

SAFETY DATA SHEET

FROSTBERG® R-407C



SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product name : FROSTBERG® R-407C
Product Use Description : Refrigerant
Principle : **FROSTBERG INTERNATIONAL LLC**
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Emergency number: + **971 56 502 1316**
Email: middleeast@frostbergint.com

SECTION 2: HAZARDS IDENTIFICATION

Form : Liquefied gas
Color : Colorless
Odor : Slight
Classification : Gases under pressure – Liquefied gas.

Label Elements

Symbol



Signal Word : Warning
Hazard Statement : Contains gas under pressure; may explode if heated.
Precautionary Statements : Protect from sunlight. Store in a well-ventilated place.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

Concentration

Substance Name	CAS No.	EC No.	Concentration
1,1,1,2-Tetrafluoroethane	811-97-2	212-377-0	52%
Pentafluoroethane	354-33-6	206-557-8	25%
Difluoromethane	75-10-5	200-839-4	23%

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Hazardous components according to Regulation (EC) 1272/2008 as amended

Substance name	Hazard Class	Hazard Category	H Phrases
1,1,1,2-Tetrafluoroethane	Gases under pressure	Liquefied gas	H 280
Pentafluoroethane	Gases under pressure	Liquefied gas	H 280
Difluoromethane	Flammable gases	Category 1	H 280
	Gases under pressure	Liquefied gas	H 280

SECTION 4: FIRST AID MEASURES

Inhalation	Remove to fresh air. Oxygen or artificial respiration if needed. If symptoms persist, call the physician.
Skin Contact	After contact with skin, wash immediately with plenty of water. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. If symptoms persist, call a physician.
Eye Contact	Immediately irrigate with eyewash solution or clean water, holding the eyelids apart for at least 10 minutes. Obtain immediate medical attention.
Ingestion	Unlikely Route of exposure
Treatment	Because of the possible disturbance 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: FIRE-FIGHTING MEASURE

Extinguishing Media	
Suitable Extinguishing Media	As appropriate for surrounding fire. Keep fire exposed containers cool by spraying with water.
Unsuitable Extinguishing Media	None.
Specific Hazard Arising From The Chemical	The product is not flammable. Hazardous decomposition products formed under fire conditions.
Special Protective Actions For Fire-Fighters	Wear self-contained breathing apparatus and protective suit. Wear chemical resistant over suit. Special protective actions for fire-fighters. In case of fire, use water spray. Keep product and empty container away from heat and sources of ignition.

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SECTION 6: ACCIDENTAL RELEASE MEASURE

	Immediately evacuate personnel to safe areas.
	Keep people away from and upwind of spill/leak.
	Wear personal protective equipment.
	Unprotected persons must be kept away.
	Remove all source of ignition.
	Avoid skin contact with leaking liquid (danger of frostbite).
	Ventilate the area.
	Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing.
	Avoid accumulation of vapors in low areas.
	Unprotected personnel should not return until air has been tested and determined safe.
	Ensure that the oxygen content is $\geq 19.5\%$
Environmental	Prevent further leakage or spillage if safe to do so.
Precautions	The product evaporates readily.
Methods For Cleaning Up	Ventilate the area.
	Prevent product from entering drains.

SECTION 7: HANDLING AND STORAGE

Handling	Use only in well-ventilated areas.
	Use only clean and dry utensils.
	Keep away from water.
	Preferably transfer by pump or gravity.
	Keep away from incompatible products.
Storage	Keep only in the original container.
	Store in a reachable equipped with a vent.
	Keep containers tightly closed in a cool, well-ventilated place.
	Keep in properly labelled containers.
	Protect cylinders from physical damage. Away from heat/ sparks/ open flames/ hot surfaces.
Packing Material	Suitable material – steel cylinder

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Control Parameters Guidelines

Substance name	Acceptable exposure limit	EH40 workplace exposure limits
1,1,1,2-Tetrafluoroethane	TWA = 1000 ppm	TWA = 1000 ppm / 4240 mg/m ³
Pentafluoroethane	TWA = 1000 ppm	-----
Difluoromethane	TWA = 1000 ppm	-----

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Exposure Controls

Appropriate Engineering Controls

Ensure adequate ventilation.

Apply technical measures to comply with the occupational exposure limits.

Respiratory Protection

Self-contained breathing apparatus (EN 133).

Wear self-contained breathing apparatus in confined spaces, in cases where the oxygen level is depleted, or in case of significant emissions.

Use only respiratory protection that conforms to international / national standards.

Hand Protection

Take note of the information given by the producer concerning permeability and break through times and of special workplace conditions (mechanical strain, duration of contact). Protective gloves.

Suitable material: Fluoroelastomer.

Eye Protection

Tightly fitted safety goggles.

Skin And Body Protection

Wear suitable protective clothing.

If splashes are likely to occur, wear: apron, boots, Neoprene.

Hygiene Measures

Eye wash bottles or eye wash stations in compliance with applicable standards. When using do not eat, drink or smoke.

Gloves, overalls and boots have to be doubled layered (protection against cold temperature).

Handle in accordance with good industrial hygiene and safety practice.

Environmental Exposure Controls

Dispose of rinse water in accordance with local and national regulations.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State

Liquefied gas

Color

Colorless

Odor

Slight

pH

Neutral

Melting/Freezing Point

-103°C (Pentafluoroethane)

Boiling Point/Boiling Range

-44 to -37°C

Flash Point

N/A

Evaporation Rate

>1

Explosive Properties

Not Explosive

Vapor Pressure

10,769 hPa at 21.1°C

24,593 hPa at 54.4°C

Vapor Density

3.45

Density

1.16 g/cm³ at 21.1 °C

Relative Density

1.17 at 20°C

Water Solubility

430 mg/l at 25°C

Partition Coefficient:

n - log Pow: 1.48, 20°C

octanol/water

Auto Ignition Temperature

N/A

Decomposition Temperature

N/A

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SECTION 10: STABILITY AND REACTIVITY

Reactivity	Risk of violent reaction.
Chemical Stability	Stable under recommended storage conditions.
Possibility of hazardous reactions	Strong oxidizers, alkali metals and alkaline earth metals may cause fires or explosions.
Conditions To Avoid	Heat
Material To Avoid	Light and/or alkaline metals, powdered metals, alkaline earth metals, oxidizing agents.
Hazardous Decomposition Products	Gaseous hydrogen fluoride (HF), Fluorophosgene. The release of other hazardous decomposition products is possible.

SECTION 11: TOXICOLOGICAL INFORMATION

Acute Toxicity	
Acute Oral Toxicity	N/A
Acute Inhalation Toxicity	LC50, 4 h,>2,080,000 mg/m ³ (1,1,1,2-Tetrafluoroethane)
Acute Dermal Toxicity	N/A
Skin Corrosion/Irritation	N/A
Serious Eye Damage/Eye Irritation	N/A
Respiratory Or Skin Sensitization	Guinea pig, did not cause sensitization on laboratory animals
Mutagenicity	In vitro tests did not show mutagenic effects (Pentafluoroethane). In vivo tests did not show mutagenic effects (Pentafluoroethane). Negative (1,1,1,2-Tetrafluoroethane).
Carcinogenicity	
Toxicity For Reproduction	Developed toxicity, rat, no observed effect (1,1,1,2-Tetrafluoroethane).
Repeated Dose Toxicity	Inhalation, after a single exposure, dog, cardiac sensitization following adrenergic stimulation. Inhalation, rat, >=5000ppm, NOAEL (1,1,1,2-Tetrafluoroethane). Inhalation, repeated exposure, rat, >=5000ppm, NOAEL (Pentafluoroethane). Inhalation, 90-day, rat, 108mg/m ³ , NOAEL (Difluoromethane)
Other Information	No data available.

SECTION 12: ECOLOGICAL INFORMATION

Eco Toxicity Effects	
Toxicity To Daphnia And Other Aquatic Invertebrates	No data available
Biodegradability: Pentafluoroethane	Result: Not readily biodegradable. Value: 5% Method: OECD 301 D
Difluoromethane	Note: Minimal

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Further Information On Ecology

Additional Ecological Information

This product is subjected to U.S. Environment Protection Agency Clean Air Act Regulations at 40 CFR Part 82.
This product contains greenhouse gases which may contribute to global warming. Do NOT vent to atmosphere.
To comply with provisions of the U.S. Clean Air Act, any residual must be recovered.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Methods

In accordance with local and national regulations.

Contaminated Packaging

Refer to manufacture/supplier for information on recovery/recycling.
To avoid treatments, as far as possible, use dedicated containers.
Where possible recycling is preferred to disposal or incineration.

SECTION 14: TRANSPORT INFORMATION

DOT	UN/ID No.	UN 3340
	Proper Shipping Name	REFRIGERANT GAS R 407C
	Class	2.2
	Packing Group	
	Hazard Labels	2.2
IATA	UN/ID No.	UN 3340
	Description Of Goods	REFRIGERANT GAS R 407C
	Class	2.2
	Hazard Labels	2.2
	Packing Instruction (Cargo 200 Aircraft)	
IMDG	Packing Instruction (Passenger 200 Aircraft)	
	UN/ID No.	UN 3340
	Proper Shipping Name	REFRIGERANT GAS R 407C
	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.

Canada: Canadian Environmental Protection Act (CEPA). Domestic Substances List. 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.

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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.
New Zealand: NZIOC National Regulatory Information	On the inventory, or in compliance with the inventory.
SARA 302 Components:	No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302
SARA 313 Components:	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	WARNING! This product contains a chemical known to the state of California to cause cancer. Dichloromethane 75-09-2 WARNING! This product contains a chemical known to the state of California to cause birth defects or other reproductive harm. Chloromethane 74-87-3
Massachusetts RTK	Dichloromethane 75-09-2
New Jersey RTK	Dichloromethane 75-10-5
Pennsylvania RTK	Dichloromethane 75-10-5
WHMIS Classification	Compressed Gas: This product has been classified according to the hazard criteria of the CPR and the SDS contains all of the information required by the CPR.
Global Warming Potential	1,653
Ozone Depletion Potential	0

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.