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**MATERIAL  
SAFETY  
DATA SHEET**

No. 132

PRODUCT NAME Halocarbon 134A	CAS # 811-97-3
TRADE NAME AND SYNONYMS 1,1,1,2-Tetrafluoroethane (D.O.T.)	DOT I.D. No.: UN 3159
CHEMICAL NAME AND SYNONYMS 1,1,1,2-Tetrafluoroethane	DOT Hazard Class: Division 2.2
ISSUE DATES AND REVISIONS Revised September 1996	Formula CH <sub>2</sub> FCF <sub>3</sub>
	Chemical Family: Fluorinated Hydrocarbon

**HEALTH HAZARD DATA**

<b>TIME WEIGHTED AVERAGE EXPOSURE LIMIT</b> TWA: None listed (ACGIH 1995-1996). OSHA 1995 PEL (8Hr. TWA) = None listed. Oxygen levels should be maintained at greater than (Continued on Page 4)
<b>SYMPTOMS OF EXPOSURE</b> Inhalation of high concentrations of vapor may caused heart irregularities or unconsciousness or death due to displacement of adequate supply of axxygen to the lungs. Contact with the rapidly evaporating liquid may cause frosbite or cryogenic "burns".
<b>TOXICOLOGICAL PROPERTIES</b> Deprivation of the body of oxygen and its subsequent effects are major properties.  No irreversible effects are known once an adequate supply of oxygen is returned (oxygen deficiency corrected).  Frostbite effects are a change in color of the skin to gray or white possibly followed by blistering.  (Continued on Page 4)
<b>RECOMMENDED FIRST AID TREATMENT</b> PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO HALOCARBON 134A. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. <u>Inhalation:</u> Conscious persons should be assisted to an uncontaminated area and inhale fresh air. 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> Remove contaminated clothing and 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.

Information contained in this material safety data sheet is offered without charge for use by technically qualified personnel at their discretion and risk. All statements, technical information and recommendations contained herein are based on tests and data which we believe to be reliable, but the accuracy or completeness thereof is not guaranteed and no warranty of any kind is made with respect thereto. This information is not intended as a license to operate under or a recommendation to practice or infringe any patent of this Company or others covering any process, composition of matter or use. Since the Company shall have no control of the use of the product described herein, the Company assumes no liability for loss or damage incurred from the proper or improper use of such product.

**HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES**

Halocarbon 134 A is a relatively inert non-reactive gas.

**PHYSICAL DATA**

BOILING POINT -15.7°F (-26.5°C)	LIQUID DENSITY AT BOILING POINT @ 77°F (25°C) = 75.5 lb/ft <sup>3</sup> (1210 kg/m <sup>3</sup> )
VAPOR PRESSURE @ 77°F (25°C) = 96 psia (662 kPa)	GAS DENSITY AT 70°F, 1 atm @ 77°F (25°C) = .2351 lb/ft <sup>3</sup> (3.765 kg/m <sup>3</sup> )
SOLUBILITY IN WATER Negligible	FREEZING POINT Unknown
EVAPORATION RATE N/A (Gas)	SPECIFIC GRAVITY (AIR=1) @ 77°F (25°C) = 3.18
APPEARANCE AND ODOR Colorless gas with slight ethereal odor	

**FIRE AND EXPLOSION HAZARD DATA**

FLASH POINT (Method used) N/A	AUTO IGNITION TEMPERATURE N/A	FLAMMABLE LIMITS % BY VOLUME (See Page 4) LE N/A UEL N/A
EXTINGUISHING MEDIA Nonflammable Gas		ELECTRICAL CLASSIFICATION Nonhazardous
SPECIAL FIRE FIGHTING PROCEDURES If cylinders are involved in a fire, safely relocate or keep cool with water spray.		
UNUSUAL FIRE AND EXPLOSION HAZARDS If halocarbon 134 A is involved in a fire, it may decompose yielding toxic products.		

**REACTIVITY DATA**

STABILITY Unstable		CONDITIONS TO AVOID Open flames and high temperatures
Stable	X	
INCOMPATIBILITY (Materials to avoid) Alkali or alkaline earth metals; powdered aluminum, zinc, beryllium, etc.		
HAZARDOUS DECOMPOSITION PRODUCTS Hydrochloric and hydrofluoric acids, possibly phosgene at 1000°F (538°C).		
HAZARDOUS POLYMERIZATION May Occur		CONDITIONS TO AVOID
Will Not Occur	X	None

**SPILL OR LEAK PROCEDURES**

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact your closest supplier location or call the emergency telephone number listed herein.
WASTE DISPOSAL METHOD Do not attempt to dispose of waste or unused quantities. Return in the shipping container <u>properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place</u> to your supplier. For emergency disposal assistance, contact your closest supplier location or call the emergency telephone number listed herein.

**SPECIAL PROTECTION INFORMATION**

<b>RESPIRATORY PROTECTION</b> (Specify type)		Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.	
<b>VENTILATION</b>  Hood with forced ventilation	<b>LOCAL EXHAUST</b> See Page 4	<b>SPECIAL</b>	N/A
	<b>MECHANICAL (Gen.)</b> N/A	<b>OTHER</b>	N/A
<b>PROTECTIVE GLOVES</b> Plastic or rubber			
<b>EYE PROTECTION</b> Safety goggles or glasses			
<b>OTHER PROTECTIVE EQUIPMENT</b> Safety shoes, eyewash "fountain"			

**SPECIAL PRECAUTIONS\***

<b>SPECIAL LABELING INFORMATION</b>	
DOT Shipping Name: 1,1,1,2-Tetrafluoroethane	DOT Hazard Class: Division 2.2
DOT Shipping Label: Nonflammable Gas	I.D. No.: UN 3159
<b>SPECIAL HANDLING RECOMMENDATIONS</b>	
<p>Use only in well-ventilated areas. Valve protection caps must remain in place unless ! container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (&lt;150 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.</p> <p>For additional handling recommendations, consult Compressed Gas Association's Pamphlet P-1.</p>	
<b>SPECIAL STORAGE RECOMMENDATIONS</b>	
<p>Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperatures where cylinders are stored to exceed 125°F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in -first out" inventory system to prevent full cylinders being soiled for excessive periods of time.</p> <p>For additional storage recommendations, consult Compressed Gas Association's Pamphlet P-1.</p>	
<b>SPECIAL PACKAGING RECOMMENDATIONS</b>	
<p>Halocarbon 134A is noncorrosive and may be used with any common structural material. Silver and copper bearing alloys can act as catalysts for the decomposition of halo carbon 134A at high temperatures. Alloys containing more than 2% magnesium should not be used if water is present.</p>	
<b>OTHER RECOMMENDATIONS OR PRECAUTIONS</b>	
<p>Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR). Also see Compressed GAs Association's Safety Bulletin SB-1.</p>	
(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.

Halocarbon 134A

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT: (Continued)

18 molar % at normal atmospheric pressure (  $pO_2 > 135$  torr).

TOXICOLOGICAL PROPERTIES: (Continued)

Halocarbon 134A is not listed in the IARC, NTP or by OSHA as a carcinogen or potential carcinogen.

Persons in ill health where such illness would be aggravated by exposure to halocarbon 134A should not be allowed to work with or handle this product.

SPECIAL PROTECTION INFORMATION: (Continued)

LOCAL EXHAUST:

To prevent accumulation so as to exclude an adequate oxygen supply.

SPECIAL PRECAUTIONS

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.

Reporting under SARA, Title III, Section 313 not required.

NFPA 704 No. for halocarbon 134A = 1 0 0 None