



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

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

R-404A 0.0001% to 1% in Nitrogen

MATERIAL SAFETY DATA SHEET

Identification

Product Name: R-404A in Nitrogen

Revision Date: 03/19/13

Last Review Date: 03/19/13

Chemical Name: R-404A (44% Pentafluoroethane, 52% 1, 1, 1-Trifluoroethane, 4%, 1, 1, 1, 2-Tetrafluoroethane) in Nitrogen

Chemical Family: Gas Mixture

CAS Number: N/A

Common Names/Synonyms: Calibration Gas Mixture

MSDS Identification Code/Number: #4090

Prepared by: Quality Dept.

Composition, Information on Ingredients, Exposure Limits

Exposure Limits¹

Ingredient	% Volume	PEL-OSHA ¹	TLV-ACGIH ²	LD ₅₀ or LC ₅₀ Route/Species
Refrigerant R-404A 44% Pentafluoroethane CAS# 354-33-6 52% 1, 1, 1-Trifluoroethane CAS# 420-46-2 4% 1,1,1,2-Tetrafluoroethane CAS# 811-97-2	0.0001% to 1.0% 1 PPM to 10,000PPM	Not Available Du Pont Acceptable Exposure Level (AEL) is 1000 ppm 8 & 12 hour TWA	Not Available	Pentafluoroethane LC ₅₀ : >800,000 ppm inhalation rat (4 Hr) 1,1,1-Trifluoroethane LC ₅₀ : >540,000 ppm inhalation rat (4 Hr) 1,1,1,2-Tetrafluoroethane LC ₅₀ : >500,000 ppm 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.

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, 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°F (52°C).

Route of Entry:

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

Hazards Identification Continued

Health Effects:

Exposure Limits Yes	Irritant No	Sensitization No
Teratogen No	Reproductive Hazard No	Mutagen No

Synergistic Effects:
None reported

Carcinogenicity: NTP: No IARC: No OSHA: No

Eye Effects:

May cause minor irritation. Contact with rapidly expanding gas near the point of release may cause frostbite.

Skin Effects:

Liquid R-404A can cause a defatting action on the skin. Prolonged or repeated contact may tend to dry and defat skin causing irritation and dermatitis. Contact with rapidly expanding gas near the point of release may cause frostbite with redness, skin color change to gray or white, and blistering.

Ingestion Effects:

None known. Ingestion is unlikely as product is a gas at room temperature.

Inhalation Effects:

High concentrations of R-404A vapors may cause cardiac arrhythmia. Large releases of this product may displace atmospheric oxygen resulting in asphyxiation. Symptoms of asphyxiation include loss of coordination, increased pulse rate and deeper respiration.

Medical Conditions Aggravated by Exposure: None known.

NFPA Hazard Codes

Health: 0
Flammability: 0
Instability: 0

HMIS Hazard Codes

Health: 0
Flammability: 0
Physical Hazards:3

Ratings System

0: No Hazard
1: Slight Hazard
2: Moderate Hazard
3: Serious Hazard
4: Severe 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

Eyes:

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

Skin:

Rinse skin thoroughly with water. For skin, immerse skin in lukewarm water. DO NOT USE HOT WATER. For frostbite or persistent irritation, seek medical attention.

Ingestion:

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

Inhalation:

PROMPT 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: Not Available	Method: Not Available	Autoignition Temperature: Not Available
LEL % None		UEL % None
Hazardous Combustion Products: Hydrofluoric acid and possibly carbonyl fluoride		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: None		

Fire and Explosion Hazards:

Nonflammable. Cylinders 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-facepiece 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 leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or valve, contact the appropriate emergency telephone number listed in section 1 or call your closest Norco/NorLab location.

Handling and Storage

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°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 from being stored for excessive periods of time. Post "NO SMOKING OR OPEN FLAMES" sign in the storage or use area.

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 form 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. Maintain atmospheric oxygen content above 19.5%.

Eye/Face Protection:

Safety goggles or glasses as appropriate for the job.

Skin Protection:

Protective gloves.

Exposure Controls, Personal Protection Continued

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	: Above critical temp.	
Vapor density (Air = 1)	: ~ 1	(as air)
Evaporation point	: Not Available	
Boiling point	: Not Available	
Freezing point	: Not Available	
pH	: Not Applicable	
Specific gravity	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H ₂ O)	: Slight	
Odor threshold	: Not available	
Odor and appearance	: Colorless gas with a faint sweetish odor.	

Stability and Reactivity

Stability:

Stable

Incompatible Materials:

Incompatible with active metals, alkali or alkaline earth metals such as powdered aluminum or zinc.

Hazardous Polymerization:

Does not occur.

Toxicological Information

Inhalation:

Acute exposure to moderate to high doses of R-404A can cause headaches, nausea, and irritation of the eyes and respiratory tract.

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 Pentafluoroethane (HFC-125), 1, 1, 1-Trifluoroethane (HFC-143a), and 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 Norco or NorLab for proper disposal. Non-refillable containers should be vented in a well-ventilated area then disposed of in accordance with local regulations, or returned to NorLab.

Transport Information

Parameter	United States DOT	Canada TDG
Proper Shipping Name:	Compressed gas, N.O.S., (Pentafluoroethane, Nitrogen)	Compressed gas, N.O. S.
Hazard Class:	2.2	2.2
Identification Number:	UN 1956	UN 1956
Shipping Label:	Non-flammable Gas	Non-flammable Gas

Regulatory Information

SARA Title III Notifications and Information:

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.

SARA Title III – Hazard Classes:

Acute Health Hazard
Sudden Release of Pressure Hazard

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

Other Information

ACGIH	American Conference of Governmental Industrial Hygienists
DOT	Department of Transportation
IARC	International Agency for Research on Cancer
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
SARA	Superfund Amendments and Reauthorization Act
STEL	Short Term Exposure Limit
TDG	Transportation of Dangerous Goods
TLV	Threshold Limit Value

Compressed gas cylinders shall 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:

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).