

1,2-Dichloroethylene, mixture of cis and trans

sc-222828



The Power is Question

Material Safety Data Sheet

Hazard Alert Code Key: **EXTREME** **HIGH** **MODERATE** **LOW**

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

1,2-Dichloroethylene, mixture of cis and trans

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

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EMERGENCY

ChemWatch

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(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS

Cl-CH=CH-Cl, C2-H2-Cl2, "ethylene, 1, 2-dichloro-", "1, 2-dichloroethene", "dichloro-1, 2-ethylene", "acetylene dichloride", Dioform, NCI-C56031

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability:	3	
Toxicity:	2	
Body Contact:	2	
Reactivity:	2	
Chronic:	2	

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

May form explosive peroxides.

Harmful by inhalation and if swallowed.

Highly flammable.

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.

EYE

■ There is some evidence to suggest that this material can cause eye irritation and damage in some persons.

■ Exposure to the trans isomer acetylene dichloride at 2200 ppm caused burning of the eyes, vertigo, nausea.

Reversible corneal clouding has been described in exposures to acetylene dichloride.

■ The vapour when concentrated has pronounced eye irritation effects and this gives some warning of high vapour concentrations.

If eye irritation occurs seek to reduce exposure with available control measures, or evacuate area.

SKIN

■ Skin contact is not thought to produce harmful health effects (as classified using animal models).

Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions.

■ Repeated exposure may cause skin cracking, flaking or drying following normal handling and use.

■ Open cuts, abraded or irritated skin should not be exposed to this material.

■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.

Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

■ Inhalation of vapors or aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful.

■ The material is not thought to produce respiratory irritation (as classified using animal models).

Nevertheless inhalation of vapors, fumes or aerosols, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.

■ Inhalation of vapours may cause drowsiness and dizziness.

This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.

■ There is a single report of an industrial poisoning acetylene dichloride, a fatality caused by the inhalation of a vapour in a small enclosure.

The most important effects of exposure are narcosis and irritation of the central nervous system.

■ Acute intoxication by halogenated aliphatic hydrocarbons appears to take place over two stages.

Signs of a reversible narcosis are evident in the first stage and in the second stage signs of injury to organs may become evident, a single organ alone is (almost) never involved.

■ Depression of the central nervous system is the most outstanding effect of most halogenated aliphatic hydrocarbons.

Inebriation and excitation, passing into narcosis, is a typical reaction.

CHRONIC HEALTH EFFECTS

■ There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.

Halogenated oxiranes may arise following epoxidation of haloalkenes.

The metabolism of haloethylenes by microsomal oxidation leading to epoxide formation across the double bond has been proposed. The resulting oxiranes are highly reactive and may covalently bind to nucleic acids leading to mutations and possible cancers. A measure of such potential carcinogenicity is the development of significant preneoplastic foci in livers of treated rats.

The carcinogenicity of halogenated oxiranes may lie in the reactivity of an epoxide intermediate. It is reported that 1,1-dichloroethylene, vinyl chloride, trichloroethylene, tetrachloroethylene and chloroprene, for example, are carcinogens in vivo - this may be a consequence of oxirane formation.

Symmetrically substituted oxiranes such as 1,2-dichloroethylene and 1,1,2,2-tetrachloroethylene are more stable and less mutagenic than unsymmetrical chlorinated oxiranes such as 1,1-dichloroethylene, 1,1,2-trichloroethylene and monochloroethylene (vinyl chloride).

The carcinogenicity of 1,1-dichloroethylene has primarily been associated with inhalation exposure while that of vinyl chloride, trichloroethylene and tetrachloroethylene occurs following exposure by both inhalation and oral routes. National Toxicology Program Toxicity Report Series Number 55; April 2002

Various studies report an association between cancer and industrial exposure to tetrachloroethylene; IARC concluded that this evidence is sufficient to assign appropriate warnings. Similar warnings have been issued by IARC for vinyl fluoride. Similarly vinyl bromide exhibited neoplastic and tumourigenic activity in rats exposed by inhalation and is classified by various bodies as potentially carcinogenic.

Substances such as chloroprene (2-chloro-1,3-butadiene), are reported to produce an increased frequency of chromosomal aberrations

in the lymphocytes of Russian workers. Russian epidemiological studies also suggest an increased incidence of skin and lung cancer following exposure to chloroprene, a result which is not supported by other studies. Generally speaking, the monohalogenated substances exhibit higher carcinogenic potential than their dihalogenated counterparts. Whether additional substitution lessens such hazard is conjectural. Tetrafluoroethylene, for example, produced clear evidence of carcinogenic activity in a two-year inhalation study in rats and mice. National Toxicology Program Technical Report Series 450, April 1997.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
acetylene dichloride	540-59-0	>98

Section 4 - FIRST AID MEASURES

SWALLOWED

· IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY. · Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise: · Avoid giving milk or oils. · Avoid giving alcohol.

EYE

■ If this product comes in contact with the eyes: · Wash out immediately with fresh running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN

■ If skin or hair contact occurs: · Flush skin and hair with running water (and soap if available). · Seek medical attention in event of irritation.

INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested.

NOTES TO PHYSICIAN

■ for intoxication due to Freons/ Halons;

A: Emergency and Supportive Measures

· Maintain an open airway and assist ventilation if necessary

· Treat coma and arrhythmias if they occur. Avoid (adrenaline) epinephrine or other sympathomimetic amines that may precipitate ventricular arrhythmias. Tachyarrhythmias caused by increased myocardial sensitization may be treated with propranolol, 1-2 mg IV or esmolol 25-100 microgm/kg/min IV.

· Acute exposures to carbon tetrachloride present, initially, with CNS depression followed by hepatic and renal dysfunction.

· Respiratory depression and cardiac dysrhythmias are an immediate threat to life.

Treatment should follow that practiced in carbon tetrachloride exposures.

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg):	274.973 @ 20 C
Upper Explosive Limit (%):	Not available
Specific Gravity (water=1):	1.28
Lower Explosive Limit (%):	Not available

EXTINGUISHING MEDIA

· Foam.

· Dry chemical powder.

FIRE FIGHTING

· Alert Emergency Responders and tell them location and nature of hazard.

· May be violently or explosively reactive.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 1000 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

· Liquid and vapor are highly flammable.

· Severe fire hazard when exposed to heat, flame and/or oxidizers.

Combustion products include: carbon dioxide (CO₂), hydrogen chloride, phosgene, other pyrolysis products typical of burning organic material.

Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.

FIRE INCOMPATIBILITY

‡ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

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Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.

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Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Remove all ignition sources.
- Clean up all spills immediately.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Containers, even those that have been emptied, may contain explosive vapours.
 - Do NOT cut, drill, grind, weld or perform similar operations on or near containers.
- The substance accumulates peroxides which may become hazardous only if it evaporates or is distilled or otherwise treated to concentrate the peroxides. The substance may concentrate around the container opening for example.
- Purchases of peroxidisable chemicals should be restricted to ensure that the chemical is used completely before it can become peroxidised.
- A responsible person should maintain an inventory of peroxidisable chemicals or annotate the general chemical inventory to indicate which chemicals are subject to peroxidation. An expiration date should be determined. The chemical should either be treated to remove peroxides or disposed of before this date.
 - The person or laboratory receiving the chemical should record a receipt date on the bottle. The individual opening the container should add an opening date.
 - Unopened containers received from the supplier should be safe to store for 18 months.
 - Opened containers should not be stored for more than 12 months.
 - Avoid all personal contact, including inhalation.
 - Wear protective clothing when risk of exposure occurs.
- Contains low boiling substance:
Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.
- Check for bulging containers.
 - Vent periodically.

RECOMMENDED STORAGE METHODS

- ‡ DO NOT use aluminum or galvanized containers.
- Packing as supplied by manufacturer. Plastic containers may only be used if approved for flammable liquid.
- For low viscosity materials (i): Drums and jerricans must be of the non-removable head type. (ii): Where a can is to be used as an inner package, the can must have a screwed enclosure.
 - For materials with a viscosity of at least 2680 cSt. (23 deg. C).

STORAGE REQUIREMENTS

- Store in original containers in approved flame-proof area.
 - No smoking, naked lights, heat or ignition sources.
- May decomposes on exposure to air/ moisture and light.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC	Notes

US NIOSH Recommended Exposure Limits (RELs)	acetylene dichloride (1,2-Dichloroethylene)	200	790		
US - Minnesota Permissible Exposure Limits (PELs)	acetylene dichloride (1,2-Dichloroethylene)	200	790		
US ACGIH Threshold Limit Values (TLV)	acetylene dichloride (1,2-Dichloroethylene, sym-isomer)	200			TLV Basis: central nervous system impairment; eye irritation
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	acetylene dichloride (1,2-Dichloroethylene)	200	790		
US OSHA Permissible Exposure Levels (PELs) - Table Z1	acetylene dichloride (1,2-Dichloroethylene)	200	790		
US - California Permissible Exposure Limits for Chemical Contaminants	acetylene dichloride (1,2-Dichloroethylene; acetylene dichloride)	200	790		
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	acetylene dichloride (1,2-Dichloroethylene)	200	790		
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	acetylene dichloride (1,2-Dichloroethylene)	200	790		
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	acetylene dichloride (1,2-Dichloroethylene)	200	790		
US - Idaho - Limits for Air Contaminants	acetylene dichloride (1,2-Dichloroethylene)	200	790		
US - Hawaii Air Contaminant Limits	acetylene dichloride (1,2-Dichloroethylene)	200	790	250	1,000
US - Alaska Limits for Air Contaminants	acetylene dichloride (1,2-Dichloroethylene)	200	790		
US - Washington Permissible exposure limits of air	acetylene dichloride (Acetylene dichloride (1,2-Dichloroethylene))	200		250	

contaminants						
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	acetylene dichloride (Acetylene dichloride, see 1,2-Dichloroethylene)	200	790	250	1,000	
US - Michigan Exposure Limits for Air Contaminants	acetylene dichloride (1,2-Dichloroethylene)	200	790			
Canada - Nova Scotia Occupational Exposure Limits	acetylene dichloride (1,2-Dichloroethylene, sym-isomer)	200				TLV Basis: central nervous system impairment; eye irritation
Canada - Prince Edward Island Occupational Exposure Limits	acetylene dichloride (1,2-Dichloroethylene, sym-isomer)	200				TLV Basis: central nervous system impairment; eye irritation
Canada - Northwest Territories Occupational Exposure Limits (English)	acetylene dichloride (1,2-Dichloroethylene)	200	795	250	995	
US - Oregon Permissible Exposure Limits (Z-1)	acetylene dichloride (1, 2-Dichloroethylene)	200	790			
Canada - British Columbia Occupational Exposure Limits	acetylene dichloride (Diesel fuel, as total hydrocarbons, Inhalable)		100 (V)			Skin
Canada - British Columbia Occupational Exposure Limits	acetylene dichloride (Kerosene /Jet fuels, as total hydrocarbon vapour, Revised 2003)		200 (P)			Skin
Canada - Alberta Occupational Exposure Limits	acetylene dichloride (Kerosene/Jet fuels, as total hydrocarbon vapour)		200			
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	acetylene dichloride (Diesel fuel as total hydrocarbons, (vapour))		100	150		Skin
Canada - Alberta Occupational Exposure Limits	acetylene dichloride (Diesel fuel, as total hydrocarbons)		100			
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination	acetylene dichloride (1,2-Dichloroethylene, all isomers)	200		250		

Limits					
Canada - British Columbia Occupational Exposure Limits	acetylene dichloride (1,2-Dichloroethylene, all isomers)	200			
Canada - Ontario Occupational Exposure Limits	acetylene dichloride (1,2-Dichloroethylene, All isomers / Dichloro-1,2 éthylène, tous les isomères)	200	790	250	990
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	acetylene dichloride (1,2-Dichloroethylene)	200	793		
Canada - Alberta Occupational Exposure Limits	acetylene dichloride (Acetylene dichloride (1,2-Dichloroethylene))	200	793		

ENDOELTABLE

PERSONAL PROTECTION



RESPIRATOR

· Type AX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

EYE

- Safety glasses with side shields.
- Chemical goggles.

HANDS/FEET

Wear chemical protective gloves, eg. PVC.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

- Neoprene gloves.

OTHER

- Overalls.
- PVC Apron.
- Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
- For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

ENGINEERING CONTROLS

For flammable liquids and flammable gases, local exhaust ventilation or a process enclosure ventilation system may be required. Ventilation equipment should be explosion-resistant.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid.

State	Liquid	Molecular Weight	96.94
Melting Range (°F)	-71	Viscosity	Not Available
Boiling Range (°F)	131	Solubility in water (g/L)	Reacts
Flash Point (°F)	43	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapor Pressure (mmHg)	274.973 @ 20 C
Upper Explosive Limit (%)	Not available	Specific Gravity (water=1)	1.28
Lower Explosive Limit (%)	Not available	Relative Vapor Density (air=1)	>1
Volatile Component (%vol)	Not available	Evaporation Rate	Not available
acetylene dichloride			
log Kow (Prager 1995):			1.86
log Kow (Sangster 1997):			2.09

APPEARANCE

Liquid with pleasant chloroform-like odour; does not mix with water. May polymerise. A mixture of isomers typically comprising 60% cis-form and 40% trans-form.

TERRESTRIAL FATE An estimated Koc value of 250, determined from a log Kow of 1.86 and a regression-derived equation, indicates that acetylene chloride is expected to have moderate mobility in soil. Volatilisation of cis-acetylene dichloride from moist soil surfaces is expected to be an important fate process given a Henry's Law constant of 4.1×10^{-3} atm.m³/mole. The potential for volatilisation of acetylene dichloride from dry soil surfaces may exist based upon a vapor pressure of 200 mm Hg. cis-Acetylene dichloride biodegrades in soil under anaerobic conditions. The field scale estimate of the apparent loss coefficient for cis-acetylene chloride under anaerobic (reducing) conditions ranges from 0.07 to 5.11 yr⁻¹ which corresponds to half-lives ranging from 0.14 to 9.9 yrs. The fact that ethyl chloride is produced as well as vinyl chloride indicates that there are different pathways in the sequential dechlorination of cis-acetylene dichloride than for the trans isomer where only vinyl chloride is produced. cis-Acetylene dichloride, present at 2.6 mg/l reached 0% of its theoretical BOD in 4 weeks using an activated sludge inoculum (concn not specified) and the Japanese MITI test(8). **AQUATIC FATE** An estimated Koc value of 250(SRC), determined from a log Kow of 1.86 indicates that acetylene dichloride is expected to adsorb to suspended solids and sediment. Volatilisation from water surfaces is expected(3) based upon a Henry's Law constant of 4.1×10^{-3} atm-m³/mole. Using this Henry's Law constant volatilisation half-lives for a model river and model lake are 1.1 and 95 hours, respectively. A BCF of 5, estimated from its log Kow suggests the potential for bioconcentration in aquatic organisms is low. Acetylene dichloride biodegrades in water under anaerobic conditions. The field scale estimate of the apparent loss coefficient for cis-acetylene dichloride under anaerobic (reducing) conditions ranges from 0.07 to 5.11 yr⁻¹, which corresponds to half-lives ranging from 0.14 to 9.9 yrs. cis-Acetylene dichloride present at 2.6 mg/l reached 0% of its theoretical BOD in 4 weeks using an activated sludge inoculum (concn not specified) and the Japanese MITI test.

Material	Value
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Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.

STORAGE INCOMPATIBILITY

‡ Dichloroethylene:

- requires inhibition (typically with monomethyl ether or hydroquinone) to prevent polymerisation
- readily forms explosive peroxides with air or contaminants (a white deposit) may indicate the presence of explodable peroxides)
- polymerises violently on heating or on contact with oxidisers, chlorosulfonic acid, nitric acid, or oleum; or under the influence of oxygen, sunlight, copper or aluminium
- reacts violently with alkaline metals (lithium, sodium, potassium, rubidium, caesium, and francium) and nitrogen tetroxide
- is incompatible with ozone, strong bases, difluoromethylene
- may react explosively with trifluoroethylene above 180 C. perchloryl fluoride above 100 C
- may be corrosive or unstable in the presence of steel
- attacks iron, aluminium, plastics and coatings

1,2-Dichloroethylene in contact with solid caustic alkalis or their concentrated solutions will form chloroacetylene which ignites in air.

Distillation of ethanol containing 0.25% of the halocarbon with aqueous sodium hydroxide gave a product which ignited in air.

Haloalkenes are highly reactive. Some of the more lightly substituted lower members are highly flammable; many members of the group are peroxidizable and polymerizable.

- Haloacetylenes should be used with exceptional precautions.

· Explosions may occur during distillation when bath temperatures are too high or if air is admitted to a hot vacuum-distillation as evidenced by experience with bromoacetylenes.

BREThERICK L.: Handbook of Reactive Chemical Hazards.

Segregate from alcohol, water.

· NOTE: May develop pressure in containers; open carefully. Vent periodically.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

acetylene dichloride

TOXICITY AND IRRITATION

ACETYLENE DICHLORIDE:

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
Oral (rat) LD50: 770 mg/kg	SKIN (RABBIT): 100 MG/24H - moderate.
Intraperitoneal (mouse) LD50: 2000 mg/kg	

■ for dichloroethylene:

Acute toxicity: trans-1, 2-dichloroethylene showed low acute toxicity in several published data.

Repeat dose toxicity: Several subchronic studies in rodents have been conducted to evaluate the toxicity of trans-1, 2-dichloroethylene. In an inhalation study where groups of rats were exposed whole body for 6 hours/day, 5 days/week for 90 days, the NOEL (no observed effect level) was 4000 ppm, the highest concentration tested. In a microencapsulated feeding study in rats and mice exposed for 14 weeks at concentrations of 3125, 6250, 12500, 25000 or 50000 ppm, a maximum tolerated dose was not reached and minimal toxicity was observed (NTP report, 2002). Some decreases in body weight were noted at the two highest concentrations as well as some changes in hematology parameters, liver weights, and kidney weights. However, no mortality or exposure-related changes in clinical findings, neurotoxicity endpoints, food consumption, clinical chemistry, gross lesions, or microscopic findings were noted for either sex of mice or rats. In a 90-day drinking water study, exposure of rats to 500, 1500, or 3000 mg/kg/day failed to elicit significant compound-related adverse effects on body weight, behavior, hematology, urinalysis, or serum chemistries. Although changes in kidney weights were noted for female rats in this drinking water study, there were no microscopic lesions noted in any organ for either male or female rats. In another drinking water study, groups of mice were exposed to trans-1, 2-Dichloroethylene up to 2 mg/ml (1/5 the LD50) for 90 days and standard toxicological assessments were made (i.e., water consumption, body and organ weights, hematology and clinical chemistry, and macroscopic evaluation of organs). The only effects noted were decreased glutathione levels in males and decreased aniline hydroxylase activity in females. Additionally, various immunologic endpoints were evaluated in this study and no changes were noted in the cell-mediated immune status of either male or female mice or in the humoral immune status of females. Suppression in the humoral immune status of the male mice was observed.

Genotoxicity:

In vitro: Trans-1,2-Dichloroethylene has been tested for mutagenicity in *S. typhimurium* strains TA98, TA100, TA1535, and TA1537 in the absence and presence of a metabolic activation system and produced negative results. In addition, trans-1, 2-Dichloroethylene produced no significant increase in sister chromatid exchange or chromosomal aberrations in Chinese hamster ovary (CHO) cells with or without metabolic activation.

In vivo: Trans-1,2-Dichloroethylene administered by i.p. injection at doses up to 2000 mg/kg did not induce sister chromatid exchange or chromosomal aberrations in bone marrow cells of male mice (NTP Report, 2002). In addition, trans-1,2-Dichloroethylene administered in microcapsules in feed for 14 weeks did not increase the frequency of micronucleated normochromatic erythrocytes (NCEs) in the peripheral blood of male and female mice.

Reproductive/Developmental Toxicity: Data from a developmental toxicity in the rats showed that trans-1,2-Dichloroethylene is not a developmental toxicant. The NOEL was less than 2000 ppm for the dam and was determined to be 6000 ppm for the conceptus. In a repeated exposure study, no effects on reproductive organs, sperm motility, and vaginal cytology parameters of rats or mice were noted when the animals were fed diets containing up to 50000 ppm microencapsulated test substance for 14 weeks.

The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

CARCINOGEN

acetylene dichloride	US - Rhode Island Hazardous Substance List	IARC
SKIN		
acetylene dichloride	Canada - British Columbia Occupational Exposure Limits - Skin	Notation
acetylene dichloride	Canada - Alberta Occupational Exposure Limits - Skin	Substance Interaction
		1

Section 12 - ECOLOGICAL INFORMATION

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

This material and its container must be disposed of as hazardous waste.

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Ignitability characteristic: use EPA hazardous waste number D001 (waste code I)

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

‡ Puncture containers to prevent re-use and bury at an authorized landfill.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols: None Hazard class or Division: 3

Identification Numbers: UN1150 PG: II

Label Codes: 3 Special provisions: IB2, T7,

TP2

Packaging: Exceptions: 150 Packaging: Non- bulk: 202

Packaging: Exceptions: 150 Quantity limitations: 5 L

Passenger aircraft/rail:

Quantity Limitations: Cargo 60 L Vessel stowage: Location: B

aircraft only:

Vessel stowage: Other: None

Hazardous materials descriptions and proper shipping names:

1,2-Dichloroethylene

Air Transport IATA:

UN/ID Number: 1150 Packing Group: II

Special provisions: None

Cargo Only

Packing Instructions: 364 Maximum Qty/Pack: 60 L

Passenger and Cargo Passenger and Cargo

Packing Instructions: Y341 Maximum Qty/Pack: 5 L

Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity

Packing Instructions: 353 Maximum Qty/Pack: 1 L

Shipping Name: 1,2-DICHLOROETHYLENE

Maritime Transport IMDG:

IMDG Class: 3 IMDG Subrisk: None

UN Number: 1150 Packing Group: II

EMS Number: F-E,S-D Special provisions: None

Limited Quantities: 1 L

Shipping Name: 1,2-DICHLOROETHYLENE

Section 15 - REGULATORY INFORMATION

acetylene dichloride (CAS: 540-59-0) is found on the following regulatory lists;

"Canada - Northwest Territories Occupational Exposure Limits (English)", "Canada - Nova Scotia Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits", "Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances", "Canada Ingredient Disclosure List (SOR/88-64)", "Canada Non-Domestic Substances List (NDSL)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk", "US - Alaska Limits for Air Contaminants", "US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which production, use or other presence must be reported", "US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List", "US - California Permissible Exposure Limits for Chemical

Contaminants","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Massachusetts Oil & Hazardous Material List","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Hazardous Substance List","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Oregon Permissible Exposure Limits (Z-1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Dangerous waste constituents list","US - Washington Permissible exposure limits of air contaminants","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US CERCLA Priority List of Hazardous Substances","US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA Master Testing List - Index I Chemicals Listed","US EPA National Priorities List - Superfund Chemical Data Matrix (SCDM) - Hazard Ranking System - Hazardous Substance Benchmarks","US EPCRA Section 313 Chemical List","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act","US NIOSH Recommended Exposure Limits (RELs)","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US TSCA Section 4 (e) - ITC Priority Testing List","US TSCA Section 8 (a) - Preliminary Assessment Information Rules (PAIR) - Reporting List","US TSCA Section 8 (d) - Health and Safety Data Reporting","WHO Guidelines for Drinking-water Quality - Guideline values for chemicals that are of health significance in drinking-water"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- May produce discomfort of the eyes*.
- Limited evidence of a carcinogenic effect*.
- Repeated exposure potentially causes skin dryness and cracking*.
- Vapours potentially cause drowsiness and dizziness*.

* (limited evidence).

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- Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:

www.chemwatch.net/references.

- The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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