

MATERIAL SAFETY DATA SHEET

R-410A

Issue Date: 2nd April 2020

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: R-410A
SUPPLIER: Dynaflo Co. Ltd., Nana Bhai Lane Fort,
Mumbai - 400 001, India

2. COMPOSITION/INFORMATION ON INGREDIENTS

The substance(s) marked with a "Y" in the OSHA column, are identified as hazardous chemicals according to the criteria of the OSHA Communication Standard (29 CFR 1910.1200) the components of this product are all on the TSCA inventory list.

3. HAZARDS IDENTIFICATION



POTENTIAL HEALTH EFFECTS:

Clear, Colorless liquid and vapor with a faint ethereal odor

WARNING! Liquid and gas under pressure, overheating and over pressurizing 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.

Skin contact and inhalation are expected to be the primary routes of occupational exposure to this material. As with most liquefied gases, contact with the rapidly volatilizing liquid or cold vapor can cause frostbite to any tissue. Based on single exposure animal tests, this material is considered to be practically non-toxic if inhaled. However, exposure to gas of this material at high concentrations may affect the nervous system and produce a rapid anesthetic effect. The dense vapor of this material can reduce the oxygen available for breathing and produce symptoms such as headache, dizziness, drowsiness, cyanosis and lack of muscle control followed by collapse. Prolonged exposure to an oxygen deficient



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PRODUCT SYNONYM(S): Hydrogenated Fluorocarbon Blend Chemical Family

MIXTURE CHEMICAL FORMULA: Pentafluoroethane (HFC - 125) 50/ Difluoromethane (HFC - 32) Blend 50.

4. FIRST AID MEASURES

EYES: Immediately flush with plenty of water. Get medical attention if irritation persists.

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.

SWALLOWED: Not applicable - product is a gas at ambient temperatures.

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

EXTINGUISHING MEDIA:

Use extinguishing agent suitable for type of surrounding fire.

FIRE FIGHTING INSTRUCTIONS:

Avoid contaminant with oxidizing agents like nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result. Wear breathing apparatus and protective gloves. Use water delivered as a fine spray to control fire and cool adjacent area.

FIRE/EXPLOSION HAZARD:

Use extinguishing media appropriate to surrounding fire conditions. 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 firefighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand NIOSH approved or equivalent). Firefighting equipment should be thoroughly decontaminated after use.

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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.

FIRE AND EXPLOSIVE PROPERTIES:

Adrenaline, which could result in irregular heartbeats and reduced heart function. Workers with heart disease or Compromised heart function should limit exposure to this material.

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.

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):

Use with sufficient ventilation to keep employee exposure below recommended limits.

HANDLING (PHYSICAL ASPECTS):

Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open. Such compounds should be sited and built in accordance with statutory requirements. The storage compound should be kept clear and access restricted to authorize personnel only. Cylinders stored in the open should be protected against rust and extremes of weather.

STORAGE: Store in a clean, dry place.



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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 CONTROLS:

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

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Ethane, pentafluoro-Methane, difluoride- Airborne Exposure Guidelines for Ingredients

- 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.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE/ODOR:	Colourless liquefied gas with slight ethereal odour
SPECIFIC GRAVITY:	1.06 @ 4 C
VAPOR PRESSURE	215.3 PSIA @ 70 F
VAPOR DENSITY	3.0
MELTING POINT	NA
FREEZING POINT	NE
BOILING POINT	- 52.8 C
SOLUBILITY IN WATER	Unknown
MOLECULAR WEIGHT	72.59
BULK DENSITY	1.06 @ 25 C (g/cm ³)

10. STABILITY AND REACTIVITY

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.

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION:

ETHANE, PENTAFLUORO - Inhalation, followed by intravenous injection of epinephrine to simulate 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)

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METHANE, DIFLUORO - Inhalation, followed by intravenous injection of epinephrine to simulate stress reactions, resulted in cardiac sensitization in dogs. Acute inhalation of high concentrations has produced an anesthetic effect in rats. 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, even at dosages which produced significant adverse effects in the mother. 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 >520,000 ppm)

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.

INCOMPATIBILITY:

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

HAZARDOUS DECOMPOSITION PRODUCTS:

Clear, Colorless liquid and vapor with a faint ethereal odor. 5 Page of Product Code: 04003 Revision: 4 20 SEP 2001 Issued: 6 Material Safety Data Sheet

12. ECOLOGICAL INFORMATION

ECO TOXICOLOGICAL INFORMATION:

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. Methane, difluoro- The octanol/water partition coefficient (log POW) was 1.62 indicating a low bio concentration factor. In a 28-day ready biodegradability closed bottle test, it appeared to be stable.

CHEMICAL FATE INFORMATION:

No data are available.

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13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL:

Recover, reclaim or recycle when practical. Dispose of in accordance with federal, state 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 federal laws and regulations.

14. TRANSPORTATION INFORMATION



NOS DOT NAME:	Liquefied Gas
DOT TECHNICAL NAME:	Pentafluoroethane, Difluoromethane
DOT HAZARD CLASS:	2.2
UN NUMBER:	UN 3163
DOT PACKING GROUP:	NA

15. REGULATORY INFORMATION

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



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HAZARDOUS CHEMICAL LISTS

SARA EXTREMELY HAZARDOUS SUBSTANCE:	No
CERCLA HAZARDOUS SUBSTANCE:	No
SARA TOXIC CHEMICAL:	No

16. OTHER INFORMATIONS

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.
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17. DISCLAIMER

The information recommendations and suggestions herein were compiled from reference material and sources believed to be reliable. This MSDS is not intended as a license to operate under or recommendation to infringe on any patents. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Data contained is based on a worst case condition of one of the constituents used in the refrigerant.