

1. CHEMICAL PRODUCT

Material Identification
Product Name : R404A
Formula : CF₃CH₂F/CF₃CH₂F/CF₃CH₃
Product Use : Refrigerant Blend

2. HAZARDS IDENTIFICATION

Emergency Overview
Colorless liquified gas with faint ether odor.

WARNING! LIQUID AND GAS UNDER PRESSURE, OVERHEATING AND OVERPRESSURIZING MAY CAUSE GAS RELEASE OR VIOLENT CYLINDER BURSTING. MAY DECOMPOSE ON CONTACT WITH FLAMES OR EXTREMELY HOT METAL SURFACES TO PRODUCE TOXIC AND CORROSIVE PRODUCTS. VAPOR REDUCES OXYGEN AVAILABLE FOR BREATHING AND IS HEAVIER THAN AIR. HARMFUL IF INHALED AND MAY CAUSE HEART IRREGULARITIES, UNCONSCIOUSNESS OR DEATH. LIQUID CONTACT WITH EYES OR SKIN MAY CAUSE FROSTBITE.

GHS classification in accordance with 29 CFR 1910.1200

Gases under pressure : Liquefied gas
Simple Asphyxiant

GHS label elements
Hazard pictograms :



Signal Word : Warning

Hazard Statements : H280 Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation.

Precautionary Statements : Storage: P410 + P403 Protect from sunlight. Store in a well-ventilated place.

Other hazards

Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing. Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects. Rapid evaporation of the product may cause frostbite.

Potential Health Effects

Skin contact and inhalation are expected to be the primary routes of occupational exposure to this material. As with most liquified gases, contact with the rapidly volatilizing liquid can cause frostbite to any tissue. High vapor concentrations are irritating to the eyes and respiratory tract and may result in central nervous system (CNS) effects such as headache, dizziness, drowsiness and, in severe exposure, loss of consciousness and death. The dense vapor of this material may reduce the available oxygen for breathing. Prolonged exposure to an oxygen-deficient atmosphere may be fatal. Inhalation may cause an increase in the sensitivity of the heart to adrenaline, which could result in irregular or rapid heartbeats. Medical conditions aggravated by exposure to this material include heart disease or compromised heart function.

3. COMPOSITION/INFORMATION ON INGREDIENTS

| Components Material | CAS Number | % |
|---------------------------|------------|----|
| Ethane, 1,1,1-trifluoro- | 420-46-2 | 52 |
| Pentafluoroethane | 354-33-6 | 44 |
| 1,1,1,2-tetrafluoroethane | 811-97-2 | 2 |

4. FIRST AID MEASURES

First Aid

IF IN EYES, immediately flush with plenty of water. Get medical attention if irritation persists.

IF ON SKIN, Flush exposed skin with lukewarm water (not hot), or use other means to warm skin slowly. Get medical attention if frostbitten by liquid or if irritation occurs.

IF SWALLOWED, not applicable - product is a gas at ambient temperatures.

IF INHALED, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention. Do not give adrenaline, epinephrine or similar drugs following exposure to this product.

5. FIRE FIGHTING MEASURES

Fire and Explosive Properties

| | |
|---------------------------|---------------------------|
| Auto-Ignition Temperature | NA |
| Flash Point | NA-GAS Flash Point Method |
| Flammable Limits – Upper | NA |
| Flammable Limits - Lower | NA |

Extinguishing Media

Use extinguishing media appropriate to surrounding fire conditions.

Fire Fighting Instructions

Stop the flow of gas if possible. Use water spray on person making shut-off. Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Banker Gear) and self-contained breathing apparatus (pressure demand NIOSH approved or equivalent). Fire fighting equipment should be thoroughly decontaminated after use.

Fire and Explosion Hazards

May decompose on contact with flames or extremely hot metal surfaces to produce toxic and corrosive products. Liquid and gas under pressure, overheating or over pressurizing may cause gas release and/or violent cylinder bursting. Container may explode if heated due to resulting pressure rise. Some mixtures of HCFCs and/or HFCs, and air or oxygen may be combustible if pressurized and exposed to extreme heat or flame..

6. ACCIDENTAL RELEASE MEASURES

In Case of Spill or Leak

Use Halogen leak detector or other suitable means to locate leaks or check atmosphere. Keep upwind. Evacuate enclosed spaces and disperse gas with floor-level forced-air ventilation. Exhaust vapors outdoors. Do not smoke or operate internal combustion engines. Remove flames and heating elements.

7. HANDLING AND STORAGE

Handling

Avoid breathing gas. Avoid contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Do not enter confined spaces unless adequately ventilated.

Storage

Do not apply direct flame to cylinder. Do not store cylinder in direct sun or expose it to heat above 120 F. Do not drop or refill this cylinder. Keep away from heat, sparks and flames

8. ECOLOGICAL INFORMATION

Ecotoxicological Information

Ethane, 1,1,1,-trifluoro

This material is practically non-toxic to *Daphnia magna* (48-hr LC50 300mg/l) and on more than slightly toxic to rainbow trout (96-hr LC50>40mg/l)

1,1,1,2-Tetrafluoroethane (HFC-134a) Based on its low n-octanol/water partition coefficient (log Pow of 1.06), bioaccumulation of this material is considered unlikely.

Chemical Fate Information

1,1,1,2-Tetrafluoroethane (HFC-134a) Based on its low n-octanol/water partition coefficient (log Pow of 1.06), bioaccumulation of this material is considered unlikely. When evaluated in a 28 day activated sludge test, 3% degradation of this material was observed.

Ethane, pentafluoro-

When released into the environment, this material may be expected to partition almost exclusively into the atmosphere. Based on its low n-octanol/water partition coefficient (log Pow of 1.48), bioaccumulation is considered unlikely. In a 28-day ready biodegradability closed bottle test, it appeared to be stable (about 2% degraded). This material does not dissociate in water

9. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Investigate engineering techniques to reduce exposures below airborne exposure limits. Provide ventilation if necessary to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

Eye / Face Protection

Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment available.

Skin Protection

Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove material for given application. Rinse contaminated skin promptly. Wash contaminated clothing and clean protective equipment before reuse. Wash skin thoroughly after handling.

Respiratory Protection

Avoid breathing gas. When airborne exposure limits are exceeded (see below), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components (full facepiece recommended). Consult respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.

Airborne Exposure Guidelines for Ingredients Exposure Limit Value

| | |
|--------------------------------------|-------------------------------|
| 1,1,1,2-Tetrafluoroethane (HFC-134a) | WEEL TWA - 1000 ppm 4240mg/m3 |
| Ethane, pentafluoro | WEEL TWA - 4900mg/m3 1000ppm |
| Ethane, 1,1,1-trifluoro | WEEL TWA - 3400mg/ m3 1000ppm |

-Only those components with exposure limits are printed in this section.

-Skin contact limits designated with a "Y" above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required.

-ACGIH Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic reactions.

-WEEL-AIHA Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic skin reactions.

10. PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

| | |
|---------------------|------------------|
| Specific Gravity | : 1.08@21C/70F |
| Vapor Pressure | : 169.6psia@70 F |
| Vapor Density | : 3.36 |
| Boiling Point | : -47.8 C/ -54F |
| Solubility in Water | : Negligible |
| % Volatile | : 100 |

| | |
|------------------|-------------------|
| Molecular Weight | : 97.60 |
| Odor | : Ether (slight). |
| Form | : Liquified Gas. |
| Color | : Colorless. |

11. STABILITY AND REACTIVITY

Stability

This material is chemically stable under specified conditions or storage, shipment and/or use. See HANDLING AND STORAGE section of this MSDS for specified conditions.

Incompatibility

Avoid contact with strong alkali or alkaline earth metals, finely powdered metals such as aluminum, magnesium or zinc and strong oxidizers, since they may react or accelerate decomposition.

Hazardous Decomposition Products

Thermal decomposition products include hydrogen fluoride, hydrogen chloride, carbon monoxide, carbon dioxide and chlorine.

12. TOXICOLOGICAL INFORMATION

1,1,1,2-Tetrafluoroethane (HFC-134a) No skin allergy was observed in guinea pigs following repeated exposure. Acute inhalation exposure produced anesthetic effects in mice, dogs, cats and monkeys. Repeated inhalation exposure produced no adverse effects in rats. Inhalation of this material, followed by intravenous injection of epinephrine to stimulate stress reactions, resulted in cardiac sensitization in dogs. Following long-term inhalation studies in rats, an increased incidence of benign tumors (at high concentrations) in the tests were the only tumors observed. No birth defects were noted in the offspring of rats exposed to this material by inhalation during pregnancy, even at dosages which produced significant adverse effects in the mother. This material produced no genetic changes in standard tests using bacterial or animal cells and whole animals. Single exposure (acute) studies indicate: Inhalation- Practically Non-toxic to Rats (4-hr LC50>500,000 ppm; 30-min LC50~750,000 ppm) Eye Irritation-Slightly Irritating to Rabbits Skin Irritation-Slightly Irritating to Rabbits (24-hr exposure)

Ethane, 1,1,1-trifluoroInhalation, followed by intravenous injection of epinephrine to simulate stress reactions, resulted in cardiac sensitization in dogs. Following repeated inhalation exposure, lung irritant effects including mild bronchitis and pneumonia were observed in rats and guinea pigs. No adverse effects were observed in long-term oral studies with rats. No birth defects were noted in the offspring of rats or rabbits exposed by inhalation during pregnancy. No genetic changes were observed in standard tests using animal cells or whole animals. Both positive and negative results have been reported in tests using bacteria. Single exposure (acute) studies indicate Inhalation - Practically Non- Toxic to Rats (4-hr LC50>540,000 ppm)

Ethane, pentafluoro- Inhalation, followed by intravenous injection of epinephrine to stimulate stress reactions, resulted in cardiac sensitization in dogs. Following repeated inhalation exposure, no adverse effects were observed in rats. No birth defects were noted in the offspring of rats or rabbits exposed by inhalation during pregnancy. No genetic changes were observed in standard tests using bacteria, animal cells or whole animals. Single exposure (acute) studies indicate Inhalation - Practically Non- Toxic to Rats (4-hr LC50>800,000 ppm)

13. DISPOSAL CONSIDERATIONS

Waste Disposal

Recover, reclaim or recycle when practical. Dispose of in accordance with country and local regulations.

Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from country laws and regulations.

14. TRANSPORTATION INFORMATION

DOT Name Refrigerant Gas R404A
DOT Technical Name 1,1,1,2-tetrafluoroethane/ Pentafluoroethane / 1,1,1-Trifluoroethane
DOT Hazard Class 2.2
UN Number UN 3337
DOT Packing Group PG NA

15. REGULATORY INFORMATION

Hazard Categories Under Criteria of SAVA Title III Rules (40 CFR Part 370)

Immediate (Acute) Health : Yes
Fire : No
Delayed (Chronic) Health : No
Reactivity : No
Sudden Release of Pressure : Yes

16. OTHER INFORMATION

Information in this publication is believed to be accurate and is given in good faith, but it is for the Customer to satisfy itself of the suitability for its own particular purpose. Accordingly, UNIFORM REFRIGERATION & AIR-CONDITIONING SUPPLY, INC. gives no warranty as to the fitness of the Product for any particular purpose and any implied warranty or condition (statutory or otherwise) is excluded except to the extent that such exclusion is prevented by law. Freedom under Patent, Copyright and Designs cannot be assumed.

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