

Safety Data Sheet

R1234yf

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: R1234yf
OTHER NAME: 2,3,3,3-Tetrafluoropropene
USE: Refrigerant Gas
DISTRIBUTOR: Troy Ave South
 El Monte California 91733

FOR MORE INFORMATION CALL:
 +1 (213) 705-8489

IN CASE OF EMERGENCY CALL:
 +1 (213) 705-8489

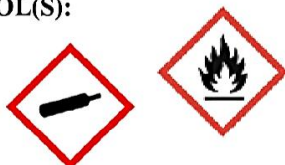
2. HAZARDS IDENTIFICATION

CLASSIFICATION:

SIGNAL WORD:

HAZARD STATEMENT(S):
 heated

SYMBOL(S):



Flammable Gas (Category 2), Gas under pressure, Liquefied Compressed Gas
WARNING
 Flammable gas. Contains gas under pressure; may explode if heated.
 Flames, Gas Cylinder

PRECAUTIONARY STATEMENT(S):

Prevention: Keep away from heat, sparks, open flame, and hot surfaces. No Smoking
Response: Leaking gas fire: Do not extinguish unless leak can be stopped immediately. Eliminate all ignition sources if safe to do so.
Storage: Protect from sunlight, store in a well-ventilated place.

EMERGENCY OVERVIEW:

Flammable gas. Liquid under high pressure.

POTENTIAL HEALTH EFFECTS:

Effects of Overexposure:

Eye Contact
 Eye Contact with the rapidly evaporation liquid may cause frostbite.

Skin Contact
 Skin contact with the rapidly evaporation liquid may cause frostbite. Frostbite effects are a change in color of the skin to

grey or white, followed by blistering.

Inhalation

Vapor is heavier than air and can cause suffocation by reducing oxygen available for breathing. Inhalation of high vapor concentration may cause dizziness, disorientation, incoordination, narcosis, nausea or vomiting, leading to unconsciousness, cardiac irregularities, or death.

Ingestion

Not an expected route of exposure.

OTHER EFFECTS OF OVEREXPOSURE: None Expected.

3. COMPOSITION / INFORMATION ON INGREDIENTS

<u>INGREDIENT NAME</u>	<u>CAS NUMBER</u>	<u>WEIGHT %</u>
1,1-Difluoromethane	75-10-5	24.3
2,3,3,3-Tetrafluoroprop-1-EN	754-12-1	25.3
Pentafluoroethane	354-33-6	24.7
1,1,1,2-Tetrafluoroethane	811-97-2	25.7

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 on-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.

ADVICE 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:	-82 °C (-116 °F)
AUTOIGNITION TEMPERATURE:	405 °C (761 °F)
UPPER FLAME LIMIT:	11.7 vol% in air (25 °C, 1 atm)
LOWER FLAME LIMIT:	6.2 vol% in air (25 °C, 1 atm)

HAZARDOUS REACTIONS:

Use appropriate extinguishing media for surrounding fires (e.g., dry powder, carbon dioxide, water spray). Do not use water directly on the leak.

During a fire the product can form toxic and corrosive gases such as hydrogen fluoride.

EXTINGUISHING MEDIA:

Use appropriate extinguishing media for surrounding fires (e.g., dry powder, carbon dioxide, water spray). Do not use water directly on the leak.

FIRE AND EXPLOSION HAZARDS:

Non-flammable liquefied gas (ASHRAE A1 classification). Container may burst under intense heat. Ruptured cylinders may rocket or fragment. Heavy vapor may suffocate.

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

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

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 suffocation 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 for use.

This product is a flammable (ASHRAE A2L classification), liquefied gas, which exits the container at temperatures capable of causing freeze burns (frostbite). Ensure personnel are trained in handling and storing flammable compressed gas cylinders. Secure containers at all times. Keep containers closed when not in use. Keep away from heat, sparks, open flames, hot surfaces, and all other ignition sources. No smoking in handling and storage areas.

Ensure there is adequate ventilation or use proper respiratory protection in poorly ventilated or confined areas, to prevent accumulation of flammable vapor-air mixtures and oxygen deficiency. Avoid generating and inhaling high concentrations of vapor. Atmospheric levels should be controlled to below the occupational exposure limit and kept as low as practicable.

Prevent liquid or vapor from entering sumps, sewers, basements, or other low-lying areas since vapor is heavier than air and may form suffocating and explosive atmospheres.

Do not put mixtures of R1234yf with air or oxygen under pressure; do not use such mixtures for leak or pressure testing, as they may form explosive mixtures. Do not heat containers, even to facilitate product transfer.

Liquid transfers between containers may generate static electricity. Ensure adequate bonding and grounding during all transfer operations.

Avoid R1234yf contact with flames or very hot surfaces.

STORAGE RECOMMENDATIONS:

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

STORAGE TEMPERATURE:

Store at temperature not exceeding 125 deg. F. (52deg. 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

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 for contact with liquid. User should verify impermeability under normal conditions of use prior to general use. Additional protection such as an apron, arm covers, may be need 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 with liquid or spray, to prevent frostbite and irritation.

RESPIRATORY PROTECTION:

Not normally needed if ventilation is adequate and exposure levels are below occupational limits. If needed, use NIOSH/MSHA approved respirator for organic vapors. For high concentrations, confined spaces, or oxygen-deficient atmospheres, use positive pressure self-contained breathing apparatus (SCBA).

OTHER PROTECTION:

Safety shower and eye wash station should be available in the immediate work area.

EXPOSURE GUIDELINES

<u>INGREDIENT NAME</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>	<u>OTHER LIMIT</u>
2,3,3,3-Tetrafluoroprop-1-EN	None	None	*500 ppm TWA (8hr)

* = Workplace Environmental Exposure Level (AIHA)
 Minimize exposure in accordance with good hygiene practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Colorless, clear liquefied gas
PHYSICAL STATE:	Gas (vapour), Liquid
ODOR:	Slight ethereal odor
SOLUBILITY IN WATER (weight %):	Sparingly soluble / Insoluble
BOILING POINT:	-29.5 °C (-21.1 °F)
VAPOR PRESSURE (mmHg at 20 deg. C):	~4670 mmHg (6.22 bar)
FLASH POINT:	-82 °C (-116 °F)
EVAPORATION RATE	Not applicable (N/A)
FLAMMABILITY:	Flammable (ASHRAE A2L)
LEL/UEL:	6.2 vol% / 11.7 vol% in air (25°C, 1 atm)
PARTITION COEFF (n-octanol/water)	log Kow = 2.25
AUTO IGNITION TEMP:	405 °C (761 °F)
DECOMPOSITION TEMPERATURE:	>250 °C
VISCOSITY:	Not applicable (N/A)
VAPOR DENSITY (air = 1.0):	~3.0
% VOLATILES BY VOLUME	100% (Saturated vapor)
DENSITY:	~1.09 g/cm ³
pH:	Not available (N/A)
MELTING POINT:	152.2 °C (-242.0 °F)
SPECIFIC GRAVITY (water = 1.0):	~1.09
MOLECULAR FORMULA:	C ₃ H ₂ F ₄
MOLECULAR WEIGHT:	114.04 g/mol

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY:

Stable under normal recommended handling and storage conditions.

INCOMPATIBILITIES:

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, as well as strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS:

Hydrogen fluoride, carbonyl fluoride, and other toxic fluorinated compounds by thermal decomposition and hydrolysis at high temperatures.

CONDITIONS TO AVOID:

Keep away from heat, sparks, open flame, and all ignition sources. Avoid high temperatures, direct sunlight, and welding operations near containers.

HAZARDOUS POLYMERIZATION:

Will not occur under normal conditions.

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: See Below

<u>Ingredient Name</u>	<u>NTP STATUS</u>	<u>ACGIH</u>	<u>IARC STATUS</u>	<u>OSHA LIST</u>
No ingredients listed in this section				

12. ECOLOGICAL INFORMATION

PERSISTENCE AND DEGRADATION:

R1234yf is a hydrofluoroolefin (HFO) with an extremely short atmospheric lifetime (~11 days) and rapid photolysis in the troposphere. The substance is not PBT/vPvB and does not persist in the environment. It has an ozone depletion potential (ODP) of 0 and a 100-year global warming potential (GWP) of <1.

EFFECT ON EFFLUENT TREATMENT:

R1234yf is a gaseous refrigerant with very low water solubility, so it does not normally enter wastewater and has no direct impact on effluent treatment processes. Leaked refrigerant volatilizes rapidly to the atmosphere, with trace amounts posing no risk to biological wastewater treatment systems. Do not discharge leak-related rinse water directly into sewers or waterways.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD:

Recover and reclaim unused or waste refrigerant whenever possible. Dispose of in accordance with Federal, State, and local regulations for flammable compressed gases. Do not vent directly to the atmosphere. Empty cylinders must be returned to the supplier, and must not be punctured, cut, welded, or reused.

CONTAINER DISPOSAL:

May contain explosive vapors. Do not distribute, make available, furnish, or reuse container when emptied of the original product. Do not weld or use cutting torch on or near container. Empty container retains product residue. Return containers to supplier.

14. TRANSPORT INFORMATION

US DOT ID NUMBER: UN 3161**US DOT PROPER SHIPPING NAME:** LIQUEFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-Tetrafluoropropene)**US DOT HAZARD CLASS:** 2.1**US DOT PACKING GROUP:** Not applicable

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

: Flammable Gas
: 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**

2,3,3,3-Tetrafluoropropene 754-12-1

California List of Hazardous Substances

No components listed

International Regulations

Montreal Protocol : None of the components are ozone-depleting substances (ODP=0)

Additional regulatory information

2,3,3,3-Tetrafluoropropene 754-12-1

The United States Environmental Protection Agency (USEPA) has listed this product under the Significant New Alternatives Policy (SNAP) as an acceptable substitute for high-GWP refrigerants in mobile air conditioning, commercial refrigeration, and heat pump applications. The EPA has also established a Significant New Use Rule (SNUR) for this substance.

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Rule (SNUR) for one of the components in this product.

See 40 CFR § 721.10182

This material contains one or more substances which requires export notification under TSCA Section 12(b) and 40 CFR Part 707 Subpart D:

2,3,3,3-Tetrafluoropropene (754-12-1)

16. OTHER INFORMATION

CURRENT ISSUE DATE: January, 2026

OTHER INFORMATION: HMIS Classification: Health – 1, Flammability – 2, Physical Hazard – 3

Regulatory Standards:

1. OSHA regulations for compressed gases: 29 CFR 1910.101
2. DOT classification per 49 CFR 172.101

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