1. Identification of the Substance/Preparation and the Company

Product Identifier:

- **Product Name:** R422D
- **Chemical Name:** Mixture of Pentafluoroethane (HFC-125), 1,1,1,2-Tetrafluoroethane (HFC-134a), n-Butane
- **Synonyms:** Freon 422D, Genetron 422D, Isceon MO29
- **CAS Numbers:**
  - HFC-125: 354-33-6
  - HFC-134a: 811-97-2
  - n-Butane: 106-97-8
- **EC Numbers:**
  - HFC-125: 206-557-8
  - HFC-134a: 212-377-0
  - n-Butane: 203-448-7
- **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)

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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)
  - Flammable Gas (H220)
- **Health Hazards:**
  - Not classified as hazardous.
- **Environmental Hazards:**
  - Not classified as hazardous.

2.2 Label Elements

- **Pictogram:**

- **Signal Word:** Danger
- **Hazard Statements:**
  - **H220:** Extremely flammable gas.
  - **H280:** Contains gas under pressure; may explode if heated.
- **Precautionary Statements:**
  - **P210:** Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking.
  - **P377:** Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
  - **P381:** Eliminate all ignition sources if safe to do so.
  - **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.

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3. Composition / Information on Ingredients

Substance	CAS Number	EC Number	Concentration (%)
Pentafluoroethane (HFC-125)	354-33-6	206-557-8	65.1%
1,1,1,2-Tetrafluoroethane (HFC-134a)	811-97-2	212-377-0	31.5%
n-Butane (C_4H_{10})	106-97-8	203-448-7	3.4%

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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.

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5. Fire-Fighting Measures

5.1 Extinguishing Media

- **Suitable Extinguishing Media:** Use CO_2, 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.

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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.

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.

8. Exposure Controls / Personal Protection

8.1 Control Parameters

Substance	Occupational Exposure Limits (OELs)
HFC-125	Not established
HFC-134a	1,000 ppm (TWA)
n-Butane	800 ppm (TWA)

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.

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	-40.8°C
Flash Point	-60°C
Vapor Pressure	10,200 kPa at 25°C
Vapor Density	3.4 (air = 1)
Solubility in Water	Slight
Partition Coefficient (Kow)	Not available
Auto-ignition Temperature	550°C
Decomposition Temperature	>400°C

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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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.

Germ Cell Mutagenicity:

- Not classified as mutagenic.

Reproductive Toxicity:

- Not classified as toxic to reproduction.

STOT – Single Exposure:

- May cause drowsiness or dizziness due to inhalation.

Aspiration Hazard:

- Not applicable.

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12. Ecological Information

12.1 Toxicity

- Low toxicity to aquatic life.
    - **LC50 (Fish, 96h):** Not available
    - **EC50 (Daphnia, 48h):** Not available

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.

12.5 Results of PBT and vPvB Assessment

- Not classified as Persistent, Bioaccumulative, and Toxic (PBT) or very Persistent and very Bioaccumulative (vPvB).

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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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14. Transport Information

14.1 UN Number

- **UN 3161** for **Liquefied Flammable Gas**

14.2 UN Proper Shipping Name

- **Liquefied Gas, Flammable, n.o.s. (contains R422D)**

14.3 Transport Hazard Class(es)

- **Class 2.1 (Flammable Gas)**

14.4 Packing Group

- Not applicable (gases do not require packing groups).

14.5 Environmental Hazards

- Not classified as a marine pollutant under IMDG.
- However, steps should be taken to avoid contamination of the environment with large releases.

14.6 Special Precautions for User

- Ensure proper ventilation during transport, especially in confined spaces.
- Cylinders must be secured to prevent movement and should be transported upright.
- Use only approved gas containers for transport, and ensure the containers are properly labeled with the UN number, hazard class, and correct shipping name.

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

- Not applicable as this substance is transported in cylinders and not in bulk.

14.8 Additional Transport Information

Transport by Road/Rail (ADR/RID):

- **Classification Code:** 2F (Flammable Gases)
- **Tunnel Restriction Code:** (B/D) – Prohibited in tunnels of category B when transported in bulk.

Transport by Sea (IMDG):

- **EMS Code:** F-D, S-U
- **Stowage:** Away from sources of heat and direct sunlight.

Transport by Air (IATA):

- **Packing Instruction:** 200
- **Passenger and Cargo Aircraft:** Limited to smaller quantities.
- **Cargo Aircraft Only:** Larger quantities permitted, but ensure proper stowage and ventilation.

Special Handling Instructions:

- Transport must comply with all applicable regulations regarding hazardous materials.
- Ensure gas cylinders are equipped with pressure relief devices, and inspect for leaks prior to transport.
- Drivers and handlers must be trained in handling flammable gases and dealing with emergencies during transport.

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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.
  - F-gas Regulation: Subject to restrictions under the F-gas regulations.

15.2 Chemical Safety Assessment

- A chemical safety assessment has not been conducted for this mixture.

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16. Other Information

Key Abbreviations:

- **PBT:** Persistent, Bioaccumulative, Toxic
- **vPvB:** Very Persistent, Very Bioaccumulative
- **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.