

CORCO CHEMICAL CORPORATION

Manufacturers of ACS Reagents and Semiconductor Grade Chemicals

SAFETY DATA SHEET

TRICHLOROETHYLENE

1. IDENTIFICATION

Product identifier: TRICHLOROETHYLENE

Product Code Number: 2300
Company Identification: Corco Chemical Corporation
299 Cedar Lane
Fairless Hills, PA 19030
Phone: 215-295-5006
Fax: 215-295-0781

24 Hour Emergency Telephone Number: CHEMTREC (U.S.): 1-800-424-9300
CHEMTREC (Outside U.S. 1-703-527-3887)

Trade Name: Trichloroethylene
Synonyms: Ethylene Trichloride, Triclene, Trichloroethene, Benzinol Cecolene, TCE
Chemical Formula: CICH=CCl₂
Product use: Process chemical, Laboratory and scientific research and development

2. HAZARD(S) IDENTIFICATION

Target Organs: Liver, Central nervous system, Heart, Lungs

Health hazards:	Acute toxicity, Oral	Category 5
	Skin irritation	Category 2
	Eye irritation	Category 2A
	Germ cell mutagenicity	Category 2
	Carcinogenicity	Category 1B
	Specific target organ toxicity	

single exposure
Acute aquatic toxicity
Chronic aquatic toxicity

Category 2
Category 3
Category 3

OSHA Hazards: Carcinogen, Irritant, Mutagen, Target organ effect

Label Elements:



Signal word **Danger**

Hazard statement: Causes skin irritation Harmful if swallowed. Causes serious eye irritation. May cause respiratory irritation. Suspected of causing genetic defects. Suspected of causing cancer. May cause damage to organs (nervous system). Causes damage to organs (kidney, liver, nervous system) through prolonged or repeated exposure. May cause drowsiness and dizziness. Harmful to aquatic life with long lasting effects.

Precautionary statement: Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. No smoking. Use only outdoors or in a well-ventilated area. Keep container tightly closed. Do not breathe mist or vapor. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Wear protective gloves/protective clothing/eye protection/face protection. Do not breathe dust/ fume/ gas/ mist/ vapors/ spray. Avoid release to the environment. **IF IN EYES:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. **IF exposed or concerned:** Get medical advice/ attention.

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. **If on skin (or hair):** Take off immediately all contaminated clothing. Rinse skin with water/shower. **If inhaled:** Remove person to fresh air and keep comfortable for breathing. **If in eyes:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. **If exposed or concerned:** Get medical advice/attention. Rinse mouth. **If skin irritation occurs:** Get medical advice/attention. **If eye irritation persists:** Get medical advice/attention.

Storage: Store in a well-ventilated place. Keep container tightly closed. Store in a well-ventilated place. Keep cool. Store locked up.

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. Target organs: Kidneys, liver, spleen, central nervous system, respiratory system, eyes, and skin.

3. Composition/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

Skin contact: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash off with soap and plenty of water. If skin irritation occurs: Get medical advice/attention.

Eye contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.

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: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. Rinse mouth. Do not induce vomiting.

General information: Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. IF exposed or concerned: Get medical advice/attention. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Flammability:

Auto-ignition Temperature:

420 o C (788o 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.

Environmental precautions: Prevent spillage from entering drains. Any release to the environment may be subject to federal/national or local reporting requirements. Dispose of all waste and cleanup materials in accordance with regulations.

The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and storage

Precautions for safe handling: See section 8 for recommendations on the use of personal protective equipment. Use with adequate ventilation. Wash thoroughly after using. Avoid contact with eyes, skin, and clothing. Remove contaminated clothing and wash before reuse. Avoid formation of aerosols. Avoid ingestion and inhalation.

Storage: Store in cool, dry well ventilated area. Light sensitive. Handle and store under inert gas. Keep away from incompatible materials (see section 10 for

incompatibilities). 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

General hygiene considerations: When using, do not eat, drink or smoke. Avoid contact with eyes. Avoid contact with skin. Wash hands before breaks and immediately after handling the product. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State and Appearance:	Clear, colorless liquid.
Odor:	Chloroform-like odor
Odor Threshold:	28 ppm
Molecular Formula:	C ₂ HCl=CCl ₂
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 @ 20o C
Viscosity:	Not available
Solubility:	Insoluble
Partition coefficient:	n-octanol/water log Pow: 2.29

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;Page 5 of 6

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.

The information offered in section 13 is for the product as shipped. Use and/or alterations to the product may significantly change the characteristics of the material and alter the waste classification and proper disposal methods.

14. Transportation Information

UN Number: UN2056
UN Proper Shipping Name: Trichloroethylene
Packaging Group: III
Hazard Class: 6.1

DOT / IMDG / IATA



Transport hazard class(es):	6.1
Subsidiary class(es):	-
Packaging group:	III
Environmental hazards:	
Marine pollutant	No
Labels required:	Not available
Special precautions for user	Not available
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	No information 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 æg/day NSRL (oral); 80 æg/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

Disclaimer - The information in the sheet was written based on the best knowledge and experience currently available. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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