



ETHYL CHLORIDE

Material Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	ETHYL CHLORIDE
Product Code(s)	G-32
UN-No	UN1037
Recommended Use	Compressed gas.
Synonyms	Chloroethane; Monochloroethane; Chlorene; Chloroethyl
Supplier Address*	Linde Gas North America LLC - Linde Merchant Production Inc. - Linde LLC 575 Mountain Ave. Murray Hill, NJ 07974 Phone: 908-464-8100 www.lindeus.com Linde Gas Puerto Rico, Inc. Las Palmas Village Road No. 869, Street No. 7 Catano, Puerto Rico 00962 Phone: 787-641-7445 www.pr.lindegas.com Linde Canada Limited 5860 Chedworth Way Mississauga, Ontario L5R 0A2 Phone: 905-501-1700 www.lindecanada.com * May include subsidiaries or affiliate companies/divisions. For additional product information contact your local customer service.
Chemical Emergency Phone Number	Chemtrec: 1-800-424-9300 for US/ 703-527-3887 outside US

2. HAZARDS IDENTIFICATION

DANGER!**Emergency Overview**

Extremely flammable
May form explosive mixtures with air
May cause skin and eye irritation
Direct contact with skin causes numbness.
Causes central nervous system depression
Contact with product may cause frostbite
May cause sensitization by skin contact
May adversely affect liver and kidney.
Contents under pressure
Keep at temperatures below 52°C / 125°F

Appearance Colorless**Physical State** Compressed gas.**Odor** Ether

OSHA Regulatory Status This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Potential Health Effects

Principle Routes of Exposure Inhalation. Eye contact. Skin contact.

Acute Toxicity

Inhalation May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination.

Eyes This product is a gas at room temperature. Contact with liquid may cause frostbite. May cause irritation.

Skin This product is a gas at room temperature. Contact with liquid may cause frostbite. May cause irritation. Direct contact with skin causes numbness. May cause sensitization by skin contact.

Skin Absorption Hazard No known hazard in contact with skin.

Ingestion Not an expected route of exposure.

Chronic Effects May cause adverse liver and kidney effects.

Aggravated Medical Conditions Skin disorders. Liver disorders. Kidney disorders. Central nervous system. Respiratory disorders.

Environmental Hazard See Section 12 for additional Ecological Information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Volume %	Chemical Formula
Ethyl chloride	75-00-3	>99	C ₂ H ₅ Cl

4. FIRST AID MEASURES

Eye Contact	None required for gas. If frostbite is suspected, flush eyes with cool water for 15 minutes and obtain immediate medical attention.
Skin Contact	None required for gas. For dermal contact or suspected frostbite, remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER. A physician should see the patient promptly if contact with the product has resulted in blistering of the dermal surface or in deep tissue freezing.
Inhalation	PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF INHALATION OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Conscious inhalation victims should be assisted to an uncontaminated area and inhale fresh air. If breathing is difficult, administer oxygen. Unconscious persons should be moved to an uncontaminated area and, as necessary, given artificial resuscitation and supplemental oxygen. Treatment should be symptomatic and supportive.
Ingestion	None under normal use. Get medical attention if symptoms occur.
Notes to Physician	Treat symptomatically. A patient adversely affected by exposure to this product should not be given adrenaline (epinephrine) or similar heart stimulant since these would increase the risk of cardiac arrhythmias.

5. FIRE-FIGHTING MEASURES

Flammable Properties	Extremely flammable.
Suitable Extinguishing Media	Dry chemical or CO ₂ . Water spray or fog. DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.
Hazardous Combustion Products	Hydrogen chloride. Phosgene.
<u>Explosion Data</u>	
Sensitivity to Mechanical Impact	None
Sensitivity to Static Discharge	Yes
Specific Hazards Arising from the Chemical	Vapors may form explosive mixtures with air. Continue to cool fire exposed cylinders until flames are extinguished. Cylinders may rupture under extreme heat. Damaged cylinders should be handled only by specialists.
Protective Equipment and Precautions for Firefighters	If possible, stop the flow of gas. Do not extinguish the fire until supply is shut off as otherwise an explosive-ignition may occur. If the fire is extinguished and the flow of gas continues, use increased ventilation to prevent build-up of explosive atmosphere. Ventilation fans must be explosion proof. Use non-sparking tools to close container valves. Isolate spill or leak area for at least 100 meters (330 feet) in all directions. Vapors from liquefied gas are initially heavier than air and spread along ground. Vapors may accumulate in confined areas (basement, tanks, hopper/tank cars, etc.). Vapors may travel to source of ignition and flash back. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible withdraw from area and let fire burn. Use water spray to cool surrounding containers. Be cautious of a Boiling Liquid Evaporating Vapor Explosion, BLEVE, if flame is impinging on surrounding containers. As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. All equipment used when handling the product must be grounded. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Monitor oxygen level.
Environmental Precautions	Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material. Prevent spreading of vapors through sewers, ventilation systems and confined areas.
Methods for Containment	Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. If leak is in container or container valve, contact the appropriate emergency telephone number in Section 1 or call your closest Linde location.
Methods for Cleaning Up	Return cylinder to Linde or an authorized distributor.

7. HANDLING AND STORAGE

Handling	Ground and bond all lines and equipment associated with product system. All equipment should be non-sparking and explosion proof. "NO SMOKING" signs should be posted in storage and use areas. Remove all sources of ignition. Use only in ventilated areas. Never attempt to lift a cylinder by its valve protection cap. Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distance, use a cart designed to transport cylinders. Use equipment rated for cylinder pressure. Use backflow preventive device in piping. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing leak to occur. Use an adjustable strap wrench to remove over-tight or rusted caps. Close valve after each use and when empty. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Never put cylinders into trunks of cars or unventilated areas of passenger vehicles. Never attempt to refill a compressed gas cylinder without the owner's written consent. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit. Gasketing materials should be Teflon®, Buna®, or Buna N®. Do not use PVC, polypropylene, Hypalon®, natural or butyl rubber.
Storage	Outside or detached storage is preferred. Protect from physical damage. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Keep at temperatures below 52°C / 125°F. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, pamphlet CGA-P1, Safe Handling of Compressed Gases in Containers.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Ethyl chloride 75-00-3	TWA: 100 ppm S*	TWA: 1000 ppm TWA: 2600 mg/m ³ (vacated) TWA: 1000 ppm (vacated) TWA: 2600 mg/m ³	IDLH: 3800 ppm 10% LEL

Legend

S* - Skin Absorber

Engineering Measures

Showers. Eyewash stations. Explosion proof ventilation systems.

Ventilation

Use ventilation adequate to keep exposures below recommended exposure limits.

Personal Protective Equipment**Eye/Face Protection**

Wear protective eyewear (safety glasses). If splashes are likely to occur, wear: Goggles. Face-shield.

Skin and Body Protection

Appropriate protective and chemical resistant gloves, clothing and splash protection, or fully encapsulating vapor protective clothing to prevent exposure. For materials of construction, consult protective clothing manufacturer's specifications. (Teflon®, or Kel-F® are generally effective. Do not use PVC, natural rubber, butyl rubber or polypropylene). Wear cold insulating gloves when handling liquid. Safety shoes.

Respiratory Protection**General Use**

If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Emergency Use

Use positive pressure airline respirator with escape cylinder or self contained breathing apparatus for oxygen-deficient atmospheres (<19.5%).

Hygiene Measures

When using, do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colorless.	Odor	Ether.
Odor Threshold	No information available.	Physical State	Compressed gas
Flash Point	-58°F / -50°C	Autoignition Temperature	519°C / 966°F
Decomposition Temperature	No information available.	Boiling Point/Range	12.2°C / 54°F
Freezing Point	-139°C / -218°F	Molecular Weight	64.51
Water Solubility	Slightly soluble	Evaporation Rate	No information available
Vapor Pressure	20.3 PSIA @ 70°F	Vapor Density	2.22 (air = 1)
VOC Content (%)	Not applicable.	Flammability Limits in Air	
		Upper	15.4%
		Lower	3.8%

10. STABILITY AND REACTIVITY**Stability**

Stable.

Incompatible Products

Oxidizing agents.

Conditions to Avoid

Heat, flames and sparks. Protect from water.

Hazardous Decomposition Products	Hydrogen chloride. Phosgene.
Hazardous Polymerization	Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

LD50 Oral:	No information available.
LD50 Dermal:	No information available.
LC50 Inhalation:	57,600 ppm/2 hr. (Rat)
Inhalation	Effects begin in humans at approximately 13,000 ppm. Higher concentrations may produce anesthesia. No overt signs of toxicity were seen in rats or mice exposed for a single 4-hr. period to 19,000 ppm. A single 6 hour exposure has caused liver effects in rats at 4000 ppm but not at 1600 ppm.
Repeated Dose Toxicity	No information available.

Chronic Toxicity

Chronic Toxicity	May cause adverse liver and kidney effects.
Carcinogenicity	Ethyl chloride produced clear evidence of uterine cancer in mice and malignant skin neoplasms in rats both chronically exposed at 15,000 ppm. Toxicokinetics studies indicate that the female mouse may be unique in its response to ethyl chloride.

Chemical Name	ACGIH	IARC	NTP	OSHA
Ethyl chloride	A3	Group 3		

Irritation	Non-irritating to the skin. Non-irritating to the eye.
Sensitization	May cause sensitization by skin contact.
Mutagenic Effects	Mutations seen on S. Typhmuri screening test with and without metabolic activation; however was negative in the cell transformation assay and mouse micronuclei assay.
Reproductive Toxicity	No information available.
Developmental Toxicity	Concentrations of 500-5000 ppm administered during organogenesis caused no evidence of teratogenicity in mice. The only evidence of fetotoxicity was the presence of a few small unossified areas at 5000 ppm.
Synergistic Materials	None known.
Target Organ Effects	None known.

12. ECOLOGICAL INFORMATION

Ecotoxicity

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

Ozone depletion potential; ODP; (R-11 = 1): Does not contain ozone depleting chemical (40 CFR Part 82).

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Ethyl chloride	EC50: 39 mg/L Desmodesmus subspicatus 72 h			EC50: 58 mg/L Daphnia magna 48 h

Chemical Name	Log Pow
Ethyl chloride	1.52

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods

Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to Linde for proper disposal. This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261).

14. TRANSPORT INFORMATION

DOT

Proper Shipping Name	Ethyl chloride
Hazard Class	2.1
Subsidiary Class	None
UN-No	UN1037
Description	UN1037, Ethyl chloride, 2.1
Emergency Response Guide Number	115

TDG

Proper Shipping Name	Ethyl chloride
Hazard Class	2.1
UN-No	UN1037
Description	UN1037, ETHYL CHLORIDE, 2.1

MEX

Proper Shipping Name	Ethyl chloride
Hazard Class	2.1
UN-No	UN1037
Description	UN1037, Ethyl chloride, 2.1

IATA

UN-No	UN1037
Proper Shipping Name	Ethyl chloride
Hazard Class	2.1
ERG Code	10A
Description	UN1037, Ethyl chloride, 2.1
Maximum Quantity for Passenger	Forbidden
Maximum Quantity for Cargo Only	150 kg
Limited Quantity	No information available.

IMDG/IMO

Proper Shipping Name	Ethyl chloride
Hazard Class	2.1
UN-No	UN1037
EmS No.	F-D, S-U
Description	UN1037, Ethyl chloride, 2.1, FP -50C

ADR

Proper Shipping Name	Ethyl chloride
Hazard Class	2.1
UN-No	UN1037
Classification Code	2F
Description	UN1037, Ethyl chloride, 2.1

15. REGULATORY INFORMATIONInternational Inventories

TSCA	Complies
DSL	Complies
EINECS/ELINCS	Complies

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
 DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
 EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

U.S. Federal RegulationsSARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Chemical Name	CAS-No	SARA 313 - Threshold Values %
Ethyl chloride	75-00-3	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	Yes
Sudden Release of Pressure Hazard	Yes
Reactive Hazard	No

Clean Water Act

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42):

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Ethyl chloride		X	X	

Risk and Process Safety Management Programs

This material, as supplied, contains one or more regulated substances with specified thresholds under 40 CFR Part 68 or regulated as a highly hazardous chemical pursuant to the 29 CFR Part 1910.110 with specified thresholds:

Chemical Name	U.S. - CAA (Clean Air Act) - Accidental Release Prevention - Toxic Substances	U.S. - CAA (Clean Air Act) - Accidental Release Prevention - Flammable Substances	U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals
Ethyl chloride		10000 lbs	

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product contains the following substances which are listed hazardous air pollutants (HAPs) under Section 112 of the Clean Air Act:

Chemical Name	CAS-No	HAPS data	VOC Chemicals	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Ethyl chloride	75-00-3	Present	Group IV		

CERCLA/SARA

This material, as supplied, contains one or more substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355):

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	TPQ
Ethyl chloride	100 lb		

U.S. State Regulations**California Proposition 65**

This product contains the following Proposition 65 chemicals:

Chemical Name	CAS-No	California Prop. 65
Ethyl chloride	75-00-3	Carcinogen

U.S. State Right-to-Know Regulations

Chemical Name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Ethyl chloride	X	X	X	X	X

International Regulations

Mexico - Grade Severe risk, Grade 4

Chemical Name	Carcinogen Status	Exposure Limits
Ethyl chloride	A3	Mexico: TWA= 2600 mg/m ³ Mexico: TWA= 1000 ppm Mexico: STEL= 1250 ppm Mexico: STEL= 3250 mg/m ³

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class

A Compressed gases

B1 Flammable gas



Chemical Name	NPRI
Ethyl chloride	X

Legend

NPRI - National Pollutant Release Inventory

16. OTHER INFORMATION

Prepared By Product Stewardship
 23 British American Blvd.
 Latham, NY 12110
 1-800-572-6501

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Revision Number 1

Revision Note (M)SDS sections updated. 1.

<u>NFPA</u>	Health Hazard 2	Flammability 4	Stability 0	Physical and Chemical Hazards -
<u>HMIS</u>	Health Hazard 2*	Flammability 4	Physical Hazard 1	Personal Protection -

Note: Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2009, CGA Recommended Hazard Ratings for Compressed Gases, 3rd Edition.

General Disclaimer

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde LLC, Linde Merchant Production, Inc. or Linde Gas North America LLC (or any of their affiliates and subsidiaries) and the purchaser.

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End of Safety Data Sheet