
1. Identification of the Substance/Preparation and Company

Product Identifier:

- **Product Name:** R134a
- **Chemical Name:** 1,1,1,2-Tetrafluoroethane
- **Synonyms:** HFC-134a, Norflurane, Freon 134a
- **CAS Number:** 811-97-2
- **EC Number:** 212-377-0
- **REACH Registration Number:** 01-2119459374-33

Relevant Identified Uses of the Substance:

- Refrigerant gas in air conditioning and refrigeration systems.
- Propellant in aerosol products.
- Blowing agent for foams.

Details of the Supplier:

- **Company Name:** Gaslogic B.V.
- **Address:** Overschieweg 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)

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

- Rapid evaporation of the liquid may cause frostbite.
- High concentrations can cause asphyxiation due to oxygen displacement.
- Not a flammable gas under normal conditions, but can become combustible at high temperatures and pressures.

3. Composition/Information on Ingredients

Substance Name	Identifier	Concentration (%)
1,1,1,2-Tetrafluoroethane	CAS No: 811-97-2 EC No: 212-377-0	≥99.9%

Impurities: Contains no other components or impurities which will influence the classification of the product.

4. First Aid Measures

4.1 Description of First Aid Measures

- **Inhalation:**
 - Move the person to fresh air.
 - If breathing is difficult, administer oxygen.
 - If not breathing, give artificial respiration.
 - Seek medical attention if symptoms persist.
- **Skin Contact:**
 - Flush skin with lukewarm water (not hot).
 - Do not use hot water or heat the affected area.
 - Do not rub the skin.
 - Seek medical attention for frostbite or burns.
- **Eye Contact:**
 - Immediately flush eyes with plenty of water for at least 15 minutes.
 - Hold eyelids open to ensure thorough rinsing.
 - Seek medical attention if irritation persists.
- **Ingestion:**
 - Ingestion is unlikely due to the physical state.
 - If ingestion occurs, do not induce vomiting.
 - Rinse mouth with water.
 - Seek medical attention.

4.2 Most Important Symptoms and Effects

- Dizziness, headache, nausea, and loss of coordination due to inhalation.
- Frostbite symptoms: cold burn, blistering, and numbness.

4.3 Indication of Immediate Medical Attention

- If frostbite occurs.
- If respiratory symptoms develop.
- Show this SDS to the medical personnel.

5. Fire-Fighting Measures

5.1 Extinguishing Media

- **Suitable Extinguishing Media:**
 - Water spray or fog.
 - Dry chemical powder.
 - Carbon dioxide (CO₂).
 - Alcohol-resistant foam.
- **Unsuitable Extinguishing Media:**
 - Do not use a solid water stream as it may be ineffective.

5.2 Special Hazards Arising from the Substance

- Containers may explode when heated.
- Thermal decomposition can lead to the release of toxic and corrosive gases such as hydrogen fluoride and carbonyl fluoride.

5.3 Advice for Firefighters

- Wear self-contained breathing apparatus (SCBA) and full protective gear.
 - Cool containers with water spray to prevent pressure build-up.
 - Evacuate personnel to a safe area.
 - Avoid inhalation of combustion gases.
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6. Accidental Release Measures**6.1 Personal Precautions**

- Evacuate area.
- Ensure adequate ventilation.
- Use personal protective equipment (PPE) as specified in Section 8.
- Avoid contact with skin and eyes.
- Avoid breathing vapors.

6.2 Environmental Precautions

- Prevent further leakage if safe to do so.
- Do not allow material to contaminate ground water system.
- Notify authorities if large amounts are released.

6.3 Methods and Material for Containment and Cleaning Up

- Ventilate the area.
- Isolate the leak if safe to do so.
- Allow gas to dissipate.
- Do not direct water at spill or source of leak.

6.4 Reference to Other Sections

- For PPE see Section 8.
 - For disposal considerations see Section 13.
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7. Handling and Storage**7.1 Precautions for Safe Handling**

- Use only in well-ventilated areas.
- Avoid inhalation of vapors.
- Do not get in eyes, on skin, or on clothing.
- Use proper personal protective equipment.
- Keep away from heat and ignition sources.

7.2 Conditions for Safe Storage

- Store in a cool, dry, and well-ventilated place.
- Keep container tightly closed.
- Protect from sunlight and physical damage.
- Store away from incompatible materials (see Section 10).

7.3 Specific End Use(s)

- Refrigerant applications.
 - Follow industry best practices for handling refrigerant gases.
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8. Exposure Controls/Personal Protection
8.1 Control Parameters

- **Occupational Exposure Limits:**

Country	Limit Type	Value
EU	TWA (8-hour)	1,000 ppm
USA (ACGIH)	TWA	1,000 ppm

- **Derived No-Effect Level (DNEL):**

- Workers: Not established.
- Consumers: Not established.

- **Predicted No-Effect Concentration (PNEC):**

- Not established.

8.2 Exposure Controls
Engineering Controls:

- Use local exhaust ventilation to keep concentrations below exposure limits.
- Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment:

- **Respiratory Protection:**

- If exposure limits are exceeded, use an approved respirator.
- In case of insufficient ventilation, wear suitable respiratory equipment.

- **Hand Protection:**

- Wear protective gloves resistant to cold temperatures (e.g., insulated gloves).

- **Eye Protection:**

- Safety goggles or face shield.

- **Skin and Body Protection:**

- Wear suitable protective clothing to prevent skin contact.
- Protective shoes.

Environmental Exposure Controls:

- Do not release into the environment.
- Follow applicable regulations for emissions.

9. Physical and Chemical Properties

Property	Value
Physical State	Gas at ambient temperature
Appearance	Colorless gas
Odor	Slight ethereal odor
Odor Threshold	Not available
pH	Neutral
Melting Point/Freezing Point	-103.3°C
Initial Boiling Point	-26.1°C
Flash Point	Not applicable (non-flammable)
Evaporation Rate	Rapid evaporation
Flammability (solid, gas)	Non-flammable gas
Upper/Lower Flammability Limits	Not applicable
Vapor Pressure	5,715 kPa at 25°C
Vapor Density	3.5 (air = 1)
Relative Density (Liquid)	1.21 at 25°C
Solubility(ies)	Slightly soluble in water

Property	Value
Partition Coefficient (Kow)	Log Pow: 1.06
Auto-ignition Temperature	Not applicable
Decomposition Temperature	>370°C
Viscosity	Not applicable
Explosive Properties	Not explosive
Oxidizing Properties	Not oxidizing

10. Stability and Reactivity

10.1 Reactivity

- Not reactive under normal conditions.

10.2 Chemical Stability

- Stable under recommended storage conditions.

10.3 Possibility of Hazardous Reactions

- No hazardous polymerization expected.

10.4 Conditions to Avoid

- Heat, sparks, open flames, and direct sunlight.
- Temperatures exceeding the boiling point.

10.5 Incompatible Materials

- Alkali or alkaline earth metals (e.g., sodium, potassium).
- Strong oxidizers.
- Magnesium and aluminum at high temperatures.

10.6 Hazardous Decomposition Products

- Thermal decomposition may produce:
 - Hydrogen fluoride (HF)
 - Carbonyl fluoride (COF₂)
 - Carbon monoxide (CO)
 - Carbon dioxide (CO₂)
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11. Toxicological Information

11.1 Information on Toxicological Effects

Acute Toxicity:

- **Inhalation:**
 - LC50 (rat, 4h): >500,000 ppm
 - High concentrations can cause asphyxiation.
- **Oral and Dermal:**
 - Not applicable due to physical state (gas at room temperature).

Skin Corrosion/Irritation:

- Contact with liquid may cause frostbite.

Serious Eye Damage/Irritation:

- Contact with liquid may cause frostbite and eye injury.

Respiratory or Skin Sensitization:

- Not expected to be a sensitizer.

Germ Cell Mutagenicity:

- Not classified; negative in in vitro and in vivo tests.

Carcinogenicity:

- Not classified as a carcinogen.

Reproductive Toxicity:

- Not expected to cause reproductive or developmental toxicity.

STOT – Single Exposure:

- May cause dizziness, headache, and narcosis at high concentrations.

STOT – Repeated Exposure:

- No data indicating significant effects.

Aspiration Hazard:

- Not applicable.
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12. Ecological Information**12.1 Toxicity**

- **Aquatic Toxicity:**
 - LC50 (Fish, 96h): >450 mg/L
 - EC50 (Daphnia, 48h): >980 mg/L
 - Low acute toxicity to aquatic organisms.

12.2 Persistence and Degradability

- Not readily biodegradable.
- Degrades slowly in the atmosphere via photolysis.

12.3 Bioaccumulative Potential

- Low bioaccumulation potential (Log Pow: 1.06).

12.4 Mobility in Soil

- Highly volatile; expected to partition to air.
- Low adsorption to soil/sediment.

12.5 Results of PBT and vPvB Assessment

- Not considered to be PBT or vPvB.

12.6 Other Adverse Effects

- Global Warming Potential (GWP): Approximately 1,430 (100-year horizon).
 - Not an ozone-depleting substance.
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13. Disposal Considerations**13.1 Waste Treatment Methods**

- **Product Disposal:**
 - Recover and recycle if possible.
 - Dispose of in accordance with local, regional, national, and international regulations.
 - Do not vent to the atmosphere.
- **Packaging Disposal:**
 - Empty containers may contain residue; handle as hazardous.
 - Return cylinders to supplier for recycling or disposal.

13.2 Additional Information

- Do not puncture or incinerate containers.
 - Consult local waste authorities for specific guidance.
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14. Transport Information**14.1 UN Number**

- **UN 3159**

14.2 UN Proper Shipping Name

- **1,1,1,2-Tetrafluoroethane**

14.3 Transport Hazard Class(es)

- **Class 2.2 (Non-flammable, non-toxic gas)**

14.4 Packing Group

- Not applicable.

14.5 Environmental Hazards

- Not a marine pollutant.

14.6 Special Precautions for User

- Avoid transport on vehicles where the load space is not separated from the driver's compartment.
- Ensure cylinders are secured and upright.

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

- Not applicable.

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

- **Classification Code:** 2A
- **Label:** 2.2 (Non-flammable gas)
- **Tunnel Restriction Code:** (C/E)
- **Hazard Identification Number (Kemler Code):** 20
- **Special precautions:**
 - Cylinders must be transported in an upright position and secured.
 - Ensure ventilation to prevent gas accumulation.

Transport by Sea (IMDG):

- **IMDG Code:** Complies with International Maritime Dangerous Goods Code.
- **EMS Code:** F-C, S-V
- **Stowage:** Away from heat sources and in well-ventilated areas.

Transport by Air (IATA/ICAO):

- **Passenger Aircraft:** Allowed with restrictions.
- **Cargo Aircraft Only:** Allowed.
- **Special precautions:** Ventilation is critical.

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

- **EU Regulations:**
 - **REACH Regulation (EC) No 1907/2006:** Substance is registered.
 - **CLP Regulation (EC) No 1272/2008:** Classification provided.
 - **F-gas Regulation (EU) No 517/2014:** Subject to phase-down measures.
- **National Regulations:**
 - Compliance with local laws required.

15.2 Chemical Safety Assessment

- A Chemical Safety Assessment has been carried out.
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16. Other Information**Abbreviations and Acronyms**

- **ACGIH:** American Conference of Governmental Industrial Hygienists
- **ADR:** European Agreement concerning the International Carriage of Dangerous Goods by Road
- **CAS:** Chemical Abstracts Service
- **CLP:** Classification, Labeling, and Packaging
- **DNEL:** Derived No-Effect Level
- **EC50:** Effective Concentration for 50% of the population
- **GWP:** Global Warming Potential
- **LC50:** Lethal Concentration for 50% of the population
- **PBT:** Persistent, Bioaccumulative, and Toxic
- **PNEC:** Predicted No-Effect Concentration
- **REACH:** Registration, Evaluation, Authorization, and Restriction of Chemicals
- **RID:** Regulations concerning the International Carriage of Dangerous Goods by Rail
- **STOT:** Specific Target Organ Toxicity
- **TWA:** Time-Weighted Average
- **vPvB:** Very Persistent and Very Bioaccumulative

Key Literature References and Sources

- Supplier Safety Data Sheets.
- ECHA (European Chemicals Agency) database.
- OECD Guidelines for the Testing of Chemicals.

Training Advice

- Personnel handling R134a should be trained in the proper handling and emergency procedures.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge at the date of its publication. The information is designed only as guidance for safe handling, use, processing, storage, transportation, disposal, and release. It is not to be considered a warranty or quality specification.

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