

SAFETY DATA SHEET



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TRICHLOROETHYLENE

SDS No. M0196

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Trichloroethylene

Synonyms: Ethylene Trichloride, Triclene, Trichloroethene, Benzinol Cecolene

Recommended Use: This product is recommended for laboratory and manufacturing use only. It is not recommended for drug, food or household use.

2. HAZARDS IDENTIFICATION



Classification

Skin Irritation: GHS Category 2

Eye Irritation: GHS Category 2

Label Elements

Signal Word: DANGER!

Hazard Statements:

- H315 – Causes skin irritation
- H320 – Causes eye irritation.
- H335 – May cause respiratory irritation.
- H336 – May cause drowsiness and dizziness
- H350 – may cause cancer.
- H412 – Harmful to aquatic life with long lasting effects,

Precautionary Statements:

- P243 – Take precautionary measures against static discharge.
- P273 – Avoid release to environment.
- P280 – Wear protective gloves/protective clothing/eye protection/face protection.
- P303+P361+P353 – If on skin or hair: Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
- H410 – Protect from sunlight.

Emergency Overview

Breathing vapors may cause drowsiness and dizziness. May cause respiratory tract irritation. Causes eye and skin irritation. May cause central nervous system effects. May cause liver and kidney damage. Possible risk of irreversible effects. Cancer hazard. Harmful to aquatic organisms. May cause long term effects in an aquatic system. Possible static electrical hazard. Target organs: Kidneys, liver, spleen, central nervous system, respiratory system, eyes, and skin.

HMIS Rating:

Health – 2* Flammability – 0 Physical Hazard – 1 PPE – User supplied

NOTE: HMIS ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. These ratings are based on the inherent properties of this chemical under expected conditions of normal use and are not intended to be used in emergency situations. PPE is determined by the user based on their needs and conditions

3. COMPOSITION AND INFORMATION ON INGREDIENTS

<u>Ingredient</u>	<u>CAS No</u>	<u>Percent</u>	<u>Hazardous</u>
Trichloroethylene	79-01-6	>99%	Yes
Butylene Oxide	106-88-6	<0.6%	Yes
Stabilizers	NA	<0.2%	No

4. FIRST-AID MEASURES

Inhalation: If inhaled, remove to fresh air. If breathing is labored or with coughing, give 100% supplemental oxygen. If not breathing, begin artificial respiration. Get medical aid.

Ingestion: Do not induce vomiting. 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.

Eye Contact: Check for and remove contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Notes to Physician: Maintain adequate oxygenation and ventilation of patient. If lavage is performed, suggest endotracheal and/or esophageal control. Because rapid absorption may occur through lungs if aspirated and cause systemic effects, the decision to induce vomiting or not should be made by a physician. Exposure may increase myocardial irritability. Do not administer sympathomimetic drugs such as epinephrine unless absolutely necessary. Alcohol consumed before or after exposure may increase adverse effects. No specific antidote. Treatment should be directed at control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES

Flammability:

Auto-ignition Temperature: 420° C (788° F)

Flash Point: Not available

Flammable Limits: Lower Limit – 7.9%; Upper Limit – 44.8%

Products of Combustion: May decompose into highly toxic and irritating gases (hydrogen chloride, carbon monoxide, and carbon dioxide) under fire conditions.

Specific Fire Hazards: As in any fire, always wear self-contained breathing apparatus in pressure-demand (MSA/NIOSH approved or equivalent), and full protective gear. Strong ignition sources may cause flame.

Specific Explosion Hazards: None

Fire Fighting Media: Use water spray, dry chemical, carbon dioxide, or chemical foam. Water run-off should be contained.

National Fire Protective Association: Health - 2, Flammability - 1, Reactivity - 0

NOTE: NFPA ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. They are for use by emergency personnel to address the hazards that are presented by short term, acute exposure to this product under fire, spill, or similar emergencies. Ratings involve data and interpretations that may vary from company to company..

6. ACCIDENTAL RELEASE MEASURES

Absorb spilled liquid with sorbent pads, socks, or other inert material such as vermiculite, sand, or earth. Provide ventilation to the affected area. Avoid run-off into storm sewers and ditches that lead to waterways. Approach the spill from upwind and pick up absorbed material and place it in a suitable container. Always use proper personal protective equipment as described in section 8.

7. HANDLING AND STORAGE

Precautions: Always use proper personal protective equipment as described in section 8. Wash thoroughly after handling. Avoid contact with eyes, skin, and clothing. Remove contaminated clothing and wash before reuse. Keep container tightly closed. Avoid ingestion and inhalation.

Storage: Keep in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances and ignition sources. Protect from moisture.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Facilities storing or using the material should be equipped with eyewash station and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Personal Protection: Wear protective chemical goggles or appropriate eye protection. Use appropriate protective gloves and protective clothing to prevent skin exposure. A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever possible. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Exposure Limits (Trichloroethylene):

ACGIH – 10 ppm TWA; 25 ppm STEL

NIOSH – 1000 ppm IDLH

OSHA Final PELs: 100 ppm TWA; 200 ppm Ceiling

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

Exposure Limits (Butylene Oxide):

AIHA WEEL: 2 ppm; 5.9 mg/m³ TWA

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance: Clear, colorless liquid.

Odor: Chloroform-like odor

Odor Threshold: 28 ppm

Molecular Formula: ClCH=CCl₂

Molecular Weight: 131.39

Auto-ignition Temperature: 420° C (788° F)

Flash Point: Not available

Flammable Limits: Lower Limit – 7.9%; Upper Limit – 44.8%

pH: Not available.

Boiling Point: 87° C 760 mm Hg @ 20° C (189° F)

Freezing/Melting Point: -86° C (-123° F)

Decomposition Temperature: Not available

Specific Gravity: 1.46 (Water=1)

Vapor Density (Air=1): 4.5

Vapor Pressure: 0.58 mpas @ 20° C

Viscosity: Not available

Solubility: Insoluble

Conductivity: Semiconductive; Conductivity = 800 pS/m; Dielectric Constant = 3.42; Relaxation Time Constant = 3.7×10^{-2} seconds

10. STABILITY AND REACTIVITY

Stability: Moisture sensitive. Light sensitive

Conditions to Avoid: Incompatible materials, light, ignition sources, excess heat, exposure to moist air or water.

Incompatibility With Various Substances: Strong oxidizing agents, strong reducing agents, bases, alkali metals, metals, metal compounds (toxic, e.g. beryllium, lead acetate, nickel carbonyl, tetraethyl lead), and amines.

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

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Routes of Entry: Inhalation, skin absorption, skin contact

Acute Exposure Hazards:

INHALATION HAZARD: May cause respiratory tract irritation. May cause liver and kidney damage. May be harmful if inhaled. May cause central nervous system effects. Excessive exposure may cause unconsciousness and death. The chief symptoms of TCE exposure were found to be abnormal fatigue, irritability, headache, gastric disturbances, and intolerance to alcohol.

INGESTION HAZARD: Low oral toxicity. May cause irritation of the digestive tract. May be harmful if swallowed. May cause central nervous system effects. Small amounts swallowed incidentally are not likely to cause injury.

SKIN CONTACT HAZARD: Causes irritation. May be harmful if absorbed through the skin. May cause more serious response on covered skin. Some evidence of sensitization in lab animal testing.

EYE CONTACT HAZARD: Causes eye irritation. Contact with trichloroethylene causes pain but no permanent injury to the eyes.

Chronic Exposure Hazards: Prolonged or repeated skin contact may cause defatting and dermatitis. May cause liver and kidney damage. May cause cancer in humans. Repeated exposure may cause damage to the spleen and hearing loss. Adverse reproductive effects have been reported in animals. Laboratory experiments have resulted in mutagenic effects. Possible risk of irreversible effects.

Animal Toxicity (Trichloroethylene):

Draize test, rabbit, eye: 20 mg/24H Moderate;
 Draize test, rabbit, skin: 2 mg/24H Severe;
 Inhalation, mouse: LC50 = 8450 ppm/4H;
 Inhalation, mouse: LC50 = 220000 mg/m³/20M;
 Inhalation, mouse: LC50 = 262000 mg/m³/30M;
 Inhalation, mouse: LC50 = 40000 mg/m³/4H;
 Inhalation, rat: LC50 = 140700 mg/m³/1H;
 Oral, mouse: LD50 = 2402 mg/kg;
 Oral, mouse: LD50 = 2400 mg/kg;
 Oral, rat: LD50 = 4920 mg/kg;
 Skin, rabbit: LD50 = >20 gm/kg;
 Skin, rabbit: LD50 = 20 mL/kg;

Carcinogenicity: ACGIH: A2 - Suspected Human Carcinogen; California Prop 65: carcinogen, initial date 4/1/88; NTP: suspect carcinogen; IARC: Group 2A carcinogen

Epidemiology: Tumorigenic effects have been reported in experimental animals.

Teratogenicity: Teratogenic effects have occurred in experimental animals.

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

Mutagenicity: Mutagenic effects have occurred in humans.

Neurotoxicity: No data available.

Animal Toxicity (Butylene Oxide):

Oral, rat: LD50 = 1180 mg/kg;

Skin, rabbit: LD50 = 1760 gm/kg;

Carcinogenicity: Listed by NTP as a carcinogen. In long-term animal studies with concentrations irritating to the mucous membrane a carcinogenic effect was observed.

Epidemiology: Danger of skin sensitization on repeated contact.

Teratogenicity: No data available.

Reproductive Effects: No data available.

Mutagenicity: The substance was mutagenic in various test systems with microorganisms and cell cultures; however these test results could not be confirmed with mammals.

Neurotoxicity: No data available.

12. ECOLOGICAL INFORMATION

Ecotoxicity (Trichloroethylene):

Fish: Fathead Minnow: 41-67 mg/L; 96 Hrs. LC50

Daphnia: Daphnia: 2.2-100 mg/L; 48 Hrs. LC50

Mollusk Shrimp: 2 mg/L; 96 hrs. LC50

Bluegill sunfish, LD50= 44,700 ug/L/96Hr.

Fathead minnow, LC50=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. Potential for mobility in soil is high. Bioconcentration potential is low (BCF less than 100).

Ecotoxicity (Butylene Oxide):

Fish: Golden orfe: 100-215 mg/L; 96 Hrs. LC50

Bacterium, LC50= 4840 mg/L/17Hr.

Green algae, LC50=>500 mg/L/72Hr.

Environmental Fate: This material is highly volatile and can be eliminated from water by stripping. Readily biodegradable by Abiotic processes. Not expected to bioaccumulate

13. DISPOSAL CONSIDERATIONS

Material that cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Processing, use or contamination of this product may change the waste management options. Waste generators must decide if discarded material is a hazardous waste. State and local disposal regulations may differ from federal disposal definitions found in 40 CFR 261.3. Dispose of container and unused contents in accordance with federal, state and local requirements. Trichloroethylene is a "U" listed waste (U228) under 40 CFR 261.33. Butylene Oxide is a "D" listed waste (D001) under 40 CFR 261.33.

14. TRANSPORT INFORMATION

US DOT

Proper Shipping Name: Trichloroethylene

Hazard Class: 6.1

UN Number: UN1710

Packing Group: III

Canada TDG

Additional Information: Not available

15. REGULATORY INFORMATION

US Federal Regulations:

TSCA: CAS# 79-01-6 and CAS# 108-88-6 are listed on the TSCA Inventory.

Chemical Test Rules: CAS# 79-01-6 is not listed.

Section 12b: CAS# 79-01-6 is not listed.

TSCA Significant New Use Rule: Does not have an SNUR under TSCA.

CERCLA Hazardous Substances: CAS# 79-01-6: 100 lb final RQ; 45.4 kg final RQ.

SARA Section 302: Does not have a TPQ

SARA Codes: CAS# 79-01-6 – immediate, delayed, reactive; CAS# 108-88-6 – immediate, fire

Section 313: Trichloroethylene (CAS# 79-01-6) is subject to SARA Title III Section 313 and 40 CFR 373 reporting requirements.

OSHA: Not considered highly hazardous by OSHA.

Clean Air Act: CAS# 79-01-6 is listed as a hazardous air pollutant (HAP). It is not a Class 1 ozone depletory. It is not a Class 2 ozone depletory.

Clean Water Act: CAS# 79-01-6 listed as a Hazardous Substance under the CWA. It is listed as a Priority Pollutant under the Clean Water Act. It is listed as a Toxic Pollutant under the Clean Water Act.

US State Regulations:

CAS# 79-01-6 is on the following state right-to-know lists: California, New Jersey, Pennsylvania, Minnesota, and 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: 50 $\mu\text{g}/\text{day}$ NSRL (oral); 80 $\mu\text{g}/\text{day}$ NSRL (inhalation)

Canada:

DSL/NDSL: CAS# 79-01-6 is listed on Canada's DSL list.

WHMIS: This product has a WHMIS classification of D1B, D2B. This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and this MSDS contains all the information required by those regulations.

DSCL (EEC):

Hazard Symbols: Xn, N

Risk Phrases: R36/38 - Irritating to eyes and skin; R45 - May cause cancer; R52/53 - Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment; R67 - Vapors may cause drowsiness and dizziness; R68 - Possible risk of irreversible effects.

Safety Phrases: S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible); S53 - Avoid exposure - obtain special instructions before use; S61 - Avoid release to the environment. Refer to special instructions/safety data sheets.

WGK (Water Danger/protection): CAS# 79-01-6: 3

16. OTHER INFORMATION

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Last Revised: 1/5/2012 – Converted to GHS format.

The information contained herein is based on current knowledge and experience; no responsibility is accepted that the information is sufficient or correct in all cases. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers and the protection of the environment.

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