NATIONAL REFRIGERANTS, INC.

R-422E

Safety Data Sheet

R-422E

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: R-422E
OTHER NAME: 1,1,1,2,2-Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane
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 (HCI), Hydrofluoric Acid (HF) and carbonyl halides.

POTENTIAL HEALTH HAZARDS:

SKIN: Irritation can result from a defatting action on tissue. Liquid contact may cause frostbite

EYE: Liquid may cause frostbite. Mist may irritate.

INHALATION: Overexposure may cause dizziness and loss of concentration. At higher levels, central nervous system depression and cardiac arrhythmia may result.

INGESTION: Unlikely route of exposure. Should it result, discomfort in the gastrointestinal tract would occur.

DELAYED EFFECTS: None Known

CHRONIC (CANCER) INFORMATION: None of the components are designated as carcinogens by IARC, NTP, OSHA, or ACGIH.

TERATOLOGY (BIRTH DEFECT) INFORMATION: No hazard expected.

Ingredients found on one of the OSHA designated carcinogen lists are listed below.

INGREDIENT NAME	NTP STATUS	IARC STATUS	OSHA LIST
No ingredients listed in this section			

3. COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS NUMBER	WEIGHT %
1,1,1,2,2-Pentafluoroethane (HFC - 125)	354-33-6	58%
1,1,1,2-Tetrafluoroethane (HFC - 134A)	811-97-2	39.3%
Isobutane (HC - 600A)	75-28-5	2.7%

COMMON NAME and SYNONYMS
R-422E; HFC422E

There are no impurities or stabilizers that contribute to the classification of the material identified in Section 2

4. FIRST AID MEASURES

SKIN: Warm the area gradually by flushing with plenty of water. Get medical attention if there is evidence of tissue damage.

EYES: Irrigate eyes with running water for at least 15 minutes. Get medical attention.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration administer oxygen and call a physician. DO NOT give epinephrine or similar drugs.

INGESTION: Do not induce vomiting. Get medical attention.

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:

FLAMMABLE PROPERTIES

FLASH POINT:	None
FLASH POINT METHOD:	Not applicable
AUTOIGNITION TEMPERATURE:	>550 deg. C (1022 deg. F)
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:
The choice of media depends on surrounding materials.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
Cylinders may rupture under elevated temperatures and /or fire conditions. In concentration above the recommended exposure limit, open flame will vary in size and color. Eliminate the flame or ignition source and ventilate to disperse the

refrigerant vapors. Refrigerant 422E is not flammable at atmospheric pressure and temperatures below 100 deg. C. Refrigerant 422E should not exist with air/excess oxygen at elevated pressures and high temperatures. Refrigerant 422E can become combustible with combinations of elevated temperatures, pressures, and oxygen, and an ignition source. For example: Do not mix Refrigerant 422E with air under pressure for leak detection purposes.

SPECIAL FIRE FIGHTING PRECAUTIONS/ INSTRUCTIONS:

Keep personnel removed and upwind of fire. Wear self contained breathing apparatus. Wear full protective equipment. Cool tank/container with water spray. Heat may rupture containers. Fight fire from distance. Contain and neutralize runoff prior to disposal.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE:

Note: Review FIRE FIGHTING MEASURES and HANDLING sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean up.

Remove or extinguish combustion sources. Evacuate enclosed spaces until gas is dispersed. Stop the release if possible. Ventilate area including low or enclosed spaces. Exhaust outdoors. Contain spill and collect remainder using absorbent material and place in drum approved for waste disposal or recovery.

Spills and releases may have to be reported to Federal and /or local authorities. See Section 15 regarding reporting requirements.

7. HANDLING AND STORAGE

HANDLING (Personnel):

Avoid breathing vapors and liquid contact with eyes, skin or clothing. Use with sufficient ventilation to keep employee exposure below recommended limits. Avoid contact with hot surfaces. Avoid high temperatures. Smoking is forbidden.

STORAGE RECOMMENDATIONS:

Storage facilities should be equipped with ventilation at low level. Take all necessary precautions to avoid the accidental release of the product outside, due to the rupture of containers or transfer system. Keep the container tightly closed and dry in a cool, well-ventilated area. Keep at temperatures not exceeding 45° and away from any source of heat or ignition.

INCOMPATIBILITIES:

Refer to the detailed list of incompatible materials (section 10 “Stability/Reactivity). Incompatible with magnesium and its alloys, zinc and its alloys, and aluminum alloys containing more than 2% magnesium

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS:

Avoid contact with skin or eyes. Avoid breathing vapors. Use with sufficient ventilation to keep exposure below recommended exposure limit. Utilize mechanical ventilation in case of low or enclosed spaces, or release of large quantity.

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

INGREDIENT NAME	ACGIH TLV	OSHA PEL	OTHER LIMITS
Pentafluoroethane	None	None	*1000 ppm TWA (8hr)
1,1,1,2-Tetrafluoroethane	None	None	*1000 ppm TWA (8hr)
Isobutane	1000 ppm TWA (8hr)	None	** 800 ppm TWA (10hr)

* = Workplace Environmental Exposure Level (AIHA).
**= National Institute of Occupational Safety & Health (NIOSH).

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Colorless
PHYSICAL STATE:	Gas at ambient temperature
MOLECULAR WEIGHT:	109.3
CHEMICAL FORMULA:	CF_3CHF_2,CF_3CH_2F, C_4H_{10}
ODOR:	Slight ethereal
SPECIFIC GRAVITY (water =1.0):	1.18 @ 21˚C
SOLUBILITY IN WATER (weight %):	Not Determined
pH:	Neutral
BOILING POINT:	Dew @ 1 atm. -33.6˚F Bubble @ 1 atm. -43.2˚F
FREEZING POINT:	Not determined
VAPOR PRESSURE:	@ 68˚F 135.9 psia @ 140˚F 362.25 psia
VAPOR DENSITY (air = 1.0):	3.86
EVAPORATION RATE:	>1 (CCl_4 = 1)
MOECULAR WEIGHT:	109.3 g/mol
% VOLITILES:	100
ODOR THRESHHOLD:	Not established
FLAMMABILITY:	Not applicable
LEL/UEL:	None/None
RELATIVE DENSITY:	1.18 g/cm^3 @ 21˚C
PARTITION COEFF (n-octanol/ water)	Not applicable

AUTO IGNITION TEMP: Not determined
DECOMPOSITION TEMPERATURE: >250˚C
VISCOSITY: Not applicable
FLASH POINT:
(Flash point method and additional flammability data are found in Section 5)

10. STABILITY AND REACTIVITY

NORMALLY STABLE: (CONDITIONS TO AVOID):
Material is stable. However, avoid open flames and high temperatures.

INCOMPATIBILITIES:
Incompatible with alkali or alkaline earth metals, powdered metals, magnesium.

HAZARDOUS DECOMPOSITION PRODUCTS:
Decomposition products are hazardous. High temperatures or flames will cause decomposition by products forming halogens, halogen acids and possible carbonyl halides.

HAZARDOUS POLYMERIZATION:
Will not occur.

OTHER HAZARDS:
Cylinders of used product may contain oil as well as refrigerant. A leak or venting during a fire will produce a cloud of oil mist that is flammable.

11. TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS:

HFC-125:	LC_{50} : 4 hr. (rat) - > 769,000 ppm Cardiac Sensitization threshold (dog) 75,000 ppm.
HFC-134a:	LC_{50} : 4 hr. (rat) - > 3590,000 ppm Cardiac Sensitization threshold (dog) 80,000 ppm.
R-600a:	LC_{50} : 15 min. (rat) - 520,000 ppm

DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:

HFC-125:	Teratogenic NOEL (rat and rabbit) – 50,000 ppm Subchronic inhalation (rat) NOEL - >50,000 ppm Chronic NOEL – 10,000 ppm
HFC-134a:	Teratogenic NOEL (rat and rabbit) – 40,000 ppm Subchronic inhalation (rat) NOEL - 50,000 ppm Chronic NOEL – 10,000 ppm
R-600a:	Subchronic inhalation (rat) NOAEL - 4,489 ppm

OTHER DATA:

HFC–125, HFC–134a: Not active in four genetic studies
R-600a: Negative Ames test with and without activation

POTENTIAL HEALTH HAZARDS:

SKIN: Irritation can result from a defatting action on tissue. Liquid contact may cause frostbite

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INHALATION: Overexposure may cause dizziness and loss of concentration. At higher levels, central nervous system depression and cardiac arrhythmia may result.

INGESTION: Unlikely route of exposure. Should it result, discomfort in the gastrointestinal tract would occur.

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CHRONIC (CANCER) INFORMATION: None of the components are designated as carcinogens by IARC, NTP, OSHA, or ACGIH.

TERATOLOGY (BIRTH DEFECT) INFORMATION: No hazard expected.

Ingredients found on one of the OSHA designated carcinogen lists are listed below.

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12. ECOLOGICAL INFORMATION

DEGRADABILITY:

Refrigerant 422E is a gas at room temperature. It is unlikely to remain in water.

Octanol Water Partition Coefficient: As blended N/A (See section 9)

Components:		Aquatic Toxicity: R-134a
	R-134a – Log Pow = 1.06	48 hrs. LC50 – daphnia magna: mg/L
	R-125 – Log Pow = 1.48	96 hrs. LC50 rainbow trout: 450 mg/L
	R-600a – Log Pow = 2.8	

13. DISPOSAL CONSIDERATIONS

RCRA: Alteration to the product such as mixing with other material may change the characteristics of the material and alter the RCRA classification and the proper disposal method.

OTHER DISPOSAL CONSIDERATIONS:

Disposal must comply with federal, state, and local regulations. Refrigerant 422E is subject to Clean Air Act Regulations Section 608 in 40 CFR Part 82 concerning refrigerant recycling.

14. TRANSPORT INFORMATION

US DOT ID NUMBER: UN3163
US DOT PROPER SHIPPING NAME: Liquefied Gas, n.o.s (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane)
US DOT HAZARD CLASS: 2.2
US DOT PACKING GROUP: N/A

15. REGULATORY INFORMATION

TOXIC SUBSTANCE CONTROL ACT (TSCA)

Components: Listed on Inventory

SARA TITLE III/CERCLA: Components:

Reportable Quantities (RQs):	No components listed
Threshold Planning Quantities (TPQs):	No components listed
Section 311 Hazard Class:	IMMEDIATE PRESSURE
Section 313 Toxic Chemical:	No components listed

WHMIS Classification (Canada): This product has been evaluated with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

ADDITIONAL REGULATORY INFORMATION: U. S. Clean Air Act – 40 CFR Part 82

16. OTHER INFORMATION

HMIS Classification:

Health	**1**
Flammability	**1**
Reactivity	**0**

NFPA Classification:

Health	**2**
Flammability	**1**
Reactivity	**0**

OSHA Regulations for compressed gases: 29CFR 1910.11

DOT Classification per 49 CFR 172.101

ANSI/ASHRAE: Standard 34 Safety Designation – A1

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