

SAFETY DATA SHEET

FROSTBERG® R-404A



SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product name : Frostberg® R-404A

MSDS Number : 000000005820

Product Use Description : Refrigerant

Chemical Family : Hydrofluorocarbon (HFC)

Molecular Formula : C₂HF₅/C₂H₃F₃/C₂H₂F₄

Company : FROSTBERG INTERNATIONAL LLC
16192 Coastal Highway Lewes,
Delaware 19958, USA

For more information : www.frostbergint.com

SECTION 2: HAZARDS IDENTIFICATION

Form : Liquefied gas

Color : Colorless

Odor : Slight ether like

Classification : Gases under pressure – Liquefied gas.

Label Elements
Symbol



Signal Word : Warning

Hazard Statement : H280 – Contains gas under pressure; may explode if heated.

Precautionary Statements : P410 + P403: 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	4%
Pentafluoroethane	354-33-6	206-557-8	44%
1,1,1 – Trifluoroethane	420-46-2	206-996-5	52%



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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
1,1,1, - Trifluoroethane	Flammable gases	Category 1	H 220
	Gases under pressure	Liquefied gas	H 280

Hazardous components according to European Directive 67/548/EEC or 1999/45/EC as amended

Substance Name	Classification	Hazard Category	H Phrases
1,1,1, - Trifluoroethane	F+	Extremely flammable	R12

SECTION 4: FIRST AID MEASURES

Inhalation	Remove to fresh air. Oxygen or artificial respiration if needed. If symptoms persist, call the physician.
Skin Contact	Allow to evaporate. Wash off with warm water. If symptoms persist, call the 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

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.

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In case of fire, use water spray.
Keep product and empty container away from heat and sources of ignition.

SECTION 6: ACCIDENTAL RELEASE MEASURE

Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel	Prevent further leakage or spillage if safe to do so. Keep away from incompatible products.
Advice for emergency personnel	Immediately evacuate personnel to safe areas. Keep people away from and upwind of spill/leak and wear self-contained breathing apparatus and protective suit. Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing. Suppress (knock down) gases/vapors/mists with a water spray jet and avoid spraying the leak source.
Methods For Cleaning Up	Ventilate the area. Prevent product from entering drains.
Environmental Precautions	Discharge into the environment must be avoided. Inform the responsible authorities in case of gas leakage or of entry into waterways, soils or 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.
Storage	Keep away from incompatible products. 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. Keep in banded area. Keep away from incompatible products. Protect cylinders from physical damage. Away from heat/ sparks/ open flames/ hot surfaces.

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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	-----
1,1,1-trifluoroethane	TWA = 1000 ppm	-----

Exposure Controls

Appropriate Controls	Engineering	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.

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

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Compressed Liquefied gas
Color	Colorless
Chemical Formula	CHF ₂ CF ₃ , CH ₃ CF ₃ , CH ₂ FCF ₃
Odor	Slight ether like
pH	Neutral
Melting/Freezing Point	-103°C (Pentafluoroethane)
Boiling Point/Boiling Range	-47.2°C to -46.4°C
Flash Point	N/A
Evaporation Rate	N/A
Explosive Properties	Not Explosive
Vapor Pressure	>3
Vapor Density	1.06 at 20°C.
Density	N/A
Relative Density	3.43 (Air = 1.0)
Water Solubility	430 mg/l at 25°C
Partition Coefficient: n-octanol/water	log Pow: 1.48, 20°C (pentafluoroethane)
Auto Ignition Temperature	728°C
Decomposition Temperature	>700°C

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. Vapors are heavier than air and may spread along floors.
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.

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SECTION 11: TOXICOLOGICAL INFORMATION

Acute Toxicity

Acute Oral Toxicity	N/A
Acute Inhalation Toxicity	LC50, 4 h, >2,030,000 mg/m ³ (1,1,1 - Trifluoroethane) LC0, 4h rat, >800000 ppm (Pentafluoroethane)
Acute Dermal Toxicity	N/A
Skin Corrosion/Irritation	N/A
Serious Eye Damage/Eye Irritation	N/A
Respiratory Or Skin Sensitization	N/A
Mutagenicity	In vitro tests did not show mutagenic effects (Pentafluoroethane). In vivo tests did not show mutagenic effects (Pentafluoroethane).
Carcinogenicity	N/A
Toxicity For Reproduction	No toxicity to reproduction (Pentafluoroethane).
Repeated Dose Toxicity	Inhalation, atier a single exposure, dog, 10% w/w risk of cardiac sensitization at high doze(Pentafluoroethane) Inhalation, repeated exposure, rat, >=5000ppm, NOEL (Pentafluoroethane).
Other Information	No data available.

SECTION 12: ECOLOGICAL INFORMATION

Eco Toxicity Effects

Toxicity To Fish	No data available
Toxicity To Aquatic Plants	No data available
Toxicity To Aquatic Invertebrates	No data available
Persistence And Degradability	No data available
Bio accumulative Potential	No data available
Mobility In Soil	No data available
Results Of PBT and vPvB Assessment	No data available

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Other Adverse Effects Accumulation in aquatic organisms is unlikely.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Methods In accordance with local and national regulations.
Refer to manufacture/supplier for information on
recovery/recycling.

Contaminated Packaging To avoid treatments, as far as possible, use dedicated containers.

SECTION 14: TRANSPORT INFORMATION

IATA	UN/ID No.	3337
	Proper Shipping Name	REFRIGERANT GAS R 404A
	Class	2.2
	Hazard Labels	2.2

ADR/RID	UN/ID No.	3337
	Description Of Goods	REFRIGERANT GAS R 404A
	Class	2
	Classification Code	2A
	Hazard Identification Number	20
	ADR/RID – Labels	2.2
	Environmentally Hazardous	No

IMDG	UN/ID No.	3337
	Proper Shipping Name	REFRIGERANT GAS R 404A
	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.

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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.

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 On the inventory, or in compliance with the inventory.