



MATERIAL SAFETY DATA SHEET
GENETRON® 22

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: GENETRON® 22

OTHER/GENERIC NAMES: Chlorodifluoromethane (HCFC-22)

PRODUCT USE: REFRIGERANT

MANUFACTURER: AlliedSignal, Inc.
Fluorocarbons
101 Columbia Road
P.O. Box 1053
Morristown, NJ 07962

FOR MORE INFORMATION CALL:
(Monday-Friday, 9:00am-4:30pm) Eastern Standard Time
Product Safety Department (201) 455-4157

IN CASE OF EMERGENCY CALL:
(24 Hours/Day, 7 Days/Week)
(201) 455-2000

2. COMPOSITION/INFORMATION ON INGREDIENTS

<u>INGREDIENT NAME</u>	<u>CAS #</u>	<u>WEIGHT %</u>
Chlorodifluoromethane (HCFC-22)	75-45-6	100

Trace impurities and additional material names not listed above may also appear in the Regulatory Information section (#15) towards the end of the MSDS. These materials may be listed for local "Right to Know" compliance and for other reasons.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Colorless, volatile liquid with ethereal and faint sweetish odor. Non-flammable material. Overexposure may cause dizziness and loss of concentration. At higher levels, CNS depression and cardiac arrhythmia may result from exposure. Vapors displace air and can cause asphyxiation in confined spaces. At higher temperatures, (> 250°C), decomposition products may include Hydrochloric Acid (HCl), Hydrofluoric Acid (HF), and carbonyl halides such as phosgene.

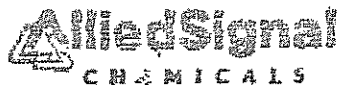
POTENTIAL HEALTH HAZARDS:

SKIN: Irritation would result from a defatting action on tissue. Liquid contact with skin could cause frostbite.

EYES: Liquid contact can cause frostbite, which may be severe. Mist may irritate.

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INHALATION: Genetron® 22 exhibits low toxicity in animals. However, when oxygen levels are reduced to 12-14% by displacement symptoms of asphyxiation, loss of coordination, increased pulse rate and deeper respiration will occur. At high levels, cardiac arrhythmia may occur.

INGESTION: Ingestion is an unlikely route of exposure because of its low boiling point. Should it occur, discomfort in the gastrointestinal tract would result from the rapid evaporation of the liquid. Necrosis from freezing of tissue could occur.

DELAYED EFFECTS: None known

Ingredients found on one of the OSHA designated carcinogen lists are listed below.

<u>Ingredient Name</u>	<u>NTP Status</u>	<u>IARC Status</u>	<u>OSHA List</u>
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No ingredients listed in this section

4. **FIRST AID MEASURES**

SKIN: Promptly flush skin with water until all chemical is removed. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. In the absence of water, cover with clean, soft wool or similar covering. Call a physician.

EYE: Immediately flush with large amounts of water for at least 15 minutes (in case of frostbite, water should be lukewarm - not hot), lifting eyelids occasionally to facilitate irrigation. Get medical attention if symptoms persist.

INHALATION: Immediately remove to fresh air. If breathing has stopped, give artificial respiration. Use oxygen as required, provided a qualified operator is available. Call a physician. Do not give epinephrine (adrenaline).

INGESTION: Ingestion is an unlikely route of exposure and is not likely to be hazardous. Do not induce vomiting unless instructed to do so by a physician.

ADVICE TO PHYSICIAN: Because of possible disturbances of cardiac rhythm, catecholamine drugs such as epinephrine, should be used with special caution only in situations of emergency life support. Treatment of overexposure should be directed at the control of symptoms and the clinical conditions.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT: N.A. - No flash point.

FLASH POINT METHOD: ASTM D-1310-67 and ASTM D-56-82

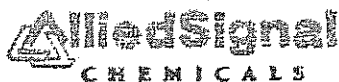
AUTOIGNITION TEMPERATURE: Unknown

UPPER FLAME LIMIT (Volume % in air): None

LOWER FLAME LIMIT (Volume % in air): None

FLAME PROPAGATION RATE (Solids): Not applicable

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OSHA FLAMMABILITY CLASS: Not applicable

EXTINGUISHING MEDIA:

Use any standard agent - choose the one most appropriate for type of surrounding fire (material itself is not flammable).

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Genetron 22 is not flammable at ambient temperatures and atmospheric pressure. However, this material will become combustible when mixed with air under pressure and exposed to strong ignition sources.

Contact with certain reactive metals may result in formation of explosive or exothermic reactions under specific conditions (e.g., very high temperatures and/or appropriate pressures).

SPECIAL FIREFIGHTING PRECAUTIONS/INSTRUCTIONS:

Firefighters should wear self-contained, NIOSH-approved breathing apparatus for protection against possible toxic decomposition products. Proper eye and skin protection should be provided. Use water spray to keep fire-exposed containers cool and to suppress vapors.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE: (Always wear recommended personal protective equipment.)
Evacuate all unprotected personnel. Protected personnel should remove any ignition sources and shut off leak, if without risk, and provide ventilation. Unprotected personnel should not return until air has been tested and determined safe, including low-lying areas.

Spills and releases may have to be reported to Federal and/or local authorities. See the Regulatory Information section (#15) regarding reporting requirements.

7. HANDLING AND STORAGE

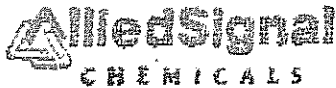
NORMAL HANDLING: (Always wear recommended personal protective equipment.)

Avoid breathing vapors or liquid contact with eyes, skin or clothing. Do not puncture or drop cylinders, expose them to open flame or excessive heat. Use authorized containers only. Follow standard safety precautions for handling use of cylinders of compressed gases.

Genetron 22 should not be mixed with air above atmospheric pressure for leak testing or any other purpose. See Section 5: Unusual Fire and Explosion Hazards.

STORAGE RECOMMENDATIONS:

Store in a cool, well-ventilated area of low fire risk. Protect container and its fittings from physical damage. Storage in subsurface locations should be avoided. Close valve tightly and replace bung after use and when empty.



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6. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

Provide local exhaust at filling zones and areas where leakage is probable. Mechanical (General) ventilation may be adequate for other operating and storage areas.

PERSONAL PROTECTIVE EQUIPMENT:

SKIN PROTECTION:

Skin contact with refrigerant gases may cause frostbite. General work clothing and gloves (leather) should provide adequate protection under routine conditions. If prolonged contact with the liquid or gas is anticipated, insulated gloves constructed of PVA, neoprene or butyl rubber should be used. Any contaminated clothing should be promptly removed and washed before reuse.

EYE PROTECTION:

For normal conditions, wear safety glasses. Where there is reasonable probability of liquid contact, wear chemical safety goggles.

RESPIRATORY PROTECTION:

None generally required for adequately ventilated work situations. For accidental release or non-ventilated situations, above the recommended PEL (1000 ppm), use a self-contained, NIOSH-approved breathing apparatus or supplied air respirator.

ADDITIONAL RECOMMENDATIONS:

Impervious boots in case of spillage or leakage, or if there is the probability of repeated or prolonged contact with liquid product. High dose-level warning signs are recommended for areas of principal exposure. Provide eyewash stations and quick-drench shower facilities at convenient locations. For tank cleaning operations, see OSHA regulations.

EXPOSURE GUIDELINES: (Guidelines exist for the following ingredients)

<u>Ingredient Name</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>	<u>Other Limit</u>
Chlorodifluoromethane (HCFC-22)	1000 ppm (TWA)	1000 ppm (TWA)	None

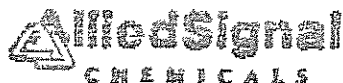
* = Limit established by AlliedSignal for internal use.

** = Workplace Environmental Exposure Level (AIIHA).

*** = Biological Exposure Index

Other exposure limits for the decomposition products normally associated with product use are as follows:

Hydrogen Fluoride: ACGIH TLV = 3 ppm ceiling



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9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Clear colorless liquid and vapor.

PHYSICAL STATE: Genetron® 22 is a gas at normal temperatures.

MOLECULAR WEIGHT: 86.45

CHEMICAL FORMULA: CHClF_2

ODOR: Faint ethereal odor.

SPECIFIC GRAVITY: (Water = 1.0) 1.21@21.1°C(70°F)

SOLUBILITY IN WATER: (Weight %) 0.3WT%@25°C and 1 atmosphere

pH: Neutral

BOILING POINT: -40.8°C (-41.40°F) C @ 760 MM Hg

MELTING POINT: -160°C(-256°F)

VAPOR PRESSURE: 136.1 psia 21.1°C (70°F)

VAPOR DENSITY: (Air = 1.0) 3.0

EVAPORATION RATE: Greater than 1 Compared to: CCl_4

% VOLATILES: % Volatiles by volume @ 20°C (68°F) = 100

FLASH POINT: N.A. - No flash point.

(Flash point method and additional flammability data are found in section 5.)

10. STABILITY AND REACTIVITY

NORMALLY STABLE? (Conditions to Avoid)

The product is stable.

Avoid any source of ignition, such as lighted cigarettes, flames, hot spots welding. May yield toxic and/or corrosive decomposition products. Avoid mixing with air or oxygen above atmospheric pressure.

INCOMPATIBILITIES:

Freshly abraded aluminum surfaces (may cause strong exothermic reaction). Chemically active metals: sodium, potassium, calcium, powdered aluminum, magnesium and zinc.

HAZARDOUS DECOMPOSITION PRODUCTS:

Halogens, halogen acids, and possibly carbonyl halides. These are toxic and corrosive.

HAZARDOUS POLYMERIZATION?

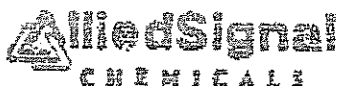
Will not occur.

11. TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS:

LC_{50} - 4 hour (rat): Greater than or equal to 300,000 ppm

Cardiac Sensitization Threshold: 50,000 ppm



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DELAYED (SUBCHRONIC & CHRONIC) EFFECTS:

Subchronic NOEL: 10,000 ppm
Not teratogenic
Not mutagenic in in-vitro and in-vivo tests

OTHER DATA:

Lifetime exposure of male rats was associated with a small increase in salivary gland fibrosarcomas.

12. ECOLOGICAL INFORMATION

Degradability (BOD): Not pertinent.
Octanol Water Partition Coefficient: Unknown

13. DISPOSAL CONSIDERATIONS

RCRA:
Is the unused product a RCRA hazardous waste if discarded? Not a hazardous waste.
If yes, the RCRA ID number is: Not applicable

OTHER DISPOSAL CONSIDERATIONS: Disposal must comply with federal, state, and local disposal or discharge laws.
Disposal of waste Genetron® 22 (Chlorodifluoromethane) may be subject to federal regulations. Users should review their operations, then consult with appropriate regulatory agencies before discharging or disposing of waste material. Disposal by a licensed waste disposal company may be necessary.

The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

US DOT HAZARD CLASS: Chlorodifluoromethane (R-22), 2.2

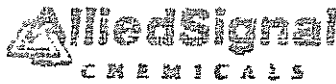
US DOT ID NUMBER: UN1018

For additional information on shipping regulations affecting this material, contact the information number found on the first page.

15. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA):
TSCA INVENTORY STATUS: Genetron® 22 is on the TSCA inventory.

OTHER TSCA ISSUES: Not applicable



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SARA TITLE III/CERCLA:

RQs & TPQs:

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

Ingredient	SARA/CERCLA RQ(lbs)	SARA EHS TPQ(lbs)
_____	_____	_____

No ingredients listed in this section

Spills/releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center (1-800-424-8802) and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS: IMMEDIATE
PRESSURE

SARA 313 TOXIC CHEMICALS:

The following ingredients are SARA 313 "Toxic Chemicals". CAS #'s and wt.% are found in section #2.

Ingredient	Comment
Chlorodifluoromethane (HCFC-22)	None

STATE RIGHT TO KNOW:

In addition to the ingredients found in section 2, the following are listed for state right-to-know purposes:

Ingredient	Wt. %	Comment
No ingredients listed in this section.		

ADDITIONAL REGULATORY INFORMATION:

WARNING

DO NOT VENT TO THE ATMOSPHERE. TO COMPLY WITH PROVISIONS OF THE U.S. CLEAN AIR ACT, ANY RESIDUAL MUST BE RECOVERED.

CONTAINS GENETRON® 22, a HCFC SUBSTANCE WHICH HARMS PUBLIC HEALTH AND ENVIRONMENT BY DESTROYING OZONE IN THE UPPER ATMOSPHERE. DESTRUCTION OF THE OZONE LAYER CAN LEAD TO INCREASED ULTRAVIOLET RADIATION WHICH, WITH EXCESS EXPOSURE TO SUNLIGHT, CAN LEAD TO AN INCREASE IN SKIN CANCER AND EYE CATARACTS.

WHMIS CLASSIFICATION (CANADA):

This product has been evaluated in accordance with the hazard criteria of the CFR and the MSDS contains all the information required by the CFR.

FOREIGN INVENTORY STATUS:

EINECS number: 2008719

16. OTHER INFORMATION

CURRENT ISSUE DATE: January 1997
PREVIOUS ISSUE DATE: December 1994

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CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING:

- Section 5: Updated Unusual Fire and Explosion Data
- Section 7: Updated Normal Handling to advise not to mix product with air.
- Section 8: Revised PPE for Skin Protection.
- Section 15: Added CFR statement to WHIMIS classification.

OTHER INFORMATION:

HMIS Classification 2-0-0

NFFA Classification 2-0-0

REGULATORY STANDARDS:

- (1) OSHA regulations for compressed gases: 29 CFR 1910.101.
- (2) DOT classification per 49 CFR 172.101.
- (3) Clean Air Amendment listing: Class II