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MATERIAL
 SAFETY
 DATA SHEET

No. 92

PRODUCT NAME Ethylene, Refrigerated Liquid	CAS # 74-85-1
TRADE NAME AND SYNONYMS Ethylene, refrigerated liquid (D.O.T.)	DOT I.D. No.: UN 1038
CHEMICAL NAME AND SYNONYMS Ethylene	DOT Hazard Class: Division 2.1
ISSUE DATES AND REVISIONS Revised April 1995	Formula Liquid (Cryogenic) C ₂ H ₄
	Chemical Family: Cryogenic Alkene

HEALTH HAZARD DATA (See Note on Page 4)

<p>TIME WEIGHTED AVERAGE EXPOSURE LIMIT Ethylene is considered a simple asphyxiant (ACGIH 1997). OSHA 1995 PEL (8 Hr. TWA) = none listed. (Continued on Page 4)</p>
<p>SYMPTOMS OF EXPOSURE <u>Inhalation:</u> High concentrations of ethylene so as to exclude an adequate supply of oxygen to the lungs causes dizziness, deeper breathing due to air hunger, possible nausea and eventual unconsciousness. Contact with the cryogenic liquid can cause tissue freezing or frostbite on dermal contact or if splashed in the eyes.</p>
<p>TOXICOLOGICAL PROPERTIES Ethylene is inactive biologically and essentially nontoxic; therefore, the major property is the exclusion of an adequate supply of oxygen to the lungs. Frostbite effects are a change in color of the skin to gray or white, possibly followed by blistering. Ethylene is not listed in the IARC, NTP or by OSHA as a carcinogen or potential carcinogen. (Continued on Page 4)</p>
<p>RECOMMENDED FIRST AID TREATMENT PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO ETHYLENE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND BE COGNIZANT OF EXTREME FIRE AND EXPLOSION HAZARD. <u>Inhalation:</u> Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given assisted respiration and supplemental oxygen. Further treatment should be symptomatic and supportive. <u>Dermal Contact or Frostbite:</u> Flush affected areas with lukewarm water. DO NOT USE HOT WATER. A physician should see the patient promptly if the cryogenic "burn" has resulted in blistering of the dermal surface or deep tissue freezing.</p>

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ETHYLENE, REFRIGERATED LIQUID

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Ethylene is flammable over a wide range in air. The flammable range in pure oxygen is 2.7 times broader than it is in air. It explodes spontaneously when mixed with chlorine in sunlight. Reacts vigorously with certain oxidizing agents.

PHYSICAL DATA

BOILING POINT -154.7°F (-103.7°C)	LIQUID DENSITY AT BOILING POINT 35.3 lb/ft ³ (566 kg/m ³)
VAPOR PRESSURE @ 70°F (21.1°C) Above critical temperature	GAS DENSITY AT 70°F, 1 atm 0.0730 lb/ft ³ (1.169 kg/m ³)
SOLUBILITY IN WATER Negligible	FREEZING POINT -272.6°F (-169.2°C)
EVAPORATION RATE Cryogenic liquid	SPECIFIC GRAVITY (AIR=1) @ 70°F (21.1°C) = .97
APPEARANCE AND ODOR Colorless gas with a slightly sweet odor; liquid is clear and colorless.	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) -213°F (-136°C)	AUTO IGNITION TEMPERATURE 968°F (520°C)	FLAMMABLE LIMITS % BY VOLUME (See Page 4) LEL 3.1 UEL 32
EXTINGUISHING MEDIA Carbon dioxide, dry chemical or water spray		ELECTRICAL CLASSIFICATION Group C. See NFPA No. 70
SPECIAL FIRE FIGHTING PROCEDURES If possible, stop flow of gas supply and allow fuel to consume itself. Use water spray, to cool adjacent containers..		
UNUSUAL FIRE AND EXPLOSION HAZARDS Explodes spontaneously when mixed with chlorine in sunlight.		

REACTIVITY DATA

STABILITY Unstable		CONDITIONS TO AVOID None
Stable	X	
INCOMPATIBILITY (Materials to avoid) Chlorine, nitrogen dioxide, aluminum chloride, carbon tetrachloride		
HAZARDOUS DECOMPOSITION PRODUCTS None		
HAZARDOUS POLYMERIZATION May Occur		CONDITIONS TO AVOID
Will Not Occur	X	High temperatures and pressures cause polymerization to polyethylene.

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED See Note on last page.
WASTE DISPOSAL METHOD See Note on last page.

ETHYLENE, REFRIGERATED LIQUID

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.		
VENTILATION Hood with forced ventilation	LOCAL EXHAUST To prevent accumulation above the LEL	SPECIAL N/A
	MECHANICAL (Gen.) In accordance with electrical codes	OTHER N/A
PROTECTIVE GLOVES Loose fitting, insulated		
EYE PROTECTION Safety goggles or glasses plus face shield		
OTHER PROTECTIVE EQUIPMENT Safety shoes, safety shower		

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION DOT Shipping Name: Ethylene, refrigerated liquid DOT Hazard Class: Division 2.1 DOT Shipping Label: Flammable Gas I.D. No.: UN 1038
SPECIAL HANDLING RECOMMENDATIONS See Note on Page 4 re Spill or Leak Procedures and Compressed Gas Association's Pamphlet P-12.
SPECIAL STORAGE RECOMMENDATIONS See Note on Page 4 re Spill or Leak Procedures and Compressed Gas Association's Pamphlet P-12.
SPECIAL PACKAGING RECOMMENDATIONS For assistance in designing equipment to contain liquid ethylene, contact your supplier. For handling gaseous ethylene, refer to your supplier's material safety data sheet for ethylene.
OTHER RECOMMENDATIONS OR PRECAUTIONS Earth-ground and bond all lines and equipment associated with the ethylene system. Electrical equipment should be non-sparking or explosion proof. Liquefied gas cylinders should not be refilled except by qualified producers of these products. Shipment of a compressed gas container which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR). (Continued on Page 4)

*Various Government Agencies (i.e. Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, handling, storage or use of this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.

ETHYLENE, REFRIGERATED LIQUID

HEALTH HAZARD DATA

NOTE: Except where specified, the health hazard data and most of the other data in this material safety data sheet are for gaseous ethylene. One volume of liquid ethylene at its boiling Point and atmospheric Pressure will vaporize into approximately 485 volumes of gaseous ethylene at 70°F (21.1°C) and 1 atmosphere.

TIME WEIGHTED AVERAGE EXPOSURE LIMIT: (Continued)

Oxygen levels should be maintained at greater than 18 Molar percent at normal atmospheric pressure (pO₂>135 torr).

TOXICOLOGICAL PROPERTIES: (Continued)

Persons in ill health where such illness would be aggravated by exposure to ethylene should not be allowed to work with or handle this product.

SPILL OR LEAK PROCEDURES

NOTE RE: SPILL OR LEAK PROCEDURES: (Continued)

Liquid ethylene is delivered to a customer into stationary vacuum-jacketed vessels at the customer's location or in portable vacuum-jacketed "liquid" cylinders.

Stationary customer-site vessels should be operated in accordance with the manufacturer's and your supplier's instructions. Do not attempt to repair, adjust or in any other way modify the operation of these vessels. If there is a malfunction or other type of operational problem with the vessel, contact the closest supplier location immediately. No smoking or open flames should be allowed near these vessels.

Liquid ethylene cylinders should be used only in well-ventilated areas of noncombustible construction and in accordance with the manufacturer's and your supplier's instructions. These cylinders must always be kept in an upright position. Specialized hand trucks are needed for their movement. A "first in - first out" inventory system should be used with these cylinders.

OTHER RECOMMENDATIONS OR PRECAUTIONS: (Continued)

Always secure cylinders in an upright position before transporting them. NEVER transport cylinders in trunks of vehicles, enclosed vans, truck cabs or in passenger compartments. Transport cylinders secured in open flatbed or in open pick-up type vehicles.

Ethylene is considered a toxic chemical and is subject to the reporting requirements of SARA, Title III, Section 313.

NFPA 704 No. for liquid (refrigerated) ethylene = 3 4 2