
Section 1: Identification of the Substance/Preparation and the Company**Product Identifier:**

- **Product Name:** R449A
- **Chemical Name:** Mixture of Difluoromethane (HFC-32), Pentafluoroethane (HFC-125), 1,1,1,2-Tetrafluoroethane (HFC-134a), 2,3,3,3-Tetrafluoroprop-1-ene (HFO-1234yf)
- **Synonyms:** Opteon XP40, Freon R449A
- **CAS Numbers:**
 - HFC-32: 75-10-5
 - HFC-125: 354-33-6
 - HFC-134a: 811-97-2
 - HFO-1234yf: 754-12-1
- **EC Numbers:**
 - HFC-32: 200-839-4
 - HFC-125: 206-557-8
 - HFC-134a: 212-377-0
 - HFO-1234yf: Not assigned
- **REACH Registration Number:** Not applicable (mixture)
- **Relevant Identified Uses of the Substance:** Refrigerant gas used in air conditioning and refrigeration systems.

Details of the Supplier of the SDS:

- **Company Name:** Gaslogic B.V.
- **Address:** Overschiesweg 105, 3044 EH, Rotterdam.
- **Telephone Number:** +31 103 22 09 94
- **Email Address:** info@gaslogic.nl

Emergency Telephone Number:

- +44 344 892 0111 (Available 24 hours)

Section 2: Hazards Identification**2.1 Classification of the Substance****According to Regulation (EC) No 1272/2008 (CLP):**

- **Physical Hazards:** Gases Under Pressure – Liquefied Gas (H280)
- **Health Hazards:** Not classified as hazardous.
- **Environmental Hazards:** Not classified as hazardous.

2.2 Label Elements

- **Pictogram:**



- **Signal Word:** Warning
- **Hazard Statements:**
 - H280: Contains gas under pressure; may explode if heated.
- **Precautionary Statements:**
 - P410 + P403: Protect from sunlight. Store in a well-ventilated place.

2.3 Other Hazards

- Direct contact with liquid may cause frostbite.
- High concentrations can displace oxygen, leading to suffocation in confined spaces.

Section 3: Composition / Information on Ingredients

Substance	CAS Number	EC Number	Concentration (%)
Difluoromethane (HFC-32)	75-10-5	200-839-4	24.3%
Pentafluoroethane (HFC-125)	354-33-6	206-557-8	24.7%
1,1,1,2-Tetrafluoroethane (HFC-134a)	811-97-2	212-377-0	25.3%
2,3,3,3-Tetrafluoroprop-1-ene (HFO-1234yf)	754-12-1	-	25.7%

Section 4: First Aid Measures

4.1 Description of First Aid Measures

- **Inhalation:**
 - Remove the person to fresh air.
 - If breathing is difficult, administer oxygen.
 - Seek medical attention if symptoms such as dizziness, headache, or nausea persist.
- **Skin Contact:**
 - In case of skin contact with liquid refrigerant, flush with lukewarm water.
 - Do not rub affected area; seek immediate medical attention for frostbite.
- **Eye Contact:**
 - Immediately flush eyes with plenty of lukewarm water for at least 15 minutes.
 - Seek medical attention if irritation persists.
- **Ingestion:**
 - Ingestion is unlikely due to the gaseous state.
 - If ingestion occurs, rinse mouth thoroughly and seek medical attention.

4.2 Most Important Symptoms and Effects

- Acute effects: Dizziness, headache, nausea, and confusion due to inhalation.
- Skin exposure: Frostbite and cold burns from contact with liquid refrigerant.

Section 5: Fire-Fighting Measures

5.1 Extinguishing Media

- **Suitable Extinguishing Media:** Use CO₂, dry chemical powder, water spray.
- **Unsuitable Extinguishing Media:** Do not use water jets.

5.2 Special Hazards Arising from the Substance

- Explosion risk: Containers may explode when exposed to heat.
- Toxic gases: Burning may release toxic gases such as hydrogen fluoride and carbonyl fluoride.

5.3 Advice for Firefighters

- Use self-contained breathing apparatus (SCBA) and full protective gear.
- Cool containers with water spray to prevent explosions.

Section 6: Accidental Release Measures

6.1 Personal Precautions, Protective Equipment, and Emergency Procedures

- Evacuate the area and ensure adequate ventilation.
- Wear appropriate PPE, including gloves and goggles.
- Eliminate all sources of ignition.

6.2 Environmental Precautions

- Avoid release into the environment.
- Ventilate the area thoroughly to disperse any gas.

6.3 Methods and Material for Containment and Cleaning Up

- Stop the leak if safe to do so.
- Allow the gas to disperse in a well-ventilated area.

Section 7: Handling and Storage

7.1 Precautions for Safe Handling

- Avoid inhalation of the gas.
- Use in a well-ventilated area.
- Keep away from open flames, sparks, or other sources of ignition.

7.2 Conditions for Safe Storage

- Store in a cool, dry, well-ventilated area away from direct sunlight.
- Ensure containers are properly labeled and stored upright to prevent leakage.

Section 8: Exposure Controls / Personal Protection

8.1 Control Parameters

Substance	Occupational Exposure Limits (OELs)
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HFC-32	Not established
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HFC-125	Not established
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HFC-134a	1,000 ppm (TWA)
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HFO-1234yf	Not established
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8.2 Exposure Controls

- **Engineering Controls:**
 - Use local exhaust ventilation in enclosed areas.
- **Personal Protective Equipment:**
 - **Respiratory Protection:** Use an approved respirator if exposure limits are exceeded.
 - **Hand Protection:** Use cold-resistant gloves when handling liquid refrigerant.
 - **Eye Protection:** Wear safety goggles or a face shield.
 - **Skin Protection:** Wear protective clothing when handling liquid refrigerants.

Section 9: Physical and Chemical Properties

Property	Value
Physical State	Gas at ambient temperature
Appearance	Colorless gas
Odor	Slight ethereal odor
Melting Point	Not available
Boiling Point	-46°C
Flash Point	Not applicable
Vapor Pressure	Approx. 1400 kPa at 25°C
Vapor Density	3.1 (air = 1)
Solubility in Water	Slight

Section 10: Stability and Reactivity**10.1 Reactivity**

- Not reactive under normal storage conditions.

10.2 Chemical Stability

- Stable under normal conditions of storage and use.

10.3 Possibility of Hazardous Reactions

- No hazardous reactions known under normal conditions of use.

10.4 Conditions to Avoid

- Avoid heat, sparks, open flames, and direct sunlight.

10.5 Incompatible Materials

- Strong oxidizers and alkali metals.

10.6 Hazardous Decomposition Products

- Decomposition may release toxic gases such as hydrogen fluoride and carbonyl fluoride.
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Section 11: Toxicological Information**11.1 Information on Toxicological Effects**

- **Acute Toxicity:**
 - **Inhalation:** May cause dizziness, drowsiness, or asphyxiation at high concentrations.
 - **Skin and Eye Contact:** May cause frostbite or cold burns upon contact with liquid refrigerant.
 - **Skin Corrosion/Irritation:** Direct contact with liquid refrigerant may cause severe frostbite.
 - **Serious Eye Damage/Irritation:** Liquid refrigerant may cause severe eye damage or irritation.
 - **Respiratory or Skin Sensitization:** Not classified as a sensitizer.
 - **Carcinogenicity:** Not classified as carcinogenic by IARC, NTP, or OSHA.
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Section 12: Ecological Information**12.1 Toxicity**

- Low toxicity to aquatic life.

12.2 Persistence and Degradability

- The components of this product are expected to be persistent in the atmosphere.

12.3 Bioaccumulative Potential

- Low bioaccumulation potential due to the high volatility of the components.

12.4 Mobility in Soil

- Highly volatile and expected to partition to the atmosphere.
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Section 13: Disposal Considerations**13.1 Waste Treatment Methods**

- **Product Disposal:** Recover or recycle if possible. Dispose of in accordance with local, regional, and national regulations.
 - **Packaging Disposal:** Empty containers may contain residue and should be handled as hazardous waste. Return empty containers to the supplier if possible.
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Section 14: Transport Information**14.1 UN Number**

- UN 1078: Assigned to Refrigerant Gas, Non-flammable and Non-toxic.

14.2 UN Proper Shipping Name

- Refrigerant Gas, N.O.S. (contains HFC-32, HFC-125, HFC-134a, HFO-1234yf)

14.3 Transport Hazard Class(es)

- Class 2.2: Non-flammable, non-toxic gas.

14.4 Packing Group

- Not applicable: Gases are not assigned packing groups.

14.5 Environmental Hazards

- IMDG Classification (Marine Transport): Not classified as a marine pollutant under the IMDG code. However, large releases should be prevented from entering marine environments to avoid contamination.

14.6 Special Precautions for User

- **General Precautions:**
 - Use only cylinders designed for the transport of compressed gases.
 - Make sure cylinders are in good condition, without leaks or damage.
 - Ensure that gas containers are securely fastened during transport to prevent movement, rolling, or damage.
 - Handle with care to avoid physical damage and protect from heat sources.
 - Confirm that cylinders are equipped with pressure relief devices.
 - Do not transport cylinders in enclosed or poorly ventilated vehicle areas, as gas leaks could lead to dangerous concentrations.
 - Avoid dropping, dragging, or using excessive force when handling gas containers.

14.7 Transport in Bulk According to Annex II of MARPOL and the IBC Code

- **Not applicable:** R449A is typically transported in cylinders and not in bulk form.

14.8 Additional Transport Information**14.8.1 Transport by Road/Rail (ADR/RID)**

- Classification Code: 2A (Non-flammable, non-toxic gases)
- Labeling Requirements: Gas cylinders must be labeled with the hazard class label for Class 2.2.
- Tunnel Restriction Code: (C/E) - Transport is prohibited in tunnels of category C, D, and E under certain conditions, especially if carried in bulk.
- Other Provisions: When transporting over long distances, ensure proper ventilation in the vehicle to prevent gas build-up.

14.8.2 Transport by Sea (IMDG)

- IMDG Class: 2.2 (Non-flammable, non-toxic gas)
- EMS Code: F-C, S-V
 - F-C: Fire Schedule for compressed gases
 - S-V: Special provisions for gases
- Stowage Requirements: Store away from heat sources and protected from direct sunlight. Keep containers in well-ventilated areas, typically on deck where possible.
- Segregation: Avoid storage close to sources of ignition or other flammable materials.
- Handling Instructions: Cylinders should be properly secured to prevent movement, especially during heavy seas. Always check for signs of damage or leaks before and after loading.

14.8.3 Transport by Air (IATA)

- **IATA Class:** 2.2 (Non-flammable gas)
- **Packing Instruction:** 200 – Specific packing requirements for the transport of non-flammable compressed gases.
- **Passenger and Cargo Aircraft Restrictions:**
 - Passenger Aircraft: Limited quantities allowed. Ensure compliance with IATA packaging and handling requirements.
 - Cargo Aircraft Only: Larger quantities permitted, but must meet packaging and labeling requirements as well as secure storage.
- **Special Handling Instructions:**
 - Ensure correct labeling of cylinders, including UN number, hazard class, and correct shipping name.
 - Ensure that gas cylinders are equipped with appropriate pressure relief devices.
 - Check for leaks and pressure issues before and after transport.

14.8.4 National Regulations for Transport

- Depending on the country of transportation, national regulations may apply regarding labeling, storage, and permissible routes. Always consult the specific regulations of the country where transport is conducted.

14.8.5 Transport Labels and Markings

- **Hazard Label: Class 2.2 (Non-flammable gas label)**
 - Ensure proper marking of the UN number (UN 1078) and shipping name on the cylinders.
 - Include the gross weight of the cylinders and ensure visibility and durability of all labels during transport.
 - Cylinders should be checked for labeling compliance before shipping.

14.8.6 Emergency Measures in Case of Accidents

- **Spill or Leak During Transport:**
 - Evacuate the area and ensure good ventilation.
 - Inform local authorities and follow emergency protocols.
 - If possible, move the leaking cylinder to an open area away from people and sources of ignition.
- **Fire During Transport:**
 - Isolate the area, and use appropriate fire-fighting measures (CO₂, dry chemical powder, water spray).
 - Do not use water jets directly on cylinders; instead, cool the containers with water from a safe distance.
- **Personal Protection for Emergency Personnel:**
 - Use self-contained breathing apparatus (SCBA) and full protective gear to avoid inhalation of potentially harmful vapors.
 - Ensure that any contaminated clothing is removed and safely discarded.

14.8.7 Documentation and Training

- Ensure that all drivers and handlers involved in the transport of R449A are trained according to regulations for the handling of compressed gases, including:
 - Emergency procedures in case of leaks or accidents.
 - Proper loading, unloading, and securing of cylinders.
 - Knowledge of the potential hazards associated with the product.

Section 15: Regulatory Information**15.1 Safety, Health, and Environmental Regulations/Legislation Specific for the Substance**

- **EU Regulations:**
 - REACH Registration: Components are registered under REACH.
 - CLP Regulation (EC) No 1272/2008: Classified and labeled according to CLP.
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Section 16: Other Information**Key Abbreviations**

- **TWA:** Time Weighted Average
- **LC50:** Lethal Concentration for 50% of organisms
- **EC50:** Effective Concentration for 50% of organisms

Disclaimer

- The information provided in this SDS is based on the current state of knowledge and is intended to describe the product in terms of health, safety, and environmental requirements only. It should not be interpreted as a warranty for specific properties of the product.