Emergency Contact: Chemtrec (800) 424-9300
Or Norco (208) 336-1643

1125 West Amity Road
Boise, ID 83705
(208) 336-1643

1,1,1,2-Tetrafluoroethane 1 ppm to 5000 ppm in Nitrogen

MATERIAL SAFETY DATA SHEET

Identification

Product Name: 1,1,1,2-Tetrafluoroethane, 1 ppm to 5000 ppm in Nitrogen
Revision Date: 04/20/12
CAS Number: Not Applicable to a mixture
Last Review Date: 04/20/12
Chemical Family: Gas Mixture
Chemical Formula: CH_2FCF_3 in N_2
Synonyms: R134a in Nitrogen, Norflurane in nitrogen, Halocarbon 134a in Nitrogen
MSDS Identification Code/Number: #3090
Prepared By: Quality Dept.

Composition, Information on Ingredients

Exposure Limits[1]:

INGREDIENT	% VOLUME	PEL-OSHA[2]	TLV-ACGIH[3]	LD_{50} or LC_{50} Route/Species
1,1,1,2-Tetrafluoroethane Formula: CH_2FCF_3 CAS #: 811-97-2 RTECS#: KI8842500	1 to 5000 PPM	TWA 1000 PPM 8 Hr. AIHA WEEL	Not Available	LC_{50} 1500 g/m^3 Inhalation rat (4 Hr)
Nitrogen Formula: N_2 CAS #: 7727-37-9 RTECS #: QW9700000	Balance	None Established	Simple Asphyxiant	Not Applicable

[1]Refer to individual state or provincial regulations, as applicable, for limits that may be more stringent than those listed here.
[2] As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993).
[3] As stated in the ACGIH 2007 Threshold Limit Values for Chemical Substances and Physical Agents.

OSHA Regulatory Status: This material is classified as hazardous under OSHA regulations.
IDLH: Not Available

Hazards Identification

Emergency Overview:
Simple Asphyxiant-This product does not contain oxygen and may cause asphyxia if released in a confined area. Colorless, non-flammable gas with a possible faint sweetish odor. High concentrations may cause nausea, Central Nervous System depression with dizziness and headaches. Repeated or prolonged skin contact may cause irritation or dermatitis. Use only with adequate ventilation. Contents under pressure. Use and store below 125^{O}F (52^{O}C).

Route of Entry:

Skin Contact	Skin Absorption	Eye Contact	Inhalation	Ingestion
Yes	No	Yes	Yes	No

Health Effects:

Exposure Limits	Irritant	Sensitization
Yes	No	No
Teratogen	Reproductive Hazard	Mutagen
No	No	No
Synergistic Effects None reported.		

Hazards Identification Continued

Carcinogenicity: NTP: No IARC: No OSHA: No

Eye Effects:
High concentrations may be moderately irritating to eyes. Contact with rapidly expanding gas near the point of release may cause frostbite.

Skin Effects:
Contact with rapidly expanding gas near the point of release may cause frostbite with redness, skin color change to gray or white, and blistering. High concentrations may be irritating to the skin.

Ingestion Effects:
Ingestion is unlikely. Gas at room temperature.

Inhalation Effects:
Gross overexposure may cause central nervous system depression with dizziness, confusion, incoordination, drowsiness or unconsciousness. Irregular heart beat with a strange sensation in the chest, "heart thumping", apprehension, lightheadedness, feeling of fainting, dizziness, weakness, sometimes progressing to loss of consciousness and death. Suffocation if air is replaced.

Medical Conditions Aggravated by Exposure:

NFPA Hazard Codes		**HMIS Hazard Codes**		**Ratings System**
Health:	0	Health:	0	0 = No Hazard
Flammability:	0	Flammability:	0	1 = Slight hazard
Instability:	0	Physical Hazard:	3	2 = Moderate Hazard
				3 = Serious Hazard
				4 = Severe Hazard

Hazard 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.*

First Aid Measures

Eye:
Flush eyes with water for 15 minutes. If irritation persists or frostbite occurs, seek medical attention.

Skin:
Rinse skin thoroughly with water. If frostbite has occurred, seek medical attention immediately; do NOT rub the affected areas or flush them with water. In order to prevent further tissue damage DO NOT attempt to remove frozen clothing from frostbite areas.

Ingestion:
None required. Product is a gas at normal temperatures and conditions.

Inhalation:
PROMPT REMOVAL FROM THE CONTAMINATED AREA AND IMMEDIATE MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Victims 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, and if breathing has stopped, administer artificial resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

Fire Fighting Measures

Conditions of Flammability: Not flammable		
Flash point: None	Method: Not Applicable	Autoignition Temperature: None
LEL (%): None	UEL (%): None	
Hazardous combustion products: Carbon Dioxide, Carbon Monoxide, Nitrogen Oxides, Halogenated compounds		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: None		

Fire and Explosion Hazards:
Nonflammable. May decompose yielding toxic products, which may include halogenated compounds. Cylinder may rupture violently from pressure when involved in a fire situation.

Extinguishing Media:
None required. Use as appropriate for surrounding materials.

Fire Fighting Instructions:
If possible, stop the flow of gas supply. Use water spray to cool adjacent cylinders and areas. Fire fighters should wear a full-face piece NIOSH/MSHA approved self-contained breathing apparatus (SCBA) operated in positive pressure mode and full turnout gear.

Accidental Release Measures

Evacuate all personnel from affected area. Use appropriate protective equipment. If a 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 the appropriate emergency telephone number listed in Section 1 or call your closest Norco/NorLab location.

Handling and Storage

Electrical classification:
Non-hazardous

Gas mixture is non-corrosive and may be used with any common structural material.

Use only in well-ventilated areas. Valve protection caps must remain in place unless the cylinder 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 regulator when connecting cylinder to lower pressure (<3000 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 backflow into the cylinder.

Protect cylinders from physical damage. Store in cool, dry, well ventilated area of non-combustible construction away from heavy traffic areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125^{O}F (52^{0}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 from being stored for excessive periods of time.

For additional recommendations, consult Compressed Gas Association Pamphlet P-1.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid from in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

Exposure Controls, Personal Protection

Engineering Controls:
Local exhaust used in combination with general ventilation as necessary to maintain air contaminants at or below acceptable exposure guidelines.

Eye/Face Protection:
Safety goggles or glasses as appropriate for the job.

Exposure Controls, Personal Protection Continued

Skin Protection:
Protective gloves appropriate for the job.

Respiratory Protection:
Positive pressure air line with full-face mask and escape bottle or self-contained breathing apparatus should be available for emergency use.

Other/General Protection:
Safety shoes.

Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure	: Not Available	
Vapor density (Air = 1)	: ~ 1	
Evaporation point	: Not Available	
Boiling point	: Not Available	^{O}F
	: Not Available	^{O}C
Freezing point	: Not Available	^{O}F
	: Not Available	^{O}C
pH	: Not Available	
Specific gravity	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H_2O)	: Slightly Soluble	
Odor threshold	: Not Applicable	
Odor and appearance	:Colorless, odorless gas. May have a slight ether odor at very high concentrations.	

Stability and Reactivity

Stability:
Stable

Incompatible Materials:
Incompatible with alkali or alkaline earth metals, powdered aluminum, zinc, etc.

Hazardous Decomposition Products:
At high temperatures 1,1,1,2-Tetrafluoroethane can decompose forming hydrofluoric acid and possibly carbonyl fluoride.

Hazardous Polymerization:
Will not occur

Toxicological Information

Inhalation:
Very high concentrations may cause effects on the cardiovascular system and central nervous system, resulting in cardiac disorders and central nervous system depression.

Chronic:
There is currently no known adverse heath effects associated with chronic exposure to this gas.

Ecological Information

Product does not contain any Class I or Class II ozone depleting substances. Not toxic. Will not bioconcentrate. This product contains small amounts of 1,1,1,2-Tetrafluoroethane (HFC-134a) greenhouse gases which may contribute to global warming.

Disposal Considerations

Do not attempt to dispose of waste or unused quantities in returnable cylinders. Return in the shipping container, *properly labeled, with any valve outlet plugs or caps secure and valve protection cap in place* to NorLab for proper disposal. Non-refillable containers should be vented in a well-ventilated area then disposed of in compliance with local regulations, or returned to NorLab.

Transportation Information

Parameter	United States DOT	Canada TDG
Proper Shipping Name:	Compressed Gas, N.O.S. (1,1,1,2-tetrafluoroethane, Nitrogen)	Compressed Gas, N.O.S.
Hazard Class:	2.2	2.2
Identification Number:	UN1956	UN1956
Shipping Label:	Non-flammable Gas	Non-flammable Gas

Regulatory Information

SARA Title III Notifications and Information:

SARA Title III – Hazard Classes:
Acute Health Hazard
Chronic Health Hazard
Sudden Release of Pressure Hazard

SARA Title III- Section 313 Supplier Notification:
This product contains no toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372.

California Proposition 65: This product does not contain ingredient(s) known to the State of California to cause cancer or reproductive toxicity.

Other Information

Compressed gas cylinders must not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

Disclaimer of expressed and implied warranties:
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