID: S-1D

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Benzo(a)anthracene	1800		ug/kg	150	49.	1
Benzo(a)pyrene	1700		ug/kg	200	62.	1
Benzo(b)fluoranthene	1900		ug/kg	150	51.	1
Benzo(k)fluoranthene	720		ug/kg	150	48.	1
Chrysene	1700		ug/kg	150	49.	1
Acenaphthylene	370		ug/kg	200	47.	1
Anthracene	780		ug/kg	150	42.	1
Benzo(ghi)perylene	1100		ug/kg	200	52.	1
Fluorene	410		ug/kg	250	72.	1
Phenanthrene	2800		ug/kg	150	49.	1
Dibenzo(a,h)anthracene	260		ug/kg	150	49.	1
Indeno(1,2,3-cd)Pyrene	910		ug/kg	200	56.	1
Pyrene	3200		ug/kg	150	49.	1
Biphenyl	640		ug/kg	570	83.	1
4-Chloroaniline	ND		ug/kg	250	66.	1
2-Nitroaniline	ND		ug/kg	250	71.	1
3-Nitroaniline	ND		ug/kg	250	69.	1
4-Nitroaniline	ND		ug/kg	250	68.	1
Dibenzofuran	280		ug/kg	250	84.	1
2-Methylnaphthalene	4300		ug/kg	300	80.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	250	78.	1
Acetophenone	ND		ug/kg	250	78.	1
2,4,6-Trichlorophenol	ND		ug/kg	150	47.	1
P-Chloro-M-Cresol	ND		ug/kg	250	73.	1
2-Chlorophenol	ND		ug/kg	250	76.	1
2,4-Dichlorophenol	ND		ug/kg	230	82.	1
2,4-Dimethylphenol	ND		ug/kg	250	75.	1
2-Nitrophenol	ND		ug/kg	540	78.	1
4-Nitrophenol	ND		ug/kg	350	82.	1
2,4-Dinitrophenol	ND		ug/kg	1200	340	1
4,6-Dinitro-o-cresol	ND		ug/kg	650	92.	1
Pentachlorophenol	ND		ug/kg	200	54.	1
Phenol	480		ug/kg	250	74.	1
2-Methylphenol	ND		ug/kg	250	81.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	360	82.	1
2,4,5-Trichlorophenol	ND		ug/kg	250	82.	1
Benzoic Acid	ND		ug/kg	820	250	1
Benzyl Alcohol	ND		ug/kg	250	78.	1
Carbazole	ND		ug/kg	250	54.	1

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-02

Date Collected: 07/08/14 11:15

Client ID: S-1D

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	71		25-120
Phenol-d6	73		10-120
Nitrobenzene-d5	77		23-120
2-Fluorobiphenyl	86		30-120
2,4,6-Tribromophenol	100		0-136
4-Terphenyl-d14	98		18-120

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-03 D  
 Client ID: S-2S  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil  
 Analytical Method: 1,8270D  
 Analytical Date: 07/12/14 18:20  
 Analyst: JB  
 Percent Solids: 82%

Date Collected: 07/08/14 11:30  
 Date Received: 07/08/14  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 07/10/14 18:36

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Semivolatile Organics by GC/MS - Westborough Lab</b>						
Acenaphthene	ND		ug/kg	1600	420	10
1,2,4-Trichlorobenzene	ND		ug/kg	2000	660	10
Hexachlorobenzene	ND		ug/kg	1200	380	10
Bis(2-chloroethyl)ether	ND		ug/kg	1800	560	10
2-Chloronaphthalene	ND		ug/kg	2000	660	10
1,2-Dichlorobenzene	ND		ug/kg	2000	660	10
1,3-Dichlorobenzene	ND		ug/kg	2000	640	10
1,4-Dichlorobenzene	ND		ug/kg	2000	610	10
3,3'-Dichlorobenzidine	ND		ug/kg	2000	540	10
2,4-Dinitrotoluene	ND		ug/kg	2000	430	10
2,6-Dinitrotoluene	ND		ug/kg	2000	520	10
Fluoranthene	3600		ug/kg	1200	370	10
4-Chlorophenyl phenyl ether	ND		ug/kg	2000	610	10
4-Bromophenyl phenyl ether	ND		ug/kg	2000	460	10
Bis(2-chloroisopropyl)ether	ND		ug/kg	2400	710	10
Bis(2-chloroethoxy)methane	ND		ug/kg	2200	610	10
Hexachlorobutadiene	ND		ug/kg	2000	570	10
Hexachlorocyclopentadiene	ND		ug/kg	5800	1300	10
Hexachloroethane	ND		ug/kg	1600	370	10
Isophorone	ND		ug/kg	1800	540	10
Naphthalene	ND		ug/kg	2000	670	10
Nitrobenzene	ND		ug/kg	1800	480	10
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	1600	420	10
n-Nitrosodi-n-propylamine	ND		ug/kg	2000	600	10
Bis(2-Ethylhexyl)phthalate	ND		ug/kg	2000	530	10
Butyl benzyl phthalate	ND		ug/kg	2000	390	10
Di-n-butylphthalate	ND		ug/kg	2000	390	10
Di-n-octylphthalate	ND		ug/kg	2000	500	10
Diethyl phthalate	ND		ug/kg	2000	420	10
Dimethyl phthalate	ND		ug/kg	2000	510	10

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-03 D  
 Client ID: S-2S  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Date Collected: 07/08/14 11:30  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Benzo(a)anthracene	2100		ug/kg	1200	390	10
Benzo(a)pyrene	2000		ug/kg	1600	490	10
Benzo(b)fluoranthene	2600		ug/kg	1200	410	10
Benzo(k)fluoranthene	910	J	ug/kg	1200	380	10
Chrysene	2300		ug/kg	1200	400	10
Acenaphthylene	ND		ug/kg	1600	380	10
Anthracene	360	J	ug/kg	1200	340	10
Benzo(ghi)perylene	1300	J	ug/kg	1600	420	10
Fluorene	ND		ug/kg	2000	580	10
Phenanthrene	1500		ug/kg	1200	390	10
Dibenzo(a,h)anthracene	ND		ug/kg	1200	390	10
Indeno(1,2,3-cd)Pyrene	1100	J	ug/kg	1600	450	10
Pyrene	3200		ug/kg	1200	390	10
Biphenyl	ND		ug/kg	4600	660	10
4-Chloroaniline	ND		ug/kg	2000	530	10
2-Nitroaniline	ND		ug/kg	2000	570	10
3-Nitroaniline	ND		ug/kg	2000	560	10
4-Nitroaniline	ND		ug/kg	2000	540	10
Dibenzofuran	ND		ug/kg	2000	670	10
2-Methylnaphthalene	ND		ug/kg	2400	640	10
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	2000	620	10
Acetophenone	ND		ug/kg	2000	620	10
2,4,6-Trichlorophenol	ND		ug/kg	1200	380	10
P-Chloro-M-Cresol	ND		ug/kg	2000	580	10
2-Chlorophenol	ND		ug/kg	2000	610	10
2,4-Dichlorophenol	ND		ug/kg	1800	650	10
2,4-Dimethylphenol	ND		ug/kg	2000	600	10
2-Nitrophenol	ND		ug/kg	4400	630	10
4-Nitrophenol	ND		ug/kg	2800	650	10
2,4-Dinitrophenol	ND		ug/kg	9700	2800	10
4,6-Dinitro-o-cresol	ND		ug/kg	5200	740	10
Pentachlorophenol	ND		ug/kg	1600	430	10
Phenol	ND		ug/kg	2000	600	10
2-Methylphenol	ND		ug/kg	2000	650	10
3-Methylphenol/4-Methylphenol	ND		ug/kg	2900	660	10
2,4,5-Trichlorophenol	ND		ug/kg	2000	650	10
Benzoic Acid	ND		ug/kg	6500	2000	10
Benzyl Alcohol	ND		ug/kg	2000	620	10
Carbazole	ND		ug/kg	2000	430	10

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-03 D

Date Collected: 07/08/14 11:30

Client ID: S-2S

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	67		25-120
Phenol-d6	61		10-120
Nitrobenzene-d5	57		23-120
2-Fluorobiphenyl	64		30-120
2,4,6-Tribromophenol	81		0-136
4-Terphenyl-d14	66		18-120

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-04 D  
 Client ID: S-2D  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil  
 Analytical Method: 1,8270D  
 Analytical Date: 07/15/14 13:48  
 Analyst: JB  
 Percent Solids: 58%

Date Collected: 07/08/14 11:35  
 Date Received: 07/08/14  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 07/10/14 18:36

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Semivolatile Organics by GC/MS - Westborough Lab</b>						
Acenaphthene	ND		ug/kg	1100	290	5
1,2,4-Trichlorobenzene	ND		ug/kg	1400	460	5
Hexachlorobenzene	ND		ug/kg	840	260	5
Bis(2-chloroethyl)ether	ND		ug/kg	1300	390	5
2-Chloronaphthalene	ND		ug/kg	1400	460	5
1,2-Dichlorobenzene	ND		ug/kg	1400	460	5
1,3-Dichlorobenzene	ND		ug/kg	1400	440	5
1,4-Dichlorobenzene	ND		ug/kg	1400	420	5
3,3'-Dichlorobenzidine	ND		ug/kg	1400	370	5
2,4-Dinitrotoluene	ND		ug/kg	1400	300	5
2,6-Dinitrotoluene	ND		ug/kg	1400	360	5
Fluoranthene	1300		ug/kg	840	260	5
4-Chlorophenyl phenyl ether	ND		ug/kg	1400	430	5
4-Bromophenyl phenyl ether	ND		ug/kg	1400	320	5
Bis(2-chloroisopropyl)ether	ND		ug/kg	1700	490	5
Bis(2-chloroethoxy)methane	ND		ug/kg	1500	420	5
Hexachlorobutadiene	ND		ug/kg	1400	390	5
Hexachlorocyclopentadiene	ND		ug/kg	4000	900	5
Hexachloroethane	ND		ug/kg	1100	250	5
Isophorone	ND		ug/kg	1300	370	5
Naphthalene	19000		ug/kg	1400	460	5
Nitrobenzene	ND		ug/kg	1300	330	5
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	1100	290	5
n-Nitrosodi-n-propylamine	ND		ug/kg	1400	420	5
Bis(2-Ethylhexyl)phthalate	13000		ug/kg	1400	370	5
Butyl benzyl phthalate	ND		ug/kg	1400	270	5
Di-n-butylphthalate	ND		ug/kg	1400	270	5
Di-n-octylphthalate	ND		ug/kg	1400	340	5
Diethyl phthalate	ND		ug/kg	1400	300	5
Dimethyl phthalate	ND		ug/kg	1400	360	5

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-04 D  
 Client ID: S-2D  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Date Collected: 07/08/14 11:35  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Benzo(a)anthracene	380	J	ug/kg	840	270	5
Benzo(a)pyrene	ND		ug/kg	1100	340	5
Benzo(b)fluoranthene	450	J	ug/kg	840	280	5
Benzo(k)fluoranthene	ND		ug/kg	840	270	5
Chrysene	540	J	ug/kg	840	280	5
Acenaphthylene	ND		ug/kg	1100	260	5
Anthracene	1000		ug/kg	840	230	5
Benzo(ghi)perylene	ND		ug/kg	1100	290	5
Fluorene	5800		ug/kg	1400	400	5
Phenanthrene	8700		ug/kg	840	270	5
Dibenzo(a,h)anthracene	ND		ug/kg	840	270	5
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	1100	310	5
Pyrene	2400		ug/kg	840	270	5
Biphenyl	4500		ug/kg	3200	460	5
4-Chloroaniline	ND		ug/kg	1400	370	5
2-Nitroaniline	ND		ug/kg	1400	390	5
3-Nitroaniline	ND		ug/kg	1400	390	5
4-Nitroaniline	ND		ug/kg	1400	380	5
Dibenzofuran	ND		ug/kg	1400	470	5
2-Methylnaphthalene	40000		ug/kg	1700	450	5
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	1400	430	5
Acetophenone	ND		ug/kg	1400	430	5
2,4,6-Trichlorophenol	ND		ug/kg	840	260	5
P-Chloro-M-Cresol	ND		ug/kg	1400	410	5
2-Chlorophenol	ND		ug/kg	1400	420	5
2,4-Dichlorophenol	ND		ug/kg	1300	450	5
2,4-Dimethylphenol	ND		ug/kg	1400	420	5
2-Nitrophenol	ND		ug/kg	3000	440	5
4-Nitrophenol	ND		ug/kg	2000	450	5
2,4-Dinitrophenol	ND		ug/kg	6700	1900	5
4,6-Dinitro-o-cresol	ND		ug/kg	3600	510	5
Pentachlorophenol	ND		ug/kg	1100	300	5
Phenol	ND		ug/kg	1400	410	5
2-Methylphenol	ND		ug/kg	1400	450	5
3-Methylphenol/4-Methylphenol	ND		ug/kg	2000	460	5
2,4,5-Trichlorophenol	ND		ug/kg	1400	450	5
Benzoic Acid	ND		ug/kg	4500	1400	5
Benzyl Alcohol	ND		ug/kg	1400	430	5
Carbazole	ND		ug/kg	1400	300	5

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-04 D

Date Collected: 07/08/14 11:35

Client ID: S-2D

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	70		25-120
Phenol-d6	71		10-120
Nitrobenzene-d5	78		23-120
2-Fluorobiphenyl	99		30-120
2,4,6-Tribromophenol	96		0-136
4-Terphenyl-d14	98		18-120

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-05  
**Client ID:** S-3S  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8270D  
**Analytical Date:** 07/12/14 19:15  
**Analyst:** JB  
**Percent Solids:** 88%

**Date Collected:** 07/08/14 12:20  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 07/10/14 18:37

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Semivolatile Organics by GC/MS - Westborough Lab</b>						
Acenaphthene	ND		ug/kg	150	38.	1
1,2,4-Trichlorobenzene	ND		ug/kg	180	61.	1
Hexachlorobenzene	ND		ug/kg	110	35.	1
Bis(2-chloroethyl)ether	ND		ug/kg	170	52.	1
2-Chloronaphthalene	ND		ug/kg	180	60.	1
1,2-Dichlorobenzene	ND		ug/kg	180	61.	1
1,3-Dichlorobenzene	ND		ug/kg	180	58.	1
1,4-Dichlorobenzene	ND		ug/kg	180	56.	1
3,3'-Dichlorobenzidine	ND		ug/kg	180	49.	1
2,4-Dinitrotoluene	ND		ug/kg	180	40.	1
2,6-Dinitrotoluene	ND		ug/kg	180	48.	1
Fluoranthene	ND		ug/kg	110	34.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	180	56.	1
4-Bromophenyl phenyl ether	ND		ug/kg	180	43.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	220	65.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	200	56.	1
Hexachlorobutadiene	ND		ug/kg	180	52.	1
Hexachlorocyclopentadiene	ND		ug/kg	530	120	1
Hexachloroethane	ND		ug/kg	150	34.	1
Isophorone	ND		ug/kg	170	49.	1
Naphthalene	ND		ug/kg	180	62.	1
Nitrobenzene	ND		ug/kg	170	44.	1
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	150	39.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	180	55.	1
Bis(2-Ethylhexyl)phthalate	ND		ug/kg	180	49.	1
Butyl benzyl phthalate	ND		ug/kg	180	36.	1
Di-n-butylphthalate	ND		ug/kg	180	36.	1
Di-n-octylphthalate	ND		ug/kg	180	46.	1
Diethyl phthalate	ND		ug/kg	180	39.	1
Dimethyl phthalate	ND		ug/kg	180	47.	1

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-05

Date Collected: 07/08/14 12:20

Client ID: S-3S

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Benzo(a)anthracene	ND		ug/kg	110	36.	1
Benzo(a)pyrene	ND		ug/kg	150	45.	1
Benzo(b)fluoranthene	ND		ug/kg	110	38.	1
Benzo(k)fluoranthene	ND		ug/kg	110	35.	1
Chrysene	ND		ug/kg	110	36.	1
Acenaphthylene	ND		ug/kg	150	35.	1
Anthracene	ND		ug/kg	110	31.	1
Benzo(ghi)perylene	ND		ug/kg	150	39.	1
Fluorene	ND		ug/kg	180	53.	1
Phenanthrene	ND		ug/kg	110	36.	1
Dibenzo(a,h)anthracene	ND		ug/kg	110	36.	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	150	41.	1
Pyrene	ND		ug/kg	110	36.	1
Biphenyl	ND		ug/kg	420	61.	1
4-Chloroaniline	ND		ug/kg	180	49.	1
2-Nitroaniline	ND		ug/kg	180	52.	1
3-Nitroaniline	ND		ug/kg	180	51.	1
4-Nitroaniline	ND		ug/kg	180	50.	1
Dibenzofuran	ND		ug/kg	180	62.	1
2-Methylnaphthalene	ND		ug/kg	220	59.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	180	58.	1
Acetophenone	ND		ug/kg	180	58.	1
2,4,6-Trichlorophenol	ND		ug/kg	110	35.	1
P-Chloro-M-Cresol	ND		ug/kg	180	54.	1
2-Chlorophenol	ND		ug/kg	180	56.	1
2,4-Dichlorophenol	ND		ug/kg	170	60.	1
2,4-Dimethylphenol	ND		ug/kg	180	55.	1
2-Nitrophenol	ND		ug/kg	400	58.	1
4-Nitrophenol	ND		ug/kg	260	60.	1
2,4-Dinitrophenol	ND		ug/kg	890	250	1
4,6-Dinitro-o-cresol	ND		ug/kg	480	68.	1
Pentachlorophenol	ND		ug/kg	150	40.	1
Phenol	ND		ug/kg	180	55.	1
2-Methylphenol	ND		ug/kg	180	60.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	270	61.	1
2,4,5-Trichlorophenol	ND		ug/kg	180	60.	1
Benzoic Acid	ND		ug/kg	600	190	1
Benzyl Alcohol	ND		ug/kg	180	57.	1
Carbazole	ND		ug/kg	180	40.	1

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-05

Date Collected: 07/08/14 12:20

Client ID: S-3S

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	85		25-120
Phenol-d6	77		10-120
Nitrobenzene-d5	71		23-120
2-Fluorobiphenyl	76		30-120
2,4,6-Tribromophenol	96		0-136
4-Terphenyl-d14	94		18-120

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-06  
**Client ID:** S-3D  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8270D  
**Analytical Date:** 07/12/14 19:43  
**Analyst:** JB  
**Percent Solids:** 91%

**Date Collected:** 07/08/14 12:25  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 07/10/14 18:37

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Semivolatile Organics by GC/MS - Westborough Lab</b>						
Acenaphthene	ND		ug/kg	150	38.	1
1,2,4-Trichlorobenzene	ND		ug/kg	180	60.	1
Hexachlorobenzene	ND		ug/kg	110	34.	1
Bis(2-chloroethyl)ether	ND		ug/kg	160	51.	1
2-Chloronaphthalene	ND		ug/kg	180	60.	1
1,2-Dichlorobenzene	ND		ug/kg	180	60.	1
1,3-Dichlorobenzene	ND		ug/kg	180	58.	1
1,4-Dichlorobenzene	ND		ug/kg	180	56.	1
3,3'-Dichlorobenzidine	ND		ug/kg	180	48.	1
2,4-Dinitrotoluene	ND		ug/kg	180	39.	1
2,6-Dinitrotoluene	ND		ug/kg	180	47.	1
Fluoranthene	280		ug/kg	110	34.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	180	56.	1
4-Bromophenyl phenyl ether	ND		ug/kg	180	42.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	220	64.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	200	55.	1
Hexachlorobutadiene	ND		ug/kg	180	52.	1
Hexachlorocyclopentadiene	ND		ug/kg	520	120	1
Hexachloroethane	ND		ug/kg	150	33.	1
Isophorone	ND		ug/kg	160	48.	1
Naphthalene	ND		ug/kg	180	61.	1
Nitrobenzene	ND		ug/kg	160	43.	1
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	150	38.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	180	54.	1
Bis(2-Ethylhexyl)phthalate	ND		ug/kg	180	48.	1
Butyl benzyl phthalate	ND		ug/kg	180	36.	1
Di-n-butylphthalate	ND		ug/kg	180	35.	1
Di-n-octylphthalate	ND		ug/kg	180	45.	1
Diethyl phthalate	ND		ug/kg	180	39.	1
Dimethyl phthalate	ND		ug/kg	180	46.	1

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-06

Date Collected: 07/08/14 12:25

Client ID: S-3D

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Benzo(a)anthracene	100	J	ug/kg	110	36.	1
Benzo(a)pyrene	120	J	ug/kg	150	45.	1
Benzo(b)fluoranthene	150		ug/kg	110	37.	1
Benzo(k)fluoranthene	50	J	ug/kg	110	35.	1
Chrysene	120		ug/kg	110	36.	1
Acenaphthylene	ND		ug/kg	150	34.	1
Anthracene	30	J	ug/kg	110	30.	1
Benzo(ghi)perylene	81	J	ug/kg	150	38.	1
Fluorene	ND		ug/kg	180	52.	1
Phenanthrene	170		ug/kg	110	36.	1
Dibenzo(a,h)anthracene	ND		ug/kg	110	35.	1
Indeno(1,2,3-cd)Pyrene	71	J	ug/kg	150	40.	1
Pyrene	250		ug/kg	110	36.	1
Biphenyl	ND		ug/kg	420	60.	1
4-Chloroaniline	ND		ug/kg	180	48.	1
2-Nitroaniline	ND		ug/kg	180	52.	1
3-Nitroaniline	ND		ug/kg	180	50.	1
4-Nitroaniline	ND		ug/kg	180	49.	1
Dibenzofuran	ND		ug/kg	180	61.	1
2-Methylnaphthalene	ND		ug/kg	220	58.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	180	56.	1
Acetophenone	ND		ug/kg	180	57.	1
2,4,6-Trichlorophenol	ND		ug/kg	110	34.	1
P-Chloro-M-Cresol	ND		ug/kg	180	53.	1
2-Chlorophenol	ND		ug/kg	180	55.	1
2,4-Dichlorophenol	ND		ug/kg	160	59.	1
2,4-Dimethylphenol	ND		ug/kg	180	54.	1
2-Nitrophenol	ND		ug/kg	390	57.	1
4-Nitrophenol	ND		ug/kg	260	59.	1
2,4-Dinitrophenol	ND		ug/kg	880	250	1
4,6-Dinitro-o-cresol	ND		ug/kg	470	67.	1
Pentachlorophenol	ND		ug/kg	150	39.	1
Phenol	ND		ug/kg	180	54.	1
2-Methylphenol	ND		ug/kg	180	59.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	260	60.	1
2,4,5-Trichlorophenol	ND		ug/kg	180	59.	1
Benzoic Acid	ND		ug/kg	590	180	1
Benzyl Alcohol	ND		ug/kg	180	56.	1
Carbazole	ND		ug/kg	180	39.	1

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-06

Date Collected: 07/08/14 12:25

Client ID: S-3D

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	78		25-120
Phenol-d6	74		10-120
Nitrobenzene-d5	65		23-120
2-Fluorobiphenyl	76		30-120
2,4,6-Tribromophenol	98		0-136
4-Terphenyl-d14	95		18-120

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-07  
**Client ID:** S-4  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8270D  
**Analytical Date:** 07/12/14 20:11  
**Analyst:** JB  
**Percent Solids:** 88%

**Date Collected:** 07/08/14 12:30  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 07/10/14 18:37

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Semivolatile Organics by GC/MS - Westborough Lab</b>						
Acenaphthene	ND		ug/kg	150	38.	1
1,2,4-Trichlorobenzene	ND		ug/kg	190	61.	1
Hexachlorobenzene	ND		ug/kg	110	35.	1
Bis(2-chloroethyl)ether	ND		ug/kg	170	52.	1
2-Chloronaphthalene	ND		ug/kg	190	61.	1
1,2-Dichlorobenzene	ND		ug/kg	190	61.	1
1,3-Dichlorobenzene	ND		ug/kg	190	59.	1
1,4-Dichlorobenzene	ND		ug/kg	190	57.	1
3,3'-Dichlorobenzidine	ND		ug/kg	190	50.	1
2,4-Dinitrotoluene	ND		ug/kg	190	40.	1
2,6-Dinitrotoluene	ND		ug/kg	190	48.	1
Fluoranthene	ND		ug/kg	110	34.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	190	57.	1
4-Bromophenyl phenyl ether	ND		ug/kg	190	43.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	220	66.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	200	56.	1
Hexachlorobutadiene	ND		ug/kg	190	53.	1
Hexachlorocyclopentadiene	ND		ug/kg	540	120	1
Hexachloroethane	ND		ug/kg	150	34.	1
Isophorone	ND		ug/kg	170	50.	1
Naphthalene	ND		ug/kg	190	62.	1
Nitrobenzene	ND		ug/kg	170	44.	1
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	150	39.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	190	56.	1
Bis(2-Ethylhexyl)phthalate	ND		ug/kg	190	49.	1
Butyl benzyl phthalate	ND		ug/kg	190	36.	1
Di-n-butylphthalate	ND		ug/kg	190	36.	1
Di-n-octylphthalate	ND		ug/kg	190	46.	1
Diethyl phthalate	ND		ug/kg	190	39.	1
Dimethyl phthalate	ND		ug/kg	190	47.	1

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-07

Date Collected: 07/08/14 12:30

Client ID: S-4

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Benzo(a)anthracene	ND		ug/kg	110	36.	1
Benzo(a)pyrene	ND		ug/kg	150	46.	1
Benzo(b)fluoranthene	ND		ug/kg	110	38.	1
Benzo(k)fluoranthene	ND		ug/kg	110	36.	1
Chrysene	ND		ug/kg	110	37.	1
Acenaphthylene	ND		ug/kg	150	35.	1
Anthracene	ND		ug/kg	110	31.	1
Benzo(ghi)perylene	ND		ug/kg	150	39.	1
Fluorene	ND		ug/kg	190	54.	1
Phenanthrene	ND		ug/kg	110	36.	1
Dibenzo(a,h)anthracene	ND		ug/kg	110	36.	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	150	41.	1
Pyrene	ND		ug/kg	110	36.	1
Biphenyl	ND		ug/kg	420	62.	1
4-Chloroaniline	ND		ug/kg	190	49.	1
2-Nitroaniline	ND		ug/kg	190	53.	1
3-Nitroaniline	ND		ug/kg	190	52.	1
4-Nitroaniline	ND		ug/kg	190	50.	1
Dibenzofuran	ND		ug/kg	190	62.	1
2-Methylnaphthalene	ND		ug/kg	220	60.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	190	58.	1
Acetophenone	ND		ug/kg	190	58.	1
2,4,6-Trichlorophenol	ND		ug/kg	110	35.	1
P-Chloro-M-Cresol	ND		ug/kg	190	54.	1
2-Chlorophenol	ND		ug/kg	190	56.	1
2,4-Dichlorophenol	ND		ug/kg	170	60.	1
2,4-Dimethylphenol	ND		ug/kg	190	56.	1
2-Nitrophenol	ND		ug/kg	400	58.	1
4-Nitrophenol	ND		ug/kg	260	60.	1
2,4-Dinitrophenol	ND		ug/kg	900	260	1
4,6-Dinitro-o-cresol	ND		ug/kg	480	68.	1
Pentachlorophenol	ND		ug/kg	150	40.	1
Phenol	ND		ug/kg	190	55.	1
2-Methylphenol	ND		ug/kg	190	60.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	270	61.	1
2,4,5-Trichlorophenol	ND		ug/kg	190	60.	1
Benzoic Acid	ND		ug/kg	600	190	1
Benzyl Alcohol	ND		ug/kg	190	58.	1
Carbazole	ND		ug/kg	190	40.	1

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-07

Date Collected: 07/08/14 12:30

Client ID: S-4

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	82		25-120
Phenol-d6	73		10-120
Nitrobenzene-d5	67		23-120
2-Fluorobiphenyl	70		30-120
2,4,6-Tribromophenol	89		0-136
4-Terphenyl-d14	91		18-120

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270D  
**Analytical Date:** 07/12/14 12:20  
**Analyst:** JB

**Extraction Method:** EPA 3546  
**Extraction Date:** 07/10/14 18:36

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-07 Batch: WG704837-1					
Acenaphthene	ND		ug/kg	130	34.
1,2,4-Trichlorobenzene	ND		ug/kg	170	54.
Hexachlorobenzene	ND		ug/kg	100	31.
Bis(2-chloroethyl)ether	ND		ug/kg	150	47.
2-Chloronaphthalene	ND		ug/kg	170	54.
1,2-Dichlorobenzene	ND		ug/kg	170	54.
1,3-Dichlorobenzene	ND		ug/kg	170	52.
1,4-Dichlorobenzene	ND		ug/kg	170	50.
3,3'-Dichlorobenzidine	ND		ug/kg	170	44.
2,4-Dinitrotoluene	ND		ug/kg	170	36.
2,6-Dinitrotoluene	ND		ug/kg	170	42.
Fluoranthene	ND		ug/kg	100	30.
4-Chlorophenyl phenyl ether	ND		ug/kg	170	50.
4-Bromophenyl phenyl ether	ND		ug/kg	170	38.
Bis(2-chloroisopropyl)ether	ND		ug/kg	200	58.
Bis(2-chloroethoxy)methane	ND		ug/kg	180	50.
Hexachlorobutadiene	ND		ug/kg	170	47.
Hexachlorocyclopentadiene	ND		ug/kg	480	110
Hexachloroethane	ND		ug/kg	130	30.
Isophorone	ND		ug/kg	150	44.
Naphthalene	ND		ug/kg	170	55.
Nitrobenzene	ND		ug/kg	150	40.
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	130	35.
n-Nitrosodi-n-propylamine	ND		ug/kg	170	50.
Bis(2-Ethylhexyl)phthalate	ND		ug/kg	170	44.
Butyl benzyl phthalate	ND		ug/kg	170	32.
Di-n-butylphthalate	ND		ug/kg	170	32.
Di-n-octylphthalate	ND		ug/kg	170	41.
Diethyl phthalate	ND		ug/kg	170	35.

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270D  
**Analytical Date:** 07/12/14 12:20  
**Analyst:** JB

**Extraction Method:** EPA 3546  
**Extraction Date:** 07/10/14 18:36

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-07 Batch: WG704837-1					
Dimethyl phthalate	ND		ug/kg	170	42.
Benzo(a)anthracene	ND		ug/kg	100	32.
Benzo(a)pyrene	ND		ug/kg	130	41.
Benzo(b)fluoranthene	ND		ug/kg	100	34.
Benzo(k)fluoranthene	ND		ug/kg	100	32.
Chrysene	ND		ug/kg	100	33.
Acenaphthylene	ND		ug/kg	130	31.
Anthracene	ND		ug/kg	100	28.
Benzo(ghi)perylene	ND		ug/kg	130	34.
Fluorene	ND		ug/kg	170	48.
Phenanthrene	ND		ug/kg	100	32.
Dibenzo(a,h)anthracene	ND		ug/kg	100	32.
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	130	37.
Pyrene	ND		ug/kg	100	32.
Biphenyl	ND		ug/kg	380	55.
4-Chloroaniline	ND		ug/kg	170	44.
2-Nitroaniline	ND		ug/kg	170	47.
3-Nitroaniline	ND		ug/kg	170	46.
4-Nitroaniline	ND		ug/kg	170	45.
Dibenzofuran	ND		ug/kg	170	55.
2-Methylnaphthalene	ND		ug/kg	200	53.
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	170	51.
Acetophenone	ND		ug/kg	170	52.
2,4,6-Trichlorophenol	ND		ug/kg	100	31.
P-Chloro-M-Cresol	ND		ug/kg	170	48.
2-Chlorophenol	ND		ug/kg	170	50.
2,4-Dichlorophenol	ND		ug/kg	150	54.
2,4-Dimethylphenol	ND		ug/kg	170	50.
2-Nitrophenol	ND		ug/kg	360	52.

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270D  
**Analytical Date:** 07/12/14 12:20  
**Analyst:** JB

**Extraction Method:** EPA 3546  
**Extraction Date:** 07/10/14 18:36

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-07 Batch: WG704837-1					
4-Nitrophenol	ND		ug/kg	230	54.
2,4-Dinitrophenol	ND		ug/kg	800	230
4,6-Dinitro-o-cresol	ND		ug/kg	430	61.
Pentachlorophenol	ND		ug/kg	130	36.
Phenol	ND		ug/kg	170	49.
2-Methylphenol	ND		ug/kg	170	54.
3-Methylphenol/4-Methylphenol	ND		ug/kg	240	54.
2,4,5-Trichlorophenol	ND		ug/kg	170	54.
Benzoic Acid	ND		ug/kg	540	170
Benzyl Alcohol	ND		ug/kg	170	51.
Carbazole	ND		ug/kg	170	36.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	75		25-120
Phenol-d6	69		10-120
Nitrobenzene-d5	63		23-120
2-Fluorobiphenyl	68		30-120
2,4,6-Tribromophenol	79		0-136
4-Terphenyl-d14	90		18-120

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-07 Batch: WG704837-2 WG704837-3								
Acenaphthene	82		86		31-137	5		50
1,2,4-Trichlorobenzene	71		77		38-107	8		50
Hexachlorobenzene	87		88		40-140	1		50
Bis(2-chloroethyl)ether	70		74		40-140	6		50
2-Chloronaphthalene	77		79		40-140	3		50
1,2-Dichlorobenzene	68		73		40-140	7		50
1,3-Dichlorobenzene	68		73		40-140	7		50
1,4-Dichlorobenzene	68		72		28-104	6		50
3,3'-Dichlorobenzidine	78		82		40-140	5		50
2,4-Dinitrotoluene	95	Q	96	Q	28-89	1		50
2,6-Dinitrotoluene	85		86		40-140	1		50
Fluoranthene	95		97		40-140	2		50
4-Chlorophenyl phenyl ether	83		87		40-140	5		50
4-Bromophenyl phenyl ether	88		90		40-140	2		50
Bis(2-chloroisopropyl)ether	69		73		40-140	6		50
Bis(2-chloroethoxy)methane	70		73		40-117	4		50
Hexachlorobutadiene	73		78		40-140	7		50
Hexachlorocyclopentadiene	74		79		40-140	7		50
Hexachloroethane	68		73		40-140	7		50
Isophorone	71		73		40-140	3		50
Naphthalene	72		76		40-140	5		50

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-07 Batch: WG704837-2 WG704837-3								
Nitrobenzene	78		82		40-140	5		50
NitrosoDiPhenylAmine(NDPA)/DPA	89		93			4		50
n-Nitrosodi-n-propylamine	71		75		32-121	5		50
Bis(2-Ethylhexyl)phthalate	104		112		40-140	7		50
Butyl benzyl phthalate	102		104		40-140	2		50
Di-n-butylphthalate	103		107		40-140	4		50
Di-n-octylphthalate	111		118		40-140	6		50
Diethyl phthalate	90		94		40-140	4		50
Dimethyl phthalate	88		92		40-140	4		50
Benzo(a)anthracene	93		98		40-140	5		50
Benzo(a)pyrene	100		103		40-140	3		50
Benzo(b)fluoranthene	90		92		40-140	2		50
Benzo(k)fluoranthene	97		100		40-140	3		50
Chrysene	89		93		40-140	4		50
Acenaphthylene	79		81		40-140	3		50
Anthracene	94		97		40-140	3		50
Benzo(ghi)perylene	96		98		40-140	2		50
Fluorene	87		91		40-140	4		50
Phenanthrene	90		91		40-140	1		50
Dibenzo(a,h)anthracene	100		104		40-140	4		50
Indeno(1,2,3-cd)Pyrene	98		101		40-140	3		50

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-07 Batch: WG704837-2 WG704837-3								
Pyrene	92		94		35-142	2		50
Biphenyl	84		88			5		50
4-Chloroaniline	70		74		40-140	6		50
2-Nitroaniline	86		90		47-134	5		50
3-Nitroaniline	80		78		26-129	3		50
4-Nitroaniline	94		96		41-125	2		50
Dibenzofuran	82		86		40-140	5		50
2-Methylnaphthalene	76		80		40-140	5		50
1,2,4,5-Tetrachlorobenzene	79		84		40-117	6		50
Acetophenone	77		81		14-144	5		50
2,4,6-Trichlorophenol	93		95		30-130	2		50
P-Chloro-M-Cresol	88		91		26-103	3		50
2-Chlorophenol	75		80		25-102	6		50
2,4-Dichlorophenol	86		90		30-130	5		50
2,4-Dimethylphenol	81		83		30-130	2		50
2-Nitrophenol	76		78		30-130	3		50
4-Nitrophenol	109		112		11-114	3		50
2,4-Dinitrophenol	77		75		4-130	3		50
4,6-Dinitro-o-cresol	87		88		10-130	1		50
Pentachlorophenol	86		88		17-109	2		50
Phenol	78		82		26-90	5		50

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-07 Batch: WG704837-2 WG704837-3								
2-Methylphenol	78		81		30-130.	4		50
3-Methylphenol/4-Methylphenol	84		87		30-130	4		50
2,4,5-Trichlorophenol	94		95		30-130	1		50
Benzoic Acid	48		42			13		50
Benzyl Alcohol	74		76		40-140	3		50
Carbazole	95		96		54-128	1		50

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
2-Fluorophenol	73		80		25-120
Phenol-d6	70		73		10-120
Nitrobenzene-d5	66		68		23-120
2-Fluorobiphenyl	72		75		30-120
2,4,6-Tribromophenol	91		94		0-136
4-Terphenyl-d14	87		89		18-120

# PCBS

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-01  
**Client ID:** S-1S  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 07/11/14 16:31  
**Analyst:** JW  
**Percent Solids:** 86%

**Date Collected:** 07/08/14 11:10  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 07/09/14 18:20  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 07/11/14  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 07/11/14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Polychlorinated Biphenyls by GC - Westborough Lab</b>							
Aroclor 1016	ND		ug/kg	36.4	2.88	1	A
Aroclor 1221	ND		ug/kg	36.4	3.36	1	A
Aroclor 1232	ND		ug/kg	36.4	4.27	1	A
Aroclor 1242	ND		ug/kg	36.4	4.46	1	A
Aroclor 1248	ND		ug/kg	36.4	3.08	1	A
Aroclor 1254	ND		ug/kg	36.4	3.00	1	A
Aroclor 1260	ND		ug/kg	36.4	2.78	1	A
Aroclor 1262	ND		ug/kg	36.4	1.81	1	A
Aroclor 1268	ND		ug/kg	36.4	5.28	1	A
PCBs, Total	ND		ug/kg	36.4	1.81	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	60		30-150	A
Decachlorobiphenyl	56		30-150	A
2,4,5,6-Tetrachloro-m-xylene	51		30-150	B
Decachlorobiphenyl	53		30-150	B

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-02  
**Client ID:** S-1D  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 07/11/14 16:45  
**Analyst:** JW  
**Percent Solids:** 64%

**Date Collected:** 07/08/14 11:15  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 07/09/14 18:20  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 07/11/14  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 07/11/14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Polychlorinated Biphenyls by GC - Westborough Lab</b>							
Aroclor 1016	ND		ug/kg	51.7	4.09	1	A
Aroclor 1221	ND		ug/kg	51.7	4.77	1	A
Aroclor 1232	ND		ug/kg	51.7	6.06	1	A
Aroclor 1242	ND		ug/kg	51.7	6.33	1	A
Aroclor 1248	ND		ug/kg	51.7	4.37	1	A
Aroclor 1254	ND		ug/kg	51.7	4.25	1	A
Aroclor 1260	ND		ug/kg	51.7	3.94	1	A
Aroclor 1262	ND		ug/kg	51.7	2.57	1	A
Aroclor 1268	ND		ug/kg	51.7	7.50	1	A
PCBs, Total	ND		ug/kg	51.7	2.57	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	78		30-150	A
Decachlorobiphenyl	98		30-150	A
2,4,5,6-Tetrachloro-m-xylene	77		30-150	B
Decachlorobiphenyl	99		30-150	B

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-03  
**Client ID:** S-2S  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 07/15/14 12:57  
**Analyst:** JW  
**Percent Solids:** 82%

**Date Collected:** 07/08/14 11:30  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 07/14/14 18:25  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 07/15/14  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 07/15/14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Polychlorinated Biphenyls by GC - Westborough Lab</b>							
Aroclor 1016	ND		ug/kg	39.6	3.13	1	A
Aroclor 1221	ND		ug/kg	39.6	3.65	1	A
Aroclor 1232	ND		ug/kg	39.6	4.64	1	A
Aroclor 1242	ND		ug/kg	39.6	4.85	1	A
Aroclor 1248	ND		ug/kg	39.6	3.34	1	A
Aroclor 1254	ND		ug/kg	39.6	3.26	1	A
Aroclor 1260	35.5	J	ug/kg	39.6	3.02	1	B
Aroclor 1262	ND		ug/kg	39.6	1.96	1	A
Aroclor 1268	ND		ug/kg	39.6	5.74	1	A
PCBs, Total	35.5	J	ug/kg	39.6	1.96	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	68		30-150	A
Decachlorobiphenyl	65		30-150	A
2,4,5,6-Tetrachloro-m-xylene	76		30-150	B
Decachlorobiphenyl	88		30-150	B

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-04  
**Client ID:** S-2D  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 07/11/14 17:13  
**Analyst:** JW  
**Percent Solids:** 58%

**Date Collected:** 07/08/14 11:35  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 07/09/14 18:20  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 07/11/14  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 07/11/14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Polychlorinated Biphenyls by GC - Westborough Lab</b>							
Aroclor 1016	ND		ug/kg	53.3	4.21	1	A
Aroclor 1221	ND		ug/kg	53.3	4.92	1	A
Aroclor 1232	ND		ug/kg	53.3	6.25	1	A
Aroclor 1242	ND		ug/kg	53.3	6.53	1	A
Aroclor 1248	ND		ug/kg	53.3	4.50	1	A
Aroclor 1254	ND		ug/kg	53.3	4.38	1	A
Aroclor 1260	ND		ug/kg	53.3	4.06	1	A
Aroclor 1262	ND		ug/kg	53.3	2.64	1	A
Aroclor 1268	ND		ug/kg	53.3	7.73	1	A
PCBs, Total	ND		ug/kg	53.3	2.64	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	56		30-150	A
Decachlorobiphenyl	82		30-150	A
2,4,5,6-Tetrachloro-m-xylene	58		30-150	B
Decachlorobiphenyl	86		30-150	B

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-05  
**Client ID:** S-3S  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 07/11/14 17:26  
**Analyst:** JW  
**Percent Solids:** 88%

**Date Collected:** 07/08/14 12:20  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 07/09/14 18:20  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 07/11/14  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 07/11/14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Polychlorinated Biphenyls by GC - Westborough Lab</b>							
Aroclor 1016	ND		ug/kg	34.2	2.71	1	A
Aroclor 1221	ND		ug/kg	34.2	3.16	1	A
Aroclor 1232	ND		ug/kg	34.2	4.02	1	A
Aroclor 1242	ND		ug/kg	34.2	4.19	1	A
Aroclor 1248	ND		ug/kg	34.2	2.89	1	A
Aroclor 1254	ND		ug/kg	34.2	2.82	1	A
Aroclor 1260	ND		ug/kg	34.2	2.61	1	A
Aroclor 1262	ND		ug/kg	34.2	1.70	1	A
Aroclor 1268	ND		ug/kg	34.2	4.97	1	A
PCBs, Total	ND		ug/kg	34.2	1.70	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	73		30-150	A
Decachlorobiphenyl	80		30-150	A
2,4,5,6-Tetrachloro-m-xylene	75		30-150	B
Decachlorobiphenyl	91		30-150	B

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-06  
**Client ID:** S-3D  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 07/11/14 17:40  
**Analyst:** JW  
**Percent Solids:** 91%

**Date Collected:** 07/08/14 12:25  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 07/09/14 18:20  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 07/11/14  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 07/11/14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Polychlorinated Biphenyls by GC - Westborough Lab</b>							
Aroclor 1016	ND		ug/kg	36.3	2.86	1	A
Aroclor 1221	ND		ug/kg	36.3	3.34	1	A
Aroclor 1232	ND		ug/kg	36.3	4.25	1	A
Aroclor 1242	ND		ug/kg	36.3	4.44	1	A
Aroclor 1248	ND		ug/kg	36.3	3.06	1	A
Aroclor 1254	ND		ug/kg	36.3	2.98	1	A
Aroclor 1260	ND		ug/kg	36.3	2.76	1	A
Aroclor 1262	ND		ug/kg	36.3	1.80	1	A
Aroclor 1268	ND		ug/kg	36.3	5.26	1	A
PCBs, Total	ND		ug/kg	36.3	1.80	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	46		30-150	A
Decachlorobiphenyl	42		30-150	A
2,4,5,6-Tetrachloro-m-xylene	45		30-150	B
Decachlorobiphenyl	48		30-150	B

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-07  
**Client ID:** S-4  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 07/11/14 17:54  
**Analyst:** JW  
**Percent Solids:** 88%

**Date Collected:** 07/08/14 12:30  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 07/09/14 18:20  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 07/11/14  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 07/11/14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Polychlorinated Biphenyls by GC - Westborough Lab</b>							
Aroclor 1016	ND		ug/kg	37.1	2.93	1	A
Aroclor 1221	ND		ug/kg	37.1	3.42	1	A
Aroclor 1232	ND		ug/kg	37.1	4.35	1	A
Aroclor 1242	ND		ug/kg	37.1	4.54	1	A
Aroclor 1248	ND		ug/kg	37.1	3.13	1	A
Aroclor 1254	ND		ug/kg	37.1	3.05	1	A
Aroclor 1260	ND		ug/kg	37.1	2.83	1	A
Aroclor 1262	ND		ug/kg	37.1	1.84	1	A
Aroclor 1268	ND		ug/kg	37.1	5.38	1	A
PCBs, Total	ND		ug/kg	37.1	1.84	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	72		30-150	A
Decachlorobiphenyl	65		30-150	A
2,4,5,6-Tetrachloro-m-xylene	67		30-150	B
Decachlorobiphenyl	75		30-150	B

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8082A  
**Analytical Date:** 07/11/14 18:07  
**Analyst:** JW

**Extraction Method:** EPA 3546  
**Extraction Date:** 07/09/14 18:20  
**Cleanup Method:** EPA 3665A  
**Cleanup Date:** 07/11/14  
**Cleanup Method:** EPA 3660B  
**Cleanup Date:** 07/11/14

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01-02,04-07 Batch: WG704489-1						
Aroclor 1016	ND		ug/kg	33.2	2.62	A
Aroclor 1221	ND		ug/kg	33.2	3.06	A
Aroclor 1232	ND		ug/kg	33.2	3.88	A
Aroclor 1242	ND		ug/kg	33.2	4.06	A
Aroclor 1248	ND		ug/kg	33.2	2.80	A
Aroclor 1254	ND		ug/kg	33.2	2.72	A
Aroclor 1260	ND		ug/kg	33.2	2.53	A
Aroclor 1262	ND		ug/kg	33.2	1.64	A
Aroclor 1268	ND		ug/kg	33.2	4.81	A
PCBs, Total	ND		ug/kg	33.2	1.64	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	78		30-150	A
Decachlorobiphenyl	71		30-150	A
2,4,5,6-Tetrachloro-m-xylene	73		30-150	B
Decachlorobiphenyl	78		30-150	B

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8082A  
 Analytical Date: 07/15/14 13:10  
 Analyst: JW

Extraction Method: EPA 3546  
 Extraction Date: 07/14/14 18:25  
 Cleanup Method: EPA 3665A  
 Cleanup Date: 07/15/14  
 Cleanup Method: EPA 3660B  
 Cleanup Date: 07/15/14

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 03 Batch: WG705646-1						
Aroclor 1016	ND		ug/kg	32.9	2.60	A
Aroclor 1221	ND		ug/kg	32.9	3.03	A
Aroclor 1232	ND		ug/kg	32.9	3.85	A
Aroclor 1242	ND		ug/kg	32.9	4.02	A
Aroclor 1248	ND		ug/kg	32.9	2.77	A
Aroclor 1254	ND		ug/kg	32.9	2.70	A
Aroclor 1260	ND		ug/kg	32.9	2.50	A
Aroclor 1262	ND		ug/kg	32.9	1.63	A
Aroclor 1268	ND		ug/kg	32.9	4.77	A
PCBs, Total	ND		ug/kg	32.9	1.63	A

Surrogate	%Recovery	Qualifier	Acceptance	Column
			Criteria	
2,4,5,6-Tetrachloro-m-xylene	72		30-150	A
Decachlorobiphenyl	58		30-150	A
2,4,5,6-Tetrachloro-m-xylene	83		30-150	B
Decachlorobiphenyl	70		30-150	B

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 01-02,04-07 Batch: WG704489-2 WG704489-3									
Aroclor 1016	70		67		40-140	4		50	A
Aroclor 1260	65		64		40-140	2		50	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	86		74		30-150	A
Decachlorobiphenyl	80		70		30-150	A
2,4,5,6-Tetrachloro-m-xylene	77		66		30-150	B
Decachlorobiphenyl	83		71		30-150	B

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 03 Batch: WG705646-2 WG705646-3									
Aroclor 1016	85		72		40-140	17		50	A
Aroclor 1260	64		72		40-140	12		50	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	76		75		30-150	A
Decachlorobiphenyl	62		62		30-150	A
2,4,5,6-Tetrachloro-m-xylene	81		78		30-150	B
Decachlorobiphenyl	71		70		30-150	B

# PESTICIDES

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-01 D  
 Client ID: S-1S  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil  
 Analytical Method: 1,8081B  
 Analytical Date: 07/15/14 13:10  
 Analyst: SH  
 Percent Solids: 86%

Date Collected: 07/08/14 11:10  
 Date Received: 07/08/14  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 07/09/14 19:06  
 Cleanup Method: EPA 3620B  
 Cleanup Date: 07/11/14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Organochlorine Pesticides by GC - Westborough Lab</b>							
Delta-BHC	ND		ug/kg	33.2	6.50	20	A
Lindane	ND		ug/kg	13.8	6.18	20	A
Alpha-BHC	ND		ug/kg	13.8	3.93	20	A
Beta-BHC	ND		ug/kg	33.2	12.6	20	A
Heptachlor	ND		ug/kg	16.6	7.44	20	A
Aldrin	ND		ug/kg	33.2	11.7	20	A
Heptachlor epoxide	ND		ug/kg	62.2	18.7	20	A
Endrin	ND		ug/kg	13.8	5.67	20	A
Endrin ketone	ND		ug/kg	33.2	8.54	20	A
Dieldrin	ND		ug/kg	20.7	10.4	20	A
4,4'-DDE	50.1		ug/kg	33.2	7.67	20	A
4,4'-DDD	51.6		ug/kg	33.2	11.8	20	A
4,4'-DDT	ND		ug/kg	62.2	26.7	20	A
Endosulfan I	ND		ug/kg	33.2	7.84	20	A
Endosulfan II	ND		ug/kg	33.2	11.1	20	A
Endosulfan sulfate	ND		ug/kg	13.8	6.58	20	A
Methoxychlor	ND		ug/kg	62.2	19.4	20	A
Toxaphene	ND		ug/kg	622	174.	20	A
cis-Chlordane	ND		ug/kg	41.5	11.6	20	A
trans-Chlordane	ND		ug/kg	41.5	10.9	20	A
Chlordane	ND		ug/kg	270	110.	20	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150	A
Decachlorobiphenyl	0	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	0	Q	30-150	B
Decachlorobiphenyl	0	Q	30-150	B

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-02 D  
 Client ID: S-1D  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil  
 Analytical Method: 1,8081B  
 Analytical Date: 07/15/14 13:23  
 Analyst: SH  
 Percent Solids: 64%

Date Collected: 07/08/14 11:15  
 Date Received: 07/08/14  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 07/09/14 19:06  
 Cleanup Method: EPA 3620B  
 Cleanup Date: 07/11/14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Organochlorine Pesticides by GC - Westborough Lab</b>							
Delta-BHC	ND		ug/kg	24.4	4.78	10	A
Lindane	ND		ug/kg	10.2	4.55	10	A
Alpha-BHC	ND		ug/kg	10.2	2.89	10	A
Beta-BHC	ND		ug/kg	24.4	9.26	10	A
Heptachlor	ND		ug/kg	12.2	5.48	10	A
Aldrin	ND		ug/kg	24.4	8.60	10	A
Heptachlor epoxide	ND		ug/kg	45.8	13.7	10	A
Endrin	ND		ug/kg	10.2	4.17	10	A
Endrin ketone	ND		ug/kg	24.4	6.29	10	A
Dieldrin	ND		ug/kg	15.3	7.63	10	A
4,4'-DDE	ND		ug/kg	24.4	5.65	10	A
4,4'-DDD	34.6		ug/kg	24.4	8.71	10	B
4,4'-DDT	ND		ug/kg	45.8	19.6	10	A
Endosulfan I	ND		ug/kg	24.4	5.77	10	A
Endosulfan II	ND		ug/kg	24.4	8.16	10	A
Endosulfan sulfate	ND		ug/kg	10.2	4.84	10	A
Methoxychlor	ND		ug/kg	45.8	14.2	10	A
Toxaphene	ND		ug/kg	458	128.	10	A
cis-Chlordane	ND		ug/kg	30.5	8.51	10	A
trans-Chlordane	ND		ug/kg	30.5	8.06	10	A
Chlordane	ND		ug/kg	198	80.9	10	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	44		30-150	A
Decachlorobiphenyl	55		30-150	A
2,4,5,6-Tetrachloro-m-xylene	41		30-150	B
Decachlorobiphenyl	47		30-150	B

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-03  
 Client ID: S-2S  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil  
 Analytical Method: 1,8081B  
 Analytical Date: 07/12/14 13:51  
 Analyst: SH  
 Percent Solids: 82%

Date Collected: 07/08/14 11:30  
 Date Received: 07/08/14  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 07/09/14 19:06  
 Cleanup Method: EPA 3620B  
 Cleanup Date: 07/11/14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Organochlorine Pesticides by GC - Westborough Lab</b>							
Delta-BHC	ND		ug/kg	1.90	0.371	1	A
Lindane	ND		ug/kg	0.790	0.353	1	A
Alpha-BHC	ND		ug/kg	0.790	0.224	1	A
Beta-BHC	ND		ug/kg	1.90	0.719	1	A
Heptachlor	ND		ug/kg	0.948	0.425	1	A
Aldrin	ND		ug/kg	1.90	0.667	1	A
Heptachlor epoxide	ND		ug/kg	3.55	1.07	1	A
Endrin	ND		ug/kg	0.790	0.324	1	A
Endrin ketone	ND		ug/kg	1.90	0.488	1	A
Dieldrin	ND		ug/kg	1.18	0.592	1	A
4,4'-DDE	ND		ug/kg	1.90	0.438	1	A
4,4'-DDD	7.10		ug/kg	1.90	0.676	1	B
4,4'-DDT	ND		ug/kg	3.55	1.52	1	A
Endosulfan I	ND		ug/kg	1.90	0.448	1	A
Endosulfan II	ND		ug/kg	1.90	0.633	1	A
Endosulfan sulfate	ND		ug/kg	0.790	0.376	1	A
Methoxychlor	ND		ug/kg	3.55	1.10	1	A
Toxaphene	ND		ug/kg	35.5	9.95	1	A
cis-Chlordane	ND		ug/kg	2.37	0.660	1	A
trans-Chlordane	ND		ug/kg	2.37	0.626	1	A
Chlordane	ND		ug/kg	15.4	6.28	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	98		30-150	A
Decachlorobiphenyl	75		30-150	A
2,4,5,6-Tetrachloro-m-xylene	76		30-150	B
Decachlorobiphenyl	65		30-150	B

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-04  
**Client ID:** S-2D  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8081B  
**Analytical Date:** 07/12/14 14:05  
**Analyst:** SH  
**Percent Solids:** 58%

**Date Collected:** 07/08/14 11:35  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 07/09/14 19:06  
**Cleanup Method:** EPA 3620B  
**Cleanup Date:** 07/11/14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Organochlorine Pesticides by GC - Westborough Lab</b>							
Delta-BHC	ND		ug/kg	2.56	0.502	1	A
Lindane	ND		ug/kg	1.07	0.477	1	A
Alpha-BHC	ND		ug/kg	1.07	0.303	1	A
Beta-BHC	ND		ug/kg	2.56	0.972	1	A
Heptachlor	ND		ug/kg	1.28	0.575	1	A
Aldrin	ND		ug/kg	2.56	0.902	1	A
Heptachlor epoxide	ND		ug/kg	4.81	1.44	1	A
Endrin	ND		ug/kg	1.07	0.438	1	A
Endrin ketone	ND		ug/kg	2.56	0.660	1	A
Dieldrin	1.97		ug/kg	1.60	0.801	1	B
4,4'-DDE	2.29	J	ug/kg	2.56	0.593	1	A
4,4'-DDD	2.75		ug/kg	2.56	0.914	1	B
4,4'-DDT	14.8		ug/kg	4.81	2.06	1	B
Endosulfan I	ND		ug/kg	2.56	0.606	1	A
Endosulfan II	ND		ug/kg	2.56	0.856	1	A
Endosulfan sulfate	ND		ug/kg	1.07	0.508	1	A
Methoxychlor	ND		ug/kg	4.81	1.50	1	A
Toxaphene	ND		ug/kg	48.1	13.4	1	A
cis-Chlordane	ND		ug/kg	3.20	0.893	1	A
trans-Chlordane	ND		ug/kg	3.20	0.846	1	A
Chlordane	ND		ug/kg	20.8	8.49	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	79		30-150	A
Decachlorobiphenyl	66		30-150	A
2,4,5,6-Tetrachloro-m-xylene	73		30-150	B
Decachlorobiphenyl	64		30-150	B

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-05  
 Client ID: S-3S  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil  
 Analytical Method: 1,8081B  
 Analytical Date: 07/12/14 13:11  
 Analyst: SH  
 Percent Solids: 88%

Date Collected: 07/08/14 12:20  
 Date Received: 07/08/14  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 07/09/14 19:06  
 Cleanup Method: EPA 3620B  
 Cleanup Date: 07/11/14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Organochlorine Pesticides by GC - Westborough Lab</b>							
Delta-BHC	ND		ug/kg	1.63	0.318	1	A
Lindane	ND		ug/kg	0.678	0.303	1	A
Alpha-BHC	ND		ug/kg	0.678	0.192	1	A
Beta-BHC	ND		ug/kg	1.63	0.617	1	A
Heptachlor	ND		ug/kg	0.813	0.365	1	A
Aldrin	ND		ug/kg	1.63	0.573	1	A
Heptachlor epoxide	ND		ug/kg	3.05	0.915	1	A
Endrin	ND		ug/kg	0.678	0.278	1	A
Endrin ketone	ND		ug/kg	1.63	0.419	1	A
Dieldrin	ND		ug/kg	1.02	0.508	1	A
4,4'-DDE	ND		ug/kg	1.63	0.376	1	A
4,4'-DDD	ND		ug/kg	1.63	0.580	1	A
4,4'-DDT	ND		ug/kg	3.05	1.31	1	A
Endosulfan I	ND		ug/kg	1.63	0.384	1	A
Endosulfan II	ND		ug/kg	1.63	0.544	1	A
Endosulfan sulfate	ND		ug/kg	0.678	0.323	1	A
Methoxychlor	ND		ug/kg	3.05	0.949	1	A
Toxaphene	ND		ug/kg	30.5	8.54	1	A
cis-Chlordane	ND		ug/kg	2.03	0.567	1	A
trans-Chlordane	ND		ug/kg	2.03	0.537	1	A
Chlordane	ND		ug/kg	13.2	5.39	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	53		30-150	A
Decachlorobiphenyl	53		30-150	A
2,4,5,6-Tetrachloro-m-xylene	54		30-150	B
Decachlorobiphenyl	57		30-150	B

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

**Lab ID:** L1415006-06  
**Client ID:** S-3D  
**Sample Location:** 583 FRANKLIN AVENUE, BROOKLYN  
**Matrix:** Soil  
**Analytical Method:** 1,8081B  
**Analytical Date:** 07/12/14 13:24  
**Analyst:** SH  
**Percent Solids:** 91%

**Date Collected:** 07/08/14 12:25  
**Date Received:** 07/08/14  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 07/09/14 19:06  
**Cleanup Method:** EPA 3620B  
**Cleanup Date:** 07/11/14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Organochlorine Pesticides by GC - Westborough Lab</b>							
Delta-BHC	ND		ug/kg	1.65	0.323	1	A
Lindane	ND		ug/kg	0.686	0.307	1	A
Alpha-BHC	ND		ug/kg	0.686	0.195	1	A
Beta-BHC	ND		ug/kg	1.65	0.625	1	A
Heptachlor	ND		ug/kg	0.824	0.369	1	A
Aldrin	ND		ug/kg	1.65	0.580	1	A
Heptachlor epoxide	ND		ug/kg	3.09	0.927	1	A
Endrin	ND		ug/kg	0.686	0.281	1	A
Endrin ketone	ND		ug/kg	1.65	0.424	1	A
Dieldrin	ND		ug/kg	1.03	0.515	1	A
4,4'-DDE	ND		ug/kg	1.65	0.381	1	A
4,4'-DDD	ND		ug/kg	1.65	0.588	1	A
4,4'-DDT	ND		ug/kg	3.09	1.32	1	A
Endosulfan I	ND		ug/kg	1.65	0.389	1	A
Endosulfan II	ND		ug/kg	1.65	0.550	1	A
Endosulfan sulfate	ND		ug/kg	0.686	0.327	1	A
Methoxychlor	ND		ug/kg	3.09	0.961	1	A
Toxaphene	ND		ug/kg	30.9	8.65	1	A
cis-Chlordane	ND		ug/kg	2.06	0.574	1	A
trans-Chlordane	ND		ug/kg	2.06	0.544	1	A
Chlordane	ND		ug/kg	13.4	5.46	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	67		30-150	A
Decachlorobiphenyl	67		30-150	A
2,4,5,6-Tetrachloro-m-xylene	70		30-150	B
Decachlorobiphenyl	73		30-150	B

**Project Name:** VACANT LOT**Lab Number:** L1415006**Project Number:** 14-0526**Report Date:** 07/16/14**SAMPLE RESULTS**

Lab ID: L1415006-07  
 Client ID: S-4  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil  
 Analytical Method: 1,8081B  
 Analytical Date: 07/12/14 13:38  
 Analyst: SH  
 Percent Solids: 88%

Date Collected: 07/08/14 12:30  
 Date Received: 07/08/14  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 07/09/14 19:06  
 Cleanup Method: EPA 3620B  
 Cleanup Date: 07/11/14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Organochlorine Pesticides by GC - Westborough Lab</b>							
Delta-BHC	ND		ug/kg	1.82	0.357	1	A
Lindane	ND		ug/kg	0.760	0.340	1	A
Alpha-BHC	ND		ug/kg	0.760	0.216	1	A
Beta-BHC	ND		ug/kg	1.82	0.692	1	A
Heptachlor	ND		ug/kg	0.913	0.409	1	A
Aldrin	ND		ug/kg	1.82	0.643	1	A
Heptachlor epoxide	ND		ug/kg	3.42	1.03	1	A
Endrin	ND		ug/kg	0.760	0.312	1	A
Endrin ketone	ND		ug/kg	1.82	0.470	1	A
Dieldrin	ND		ug/kg	1.14	0.570	1	A
4,4'-DDE	ND		ug/kg	1.82	0.422	1	A
4,4'-DDD	ND		ug/kg	1.82	0.651	1	A
4,4'-DDT	ND		ug/kg	3.42	1.47	1	A
Endosulfan I	ND		ug/kg	1.82	0.431	1	A
Endosulfan II	ND		ug/kg	1.82	0.610	1	A
Endosulfan sulfate	ND		ug/kg	0.760	0.362	1	A
Methoxychlor	ND		ug/kg	3.42	1.06	1	A
Toxaphene	ND		ug/kg	34.2	9.58	1	A
cis-Chlordane	ND		ug/kg	2.28	0.636	1	A
trans-Chlordane	ND		ug/kg	2.28	0.602	1	A
Chlordane	ND		ug/kg	14.8	6.05	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	87		30-150	A
Decachlorobiphenyl	89		30-150	A
2,4,5,6-Tetrachloro-m-xylene	83		30-150	B
Decachlorobiphenyl	86		30-150	B

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8081B  
**Analytical Date:** 07/11/14 12:36  
**Analyst:** SH

**Extraction Method:** EPA 3546  
**Extraction Date:** 07/09/14 19:06  
**Cleanup Method:** EPA 3620B  
**Cleanup Date:** 07/11/14

Parameter	Result	Qualifier	Units	RL	MDL	Column
Organochlorine Pesticides by GC - Westborough Lab for sample(s): 01-07 Batch: WG704493-1						
Delta-BHC	ND		ug/kg	1.58	0.309	A
Lindane	ND		ug/kg	0.658	0.294	A
Alpha-BHC	ND		ug/kg	0.658	0.187	A
Beta-BHC	ND		ug/kg	1.58	0.599	A
Heptachlor	ND		ug/kg	0.789	0.354	A
Aldrin	ND		ug/kg	1.58	0.556	A
Heptachlor epoxide	ND		ug/kg	2.96	0.888	A
Endrin	ND		ug/kg	0.658	0.270	A
Endrin ketone	ND		ug/kg	1.58	0.406	A
Dieldrin	ND		ug/kg	0.987	0.493	A
4,4'-DDE	ND		ug/kg	1.58	0.365	A
4,4'-DDD	ND		ug/kg	1.58	0.563	A
4,4'-DDT	ND		ug/kg	2.96	1.27	A
Endosulfan I	ND		ug/kg	1.58	0.373	A
Endosulfan II	ND		ug/kg	1.58	0.528	A
Endosulfan sulfate	ND		ug/kg	0.658	0.313	A
Methoxychlor	ND		ug/kg	2.96	0.921	A
Toxaphene	ND		ug/kg	29.6	8.29	A
cis-Chlordane	ND		ug/kg	1.97	0.550	A
trans-Chlordane	ND		ug/kg	1.97	0.521	A
Chlordane	ND		ug/kg	12.8	5.23	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	76		30-150	A
Decachlorobiphenyl	72		30-150	A
2,4,5,6-Tetrachloro-m-xylene	72		30-150	B
Decachlorobiphenyl	71		30-150	B



## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415006

Report Date: 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 01-07 Batch: WG704493-2 WG704493-3									
Delta-BHC	91		94		30-150	3		30	A
Lindane	90		94		30-150	4		30	A
Alpha-BHC	97		99		30-150	2		30	A
Beta-BHC	78		81		30-150	4		30	A
Heptachlor	105		110		30-150	5		30	A
Aldrin	97		102		30-150	5		30	A
Heptachlor epoxide	90		96		30-150	6		30	A
Endrin	95		105		30-150	10		30	A
Endrin ketone	79		91		30-150	14		30	A
Dieldrin	94		102		30-150	8		30	A
4,4'-DDE	93		101		30-150	8		30	A
4,4'-DDD	97		107		30-150	10		30	A
4,4'-DDT	116		129		30-150	11		30	A
Endosulfan I	93		101		30-150	8		30	A
Endosulfan II	88		100		30-150	13		30	A
Endosulfan sulfate	80		85		30-150	6		30	A
Methoxychlor	99		114		30-150	14		30	A
cis-Chlordane	87		96		30-150	10		30	A
trans-Chlordane	89		97		30-150	9		30	A

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
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Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 01-07 Batch: WG704493-2 WG704493-3

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	72		71		30-150	A
Decachlorobiphenyl	62		77		30-150	A
2,4,5,6-Tetrachloro-m-xylene	72		69		30-150	B
Decachlorobiphenyl	68		77		30-150	B

## METALS

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**SAMPLE RESULTS**

Lab ID: L1415006-01  
 Client ID: S-1S  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil  
 Percent Solids: 86%

Date Collected: 07/08/14 11:10  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>Total Metals - Westborough Lab</b>											
Aluminum, Total	8800		mg/kg	9.2	1.8	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Antimony, Total	ND		mg/kg	4.6	0.73	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Arsenic, Total	11		mg/kg	0.92	0.18	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Barium, Total	59		mg/kg	0.92	0.27	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Beryllium, Total	0.60		mg/kg	0.46	0.09	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Cadmium, Total	ND		mg/kg	0.92	0.06	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Calcium, Total	1600		mg/kg	9.2	2.7	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Chromium, Total	32		mg/kg	0.92	0.18	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Cobalt, Total	6.7		mg/kg	1.8	0.46	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Copper, Total	25		mg/kg	0.92	0.18	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Iron, Total	34000		mg/kg	4.6	1.8	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Lead, Total	11		mg/kg	4.6	0.18	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Magnesium, Total	2100		mg/kg	9.2	0.92	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Manganese, Total	490		mg/kg	0.92	0.18	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Mercury, Total	0.06	J	mg/kg	0.08	0.02	1	07/10/14 08:37	07/10/14 10:35	EPA 7471B	1,7471B	MC
Nickel, Total	18		mg/kg	2.3	0.37	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Potassium, Total	1200		mg/kg	230	37.	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Selenium, Total	ND		mg/kg	1.8	0.27	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Silver, Total	ND		mg/kg	0.92	0.18	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Sodium, Total	80	J	mg/kg	180	27.	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Thallium, Total	ND		mg/kg	1.8	0.37	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Vanadium, Total	60		mg/kg	0.92	0.09	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT
Zinc, Total	41		mg/kg	4.6	0.64	2	07/10/14 16:53	07/14/14 14:06	EPA 3050B	1,6010C	TT



**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**SAMPLE RESULTS**

Lab ID: L1415006-02  
 Client ID: S-1D  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil  
 Percent Solids: 64%

Date Collected: 07/08/14 11:15  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>Total Metals - Westborough Lab</b>											
Aluminum, Total	9700		mg/kg	12	2.4	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Antimony, Total	6.9		mg/kg	5.9	0.94	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Arsenic, Total	12		mg/kg	1.2	0.24	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Barium, Total	550		mg/kg	1.2	0.35	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Beryllium, Total	ND		mg/kg	0.59	0.12	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Cadmium, Total	1.9		mg/kg	1.2	0.08	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Calcium, Total	110000		mg/kg	12	3.5	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Chromium, Total	22		mg/kg	1.2	0.24	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Cobalt, Total	6.8		mg/kg	2.4	0.59	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Copper, Total	290		mg/kg	1.2	0.24	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Iron, Total	20000		mg/kg	5.9	2.4	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Lead, Total	960		mg/kg	5.9	0.24	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Magnesium, Total	6200		mg/kg	12	1.2	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Manganese, Total	610		mg/kg	1.2	0.24	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Mercury, Total	0.67		mg/kg	0.11	0.02	1	07/10/14 08:37	07/10/14 10:42	EPA 7471B	1,7471B	MC
Nickel, Total	26		mg/kg	2.9	0.47	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Potassium, Total	860		mg/kg	290	47.	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Selenium, Total	0.53	J	mg/kg	2.4	0.35	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Silver, Total	0.68	J	mg/kg	1.2	0.24	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Sodium, Total	440		mg/kg	240	35.	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Thallium, Total	ND		mg/kg	2.4	0.47	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Vanadium, Total	250		mg/kg	1.2	0.12	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT
Zinc, Total	810		mg/kg	5.9	0.82	2	07/10/14 16:53	07/14/14 14:10	EPA 3050B	1,6010C	TT



**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**SAMPLE RESULTS**

Lab ID: L1415006-03  
 Client ID: S-2S  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil  
 Percent Solids: 82%

Date Collected: 07/08/14 11:30  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>Total Metals - Westborough Lab</b>											
Aluminum, Total	18000		mg/kg	9.7	1.9	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Antimony, Total	6.7		mg/kg	4.8	0.77	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Arsenic, Total	68		mg/kg	0.97	0.19	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Barium, Total	720		mg/kg	0.97	0.29	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Beryllium, Total	ND		mg/kg	24	4.8	100	07/10/14 16:53	07/14/14 22:37	EPA 3050B	1,6010C	TT
Cadmium, Total	0.45	J	mg/kg	0.97	0.07	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Calcium, Total	30000		mg/kg	9.7	2.9	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Chromium, Total	600		mg/kg	0.97	0.19	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Cobalt, Total	97		mg/kg	1.9	0.48	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Copper, Total	790		mg/kg	0.97	0.19	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Iron, Total	64000		mg/kg	4.8	1.9	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Lead, Total	900		mg/kg	4.8	0.19	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Magnesium, Total	4400		mg/kg	9.7	0.97	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Manganese, Total	8700		mg/kg	48	9.7	100	07/10/14 16:53	07/14/14 22:37	EPA 3050B	1,6010C	TT
Mercury, Total	0.45		mg/kg	0.08	0.02	1	07/10/14 08:37	07/10/14 10:44	EPA 7471B	1,7471B	MC
Nickel, Total	2300		mg/kg	2.4	0.39	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Potassium, Total	1300		mg/kg	240	39.	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Selenium, Total	ND		mg/kg	1.9	0.29	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Silver, Total	3.5		mg/kg	0.97	0.19	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Sodium, Total	2100		mg/kg	190	29.	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Thallium, Total	ND		mg/kg	1.9	0.39	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT
Vanadium, Total	12000		mg/kg	48	4.8	100	07/10/14 16:53	07/14/14 22:37	EPA 3050B	1,6010C	TT
Zinc, Total	360		mg/kg	4.8	0.68	2	07/10/14 16:53	07/14/14 14:25	EPA 3050B	1,6010C	TT



**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**SAMPLE RESULTS**

Lab ID: L1415006-04  
 Client ID: S-2D  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil  
 Percent Solids: 58%

Date Collected: 07/08/14 11:35  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>Total Metals - Westborough Lab</b>											
Aluminum, Total	18000		mg/kg	13	2.6	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Antimony, Total	8.9		mg/kg	6.4	1.0	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Arsenic, Total	21		mg/kg	1.3	0.26	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Barium, Total	190		mg/kg	1.3	0.39	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Beryllium, Total	ND		mg/kg	1.6	0.32	5	07/10/14 16:53	07/15/14 11:05	EPA 3050B	1,6010C	MG
Cadmium, Total	1.4		mg/kg	1.3	0.09	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Calcium, Total	81000		mg/kg	13	3.9	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Chromium, Total	110		mg/kg	1.3	0.26	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Cobalt, Total	21		mg/kg	2.6	0.64	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Copper, Total	230		mg/kg	1.3	0.26	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Iron, Total	39000		mg/kg	6.4	2.6	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Lead, Total	1700		mg/kg	6.4	0.26	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Magnesium, Total	11000		mg/kg	13	1.3	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Manganese, Total	1800		mg/kg	1.3	0.26	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Mercury, Total	0.48		mg/kg	0.11	0.02	1	07/10/14 08:37	07/10/14 10:46	EPA 7471B	1,7471B	MC
Nickel, Total	360		mg/kg	3.2	0.52	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Potassium, Total	1700		mg/kg	320	52.	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Selenium, Total	ND		mg/kg	2.6	0.39	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Silver, Total	0.93	J	mg/kg	1.3	0.26	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Sodium, Total	1800		mg/kg	260	39.	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Thallium, Total	ND		mg/kg	2.6	0.52	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Vanadium, Total	1200		mg/kg	1.3	0.13	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT
Zinc, Total	1400		mg/kg	6.4	0.90	2	07/10/14 16:53	07/14/14 14:52	EPA 3050B	1,6010C	TT



**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**SAMPLE RESULTS**

Lab ID: L1415006-05  
 Client ID: S-3S  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil  
 Percent Solids: 88%

Date Collected: 07/08/14 12:20  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>Total Metals - Westborough Lab</b>											
Aluminum, Total	7400		mg/kg	8.9	1.8	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Antimony, Total	0.80	J	mg/kg	4.4	0.71	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Arsenic, Total	8.7		mg/kg	0.89	0.18	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Barium, Total	58		mg/kg	0.89	0.27	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Beryllium, Total	0.51		mg/kg	0.44	0.09	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Cadmium, Total	ND		mg/kg	0.89	0.06	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Calcium, Total	2000		mg/kg	8.9	2.7	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Chromium, Total	19		mg/kg	0.89	0.18	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Cobalt, Total	5.7		mg/kg	1.8	0.44	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Copper, Total	25		mg/kg	0.89	0.18	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Iron, Total	30000		mg/kg	4.4	1.8	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Lead, Total	4.6		mg/kg	4.4	0.18	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Magnesium, Total	2800		mg/kg	8.9	0.89	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Manganese, Total	610		mg/kg	0.89	0.18	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Mercury, Total	ND		mg/kg	0.08	0.02	1	07/10/14 08:37	07/10/14 10:51	EPA 7471B	1,7471B	MC
Nickel, Total	20		mg/kg	2.2	0.36	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Potassium, Total	1100		mg/kg	220	36.	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Selenium, Total	ND		mg/kg	1.8	0.27	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Silver, Total	ND		mg/kg	0.89	0.18	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Sodium, Total	190		mg/kg	180	27.	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Thallium, Total	ND		mg/kg	1.8	0.36	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Vanadium, Total	35		mg/kg	0.89	0.09	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT
Zinc, Total	71		mg/kg	4.4	0.62	2	07/10/14 16:53	07/14/14 14:56	EPA 3050B	1,6010C	TT



**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**SAMPLE RESULTS**

Lab ID: L1415006-06  
 Client ID: S-3D  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil  
 Percent Solids: 91%

Date Collected: 07/08/14 12:25  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>Total Metals - Westborough Lab</b>											
Aluminum, Total	5500		mg/kg	8.8	1.8	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Antimony, Total	ND		mg/kg	4.4	0.70	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Arsenic, Total	6.0		mg/kg	0.88	0.18	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Barium, Total	41		mg/kg	0.88	0.26	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Beryllium, Total	0.41	J	mg/kg	0.44	0.09	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Cadmium, Total	ND		mg/kg	0.88	0.06	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Calcium, Total	770		mg/kg	8.8	2.6	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Chromium, Total	15		mg/kg	0.88	0.18	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Cobalt, Total	4.9		mg/kg	1.8	0.44	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Copper, Total	19		mg/kg	0.88	0.18	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Iron, Total	20000		mg/kg	4.4	1.8	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Lead, Total	5.2		mg/kg	4.4	0.18	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Magnesium, Total	1600		mg/kg	8.8	0.88	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Manganese, Total	420		mg/kg	0.88	0.18	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Mercury, Total	ND		mg/kg	0.08	0.02	1	07/10/14 08:37	07/10/14 10:53	EPA 7471B	1,7471B	MC
Nickel, Total	11		mg/kg	2.2	0.35	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Potassium, Total	830		mg/kg	220	35.	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Selenium, Total	ND		mg/kg	1.8	0.26	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Silver, Total	ND		mg/kg	0.88	0.18	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Sodium, Total	46	J	mg/kg	180	26.	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Thallium, Total	ND		mg/kg	1.8	0.35	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Vanadium, Total	26		mg/kg	0.88	0.09	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT
Zinc, Total	22		mg/kg	4.4	0.61	2	07/10/14 16:53	07/14/14 15:05	EPA 3050B	1,6010C	TT



**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**SAMPLE RESULTS**

Lab ID: L1415006-07  
 Client ID: S-4  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil  
 Percent Solids: 88%

Date Collected: 07/08/14 12:30  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>Total Metals - Westborough Lab</b>											
Aluminum, Total	5400		mg/kg	8.6	1.7	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Antimony, Total	ND		mg/kg	4.3	0.69	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Arsenic, Total	6.8		mg/kg	0.86	0.17	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Barium, Total	40		mg/kg	0.86	0.26	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Beryllium, Total	0.71		mg/kg	0.43	0.09	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Cadmium, Total	ND		mg/kg	0.86	0.06	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Calcium, Total	800		mg/kg	8.6	2.6	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Chromium, Total	16		mg/kg	0.86	0.17	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Cobalt, Total	6.8		mg/kg	1.7	0.43	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Copper, Total	15		mg/kg	0.86	0.17	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Iron, Total	22000		mg/kg	4.3	1.7	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Lead, Total	6.1		mg/kg	4.3	0.17	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Magnesium, Total	1600		mg/kg	8.6	0.86	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Manganese, Total	320		mg/kg	0.86	0.17	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Mercury, Total	0.02	J	mg/kg	0.07	0.02	1	07/10/14 08:37	07/10/14 10:55	EPA 7471B	1,7471B	MC
Nickel, Total	16		mg/kg	2.1	0.34	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Potassium, Total	860		mg/kg	210	34.	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Selenium, Total	ND		mg/kg	1.7	0.26	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Silver, Total	ND		mg/kg	0.86	0.17	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Sodium, Total	48	J	mg/kg	170	26.	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Thallium, Total	ND		mg/kg	1.7	0.34	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Vanadium, Total	30		mg/kg	0.86	0.09	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT
Zinc, Total	24		mg/kg	4.3	0.60	2	07/10/14 16:53	07/14/14 15:08	EPA 3050B	1,6010C	TT



**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

## Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Westborough Lab for sample(s): 01-07 Batch: WG704553-1									
Mercury, Total	ND	mg/kg	0.08	0.02	1	07/10/14 08:37	07/10/14 10:31	1,7471B	MC

### Prep Information

Digestion Method: EPA 7471B

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Westborough Lab for sample(s): 01-07 Batch: WG704807-1									
Aluminum, Total	ND	mg/kg	4.0	0.80	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Antimony, Total	0.88 J	mg/kg	2.0	0.32	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Arsenic, Total	ND	mg/kg	0.40	0.08	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Barium, Total	ND	mg/kg	0.40	0.12	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Beryllium, Total	ND	mg/kg	0.20	0.04	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Cadmium, Total	ND	mg/kg	0.40	0.03	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Calcium, Total	ND	mg/kg	4.0	1.2	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Chromium, Total	ND	mg/kg	0.40	0.08	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Cobalt, Total	ND	mg/kg	0.80	0.20	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Copper, Total	ND	mg/kg	0.40	0.08	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Iron, Total	ND	mg/kg	2.0	0.80	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Lead, Total	ND	mg/kg	2.0	0.08	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Magnesium, Total	ND	mg/kg	4.0	0.40	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Manganese, Total	ND	mg/kg	0.40	0.08	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Nickel, Total	ND	mg/kg	1.0	0.16	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Potassium, Total	ND	mg/kg	100	16.	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Selenium, Total	ND	mg/kg	0.80	0.12	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Silver, Total	ND	mg/kg	0.40	0.08	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Sodium, Total	ND	mg/kg	80	12.	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Thallium, Total	ND	mg/kg	0.80	0.16	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Vanadium, Total	ND	mg/kg	0.40	0.04	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT
Zinc, Total	ND	mg/kg	2.0	0.28	1	07/10/14 16:53	07/14/14 10:10	1,6010C	TT

**Project Name:** VACANT LOT

**Lab Number:** L1415006

**Project Number:** 14-0526

**Report Date:** 07/16/14

## Method Blank Analysis Batch Quality Control

### Prep Information

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Digestion Method: EPA 3050B

## Lab Control Sample Analysis

Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 01-07 Batch: WG704553-2 SRM Lot Number: 0518-10-02								
Mercury, Total	114		-		67-133	-		

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 01-07 Batch: WG704807-2 SRM Lot Number: 0518-10-02					
Aluminum, Total	78	-	29-171	-	
Antimony, Total	122	-	4-196	-	
Arsenic, Total	114	-	81-119	-	
Barium, Total	100	-	83-118	-	
Beryllium, Total	104	-	83-117	-	
Cadmium, Total	102	-	82-117	-	
Calcium, Total	94	-	83-117	-	
Chromium, Total	101	-	80-119	-	
Cobalt, Total	103	-	83-117	-	
Copper, Total	101	-	83-117	-	
Iron, Total	94	-	51-150	-	
Lead, Total	102	-	80-120	-	
Magnesium, Total	92	-	74-126	-	
Manganese, Total	100	-	83-117	-	
Nickel, Total	104	-	82-117	-	
Potassium, Total	99	-	74-126	-	
Selenium, Total	109	-	80-120	-	
Silver, Total	107	-	66-134	-	
Sodium, Total	100	-	74-127	-	
Thallium, Total	106	-	79-120	-	
Vanadium, Total	98	-	79-121	-	

## Lab Control Sample Analysis

Batch Quality Control

Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415006

Report Date: 07/16/14

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 01-07 Batch: WG704807-2 SRM Lot Number: 0518-10-02					
Zinc, Total	100	-	82-119	-	

**Matrix Spike Analysis**  
Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Qual	MSD Found	MSD %Recovery	MSD Qual	Recovery Limits	RPD	RPD Qual	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 01-07 QC Batch ID: WG704553-4 QC Sample: L1415006-01 Client ID: S-1S												
Mercury, Total	0.06J	0.152	0.22	144	Q	-	-		80-120	-		20

## Matrix Spike Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 01-07 QC Batch ID: WG704807-4 QC Sample: L1415001-21 Client ID: MS Sample									
Aluminum, Total	3000	195	4400	716	Q	-	75-125	-	20
Antimony, Total	5.3	48.9	46	83		-	75-125	-	20
Arsenic, Total	21.	11.7	33	102		-	75-125	-	20
Barium, Total	36.	195	240	104		-	75-125	-	20
Beryllium, Total	0.53	4.89	5.2	96		-	75-125	-	20
Cadmium, Total	ND	4.98	4.6	92		-	75-125	-	20
Calcium, Total	170000	977	160000	0	Q	-	75-125	-	20
Chromium, Total	3.9	19.5	24	103		-	75-125	-	20
Cobalt, Total	5.8	48.9	49	88		-	75-125	-	20
Copper, Total	13.	24.4	40	110		-	75-125	-	20
Iron, Total	14000	97.7	13000	0	Q	-	75-125	-	20
Lead, Total	11.	49.8	59	96		-	75-125	-	20
Magnesium, Total	94000	977	84000	2660	Q	-	75-125	-	20
Manganese, Total	180	48.9	190	20	Q	-	75-125	-	20
Nickel, Total	9.7	48.9	53	89		-	75-125	-	20
Potassium, Total	620	977	1500	90		-	75-125	-	20
Selenium, Total	3.6	11.7	15	97		-	75-125	-	20
Silver, Total	ND	29.3	31	106		-	75-125	-	20
Sodium, Total	94.J	977	1100	112		-	75-125	-	20
Thallium, Total	ND	11.7	5.9	50	Q	-	75-125	-	20
Vanadium, Total	5.4	48.9	53	97		-	75-125	-	20

**Matrix Spike Analysis**  
Batch Quality Control

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

<b>Parameter</b>	<b>Native Sample</b>	<b>MS Added</b>	<b>MS Found</b>	<b>MS %Recovery</b>	<b>MSD Found</b>	<b>MSD %Recovery</b>	<b>Recovery Limits</b>	<b>RPD</b>	<b>RPD Limits</b>
Total Metals - Westborough Lab Associated sample(s): 01-07 QC Batch ID: WG704807-4 QC Sample: L1415001-21 Client ID: MS Sample									
Zinc, Total	24.	48.9	72	98	-	-	75-125	-	20

**Lab Duplicate Analysis**  
Batch Quality Control

Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415006

Report Date: 07/16/14

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 01-07 QC Batch ID: WG704553-3 QC Sample: L1415006-01 Client ID: S-1S						
Mercury, Total	0.06J	0.03J	mg/kg	NC		20

## Lab Duplicate Analysis

Batch Quality Control

Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415006

Report Date: 07/16/14

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 01-07 QC Batch ID: WG704807-3 QC Sample: L1415001-21 Client ID: DUP Sample					
Aluminum, Total	3000	2600	mg/kg	14	20
Antimony, Total	5.3	1.8J	mg/kg	NC	20
Arsenic, Total	21.	27	mg/kg	25 Q	20
Barium, Total	36.	36	mg/kg	0	20
Beryllium, Total	0.53	0.52	mg/kg	2	20
Cadmium, Total	ND	ND	mg/kg	NC	20
Chromium, Total	3.9	6.6	mg/kg	51 Q	20
Cobalt, Total	5.8	6.5	mg/kg	11	20
Copper, Total	13.	16	mg/kg	21 Q	20
Iron, Total	14000	17000	mg/kg	19	20
Lead, Total	11.	12	mg/kg	9	20
Manganese, Total	180	140	mg/kg	25 Q	20
Nickel, Total	9.7	11	mg/kg	13	20
Potassium, Total	620	420	mg/kg	38 Q	20
Selenium, Total	3.6	5.1	mg/kg	34 Q	20
Silver, Total	ND	ND	mg/kg	NC	20
Sodium, Total	94.J	79J	mg/kg	NC	20
Thallium, Total	ND	ND	mg/kg	NC	20
Vanadium, Total	5.4	5.0	mg/kg	8	20

### Lab Duplicate Analysis Batch Quality Control

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 01-07 QC Batch ID: WG704807-3 QC Sample: L1415001-21 Client ID: DUP Sample					
Zinc, Total	24.	23	mg/kg	4	20
Total Metals - Westborough Lab Associated sample(s): 01-07 QC Batch ID: WG704807-3 QC Sample: L1415001-21 Client ID: DUP Sample					
Calcium, Total	170000	150000	mg/kg	13	20
Magnesium, Total	94000	81000	mg/kg	33	Q 20



# **INORGANICS & MISCELLANEOUS**

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-01

Date Collected: 07/08/14 11:10

Client ID: S-1S

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.5		%	0.100	NA	1	-	07/09/14 17:00	30,2540G	SP



Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

**SAMPLE RESULTS**

Lab ID: L1415006-02

Date Collected: 07/08/14 11:15

Client ID: S-1D

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	64.3		%	0.100	NA	1	-	07/09/14 17:00	30,2540G	SP



Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

**SAMPLE RESULTS**

Lab ID: L1415006-03

Date Collected: 07/08/14 11:30

Client ID: S-2S

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.0		%	0.100	NA	1	-	07/09/14 17:00	30,2540G	SP



Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-04  
 Client ID: S-2D  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil

Date Collected: 07/08/14 11:35  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	58.3		%	0.100	NA	1	-	07/09/14 17:00	30,2540G	SP



Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415006

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-05  
 Client ID: S-3S  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Soil

Date Collected: 07/08/14 12:20  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.4		%	0.100	NA	1	-	07/09/14 17:00	30,2540G	SP



Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-06

Date Collected: 07/08/14 12:25

Client ID: S-3D

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.1		%	0.100	NA	1	-	07/09/14 17:00	30,2540G	SP



Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## SAMPLE RESULTS

Lab ID: L1415006-07

Date Collected: 07/08/14 12:30

Client ID: S-4

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	87.6		%	0.100	NA	1	-	07/09/14 17:00	30,2540G	SP



**Lab Duplicate Analysis**  
Batch Quality Control

Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415006

Report Date: 07/16/14

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-07 QC Batch ID: WG704474-1 QC Sample: L1415006-01 Client ID: S-1S						
Solids, Total	85.5	86.0	%	1		20

Project Name: VACANT LOT

Lab Number: L1415006

Project Number: 14-0526

Report Date: 07/16/14

## Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: 07/09/2014 04:14

## Cooler Information Custody Seal

## Cooler

A Absent  
B Absent

## Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1415006-01A	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-01B	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-01C	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-01E	Amber 120ml unpreserved	A	N/A	3.1	Y	Absent	BE-TI(180),NYTCL-8270(14),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TS(7),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1415006-01F	Amber 250ml unpreserved	A	N/A	3.1	Y	Absent	BE-TI(180),NYTCL-8270(14),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TS(7),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1415006-01X	Vial MeOH preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-01Y	Vial Water preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-01Z	Vial Water preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-02A	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-02B	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-02C	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)

\*Values in parentheses indicate holding time in days



Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415006

Report Date: 07/16/14

## Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1415006-02E	Amber 120ml unpreserved	A	N/A	3.1	Y	Absent	BE-TI(180),NYTCL-8270(14),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TS(7),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1415006-02F	Amber 250ml unpreserved	A	N/A	3.1	Y	Absent	BE-TI(180),NYTCL-8270(14),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TS(7),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1415006-02X	Vial MeOH preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-02Y	Vial Water preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-02Z	Vial Water preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-03A	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-03B	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-03C	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-03E	Amber 120ml unpreserved	A	N/A	3.1	Y	Absent	BE-TI(180),NYTCL-8270(14),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TS(7),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)

\*Values in parentheses indicate holding time in days



Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415006

Report Date: 07/16/14

## Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1415006-03F	Amber 250ml unpreserved	A	N/A	3.1	Y	Absent	BE-TI(180),NYTCL-8270(14),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TS(7),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1415006-03X	Vial MeOH preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-03Y	Vial Water preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-03Z	Vial Water preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-04A	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-04B	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-04C	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-04E	Amber 120ml unpreserved	A	N/A	3.1	Y	Absent	BE-TI(180),NYTCL-8270(14),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TS(7),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1415006-04F	Amber 250ml unpreserved	A	N/A	3.1	Y	Absent	BE-TI(180),NYTCL-8270(14),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TS(7),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1415006-04X	Vial MeOH preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-04Y	Vial Water preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-04Z	Vial Water preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-05A	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-05B	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-05C	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)

\*Values in parentheses indicate holding time in days



Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415006

Report Date: 07/16/14

## Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1415006-05E	Amber 120ml unpreserved	A	N/A	3.1	Y	Absent	BE-TI(180),NYTCL-8270(14),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TS(7),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1415006-05F	Amber 250ml unpreserved	A	N/A	3.1	Y	Absent	BE-TI(180),NYTCL-8270(14),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TS(7),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1415006-05X	Vial MeOH preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-05Y	Vial Water preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-05Z	Vial Water preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-06A	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-06B	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-06C	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-06E	Amber 120ml unpreserved	A	N/A	3.1	Y	Absent	BE-TI(180),NYTCL-8270(14),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TS(7),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)

\*Values in parentheses indicate holding time in days



Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415006

Report Date: 07/16/14

## Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1415006-06F	Amber 250ml unpreserved	A	N/A	3.1	Y	Absent	BE-TI(180),NYTCL-8270(14),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TS(7),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1415006-06X	Vial MeOH preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-06Y	Vial Water preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-06Z	Vial Water preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-07A	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-07B	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-07C	5 gram Encore Sampler	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(2)
L1415006-07E	Amber 120ml unpreserved	A	N/A	3.1	Y	Absent	BE-TI(180),NYTCL-8270(14),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TS(7),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1415006-07F	Amber 250ml unpreserved	A	N/A	3.1	Y	Absent	BE-TI(180),NYTCL-8270(14),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TS(7),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1415006-07X	Vial MeOH preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-07Y	Vial Water preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-07Z	Vial Water preserved split	A	N/A	3.1	Y	Absent	NYTCL-8260HLW(14)
L1415006-08A	Vial HCl preserved	B	N/A	3.0	Y	Absent	NYTCL-8260(14)
L1415006-08B	Vial HCl preserved	B	N/A	3.0	Y	Absent	NYTCL-8260(14)

\*Values in parentheses indicate holding time in days



**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

## GLOSSARY

### Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NI	- Not Ignitable.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

### Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

### Terms

**Total:** With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

### Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit.
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.

**Report Format:** DU Report with 'J' Qualifiers



**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

**Data Qualifiers**

- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

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**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415006  
**Report Date:** 07/16/14

## REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.
- 30 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WPCF. 18th Edition. 1992.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



## Certification Information

Last revised April 15, 2014

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**The following analytes are not included in our NELAP Scope of Accreditation:**

### Westborough Facility

**EPA 524.2:** Acetone, 2-Butanone (Methyl ethyl ketone (MEK)), Tert-butyl alcohol, 2-Hexanone, Tetrahydrofuran, 1,3,5-Trichlorobenzene, 4-Methyl-2-pentanone (MIBK), Carbon disulfide, Diethyl ether.

**EPA 8260C:** 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene, Iodomethane (methyl iodide), Methyl methacrylate, Azobenzene.

**EPA 8330A/B:** PETN, Picric Acid, Nitroglycerine, 2,6-DANT, 2,4-DANT.

**EPA 8270D:** 1-Methylnaphthalene, Dimethylnaphthalene, 1,4-Diphenylhydrazine.

**EPA 625:** 4-Chloroaniline, 4-Methylphenol.

**SM4500:** Soil: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.

**EPA 9071:** Total Petroleum Hydrocarbons, Oil & Grease.

### Mansfield Facility

**EPA 8270D:** Biphenyl.

**EPA 2540D:** TSS

**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

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**The following analytes are included in our Massachusetts DEP Scope of Accreditation, Westborough Facility:**

### Drinking Water

**EPA 200.8:** Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl; **EPA 200.7:** Ba,Be,Ca,Cd,Cr,Cu,Na; **EPA 245.1:** Mercury;

**EPA 300.0:** Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B**

**EPA 332:** Perchlorate.

**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, Enterolert-QT.**

### Non-Potable Water

**EPA 200.8:** Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn;

**EPA 200.7:** Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn;

**EPA 245.1, SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2340B, SM2320B, SM4500CL-E, SM4500F-BC, SM426C, SM4500NH3-BH, EPA 350.1:** Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **SM4500NO3-F,**

**EPA 353.2:** Nitrate-N, **SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, SM4500P-B, E, SM5220D, EPA 410.4,**

**SM5210B, SM5310C, SM4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.**

**EPA 624:** Volatile Halocarbons & Aromatics,

**EPA 608:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

**EPA 625:** SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, SM9222D-MF.**

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For a complete listing of analytes and methods, please contact your Alpha Project Manager.





# CHAIN OF CUSTODY

PAGE 1 OF 1Date Rec'd In Lab: 7/8/14ALPHA Job #: L1415 6

WESTBORO, MA  
TEL: 508-898-9220  
FAX: 508-898-9193

MANSFIELD, MA  
TEL: 508-822-9300  
FAX: 508-822-3288

**Project Information**

Project Name: Vacant Lot

**Report Information - Data Deliverables**
 FAX  
 EMAIL  
 ADEX  
 Add'l Deliverables
**Billing Information**
 Same as Client Info  
 PO #:
**Client Information**

Client: Airtek Environmental Corp.

Project Location: 583 Franklin Avenue, Brooklyn

Project #: 14-0526

**Regulatory Requirements/Report Limits**

State /Fed Program

Criteria

Address: 39-37 29th Street

Project Manager: Christine Chen

Long Island City, NY 11101

ALPHA Quote #: 2011060

Phone: (718) 937-3720 Ext. 28

**Turn-Around Time**

Fax: (718) 937-3721

 Standard  
 RUSH (only confirmed if pre-approved)

Email: cchen@airtekenv.com

Date Due: 7/15/14 Time:
 These samples have been previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

VOCs with MTBE (by Method 8260B)	SVOCs (by Method 8270C)	Pesticides (by Method 8081A)	PCBs (by Method 8082)	TAL Metals (by Method 6010)																
X	X	X	X	X																

**SAMPLE HANDLING**

Filtration \_\_\_\_\_

Done

Not needed

Lab to do

Preservation

Lab to do

(Please specify below)

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials	VOCs with MTBE (by Method 8260B)	SVOCs (by Method 8270C)	Pesticides (by Method 8081A)	PCBs (by Method 8082)	TAL Metals (by Method 6010)										Sample Specific Comments	TOTAL # BOTTLES
		Date	Time																		
15006-01	S-1s	7/8/14	1110	S	PP	X	X	X	X	X											5
	S-1d	7/8/14	1115	S	PP	X	X	X	X	X											5
	S-2s	7/8/14	1130	S	PP	X	X	X	X	X											5
	S-2d	7/8/14	1135	S	PP	X	X	X	X	X											5
	S-3s	7/8/14	1220	S	PP	X	X	X	X	X											5
	S-3d	7/8/14	1225	S	PP	X	X	X	X	X											5
	S-4	7/8/14	1230	S	PP	X	X	X	X	X											5

 Container Type  
 Preservative

 Relinquished By: David Repburn  
Tom Cohen

 Date/Time: 7/8/14 18:25  
7-8-14

 Received By: Tom Cohen  
Kooban Roman

 Date/Time: 7-8-14 1309  
7-8-14 1825  
7/7/14 21:0

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

**Appendix G.**

**Laboratory Data Deliverable for Soil Vapor Analytical Data**



## ANALYTICAL REPORT

Lab Number:	L1415064
Client:	Airtek Environmental Corp. 39-37 29th Street Long Island City, NY 11101
ATTN:	Christine Chen
Phone:	(718) 937-3720
Project Name:	VACANT LOT
Project Number:	14-0526
Report Date:	07/15/14

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: NY (11627), CT (PH-0141), NH (2206), NJ NELAP (MA015), RI (LAO00299), PA (68-02089), LA NELAP (03090), FL (E87814), TX (T104704419), WA (C954), DOD (L2217.01), USDA (Permit #P330-11-00109), US Army Corps of Engineers.

---

320 Forbes Boulevard, Mansfield, MA 02048-1806  
508-822-9300 (Fax) 508-822-3288 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415064  
**Report Date:** 07/15/14

<b>Alpha Sample ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Sample Location</b>	<b>Collection Date/Time</b>	<b>Receive Date</b>
L1415064-01	SG-1	AIR	583 FRANKLIN AVENUE, BROOKLYN	07/08/14 12:35	07/08/14
L1415064-02	SG-2	AIR	583 FRANKLIN AVENUE, BROOKLYN	07/08/14 12:40	07/08/14

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415064  
**Report Date:** 07/15/14

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. Performance criteria for CAM and RCP methods allow for some LCS compound failures to occur and still be within method compliance. In these instances, the specific failures are not narrated but are noted in the associated QC table. This information is also incorporated in the Data Usability format for our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

#### HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

---

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415064  
**Report Date:** 07/15/14

### Case Narrative (continued)

#### Volatile Organics in Air

Canisters were released from the laboratory on July 2, 2014. The canister certification results are provided as an addendum.

Samples L1415064-01, -02 and WG704120-5 Duplicate have elevated detection limits due to the dilution required by the elevated concentrations of non-target compounds in the samples.

Laboratory Duplicate WG704120-5: The relative percent difference for Dichlorodifluoromethane (31%) is above the RPD limit of 25%. This compound represented less than 10% of the compounds detected, therefore no further action was taken.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Christopher J. Anderson

Title: Technical Director/Representative

Date: 07/15/14

**AIR**

**Project Name:** VACANT LOT**Lab Number:** L1415064**Project Number:** 14-0526**Report Date:** 07/15/14**SAMPLE RESULTS**

Lab ID: L1415064-01 D  
 Client ID: SG-1  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Air  
 Analytical Method: 48,TO-15  
 Analytical Date: 07/10/14 09:46  
 Analyst: RY

Date Collected: 07/08/14 12:35  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
<b>Volatile Organics in Air - Mansfield Lab</b>								
Dichlorodifluoromethane	ND	4.94	--	ND	24.4	--		24.69
Chloromethane	5.73	4.94	--	11.8	10.2	--		24.69
Freon-114	ND	4.94	--	ND	34.5	--		24.69
Vinyl chloride	ND	4.94	--	ND	12.6	--		24.69
1,3-Butadiene	69.5	4.94	--	154	10.9	--		24.69
Bromomethane	ND	4.94	--	ND	19.2	--		24.69
Chloroethane	ND	4.94	--	ND	13.0	--		24.69
Ethanol	ND	61.7	--	ND	116	--		24.69
Vinyl bromide	ND	4.94	--	ND	21.6	--		24.69
Acetone	437	24.7	--	1040	58.7	--		24.69
Trichlorofluoromethane	ND	4.94	--	ND	27.8	--		24.69
Isopropanol	ND	12.3	--	ND	30.2	--		24.69
1,1-Dichloroethene	ND	4.94	--	ND	19.6	--		24.69
Tertiary butyl Alcohol	ND	12.3	--	ND	37.3	--		24.69
Methylene chloride	ND	24.7	--	ND	85.8	--		24.69
3-Chloropropene	ND	4.94	--	ND	15.5	--		24.69
Carbon disulfide	81.2	4.94	--	253	15.4	--		24.69
Freon-113	ND	4.94	--	ND	37.9	--		24.69
trans-1,2-Dichloroethene	ND	4.94	--	ND	19.6	--		24.69
1,1-Dichloroethane	ND	4.94	--	ND	20.0	--		24.69
Methyl tert butyl ether	ND	4.94	--	ND	17.8	--		24.69
2-Butanone	11.7	4.94	--	34.5	14.6	--		24.69
cis-1,2-Dichloroethene	ND	4.94	--	ND	19.6	--		24.69
Ethyl Acetate	ND	12.3	--	ND	44.3	--		24.69



**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415064  
**Report Date:** 07/15/14

**SAMPLE RESULTS**

Lab ID: L1415064-01 D  
 Client ID: SG-1  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Date Collected: 07/08/14 12:35  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Chloroform	ND	4.94	--	ND	24.1	--		24.69
Tetrahydrofuran	ND	4.94	--	ND	14.6	--		24.69
1,2-Dichloroethane	ND	4.94	--	ND	20.0	--		24.69
n-Hexane	49.0	4.94	--	173	17.4	--		24.69
1,1,1-Trichloroethane	ND	4.94	--	ND	27.0	--		24.69
Benzene	24.9	4.94	--	79.5	15.8	--		24.69
Carbon tetrachloride	ND	4.94	--	ND	31.1	--		24.69
Cyclohexane	123	4.94	--	423	17.0	--		24.69
1,2-Dichloropropane	ND	4.94	--	ND	22.8	--		24.69
Bromodichloromethane	ND	4.94	--	ND	33.1	--		24.69
1,4-Dioxane	ND	4.94	--	ND	17.8	--		24.69
Trichloroethene	ND	4.94	--	ND	26.5	--		24.69
2,2,4-Trimethylpentane	ND	4.94	--	ND	23.1	--		24.69
Heptane	53.8	4.94	--	220	20.2	--		24.69
cis-1,3-Dichloropropene	ND	4.94	--	ND	22.4	--		24.69
4-Methyl-2-pentanone	ND	4.94	--	ND	20.2	--		24.69
trans-1,3-Dichloropropene	ND	4.94	--	ND	22.4	--		24.69
1,1,2-Trichloroethane	ND	4.94	--	ND	27.0	--		24.69
Toluene	11.2	4.94	--	42.2	18.6	--		24.69
2-Hexanone	ND	4.94	--	ND	20.2	--		24.69
Dibromochloromethane	ND	4.94	--	ND	42.1	--		24.69
1,2-Dibromoethane	ND	4.94	--	ND	38.0	--		24.69
Tetrachloroethene	ND	4.94	--	ND	33.5	--		24.69
Chlorobenzene	ND	4.94	--	ND	22.8	--		24.69
Ethylbenzene	ND	4.94	--	ND	21.5	--		24.69
p/m-Xylene	ND	9.88	--	ND	42.9	--		24.69
Bromoform	ND	4.94	--	ND	51.1	--		24.69
Styrene	ND	4.94	--	ND	21.0	--		24.69



**Project Name:** VACANT LOT**Lab Number:** L1415064**Project Number:** 14-0526**Report Date:** 07/15/14**SAMPLE RESULTS**

Lab ID: L1415064-01 D

Date Collected: 07/08/14 12:35

Client ID: SG-1

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
1,1,2,2-Tetrachloroethane	ND	4.94	--	ND	33.9	--		24.69
o-Xylene	ND	4.94	--	ND	21.5	--		24.69
4-Ethyltoluene	ND	4.94	--	ND	24.3	--		24.69
1,3,5-Trimethylbenzene	ND	4.94	--	ND	24.3	--		24.69
1,2,4-Trimethylbenzene	ND	4.94	--	ND	24.3	--		24.69
Benzyl chloride	ND	4.94	--	ND	25.6	--		24.69
1,3-Dichlorobenzene	ND	4.94	--	ND	29.7	--		24.69
1,4-Dichlorobenzene	ND	4.94	--	ND	29.7	--		24.69
1,2-Dichlorobenzene	ND	4.94	--	ND	29.7	--		24.69
1,2,4-Trichlorobenzene	ND	4.94	--	ND	36.7	--		24.69
Hexachlorobutadiene	ND	4.94	--	ND	52.7	--		24.69

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	101		60-140
Bromochloromethane	100		60-140
chlorobenzene-d5	106		60-140



**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415064  
**Report Date:** 07/15/14

### SAMPLE RESULTS

Lab ID: L1415064-02 D  
 Client ID: SG-2  
 Sample Location: 583 FRANKLIN AVENUE, BROOKLYN  
 Matrix: Air  
 Analytical Method: 48,TO-15  
 Analytical Date: 07/09/14 22:24  
 Analyst: RY

Date Collected: 07/08/14 12:40  
 Date Received: 07/08/14  
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Dichlorodifluoromethane	2.44	0.500	--	12.1	2.47	--		2.5
Chloromethane	2.04	0.500	--	4.21	1.03	--		2.5
Freon-114	1.04	0.500	--	7.27	3.49	--		2.5
Vinyl chloride	ND	0.500	--	ND	1.28	--		2.5
1,3-Butadiene	18.9	0.500	--	41.8	1.11	--		2.5
Bromomethane	ND	0.500	--	ND	1.94	--		2.5
Chloroethane	ND	0.500	--	ND	1.32	--		2.5
Ethanol	8.37	6.25	--	15.8	11.8	--		2.5
Vinyl bromide	ND	0.500	--	ND	2.19	--		2.5
Acetone	417	2.50	--	991	5.94	--		2.5
Trichlorofluoromethane	1.38	0.500	--	7.76	2.81	--		2.5
Isopropanol	1.82	1.25	--	4.47	3.07	--		2.5
1,1-Dichloroethene	ND	0.500	--	ND	1.98	--		2.5
Tertiary butyl Alcohol	2.77	1.25	--	8.40	3.79	--		2.5
Methylene chloride	3.52	2.50	--	12.2	8.69	--		2.5
3-Chloropropene	ND	0.500	--	ND	1.57	--		2.5
Carbon disulfide	44.4	0.500	--	138	1.56	--		2.5
Freon-113	ND	0.500	--	ND	3.83	--		2.5
trans-1,2-Dichloroethene	ND	0.500	--	ND	1.98	--		2.5
1,1-Dichloroethane	ND	0.500	--	ND	2.02	--		2.5
Methyl tert butyl ether	ND	0.500	--	ND	1.80	--		2.5
2-Butanone	13.5	0.500	--	39.8	1.47	--		2.5
cis-1,2-Dichloroethene	ND	0.500	--	ND	1.98	--		2.5
Ethyl Acetate	ND	1.25	--	ND	4.50	--		2.5



**Project Name:** VACANT LOT**Lab Number:** L1415064**Project Number:** 14-0526**Report Date:** 07/15/14**SAMPLE RESULTS**

Lab ID: L1415064-02 D

Date Collected: 07/08/14 12:40

Client ID: SG-2

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Chloroform	1.06	0.500	--	5.18	2.44	--		2.5
Tetrahydrofuran	ND	0.500	--	ND	1.47	--		2.5
1,2-Dichloroethane	ND	0.500	--	ND	2.02	--		2.5
n-Hexane	19.4	0.500	--	68.4	1.76	--		2.5
1,1,1-Trichloroethane	5.26	0.500	--	28.7	2.73	--		2.5
Benzene	16.8	0.500	--	53.7	1.60	--		2.5
Carbon tetrachloride	1.92	0.500	--	12.1	3.15	--		2.5
Cyclohexane	20.9	0.500	--	71.9	1.72	--		2.5
1,2-Dichloropropane	ND	0.500	--	ND	2.31	--		2.5
Bromodichloromethane	ND	0.500	--	ND	3.35	--		2.5
1,4-Dioxane	ND	0.500	--	ND	1.80	--		2.5
Trichloroethene	ND	0.500	--	ND	2.69	--		2.5
2,2,4-Trimethylpentane	ND	0.500	--	ND	2.34	--		2.5
Heptane	14.1	0.500	--	57.8	2.05	--		2.5
cis-1,3-Dichloropropene	ND	0.500	--	ND	2.27	--		2.5
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		2.5
trans-1,3-Dichloropropene	ND	0.500	--	ND	2.27	--		2.5
1,1,2-Trichloroethane	ND	0.500	--	ND	2.73	--		2.5
Toluene	10.4	0.500	--	39.2	1.88	--		2.5
2-Hexanone	ND	0.500	--	ND	2.05	--		2.5
Dibromochloromethane	ND	0.500	--	ND	4.26	--		2.5
1,2-Dibromoethane	ND	0.500	--	ND	3.84	--		2.5
Tetrachloroethene	ND	0.500	--	ND	3.39	--		2.5
Chlorobenzene	ND	0.500	--	ND	2.30	--		2.5
Ethylbenzene	3.15	0.500	--	13.7	2.17	--		2.5
p/m-Xylene	4.67	1.00	--	20.3	4.34	--		2.5
Bromoform	ND	0.500	--	ND	5.17	--		2.5
Styrene	0.732	0.500	--	3.12	2.13	--		2.5



**Project Name:** VACANT LOT**Lab Number:** L1415064**Project Number:** 14-0526**Report Date:** 07/15/14**SAMPLE RESULTS**

Lab ID: L1415064-02 D

Date Collected: 07/08/14 12:40

Client ID: SG-2

Date Received: 07/08/14

Sample Location: 583 FRANKLIN AVENUE, BROOKLYN

Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
1,1,2,2-Tetrachloroethane	ND	0.500	--	ND	3.43	--		2.5
o-Xylene	1.22	0.500	--	5.30	2.17	--		2.5
4-Ethyltoluene	ND	0.500	--	ND	2.46	--		2.5
1,3,5-Trimethylbenzene	0.872	0.500	--	4.29	2.46	--		2.5
1,2,4-Trimethylbenzene	2.08	0.500	--	10.2	2.46	--		2.5
Benzyl chloride	ND	0.500	--	ND	2.59	--		2.5
1,3-Dichlorobenzene	ND	0.500	--	ND	3.01	--		2.5
1,4-Dichlorobenzene	ND	0.500	--	ND	3.01	--		2.5
1,2-Dichlorobenzene	ND	0.500	--	ND	3.01	--		2.5
1,2,4-Trichlorobenzene	ND	0.500	--	ND	3.71	--		2.5
Hexachlorobutadiene	ND	0.500	--	ND	5.33	--		2.5

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	61		60-140
Bromochloromethane	77		60-140
chlorobenzene-d5	107		60-140



Project Name: VACANT LOT

Lab Number: L1415064

Project Number: 14-0526

Report Date: 07/15/14

### Method Blank Analysis Batch Quality Control

Analytical Method: 48,TO-15

Analytical Date: 07/09/14 15:01

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab for sample(s): 01-02 Batch: WG704120-4								
Propylene	ND	0.500	--	ND	0.861	--		1
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	2.50	--	ND	4.71	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	1.00	--	ND	3.47	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	ND	0.200	--	ND	0.590	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1

Project Name: VACANT LOT

Lab Number: L1415064

Project Number: 14-0526

Report Date: 07/15/14

### Method Blank Analysis Batch Quality Control

Analytical Method: 48,TO-15

Analytical Date: 07/09/14 15:01

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab for sample(s): 01-02 Batch: WG704120-4								
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1



Project Name: VACANT LOT

Lab Number: L1415064

Project Number: 14-0526

Report Date: 07/15/14

### Method Blank Analysis Batch Quality Control

Analytical Method: 48,TO-15

Analytical Date: 07/09/14 15:01

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab for sample(s): 01-02 Batch: WG704120-4								
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415064

Project Number: 14-0526

Report Date: 07/15/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-02 Batch: WG704120-3								
Chlorodifluoromethane	90		-		70-130	-		
Propylene	93		-		70-130	-		
Propane	74		-		70-130	-		
Dichlorodifluoromethane	117		-		70-130	-		
Chloromethane	94		-		70-130	-		
1,2-Dichloro-1,1,2,2-tetrafluoroethane	109		-		70-130	-		
Methanol	74		-		70-130	-		
Vinyl chloride	103		-		70-130	-		
1,3-Butadiene	93		-		70-130	-		
Butane	89		-		70-130	-		
Bromomethane	103		-		70-130	-		
Chloroethane	100		-		70-130	-		
Ethyl Alcohol	88		-		70-130	-		
Dichlorofluoromethane	101		-		70-130	-		
Vinyl bromide	104		-		70-130	-		
Acrolein	92		-		70-130	-		
Acetone	111		-		70-130	-		
Acetonitrile	88		-		70-130	-		
Trichlorofluoromethane	123		-		70-130	-		
iso-Propyl Alcohol	96		-		70-130	-		
Acrylonitrile	94		-		70-130	-		

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415064

Project Number: 14-0526

Report Date: 07/15/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-02 Batch: WG704120-3								
Pentane	92		-		70-130	-		
Ethyl ether	90		-		70-130	-		
1,1-Dichloroethene	112		-		70-130	-		
tert-Butyl Alcohol	105		-		70-130	-		
Methylene chloride	104		-		70-130	-		
3-Chloropropene	103		-		70-130	-		
Carbon disulfide	102		-		70-130	-		
1,1,2-Trichloro-1,2,2-Trifluoroethane	116		-		70-130	-		
trans-1,2-Dichloroethene	91		-		70-130	-		
1,1-Dichloroethane	104		-		70-130	-		
Methyl tert butyl ether	109		-		70-130	-		
Vinyl acetate	110		-		70-130	-		
2-Butanone	90		-		70-130	-		
cis-1,2-Dichloroethene	116		-		70-130	-		
Ethyl Acetate	92		-		70-130	-		
Chloroform	111		-		70-130	-		
Tetrahydrofuran	92		-		70-130	-		
2,2-Dichloropropane	109		-		70-130	-		
1,2-Dichloroethane	116		-		70-130	-		
n-Hexane	84		-		70-130	-		
Isopropyl Ether	88		-		70-130	-		

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415064

Report Date: 07/15/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-02 Batch: WG704120-3								
Ethyl-Tert-Butyl-Ether	91		-		70-130	-		
1,1,1-Trichloroethane	111		-		70-130	-		
1,1-Dichloropropene	92		-		70-130	-		
Benzene	90		-		70-130	-		
Carbon tetrachloride	114		-		70-130	-		
Cyclohexane	82		-		70-130	-		
Tertiary-Amyl Methyl Ether	93		-		70-130	-		
Dibromomethane	89		-		70-130	-		
1,2-Dichloropropane	90		-		70-130	-		
Bromodichloromethane	100		-		70-130	-		
1,4-Dioxane	84		-		70-130	-		
Trichloroethene	100		-		70-130	-		
2,2,4-Trimethylpentane	86		-		70-130	-		
Methyl methacrylate	88		-		70-130	-		
Heptane	85		-		70-130	-		
cis-1,3-Dichloropropene	109		-		70-130	-		
4-Methyl-2-pentanone	90		-		70-130	-		
trans-1,3-Dichloropropene	98		-		70-130	-		
1,1,2-Trichloroethane	97		-		70-130	-		
Toluene	95		-		70-130	-		
1,3-Dichloropropane	85		-		70-130	-		

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Lab Number: L1415064

Project Number: 14-0526

Report Date: 07/15/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-02 Batch: WG704120-3								
2-Hexanone	93		-		70-130	-		
Dibromochloromethane	105		-		70-130	-		
1,2-Dibromoethane	102		-		70-130	-		
Butyl Acetate	96		-		70-130	-		
Octane	88		-		70-130	-		
Tetrachloroethene	102		-		70-130	-		
1,1,1,2-Tetrachloroethane	98		-		70-130	-		
Chlorobenzene	97		-		70-130	-		
Ethylbenzene	103		-		70-130	-		
p/m-Xylene	105		-		70-130	-		
Bromoform	109		-		70-130	-		
Styrene	106		-		70-130	-		
1,1,1,2-Tetrachloroethane	98		-		70-130	-		
o-Xylene	107		-		70-130	-		
1,2,3-Trichloropropane	90		-		70-130	-		
Nonane (C9)	87		-		70-130	-		
Isopropylbenzene	98		-		70-130	-		
Bromobenzene	94		-		70-130	-		
o-Chlorotoluene	96		-		70-130	-		
n-Propylbenzene	98		-		70-130	-		
p-Chlorotoluene	95		-		70-130	-		

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415064

Report Date: 07/15/14

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-02 Batch: WG704120-3								
4-Ethyltoluene	95		-		70-130	-		
1,3,5-Trimethylbenzene	107		-		70-130	-		
tert-Butylbenzene	102		-		70-130	-		
1,2,4-Trimethylbenzene	113		-		70-130	-		
Decane (C10)	90		-		70-130	-		
Benzyl chloride	110		-		70-130	-		
1,3-Dichlorobenzene	108		-		70-130	-		
1,4-Dichlorobenzene	109		-		70-130	-		
sec-Butylbenzene	99		-		70-130	-		
p-Isopropyltoluene	95		-		70-130	-		
1,2-Dichlorobenzene	109		-		70-130	-		
n-Butylbenzene	102		-		70-130	-		
1,2-Dibromo-3-chloropropane	105		-		70-130	-		
Undecane	102		-		70-130	-		
Dodecane (C12)	121		-		70-130	-		
1,2,4-Trichlorobenzene	126		-		70-130	-		
Naphthalene	111		-		70-130	-		
1,2,3-Trichlorobenzene	113		-		70-130	-		
Hexachlorobutadiene	120		-		70-130	-		

## Lab Duplicate Analysis

Batch Quality Control

Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415064

Report Date: 07/15/14

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG704120-5 QC Sample: L1415064-02 Client ID: SG-2						
Dichlorodifluoromethane	2.44	3.33	ppbV	31	Q	25
Chloromethane	2.04	2.26	ppbV	10		25
Freon-114	1.04	1.10	ppbV	6		25
Vinyl chloride	ND	ND	ppbV	NC		25
1,3-Butadiene	18.9	18.6	ppbV	2		25
Bromomethane	ND	ND	ppbV	NC		25
Chloroethane	ND	ND	ppbV	NC		25
Ethanol	8.37	7.80	ppbV	7		25
Vinyl bromide	ND	ND	ppbV	NC		25
Acetone	417	417	ppbV	0		25
Trichlorofluoromethane	1.38	1.46	ppbV	6		25
Isopropanol	1.82	1.86	ppbV	2		25
1,1-Dichloroethene	ND	ND	ppbV	NC		25
Tertiary butyl Alcohol	2.77	2.51	ppbV	10		25
Methylene chloride	3.52	3.59	ppbV	2		25
3-Chloropropene	ND	ND	ppbV	NC		25
Carbon disulfide	44.4	45.3	ppbV	2		25
Freon-113	ND	ND	ppbV	NC		25
trans-1,2-Dichloroethene	ND	ND	ppbV	NC		25

## Lab Duplicate Analysis

Batch Quality Control

Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415064

Report Date: 07/15/14

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG704120-5 QC Sample: L1415064-02 Client ID: SG-2					
1,1-Dichloroethane	ND	ND	ppbV	NC	25
Methyl tert butyl ether	ND	ND	ppbV	NC	25
2-Butanone	13.5	13.8	ppbV	2	25
cis-1,2-Dichloroethene	ND	ND	ppbV	NC	25
Ethyl Acetate	ND	ND	ppbV	NC	25
Chloroform	1.06	1.00	ppbV	6	25
Tetrahydrofuran	ND	ND	ppbV	NC	25
1,2-Dichloroethane	ND	ND	ppbV	NC	25
n-Hexane	19.4	19.0	ppbV	2	25
1,1,1-Trichloroethane	5.26	5.16	ppbV	2	25
Benzene	16.8	17.1	ppbV	2	25
Carbon tetrachloride	1.92	1.84	ppbV	4	25
Cyclohexane	20.9	20.0	ppbV	4	25
1,2-Dichloropropane	ND	ND	ppbV	NC	25
Bromodichloromethane	ND	ND	ppbV	NC	25
1,4-Dioxane	ND	ND	ppbV	NC	25
Trichloroethene	ND	ND	ppbV	NC	25
2,2,4-Trimethylpentane	ND	ND	ppbV	NC	25
Heptane	14.1	13.7	ppbV	3	25

## Lab Duplicate Analysis

Batch Quality Control

Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415064

Report Date: 07/15/14

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG704120-5 QC Sample: L1415064-02 Client ID: SG-2					
cis-1,3-Dichloropropene	ND	ND	ppbV	NC	25
4-Methyl-2-pentanone	ND	ND	ppbV	NC	25
trans-1,3-Dichloropropene	ND	ND	ppbV	NC	25
1,1,2-Trichloroethane	ND	ND	ppbV	NC	25
Toluene	10.4	10.7	ppbV	3	25
2-Hexanone	ND	ND	ppbV	NC	25
Dibromochloromethane	ND	ND	ppbV	NC	25
1,2-Dibromoethane	ND	ND	ppbV	NC	25
Tetrachloroethene	ND	ND	ppbV	NC	25
Chlorobenzene	ND	ND	ppbV	NC	25
Ethylbenzene	3.15	3.34	ppbV	6	25
p/m-Xylene	4.67	4.56	ppbV	2	25
Bromoform	ND	ND	ppbV	NC	25
Styrene	0.732	0.775	ppbV	6	25
1,1,1,2-Tetrachloroethane	ND	ND	ppbV	NC	25
o-Xylene	1.22	1.29	ppbV	6	25
4-Ethyltoluene	ND	ND	ppbV	NC	25
1,3,5-Trimethylbenzene	0.872	0.898	ppbV	3	25
1,2,4-Trimethylbenzene	2.08	2.06	ppbV	1	25

## Lab Duplicate Analysis

Batch Quality Control

Project Name: VACANT LOT

Project Number: 14-0526

Lab Number: L1415064

Report Date: 07/15/14

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG704120-5 QC Sample: L1415064-02 Client ID: SG-2					
Benzyl chloride	ND	ND	ppbV	NC	25
1,3-Dichlorobenzene	ND	ND	ppbV	NC	25
1,4-Dichlorobenzene	ND	ND	ppbV	NC	25
1,2-Dichlorobenzene	ND	ND	ppbV	NC	25
1,2,4-Trichlorobenzene	ND	ND	ppbV	NC	25
Hexachlorobutadiene	ND	ND	ppbV	NC	25

Project Name: VACANT LOT

Project Number: 14-0526

Serial\_No:07151415:40  
Lab Number: L1415064

Report Date: 07/15/14

### Canister and Flow Controller Information

Samplenum	Client ID	Media ID	Media Type	Date Prepared	Bottle Order	Cleaning Batch ID	Can Leak Check	Initial Pressure (in. Hg)	Pressure on Receipt (in. Hg)	Flow Controller Leak Chk	Flow Out mL/min	Flow In mL/min	% RPD
L1415064-01	SG-1	0283	#30 AMB	07/02/14	104877		-	-	-	Pass	11.6	12.2	5
L1415064-01	SG-1	196	2.7L Can	07/02/14	104877	L1413800-01	Pass	-29.5	-12.3	-	-	-	-
L1415064-02	SG-2	0312	#20 AMB	07/02/14	104877		-	-	-	Pass	11.9	12.2	2
L1415064-02	SG-2	490	2.7L Can	07/02/14	104877	L1413800-01	Pass	-29.6	-10.3	-	-	-	-

**Project Name:** BATCH CANISTER CERTIFICATION  
**Project Number:** CANISTER QC BAT

**Lab Number:** L1413800  
**Report Date:** 07/15/14

### Air Canister Certification Results

Lab ID: L1413800-01  
 Client ID: CAN 137 SHELF 15  
 Sample Location:  
 Matrix: Air  
 Analytical Method: 48,TO-15  
 Analytical Date: 06/24/14 15:47  
 Analyst: RY

Date Collected: 06/23/14 16:52  
 Date Received: 06/24/14  
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Chlorodifluoromethane	ND	0.200	--	ND	0.707	--		1
Propylene	ND	0.500	--	ND	0.861	--		1
Propane	ND	0.500	--	ND	0.902	--		1
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Butane	ND	0.200	--	ND	0.475	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	2.50	--	ND	4.71	--		1
Dichlorofluoromethane	ND	0.200	--	ND	0.842	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acrolein	ND	0.500	--	ND	1.15	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Acetonitrile	ND	0.200	--	ND	0.336	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
Acrylonitrile	ND	0.200	--	ND	0.434	--		1
Pentane	ND	0.200	--	ND	0.590	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	1.00	--	ND	3.47	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1



**Project Name:** BATCH CANISTER CERTIFICATION  
**Project Number:** CANISTER QC BAT

**Lab Number:** L1413800  
**Report Date:** 07/15/14

### Air Canister Certification Results

Lab ID: L1413800-01  
 Client ID: CAN 137 SHELF 15  
 Sample Location:

Date Collected: 06/23/14 16:52  
 Date Received: 06/24/14  
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	ND	0.200	--	ND	0.590	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
2,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Diisopropyl ether	ND	0.200	--	ND	0.836	--		1
tert-Butyl Ethyl Ether	ND	0.200	--	ND	0.836	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
1,1-Dichloropropene	ND	0.200	--	ND	0.908	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
tert-Amyl Methyl Ether	ND	0.200	--	ND	0.836	--		1
Dibromomethane	ND	0.200	--	ND	1.42	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1



**Project Name:** BATCH CANISTER CERTIFICATION  
**Project Number:** CANISTER QC BAT

**Lab Number:** L1413800  
**Report Date:** 07/15/14

### Air Canister Certification Results

Lab ID: L1413800-01  
 Client ID: CAN 137 SHELF 15  
 Sample Location:

Date Collected: 06/23/14 16:52  
 Date Received: 06/24/14  
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
Methyl Methacrylate	ND	0.500	--	ND	2.05	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
1,3-Dichloropropane	ND	0.200	--	ND	0.924	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Butyl acetate	ND	0.500	--	ND	2.38	--		1
Octane	ND	0.200	--	ND	0.934	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
1,1,1,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
1,2,3-Trichloropropane	ND	0.200	--	ND	1.21	--		1
Nonane	ND	0.200	--	ND	1.05	--		1
Isopropylbenzene	ND	0.200	--	ND	0.983	--		1
Bromobenzene	ND	0.200	--	ND	0.793	--		1
2-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
n-Propylbenzene	ND	0.200	--	ND	0.983	--		1



**Project Name:** BATCH CANISTER CERTIFICATION  
**Project Number:** CANISTER QC BAT

**Lab Number:** L1413800  
**Report Date:** 07/15/14

### Air Canister Certification Results

Lab ID: L1413800-01  
 Client ID: CAN 137 SHELF 15  
 Sample Location:

Date Collected: 06/23/14 16:52  
 Date Received: 06/24/14  
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air - Mansfield Lab								
4-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
tert-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Decane	ND	0.200	--	ND	1.16	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
sec-Butylbenzene	ND	0.200	--	ND	1.10	--		1
p-Isopropyltoluene	ND	0.200	--	ND	1.10	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
n-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2-Dibromo-3-chloropropane	ND	0.200	--	ND	1.93	--		1
Undecane	ND	0.200	--	ND	1.28	--		1
Dodecane	ND	0.200	--	ND	1.39	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Naphthalene	ND	0.200	--	ND	1.05	--		1
1,2,3-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

	Results	Qualifier	Units	RDL	Dilution Factor
Tentatively Identified Compounds					

No Tentatively Identified Compounds

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	97		60-140
Bromochloromethane	96		60-140



**Project Name:** BATCH CANISTER CERTIFICATION  
**Project Number:** CANISTER QC BAT

**Lab Number:** L1413800  
**Report Date:** 07/15/14

### Air Canister Certification Results

Lab ID: L1413800-01  
 Client ID: CAN 137 SHELF 15  
 Sample Location:  
 Matrix: Air  
 Analytical Method: 48,TO-15-SIM  
 Analytical Date: 06/24/14 15:47  
 Analyst: RY

Date Collected: 06/23/14 16:52  
 Date Received: 06/24/14  
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	ND	0.050	--	ND	0.247	--		1
Chloromethane	ND	0.500	--	ND	1.03	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Acetone	ND	2.00	--	ND	4.75	--		1
Trichlorofluoromethane	ND	0.050	--	ND	0.281	--		1
Acrylonitrile	ND	0.500	--	ND	1.09	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	1.00	--	ND	3.47	--		1
Freon-113	ND	0.050	--	ND	0.383	--		1
Halothane	ND	0.050	--	ND	0.404	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1



**Project Name:** BATCH CANISTER CERTIFICATION  
**Project Number:** CANISTER QC BAT

**Lab Number:** L1413800  
**Report Date:** 07/15/14

### Air Canister Certification Results

Lab ID: L1413800-01  
 Client ID: CAN 137 SHELF 15  
 Sample Location:

Date Collected: 06/23/14 16:52  
 Date Received: 06/24/14  
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
1,4-Dioxane	ND	0.100	--	ND	0.360	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	ND	0.050	--	ND	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Ethylbenzene	ND	0.020	--	ND	0.087	--		1
p/m-Xylene	ND	0.040	--	ND	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	ND	0.020	--	ND	0.087	--		1
Isopropylbenzene	ND	0.500	--	ND	2.46	--		1
4-Ethyltoluene	ND	0.020	--	ND	0.098	--		1
1,3,5-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
sec-Butylbenzene	ND	0.500	--	ND	2.74	--		1
p-Isopropyltoluene	ND	0.500	--	ND	2.74	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1

**Project Name:** BATCH CANISTER CERTIFICATION  
**Project Number:** CANISTER QC BAT

**Lab Number:** L1413800  
**Report Date:** 07/15/14

### Air Canister Certification Results

Lab ID: L1413800-01  
 Client ID: CAN 137 SHELF 15  
 Sample Location:

Date Collected: 06/23/14 16:52  
 Date Received: 06/24/14  
 Field Prep: Not Specified

Parameter	ppbV			ug/m3			Qualifier	Dilution Factor
	Results	RL	MDL	Results	RL	MDL		
Volatile Organics in Air by SIM - Mansfield Lab								
n-Butylbenzene	ND	0.500	--	ND	2.74	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
1,2,3-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	99		60-140
bromochloromethane	99		60-140
chlorobenzene-d5	100		60-140

**Project Name:** VACANT LOT**Lab Number:** L1415064**Project Number:** 14-0526**Report Date:** 07/15/14**Sample Receipt and Container Information**

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: NA

**Cooler Information Custody Seal****Cooler**

N/A Present/Intact

**Container Information**

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1415064-01A	Canister - 2.7 Liter	N/A	NA		Y	Present/Intact	TO15-LL(30)
L1415064-02A	Canister - 2.7 Liter	N/A	NA		Y	Present/Intact	TO15-LL(30)

\*Values in parentheses indicate holding time in days

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415064  
**Report Date:** 07/15/14

## GLOSSARY

### Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NI	- Not Ignitable.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

### Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

### Terms

**Total:** With respect to Organic analyses, a "Total" result is defined as the summation of results for individual isomers or Aroclors. If a "Total" result is requested, the results of its individual components will also be reported. This is applicable to "Total" results for methods 8260, 8081 and 8082.

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

### Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit.
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.

Report Format: Data Usability Report



**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415064  
**Report Date:** 07/15/14

**Data Qualifiers**

- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the reporting limit (RL) for the sample.

**Project Name:** VACANT LOT  
**Project Number:** 14-0526

**Lab Number:** L1415064  
**Report Date:** 07/15/14

## REFERENCES

- 48 Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air. Second Edition. EPA/625/R-96/010b, January 1999.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



## Certification Information

Last revised April 15, 2014

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**The following analytes are not included in our NELAP Scope of Accreditation:**

### Westborough Facility

**EPA 524.2:** Acetone, 2-Butanone (Methyl ethyl ketone (MEK)), Tert-butyl alcohol, 2-Hexanone, Tetrahydrofuran, 1,3,5-Trichlorobenzene, 4-Methyl-2-pentanone (MIBK), Carbon disulfide, Diethyl ether.

**EPA 8260C:** 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene, Iodomethane (methyl iodide), Methyl methacrylate, Azobenzene.

**EPA 8330A/B:** PETN, Picric Acid, Nitroglycerine, 2,6-DANT, 2,4-DANT.

**EPA 8270D:** 1-Methylnaphthalene, Dimethylnaphthalene, 1,4-Diphenylhydrazine.

**EPA 625:** 4-Chloroaniline, 4-Methylphenol.

**SM4500:** Soil: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.

**EPA 9071:** Total Petroleum Hydrocarbons, Oil & Grease.

### Mansfield Facility

**EPA 8270D:** Biphenyl.

**EPA 2540D:** TSS

**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

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**The following analytes are included in our Massachusetts DEP Scope of Accreditation, Westborough Facility:**

### Drinking Water

**EPA 200.8:** Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl; **EPA 200.7:** Ba,Be,Ca,Cd,Cr,Cu,Na; **EPA 245.1:** Mercury;

**EPA 300.0:** Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B**

**EPA 332:** Perchlorate.

**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, Enterolert-QT.**

### Non-Potable Water

**EPA 200.8:** Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn;

**EPA 200.7:** Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn;

**EPA 245.1, SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2340B, SM2320B, SM4500CL-E, SM4500F-BC, SM426C, SM4500NH3-BH, EPA 350.1:** Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **SM4500NO3-F,**

**EPA 353.2:** Nitrate-N, **SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, SM4500P-B, E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.**

**EPA 624:** Volatile Halocarbons & Aromatics,

**EPA 608:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

**EPA 625:** SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, SM9222D-MF.**

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For a complete listing of analytes and methods, please contact your Alpha Project Manager.



# AIR ANALYSIS

CHAIN OF CUSTODY

PAGE 1 OF 1

320 Forbes Blvd, Mansfield, MA 02048  
 TEL: 508-822-9300 FAX: 508-822-3288

**Client Information**

Client: **Airtek Environmental Corp.**

Address: **39-37 29th Street  
 Long Island City, NY 11101**

Phone: **718-937-3720**

Fax: **718-937-3721**

Email: **cchen@airtekenv.com**

These samples have been previously analyzed by Alpha

Other Project Specific Requirements/Comments:

**Project Information**

Project Name: **Vacant Lot**

Project Location: **583 Franklin Ave, Brooklyn, NY**

Project #: **14-0526**

Project Manager: **Christine Chen**

ALPHA Quote #: **2011060**

**Turn-Around Time**

Standard  RUSH (only confirmed if pre-approved)

Date Due: \_\_\_\_\_ Time: \_\_\_\_\_

Date Rec'd in Lab: \_\_\_\_\_

**Report Information - Data Deliverables**

FAX  
 ADEx  
 Criteria Checker: \_\_\_\_\_  
 (Default based on Regulatory Criteria Indicated)

Other Formats: \_\_\_\_\_  
 EMAIL (standard pdf report)  
 Additional Deliverables: \_\_\_\_\_

Report to: (if different than Project Manager)

ALPHA Job #: **L1415064**

**Billing Information**

Same as Client Info PO #: \_\_\_\_\_

**Regulatory Requirements/Report Limits**

State/Fed	Program	Criteria

**All Columns Below Must Be Filled Out**

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection					Sample Matrix*	Sampler's Initials	Can Size	I D Can	I D - Flow Controller	ANALYSIS						Sample Comments (i.e. PID)
		Date	Start Time	End Time	Initial Vacuum	Final Vacuum						TO-14A by TO-15	TO-15	TO-15 SIM	APP	FIXED GASES	TO-13A	
15064.01	SG-1	7/8/14	10:00	12:35	-32.34	-12.5	Air	DP	2.7 L	196	0283	X						
02	SG-2	7/8/14	10:15	12:40	-30.9	-9.7	Air	DP	2.7 L	490	0312	X						

**\*SAMPLE MATRIX CODES**

AA = Ambient Air (Indoor/Outdoor)  
 SV = Soil Vapor/Landfill Gas/SVE  
 Other = Please Specify

Container Type

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

Relinquished By:

Date/Time:

Received By:

Date/Time:

*Christine Chen*  
 7-8-14 1309

*Tom*  
 7-8-14 1830

*Tom*  
 7-8-14 1830