1. Identification of the Substance/Preparation and the Company

Product Identifier:

- **Product Name:** R453A
- **Chemical Name:** Mixture of Trifluoroiodomethane (CF3I), Pentafluoroethane (HFC-125), Difluoromethane (HFC-32)
- **Synonyms:** Solstice® N40, RS-70
- **CAS Numbers:**
  - Trifluoroiodomethane: 2314-97-8
  - Pentafluoroethane: 354-33-6
  - Difluoromethane: 75-10-5
- **EC Numbers:**
  - Trifluoroiodomethane: 219-064-6
  - Pentafluoroethane: 206-557-8
  - Difluoromethane: 200-839-4
- **REACH Registration Number:** Not applicable (mixture)

Relevant Identified Uses of the Substance:

- Refrigerant gas used in air conditioning, refrigeration systems, typically as a replacement for R22.

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 (H221)
- **Health Hazards:**
  - Not classified as hazardous.
- **Environmental Hazards:**
  - Not classified as hazardous.

2.2 Label Elements

- **Pictogram:**
- 
- **Signal Word:** Warning
- **Hazard Statements:**
  - **H221:** 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.
  - **P410 + P403:** Protect from sunlight. Store in a well-ventilated place.

2.3 Other Hazards

- **Frostbite risk:** Direct contact with liquid can cause cold burns or frostbite.
- **Asphyxiation risk:** High concentrations can displace oxygen in confined spaces, causing suffocation.

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3. Composition / Information on Ingredients

Substance	CAS Number	EC Number	Concentration (%)
Trifluoroiodomethane (CF3I)	2314-97-8	219-064-6	56%
Pentafluoroethane (HFC-125)	354-33-6	206-557-8	39%
Difluoromethane (HFC-32)	75-10-5	200-839-4	5%

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4. First Aid Measures

4.1 Description of First Aid Measures

- **Inhalation:**
  - Move the affected person to fresh air.
  - Administer oxygen if breathing is difficult.
  - Seek immediate medical attention if symptoms such as dizziness, headache, or nausea persist.
- **Skin Contact:**
  - If the skin comes into contact with liquid refrigerant, flush the area with lukewarm water.
  - Do not rub the affected area; seek immediate medical attention for frostbite or burns.
- **Eye Contact:**
  - Immediately flush eyes with lukewarm water for at least 15 minutes.
  - Seek medical attention if irritation or injury occurs.
- **Ingestion:**
  - Ingestion is not likely due to the gaseous state.
  - If ingestion occurs, seek immediate medical attention.

4.2 Most Important Symptoms and Effects

- **Acute effects:** Dizziness, headache, nausea, or confusion may occur due to inhalation.
- **Skin contact:** Frostbite or cold burns from contact with the liquid refrigerant.

4.3 Indication of Immediate Medical Attention

- Immediate medical attention is required for frostbite or for high inhalation exposure that causes asphyxiation.

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5. Fire-Fighting Measures

5.1 Extinguishing Media

- **Suitable Extinguishing Media:** Use CO_2, dry chemical, or water spray.
- **Unsuitable Extinguishing Media:** Avoid using water jets, as they may spread the fire.

5.2 Special Hazards Arising from the Substance

- **Explosion risk:** Containers may explode when exposed to heat or fire.
- **Toxic gases:** Combustion 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 clothing.
- Cool exposed 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 proper ventilation.
- Wear personal protective equipment (PPE), including cold-resistant gloves and eye protection.
- Eliminate ignition sources.

6.2 Environmental Precautions

- Avoid release into the environment, especially into water bodies or drains.
- Ensure adequate ventilation for gas to disperse.

6.3 Methods and Material for Containment and Cleaning Up

- Stop the leak if it is safe to do so.
- Allow the gas to disperse in a well-ventilated area.
- For large spills, use gas detection equipment to monitor CO_2 levels in confined spaces.

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7. Handling and Storage

7.1 Precautions for Safe Handling

- Avoid inhalation of gas and vapors.
- Ensure good ventilation in enclosed areas.
- Keep away from heat, sparks, and open flames.
- Use only in well-ventilated areas.

7.2 Conditions for Safe Storage

- Store in a cool, dry, well-ventilated area away from direct sunlight.
- Keep cylinders upright and properly labeled.
- Ensure that containers are tightly closed and secured.

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8. Exposure Controls / Personal Protection

8.1 Control Parameters

Substance	Occupational Exposure Limits (OELs)
Trifluoroiodomethane (CF3I)	Not established
Pentafluoroethane (HFC-125)	Not established
Difluoromethane (HFC-32)	1,000 ppm (TWA)

8.2 Exposure Controls

Engineering Controls:

- Use local exhaust ventilation in confined or enclosed areas.
- Ensure gas detection systems are installed.

Personal Protective Equipment:

- **Respiratory Protection:** Use an approved respirator if exposure limits are exceeded.
- **Hand Protection:** Use insulated gloves when handling liquid refrigerant.
- **Eye Protection:** Wear safety goggles or a face shield when handling liquid refrigerant.
- **Skin Protection:** Wear protective clothing to prevent skin exposure.

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9. Physical and Chemical Properties

Property	Value
Physical State	Gas at ambient temperature
Appearance	Colorless gas
Odor	Slight odor
Melting Point	Not available
Boiling Point	-47.1°C
Flash Point	-81°C
Vapor Pressure	9,990 kPa at 25°C
Vapor Density	3.6 (air = 1)
Solubility in Water	Slight
Partition Coefficient (Kow)	Not available
Auto-ignition Temperature	750°C
Decomposition Temperature	>400°C

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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 dangerous reactions are known under normal use.

10.4 Conditions to Avoid

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

10.5 Incompatible Materials

- Strong oxidizers and reactive metals.

10.6 Hazardous Decomposition Products

- Thermal decomposition may produce 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 unconsciousness at high concentrations.
- **Skin and Eye Contact:** Contact with liquid refrigerant may cause frostbite or cold burns.

Skin Corrosion/Irritation:

- Frostbite may occur from direct contact with liquid refrigerant.

Serious Eye Damage/Irritation:

- Liquid refrigerant may cause serious eye damage upon direct exposure.

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 dizziness, drowsiness, and respiratory irritation due to inhalation of high concentrations.

Aspiration Hazard:

- Not applicable (gaseous state).

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12. Ecological Information

12.1 Toxicity

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

12.2 Persistence and Degradability

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

12.3 Bioaccumulative Potential

- Low potential for bioaccumulation due to high volatility.

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 should be returned to the supplier for recycling or disposal according to local regulations.

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14. Transport Information (Extended Chapter)

14.1 UN Number

- **UN 3161**

14.2 UN Proper Shipping Name

- **Liquefied Gas, Flammable, n.o.s. (contains R453A)**

14.3 Transport Hazard Class(es)

- **Class 2.1 (Flammable Gas)**

14.4 Packing Group

- Not applicable (gases do not have a packing group).

14.5 Environmental Hazards

- Not classified as a marine pollutant.

14.6 Special Precautions for User

- Ensure adequate ventilation during transport.
- Cylinders must be secured upright and should be transported in an approved container.
- Ensure that all containers are correctly 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 R453A 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:** Store away from heat sources and combustible materials.

Transport by Air (IATA):

- **Packing Instruction:** 200
- **Passenger Aircraft:** Limited to smaller quantities.
- **Cargo Aircraft Only:** Larger quantities are allowed, but ensure adequate ventilation.

Special Handling Instructions:

- Ensure that all personnel involved in handling and transporting this substance are trained in handling flammable gases and are aware of the associated risks and emergency response procedures.
- Inspect gas cylinders for damage or leaks prior to transport. All cylinders should be equipped with pressure-relief devices as appropriate.

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15. Regulatory Information

15.1 Safety, Health, and Environmental Regulations/Legislation Specific for the Substance

- **EU Regulations:**
  - **REACH Registration:** The components are registered under REACH.
  - **CLP Regulation (EC) No 1272/2008:** Classified and labeled according to CLP regulation.
  - **F-gas Regulation:** Subject to restrictions under the F-gas regulations.

15.2 Chemical Safety Assessment

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

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16. Other Information

Key Abbreviations:

- **PBT:** Persistent, Bioaccumulative, and Toxic
- **vPvB:** Very Persistent, Very Bioaccumulative
- **LC50:** Lethal Concentration for 50% of organisms
- **EC50:** Effective Concentration for 50% of organisms

Training Advice:

- Personnel handling R453A should be trained in proper handling, emergency response, and storage procedures, especially for dealing with flammable and pressurized gases.

Disclaimer:

- The information provided in this SDS is correct to the best of our knowledge, based on available information at the time of publication. It is intended to describe the product for health, safety, and environmental purposes only and should not be interpreted as a warranty or specification of quality.