

January 1999

MATERIAL SAFETY DATA SHEET
REFRON[®] -113

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: REFRON[®] -113

OTHER/GENERIC NAMES: 1,1,2-Trichloro-1,2,2-trifluoroethane
Refrigerant-113 or R-113

PRODUCT USE: Solvent and Refrigerant

MANUFACTURER: Refron, Inc.
38-18 33rd 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>
Trichlorotrifluoroethane	76-13-14	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 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: Prolonged and/or repeated contact with this solvent can cause irritation of the skin (defatting of skin), erythema (reddening of the skin), or dermatitis.

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EYES: Irritant: Liquid contact will irritate eyes and may cause conjunctivitis. Vapors may act as a mild irritant.

INHALATION:

At low levels of concentration (human: 2,500 ppm Trichlorotrifluoroethane, 0.5-1.0 hour exposure), initial symptoms may include headache, dizziness, nausea, loss of concentration, and irritation. With high exposure levels, effects can include intoxication, central nervous system (CNS) depression (loss of concentration or even death), and cardiac arrhythmia. Product vapors displace air and can cause suffocation especially in a confined space. At high levels, potentially reached in poorly ventilated or confined spaces, cardiac effects and/or rapid suffocation resulting in death has been reported. (NIOSH "ALERT", Preventing Death from Excessive Exposure to CFC-113, May 1989).

INGESTION:

Similar symptoms as for inhalation. In large doses, respiratory failure can occur.

DELAYED EFFECTS: None currently identified.

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: Wash promptly with soap and water for at least 15 minutes while removing contaminated clothing and shoes. If irritation occurs, get medical attention immediately. Thoroughly clean contaminated clothing and shoes before reuse or discard.

EYE: Immediately flush eyes with large amounts of water for at least 15 minutes, lifting eyelids 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: Do not induce vomiting. Do not give stimulants. Take immediately to a hospital or physician.

ADVICE TO PHYSICIAN: Because of 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 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

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AUTOIGNITION TEMPERATURE: 770°C (1418°F)
UPPER FLAME LIMIT (Volume % in air): None
LOWER FLAME LIMIT (Volume % in air): None
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 explosive or exothermic reactions under specific conditions (e.g. very high temperatures and/or appropriate pressures and in the presence of oxygen). High temperatures may result in formation of toxic or corrosive products, such as halogen acids, carbonyl halides (e.g. Phosgene). See Reactivity section.

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 also be provided. Use water spray to keep fire-exposed containers cool and to suppress vaporization.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE: (Always wear recommended personal protective equipment). Evacuate 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 and liquid contact with eyes, skin or clothing. Do not puncture or drop containers or expose them to open flame or excessive heat. Use authorized containers only. Follow standard safety precautions for handling and use of drums.

STORAGE RECOMMENDATIONS: Store in a cool, well-ventilated area of low fire risk. Storage in subsurface locations should be avoided. Keep containers out of direct sun. If storage temperatures exceeds boiling point of 82°F, the container will develop pressure. **COOL BEFORE REMOVING PRODUCT.**

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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. Concentration of REFRON[®] - 113 should be monitored and kept below the recommended levels in work areas.

PERSONAL PROTECTIVE EQUIPMENT:

SKIN PROTECTION:

Wear protective, impervious gloves and clothing with an outer layer of MYLAR[®] -coated Durafab (2nd choices: PVA or neoprene), if prolonged or repeated contact with liquid is anticipated. Remove and wash clothing promptly. Any non-impervious clothing should also be promptly removed when contaminated 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, where concentrations are above recommended PEL (1000 ppm), use a self-contained, NIOSH-approved breathing apparatus or supplied air respirator. For escape: use the former or a NIOSH-approved gas mask with organic vapor canister.

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>
Trichlorofluoromethane	1000 ppm (TWA) 1250 ppm (STEL)	1000 ppm (TWA) 1250 ppm (STEL)	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

APPEARANCE: Clear colorless liquid and vapor.
PHYSICAL STATE: REFRON[®] -113 is liquid at room temperature.
MOLECULAR WEIGHT: 187.35
CHEMICAL FORMULA: CCl₂FCClF₂
ODOR: Faint ethereal odor.

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SPECIFIC GRAVITY: (Water = 1.0) 1.47 gram/cc @ 70°F
SOLUBILITY IN WATER: (Weight %) 0.21% (wt) @ 70°F
pH: Neutral
BOILING POINT: 47.6°C (117.7°F) @ 760 mm Hg
MELTING POINT: -35°C (-31°F)
VAPOR PRESSURE: 5.6 psia (21.1°C) (70°F)
VAPOR DENSITY: (Air = 1.0) 6.5
EVAPORATION RATE: Greater than 1 Compared to: CCl₄
% 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)

Source of high temperatures, such as lighted cigarettes, flames, welding cutting torches or unit heaters should be avoided to prevent formation of toxic and/or corrosive by-products.

INCOMPATIBILITIES:

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

HAZARDOUS DECOMPOSITION PRODUCTS:

Halogens, halogen acids, and possibly carbonyl halides such as phosgene may be formed. These are toxic and corrosive. After REFRON[®] -113 has been exposed to lubricated oils, alcohols, polyols or other hydrocarbons at temperatures in excess of 100°F, the composition should be monitored for reaction products, particularly R-133a. Reaction products may be toxic.

HAZARDOUS POLYMERIZATION:

Will not occur.

11. TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS:

2-hr LC - Rats - 110,000 ppm (v/v)

Mice - 95,000 ppm (v/v)

Exposure of Dogs to Levels of 5,000 ppm (v/v) and greater have resulted in increased sensitivity of the heart to adrenalin.

DELAYED (SUBCHRONIC & CHRONIC) EFFECTS:

Results of a 2 year chronic inhalation study on rats exposed to 2,000, 10,000 and 20,000 ppm confirmed the low order of toxicity of this material. This, and results of other studies available in the literature, have shown no evidence of carcinogenicity, mutagenicity, or teratogenicity in animal studies and in human experience. (Reference: Haskell Laboratory data).

OTHER DATA:

Not mutagenic in invitro or invivo test.

Not a development toxin

12. ECOLOGICAL INFORMATION

None found

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13. DISPOSAL CONSIDERATIONS

RCRA:

Is the unused product a RCRA hazardous waste if discarded? It is a hazardous waste if used as a solvent.
If yes, the RCRA ID number is: F002

OTHER DISPOSAL CONSIDERATIONS: Disposal must comply with federal, state, and local disposal or discharge laws. Disposal of waste REFRON[®]-113 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: For shipments of **virgin** REFRON[®]-113 and for shipments of **spent** REFRON[®]-113 in individual packages that contain **LESS THAN** the Reportable Quantity, 5000# - **Not Regulated.**

US DOT ID NUMBER: **Not applicable**
For shipments of **spent** REFRON[®]-113 in individual packages that contain **MORE THAN** the Reportable Quantity, 5000# : Waste Environmentally Hazardous Substances, Liquid, n.o.s (Trichlorofluoromethane) Class 9, PG III
U.S. DOT ID number: UN 3082

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: **Listed**

OTHER TSCA ISSUES: **None**

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</u> <u>RQ (lbs)</u>	<u>SARA EHS</u> <u>TPO(lbs)</u>
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No ingredients listed in this section

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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

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>
Trichlorotrifluoroethane	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[®]-113, 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 1-0-1