

SAFETY DATA SHEET

FROSTBERG[®] R-134a



PRODUCT AND COMPANY IDENTIFICATION

Product name : Frostberg[®] R-134a
MSDS Number : 000000002157
Chemical Formula : CF₃CH₂F
Chemical Family : Hydrofluorocarbon (HFC)
Product Use Description : Refrigerant Propellant
Principle : **FROSTBERG INTERNATIONAL LLC**
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Delaware 19958, USA
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SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

| Chemical Name | CAS-No. | Concentration |
|---|----------|---------------|
| 1,1,1,2-Tetrafluoroethane HFC - 134a | 811-97-2 | 99.90 % |

SECTION 3. HAZARDS IDENTIFICATION

Emergency Overview

Form : Gas (Liquefied)
Color : Colorless
Odor : Weak

Classification of the substance

Classification of the Substance : Gas under pressure, Simple Asphyxiant
Liquefied gas

GHS Label elements, including precautionary statements

Symbol(s)



Signal word : Warning

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| | | |
|----------------------------------|---|--|
| Hazard statements | : | Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation. |
| Precautionary statements | : | Storage: Protect from sunlight. Store in a well-ventilated place. |
| Hazards not otherwise classified | : | May cause cardiac arrhythmia. May cause frostbite. |
| Carcinogenicity | : | No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP, IARC, or OSHA. |

SECTION 4. FIRST AID MEASURES

| | | |
|---------------------------|---|--|
| Skin contact | : | In case of skin contact, flush with plenty of water for 15 minutes. If there is evidence of frostbite, treat it by gently warming the affected area and contact physician. |
| Inhalation | : | Remove from exposure immediately. Move to fresh air. Provide artificial respiration if breathing is irregular or stopped. Consult a physician. |
| Eye contact | : | Immediately flush eyes with plenty of water, also under the eyelids for at least 15 minutes. In case of frostbite, wash with lukewarm (not hot) water. |
| Ingestion | : | Because the product is a gas at ambient temperature so ingestion is not applicable. |
| Notes to physician | : | Do not give drugs from adrenaline-ephedrine group. |
| Treatment | : | Because of the possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should be used with special caution and only in situations of emergency life support. Treatment of overexposure should be directed at the control of symptoms and the clinical conditions. Treat frost-bitten areas as needed. |

SECTION 5. FIREFIGHTING MEASURES

| | | |
|--------------------------------------|---|---|
| Suitable extinguishing media | : | The product is not flammable. Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. |
| Specific hazards during firefighting | : | Contents under high pressure. At ambient temperatures and atmospheric pressure, the product is not flammable. However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Cool closed containers exposed to fire with water spray. Do not allow run-off from fire-fighting to enter drains or water courses. Container may rupture on heating. In case of fire hazardous decomposition products may be produced such as: Hydrogen halides Hydrogen fluoride Carbon dioxide (CO ₂) Carbonyl halides Carbon monoxide |

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Special protective equipment for firefighters : Wear self-contained breathing apparatus and protective suit.
In the event of fire and/or explosion do not breathe fumes.
No area of the skin must be exposed.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Wear personal protective equipment. Unprotected person must be kept away.
Keep people away from spills and upwind of spill/leak.
Immediately evacuate personnel to safe areas.
Remove all sources of ignition.
Avoid skin contact with leaking liquid (danger of frostbite).
Ventilate the area.
After release, disperses into the air.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Avoid accumulation of vapours in low areas.
Ensure that the oxygen content is greater than or equal to 19.5%.
Unprotected personnel should not return until air has been tested and determined safe.

Environmental precautions : Prevent further leakage or spillage if safe to do so.
The product evaporates readily.

Methods for cleaning up : Ventilate the area.

SECTION 7. HANDLING AND STORAGE

Handling : Handle in accordance with good industrial hygiene and safety practice.
Avoid inhalation of vapour or mist.
Protect from sunlight and do not expose to temperatures exceeding 50 °C.
Wear personal protective equipment Use only in well-ventilated areas.
Pressurized container.
Follow all standard safety precautions for handling and use of compressed gas cylinders.
Use authorized cylinders only.
Protect cylinders from physical damage.
Do not puncture or drop cylinders, expose them to open flame or excessive heat.
Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material.
Do not remove screw cap until immediately ready for use.
Always replace cap after use.

Advice on protection against fire and explosion : At ambient temperature and pressure, this product is not flammable.
The product can form a combustible mixture with air at pressures above atmospheric pressure.

Storage

Requirements for storage areas and containers : Valve protection caps must be kept in place
Contents under high pressure. Protect from sunlight and do not expose to temperatures exceeding 50 °C
Do not pierce or burn, even after use.
Keep containers tightly closed in a dry, cool and well-ventilated place.
Storage rooms must be properly ventilated.
Ensure sufficient ventilation, especially in confined areas.
Protect cylinders from physical damage.
Cylinders should be stored upright.

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SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- Protective measures : Do not breathe vapour.
Avoid contact with skin, eyes and clothing.
Ensure that eyewash stations and safety showers are close to the workstation location.
- Engineering measures : General room ventilation is adequate for storage and handling.
- Eye protection : Wear as appropriate:
Safety glasses with side-shields
If splashes are likely to occur, wear:
Goggles or face shield, giving complete protection to eyes
- Hand protection : Leather gloves
In case of contact through splashing:
Protective gloves
Neoprene gloves
Polyvinyl alcohol or nitrile- butyl-rubber gloves
- Skin and body protection : Avoid skin contact with leaking liquid (danger of frostbite).
Wear cold insulating gloves/ face shield/ eye protection.
- Respiratory protection : In case of insufficient ventilation, wear suitable respiratory equipment.
Wear a positive-pressure supplied-air respirator.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
For rescue and maintenance work in storage tanks use self-contained breathing apparatus.
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
Ensure adequate ventilation, especially in confined areas.
Avoid contact with skin, eyes and clothing.
Remove and wash contaminated clothing before re-use.
Keep working clothes separately.

Exposure Guidelines

| Components | CAS-No. | Value | Control parameters | Update |
|---------------------------|----------|------------------------------------|----------------------------|--------|
| 1,1,1,2-Tetrafluoroetha | 811-97-2 | TWA time weighted average | (1,000 ppm) | |
| 1,1,1,2-Tetrafluoroethane | 811-97-2 | TWA time weighted average | 4,240 mg/m3 (1,000 ppm) | 2007 |

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Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act : On the inventory, or in compliance with the inventory

China. Inventory of Existing Chemical Substances : On the inventory, or in compliance with the inventory

NZIOC - New Zealand : On the inventory, or in compliance with the inventory

National regulatory information

SARA 302 Components : SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components : SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards : Acute Health Hazard
Sudden Release of Pressure Hazard

California Prop. 65 : This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

New Jersey RTK : 1,1,1,2-Tetrafluoroethane 811-97-2

Pennsylvania RTK : 1,1,1,2-Tetrafluoroethane 811-97-2

WHMIS Classification : A Compressed Gas
This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

Global warming potential : 1,300

Ozone depletion potential (ODP) : 0

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state : Gas (Liquefied)

Color : Colorless

Odor : Weak

pH : Neutral

Melting point/freezing point : -101 °C

Boiling point/boiling range : -26.2 °C

Flash point : Not applicable

Evaporation rate : > 1
Method: Compared to CCl₄.

Lower explosion limit : None

Upper explosion limit : None

Vapor pressure : 5,915 hPa
at 21.1 °C(70.0 °F)
14,713 hPa
at 54.4 °C(129.9 °F)

Vapor density : 3.5

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| Density | : | 1.2 g/cm ³ |
| Water solubility | : | 1.5 g/l |
| Partition coefficient: n-octanol/water | : | log Pow: 1.06 Note: The product is more soluble in octanol. |
| Ignition temperature | : | > 750 °C |
| Auto-ignition temperature | : | > 750 °C |
| Decomposition temperature | : | > 250 °C Note: To avoid thermal decomposition, do not overheat. |
| Molecular weight | : | 102.02 g/mol |
| Global warming potential (GWP) | : | 1,300 |
| Ozone depletion potential (ODP) | : | 0 |

SECTION 10. STABILITY AND REACTIVITY

| | | |
|------------------------------------|---|--|
| Chemical stability | : | Stable under normal conditions. |
| Possibility of hazardous reactions | : | Hazardous polymerisation does not occur. |
| Conditions to avoid | : | Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C. Decomposes under high temperature. Some risk may be expected of corrosive and toxic decomposition products. Can form a combustible mixture with air at pressures above atmospheric pressure. Do not mix with oxygen or air above atmospheric pressure. |
| Incompatible materials to avoid | : | Potassium Calcium Powdered metals Finely divided aluminum Magnesium Zinc |
| Hazardous decomposition products | : | Halogenated compounds Hydrogen fluoride Carbonyl halides Carbon oxides |

SECTION 11. TOXICOLOGICAL INFORMATION

| | | |
|---------------------------|---|---|
| Acute inhalation toxicity | : | LC50: > 500000 ppm Exposure time: 4 h Species: rat |
| Sensitisation | : | Cardiac sensitization Species: dogs Note: No-observed-effect level 50 000 ppm Lowest observable effect level 75 000 ppm |
| Repeated dose toxicity | : | Species: rat NOEL: 40000 ppm |
| Genotoxicity in vitro | : | Note: In vitro tests did not show mutagenic effects |
| Further information | : | Note: Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Rapid evaporation of the liquid may cause frostbite. Avoid skin contact with leaking liquid (danger of frostbite). |

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SECTION 12. ECOLOGICAL INFORMATION

Further information on ecology

Additional ecological information : Accumulation in aquatic organisms is unlikely.
This product contains greenhouse gases which may contribute to global warming. Do NOT vent to the atmosphere.
To comply with provisions of the U.S. Clean Air Act, any residual must be recovered.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods : Observe all Federal, State, and Local Environmental regulations.

Note : This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling.

SECTION 14. TRANSPORT INFORMATION

DOT

| | |
|----------------------|-----------------------------|
| UN/ID No. | : UN 3159 |
| Proper shipping name | : 1,1,1,2-Tetrafluoroethane |
| Class | : 2.2 |
| Packing group | |
| Hazard Labels | : 2.2 |

IATA

| | |
|--|-----------------------------|
| UN/ID No. | : UN 3159 |
| Description of the goods | : 1,1,1,2-Tetrafluoroethane |
| Class | : 2.2 |
| Hazard Labels | : 2.2 |
| Packing instruction (cargo aircraft) | : 200 |
| Packing instruction (passenger aircraft) | : 200 |

IMDG

| | |
|--------------------------|-----------------------------|
| UN/ID No. | : UN 3159 |
| Description of the goods | : 1,1,1,2-Tetrafluoroethane |
| Class | : 2.2 |
| Hazard Labels | : 2.2 |
| EmS Number | : F-C, S-V |
| Marine pollutant | : no |

SECTION 15. REGULATORY INFORMATION

Inventories

US. Toxic Substances Control Act : On TSCA Inventory

Australia. Industrial Chemical (Notification and Assessment) Act : On the inventory, or in compliance with the inventory

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Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL) : All components of this product are on the Canadian DSL.

Japan. Kashin-Hou Law List : On the inventory, or in compliance with the inventory

Korea. Toxic Chemical Control Law (TCCL) List : On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION

| | HMIS III | NFPA |
|-----------------|----------|------|
| Health hazard | 1 | 2 |
| Flammability | 1 | 1 |
| Physical Hazard | 0 | |
| Instability | | 0 |

Hazard rating and rating systems (e.g. HMIS® III, NFPA): This information is intended solely for the use of individuals trained in the particular system.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user.
All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.