



Safety Data Sheet

R-500

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: R-500
OTHER NAME: Dichlorodifluoromethane, 1,1, Difluoroethane
USE: Refrigerant Gas
DISTRIBUTOR: National Refrigerants, Inc.
 661 Kenyon Avenue
 Bridgeton, New Jersey 08302

FOR MORE INFORMATION CALL:
 (Monday-Friday, 8:00am-5:00pm)
 1-800-262-0012

IN CASE OF EMERGENCY CALL:
 CHEMTREC: 1-800-424-9300

2. HAZARDS IDENTIFICATION

CLASSIFICATION: Gases under pressure, Liquefied Gas
SIGNAL WORD: WARNING
HAZARD STATEMENT: Contains gas under pressure, may explode if heated
SYMBOL: Gas Cylinder
PRECAUTIONARY STATEMENT: STORAGE: Protect from sunlight, store in a well ventilated place



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.

POTENTIAL HEALTH HAZARDS

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

EYES: Liquid contact can cause severe irritation and frostbite. Mist may irritate.

INHALATION: R-500 is low in acute toxicity in animals even at concentrations of 4% (40,000 ppm). However, when oxygen levels in air 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 unlikely because of the low boiling point of the material. Should it occur, discomfort in the gastrointestinal tract from rapid evaporation of the material and consequent evolution of gas would result. Some effects of inhalation and skin exposure would be expected.

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 ingredients listed in this section			



3. COMPOSITION / INFORMATION ON INGREDIENTS

<u>INGREDIENT NAME</u>	<u>CAS NUMBER</u>	<u>WEIGHT %</u>
Dichlorodifluoromethane (CFC-12)	75-71-8	73.8
1,1 Difluoroethane (HFC-152a)	75-37-6	26.2

COMMON NAME and SYNONYMS

R-500; CFC500

Trace impurities and additional material names not listed above may also appear in Section 15 toward the end of the MSDS. These materials may be listed for local "Right-To-Know" compliance and for other reasons.

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 immediately. DO NOT give epinephrine (adrenaline).

INGESTION: Ingestion is unlikely because of the physical properties and is not expected to be hazardous. DO NOT induce vomiting unless instructed to do so by a physician.

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 PROPERTIES

FLASH POINT:	Gas, not applicable per DOT regulations
FLASH POINT METHOD:	Not applicable
AUTOIGNITION TEMPERATURE:	Unknown
UPPER FLAME LIMIT (volume % in air):	None*
LOWER FLAME LIMIT (volume % in air):	None*
	*Based on ASHRAE Standard 34 with match ignition
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.

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).



This material may become flammable when mixed with air under pressure and exposed to strong ignition sources.

SPECIAL FIRE FIGHTING 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.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE: (Always wear recommended personal protective equipment.)

Evacuate unprotected personnel. Product dissipates upon release. Protected personnel should remove ignition sources and shut off leak, if without risk, and provide ventilation. Unprotected personnel should not return to the effected area 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 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 cylinders, expose them to open flame or excessive heat. Use authorized cylinders only. Follow standard safety precautions for handling and use of compressed gas cylinders.

STORAGE RECOMMENDATIONS:

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

INCOMPATIBILITIES:

Freshly abraded aluminum surfaces at specific temperatures and pressures may cause a strong exothermic reaction. Chemically reactive metals: potassium, calcium, powdered aluminum, magnesium, and zinc.

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:

Skin contact with refrigerant may cause frostbite. General work clothing and gloves (leather) should provide adequate protection. If prolonged contact with 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, 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>
Dichlorodifluoromethane	1000 ppm TWA (8hr)	1000 ppm TWA (8hr)	None
1,1-Difluoroethane	None	None	*1000 ppm TWA (8hr)

* = Workplace Environmental Exposure Level (AIHA)

OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS:

Hydrogen Fluoride: ACGIH TLV = 2ppm ceiling, 0.5ppm TLV-TWA

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Clear, colorless liquid and vapor	
PHYSICAL STATE:	Gas at ambient temperatures	
MOLECULAR WEIGHT:	99.31 average	
CHEMICAL FORMULA:	CCl ₂ F ₂ , CHF ₂ CH ₃	
ODOR:	Faint ethereal odor	
SPECIFIC GRAVITY (water = 1.0):	1.171 @ 30°C (86°F)	
SOLUBILITY IN WATER (weight %):	Unknown	
pH:	Neutral	
BOILING POINT:	-33.5°C (-28.3°F)	
FREEZING POINT:	-158°C (-252.4°F)	
VAPOR PRESSURE:	100.1 psia @ 70°F 231.7 psia @ 130°F	
VAPOR DENSITY (air = 1.0):	4.2	
EVAPORATION RATE:	>1	COMPARED TO: CCl ₄ = 1
% VOLATILES:	100	
FLASH POINT:	Not applicable (Flash point method and additional flammability data are found in Section 5.)	
ODOR THRESHHOLD:	High	
FLAMMABILITY:	Not applicable	
LEL/UEL:	None/None	
RELATIVE DENSITY:	1.16 g/cm ³ at 21.1 C	
PARTITION COEFF (n-octanol/water)	Not applicalbe	
AUTO IGNITION TEMP:	Not Determined	
DECOMPOSITION TEMPERATURE:	>250 degrees C	
VISCOSITY:	Not applicable	



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 temperatures, 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 reactive metals: potassium, calcium, powdered aluminum, magnesium, and zinc.

HAZARDOUS DECOMPOSITION PRODUCTS:

Halogens, halogen acids and possibly carbonyl halides.

HAZARDOUS POLYMERIZATION:

Will not occur.

11. TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS:

Dichlorodifluoromethane

LC₅₀ : Inhalation 4 hr. (rat) - > 760,000 ppm / Cardiac Sensitization threshold (dog) - 50,000 ppm

10 min EC₅₀ - 254,000 ppm

Difluoroethane

LD₅₀: single dose (rat) – non-lethal at 1,500 mg/kg

LC₅₀: 2 hr (rat) - ~383,000 ppm. Non-lethal at 200,000 ppm

Cardiac Sensitization NOEL - > 150,000 ppm

DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:

Dichlorodifluoromethane

Subchronic NOEL – 10,000 ppm

Difluoroethane

Exposures of rats 6 hrs/day, 5 days/week, for two years at levels up to 25,000 ppm, did not cause chronic toxicity or carcinogenic response.

OTHER DATA:

Teratology: Not a teratogen

REPEATED DOSE TOXICITY:

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

FURTHER INFORMATION:

Acute effects of rapid evaporation of the liquid may cause frostbite. Vapors are heavier than air and can displace oxygen causing difficulty breathing or suffocation. May cause cardiac arrhythmia.

12. ECOLOGICAL INFORMATION

Degradability (BOD):

R-500 is a gas at room temperature; therefore, it is unlikely to remain in water.

Octanol Water Partition Coefficient:

See Section 9



INGREDIENT NAME

WEIGHT %

COMMENT

No ingredients listed in this section

ADDITIONAL REGULATORY INFORMATION:

R-500 is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82.

WARNING: DO NOT vent to the atmosphere. To comply with provisions of the U.S. Clean Air Act, any residual must be recovered. **Contains Dichlorodifluoromethane (CFC-12)**, 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.

Contains R-152a, a greenhouse gas which may contribute to global warming.

WHMIS CLASSIFICATION (CANADA):

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

FOREIGN INVENTORY STATUS:

Dichlorodifluoromethane
Canada – Listed on DSL
EU - EINECS # 2206926

Difluoroethane
Canada – Listed on DSL
EU – EINECS # 2008661
ECL Serial No. 2-276

16. OTHER INFORMATION

CURRENT ISSUE DATE: April, 2015
PREVIOUS ISSUE DATE: November, 2012

OTHER INFORMATION: HMIS Classification: Health – 1, Flammability – 1, Reactivity – 0
NFPA Classification: Health – 2, Flammability – 1, Reactivity – 0
ANSI/ASHRAE 34 Safety Group – A1

Regulatory Standards:

1. OSHA regulations for compressed gases: 29 CFR 1910.101
2. DOT classification per 49 CFR 172.101
3. Clean Air Act Class I Substance

General

- a) CGA pamphlet P-1, Safe Handling of Compressed Gases in Containers, 1984, Compressed Gas Association (1980 Printing)
- b) Bretherick, L., Handbook of Reactive Chemical Hazards, 4th ed., 1992, Butterworths, Boston, MA

DISCLAIMER:

National Refrigerants, Inc. believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be valid where such product is used in combination with any other methods or use of the product and of the information referred to herein are beyond the control of National Refrigerants. National Refrigerants expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.