Material Safety Data Sheet
Trichloroethylene
ACC# 23850

Section 1 - Chemical Product and Company Identification

MSDS Name: Trichloroethylene
Synonyms: Ethylene trichloride, triclene, trichloroethene, benzol cecolene

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

<table>
<thead>
<tr>
<th>CAS#</th>
<th>Chemical Name</th>
<th>Percent</th>
<th>EINECS/ELINCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>79-01-6</td>
<td>Trichloroethylene</td>
<td>100</td>
<td>201-167-4</td>
</tr>
</tbody>
</table>

Hazard Symbols: XN
Risk Phrases: 40 52/53

Section 3 - Hazards Identification

EMERGENCY OVERVIEW


Target Organs: Central nervous system, liver.

Potential Health Effects

Eye: Causes moderate eye irritation. May result in corneal injury. Contact produces irritation, tearing, and burning pain.
Skin: Causes mild skin irritation. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis. May cause peripheral nervous system function impairment including persistent neuritis, and temporary loss of touch. Damage to the liver and other organs has been observed in workers who have been overexposed.
Ingestion: Aspiration hazard. May cause irritation of the digestive tract. 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. May cause respiratory tract irritation. May cause liver abnormalities. May cause peripheral nervous system effects.
Chronic: Possible cancer hazard based on tests with laboratory animals. Chronic inhalation may cause effects similar to those of acute inhalation. Prolonged or repeated skin contact may cause defatting and dermatitis. May cause peripheral nervous system function impairment including persistent neuritis, and temporary loss of touch. Damage to the liver and other organs has been observed in workers who have been overexposed.

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 if irritation develops or persists. Flush skin with plenty of soap and water.
Ingestion: 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 not breathing, give artificial respiration. If breathing is difficult, give oxygen. DO NOT use mouth-to-mouth respiration.

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 can travel to a source of ignition and flash back. Combustion generates toxic fumes. Containers may explode in the heat of a fire.
Extinguishing Media: Use water spray to cool fire-exposed containers. Use water spray, dry chemical, carbon dioxide, or chemical 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., dry sand or earth), then place into a chemical waste container. Remove all sources of ignition. Provide ventilation.

Section 7 - Handling and Storage
Handling: Wash thoroughly after handling. Use only in a well-ventilated area. 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, drill, grind, or expose empty containers to heat, sparks or open flames.

Storage: Keep away from sources of ignition. Store in tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances.

Engineering Controls: Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH</th>
<th>NIOSH Potential Occupational</th>
<th>OSHA - Final PELs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trichloroethylene</td>
<td>50 ppm; 100 ppm STEL</td>
<td>Not available.</td>
<td>100 ppm TWA; C 20</td>
</tr>
</tbody>
</table>

OSHA Vacated PELs: Trichloroethylene: 50 ppm TWA; 270 mg/m3 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.

Physical State: Liquid

Appearance: clear, colorless

Odor: sweetish odor - chloroform-like

pH: Not available.

Vapor Pressure: 58 mm Hg @20C

Vapor Density: 4.53

Evaporation Rate: 0.89 (CCl4=1)

Viscosity: 0.0055 poise

Boiling Point: 189 deg F

Freezing/Melting Point: -121 deg F

Decomposition Temperature: Not available.

Autoignition Temperature: 778 deg F (414.44 deg C)

Flash Point: Not applicable.

NFPA Rating: (Estimated) Health: 2; Flammability: 1; Reactivity: 0

Explosion Limits, Lower: 12.5

Upper: Not available.

Solubility: Insoluble in water.

Specific Gravity/Density: 1.47 (water=1)

Molecular Formula: C2HCl3

Molecular Weight: 131.366

Chemical Stability: Stable under normal temperatures and pressures.

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

Incompatibilities with Other Materials: Alkalis (sodium hydroxide), chemically active metals (aluminum, beryllium, lithium, magnesium), epoxies and oxidants. Can react violently with aluminum, barium, lithium, magnesium, liquid oxygen, ozone, potassium hydroxide, potassium nitrate, sodium, sodium hydroxide, titanium, and nitrogen dioxide. Reacts with water under heat and pressure to form hydrogen chloride gas.

Hazardous Decomposition Products: Hydrogen chloride, carbon dioxide, chloride fumes.

Hazardous Polymerization: Has not been reported.

RTECS:

CAS#: 79-01-6; KX4S50000

LD50/LC50:

CAS#: 79-01-6;

Inhalation, mouse: LC50 = 8450 ppm/4H;

Oral, mouse: LD50 = 2402 mg/kg;
Oral, rat: LD$_{50}$ = 5650 mg/kg; Skin, rabbit: LD$_{50}$ > 20 gm/kg;

Carcinogenicity:
CAS# 79-01-6:
ACGIH: A5 - not suspected as a human carcinogen
California: carcinogen; initial date 4/1/88
NIOSH: occupational carcinogen
OSHA: Possible Select carcinogen
IARC: Group 2A carcinogen

Epidemiology: Suspected carcinogen with experimental carcinogetic, tumorigenic, and teratogenic data.

Reproductive Effects: Experimental reproductive effects have been observed.

Neurotoxicity: No information available.

Mutagenicity: Human mutation data has been reported. IARC and the National Toxicology Program (NTP) stated that variability in the mutagenicity test results with trichloroethylene may be due to the presence of various stabilizers used in TCE which are mutagens (e.g., epoxibutane, epichlorohydrin).

Other Studies: None.

Ecotoxicity: Bluegill sunfish, LD$_{50}$= 44,700 ug/L/96Hr. Fathead minnow, LC$_{50}$=40.7 mg/L/96Hr.

Environmental Fate: In air, substance is photooxidized and is reported to form phosgene, dichloroacetyl chloride, and formyl chloride. In water, it evaporates rapidly.

Physical/Chemical: No information available.

Other: None.

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.

Shipping Name: TRICHLOROETHYLENE

Hazard Class: 6.1

UN Number: UN1710

Packing Group: III

This material contains Trichloroethylene (CAS# 79-01-6, 100%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
CAS# 79-01-6 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# 79-01-6 is listed as a Hazardous Substance under the CWA. CAS# 79-01-6 is listed as a Priority Pollutant under the Clean Water Act. CAS# 79-01-6 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# 79-01-6 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 Trichloroethylene, a chemical known to the state of California to cause cancer. California No Significant Risk Level: CAS# 79-01-6: ingestion: no significant risk level = 50 ug/day; inhalation: no significant risk level = 80 ug/day

**European/International Regulations**

**European Labelling In Accordance with EC Directives**

**Hazard Symbols:**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>XN</td>
<td></td>
</tr>
</tbody>
</table>

**Risk Phrases:**
R 40 Possible risks of irreversible effects. 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 61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

**WGK (Water Danger/Protection)**

CAS# 79-01-6: 3

**Canada**
CAS# 79-01-6 is listed on Canada's DSL/NDSL List.
This product has a WHMIS classification of D1B, D2B.
CAS# 79-01-6 is not listed on Canada's Ingredient Disclosure List.

**Exposure Limits**

<table>
<thead>
<tr>
<th>Country</th>
<th>TWA (mg/m³)</th>
<th>STEL (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEL-AUSTRALIA</td>
<td>50 ppm</td>
<td>200 ppm</td>
</tr>
<tr>
<td>OEL-BELGIUM</td>
<td>50 ppm</td>
<td>200 ppm</td>
</tr>
<tr>
<td>OEL-CZECHOSLOVAKIA</td>
<td>250 mg/m³</td>
<td>1250 mg/m³</td>
</tr>
<tr>
<td>OEL-DENMARK</td>
<td>30 ppm</td>
<td>160 ppm</td>
</tr>
<tr>
<td>OEL-FINLAND</td>
<td>30 ppm</td>
<td>45 ppm</td>
</tr>
<tr>
<td>OEL-FRANCE</td>
<td>35 ppm</td>
<td>100 ppm</td>
</tr>
<tr>
<td>OEL-GERMANY</td>
<td>50 ppm</td>
<td>75 ppm</td>
</tr>
<tr>
<td>OEL-HUNGARY</td>
<td>10 mg/m³</td>
<td>40 mg/m³</td>
</tr>
<tr>
<td>OEL-JAPAN</td>
<td>50 ppm</td>
<td>50 mg/m³</td>
</tr>
<tr>
<td>OEL-THE NETHERLAND</td>
<td>100 ppm</td>
<td>150 ppm</td>
</tr>
<tr>
<td>OEL-THE PHILIPPINES</td>
<td>100 ppm</td>
<td>535 mg/m³</td>
</tr>
<tr>
<td>OEL-POLAND</td>
<td>50 mg/m³</td>
<td>50 ppm</td>
</tr>
<tr>
<td>OEL-RUSSIA</td>
<td>50 ppm</td>
<td>1 ppm</td>
</tr>
<tr>
<td>OEL-SWEDEN</td>
<td>10 ppm</td>
<td>50 mg/m³</td>
</tr>
<tr>
<td>OEL-TURKEY</td>
<td>200 ppm</td>
<td>100 ppm</td>
</tr>
<tr>
<td>OEL-UNITED KINGDOM</td>
<td>100 ppm</td>
<td>535 mg/m³</td>
</tr>
<tr>
<td>BULGARIA, COLOMBIA, JORDAN, KOREA</td>
<td>check ACGIH TLV</td>
<td></td>
</tr>
<tr>
<td>SINGAPORE, VIETNAM</td>
<td>check ACGIH TLV</td>
<td></td>
</tr>
</tbody>
</table>

**Section 16 - Additional Information**

**MSDS Creation Date:** 2/01/1999

**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 way shall Fisher be liable for any claims, losses, or damages of any kind, either in contract or tort, arising out of the use of this information. Fisher has been advised of the possibility of such damages.