

COOLING SUPPLIES

REFRIGERANT HFC-407F

Material Safety Data Sheet

Date Prepared: 27/07/2021

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT INFORMATION:

Name: HFC-407F, R407F

Use: Refrigerant

Formula: CF₃-CHF₂/CH₂F-CF₃/CH₂F₂

DISTRIBUTOR INFORMATION:

ILYS Ltd t/a Cooling Supplies

11A King St

Rangiora

New Zealand

Ph: 0274 746 786

Fax: 03 313 7631

EMERGENCY TELEPHONE NUMBER 0800 746 786 (NZ only)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components:

Material	CAS Number	%
PENTAFLUOROETHANE (HFC-125)	354-33-6	30
ETHANE, 1,1,1,2-TETRAFLUORO- (HFC-134a)	811-97-2	40
DIFLUOROMETHANE (HFC-32)	75-10-5	30

3. HAZARDS IDENTIFICATION

Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO HAZARDOUS SUBSTANCES [CLASSIFICATION] REGULATIONS 2001

HSNO classifications

H280 - Liquefied Gas. Contains gas under pressure; may explode if heated.

GHS Label elements

Signal word: WARNING

Pictograms



Hazard Statements

H280 Contains gas under pressure; may explode if heated.

Prevention statements

P103 Read label before use.

GHS Label elements (cont'd)

Response statements

None allocated.

Storage statements

P410 + P403 Protect from sunlight. Store in a well-ventilated place.

Disposal statements

None allocated.

Potential Health Effects

INHALATION

Inhalation of high concentrations of vapor may cause heart irregularities, unconsciousness, or death. Intentional misuse or deliberate inhalation may cause death without warning. Vapor reduces oxygen available for breathing and is heavier than air. Overexposure to the vapors by inhalation may include temporary nervous system depression with anesthetic effects such as dizziness, headache, confusion, incoordination, and loss of consciousness. Higher exposures to the vapors may cause temporary alteration of the heart's electrical activity with irregular pulse, palpitations, or inadequate circulation or fatality from gross overexposure. Increased susceptibility to the effects of this material may be observed in persons with pre-existing disease of the central nervous system, cardiovascular system.

SKIN CONTACT

Liquid contact can cause frostbite.

EYE CONTACT

"Frostbite-like" effects may occur if the liquid or escaping vapors contact the eyes.

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

4. FIRST AID MEASURES

INHALATION

If high concentrations are inhaled, immediately remove to fresh air. Keep person calm. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SKIN CONTACT

In case of contact, immediately flush area with lukewarm water while removing contaminated clothing and shoes. Do not use hot water. If frostbite has occurred, call a physician. Treat for frostbite if necessary by gently warming affected area.

EYE CONTACT

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

INGESTION

Ingestion is not considered a potential route of exposure.

Notes to Physicians

THIS MATERIAL MAY MAKE THE HEART MORE SUSCEPTIBLE TO ARRHYTHMIAS. Catecholamines such as adrenaline, and other compounds having similar effects, should be reserved for emergencies and then used only with special caution.

5. FIRE FIGHTING MEASURES

Flammable Properties

Flash Point: No flash point

Flammable Limits in Air, % by Volume:

LEL: None per ASTM E681

UEL: None per ASTM E681

Auto ignition: Not determined

Fire and Explosion Hazards:

Cylinders may rupture under fire conditions. Decomposition may occur. Contact of welding or soldering torch flame with high concentrations of refrigerant can result in visible changes in the size and color of torch flames. This flame effect will only occur in concentrations of product well above the recommended exposure limit, therefore stop all work and ventilate to disperse refrigerant vapors from the work area before using any open flames.

HFC-407C is not flammable in air at temperatures up to 100 deg. C (212 deg. F) at atmospheric pressure. However, mixtures of HFC-407C with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. HFC-407C can also become combustible in an oxygen enriched environment (oxygen concentrations greater than that in air). Whether a mixture containing HFC-407C and air, or HFC-407C in an oxygen enriched atmosphere become combustible depends on the inter-relationship of:

- 1) the temperature
- 2) the pressure, and
- 3) the proportion of oxygen in the mixture.

In general, HFC-407C should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. For example HFC-407C should NOT be mixed with air under pressure for leak testing or other purposes. Experimental data have also been reported which indicate combustibility of HFC-407C in the presence of certain concentrations of chlorine.

Extinguishing Media

Use media appropriate for surrounding material.

Fire Fighting Instructions

Cool tank/container with water spray. Self-contained breathing apparatus (SCBA) may be required if cylinders rupture or release under fire conditions. Water runoff should be contained and neutralized prior to release.

6. ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Please review the FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up. Ventilate area, especially low or enclosed places where heavy vapors might collect. Remove open flames. Use self-contained breathing apparatus (SCBA) if large spill or leak occurs.

7. HANDLING AND STORAGE

Handling (Personnel)

Avoid breathing vapor. Avoid liquid contact with eyes and skin. Use with sufficient ventilation to keep employee exposure below recommended limits.

Handling (Physical Aspects)

HFC-407C should not be mixed with air for leak testing or used for any other purpose above atmospheric pressure. See Flammable Properties section. Contact with chlorine or other strong oxidizing agents should also be avoided.

Storage

Store in a clean dry place. Do not heat above 52 C (126 F). Valve protection caps and valve outlet threaded plugs 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. Never attempt to lift cylinder by its cap. Use a pressure reducing regulator when connecting cylinder to lower pressure (>3000 psig) piping or systems. Do NOT heat cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Separate full containers from empty containers. Storage area temperatures should not exceed 126 deg F (52 deg C) and should be free of combustible materials. Avoid area where salt or other corrosive materials are present. Avoid excessive inventory and storage time. Use a first-in first-out system. Keep accurate inventory records.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Normal ventilation for standard manufacturing procedures is generally adequate. Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low or enclosed places. Refrigerant concentration monitors may be necessary to determine vapor concentrations in work areas prior to use of torches or other open flames, or if employees are entering enclosed areas.

Personal Protective Equipment

Impervious gloves and chemical splash goggles should be used when handling liquid. Under normal manufacturing conditions, no respiratory protection is required when using this product. Self-contained breathing apparatus (SCBA) is required if a large release occurs.

Exposure Limits

HFC-125

PEL (OSHA): None Established

TLV (ACGIH): None Established

AEL: 1000 ppm, 8 & 12 Hr. TWA

WEEL (AIHA): 1000 ppm, 4900 mg/m³, 8 Hr. TWA

HFC-134A

PEL (OSHA): None Established

TLV (ACGIH): None Established

AEL: 1000 ppm, 8 & 12 Hr. TWA

WEEL (AIHA): 1000 ppm, 8 Hr. TWA

HFC-32

AEL: 1000 ppm, 8 & 12 Hr. TWA

WEEL (AIHA): 1000 ppm, 8 Hr. TWA

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Boiling Point: -45.5 C (-47 F) Average

Vapor Pressure: 11.4 bar(a) 20 °C (68 °F)

% Volatiles: 100 WT%

Evaporation Rate: (Cl₄ = 1), Greater than 1

Solubility in Water: Not determined

Odour: Slight ethereal

Form: Liquefied gas

Colour: Clear, colourless

Critical Temperature: 82.6 °C

10. STABILITY AND REACTIVITY

Chemical Stability

Stable.

Conditions to Avoid

Avoid open flames and high temperatures.

Incompatibility with Other Materials

Incompatible with alkali or alkaline earth metals - powdered Al, Zn, Be, etc.

Decomposition

Decomposition products are hazardous. This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid and possibly carbonyl fluoride. These materials are toxic and irritating. Contact should be avoided.

Polymerization

Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

Animal Data

HFC-125

Inhalation:

4 hour, ALC, rat: > 709,000 ppm (Very low toxicity).

Single exposure to high doses caused: lethargy, labored breathing, weak cardiac sensitization, a potentially fatal disturbance of heart rhythm caused by a heightened sensitivity to the action of epinephrine. Repeated exposure caused: no significant toxicological effects. Lowest-Observed-Adverse-Effect-Level for cardiac sensitization: 100,000 ppm.

No-Observed-Adverse-Effect-Level (NOAEL): 50,000 ppm

Additional Toxicological Effects:

No animal data are available to define the following effects of this material: carcinogenicity, reproductive toxicity. In animal testing this material has not caused developmental toxicity. Tests have shown that this material does not cause genetic damage in bacterial or mammalian cell cultures, or in animals. This material has not been tested for its ability to cause permanent genetic damage in reproductive cells of mammals (not tested for heritable genetic damage).

HFC-134a

Inhalation:

4 hour, ALC, rat: 567,000 ppm.

Single exposure caused: Cardiac sensitization, a potentially fatal disturbance of heart rhythm associated with a heightened sensitivity to the action of epinephrine. Lowest-Observed-Adverse-Effect-Level for cardiac sensitization: 75,000 ppm. Single exposure caused: Lethargy, Narcosis, Increased respiratory rates. These effects were temporary. Single exposure to near lethal doses caused: Pulmonary edema. Repeated exposure caused: Increased adrenals, liver, spleen weight. Decreased uterine, prostate weight. Repeated dosing of higher concentrations caused the following temporary effects: Tremors, Incoordination.

Carcinogenic, Developmental, Reproductive, Mutagenic Effects:

In a two-year inhalation study, HFC-134a, at a concentration of 50,000 ppm, produced an increase in late-occurring benign testicular tumors, testicular hyperplasia and testicular weight. The no-effect-level for this study was 10,000 ppm. Animal data show slight fetotoxicity but only at exposure levels producing other toxic effects in the adult animal. Reproductive data on male mice show: No change in reproductive performance. Tests have shown that this material does not cause genetic damage in bacterial or mammalian cell cultures, or in animals. In animal testing, this material has not caused permanent genetic damage in reproductive cells of mammals (has not produced heritable genetic damage).

HFC-32

Inhalation:

4 hour-ALC: > 520,000 ppm in rats

Single exposure caused: Lethargy. Spasms. Loss of mobility in the hind limbs. Other effects include weak cardiac sensitization, a potentially fatal disturbance of heart rhythm caused by a heightened sensitivity to the action of epinephrine. 250,000 ppm. Repeated exposure caused pathological changes of the lungs, liver, spleen, kidneys. In more recent studies repeated exposure caused: No significant toxicological effects. No-Observed-Effect-Level (NOEL): 49,100 ppm.

No animal data are available to define the following effects of this material: carcinogenicity, reproductive toxicity. Animal data show slight fetotoxicity but only at exposure levels producing other toxic effects in the adult animal. Tests have shown that this material does not cause genetic damage in bacterial or mammalian cell cultures, or in animals. This material has not been tested for its ability to cause permanent genetic damage in reproductive cells of mammals (not tested for heritable genetic damage).

12. ECOLOGICAL INFORMATION

ECO-TOXICOLOGICAL INFORMATION

Aquatic Toxicity:

HFC-134a

LC50 (96 hours) Fish 450mg/L

EC50 (48 hours) Crustacea 980mg/L

EC50 (72 hours) Algae or other aquatic plants >114mg/L

NOEC (72 hours) Algae or other aquatic plants ca.13.2mg/L

HFC-125

LC50 (96 hours) Fish >81.8mg/L

EC50 (48 hours) Crustacea >97.9mg/L

EC50 (72 hours) Algae or other aquatic plants >114mg/L

NOEC (72 hours) Algae or other aquatic plants ca.13.2mg/L

HFC-32

LC50 (96 hours) Fish >81.8mg/L

EC50 (48 hours) Crustacea >97.9mg/L

EC50 (72 hours) Algae or other aquatic plants >114mg/L

NOEC (72 hours) Algae or other aquatic plants ca.13.2mg/L

Persistence and degradability:

Ingredient	Persistence: Water/Soil	Persistence: Air
R-134A	HIGH	HIGH
R125	HIGH	HIGH
R32	LOW	LOW

Bio-accumulative potential:

Ingredient	Bioaccumulation
R-134A	LOW (LogKOW = 1.68)
R125	LOW (LogKOW = 1.5472)
R32	LOW (LogKOW = 0.2)

Mobility in soil:

Ingredient	Mobility
R-134A	LOW (KOC = 96.63)
R125	LOW (KOC = 154.4)
R32	LOW (KOC = 23.74)

13. DISPOSAL CONSIDERATIONS

Waste Disposal

Comply with Federal, State, and local regulations. Reclaim by distillation or remove to a permitted waste disposal facility.

14. TRANSPORTATION INFORMATION

Shipping Information

Proper Shipping Name: Refrigerant Gas R407F

Hazard Class: 2.2

HAZCHEM code: 2TE

UN No: 3163

Marine Pollutant: No

Label(s): Nonflammable Gas



Shipping Containers: Tank Cars, Cylinders, Ton Tanks

15. REGULATORY INFORMATION

Approval code: HSR002533

Group standard: Compressed Gases (Non-hazardous) Group Standard 2006

Inventory listing(s): NEW ZEALAND: NZIoC (New Zealand Inventory of Chemicals)

All components are listed on the NZIoC inventory, or are exempt.

U.S. Federal Regulations

TSCA Inventory Status: Reported/Included

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute: Yes

Chronic: Yes

Fire: No

Reactivity: No

Pressure: Yes

HAZARDOUS CHEMICAL LISTS

SARA Extremely Hazardous Substance: No

CERCLA Hazardous Substance: No

SARA Toxic Chemical: No

16. OTHER INFORMATION

**NFPA, NPCA-HMIS
NPCA-HMIS Rating**

**Health: 1
Flammability: 0
Reactivity: 1**

Personal Protection rating to be supplied by user depending on use conditions.

Additional Information

MEDICAL USE

CAUTION: Do not use in medical applications involving permanent implantation in the human body.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process. This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS