MATERIAL SAFETY DATA SHEET (MSDS)

R407C

Please ensure that this MSDS is received by the appropriate person.

DATE: October 2023

1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT IDENTIFICATION

Product Name	R407C
Chemical Formula	CH2F2, CF3CH2F, CH2CF3
Trade Name	R407C
Company Identification	**FRIOFLOR REFRIGERANTS** Suncity Sector 54 Gurugram, Haryana 122003, INDIA

2 COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS NUMBER	WEIGHT%
Difluoromethane (HFC-32)	75-10-5	23
Pentafluoroethane (HFC-125)	354-33-6	25
1,1,1,2-Tetrafluoroethane (HFC-134a)	811-97-2	52

COMMON NAME and SYNONYMS

R-407C , CH2F2, CF3CH2F, CH2CF3

3 HAZARDS IDENTIFICATION

Main Hazards: All cylinders are portable gas containers and must be regarded as pressure vessels at all times.

Adverse Health effects: Contains a liquefied gas. Contact with liquid may cause frostbite and injury to the cornea.

Chemical hazards. **Heating will cause a rise in pressure with a risk of the cylinders bursting. On Combustion, toxic gases are released.**

Biological hazards: Contact with liquid could cause frost burns.

Vapour Inhalation: High exposures may cause an abnormal heart rhythm and prove suddenly fatal. May have a narcotic effect, very high concentrations may cause anaesthetic effects and asphyxiation.

Eye Contact: Liquid contact can cause severe irritation and frostbite. Mist may irritate.

Skin Contact: Irritation would result from defatting action on tissue. Liquid contact cause frostbite.

Ingestion: Ingestion is unlikely because of the physical properties and is not expected to be hazardous.
Do not induce vomiting unless instructed to do so by a physician.

4 FIRST AID MEASURES

Prompt medical attention is mandatory in all cases of overexposure to vaporised R407C. Rescue personnel should be equipped with self-contained breathing apparatus. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be removed to an uncontaminated area
and given mouth-to-mouth resuscitation and supplemental oxygen. The use of adrenaline or similar drugs should be avoided.

5 FIRE FIGHTING MEASURES

Extinguishing media All extinguishing agents can be used. If there is a fire close by, use suitable extinguishing agents.

Specific hazards. Pressurised container. On heating there is a risk of bursting due to internal pressure build-up NOT flammable. However, it may present a risk in the event of fire. Toxic vapours (Halogen compounds are released).

Emergency Actions Stay upwind. Evacuate the personnel away from the fumes. Cool down the containers/equipment exposed to heat with a water spray.

Protective clothing Self-contained breathing apparatus. Safety gloves and shoes, or boots, should be worn when handling cylinders.

Environmental precautions Prevent the product from spreading into the environment

6 ACCIDENTAL RELEASE MEASURES

Personal precautions. Avoid contact with skin and eyes. Do not breathe gas. For further information refer to 8 “Exposure-controls/Personal Protection” Heavy vapours. Shut off low-level openings in the vicinity (ventilation shafts, drains) Prevent the product from entering cellars, basements of pits. Stop the leak. Ventilate spillage area and basements.

Environmental precautions. Prevent the product from spreading into the environment.

Small spills. Shut off source of product. Ventilate area

Large spills. Evacuate the area. Shut off the source of the spill if this can be done without risk. Restrict access to the area until completion of the clean-up procedure. Ventilate the area using forced-draught if necessary.

7 HANDLING AND STORAGE

Store in a cool, well ventilated area of low fire risk and out of direct sunlight. Use only properly specified equipment, which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Refer to supplier’s container handling instructions. Do not allow cylinders to slide or come into contact with sharp edges. Cylinders should be stacked vertically at all times and should be firmly secured in order to prevent them from being knocked over. Use a “first in - first out” inventory system to prevent full cylinders from being stored for excessive periods of time. Keep out of reach of children.

R407C should not be mixed with air above atmospheric pressure for leak testing or any other purpose.

INCOMPATIBILITIES: Freshly abraded aluminium surfaces at specific temperatures and pressures may cause a strong exothermic reaction. Chemically reactive metals: Potassium, calcium, powdered aluminium, magnesium and zinc.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory protection: None generally required for adequately ventilated work situations. For accidental release or non-ventilated situations, or release into confined space, where the concentration may be above the PEL of 1,000 ppm, use a self-contained, NIOSH approved breathing apparatus or supplied air respirator. For escape: use the former or a NIOSH-approved gas mask with organic vapor canister.

Engineering control measures: Provide local ventilation at filling zones and areas where leakage is probable. Mechanical (general) ventilation may be adequate for other operating and storage areas.

Eye protection: For normal conditions, wear safety glasses. Where there is reasonable probability of liquid contact, wear chemical safety goggles.

Skin: Skin contact with refrigerant may cause frostbite. General work work clothing and gloves (leather) should provide adequate protection. If prolonged contact with the liquid or gas is anticipated, insulated gloves constructed of PVA, neoprene or butyl rubber should be used. Any contaminated clothing should be promptly removed and washed before reuse.

9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DATA

APPEARANCE: Clear, colorless liquid and vapor
PHYSICAL STATE: Gas at ambient temperatures
MOLECULAR WEIGHT: 86.2
CHEMICAL FORMULA: CH2F2, CF3CH2F, CH2CF3
ODOR: Faint ethereal odor
SPECIFIC GRAVITY (water = 1.0): 1.16 @ 21.1□C (70□F)
SOLUBILITY IN WATER (weight %): Unknown
pH: Neutral
BOILING POINT: -43□C (-45.4□F)
FREEZING POINT: Not determined
VAPOR PRESSURE: 156.2 psia @ 70F 356.7 psia @ 130F
VAPOR DENSITY (air = 1.0): 3.0
EVAPORATION RATE: >1COMPARED TO: CC14 = 1
% VOLATILES: 100
ODOR THRESHHOLD: Not established
FLAMMABILITY: Not applicable
LEL/UEL: None/None
RELATIVE DENSITY: 1.16 g/cm3 at 21.1 C
PARTITION COEFF (n-octanol/water): Not applicable
AUTO IGNITION TEMP: Not Determined
DECOMPOSITION TEMPERATURE: >250˚C
VISCOSITY: Not applicable
FLASH POINT: Not applicable
(Flash point method and additional flammability data are found in Section 5.)

10 STABILITY AND REACTIVITY

Normally stable? (conditions to avoid): The product is stable. Do not mix with oxygen or air above atmospheric pressure. Any source of high temperature, such as lighted cigarettes, flames, hot spots or welding may yield toxic and/or corrosive decomposition products.
Incompatibilities: (Under specific conditions: e.g. very high temperatures and/or appropriate pressures) – Freshly abraded aluminum surfaces (may cause strong exothermic reaction). Chemically active metals: potassium, calcium, powdered aluminum, magnesium and zinc.

HAZARDOUS DECOMPOSITION PRODUCTS: Halogens, halogen acids and possibly carbonyl halides**.**

HAZARDOUS POLYMERIZATION: Will not occur.

11 TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS: HFC-32:LC50: Inhalation 4 hr. (rat) - 520,000 ppm / Cardiac Sensitization threshold (dog) 350,000 ppm
HFC-125: LC50: Inhalation 4 hr. (rat) - > 800,000 ppm / Cardiac Sensitization threshold (dog) 75,000 ppm
HFC-134a: LC50: Inhalation 4 hr. (rat) - > 500,000 ppm / Cardiac Sensitization threshold (dog) > 80,000 ppm
DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:
HFC-32: Teratogenic NOEL (rat and rabbit) – 50,000 ppm
Subchronic inhalation (rat) NOEL – 50,000 ppm
HFC-125: Teratogenic NOEL (rat and rabbit) – 50,000 ppm
Subchronic inhalation (rat) NOEL - > 50,000 ppm
Chronic NOEL – 10,000 ppm
HFC-134a: Teratogenic NOEL (rat and rabbit) – 40,000 ppm
Subchronic inhalation (rat) NOEL – 50,000 ppm
Chronic NOEL – 10,000 ppm

REPEATED DOSE TOXICITY:
Lifetime inhalation exposure of male rats was associated with a small increase in salivary gland fibrosarcomas.

OTHER DATA:
HFC-32, HFC-125, HFC-134a: Not active in four genetic studies

FURTHER INFORMATION:
Acute effects of rapid evaporation of the liquid may cause frostbite. Vapors are heavier than air and can displace oxygen causing difficulty breathing or suffocation. May cause cardiac arrhythmia.

POTENTIAL HEALTH HAZARDS

SKIN: Irritation would result from a deflating action on tissue. Liquid contact could cause frostbite.

EYES: Liquid contact can cause severe irritation and frostbite. Mist may irritate.

INHALATION: R-407C is low in acute toxicity in animals. When oxygen levels in air are reduced to 12-14% by displacement, symptoms of asphyxiation, loss of coordination, increased pulse rate and deeper respiration will occur. At high levels, cardiac arrhythmia may occur.

INGESTION: Ingestion is unlikely because of the low boiling point of the material. Should it occur, discomfort in the gastrointestinal tract from rapid evaporation of the material and consequent evolution of gas would result. Some effects of inhalation and skin exposure would be expected.

DELAYED EFFECTS: None known.

Ingredients found on one of the OSHAct designated carcinogen lists are listed below.

INGREDIENT NAME	NTP STATUS	IARC STATUS
No ingredients listed in this section		

12 ECOLOGICAL INFORMATION

Degradability (BOD): R-407C is a gas at room temperature; therefore, it is unlikely to remain in water.

Octanol Water Partition Coefficient: Unknown for mixture.

13 DISPOSAL CONSIDERATIONS

RCRA
Is the unused product a RCRA hazardous waste if discarded?
Not a hazardous waste.
If yes, the RCRA ID number is: Not applicable.

OTHER DISPOSAL CONSIDERATIONS:
Disposal must comply with federal, state, and local disposal or discharge laws. R-407C is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling.

The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the properdisposal method.

14 TRANSPORT INFORMATION

ROAD TRANSPORTATION

UN No.	3340
ERG No	126
Hazchem warning	2.2 Non-flammable gases

SEA TRANSPORTATION

IMDG	3340
Class	2.2
Label	Non-flammable gas

AIR TRANSPORTATION

ICAO/IATA Code	3340
Class	2.2
Packing instructions	

15 REGULATORY INFORMATION

EEC Hazard class: Non-flammable gas

National legislation: OHSact and Regulations 85 of 1993.
Reference: SANS 10234 and its supplement.

16 OTHER INFORMATION

Other Special Considerations: No known data.

EXCLUSION OF LIABILITY

Information contained in this publication is accurate at the date of publication. The company does not accept liability arising from the use of this information, or the use, application, adaptation or process of any products described herein.