Safety Data Sheet

R449A

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: R449A
OTHER NAME: Refrigerant 449A
USE: Refrigerant
DISTRIBUTOR: FRIOFLOR Group Co.,Limited.
New Youth Mansion,Wucheng Area,Jinhua City,Zhejiang,China

FOR MORE INFORMATION CALL:
(Monday-Friday, 8:00am-5:00pm)
(0570) 8076952

IN CASE OF EMERGENCY CALL:
(0570) 8076952

2. HAZARDS IDENTIFICATION

CLASSIFICATION: **Gases under pressure, Liquefied Gas, Simple Asphyxiant**
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**



EMERGENCY OVERVIEW:
CAUTION! This product is a clear, colorless, liquefied gas with a slight ether-like odor. Contents under pressure. Cylinders may rupture and rocket under fire conditions. Thermal decomposition can produce toxic and corrosive gases. Vapors are heavier than air. May cause asphyxia. Liquid splashes or spray may cause freeze burns (frostbite). High vapor concentrations may cause an abnormal heart rhythm and prove suddenly fatal. Very high atmospheric concentrations can cause anesthetic effects progressing from dizziness, weakness, nausea, to unconsciousness. It can act as an asphyxiant by limiting available oxygen. Read the entire SDS for a more thorough evaluation of the hazards.

POTENTIAL HEALTH HAZARDS

SKIN CONTACT: Liquid splashes or spray may cause freeze burns.

SKIN ABSORTION: This product will probably not be absorbed through human skin.

EYES: Liquid splashes or spray may cause freeze burns.

INHALATION: Exposure to high vapor concentrations may cause an abnormal heart rhythm and prove suddenly fatal. Very high atmospheric concentration can cause anesthetic effects progressing from dizziness, weakness, nausea, to unconsciousness. It can act as an asphyxiant by limiting available oxygen.

INGESTION: Extremely unlikely to occur in use.

OTHER EFFECTS OF EXPOSURE: None expected.

3. COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS NUMBER	WEIGHT %
1,1,1,2-Tetrafluoroethane	811-97-2	25.70
2,3,3,3-Tetrafluoroprop-1-ene	754-12-1	25.30
Pentafluoroethane	354-33-6	24.70
Difluoromethane	75-10-5	24.30

COMMON NAME and SYNONYMS
R449A

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

4. FIRST AID MEASURES

SKIN: Immediately wash with plenty of warm water (do not rub). Thaw affected area with water. Remove contaminated clothing. Caution: Clothing may adhere to the skin in case of freeze burns. If symptoms (irritation or blistering) develop, get medical attention.

EYES: Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Hold eyelids open during flushing. Have eyes examined and treated by medical personnel.

INHALATION: Move victim to fresh air. Keep warm and at rest. If breathing is labored, give oxygen. If only breathing has stopped, give artificial respiration with a pocket mask equipped with a one-way valve to prevent exposure to product or body fluids. If breathing has stopped and there is no pulse, give cardiopulmonary resuscitation (CPR). Get immediate medical attention.

INGESTION: Highly unlikely, but should this occur, freeze burns will result. Do not induce vomiting unless instructed to do so by a physician.

NOTE TO PHYSICIAN: Symptomatic and supportive therapy, as indicated. Administration of epinephrine or similar sympathomimetic drugs should be with special caution and only in situations of emergency life support as cardiac arrhythmias may result.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT:	Does not flash
AUTOIGNITION TEMPERATURE:	Not available
UPPER FLAME LIMIT (volume % in air):	Not applicable
LOWER FLAME LIMIT (volume % in air):	Not applicable

HAZARDOUS REACTIONS:

Reacts with finely divided metals such as aluminum, zinc, magnesium, and alloys containing more than 2% magnesium. Can react violently if in contact with alkali metals and alkaline earth metals such as sodium, potassium, or barium.

During a fire the product can form toxic and corrosive gases such as hydrogen fluoride, carbon oxides, carbonyl halides.

EXTINGUISHING MEDIA:

As appropriate for surrounding materials/equipment.

FIRE AND EXPLOSION HAZARDS:

Compressed liquefied gas. Containers may burst under intense heat. Ruptured cylinders may rocket or fragment. Heavy vapor may suffocate. R449A is not flammable in air under ambient conditions or temperature and pressure. Certain mixtures of R449A and air, when under pressure, may be flammable. Certain mixtures of R449A and may be flammable or reactive under some conditions.

FIRE FIGHTING PROCEDURES:

Water spray should be used to cool containers.

FIRE FIGHTING PROTECTIVE EQUIPMENT:

Use self-contained breathing apparatus with a full face piece and special protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Contents under pressure. Ruptured cylinder may rocket or fragment. This product is a liquefied gas, which exits the container at temperatures capable of causing freeze burns (frostbite).

Precautions should take into account the severity of the leak or spill.

Move unprotected personnel upwind of leaking container. Remove ignition sources and ventilate the spill area. Use recommended personal protection and shut off the leak, if without risk. If possible, elevate leak position to highest point of container (should leak gas, not liquid). Water should never be put on leak nor should cylinder be immersed. If possible, dike and contain spillage. Prevent liquid from entering sewers, sumps, or pit areas since vapor is heavier than air and can create a suffocating atmosphere. Capture material for recycle or destruction if suitable equipment is available.

Notify applicable government authority if release is reportable or could adversely affect the environment.

7. HANDLING AND STORAGE

HANDLING:

Wear appropriate personal protective equipment. A safety shower and eyewash station should be nearby and ready to use.

This product is a liquefied gas, which exits the container at temperatures capable of causing freeze burns (frostbite). Ensure personnel are trained in handling and storing cylinders. Secure containers at all times. Keep containers closed when not in use.

Ensure there is adequate ventilation or use proper respiratory protection in poorly ventilated or confined areas. Avoid causing and inhaling high concentrations of vapor. Atmospheric levels should be controlled to below the occupational exposure limit and kept as low as practical.

Prevent liquid or vapor from entering sumps or sewers since vapor is heavier than air and may form suffocating atmospheres.

Do not put mixtures ofR449A with air or oxygen under pressure; do not use such mixtures for leak or pressure testing.

Avoid contact with flames or very hot surfaces. Do not heat containers.

Liquid transfers between containers may generate static electricity. Ensure adequate grounding.

Avoid trapping liquid between closed valves or overfilling containers as high pressures can develop with an increase in temperature.

STORAGE RECOMMENDATIONS:

Keep containers tightly closed, in a cool, well-ventilated place. Keep containers dry. Keep away from incompatibles, open flames, hot surfaces, welding operations, and other heat sources.

STORAGE TEMPERTURE:

Store at temperature not exceeding 125 deg. F (50 deg. C)

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

EXPOSURE GUIDELINES

INGREDIENT NAME	ACGIH TLV	OSHA PEL	OTHER LIMIT
1,1,1,2-Tetrafluoroethane	None	None	*1000 ppm TWA
2,3,3,3-Tetrafluoropropene	None	None	*500 ppm TWA
Pentafluoroethane	None	None	*1000 ppm TWA
Difluoromethane	None	None	*1000 ppm TWA

* = Workplace Environmental Exposure Level (AIHA)

No ACGIH TLV or OSHA PEL has been established for any of the components.

PREVENTIVE MEASURES

ENGINEERING CONTROLS:

Use ventilation to maintain safe levels. Where appropriate engineering controls are not in place or are inadequate, wear suitable respiratory equipment.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION:

Take all precautions to prevent skin contact. Use gloves and protective clothing made of material that has been found by user to be impervious under conditions of use to prevent the skin from becoming frozen from contact with liquid. User should verify impermeability under normal conditions of use prior to general use. Additional protection such as an apron, arm covers, or full body suit may be needed depending on conditions of use.

EYE PROTECTION:

Use chemical safety goggles or safety glasses and a face shield when there is potential for eye contact.

RESPIRATORY PROTECTION:

Not normally needed if controls are adequate. If needed, use NIOSH/MSHA approved respirator for organic vapors. For high concentrations and oxygen deficient atmospheres, use positive pressure air-supplied respirator.

OTHER PROTECTION:

Shower and eyewash station. Minimize exposure in accordance with good hygiene practices.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Colorless, liquefied gas
SPECIFIC GRAVITY:	1.17 @ 20。C
SOLUBILITY IN WATER:	no data available
pH:	Neutral
BOILING POINT:	No Data available
VAPOR PRESSURE (mmHg at 20。C.):	1,142 kPa At 21.1 。C (70.0 °F)
VAPOR DENSITY (air = 1.0):	no data available
% VOLATILE BY VOLUME:	100
ODOR THRESHHOLD:	No data available
FLAMMABILITY:	Not applicable
LEL/UEL:	None/None
RELATIVE DENSITY:	1.11g/cm^3
PARTITION COEFF (n-octanol/water	No data available
AUTO IGNITION TEMP:	No data available
DECOMPOSITION TEMPERATURE:	>250。C
ODOR:	Faint ethereal odor
FREEZING POINT:	No data available
VISCOSITY:	No data available
FLASH POINT:	Not applicable
DENSITY:	1.11 g/cm3

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY:

Stable under normal conditions.

INCOMPATIBILITIES:

Reacts with finely divided metals such as aluminum, zinc, magnesium, and alloys containing more than 2% magnesium. Can react violently ifin contact with alkali metals and alkaline earth metals such as sodium, potassium, or barium.

HAZARDOUS DECOMPOSITION PRODUCTS:

Hydrogen fluoride, carbonyl halides, carbon oxides by thermal decomposition and hydrolysis.

HAZARDOUS POLYMERIZATION:

Will not occur.

11. TOXICOLOGICAL INFORMATION

POSSIBLE HUMAN HEALTH EFFECTS:

ROUTES OF EXPOSURE:

Inhalation, ingestion, eye, and skin contact.

INHALATION:

Exposure to high vapor concentrations may cause an abnormal heart rhythm and prove suddenly fatal. Very high atmospheric concentrations can cause anesthetic effects progressing from dizziness, weakness, nausea, to unconsciousness. It can act as an asphyxiant by limiting available oxygen.

INGESTION:

Highly unlikely, but should this occur, freeze burns will result.

EYE CONTACT:

Liquid splashes or spray may cause freeze burns.

SKIN CONTACT:

Liquid splashes or spray may cause freeze burns.

OTHER EFFECTS:

None anticipated.

CARCINOGENICITY:

None of the ingredients are classified as carcinogenic by IARC, ACGIH, NTP, or OSHA.

ANIMAL DATA:

Acute inhalation toxicity

1,1,1, 2-Tetrafluoroethane
LC 50 4hour, rat inhalation > 500,000 ppm
Exposure time: 4 h
Species: Rat

2,3,3,3-Tetrafluoroprop-1-ene
LC50: > 400000 ppm
Exposure time: 4 h
Species: Rat
Method: OECD Test Guideline 403

Pentafluoroethane
>76900 ppm
Exposure time: 4 h
Species: Rat

Difluoromethane
LC50: > 520000 ppm
Exposure time: 4 h
Species: Rat

Skin Irritation
2,3,3,3-Tetrafluoroprop-1-ene
Not applicable. Study not technically feasible

Eye Irritation
2,3,3,3-Tetrafluoroprop-1-ene
Not applicable. Study not technically feasible.

Sensitisation
2,3,3,3-Tetrafluoroethane-1
Cardiac sensitization
Species: dogs
Note: No-observed-effect level 50 000ppm
Lowest observed effect level 75 000 ppm

2,3,3,3-Tetrafluoroprop-1-ene
Dermal
Note: not applicable, as this product is a gas.
Study technically not feasible

Pentafluoroethane
Cardiac sensitization
Species: dogs
Note: No-observed-effect level
75 000ppm
Lowest observed effect level
100 000ppm

Difluoromethane
Cardiac sensitization
Species: dogs
Note: No-observed-effect level
>350 000ppm

12. ECOLOGICAL INFORMATION

Toxicity to fish
2,3,3,3-Tetrafluoroprop-1ene
LC50: > 197 mg/l Exposure time: 96 h Species: Cyprinus carpio (Carp) Method: OECD Test Guideline 203 Note: No demonstrable toxic effect in saturated solution.

Toxicity to daphnia and other aquatic invertebrates
2,3,3,3-Tetrafluoroprop-1ene
EC50: > 83 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea) Method: OECD Test Guideline 202

Toxicity to algae
2,3,3,3-Tetrafluoroprop-1ene
EC50: > 100 mg/l Species: Scenedesmus capricornutum (fresh water algae) Method: OECD Test Guideline 201

Bioaccumulation
2,3,3,3-Tetrafluoroprop-1ene
Note: Due to the distribution coefficient n-octanol/water, accumulation in organisms is not expected.

Biodegradability
2,3,3,3-Tetrafluoroprop-1ene
Result: Not readily biodegradable. Method: OECD Test Guideline 301F

Pentafluoroethane
Result: Not readily biodegradable. Value: 5 % Method: OECD 301 D

Difluoromethane
Note: Minimal

Further information on ecology
Additional ecological information 1,1,1,2-Tetrafluoroethane : Accumulation in aquatic organisms is unlikely. This product contains greenhouse gases which may contribute to global warming. Do NOT vent to the atmosphere. To comply with provisions of the U.S. Clean Air Act, any residual must be recovered.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD:

Discarded product is not a hazardous waste under RCRA, 40 CFR 261. However, R449A should be recycled, reclaimed, or destroyed whenever possible.

14. TRANSPORT INFORMATION

US DOT ID NUMBER:	UN3163
US DOT PROPER SHIPPING NAME:	LIQUEFIED GAS N.O.S.
US DOT HAZARD CLASS:	2.2
US DOT PACKING GROUP:	Not applicable

15. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA):

TSCA INVENTORY STATUS: All ingredients are listed on the TSCA chemical substance inventory.

SARA / CERCLA REGULATIONS:

40 CFR 372: This product does not contain any chemicals subject to reporting requirements of SARA Section 313.

40 CFR 355 : This product does not contain any "extremely hazardous chemical" subject to the requirements of SARA Section 312.

CALIFORNIA PROP. 65 :

WARNING: This product can expose you to chemicals, listed below, known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov. Dichloromethane 75-09-2
Chloromethane 74-87-3

16. OTHER INFORMATION

CURRENT ISSUE DATE: December 4, 2018
PREVIOUS ISSUE DATE: NA

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

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