

Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
   	<p>Flammable material; avoid heat and sources of ignition. Corrosive to eyes and skin on contact. Toxic compound, do not ingest or inhale. Avoid all contact with this material. CARCINOGEN. MINIMIZE EXPOSURE. This compound is a possible skin sensitizer.</p>	

Section I. Chemical Product and Company Identification

Chemical Name	Epichlorohydrin		
Catalog Number	E0012	Supplier	TCI America 9211 N. Harborage St. Portland OR 1-800-423-8616
Synonym	Oxirane, 2-(chloromethyl)- (CA INDEX); Chloromethoxyirane		
Chemical Formula	C ₃ H ₅ ClO		
CAS Number	106-89-8	In case of Emergency Call	Chemtrec® (800) 424-9300 (U.S.) (703) 527-3887 (International)

Section II. Composition and Information on Ingredients

Chemical Name	CAS Number	Percent (%)	TLV/PEL	Toxicology Data
Epichlorohydrin	106-89-8	Min. 99.0 (GC)	This chemical is classified as a carcinogen. There is no acceptable exposure limit for a carcinogen.	Rat LD ₅₀ (oral) 90 mg/kg Mouse LD ₅₀ (dermal) 250 mg/kg Rat LD ₅₀ (inhalation) 250 ppm/8H

Section III. Hazards Identification

Acute Health Effects	<p>Corrosive to skin, eyes, and respiratory system. Liquid or spray mist may produce tissue damage, particularly in mucous membranes of the eyes, mouth and respiratory tract. Skin contact may produce burns. Eye contact can result in corneal damage or blindness. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Corrosive materials may cause serious injury if ingested.</p> <p>Toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness or death. Skin contact may result in sensitization. Always cover all exposed skin with an impermeable layer and use proper eye protection. A OSHA/MSHA approved dust and vapor respirator is required when working with this material.</p> <p>Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.</p>
Chronic Health Effects	<p>CARCINOGENIC EFFECTS : Carcinogenic by RTECS criteria. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Tumorigenic Effects. Rat TCLo Inhalation 100 ppm TOXIC EFFECTS: Tumorigenic - Carcinogenic by RTECS criteria Sense Organs and Special Senses (Nose, Eye, Ear, and Taste) - Tumors Lung, Thorax, or Respiration - Acute pulmonary edema Rat TCLo Inhalation 100 ppm TOXIC EFFECTS: Tumorigenic - Carcinogenic by RTECS criteria Sense Organs and Special Senses (Nose, Eye, Ear, and Taste) - Tumors Lung, Thorax, or Respiration - Acute pulmonary edema Rat TD Oral 36 gm/kg TOXIC EFFECTS: Tumorigenic - Equivocal tumorigenic agent by RTECS criteria Gastrointestinal - Tumors DEVELOPMENTAL TOXICITY: Rat TDLo Oral 1050 mg/kg; DURATION: male 21D prior to mating TOXIC EFFECTS: Paternal Effects - Spermatogenesis (including genetic material, sperm morphology, motility, and count) Paternal Effects - Testes, epididymis, sperm duct Effects on Fertility - Male fertility index (e.g., # males impregnating females per # males exposed to fertile nonpregnant females) Rat TCLo Inhalation 100 ppm/7H; DURATION: female 6-15D of pregnancy TOXIC EFFECTS: Maternal Effects - Other effects Effects on Fertility - Post-implantation mortality (e.g., dead and or resorbed implants per total number of implants) Mouse TDLo Oral 1200 mg/kg; DURATION: female 6-15D of pregnancy TOXIC EFFECTS: Effects on Embryo or Fetus - Fetotoxicity (except death, e.g., stunted fetus) Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.</p>

Section IV. First Aid Measures

Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.
Skin Contact	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Inhalation	If the victim is not breathing, perform mouth-to-mouth resuscitation. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, oxygen can be administered. Seek medical attention if respiration problems do not improve.
Ingestion	DO NOT INDUCE VOMITING. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive.

Section V. Fire and Explosion Data

Flammability	Flammable.	Auto-Ignition	429 °C (804.2 °F)
Flash Points	32 °C (89.6 °F).	Flammable Limits	LOWER: 3.8% UPPER: 21%
Combustion Products	These products are toxic carbon oxides (CO, CO ₂), halogenated compounds. WARNING: Highly toxic HCl gas is produced during combustion.		
Fire Hazards	Not available.		
Explosion Hazards	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.		
Fire Fighting Media and Instructions	Flammable liquid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion. Consult with local fire authorities before attempting large scale fire-fighting operations.		

Section VI. Accidental Release Measures

Spill Cleanup Instructions	Flammable material. Corrosive material. Toxic material. Carcinogen. Possible sensitizer. Keep away from heat. Mechanical exhaust required. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. DO NOT get water inside container. DO NOT touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Consult federal, state, and/or local authorities for assistance on disposal.
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Section VII. Handling and Storage

Handling and Storage Information	FLAMMABLE. CORROSIVE. TOXIC. CARCINOGEN. POSSIBLE SENSITIZER. Keep locked up. Keep container dry. Keep away from heat. Mechanical exhaust required. Avoid excessive heat and light. DO NOT ingest. Do not breathe gas/fumes/vapor/spray. Never add water to this product. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Treat symptomatically and supportively. Always store away from incompatible compounds such as oxidizing agents, acids, alkalis (bases).
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Section VIII. Exposure Controls/Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash station and safety shower is proximal to the work-station location.
Personal Protection	Splash goggles. Lab coat. Vapor respirator. Gloves. A MSHA/NIOSH approved respirator must be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
Exposure Limits	This chemical is classified as a carcinogen. There is no acceptable exposure limit for a carcinogen.

**Section IX. Physical and Chemical Properties**

Physical state @ 20°C	Liquid. (Colorless clear)	Solubility	Miscible in: Many organic solvents. Soluble in: Alcohol, Ether, Benzene. Immiscible with: Petroleum, Hydrocarbons.
Specific Gravity	1.18 (water=1)	Partition Coefficient	LOG P _{ow} 0.26
Molecular Weight	92.52	Vapor Pressure	1.6 kPa (@ 20 °C)
Boiling Point	117 °C (242.6 °F)	Vapor Density	3.2 (Air = 1)
Melting Point	-26 °C (-14.8 °F)	Volatility	Not available.
Refractive Index	1.483 (lit.)	Odor	Not available.
Critical Temperature	Not available.	Taste	Not available.
Viscosity	Not available.		

Section X. Stability and Reactivity Data

Stability	This material is stable if stored under proper conditions. (See Section VII for instructions)
Conditions of Instability	Reacts violently with; amonia, zinc, amines, magnesium and sodium. Avoid excessive heat and light.
Incompatibilities	Reactive with oxidizing agents, acids, alkalis (bases), sodium, magnesium and their alloys, halogenated compounds, powdered metals.

Section XI. Toxicological Information

RTECS Number	TX4900000
Routes of Exposure	Eye Contact. Ingestion. Inhalation.
Toxicity Data	Rat LD ₅₀ (oral) 90 mg/kg Mouse LD ₅₀ (dermal) 250 mg/kg Rat LD ₅₀ (inhalation) 250 ppm/8H
Chronic Toxic Effects	CARCINOGENIC EFFECTS : Carcinogenic by RTECS criteria. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Tumorigenic Effects. Rat TCl _o Inhalation 100 ppm TOXIC EFFECTS: Tumorigenic - Carcinogenic by RTECS criteria Sense Organs and Special Senses (Nose, Eye, Ear, and Taste) - Tumors Lung, Thorax, or Respiration - Acute pulmonary edema Rat TCl _o Inhalation 100 ppm TOXIC EFFECTS: Tumorigenic - Carcinogenic by RTECS criteria Sense Organs and Special Senses (Nose, Eye, Ear, and Taste) - Tumors Lung, Thorax, or Respiration - Acute pulmonary edema Rat TD Oral 36 gm/kg TOXIC EFFECTS: Tumorigenic - Equivocal tumorigenic agent by RTECS criteria Gastrointestinal - Tumors DEVELOPMENTAL TOXICITY: Rat TDLo Oral 1050 mg/kg; DURATION: male 21D prior to mating TOXIC EFFECTS: Paternal Effects - Spermatogenesis (including genetic material, sperm morphology, motility, and count) Paternal Effects - Testes, epididymis, sperm duct Effects on Fertility - Male fertility index (e.g., # males impregnating females per # males exposed to fertile nonpregnant females) Rat TCl _o Inhalation 100 ppm/7H; DURATION: female 6-15D of pregnancy TOXIC EFFECTS: Maternal Effects - Other effects Effects on Fertility - Post-implantation mortality (e.g., dead and or resorbed implants per total number of implants) Mouse TDLo Oral 1200 mg/kg; DURATION: female 6-15D of pregnancy TOXIC EFFECTS: Effects on Embryo or Fetus - Fetotoxicity (except death, e.g., stunted fetus) Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.
Acute Toxic Effects	Corrosive to skin, eyes, and respiratory system. Liquid or spray mist may produce tissue damage, particularly in mucous membranes of the eyes, mouth and respiratory tract. Skin contact may produce burns. Eye contact can result in corneal damage or blindness. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Corrosive materials may cause serious injury if ingested. Toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness or death. Skin contact may result in sensitization. Always cover all exposed skin with an impermeable layer and use proper eye protection. A OSHA/MSHA approved dust and vapor respirator is required when working with this material. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.

Section XII. Ecological Information

Ecotoxicity	Not available.
Environmental Fate	Epichlorohydrin's production and use as a solvent and chemical intermediate may result in its release to the environment through various waste streams. If released to air, a vapor pressure of 16.4 mm Hg at 25 deg C indicates epichlorohydrin will exist solely as a vapor in the ambient atmosphere. Vapor-phase epichlorohydrin will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 36 days. If released to soil, epichlorohydrin is expected to have very high mobility based upon an estimated K _{oc} of 40. Volatilization from moist soil surfaces is expected to be an important fate process based upon an estimated Henry's Law constant of 3.0X10 ⁻⁵ atm-cu m/mole. Epichlorohydrin may volatilize from dry soil surfaces based upon its vapor pressure. Epichlorohydrin is expected to undergo hydrolysis in moist soil surfaces. Limited data suggest that epichlorohydrin may undergo biodegradation in acclimated soil and surface waters. If released into water, epichlorohydrin is not expected to adsorb to suspended solids and sediment in water based upon the estimated K _{oc} . Volatilization from water surfaces is expected to be an important fate process based upon his compound's estimated Henry's Law constant. Estimated volatilization half-lives for a model river and model lake are 19 hours and 12 days, respectively. An estimated BCF of 3 suggests the potential for bioconcentration in aquatic organisms is low. Hydrolysis is expected to be an important environmental fate process based upon hydrolysis half-lives of 8.2 days and 5.3 days in distilled water and simulated seawater, respectively. Occupational exposure to epichlorohydrin may occur through inhalation and dermal contact with this compound at workplaces where epichlorohydrin is produced or used. (SRC)[Peer Reviewed]

Section XIII. Disposal Considerations

Waste Disposal	Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.
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Section XIV. Transport Information

DOT Classification	DOT Class 6.1: Toxic material. DOT Class 3: Flammable liquid	
PIN Number	UN2023	
Proper Shipping Name	Epichlorohydrin	
Packing Group (PG)	II Marine Pollutant	RQ = 100
DOT Pictograms		

Section XV. Other Regulatory Information and Pictograms

TSCA Chemical Inventory (EPA)	This compound is ON the EPA Toxic Substances Control Act (TSCA) inventory list.
WHMIS Classification (Canada)	On DSL.
EINECS Number (EEC)	203-439-8
EEC Risk Statements	R10- Flammable. R18- In use, may form flammable/explosive vapor-air mixture. R34- Causes burns. R23/24/25- Toxic by inhalation, in contact with skin and if swallowed. R45- May cause cancer. R42/43- May cause sensitization by inhalation and skin contact.
Japanese Regulatory Data	ENCS No. 2-275

Section XVI. Other Information

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Notice to Reader

TCl laboratory chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our MSDS sheets are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated MSDS sheets for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, facial mask, fume hood). For proper handling and disposal, always comply with federal, state, and local regulations.