

January 1999

**MATERIAL SAFETY DATA SHEET**  
**REFRON<sup>®</sup>-12**

**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

PRODUCT NAME: REFRON<sup>®</sup>-12

OTHER/GENERIC NAMES: Dichlorodifluoromethane

PRODUCT USE: Used in refrigeration and as an inert nonflammable diluent in sterilant gas mixtures.

MANUFACTURER: Refron, Inc.  
38-18 33<sup>rd</sup> Street  
Long Island City, NY 11101

FOR MORE INFORMATION CALL:

TOLL FREE: 1-800-473-3766 (during business hours)

IN CASE OF EMERGENCY CALL:

CHEMTREC: 1-800-424-9300

**2. COMPOSITION/INFORMATION ON INGREDIENTS**

<u>INGREDIENT NAME</u>	<u>CAS #</u>	<u>WEIGHT %</u>
dichlorodifluoromethane	75-71-8	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:**

REFRON<sup>®</sup>-12 is low in toxicity in animals even at a concentration of 5% (50,000 ppm); 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>
No ingredient 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): Not applicable.

LOWER FLAME LIMIT (Volume % in air): Not applicable.

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**FLAME PROPAGATION RATE (Solids):** Not applicable

**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:**

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 and use of cylinders of compressed gases.

**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.

**8. 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.

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**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 or non-ventilated situations, above the recommended PEL (1000 ppm), use a self-contained, NIOSH-approved breathing apparatus or supplied air respirator.

**ADDITIONAL RECOMMENDATIONS:**

Wear 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>
Dichlorodifluoromethane	1000 ppm (TWA)	1000 ppm (TWA)	None

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

Hydrogen Fluoride: ACGIH TLV = 3 ppm ceiling

**9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>APPEARANCE:</b>	Clear colorless liquid and vapor.
<b>PHYSICAL STATE:</b>	REFRON <sup>®</sup> -12 is a gas at normal temperatures.
<b>MOLECULAR WEIGHT:</b>	120.9
<b>CHEMICAL FORMULA:</b>	CCl <sub>2</sub> F <sub>2</sub>
<b>ODOR:</b>	Faint ethereal odor.
<b>SPECIFIC GRAVITY:</b>	(Water = 1.0) 1.34 @ 30°C (86°F)
<b>SOLUBILITY IN WATER:</b>	(Weight %) Unknown
<b>pH:</b>	Neutral
<b>BOILING POINT:</b>	-29.8°C (-21.6°F) 760 mm Hg
<b>MELTING POINT:</b>	-158°C (-252.4°F)
<b>VAPOR PRESSURE:</b>	84.9 psia 21.1°C (70°F)
<b>VAPOR DENSITY:</b>	(Air = 1.0) 4.2
<b>EVAPORATION RATE:</b>	Greater than 1 Compared to: CCl <sub>4</sub>
<b>% VOLATILES:</b>	% Volatiles by volume @ 20°C (68°F) = 100
<b>FLASH POINT:</b>	N.A. - No flash point.

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

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**10. STABILITY AND REACTIVITY**

**NORMALLY STABLE: (Conditions to Avoid)**

The product is stable.

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:**

Acute Inhalation:.... LC<sub>50</sub> - 4HR ...Rat....760,000 ppm

Cardiac Sensitization Threshold..... 50,000 ppm

10 min EC<sub>50</sub>....254,000 ppm

**DELAYED (SUBCHRONIC & CHRONIC) EFFECTS:**

Subchronic: NOEL.... 10,000 ppm

**OTHER DATA:**

Teratology - not a teratogen

**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?**

Yes

If yes, the RCRA ID number is: U075

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**OTHER DISPOSAL CONSIDERATIONS:** Disposal must comply with federal, state, and local disposal or discharge laws. Disposal of waste REFRON<sup>®</sup>-12 (dichlorodifluoromethane) is 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:** US DOT PROPER SHIPPING NAME: Dichlorodifluoromethane (R12)  
US DOT HAZARD CLASS: 2.2  
US DOT PACKING GROUP: Not applicable

**US DOT ID NUMBER:** UN1028

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:** REFRON<sup>®</sup>-12 is on the TSCA inventory.

**OTHER TSCA ISSUES:** REFRON<sup>®</sup>-12 is subject to clean Air Act amendments relating to venting and applications.

**SARA TITLE III/CERCLA:**

**RQs & TPQs:**

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

<u>Ingredient</u>	<u>SARA/CERCLA RQ (lbs)</u>	<u>SARA EHS TPO(lbs)</u>
Dichlorodifluoromethane	5000	None

**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

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**SARA 313 TOXIC CHEMICALS:**

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

<u>Ingredient</u>	<u>Comment</u>
Dichlorodifluoromethane	None

**STATE RIGHT TO KNOW:**

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

<u>Ingredient</u>	<u>Wt.%</u>	<u>Comment</u>
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 REFRON<sup>®</sup>-12 A CFC, A 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.**

**16. OTHER INFORMATION**

HMIS Classification 2-0-0

NFPA 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 I