

SAFETY DATA SHEET R-11

1. IDENTIFICATION

PRODUCT NAME: Refrigerant 11

SYNONYMS: R-11, REFRIGERANT 11, CFC 11, Trichlorofluoromethane, Trichloromonofluoromethane

RECOMMENDED USE: Refrigerant

DISTRIBUTOR: Hudson Technologies Company
ADDRESS: PO Box 1541
One Blue Hill Plaza
Pearl River, NY 10965

EMERGENCY PHONE: 1- 800-501-4376
CHEMTREC PHONE: 1-800-424-9300
INFORMATION PHONE: 1-800-953-2244

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Colorless, volatile liquid with ethereal and faint sweetish odor. Non-flammable material. Contact with the liquid may cause frostbite. Overexposure to vapors by inhalation may cause dizziness and loss of concentration. At higher levels, central nervous system 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.

HAZARD CLASSIFICATION: Hazardous to the Ozone Layer



SIGNAL WORD: WARNING

HAZARD STATEMENTS: May displace oxygen and cause rapid suffocation
Harms public health and environment by destroying ozone in the upper atmosphere

PRECAUTIONARY STATEMENTS

PREVENTION: Use only with adequate ventilation - never in a closed space. Wear protective gloves. Wear eye protection.



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RESPONSE: If inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call a physician. If not breathing, give artificial respiration, preferably mouth to mouth.
If breathing is difficult, give oxygen. Avoid stimulants. Do not give adrenalin
If on skin: Wash with plenty of water
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician.

STORAGE: Protect from sunlight. Store in well-ventilated place.
Do not heat above 120°F (50°C). Do not store in damp areas.

DISPOSAL: Comply with Federal, State and local regulations. Reclaim by distillation or remove to a permitted waste disposal facility

CARCINOGENICITY:

OSHA: <0.1% ACGIH: <0.1% NTP: <0.1% IARC: <0.1%

3. COMPOSITION / INFORMATION ON INGREDIENTS

PRODUCT NAME: Refrigerant 11

SYNONYMS: R-11, REFRIGERANT 11, CFC 11, Trichlorofluoromethane
Trichloromonofluoromethane

INGREDIENT NAME CAS NUMBER WEIGHT %

<u>Ingredient Name</u>	<u>CAS Number</u>
Trichlorofluoromethane (CFC-11)	75-69-4

Trace impurities and additional material names not listed above may also appear in Section 15 toward the end of this Safety Data Sheet.

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. If water is not available, cover with a clean, soft cloth or similar covering. Get medical attention if symptoms persist.

EYES: Immediately flush eyes 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. Get medical attention.

INGESTION: In case of accidental ingestion, get medical attention. Do not induce vomiting unless instructed to do so by a physician.



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ADVICE TO PHYSICIAN: 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.

5. FIRE FIGHTING MEASURES

FLAMMABLE LIMITS IN AIR, UPPER: N/A
(% BY VOLUME) LOWER: N/A

FLASH POINT: None – will not burn

AUTOIGNITION TEMPERATURE: Not determined

NFPA HAZARD CLASSIFICATION

HEALTH: 1 FLAMMABILITY: 0 REACTIVITY: 1
OTHER:

EXTINGUISHING MEDIA: Appropriate for combustibles in the area.

SPECIAL FIRE FIGHTING PROCEDURES: Use water spray or foam to cool containers. Self-contained breathing apparatus (SCBA) is required if cylinders rupture and contents are released under fire conditions.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Containers may rupture under fire conditions.

HAZARDOUS DECOMPOSITION PRODUCTS: Under high temperatures, this product can form hydrochloric and hydrofluoric acids, and possibly carbonyl halides.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE:

(Always wear recommended personal protective equipment.)

Ventilate area, especially low and enclosed spaces where vapors may collect. Do not flush down sewers or storm drains. Contain spill with dikes or other containment devices. Collect with pumps, or absorbent material and transfer to steel drums for recovery, reclamation or disposal. Remove open flame. Use self-contained breathing apparatus (SCBA) for large spills.

Spills and releases may have to be reported to Federal and/or local authorities. See 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, expose them to open flame or excessive heat. R-11 boils at 23.6°C (74.5°F), hence contents may be under pressure.



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STORAGE RECOMMENDATIONS:

Store in a cool, well-ventilated area of low fire risk and keep out of direct sunlight. Protect container and its fittings from physical damage. Storage in subsurface locations should be avoided. Close valve or container tightly after use and when empty. If container temperature exceeds boiling point, cool the container before opening.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide local ventilation 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: General work clothing and gloves (leather) should provide adequate protection. : Where contact with liquid is likely, impervious gloves 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, or release into confined space, where the concentration may be above the PEL of 1,000 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: Where contact with liquid is likely, such as in a spill or leak, impervious boots and clothing should be worn. High dose-level warning signs are recommended for areas of principle exposure. Provide eyewash stations and quick-drench shower facilities at convenient locations. For tank cleaning operations, see OSHA regulations, 29 CFR 1910.132 and 29 CFR 1910.133.

EXPOSURE GUIDELINES

<u>INGREDIENT NAME</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>	<u>OTHER LIMIT</u>
Trichlorofluoromethane	Ceiling: 1000ppm	TWA 8: 1000ppm	None

OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS:

Hydrogen Fluoride: ACGIH TLV: 3 ppm ceiling

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Clear, colorless liquid
ODOR:	Slight ethereal
PHYSICAL STATE:	liquid
PH	Neutral
BOILING POINT (@ 736 mm Hg):	F: 74.5 C: 23.6



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VAPOR PRESSURE (psia):	12.8 @ 70°F (21.1°C)
VAPOR DENSITY (AIR = 1):	4.8
SPECIFIC GRAVITY (H ₂ O = 1):	1.47 @70°F (21.1°C)
SOLUBILITY IN WATER (@14.7 psia):	0.21 WT% @ 70°F (21.1°C)
PERCENT SOLIDS BY WEIGHT:	Liquid
PERCENT VOLATILE:	100% By Wt
VOLATILE ORGANIC COMPOUNDS (VOC):	Gas

10. STABILITY AND REACTIVITY

NORMALLY STABLE (CONDITIONS TO AVOID):

The product is stable.

Do not mix with oxygen or air above atmospheric pressure. Any source of high temperature, such as lighted cigarettes, flames, hot spots or welding may yield toxic and/or corrosive decomposition products.

INCOMPATIBILITIES:

Under specific conditions: e.g. very high temperatures and/or appropriate pressures – Freshly abraded aluminum surfaces may cause strong exothermic reaction. Chemically active metals: potassium, calcium, powdered aluminum, magnesium and zinc.

HAZARDOUS DECOMPOSITION PRODUCTS:

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

HAZARDOUS POLYMERIZATION:

Will not occur.

11. TOXICOLOGICAL INFORMATION

Animal Data: Inhalation 4 hour LC 50: 26,200 ppm in rats
Oral ALD : >11,000 mg/kg in rats
Skin absorption ALD: >9300 mg/kg in rabbits

12. ECOLOGICAL INFORMATION

Aquatic Toxicity: 96 hour LC50: 190 mg/l in rainbow trout
130: 48 h Daphnia magna mg/L EC50

Degradability (BOD): Not readily biodegradable.

13. DISPOSAL CONSIDERATIONS

RCRA

Is the unused product a RCRA hazardous waste if discarded?	Yes
If yes, the RCRA ID number is:	U121



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Disposal must comply with federal, state, and local disposal or discharge laws. R-11 is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling.

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

HAZARD CLASS: 9
ID NUMBER: UN3082
SHIPPING NAME: Environmentally Hazardous Substance, Liquid, N.O.S.
(Trichloromonofluoromethane)
PACKING GROUP: III
REPORTABLE QUANTITY: 5000 lbs.

For additional information on shipping regulations affecting this material, contact the information number found in Section 1.

15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS

TSCA (TOXIC SUBSTANCE CONTROL ACT): TSCA Inventory Status: Reported/Included

SARA TITLE III / CERCLA

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

<u>INGREDIENT NAME</u>	<u>SARA / CERCLA RQ (lb.)</u>
Trichlorofluoromethane	5000 lb.

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

SECTION 311 HAZARD CLASS: IMMEDIATE / ACUTE

SARA 313 TOXIC CHEMICALS: Trichlorofluoromethane is listed as a SARA 313 “Toxic Chemical”. CAS number is 75-69-4.

STATE RIGHT-TO-KNOW : Trichlorofluoromethane is a listed chemical for state right-to-know purposes.

ADDITIONAL REGULATORY INFORMATION:

Trichlorofluoromethane is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82.



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WARNING:

Do not vent to the atmosphere. To comply with provisions of the U.S. Clean Air Act, any residual must be recovered.

Contains Trichlorofluoromethane (CFC-11), a substance that harms public health and environment by destroying ozone in the upper atmosphere.

California Prop. 65: This product does not contain any chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

16. OTHER INFORMATION

DISCLAIMER: The above information is based upon technical information believed to be accurate but does not purport to all-inclusive and should be used only as a guide. Hudson Technologies Company shall not be held liable for any damage from handling or from contact with this product. No warranty of merchantability or any warranty, express or implied is made with respect to such information.