December 19, 2025

SAFETY DATA SHEET – R-422B

1. IDENTIFICATION

PRODUCT NAME: R-422B

SYNONYM: 1,1,1,2,2-Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Isobutane

RECOMMENDED USE: Refrigerant

DISTRIBUTOR: Hudson Technologies Company
ADDRESS: 300 Tice Blvd.
Suite 290
Woodcliff Lake, NJ 07677

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

2. HAZARDS IDENTIFICATION

CLASSIFICATION: Gases Under Pressure – Liquefied gas

SIGNAL WORD: **WARNING**

HAZARD STATEMENT: Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

SYMBOL: Gas Cylinder

PRECAUTIONARY STATEMENT
STORAGE: Protect from sunlight, store in a well-ventilated place

OTHER HAZARDS: Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing. Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardi-ac effects. Rapid evaporation of the product may cause frostbite.

3. COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENT NAME CAS NUMBER WEIGHT %

Substance / Mixture : Mixture

COMPONENTS

Chemical name	CAS-No.	Concentration (% w/w)
Pentafluoroethane#	354-33-6	55
1,1,1,2-Tetrafluoroethane#	811-97-2	42
Isobutane	75-28-5	2.9642

Voluntarily-disclosed non-hazardous substance

4. FIRST AID MEASURES

GENERAL: In the case of accident or if you feel unwell, seek medical ad-vice immediately. When symptoms persist or in all cases of doubt seek medical advice
INHALATION: If inhaled, remove to fresh air. Get medical attention if symptoms occur.
SKIN: Thaw frosted parts with lukewarm water. Do not rub affected area. Get medical attention immediately.
EYES: Get medical attention immediately.
INGESTION: Ingestion is not considered a potential route of exposure.
MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED: May cause cardiac arrhythmia. Other symptoms potentially related to misuse or inhalation abuse are Cardiac sensitization, Anaesthetic effects, Light-headedness, Dizziness, confusion, Lack of coordination, Drowsiness, Unconsciousness, Contact with liquid or refrigerated gas can cause cold burns and frostbite.
FIRST AIDERS: No special precautions are necessary for first aid responders.
ADVICE TO PHYSICIAN: Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with special caution.

5. FIRE FIGHTING MEASURES

SUITABLE EXTINGUISHING MEDIA:
Water spray
Alcohol-resistant foam
Carbon dioxide (CO2)
Dry chemical

UNSUITABLE EXTINGUISHING MEDIA:
None known

SPECIFIC HAZARDS DURING FIRE FIGHTING:
Exposure to combustion products may be a hazard to health. If the temperature rises there is danger of the vessels bursting due to the high vapor pressure.

HAZARDOUS COMBUSTION PRODUCTS:
Fluorine compounds
Carbon oxides
Hydrogen fluoride
carbonyl fluoride

SPECIFIC EXTINGUISHING METHODS:

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Fight fire remotely due to the risk of explosion. Use water spray to cool unopened containers.
Remove undamaged containers from fire area if it is safe to do so.
Evacuate area.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS:

Wear self-contained breathing apparatus for firefighting if necessary.
Use personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES:

Evacuate personnel to safe areas.
Avoid skin contact with leaking liquid (danger of frostbite). Ventilate the area.
Follow safe handling advice (see section 7) and personal protective equipment recommendations (see section 8).

ENVIRONMENTAL PRECAUTIONS:

Avoid release to the environment.
Prevent further leakage or spillage if safe to do so.
Retain and dispose of contaminated wash water.

METHODS AND MATERIALS FOR CONATINMENT AND CLEANING UP:

Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

7. HANDLING AND STORAGE

TECHNICAL MEASURES:

Use equipment rated for cylinder pressure. Use a backflow preventative device in piping. Close valve after each use and when empty.

LOCAL/TOTAL VENTILATION:

Use only with adequate ventilation.

ADVICE ON SAFE HANDLING:

Do not breathe gas. Avoid breathing gas.
Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure Assessment
Wear cold insulating gloves/ face shield/ eye protection. Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use point.
Use a check valve or trap in the discharge line to prevent ha-zardous back flow into the cylinder.
Prevent backflow into the gas tank.
Use a pressure reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping or systems.
Close valve after each use and when empty. Do NOT change or force fit connections.
Prevent the intrusion of water into the gas tank. Never attempt to lift cylinder by its cap.
Do not drag, slide or roll cylinders.
Use a suitable hand truck for cylinder movement. Keep away from heat and sources of ignition.
Take precautionary measures against static discharges.
Take care to prevent spills, waste and minimize release to the environment.

CONDITIONS FOR SAFE STORAGE:

Cylinders should be stored upright and firmly secured to prevent falling or being knocked over.
Separate full containers from empty containers. Do not store near combustible materials.
Avoid area where salt or other corrosive materials are present. Keep in properly labeled containers.
Keep in a cool, well-ventilated place. Keep away from direct sunlight.
Store in accordance with the particular national regulations

MATERIALS TO AVOID:

Do not store with the following product types:
Self-reactive substances and mixtures
Organic peroxides
Oxidizing agents
Flammable liquids
Flammable solids
Pyrophoric liquids
Pyrophoric solids
Self-heating substances and mixtures
Substances and mixtures which in contact with water emit flammable gases
Explosives
Acutely toxic substances and mixtures
Substances and mixtures with chronic toxicity

RECOMMENDED STORAGE TEMPERATURE:

< 126 °F / < 52 °C

STORAGE PERIOD:

> 10 y

FURTHER INFORMATION ON STORAGE STABILITY:

Keep container tightly closed in a dry and well-ventilated place.
Stable under recommended storage conditions.
Keep away from direct sunlight.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Pentafluoroethane	354-33-6	TWA	1,000 ppm	US WEEL
1,1,1,2-Tetrafluoroethane	811-97-2	TWA	1,000 ppm	US WEEL
Isobutane	75-28-5	TWA	800 ppm 1,900 mg/m³	NIOSH REL
		STEL	1,000 ppm	ACGIH

ENGINEERING CONTROLS:

Ensure adequate ventilation, especially in confined areas.
Minimize workplace exposure concentrations.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory protection: General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection

Hand protection:

Remarks: Take note that the product is extremely cold, which may impact the selection of hand protection. Wash hands before breaks and at the end of workday.

Eye protection: Wear the following personal protective equipment: Chemical resistant goggles must be worn. Face-shield

Skin and body protection: Skin should be washed after contact.

Protective measures: Wear cold insulating gloves/ face shield/ eye protection.

Hygiene measures: If exposure to chemical is likely during typical use, provide eye flushing systems and safety showers close to the working place.
When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Liquefied gas
COLOR:	Colorless
ODOR:	Slight ether-like
ODOR THRESHOLD:	No data available
pH:	7
MELTING POINT/FREEZING POINT:	No data available
INITIAL BOILING POINT AND BOILING RANGE:	-32.6 °F / -35.9 °C
FLASH POINT:	NA
EVAPORATION RATE:	NA
FLAMMABILITY (SOLID, GAS):	No data available
UPPER EXPLOSION LIMIT/ UPPER FLAMMABILITY LIMIT:	Upper flammability limit No data available
VAPOR PRESSURE:	8,300 hPa (68 °F / 20 °C) 23,460 hPa (140 °F / 60 °C)
RELATIVE VAPOR DENSITY:	No data available
RELATIVE DENSITY:	No data available
DENSITY:	0.0058 g/cm³ (as liquid)
SOLUBILITY(IES)	
WATER SOLUBILITY:	No data available
PARTITION COEFFICIENT	

NOCATANOL/WATER:	NA
AUTOIGNITION TEMPERATURE:	> 1022 °F / > 550 °C
DECOMPOSITION TEMPERATURE:	No data available
VISCOSITY	
VISCOSITY, KINEMATIC:	NA
EXPLOSIVE PROPERTIES:	Not explosive
OXIDIZING PROPERTIES:	The substance or mixture is not classified as oxidizing.
PARTICLE SIZE:	NA

10. STABILITY AND REACTIVITY

REACTIVITY: Not classified as a reactivity hazard.

CHEMICAL STABILITY:
Stable if used as directed. Follow precautionary advice and avoid incompatible materials and conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:
Can react with strong oxidizing agents.

CONDITIONS TO AVOID:
This substance is not flammable in air at temperatures up to 100 °C (212 °F) at atmospheric pressure. However, mixtures of this substance with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. This substance can also become combustible in an oxygen enriched environment (oxygen concentrations greater than that in air). Whether a mixture containing this substance and air, or this substance in an oxygen enriched atmosphere become combustible depends on the inter-relationship of 1) the temperature 2) the pressure, and 3) the proportion of oxygen in the mixture. In general, this substance should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. For example this substance should NOT be mixed with air under pressure for leak testing or other purposes.
Heat, flames and sparks.

INCOMPATIBLE MATERIALS:
Oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS:
No hazardous decomposition products are known.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Inhalation
Skin contact
Eye contact

Acute toxicity
Not classified based on available information.

Components:

Pentafluoroethane:

Acute inhalation toxicity:	LC50 (Rat): > 800000 ppm Exposure time: 4 h Test atmosphere: gas Method: OECD Test Guideline 403 No observed adverse effect concentration (Dog): 75000 ppm Remarks: Cardiac sensitization Cardiac sensitisation threshold limit (Dog): 368.159 mg/m³ Remarks: Cardiac sensitization

1,1,1,2-Tetrafluoroethane:

Acute oral toxicity	Assessment: The substance or mixture has no acute oral toxicity
Acute inhalation toxicity:	LC50 (Rat): > 567000 ppm Exposure time: 4 h Test atmosphere: gas Method: OECD Test Guideline 403 No observed adverse effect concentration (Dog): 40000 ppm Test atmosphere: gas Remarks: Cardiac sensitization Lowest observed adverse effect concentration (Dog): 80000 ppm Test atmosphere: gas Symptoms: May cause cardiac arrhythmia. Cardiac sensitisation threshold limit (Dog): 334,000 mg/m³ Test atmosphere: gas Symptoms: May cause cardiac arrhythmia.

Isobutane:

Acute inhalation toxicity:	LC50 (Rat): 570000 ppm Exposure time: 15 min Test atmosphere: gas

Skin corrosion/irritation
Not classified based on available information.

Components:

1,1,1,2-Tetrafluoroethane:

Result:	No skin irritation

Serious eye damage/eye irritation
Not classified based on available information.

Components:

1,1,1,2-Tetrafluoroethane:

Result:	No eye irritation

Respiratory or skin sensitization

Skin sensitization
Not classified based on available information.

Respiratory sensitization
Not classified based on available information.

Components:

1,1,1,2-Tetrafluoroethane:

Routes of exposure:	Skin contact
Result:	negative
Routes of exposure	Inhalation
Species:	Rat
Result:	negative
Routes of exposure	Inhalation
Species:	Humans
Result:	negative

Germ cell mutagenicity

Not classified based on available information.

Components:

Pentafluoroethane:

Genotoxicity in vitro:	Test Type: Bacterial reverse mutation assay (AMES) Method: OECD Test Guideline 471 Result: negative
	Test Type: In vitro mammalian cell gene mutation test Result: negative Remarks: Based on data from similar materials
	Test Type: Chromosome aberration test in vitro Method: OECD Test Guideline 473 Result: negative
Genotoxicity in vivo:	Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay) Species: Mouse Application Route: inhalation (gas) Method: OECD Test Guideline 474 Result: negative

1,1,1,2-Tetrafluoroethane:

Genotoxicity in vitro:	Test Type: Bacterial reverse mutation assay (AMES) Method: OECD Test Guideline 471 Result: negative

Genotoxicity in vivo:	Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay) Species: Mouse Application Route: inhalation (gas) Method: OECD Test Guideline 474 Result: negative
Germ cell mutagenicity – Assessment	Weight of evidence does not support classification as a germ cell mutagen.

Isobutane:

Genotoxicity in vitro:	Test Type: Chromosome aberration test in vitro Method: OECD Test Guideline 473 Result: negative Remarks: Based on data from similar materials Test Type: Bacterial reverse mutation assay (AMES) Result: negative Remarks: Based on data from similar materials
Genotoxicity in vivo:	Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay) Species: Rat Application Route: inhalation (gas) Method: OECD Test Guideline 474 Result: negative Remarks: Based on data from similar materials

Carcinogenicity
Not classified based on available information.

Components:

1,1,1,2-Tetrafluoroethane:

Species	:	Rat
Application Route	:	inhalation (gas)
Exposure time	:	2 Years
Method	:	OECD Test Guideline 453
Result	:	negative
Carcinogenicity – Assessment	:	Weight of evidence does not support classification as a carcinogen

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity
Not classified based on available information.

Components:

Pentafluoroethane:

Effects on fertility:	Test Type: One-generation reproduction toxicity study Species: Rat Application Route: inhalation (vapor) Result: negative Remarks: Based on data from similar materials
Effects on fetal development:	Test Type: Embryo-fetal development Species: Rat Application Route: inhalation (gas) Method: OECD Test Guideline 414 Result: negative

1,1,1,2-Tetrafluoroethane:

Effects on fertility:	Species: Mouse Application Route: inhalation Result: negative
Effects on fetal development:	Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rabbit Application Route: inhalation (gas) Method: OECD Test Guideline 414 Result: negative
Reproductive toxicity - Assessment:	Weight of evidence does not support classification for reproductive toxicity

Isobutane:

Effects on fertility:	Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: inhalation (gas) Method: OECD Test Guideline 422 Result: negative
Effects on fetal development:	Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: inhalation (gas) Method: OECD Test Guideline 422 Result: negative

STOT-single exposure
Not classified based on available information.

Components:

1,1,1,2-Tetrafluoroethane:

Routes of exposure	inhalation (gas)
Assessment	No significant health effects observed in animals at concentrations of 20000 ppmV/4h or less

Isobutane:
Assessment: May cause drowsiness or dizziness.

STOT-repeated exposure
Not classified based on available information.

Components:

1,1,1,2-Tetrafluoroethane:
Routes of exposure: inhalation (gas)
Assessment: No significant health effects observed in animals at concentrations of 250 ppmV/6h/d or less.

Repeated dose toxicity

Components:

Pentafluoroethane:

Species	:	Rat
NOAEL	:	>= 50000 ppm
Application Route	:	inhalation (gas)
Exposure time	:	13 Weeks
Method	:	OECD Test Guideline 413

1,1,1,2-Tetrafluoroethane:

Species	:	Rat, male and female
NOAEL	:	50000 ppm
LOAEL	:	>50000 ppm
Application Route	:	inhalation (gas)
Exposure time	:	2 y
Method	:	OECD Test Guideline 453

Isobutane:

Species	:	Rat
NOAEL	:	>= 9000 ppm
Application Route	:	inhalation (gas)
Exposure time	:	6 Weeks
Method	:	OECD Test Guideline 422

Aspiration toxicity
Not classified based on available information.

Components:

1,1,1,2-Tetrafluoroethane:
No aspiration toxicity classification

12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Pentafluoroethane:

Toxicity to fish:	LC50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l Exposure time: 96 h Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates	EC50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h Remarks: Based on data from similar materials
Toxicity to algae/aquatic plants:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials
	NOEC (Pseudokirchneriella subcapitata (green algae)): > 1 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials

1,1,1,2-Tetrafluoroethane:

Toxicity to fish:	LC50 (Oncorhynchus mykiss (rainbow trout)): > 450 mg/l Exposure time: 96 h Method: Regulation (EC) No. 440/2008, Annex, C.1
Toxicity to daphnia and other aquatic invertebrates	EC50 (Daphnia magna (Water flea)): 980 mg/l Exposure time: 48 h Method: Regulation (EC) No. 440/2008, Annex, C.2
Toxicity to algae/aquatic plants:	ErC50 (green algae): > 100 mg/l Exposure time: 96 h Remarks: Based on data from similar materials

Persistence and degradability

Components:

Pentafluoroethane

Biodegradability:	Result: Not readily biodegradable. Biodegradation: 5 % Exposure time: 28 d Method: OECD Test Guideline 301D

1,1,1,2-Tetrafluoroethane:

Biodegradability:	Result: Not readily biodegradable. Method: OECD Test Guideline 301D

Isobutane:
Biodegradability: Result: Readily biodegradable.
Remarks: Based on data from similar materials

Bioaccumulative potential

Components:

Pentafluoroethane:
Partition coefficient noctanol/water: Pow: 1.48
Method: OECD Test Guideline 107

1,1,1,2-Tetrafluoroethane:
Bioaccumulation: Remarks: Bioaccumulation is unlikely.

Partition coefficient noctanol/water: Pow: 1.06

Isobutane:
Partition coefficient noctanol/water: Pow: 2.8

Mobility in soil
No data available

Other adverse effects
No data available

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHODS

Waste from residues:
Dispose of in accordance with local regulations.

Contaminated packaging: Empty containers should be taken to an approved waste handling site for recycling or disposal. Empty pressure vessels should be returned to the supplier. If not otherwise specified: Dispose of as unused product.

14. TRANSPORT INFORMATION

International Regulations

UNRTDG

UN number	:	UN 3163
Proper shipping name	:	LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane)
Class	:	2.2
Packing group	:	Not assigned by regulation
Labels	:	2.2

IATA-DGR

UN/ID No.	:	UN 3163
Proper shipping name	:	Liquefied gas, n.o.s. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane)

Class	:	2.2
Packing group	:	Not assigned by regulation
Labels	:	Non-flammable, non-toxic Gas
Packing instruction (cargo aircraft)	:	200
Packing instruction (passen-ger aircraft)	:	200

IMDG-Code

UN number	:	UN 3163
Proper shipping name	:	LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane)
Class	:	2.2
Packing group	:	Not assigned by regulation
Labels	:	2.2
EmS Code	:	F-C, S-V
Marine pollutant	:	no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

Domestic Regulation

49 CFR

UN/ID/NA number	:	UN 3163
Proper shipping name	:	Liquefied gas, n.o.s. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane)
Class	:	2.2
Packing group	:	Not assigned by regulation
Labels	:	NON-FLAMMABLE GAS
ERG Code	:	126
Marine pollutant	:	no

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

15. REGULATORY INFORMATION

CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards: Gases under pressure
Simple Asphyxiant

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313

US State Regulations

Pennsylvania Right To Know

Pentafluoroethane	354-33-6
1,1,1,2-Tetrafluoroethane	811-97-2
Isobutane	75-28-5

International Regulations

Montreal Protocol: Pentafluoroethane, 1,1,1,2-Tetrafluoroethane

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