SECTION 1. IDENTIFICATION

Product name	:	Genetron® 22
Number	:	000000009890
Product Use Description	:	Refrigerant
Manufacturer or supplier's details	:	Honeywell International Inc. 115 Tabor Road Morris Plains, NJ 07950-2546
For more information call	:	800-522-8001 +1-973-455-6300(Monday-Friday, 9:00am-5:00pm)
In case of emergency call	:	**Medical: 1-800-498-5701 or +1-303-389-1414**
	:	**Transportation (CHEMTREC): 1-800-424-9300 or +1-703-527-3887**
	:	
	:	(24 hours/day, 7 days/week)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Form	:	Liquefied gas
Color	:	colourless
Odor	:	slight

Classification of the substance or mixture

Classification of the substance or mixture	:	Gases under pressure, Liquefied gas Simple Asphyxiant

GHS Label elements, including precautionary statements

Symbol(s) :

Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements : **Prevention:**
Use personal protective equipment as required.

Storage:
Protect from sunlight. Store in a well-ventilated place.

Hazards not otherwise classified : May cause eye and skin irritation.
May cause frostbite.
May cause cardiac arrhythmia.

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 3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : CHClF2

Chemical nature : Substance

Chemical name	CAS-No.	Concentration
Chlorodifluoromethane	75-45-6	100.00 %

SECTION 4. FIRST AID MEASURES

General advice : First aider needs to protect himself. Move out of dangerous area. Take off all contaminated clothing immediately.

Inhalation	:	Move to fresh air. If breathing is irregular or stopped, administer artificial respiration. Use oxygen as required, provided a qualified operator is present. Call a physician. Do not give drugs from adrenaline-ephedrine group.
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	:	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In case of frostbite water should be lukewarm, not hot. If symptoms persist, call a physician.
Ingestion	:	Unlikely route of exposure. As this product is a gas, refer to the inhalation section. Do not induce vomiting without medical advice. Call a physician immediately.

Notes to physician

Indication of immediate medical attention and special treatment needed, if necessary	:	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. ASHRAE 34 Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Specific hazards during firefighting	:	Contents under pressure. This product is not flammable at ambient temperatures and atmospheric pressure. However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources. Container may rupture on heating. Cool closed containers exposed to fire with water spray. Do not allow run-off from fire fighting to enter drains or water courses. Vapours are heavier than air and can cause suffocation by

reducing oxygen available for breathing.
Fire may cause evolution of:
Hydrogen chloride gas
Hydrogen fluoride
Carbon oxides
Halogenated compounds
Carbonyl halides

Further information : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : 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 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.
Unprotected personnel should not return until air has been tested and determined safe.
Ensure that the oxygen content is >= 19.5%.

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

Methods and materials for containment and cleaning up : Ventilate the area.

SECTION 7. HANDLING AND STORAGE

Handling

Precautions for safe handling : Handle with care.
Avoid inhalation of vapour or mist.
Do not get in eyes, on skin, or on clothing.
Wear personal protective equipment.
Pressurized container. Protect from sunlight and do not expose

to temperatures exceeding 50 °C.
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 : Can form a combustible mixture with air at pressures above atmospheric pressure.
Keep product and empty container away from heat and sources of ignition.

Storage

Conditions for safe storage, including any incompatibilities : Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 55 °C.
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.
Store away from incompatible substances.

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.
Perform filling operations only at stations with exhaust ventilation facilities.

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	Basis
Chlorodifluoromethane	75-45-6	TWA : Time weighted average	(1,000 ppm)	2008	ACGIH:US. ACGIH Threshold Limit Values
Chlorodifluoromethane	75-45-6	REL : Recommended exposure limit (REL):	3,500 mg/m3 (1,000 ppm)	2005	NIOSH/GUIDE:US. NIOSH: Pocket Guide to Chemical Hazards
Chlorodifluoromethane	75-45-6	STEL : Short term exposure limit	4,375 mg/m3 (1,250 ppm)	2005	NIOSH/GUIDE:US. NIOSH: Pocket Guide to Chemical Hazards

Chlorodifluoromethane	75-45-6	TWA : Time weighted average	3,500 mg/m3 (1,000 ppm)	1989	Z1A:US. OSHA Table Z-1-A (29 CFR 1910.1000)

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	:	Liquefied gas
Color	:	colourless
Odor	:	slight
Odor threshold	:	Note: no data available
pH	:	Note: neutral
Melting point/range	:	-160 °C
Boiling point/boiling range	:	-40.8 °C
Flash point	:	Note: Not applicable
Evaporation rate	:	Note: no data available
Lower explosion limit	:	Note: None
Upper explosion limit	:	Note: None
Vapor pressure	:	9,384 hPa at 21.1 °C(70.0 °F) 21,470 hPa at 54.4 °C(129.9 °F)
Vapor density	:	3 Note: (Air = 1.0)
Density	:	1.21 g/cm3 at 21.1 °C

Water solubility	:	3.0 g/l
Partition coefficient: n-octanol/water	:	log Pow: 1.08 - 1.13 Note: The product is more soluble in octanol.
Ignition temperature	:	Note: not determined
Decomposition temperature	:	> 250 °C
Viscosity, dynamic	:	Note: no data available
Viscosity, kinematic	:	Note: no data available
Molecular weight	:	86.46 g/mol

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
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 55 °C. Can form a combustible mixture with air at pressures above atmospheric pressure. Do not mix with oxygen or air above atmospheric pressure.
Incompatible materials	:	Strong oxidizing agents Finely divided metal powders such as aluminum, magnesium, or zinc.
Hazardous decomposition products	:	In case of fire hazardous decomposition products may be produced such as:

Hydrogen chloride gas
Carbonyl halides
Carbon oxides
Halogenated compounds
Hydrogen fluoride

SECTION 11. TOXICOLOGICAL INFORMATION

Acute inhalation toxicity : LC50: > 300000 ppm
Exposure time: 4 h
Species: Rat

Sensitisation : Cardiac sensitization
Species: dogs
Note: Chlorodifluoromethane (HCFC-22): Cardiac sensitisation 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.

Further information : Acute toxicity Rapid evaporation of the liquid may cause frostbite. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. May cause cardiac arrhythmia.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Toxicity to fish : static test
LC50: 777 mg/l

Exposure time: 96 h
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)

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.
This product is subject 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.

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 1018
Proper shipping name	:	Chlorodifluoromethane
Class		2.2
Packing group		
Hazard Labels		2.2

IATA	UN/ID No.	:	UN 1018
	Description of the goods	:	Chlorodifluoromethane
	Class	:	2.2
	Hazard Labels	:	2.2
	Packing instruction (cargo aircraft)	:	200
	Packing instruction (passenger aircraft)	:	200
IMDG	UN/ID No.	:	UN 1018
	Description of the goods	:	Chlorodifluoromethane
	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 (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. Existing Chemicals Inventory (KECI)	:	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

National regulatory information

SARA 302 Components	:	No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313 Components	:	The following components are subject to reporting levels established by SARA Title III, Section 313:
	:	Chlorodifluoromethane 75-45-6
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.

Massachusetts RTK	:	Chlorodifluoromethane	75-45-6
New Jersey RTK	:	Chlorodifluoromethane	75-45-6
Pennsylvania RTK	:	Chlorodifluoromethane	75-45-6

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.

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge,

information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user. This information should not constitute a guarantee for any specific product properties.

Changes since the last version are highlighted in the margin. This version replaces all previous versions.
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