A. GENERAL INFORMATION

TRADE NAME (COMMON NAME, SYNONYM):
Refrigerant 22, Freon 22, Genetron 22,
Fluorocarbon 22, HFA-22, R-22

CHEMICAL NAME
Chlorodifluoromethane or monochlorodifluoromethane

FORMULA
CHClF_2

MANUFACTURER'S ADDRESS (MAILING)
Racon Inc.
P.O. Box 198
Wichita, KS 67201

MANUFACTURER'S ADDRESS (LOCATION)
Racon Inc.
6040 S. Ridge Road
Wichita, KS 67215

CONTACT:
Vice President of Manufacturing
(316) 524-3245 or
(800) 835-2916

CAS NO.
75-45-8

DOT NO.
UN 1018

CAS NO.
75-45-8

B. FIRST AID MEASURES

Inhalation: Vapor contact — primary route of exposure. If inhaled, remove to fresh air. Keep warm and at rest. If breathing is difficult (labored), give oxygen. If not breathing, give artificial respiration and check for pulse. If no pulse, start CPR (cardiopulmonary resuscitation). Do Not give stimulants (adrenaline, epinephrine or handheld asthma aerosols). Call 911 (if available) and a physician. Keep patient at rest for 24 hours after overexposure. No long-term effects are expected.

Eyes and/or Skin: Vapor contact — flush with fresh water for at least 20 minutes. Liquid contact — Because of defatting effects of this product, skin and eye irritation may occur. Flush exposed skin and eyes thoroughly (minimum of 10-15 minutes) with lukewarm water or balanced saline solution: if eye irritation persists, see a physician.

Ingestion: Liquid — not probable — if ingested, however, keep patient calm, if conscious, and get to a physician immediately — frostbite is probable, indicated by necrosis of lips and tongue (contacted tissue), blanching of skin, pain and tenderness. Warm skin slowly.
### C. Hazards Information

#### Toxicity and Health

**Exposure Limits**
- TLV: 1000 ppm (vol) (8 hr TWA)
- STEL: 1250 ppm (vol)

**Acute Exposure Effects**

Inhalation — HFA-22 is relatively non-toxic following acute exposure. Although no long-term comprehensive studies have specifically investigated acute overexposure of humans to HFA-22, experience indicates the cardiovascular and respiratory systems are the primary systems affected. Abuse (intentional inhalation) has caused death. Human exposure to high concentrations (e.g., 20%) may cause confusion, lung (respiratory) irritation, tremors and perhaps coma, but these effects are generally short lived and reversible without late aftereffects when removed to fresh air. LC50 values for rats and mice range from 277,000 to 390,000 ppm (vol) over varying time periods of 15 minutes to 2 hours. High atmospheric concentrations of HFA-22 produce stimulation and then depression and finally asphyxiation.

Ingestion — Not probable. At atmospheric pressure, liquid HFA-22 boils at -41.4°F (-40.8°C). Freezing and severe frostbite of contacted tissue will result.

Skin — Contact of vapor HFA-22 with skin or eyes should not cause injury. Contact of liquid HFA-22 will result in freezing and frostbite of contacted tissue.

**Note:** Human Poisoning Potential — Sniffing of fluorocarbon propellants for their intoxicating effects has produced over 100 deaths. Fluorocarbons exhibit very toxic properties (asphyxiation, cardiac arrhythmias when sniffed; however, because of variations in response, it is very difficult to predict which symptoms will be exhibited following exposure. It is possible that individuals with heart or respiratory disorders may prove especially susceptible.

**Subchronic/Chronic Exposure Effects**

Overexposure by inhalation of various animals to 46,000 ppm (vol) — 50,000 ppm (vol) of HFA-22 for 8 days to 10 months caused alterations in body weight and physiological endurance, and affected the lungs, central nervous system (CNS), heart, liver, kidneys and spleen. No information was found concerning effects on humans.

**Cardiac Studies**

HFA-22 inhaled at concentrations of 50,000 ppm and above has been shown in tests on dogs to sensitize the heart to exogenous (outside the body) adrenaline, resulting in serious and sometimes fatal irregular heart beats (cardiac arrhythmias).

**Carcinogenic Potential**

A lifetime inhalation study on rats and mice was performed by ICI, Ltd. (UK). The results from this test showed no effects on either rats or mice up to 10,000 ppm (vol). At 50,000 ppm (vol), HFA-22 was weakly carcinogenic to the oldest male rats (exhibiting a low incidence of fibrosarcoma in the salivary gland). The significance of this finding is questionable. No abnormal incidence was found in mice of either sex in rats at 50,000 ppm (vol). No other findings of biological significance were made.

**Teratogenic Potential**

Teratogenic studies on rats and rabbits showed an increased incidence of absence of eyes in rat fetuses at exposure levels of 50,000 ppm. (HFA-22 exposure occurred from the 6th to 16th day of pregnancy). There was no effect on rabbits or their offspring at this level. There was no evidence of other overt fetal abnormalities.

**Fire and Explosion**

Nonflammable and nonexplosive. One documented incident has been reported where an explosion occurred during the weld repair of a compressor shell which apparently contained 50:50 mixture of air and HFA-22. At high temperatures (1170°F, 632°C) under favorable laboratory conditions, HFA-22 is capable of forming weakly combustible mixtures with air. Formation of combustible mixtures, under practical conditions, even at higher temperatures, is extremely unlikely and the fire hazards of HFA-22 are very small.

**IFPA/IMIS Classifications**

Health: 1  Fire: 0  Reactivity: 0
**D. PRECAUTIONS/PROCEDURES**

Do not breathe vapors. Avoid contact with eyes, skin and clothing. Wear protective clothing including goggles and cloth-lined rubber gloves. Not for food, drug or cosmetic use.

Store and use with adequate ventilation. Never use in a closed or confined space. Local exhaust may be necessary to reduce concentrations below TLV (1,000ppm). Store in cool place (<120°F).

When fighting fire near or involving this product, use self-contained breathing apparatus. If HFA-22 contacts open flames or extremely hot metal surfaces, it may decompose to form HF, HCl and traces of carbonyl halides (i.e., phosgene).

In the event of a spill or leak, keep upwind. Ventilate enclosed spaces until gas is dispersed. Do not smoke or operate internal combustion engines in immediate vicinity.

HFA-22 is shipped and stored as a liquefied, compressed gas under pressure.

**E. PERSONAL PROTECTIVE EQUIPMENT**

Respiratory protection is not needed if concentrations are controlled. If concentrations exceed TLV (1,000ppm), use an approved respirator for organic vapors. In very high concentrations, self-contained breathing equipment should be used.

Protective clothing should minimize exposed skin and should include goggles, a full face shield if splashing is possible, and cloth-lined rubber gloves.

**F. PHYSICAL DATA**

HFA-22 is a gas at normal conditions of 77°F (25°C) and 1 atm.

- Molecular weight: 86.5
- Boiling Point (1 atm) -41.4°F (-40.8°C)
- Vapor pressure @ 77°F (25°C) is 136.7 psig.
- Vapor density is 2.78 lb/ft³ @ 77°F.
- Specific gravity of vapor (air = 1) is 3.08 @ 1 atm 77°F.
- Specific gravity of liquid (water = 1) is 1.28 @ 77°F.
- % volatile at 77°F and 1 atm-100% (vol)
- Solubility in water (% wt) 3gm/l
- Soluble in acetone, ethanol and chloroform
- Appearance — colorless liquid and vapor
- Odor — very slight ethereal odor to odorless

**G. REACTIVITY**

HFA-22 is stable and relatively nonreactive. It is incompatible with certain elastomers, alkali or alkaline earth metals, powdered aluminum, zinc, beryllium, etc. The Manufacturing Chemists Association (MCA) reported, 1/4/67, that industry experience shows that alkali and alkaline earth metals (i.e., sodium, potassium and barium) in their free metallic form may react violently with fluorocarbons. The MCA also noted that since materials become more reactive when finely ground, metals such as magnesium and aluminum in the powdered form may also react, especially at high temperatures. HFA-22 may decompose into HF, HCl and carbonyl halides (i.e., phosgene) if contacted with open flame or extremely hot metal surfaces.

**H. REGULATORY**

The following regulations apply to this product.

**Federal Regulations:**

- OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) HAZARD COMMUNICATION RULE, 29 CFR 1910.1200:

  OSHA considers this product hazardous, therefore it is subject to applicable OSHA regulations on Right-to-Know/Hazard Communication.
TOXIC SUBSTANCES CONTROL ACT (TSCA), 40 CFR 710:
This product is listed on the Chemical Substances Inventory compiled under Section 8(b) of TSCA.
The EPA has established a TSCA HOTLINE to answer questions regarding the Toxic Substances Control Act and Regulations - (800) 424-9065.

RESOURCE CONSERVATION and RECOVERY ACT (RCRA), 40 CFR 261:
Should this product be collected from a refrigeration system, it is considered a hazardous waste if it exhibits a hazardous waste characteristic, i.e., ignitability, corrosivity, reactivity or EP Toxicity. If considered a hazardous waste it should be managed in an appropriate manner. Consult 40 CFR 261 and 262 for details on hazardous waste determination and management.
The EPA has established a RCRA HOTLINE to answer questions regarding hazardous waste and hazardous waste management - (800) 424-9346.
The Department of Transportation regulates the transportation of this waste material. Consult 49 CFR 172 before transporting.

SUPERFUND AMENDMENTS AND REALAUTHORIZATION ACT (SARA, Title III), 40 CFR 355.372: This product is pure chlorodifluoromethane. For SARA MSDS submission requirements, Racon classifies Racon® 22 as 1) a sudden release of pressure hazard and 2) an immediate (acute) health hazard.

STATE REGULATIONS:
This Product may be subject to regulation under state laws. Consult with the appropriate State Environmental Health Office to inquire about additional applicable regulation.

I. REFERENCES
duPont, unpublished review, Haskell Laboratory (March, 1984).

While the information contained herein was derived from sources believed to be reliable, Racon neither expressly nor impliedly warrants the information is accurate and complete and assumes no responsibility for same. The data is provided solely for your consideration and investigation.