

MATERIAL SAFETY DATA SHEET

TRICHLOROETHYLENE

PRODUCT CODE NUMBER(S): 9500-1, 9500-4, 9501-2

PRODUCT IDENTIFICATION

Chemical Name and Synonyms: Trichloroethylene;
Trichlor; Trichlorothene; Triluxe II

Chemical Family: Halogenated aliphatic hydrocarbon

Chemical Formula: $\text{CHCl}_2\text{CCl}_2$

Product Use: Laboratory solvent

Manufacturer's Name and Address:

Caledon Laboratories Ltd.

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HAZARDOUS INGREDIENTS OF MATERIALS

Ingredients	%	TLV Units	CAS No.
Trichloroethylene	>99	50 ppm	79-01-6

PHYSICAL DATA

Physical State: Liquid

Odour and Appearance: Clear, colourless liquid with mild, chloroform-like odour

Odour Threshold (ppm): 82 ppm (detection); 110 ppm (recognition). Poor warning properties. Irritation may occur at 30 ppm.

Vapour Pressure (mm Hg): 60 mm Hg at 20°C

Vapour Density (Air = 1): 4.53

Evaporation Rate (Ethyl ether = 1): 3.1

Boiling Point (°C): 87°C

Freezing Point (°C): -86 to -73°C

pH: Not available

Specific Gravity: 1.464 @ 20°C

Coefficient of Water/Oil distribution: $\text{LogP}(\text{oct})=2.42$

SHIPPING DESCRIPTION

UN: 1710

T.D.G. Class: 6.1

Pkg. Group: III

REACTIVITY DATA

Chemical Stability: Stable under normal conditions. Decomposed slowly by light in the presence of moisture.

Incompatibility with other substances: May react violently or explosively with strong oxidizing and reducing agents, Lewis or mineral acids, strong bases, caustics. May react violently or explosively with metals such as sodium, potassium, barium, particularly if they are finely divided or if traces of acid are present. Mixtures with strong alkalis are shock sensitive and may explode on light impact; forms spontaneously flammable and highly toxic chloroacetylenes. Can be corrosive to aluminum. Do not use aluminum or its alloys for storage, equipment, handling, or transportation. Polymerizes in presence of aluminum chloride, with release of heat and hydrochloric acid.

Reactivity: Avoid open flames, high temperatures, sparks, all sources of ignition, sunlight, moisture, and all incompatible materials. Stabilizers become less effective above 130°C.

Hazardous Decomposition Products: Hydrogen chloride gas, phosgene, hydrochloric acid, dichloroacetyl chloride, dichloroacetic acid

FIRE AND EXPLOSION DATA

Flammability: Not flammable under most conditions of use, can burn if strongly heated; fire hazard relatively low; burns with difficulty in presence of continuous ignition source.

Extinguishing Media: Use extinguishing media appropriate to the surrounding fire. If the chemical is burning, use CO_2 , dry chemical, foam, water fog. Fight fire from upwind, from a safe distance or protected area. Water as spray or fog may be used to disperse vapours and cool containers. Firefighters must wear NIOSH/MSHA approved positive-pressure self-contained breathing apparatus and encapsulating chemical splash suit. Closed containers may rupture if exposed to heat; withdraw immediately in case of rising sound from vent or discoloration of tank..

Flash Point (Method Used): None known. Vapours can burn in air above 100 °C

Autoignition Temperature: 420°C

Upper Flammable Limit (% by volume): 9.74% @ 25°C; 52% @ 100°C (in continuous contact with ignition source)

Lower Flammable Limit (% by volume): 8.0% @ 25°C; 7.8% @ 100°C (in continuous contact with ignition source)

Hazardous Combustion Products: Hydrogen chloride, phosgene, CO_x , hexachlorobutene, dichloroacetyl chloride.

Sensitivity to Impact: None identified

Sensitivity to Static discharge: Liquid can accumulate static charge. Large amount of energy required for ignition; unlikely to be ignited by static discharge

TOXICOLOGICAL PROPERTIES AND HEALTH DATA

Toxicological Data:

LD₅₀: (oral, rat) 7,200 mg/kg, (oral, male mouse) 2,402 mg/kg; (dermal, rabbit) >29,000 mg/kg

LC₅₀: (rat) 8,000 ppm/4h

Effects of Acute Exposure to Product:

Inhaled: Vapours are irritating to the eyes, nose, throat and respiratory tract. Exposure to 350 to 400 ppm for 3 hours can cause light-headedness. Above 1000 ppm, dizziness and lack of muscle co-ordination, occur after a few minutes. At 2,000 ppm, irritation is severe, dizziness, headache, nausea, fatigue occur within 5 minutes. Very high exposures cause serious visual disturbances, blurred or double vision, cardiac arrhythmia, kidney damage, systemic poisoning, and death due to CNS effects. Temporary corneal clouding has been reported in workers where high inhalation exposures occurred.

In contact with skin: Liquid and vapour are severe skin irritants based on animal information. Causes defatting, drying and cracking of the skin. Can cause burns. Prolonged and repeated exposure may lead to dermatitis. Can be absorbed by skin with systemic effects, CNS depression, liver damage.

In contact with eyes: Liquid is severe irritant based on animal information and limited human information. May cause severe irritation and conjunctivitis. Vapour may cause mild irritation at ~200 ppm.

Ingested: May cause irritation and burning of the mouth, throat, respiratory tract and esophagus. Can cause vomiting, diarrhea, convulsions, CNS depression, peripheral nervous system effects,

CODE: 9500-1, 9500-4, 9501-2

cardiac arrhythmia, heart failure, kidney damage. Ingestion of less than 50 mL was fatal in one case, due to kidney and liver failure. May be aspirated during ingestion or vomiting, and aspiration causes chemical pneumonitis or pulmonary edema, which can be fatal.

Effects of Chronic Exposure to Product:

Prolonged exposure may cause central and peripheral nervous system effects, including tremors, vertigo, diminished feeling in hands, lowered heart rate, anxiety, insomnia, visual disturbances, caused by damage to the optic nerve. High levels have caused liver and kidney damage in laboratory animals. Consumption of alcohol before or after exposure may increase adverse effects. Repeated or prolonged skin contact can cause dermatitis.

Carcinogenicity: Group 2A, probable human carcinogen (IARC).

Teratogenicity: Results inconclusive. Teratogenic effects shown in animal experiments at levels not toxic to mother.

Reproductive Effects: Has not been shown to cause reproductive toxicity.

Mutagenicity: Results inconclusive.

Synergistic Products: Alcohols may react synergistically with chlorinated solvents.

PREVENTIVE MEASURES

Engineering Controls: Local exhaust ventilation required.

Respiratory Protection: NIOSH/MSHA approved positive-pressure full face-piece self-contained breathing apparatus or positive-pressure full face-piece supplied-air respirator with auxiliary positive-pressure self-contained breathing apparatus for concentrations exceeding the TLV, for any detectable concentrations, or for fire or spill conditions.

Eye Protection: Chemical safety goggles, face shield.

Skin Protection: Viton, Viton /butyl rubber, Barrier (PE/PA/PE), Silver Shield/4H (polyethylene/ethylene vinyl alcohol), Trelchem HPS, Tychem BR/LV, Tychem TK or polyvinyl alcohol gloves. Other protective impervious clothing, sleeves, coveralls, boots sufficient to prevent contact.

Other Personal Protective Equipment: An eyewash and safety shower should be nearby and ready for use.

Leak and Spill Procedure: Restrict access to area of spill. Ventilate area. Eliminate all sources of ignition. Cleanup personnel must be thoroughly trained in the hazards of the product and must wear protective equipment and clothing sufficient to prevent inhalation of mists or vapours and contact with skin and eyes. Do not touch spilled material. Dike spills. Prevent from entering sewers or waterways. Collect on inert absorbent material and transfer to suitable, labelled, covered containers for recovery or disposal. Contaminated material may pose the same hazards as the chemical; treat with caution. Flush area of spill with copious amounts of running water.

Waste Disposal: Follow all federal, provincial and local regulations for disposal.

Handling Procedures and Equipment: VERY TOXIC, POSSIBLE CARCINOGEN, REPRODUCTIVE HAZARD, MUTAGEN; IRRITANT. Workers handling this material must be thoroughly trained in its hazards and its safe use, and must wear appropriate protective equipment and clothing. Keep away from all ignition sources. Ground and bond equipment and containers to prevent a static charge buildup. Use spark-resistant tools and avoid splash filling of containers. Avoid generating mists or vapours. Avoid elevated temperatures. Use smallest amount possible for the purpose in a designated area with appropriate ventilation. Keep work

area free of extraneous or incompatible substances. Do not return contaminated material to the original containers. Empty containers may contain hazardous residues; treat with caution. Wash thoroughly after working with this product.

Storage Requirements: Solvents should not be stored in basement premises (risk of accumulation of vapour). Store in suitable, labelled containers, in a cool, dry, well-ventilated place, out of direct sunlight, and away from ignition sources and incompatible materials. Do not use containers of aluminum or its alloys for storage. Storage facilities should be made of fire-resistant materials and should have raised sills or ramps, with trenching to a safe area. Keep air out of container. Keep container tightly closed when not in use and when empty. Protect from damage, and inspect frequently for signs of leaking.

FIRST AID MEASURES**Specific Measures:**

Eyes: Immediately flush eyes with gently running water for at least twenty (20) minutes, holding eyelids open during flushing. Take care not to flush contaminated water into unaffected eye. Wear protective gloves to avoid contact during first aid procedures. Get medical advice immediately. Protect eyes from light if it causes pain.

Skin: Remove contaminated clothing (including rings, watches, belts, and shoes). IMMEDIATELY flush exposed area with large amounts of warm running water for at least twenty (20) minutes. Wear protective gloves to avoid contact during first aid procedures. Get medical advice immediately. Decontaminate clothing before reuse, or discard.

Inhalation: IMMEDIATELY remove to fresh air (rescuers must use caution to avoid exposure to contaminating fumes). Give oxygen for breathing difficulty. If breathing has stopped give artificial respiration. If breathing and pulse are absent give CPR. IMMEDIATELY OBTAIN MEDICAL ATTENTION. Stay with casualty until medical assistance is reached.

Ingestion: DO NOT INDUCE VOMITING. DANGER OF ASPIRATION WITH VOMITING. If casualty is alert and not convulsing, rinse out mouth with water. Give 2 to 4 glasses of water to dilute material. IMMEDIATELY GET MEDICAL ATTENTION. If spontaneous vomiting occurs, have casualty lean forward with head down to avoid breathing in of vomitus.

Note to physician: Because rapid absorption may occur through the lungs if aspirated, causing systemic effects, the decision of whether or not to induce vomiting should be made weighing carefully the danger from lung aspiration against toxicity. If lavage is performed, suggest endotracheal and/or esophageal control. Exposure may increase myocardial irritability. Do not administer sympathomimetic drugs unless absolutely necessary. No specific antidote. Supportive care based on symptoms displayed.

REFERENCES USED

Budavari: The Merck Index, 12th ed., 1997

Royal Society of Chemistry: Chemical Safety Data Sheets, Vol. 2

Sax, Lewis: Hawley's Condensed Chemical Dictionary, 11th ed., 1987
Suppliers' Material Safety Data Sheets

ADDITIONAL INFORMATION

Date Issued: November 15, 1988

Revision: May 2010

MSDS: 9500-1, 9500-4, 9501-2

Proposed WHMIS Designation: D1B; D2A; D2B

Prepared by: Caledon Laboratories Ltd. (905) 877-0101
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