2-Chloroethyl ethyl sulfide



Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

2-Chloroethyl ethyl sulfide

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.



SUPPLIER

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SYNONYMS

C4-H9-Cl-S, CICH2CH2SCH2CH3, 1-chloro-2-(ethylthio)ethane, "2-chloroethyl ethyl thioether", "ethane, 1-chloro-2-(ethylthio)-", "ethyl beta-chloroethyl sulfide", "ethyl 2-chloroethyl sulfide", 2-(ethylthio)chloroethane, "2-ethylthioethyl chloride", "half-mustard gas", h-mg





EMERGENCY OVERVIEW

RISK

Limited evidence of a carcinogenic effect. Possible risk of impaired fertility. Possible risk of harm to the unborn child. Harmful by inhalation, in contact with skin and if swallowed. Irritating to eyes, respiratory system and skin. Flammable.

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.

Absorption of nitrogen mustards from the gastrointestinal tract may produce systemic poisoning.

The effects may include prolonged tremor, inco-ordination, and convulsions.

EYE

• Nitrogen mustards are severely irritating to the eyes and may produce corneal damage and injury to the iris and lens.

• There is evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation.

Severe inflammation may be expected with pain.

SKIN

Skin contact with the material may be harmful; systemic effects may resultfollowing absorption.

The material may cause moderate inflammation of the skin either following direct contact or after a delay of some time.

Repeated exposure can cause contact dermatitis which is characterized by redness, swelling and blistering.

• Nitrogen mustards can cause serious blisters and burns of the skin, causing deep, slow-healing ulcers.

High quantities can also cause internal toxic effects.

• 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 can cause respiratory irritation in some persons.

The body's response to such irritation can cause further lung damage.

If nitrogen mustard vapors or aerosols are inhaled, there may be irritation of mucous membranes and swelling of the lungs may occur later.

They may be absorbed into the body from the lungs, causing effects such as stomach upset, nausea, vomiting and diarrhea, headache, hair loss, bone marrow impairment, damage to the lymph nodes, loss of white blood cells, period irregularities and reduced male fertility. Inhalation hazard is increased at higher temperatures.

Inhalation of quantities of liquid mist may be extremely hazardous, even lethal due to spasm, extreme irritation of larynx and bronchi, chemical pneumonitis and pulmonary edema.

CHRONIC HEALTH EFFECTS

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

Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.

Ample evidence from experiments exists that there is a suspicionthis material directly reduces fertility.

Results in experiments suggest that this material may cause disorders in the development of the embryo or fetus, even when no signs of poisoning show in the mother.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

Alkylating agents may damage the stem cell which acts as the precursor to components of the blood. Loss of the stem cell may result in pancytopenia (a reduction in the number of red and white blood cells and platelets) with a latency period corresponding to the lifetime of the individual blood cells. Granulocytopenia (a reduction in granular leukocytes) develops within days and thrombocytopenia (a disorder involving platelets), within 1-2 weeks, whilst loss of erythrocytes (red blood cells) needs months to become clinically manifest. Aplastic anaemia develops due to complete destruction of the stem cells.

The so-called mustards often exhibit antineoplastic activity.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
2-chloroethyl ethyl sulfide	693-07-2	>98

Section 4 - FIRST AID MEASURES

SWALLOWED

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

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 contact occurs: · Immediately remove all contaminated clothing, including footwear · Flush skin and hair with running water (and soap if available).

INHALED

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

NOTES TO PHYSICIAN

Treat symptomatically.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Not available
Upper Explosive Limit (%):	Not available
Specific Gravity (water=1):	1.070
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 flammable.

· Moderate fire hazard when exposed to heat or flame.

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

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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Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

· Remove all ignition sources.

· Clean up all spills immediately.

It is recommended that areas handling final finished product have cytotoxic spill kits available.

- Spill kits should include:
- · impermeable body covering,
- · shoe covers,
- · latex and utility latex gloves,
- · goggles,
- · approved HEPA respirator,
- · disposable dust pan and scoop,
- · absorbent towels,
- · spill control pillows,
- · disposable sponges,
- · sharps container,
- · disposable garbage bag and
- hazardous waste label

Where spills are treated with loose absorbents, such as vermiculite, ensure dust exposure is strictly avoided.

- To avoid accidental exposure due to waste handling of cytotoxics:
- · Place waste residue in a segregated sealed plastic container.
- · Used syringes, needles and sharps should not be crushed, clipped, recapped, but placed directly into an approved sharps container.

· Dispose of any cleanup materials and waste residue according to all applicable laws and regulations e.g, secure chemical landfill disposal

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.
- · DO NOT allow clothing wet with material to stay in contact with skin.
- · Avoid all personal contact, including inhalation.
- · Wear protective clothing when risk of overexposure occurs.

RECOMMENDED STORAGE METHODS

| Glass container.

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

- \cdot Store in original containers in approved flammable liquid storage area.
- · DO NOT store in pits, depressions, basements or areas where vapors may be trapped.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records • 2-chloroethyl ethyl sulfide: CAS:693-07-2

PERSONAL PROTECTION







RESPIRATOR

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

For laboratory, larger scale or bulk handling or where regular exposure in an occupational setting occurs:

· Chemical goggles

· Face shield. Full face shield may be required for supplementary but never for primary protection of eyes

• Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent].

HANDS/FEET

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

· frequency and duration of contact,

 \cdot chemical resistance of glove material,

 \cdot 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.

· Rubber gloves (nitrile or low-protein, powder-free latex). Employees allergic to latex gloves should use nitrile gloves in preference.

· Double gloving should be considered.

· PVC gloves.

Protective shoe covers. [AS/NZS 2210]

· Head covering.

OTHER

· When handling antineoplastic materials, it is recommended that a disposal work-uniform (such as Tyvek or closed front surgical-type gown with knit cuffs) is worn.

· 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

Does not mix with water. Sinks in water.			
State	LIQUID	Molecular Weight	124.63
Melting Range (°F)	Not available	Viscosity	Not Available
Boiling Range (°F)	313- 315	Solubility in water (g/L)	Immiscible
Flash Point (°F)	126	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapour Pressure (mmHG)	Not available
Upper Explosive Limit (%)	Not available	Specific Gravity (water=1)	1.070
Lower Explosive Limit (%)	Not available	Relative Vapor Density (air=1)	>1
Volatile Component (%vol)	Not available	Evaporation Rate	Not available

APPEARANCE

Liquid with unpleasant smell; does not mix with water.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

· Stable under controlled storage conditions provided material contains adequate stabilizer / polymerization inhibitor.

· Bulk storages may have special storage requirements.

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

STORAGE INCOMPATIBILITY

- Avoid reaction with oxidizing agents, bases and strong reducing agents.
- Stable under controlled storage conditions provided material contains adequate stabilizer / polymerization inhibitor.
- · Bulk storages may have special storage requirements.

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

Section 11 - TOXICOLOGICAL INFORMATION

2-chloroethyl ethyl sulfide

TOXICITY AND IRRITATION

2-CHLOROETHYL ETHYL SULFIDE:
unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
Oral (rat) LD50: 252 mg/kg	Skin (rabbit): 500 mg/24h-SEVERE
	Eye (rabbit): 0.25 mg/24h-SEVERE

• Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

Alkylating agents may damage the stem cell which acts as the precursor to components of the blood. Loss of the stem cell may result in pancytopenia (a reduction in the number of red and white blood cells and platelets) with a latency period corresponding to the lifetime of the individual blood cells. Granulocytopenia (a reduction in granular leukocytes) develops within days and thrombocytopenia (a disorder involving platelets), within 1-2 weeks, whilst loss of erythrocytes (red blood cells) needs months to become clinically manifest. Aplastic anaemia develops due to complete destruction of the stem cells.

The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

The material may cause severe 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. Repeated exposures may produce severe ulceration.

Section 12 - ECOLOGICAL INFORMATION

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

Symbols: None Hazard class or Division: 3 Identification Numbers: UN1992 PG: III Label Codes: 3, 6.1 Special provisions: B1, IB3, T7. TP1. TP28 Packaging: Exceptions: 150 Packaging: Non- bulk: 203 Packaging: Exceptions: 150 Quantity limitations: 60 L Passenger aircraft/rail: Quantity Limitations: Cargo 220 L Vessel stowage: Location: A aircraft only: Vessel stowage: Other: None Hazardous materials descriptions and proper shipping names: Flammable liquids, toxic, n.o.s. Air Transport IATA: UN/ID Number: 1992 Packing Group: III Special provisions: A3 Cargo Only Packing Instructions: 366 Maximum Qty/Pack: 220 L Passenger and Cargo Passenger and Cargo Packing Instructions: Y343 Maximum Qty/Pack: 60 L Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity Packing Instructions: 355 Maximum Qty/Pack: 2 L Shipping Name: FLAMMABLE LIQUID, TOXIC, N.O.S. *(CONTAINS 2-CHLOROETHYL ETHYL SULFIDE) Maritime Transport IMDG: IMDG Class: 3 IMDG Subrisk: 6.1

UN Number: 1992 Packing Group: III EMS Number: F-E,S-D Special provisions: 223 274 Limited Quantities: 5 L Shipping Name: FLAMMABLE LIQUID, TOXIC, N.O.S.(contains 2-chloroethyl ethyl sulfide)

Section 15 - REGULATORY INFORMATION

2-chloroethyl ethyl sulfide (CAS: 693-07-2) is found on the following regulatory lists;

"Canada Ingredient Disclosure List (SOR/88-64)", "Canada Non-Domestic Substances List (NDSL)", "US EPA High Production Volume Program Chemical List", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

Cumulative effects may result following exposure*.

* (limited evidence).

Denmark Advisory list for selfclassification of dangerous substances

Substance CAS Suggested codes 2- chloroethyl ethyl sulfide 693- 07- 2 Mut3; R68 Rep3; R63 Xn; R22 Xi; R38 R52/53

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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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