

SAFETY DATA SHEET

FROSTBERG® R-22



SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product name	FROSTBERG® R-22
Product Use Description	Refrigerant
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
Classification	Liquefied gas.

Label Elements

Symbol



Signal Word	Warning
Hazard Statement	Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation.
Precautionary Statements	Protect from sunlight. Store in a well -ventilated place.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

Concentration

Substance Name	CAS No.	Concentration
Chlorodifluoromethane	75-45-6	99.90%

R22, HCFC-22, monochlorodifluoromethane, Algeon 22, Algofrene 22, Frigen 22, Solkane 22

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Molecular Formula	CHClF ₂
Molecular Mass	86,47 g/mol
SMILES Notation	C(F)(F)Cl
InChI	InChI=1/CHClF ₂ /c2-1(3)4/h1H

SECTION 4: FIRST AID MEASURES

Inhalation	Remove patient from exposure, keep warm and at rest. Administer oxygen if necessary. Apply artificial respiration if breathing has ceased or shows sign of failing. Obtain immediate medical attention.
Skin Contact	Thaw affected areas with water. Remove contaminated clothing. Caution: clothing may adhere to skin in the case of freeze burns. After contact with skin, wash immediately with plenty of warm water. If irritation or blistering occurs, obtain medical attention.
Eye Contact	Immediately irrigate with eyewash solution or clean water, holding the eyelids apart for at least 10 minutes. Obtain immediate medical attention.
Ingestion	Ingestion is not considered a potential route of exposure.
Treatment	Symptomatic treatment and supportive therapy as indicated. Adrenaline and similar sympathomimetic drugs should be avoided following exposure as cardiac arrhythmia may result with possible subsequent cardiac arrest.

SECTION 5: FIRE-FIGHTING MEASURE

Extinguishing Media

Suitable Extinguishing Media	Water spray. Carbon dioxide Extinguishing foam Product itself doesn't burn but packaging may be flammable. Extinguishing agents should be oriented to the fire surroundings.
For Safety Reasons Unsuitable Extinguishing Agents	Water jet.
Specific Hazard By-Product, Combustion Products Or Formed Gases	Exposure to fire may cause containers to rupture/explode. Nonflammable, but on heating release of toxic and corrosive fumes possible: hydrogen chloride HCl, hydrogen fluoride HF, carbon monoxide CO, carbonyl chloride COCl ₂ , carbonyl fluoride COF ₂ , chlorine Cl ₂ .

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Special Protective Actions For Fire-Fighters Use pressure air respirator at low aeration and in closed rooms. In extreme conditions a chemical protection suit might be necessary.

SECTION 6: ACCIDENTAL RELEASE MEASURE

Personal Precautions	Evacuate area, wear protective equipment, especially self-contained breathing apparatus when entering area unless atmosphere has been proved to be safe. Ensure adequate air ventilation.
Environmental Precautions	Try to stop release. Prevent from entering sewers, basement and work pits, or any place where accumulation can be dangerous.
Methods For Cleaning Up	Ventilate the area.

SECTION 7: HANDLING AND STORAGE

Handling	Handle with care. Avoid inhalation of vapor or mist. Do not get in eyes, on skin, or on clothing. Wear personal protective equipment. Use only in well ventilated areas. Pressurized containers. Protect from sunlight and do not expose to temperature exceeding 50°C. Follow all standards 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 and always replace the cap after use.
Storage	Pressurized container: Protect from sunlight and do not expose to temperature 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 adequate ventilation, especially in confined areas. Protect cylinders from physical damage.

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Advice On Protection The product is not flammable.
Against Fire And Explosion Can form a combustible mixture with air at pressure above atmospheric pressure.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Control Parameters Guidelines

EC Name	EC No	CAS No	Type Of Limit Value	8 hr TWA	15 Min Short Term Exposure
Chlorodifluoromethane	200-871-9	75-45-6	OEL (European Union)	1000 ppm 3600 mg/m ³	N/A
			AGW – TRGS 900 (Germany)	3600 mg/m ³	N/A
			MAK – OEL (Austria)	500 ppm 1800 mg/m ³	1000 ppm 3600 mg/m ³
			TWA (USA / NIOSH)	1000 ppm 3500 mg/m ³	1250 ppm 4375 mg/m ³

Exposure Controls

Appropriate Engineering Controls Ensure adequate ventilation.
Apply technical measures to comply with the occupational exposure limits.

Body Protection
Regular work clothing is generally sufficient.

Respiratory Protection
Required on release of the gaseous substance. Use half mask to EN 140 or full mask to EN 136 fitted with filter to EN 143-P1. Be aware of time limits. If concentration are above limitation of filter devices, if oxygen concentration are below 17% or if condition are ambiguous, use self-contained respiratory protective devices.

Hand Protection
Gloves should comply with specification of EU directive 89/686/EEC and EN 374. For example, on full contact 0.3mm thick butyl rubber gloves should be worn

Eye Protection
Sideward closed goggles to EN 166 are required.

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Skin And Body Protection	Foot protection is required when handling gas containers. Skin protection products are not as effective as gloves. If gloves cannot be worn, apply a water insoluble skin protection substance to clean skin before the start of work and after each break. Before breaks and at the end of shift, clean skin with soap and water.
Environmental Controls	Exposure Avoid breathing the gaseous substance. Remove contaminated clothing. Don't smoke, eat and drink in the workplace.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquefied gas
Color	Colorless
Odor	Ethereal: Poor warning properties at low concentrations.
pH	N/A
Melting/Freezing Point	-160°C
Boiling Point/Boiling Range	-40.8°C
Critical Temperature	96.18°C
Flash Point	N/A
Flammability	Not flammable
Evaporation Rate	>1
Explosive Properties	Not Explosive
Oxidizing Properties	Not oxidizing
Vapor Pressure	9081 hPa
Gas Density	0.0036 kg/dm ³
Fluid Density	1.210 kg/dm ³
Solubility	Soluble in ether, acetone, choloroform
Water Solubility	3625 mg/l
Partition Coefficient: n-octanol/water	$_{10}\log Pow$: 1.13 (CSCL Japan 1992)
Dynamic viscosity at 10°C	0.22 mPa*s
Explosion Limits	Not determined

SECTION 10: STABILITY AND REACTIVITY

Reactivity	Not reactive under normal conditions of use and storage.
Possibility of hazardous reactions	Reacts violently with alkali earth metals. Catalytic decomposition in presence of powdery aluminum and zinc.

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Conditions To Avoid	Stable under normal conditions. Avoid open flames, high temperature, direct sun light.
Material To Avoid	Alkali and earth alkali metals.
Hazardous Products	Decomposition Hydrogen chloride HCl, hydrogen fluoride HF, carbon monoxide CO, carbonyl chloride COCl ₂ , carbonyl fluoride COF ₂ , chlorine Cl ₂ .

SECTION 11: TOXICOLOGICAL INFORMATION

Acute Inhalation Toxicity	LC50: > 3000000 ppm Exposure time: 4 h Species: rat
Sensitization	Cardiac sensitization Species: dogs Note: Chlorodifluoromethane (HCFC – 22): Cardiac Sensitization threshold (dog): 50000 ppm.
Repeated Dose Toxicity	Species: rat Application Route: Inhalation Exposure time: Lifetime Exposure NOEL: 10000 ppm Note: Lifetime exposure of male rats was associated with a small increase in salivary gland fibrosarcomas.
Other Information	Acute toxicity rapid evaporation of the liquid may cause frostbite. Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing. May cause cardiac arrhythmia.

SECTION 12: ECOLOGICAL INFORMATION

Eco Toxicity Effects	
Toxicity To Fish	Static test LC50: 777 mg/l Exposure time: 96h Species: Danio rerio (zebra fish)
Toxicity To Daphnia And Other Aquatic Invertebrates	Static test EC50: 433 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea)

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Further Information On Ecology

Additional Information	Ecological	Accumulation in aquatic organism 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. This product is subjected to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR part 82. Section 611 Requires the following label text on all shipments of this product. Warning: Contains Chlorodifluoromethane (HCFC – 22), a substance which harms public health and environment by destroying ozone in the upper atmosphere. Refer to sections 610 and 612 for list of acceptable and unacceptable uses for this product.
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SECTION 13: DISPOSAL CONSIDERATIONS

Disposal Methods	Observe all Federal, State, and Local Environmental regulations
Note	This product is subjected to U.S. Environmental Protection Agency Clean Air Act Regulations Sections 608 in 40 CFR Part 82 regarding refrigerant recycling.

SECTION 14: TRANSPORT INFORMATION

DOT	UN/ID No.	1018
	Proper Shipping Name	Chlorodifluoromethane
	Class	2.2
	Packing Group	
	Hazard Labels	2.2
IATA	UN/ID No.	1018
	Description Of Goods	Chlorodifluoromethane
	Class	2.2
	Hazard Labels	2.2
	Packing Instruction (Cargo Aircraft)	200

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	Packing Instruction (Passenger Aircraft)	200
	UN/ID No.	1018
	Proper Shipping Name	Cholorodifluoromethane
IMDG	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.

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.

National Regulatory Information

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

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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, birth defects, or any other reproductive harm.

WARNING! This product contains a chemical known to the state of California to cause birth defects or other reproductive harm.
Chloromethane 74-87-3

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

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

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 0.06