

Material Safety Data Sheet

NU-22B® (R-422B)

1 CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Product Name: NU-22B® (R-422B)
Product Use: Refrigerant
Manufacturer: ICOR International, Inc.
 10640 E. 59th St.
 Indianapolis, IN 46236

In Case Of Emergency Call: (24 Hours/Day, 7 Days/Week) CHEMTREC: 1-800-424-9300
 Product Information Call: (Monday-Friday, 7:30 am-4:30 pm Eastern Time) ICOR: 1-800-497-6805

2 COMPOSITION/INFORMATION ON INGREDIENTS

| Material: | CAS Number | Typical Wt. % |
|---------------------------------------|------------|---------------|
| 1,1,1,2,2-pentafluoroethane (HFC-125) | 354-33-6 | 55% |
| 1,1,1,2-tetrafluoroethane (HFC-134a) | 811-97-2 | 42% |
| Isobutane (HC-600a) | 75-28-5 | 3% |

3 HAZARDS IDENTIFICATION

Emergency Overview

Overexposure may cause dizziness and loss of concentration. At higher levels, central nervous system depression and cardiac arrhythmia may result. Vapors displace air and may cause asphyxiation in confined spaces. Volatile liquid with faint sweetish odor.

Potential Health Effects:

EYE: Liquid may cause frostbite. Mist may irritate.
SKIN: Irritation can result from a defatting action on tissue. Liquid contact may cause frostbite.
INGESTION: Unlikely route of exposure. Should it result, discomfort in the gastrointestinal tract would occur.
INHALATION: Overexposure may cause dizziness and loss of concentration. At higher levels, central nervous system depression and cardiac arrhythmia may result.
CHRONIC (CANCER) INFORMATION: None of the components are designated as carcinogens by IARC, NTP, OSHA, or ACGIH.
TERATOLOGY (BIRTH DEFECT) INFORMATION: Not expected to be teratogenic.
REPRODUCTIVE INFORMATION: No hazard expected.

4 FIRST AID MEASURES

INHALATION: Remove to fresh air. If not breathing, give artificial respiration, administer oxygen and call a physician. DO NOT give epinephrine or similar drugs.
SKIN CONTACT: Warm the area gradually by flushing with plenty of water. Get medical attention if there is evidence of tissue damage.
EYE CONTACT: Irrigate eyes with running water for at least 15 minutes. Get medical attention.
INGESTION: Do not induce vomiting. Get medical attention.

Flammable Properties:

| | | |
|---------------------------------------|----------------|---------------------------------------|
| Flash Point: | No flash point | Flammable Limits in Air (% by volume) |
| Flammable Limits in Air (% by volume) | | LEL: NONE (per ASTM E681) |
| Autoignition: >550°C (1022°F) | | UEL: NONE (per ASTM E681) |

Fire and Explosion Hazards:

Cylinders may rupture under elevated temperatures and/or fire conditions. In concentrations 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.

NU-22B is not flammable at atmospheric pressure and temperatures below 100°C (212°F). NU-22B should not exist with air/excess oxygen at elevated pressures and high temperatures. NU-22B can become combustible with combinations of elevated temperatures, pressures, and oxygen, and an ignition source.

For example: Do not mix NU-22B with air under pressure for leak detection purposes.

Extinguishing Media:

The choice of media depends on surrounding materials.

Fire Fighting 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.

Safeguards (Personnel):

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

Accidental Release Measures:

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.

Handling (Personnel):

Avoid breathing vapors. Avoid contact with skin or eyes. Use insulated or lined butyl gloves, face shield or goggles, and impervious clothing. Do not smoke.

Handling (Physical Aspects):

Insure adequate ventilation to keep exposure below recommended limits. Avoid contact with chlorine or other oxidizing. See Fire and Explosion Data section.

Storage:

Do not store cylinders in direct sun or expose to heat above 120°F (52°C).

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:

EYE/FACE PROTECTION: Goggles or face shield.
 RESPIRATORS: Use if exposure level is above PEL.
 PROTECTIVE CLOTHING: Impervious.
 HYGIENE MEASURES: Do not drink, eat, or smoke in work place.

Exposure Guidelines:

Long Term Exposure Limit**:
 1000 ppm
 (8 hr. TWA reference period)

Individual Component Applicable Exposure Limits:

Pentafluoroethane (HFC-125)

AEL* (ICOR): 1000 ppm - 8 & 12 hr. TWA
 WEEL (AIHA): 1000 ppm - 4900 mg/m³, 8 hr. TWA
 PEL (OSHA): none established
 TLV (ACGIH): none established

Isobutane (HC-600a)

TLV (ACGIH): 1,000 ppm, 8 hrs. TWA
 DFG MAK: 1,000 ppm; 2350 mg/m³
 Peak limitation category
 TWA (NIOSH) 800 ppm; 1,900 mg/m³
 Recommended TWA 10 hrs.

1,1,1,2-Tetrafluoroethane (HFC-134a):

AEL* (ICOR): 1000 ppm - 8 & 12 hr. TWA
 WEEL (AIHA): 1000 ppm - 4900 mg/m³, 8 hr. TWA
 PEL (OSHA): none established
 TLV (ACGIH): none established

** As blended (ICOR Acceptable Exposure Limit)

* ICOR reviews industry standards and recommendations in consideration of acceptable exposure limitations. Where regulated exposure limits are lower than ICOR's recommended AEL, those limits shall supersede.

Physical Data:

| | | | |
|----------------------|----------------------------|-----------------|--------------------------|
| Physical state: | Gas at ambient temperature | Density: | |
| Color: | Colorless | Liquid @ 1 atm. | 87.25 lb/ft ³ |
| Odor: | Slightly ethereal | Vapor @ 1 atm. | .3633 lb/ft ³ |
| Solubility in Water: | Not determined | Vapor Pressure: | |
| Boiling Point: | Dew @ 1 atm. -32.15°F | @ 68°F | 116.0 psia |
| | Bubble @ 1 atm. -40.86°F | @ 140°F | 328.0 psia |
| Freezing Point: | Not determined | pH | neutral |
| Molecular Weight: | 108.53 g/mol | % Volatiles: | 100 |

Chemical stability: Material is stable. However, avoid high temperatures and open flames

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

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.

Immediate (Acute) Effects

HFC-134a:

LC₅₀: 4 hr. (rat) >769,000 ppm
 NOEL 75,000 ppm

As blended: untested

HFC-125:

LC₅₀: 4 hr. (rat) >359,000 ppm
 NOEL (dog) 49,800 ppm

HC-600a:

LC₅₀: 2 hr. (mouse) >520,000 ppm

Degradability (BOD): NU-22B is a gas at room temperature. It is unlikely to remain in water.

Octanol Water Partition Coefficient: As blended N/A

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

Disposal must comply with federal, state, and local regulations. NU-22B is subject to Clean Air Act Regulations Section 608 in 40 CFR Part 82 concerning refrigerant recycling.

RCRA: Not a hazardous waste

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.

DOT/IMO/IATA

| | | | |
|-----------------------|---|---------------------|--|
| Proper shipping Name: | Liquefied Gas N.O.S. (Pentafluoroethane, 1,1,1,2- Tetrafluoroethane) | Labeling: | 2-NonFlammable Gas |
| Hazard Class: | 2.2 | Cargo Aircraft: | Packing instructions – 200 quantity: 150 kg |
| UN Number: | 3163 | Passenger Aircraft: | Packing instructions – 200 quantity: 75kg |

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

Additional Regulatory Information:

U. S. Clean Air Act - 40 CFR Part 82

Foreign Inventory Status: Components:

EU-EINECS #2065578 – HFC-125
#223770 – HFC-134a
#2008572 – HC-600a

Section 311 Hazard Class: IMMEDIATE PRESSURE

Section 313 Toxic Chemicals: 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.

CEPA Status: Components listed on DSL

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

DISCLAIMER

The information contained in this MSDS pertains only to the specific material designated herein and does not relate to use in combination with other materials. This information is offered in good faith. No warranty, either expressed or implied, as to suitability to application is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be reliable. Each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate. These recommendations are not intended to supersede state or local safety codes and procedures. The information contained herein is subject to revision without notification as additional knowledge and experience is gained.