

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Ethyl chloride (MSDS No. P-4597-E)	Trade Names: Ethyl Chloride
Chemical Name: Ethyl chloride	Synonyms: Chelene, chloroethane, chloryl anesthetic, halocarbon 160, hydrochloric ether, kelene, monochloroethane, muriatic ether, narcotile, refrigerant gas R160
Chemical Family: Halogenated alkane	Product Grades: None assigned.
Telephone: Emergencies: 1-800-645-4633* CHEMTREC: 1-800-424-9300* Routine: 1-800-PRAXAIR	Company Name: Praxair, Inc. 39 Old Ridgebury Road Danbury, CT 06810-5113

**Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier, Praxair sales representative, or call 1-800-PRAXAIR (1-800-772-9247).*

2. Hazards Identification

EMERGENCY OVERVIEW

DANGER! Flammable liquid and gas under pressure.
Causes cancer in laboratory animals.
Can form explosive mixtures with air.
May cause anesthetic effects.
May irritate the eyes, skin, and mucous membranes.
May cause liver and kidney damage.
Self-contained breathing apparatus and protective clothing
must be worn by rescue workers.

Under ambient conditions, this is a colorless gas with a pungent, ether-like odor.

OSHA REGULATORY STATUS: This material is considered hazardous by the OSHA Hazard Communications Standard (29 CFR 1910.1200).

POTENTIAL HEALTH EFFECTS:

Effects of a Single (Acute) Overexposure

Inhalation. Overexposure may cause signs of inebriation, analgesia, dizziness, abdominal cramps, incoordination, vomiting, headache, and cough. May damage liver and kidneys. High concentrations may irritate the respiratory tract causing chest discomfort with cough and cardiac arrest. Lack of oxygen can kill.

Skin Contact. Vapor may slightly irritate the skin and mucous membranes. If contact is prolonged or widespread, the skin may absorb potentially harmful amounts of material. Exposure to liquid ethyl chloride may cause frostbite.

Swallowing. An unlikely route of exposure. This product is a gas at normal temperature and pressure, but liquid ethyl chloride may cause frostbite of the lips and mouth.

Eye Contact. Vapor may slightly irritate the eyes. Liquid may cause frostbite.

Effects of Repeated (Chronic) Overexposure. None known.

Other Effects of Overexposure. Ethyl chloride may be a cardiac sensitizer.

Medical Conditions Aggravated by Overexposure. The defatting properties of ethyl chloride on the skin may aggravate an existing dermatitis.

CARCINOGENICITY: Ethyl chloride is known to cause cancer in laboratory animals at relatively high doses but not under circumstances considered relevant to human workers (ACGIH category A3, 2009). It is listed by the IARC as Group 3, unclassifiable as to carcinogenicity to humans. It is not listed by the NTP but is under review at the request of the EPA for additional information on carcinogenicity and reproductive toxicity. It is not listed by OSHA.

POTENTIAL ENVIRONMENTAL EFFECTS: None known. For further information, see section 12, Ecological Information.

3. Composition/Information on Ingredients

See section 16 for important information about mixtures.

COMPONENT	CAS NUMBER	CONCENTRATION
Ethyl chloride	75-00-3	>99%*

*The symbol > means "greater than."

4. First Aid Measures

INHALATION: Immediately remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

SKIN CONTACT: For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). In case of massive exposure, remove contaminated clothing while showering with warm water. Call a physician.

SWALLOWING: An unlikely route of exposure. This product is a gas at normal temperature and pressure.

EYE CONTACT: For contact with the liquid, immediately flush eyes thoroughly with warm water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are thoroughly flushed. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN: *This material may be a cardiac sensitizer; avoid the use of epinephrine. There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.*

5. Fire Fighting Measures

FLAMMABLE PROPERTIES: Flammable gas. Forms explosive mixtures with air and oxidizing agents.

SUITABLE EXTINGUISHING MEDIA: CO₂, dry chemical, water spray, or fog

PRODUCTS OF COMBUSTION: Phosgene, HCl

PROTECTION OF FIREFIGHTERS: DANGER! Flammable liquid and gas under pressure.

Evacuate all personnel from danger area. Immediately spray cylinders with water from maximum distance until cool, taking care not to extinguish flames. Remove sources of ignition if without risk. Remove all cylinders from fire area if without risk; continue cooling water spray while moving cylinders. Do not extinguish any flames emitted from cylinders; stop flow of gas if without risk, or allow flames to burn out. Self-contained breathing apparatus is required by rescue workers. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

Specific Physical and Chemical Hazards. Heat of fire can build pressure in cylinder and cause it to rupture. No part of a cylinder should be subjected to a temperature higher than 125°F (52°C). Ethyl chloride cylinders are equipped with a pressure-relief device. (Exceptions may exist where authorized by DOT.) If venting or leaking ethyl chloride catches fire, do not extinguish flames. Flammable gas may spread from leak, creating an explosive re-ignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an appropriate device. Reverse flow into cylinder may cause rupture.

Protective Equipment and Precautions for Firefighters. Firefighters should wear self-contained breathing apparatus and full fire-fighting turnout gear.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

DANGER! Flammable liquid and gas under pressure.

Personal Precautions. Forms explosive mixtures with air. Immediately evacuate all personnel from danger area. Do not approach without self-contained breathing apparatus. Remove all sources of ignition if without risk. Reduce vapors with fog or fine water spray. Reverse flow into cylinder may cause rupture. Shut off flow if without risk. Ventilate area or move cylinder to a well-ventilated area. Flammable vapors may spread from leak. Before entering area, especially confined areas, check atmosphere with an appropriate device.

Environmental Precautions. Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, state, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN HANDLING: May form explosive mixtures with air. Keep away from heat, sparks, and open flame. Keep away from oxidizing agents and other flammables. Ground all equipment. May cause anesthetic effects. Avoid breathing gas. Gas can cause rapid suffocation due to oxygen deficiency. Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. All piped ethyl chloride systems and associated equipment must be grounded. Electrical equipment must be non-sparking or explosion-proof. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open valve. If valve is hard to open, discontinue use and contact your supplier. For other precautions in using ethyl chloride, see section 16.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store and use with adequate ventilation. Separate cylinders containing this product from oxygen, chlorine, and other oxidizers by at least 20 ft (6.1 m) or use a barricade of noncombustible material. This barricade should be at least 5 ft (1.53 m) high and have a fire resistance rating of at least ½ hour. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Post “No Smoking or Open Flames” signs in storage and use areas. There must be no sources of ignition. All electrical equipment in storage areas must be explosion-proof. Storage areas must meet national electric codes for Class 1 hazardous areas. Store only where temperature will not exceed 125°F (52°C). Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

RECOMMENDED PUBLICATIONS: For further information on storage, handling, and use of this product, see NFPA 55, *Standard for the Storage, Use, and Handling of Compressed and Liquefied Gases in Portable Cylinders*, published by the National Fire Protection Association. Also, see Praxair publication P-14-153, *Guidelines for Handling Gas Cylinders and Containers*. Obtain from your local supplier.

8. Exposure Controls/Personal Protection

COMPONENT	OSHA PEL	ACGIH TLV-TWA (2009)
Ethyl chloride	1000 ppm	100 ppm*
*100 ppm, skin, A3 (animal carcinogen, ACGIH, 2009).		

TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

IDLH = 3800 ppm

ENGINEERING CONTROLS:

Local Exhaust. Use an explosion-proof local exhaust system with sufficient air flow velocity to maintain the concentration of ethyl chloride below the applicable exposure limits in the worker's breathing zone.

Mechanical (General). Inadequate; see SPECIAL.

Special. Use only in a closed system.

Other. See SPECIAL.

PERSONAL PROTECTIVE EQUIPMENT:

Skin Protection. Wear work gloves when handling cylinders; neoprene when changing them out or wherever contact with product may occur. Metatarsal shoes for cylinder handling; protective clothing where needed. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133. Regardless of protective equipment, never touch live electrical parts.

Eye/Face Protection. Wear safety glasses when handling cylinders. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Respiratory Protection. A respiratory protection program that meet OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable) requirements must be followed whenever workplace conditions warrant respirator use. Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must

be appropriate for the chemical exposure (e.g., an organic vapor cartridge). For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus.

9. Physical and Chemical Properties

APPEARANCE:	Colorless gas
ODOR:	Pungent, ether-like
ODOR THRESHOLD:	Not available.
PHYSICAL STATE:	Gas at normal temperature and pressure
pH:	Not applicable.
FREEZING POINT at 1 atm:	-216.94°F (-138.3°C)
BOILING POINT at 1 atm:	54.14°F (12.30°C)
FLASH POINT (test method):	-58°F (-50°C) TCC, -45°F (-43°C) TOC
EVAPORATION RATE (Butyl Acetate = 1):	High
FLAMMABILITY:	Flammable
FLAMMABLE LIMITS IN AIR , % by volume:	LOWER: 3.6% UPPER: 15.4%
VAPOR PRESSURE at 68°F (20°C):	19.5 psia (134 kPa abs)
VAPOR DENSITY at 70°F (21.1°C) and 1 atm:	Not available.
SPECIFIC GRAVITY (H ₂ O = 1) at 32°/39.2°F (0°/4°C):	0.9214
SPECIFIC GRAVITY (Air = 1) at 70°F (21.1°C) and 1 atm:	2.23
SOLUBILITY IN WATER 68°F (20°C):	Slight, by slow hydrolysis
PARTITION COEFFICIENT: n-octanol/water:	Not available.
AUTOIGNITION TEMPERATURE:	966°F (519°C)
DECOMPOSITION TEMPERATURE:	Not available.
PERCENT VOLATILES BY VOLUME:	100
MOLECULAR WEIGHT:	64.52
MOLECULAR FORMULA:	C ₂ H ₅ Cl

10. Stability and Reactivity

CHEMICAL STABILITY: Unstable Stable

CONDITIONS TO AVOID: None known.

INCOMPATIBLE MATERIALS: Water, oxidizing agents, sodium, potassium, calcium, aluminum, zinc, magnesium

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition or burning of ethyl chloride may produce phosgene/HCl.

POSSIBILITY OF HAZARDOUS REACTIONS: May Occur Will Not Occur

Thermal decomposition or burning of ethyl chloride may produce phosgene/HCl.

11. Toxicological Information

ACUTE DOSE EFFECTS: LC₅₀, 2 hr, rat = 59,701 ppm

STUDY RESULTS: A single study has shown increased incidence of embryo-fetal toxicity (delayed ossification of skull bones) in mice exposed to ethyl chloride.

12. Ecological Information

ECOTOXICITY: No known effects.

OTHER ADVERSE EFFECTS: Ethyl chloride does not contain any Class I or Class II ozone-depleting chemicals.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

14. Transport Information

DOT/IMO SHIPPING NAME: Ethyl chloride

HAZARD CLASS:	PACKING GROUP/Zone:	IDENTIFICATION NUMBER:	PRODUCT RQ:
2.1	NA*/NA	UN1037	100 lb (45.4 kg)

SHIPPING LABEL(s): FLAMMABLE GAS

PLACARD (when required): FLAMMABLE GAS

* NA=Not applicable.

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, nonventilated compartment of a vehicle can present serious safety hazards.

Shipment of compressed gas cylinders that have been filled without the owner's consent is a violation of federal law [49 CFR 173.301(b)].

MARINE POLLUTANTS: Ethyl chloride is not listed as a marine pollutant by DOT.

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, state, and local regulations.

U.S. FEDERAL REGULATIONS:

EPA (ENVIRONMENTAL PROTECTION AGENCY)

CERCLA: COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (40 CFR Parts 117 and 302):

Reportable Quantity (RQ): 100 lb (45.4 kg)

SARA: SUPERFUND AMENDMENT AND REAUTHORIZATION ACT:

SECTIONS 302/304: Require emergency planning based on Threshold Planning Quantity (TPQ) and release reporting based on Reportable Quantities (RQ) of Extremely Hazardous Substances (EHS) (40 CFR Part 355):

TPQ: None

EHS RQ (40 CFR 355): None

SECTIONS 311/312: Require submission of MSDSs and reporting of chemical inventories with identification of EPA hazard categories. The hazard categories for this product are as follows:

IMMEDIATE: Yes

PRESSURE: Yes

DELAYED: Yes

REACTIVITY: No

FIRE: Yes

SECTION 313: Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR Part 372.

Ethyl chloride is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40CFR Part 372.

40 CFR 68: RISK MANAGEMENT PROGRAM FOR CHEMICAL ACCIDENTAL RELEASE PREVENTION: Requires development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

Ethyl chloride is listed as a regulated substance in quantities of 10,000 lb (4536 kg) or greater.

TSCA: TOXIC SUBSTANCES CONTROL ACT: Ethyl chloride is listed on the TSCA inventory.

OSHA: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

29 CFR 1910.119: PROCESS SAFETY MANAGEMENT OF HIGHLY HAZARDOUS CHEMICALS: Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

Ethyl chloride is not listed in Appendix A as a highly hazardous chemical. However, any process that involves a flammable gas on site in one location in quantities of 10,000 lb (4536 kg) or greater is covered under this regulation unless the gas is used as a fuel.

STATE REGULATIONS:

CALIFORNIA: Ethyl chloride is listed by California under the SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (Proposition 65).

WARNING: Ethyl chloride is a chemical known to the State of California to cause cancer.

(California Health and Safety Code §25249.5 et seq.)

PENNSYLVANIA: Ethyl chloride is subject to the PENNSYLVANIA WORKER AND COMMUNITY RIGHT-TO-KNOW ACT (35 P.S. Sections 7301-7320).

16. Other Information

Read and understand all labels and instructions supplied with all containers of this product.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE: *Flammable liquid and gas under pressure.* Use piping and equipment adequately designed to withstand pressures to be encountered. Use only with compatible materials and equipment. ***Prevent reverse flow.*** Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. Store and use with adequate ventilation at all times. Close cylinder valve when not in use; keep closed even when empty. ***Never work on a pressurized system.*** If there is a leak, close the cylinder valve. Blow down the system in a safe and environmentally sound manner in compliance with all federal, state, and local laws; then repair the leak. ***Never place a compressed gas cylinder where it may become part of an electrical circuit.***

NOTE: *Prior to using any plastics, confirm their compatibility with ethyl chloride.*

Mixtures. When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Remember, chemicals have properties that can cause serious injury or death.

HAZARD RATING SYSTEMS:

NFPA RATINGS:

HEALTH = 2
 FLAMMABILITY = 4
 INSTABILITY = 0
 SPECIAL = None

HMIS RATINGS:

HEALTH = 2*
 FLAMMABILITY = 4
 PHYSICAL HAZARD = 1

**An asterisk used in conjunction with HMIS health hazard ratings designates a carcinogenic or reproductive hazard.*

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED: CGA-300
PIN-INDEXED YOKE: Not applicable.
ULTRA-HIGH-INTEGRITY CONNECTION: Not applicable.

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlet V-1 listed below.

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information can be found in the following materials published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, <http://www.cganet.com/Publication.asp>.

AV-1 *Safe Handling and Storage of Compressed Gases*
 P-1 *Safe Handling of Compressed Gases in Containers*
 SB-2 *Oxygen-Deficient Atmospheres*
 V-1 *Compressed Gas Cylinder Valve Inlet and Outlet Connections*
 — *Handbook of Compressed Gases, Fourth Edition*

Praxair asks users of this product to study this MSDS and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

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