

## MATERIAL SAFETY DATA SHEET

### R-407C

Issue Date: 2<sup>nd</sup> August 2020

#### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** R-407C  
**SUPPLIER:** Dynaflor Co. Ltd., Nana Bhai Lane Fort,  
Mumbai - 400 001, India

#### 2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS #	WEIGHT %	COMMON NAME
PENTAFLUOROETHANE (HFC-125)	354-33-6	25%	HFC-125
ETHANE, 1,1,1,2-TETRAFLUORO	811-97-2	52%	HFC-134A
DIFLUOROMETHANE	75-10-5	23%	HFC-32

#### 3. HAZARDS IDENTIFICATION



##### POTENTIAL HEALTH EFFECTS:

Inhalation of high concentrations of vapor is harmful and 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. Liquid contact can cause frostbite.

##### HUMAN HEALTH EFFECTS:

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

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electrical activity with irregular pulse, palpitations, or inadequate circulation; or fatality from gross overexposure. Contact with the liquid may cause frostbite. Individuals with preexisting Diseases of the central nervous or cardiovascular system may have increased susceptibility to the toxicity of increased exposures.

### 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 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:** Flush area with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician.
- EYE CONTACT:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
- INGESTION:** Not a probable route. However, in case of accidental ingestion, call a physician.

### NOTES TO PHYSICIANS:

THIS MATERIAL MAY MAKE THE HEART MORE SUSCEPTIBLE TO ARRHYTHMIAS. Catecholamine's 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:

- |  |  |
|--|--|
| <b>FLASH POINT:</b>                          | No flash point   |
| <b>FLAMMABLE LIMITS IN AIR, % BY VOLUME:</b> | <b>LEL:</b> None per ASTM E681<br><b>UEL:</b> None per ASTM E681 |
| <b>AUTOIGNITION:</b>                         | Not determined   |

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### **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.

R-407C is not flammable in air at temperatures up to 100 deg C (212 deg F) at atmospheric pressure. However, mixtures of R-407C with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. R-407C can also become combustible in an oxygen enriched environment (oxygen concentrations greater than that in air). Whether a mixture containing R-407C and air, or R-407C in an oxygen enriched atmosphere becomes combustible depends on the inter-relationship of 1) the temperature 2) the pressure, and 3) the proportion of oxygen in the mixture. In general, R-407C should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. For example: R-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-134a, a component in this blend, in the presence of chlorine.

Extinguishing Media As appropriate for combustibles in area.

Fire Fighting Instructions Cool cylinder with water spray or fog. Self-contained breathing apparatus (SCBA) is required if cylinders rupture and contents are released under fire conditions. Water runoff should be contained and neutralized prior to release.

### **6. ACCIDENTAL RELEASE MEASURES**

#### **SAFEGUARDS (PERSONNEL):**

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

#### **ACCIDENTAL RELEASE MEASURES:**

Ventilate area, especially low or enclosed places where heavy vapors might collect. Remove open flames. Use self-contained breathing apparatus (SCBA) for large spills or releases.



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## 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. Contact with chlorine or other strong oxidizing agents should also be avoided. See Fire and Explosion Data section.

### STORAGE:

Clean, dry area. Do not heat above 52 deg C (125 deg F).

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### ENGINEERING CONTROLS

Avoid breathing vapors. Avoid contact with skin or eyes. Use with sufficient ventilation to keep employee exposure below the recommended exposure limit. Local exhaust should be used if large amounts are released. Mechanical ventilation should be used in low or enclosed places.

### PERSONAL PROTECTIVE EQUIPMENT

Impervious gloves should be used to avoid prolonged or repeated exposure. Chemical splash goggles should be available for use as needed to prevent eye contact. 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 GUIDELINES:

#### APPLICABLE EXPOSURE LIMITS

##### PENTAFLUOROETHANE (HFC-125)

<b>PEL (OSHA):</b>	None Established
<b>TLV (ACGIH):</b>	None Established
<b>WEEL (AIHA):</b>	1000 ppm, 4900 mg/m <sup>3</sup> , 8 Hr. TWA ETHANE, 1, 1, 1, 2-TETRAFLUORO- (HFC-134a)

<b>PEL (OSHA):</b>	None Established
<b>TLV (ACGIH):</b>	None Established
<b>WEEL (AIHA):</b>	1000 ppm, 8 Hr. TWA DIFLUOROMETHANE (HFC-32)

<b>WEEL (AIHA):</b>	1000 ppm, 8 Hr. TWA
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### 9. PHYSICAL AND CHEMICAL PROPERTIES

#### PHYSICAL DATA:

<b>BOILING POINT:</b>	-43.9 C (-47 F) Average
<b>VAPOR PRESSURE:</b>	171.8 psia 25 C (77 F)
<b>% VOLATILES:</b>	100 WT%
<b>EVAPORATION RATE:</b>	(Cl4 = 1) Greater than 1
<b>SOLUBILITY IN WATER:</b>	Not determined
<b>ODOR:</b>	Slight ethereal
<b>FORM:</b>	Liquefied gas
<b>COLOR:</b>	Clear, colorless
<b>SPECIFIC GRAVITY:</b>	1.136 @ 25 C (77 F)

### 10. STABILITY AND REACTIVITY

#### CHEMICAL STABILITY:

Material is stable. However, avoid open flames and high temperatures. Incompatibility with Other Materials Incompatible with active metals, alkali or alkaline earth metals--powdered Al, Zn, Be, etc.

#### DECOMPOSITION:

Decomposition products are hazardous.

#### POLYMERIZATION:

Polymerization will not occur.

### 11. TOXICOLOGICAL INFORMATION

#### ANIMAL DATA

THE BLEND IS UNTESTED.

HFC-125

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INHALATION 4 HOUR ALC: > 709,000 ppm in rats Single, high inhalation exposures caused lethargy, decreased activity, labored breathing and weight loss. Weak cardiac sensitization effect, a potentially fatal disturbance of heart rhythm caused by a heightened sensitivity to the action of epinephrine. Lowest-Observed-Adverse-Effect-Level for cardiac sensitization: 100,000 ppm. REPEATED EXPOSURE CAUSED: No significant toxicological effects.

NO-OBSERVED-ADVERSE-EFFECT-LEVEL (NOAEL): 50,000 ppm

No animal data are available to define carcinogenic, developmental or reproductive hazards. In animal testing this material has not caused developmental toxicity. HFC-125 does not produce genetic damage in bacterial or mammalian cell cultures or when tested in animals (not tested for heritable genetic damage).

### HFC-134a

Inhalation 4-hour LC50: 567,000 ppm in rats 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).

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### 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

### ECOTOXICOLOGICAL INFORMATION

#### HFC-134a

<b>48-HOUR EC50, DAPHNIA MAGNA:</b>	980 mg/L
<b>96-HOUR LC50, RAINBOW TROUT:</b>	450 mg/L

## 13. DISPOSAL CONSIDERATIONS

### WASTE DISPOSAL:

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

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### 14. TRANSPORTATION INFORMATION



<b>SHIPPING INFORMATION:</b>	DOT/IMO/IATA
<b>PROPER SHIPPING NAME:</b>	Refrigerant Gas R407C
<b>HAZARD CLASS:</b>	2.2
<b>UN No. :</b>	3340
<b>LABEL(S):</b>	Nonflammable Gas Shipping Containers Tank Cars. Cylinders Ton Tanks

### 15. REGULATORY INFORMATION

This safety data sheet is in compliance with the following EU legislation and its adaptations - as far as applicable -: 67/548/EEC, 1999/45/EC, 98/24/EC, 92/85/EC, 94/33/EC, 91/689/EEC, 1999/13/EC, Commission Regulation (EU) 2015/830, Regulation (EC) No 1272/2008 and their amendments as well as the following British legislation: - The Control of Substances Hazardous to Health Regulations (COSHH) 2002 - COSHH Essentials - The Management of Health and Safety at Work Regulations 1999.

### 16. OTHER INFORMATION

#### FULL TEXT RISK AND HAZARD CODES:

<b>H220:</b>	Extremely flammable gas.
<b>H224:</b>	Extremely flammable liquid and vapour.
<b>H312:</b>	Harmful in contact with skin.
<b>H370:</b>	Causes damage to organs.
<b>H371:</b>	May cause damage to organs.
<b>R12:</b>	Extremely flammable.
<b>R18:</b>	In use, may form flammable/ explosive vapour-air mixture
<b>R4:</b>	Forms very sensitive explosive metallic compounds.



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### DSD / DPD LABEL ELEMENTS:

Not Applicable

For detailed advice on Personal Protective Equipment, refer to the following EU CEN Standards: EN 166  
Personal eye-protection

<b>EN 340:</b>	Protective clothing
<b>EN 374:</b>	Protective gloves against chemicals and micro-organisms EN 13832 Footwear protecting against chemicals
<b>EN 133:</b>	Respiratory protective devices

### DEFINITIONS AND ABBREVIATIONS:

<b>PC-TWA:</b>	Permissible Concentration n-Time Weighted Average
<b>PC-STEL:</b>	Permissible Concentration-Short Term Exposure Limit IARC: International Agency for Research on Cancer
<b>ACGIH:</b>	American Conference of Governmental Industrial Hygienists
<b>STEL:</b>	Short Term Exposure Limit
<b>TEEL:</b>	Temporary Emergency Exposure Limit
<b>IDLH:</b>	Immediately Dangerous to Life or Health Concentrations
<b>OSF:</b>	Odour Safety Factor
<b>NOAEL:</b>	No Observed Adverse Eff
<b>Level LOAEL:</b>	Lowest Observed Adverse Effect
<b>LEVEL TLV:</b>	Threshold Limit Value
<b>LOD:</b>	Limit of Detection
<b>OTV:</b>	Odour Threshold Value
<b>BCF:</b>	Bio Concentration Factors
<b>BEI:</b>	Biological Exposure Index

The MSDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.