Created: 20 August 2021

SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

- Product Name: R1234yf
- Product Description: Extremely flammable, liquified gas
- Chemical Name: 2,3,3,3-Tetrafluoroprop-1-ene
- Synonyms: Polyhaloalkene; HFO-1234yf
- Chemical formula: $CF_3CF=CH_2$
- CAS No.: 754-12-1
- EC No.: 468-710-7
- REACH Registration Number: 01-0000019665-61

1.2 Relevant identified uses of the substance or mixture and uses advised against

- Use of the substance/mixture: Refrigerant; Air conditioning systems; Industrial use
- Use advised against: No information available

1.3 Details of the supplier of the safety data sheet

- Name of Supplier: SGS Gases Ltd
- Address of Supplier: Poplar Farm
Eastertown
Weston-super-Mare
Somerset
BS24 0HY
UK
- Telephone: 01934 751265
- Email: enquiries@sgsgases.co.uk

1.4 Emergency telephone number

- Emergency Telephone: 01934 751265
Monday – Friday 8:30am – 5pm

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

- Classification (REGULATION (EC) No 1272/2008) [CLP/GHS]: Flam. Gas 1, H220; Press. Gas (Liq.), H280
- Additional information: For full text of Hazard- and EU Hazard-statements: see section 16

2.2 Label elements

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.

SECTION 2: Hazards identification (....)

P381 - In case of leakage, eliminate all ignition sources.
P410+P403 - Protect from sunlight. Store in a well-ventilated place.

Supplemental Hazard information (EU)

None

2.3 Other hazards

- Asphyxiant in high concentrations
- Contact with liquid may cause cold burns/frostbite
- Not a PBT according to REACH Annex XIII
- Not a vPvB according to REACH Annex XIII
- Does not contain any substances with endocrine disrupting properties

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical Name	Conc.	CAS No.	EC No.	Classification (REGULATION (EC) No 1272/2008) [CLP/GHS]	SCL/ M-Factor/ ATE	REACH Registration Number	WEL/ OEL
2,3,3,3-Tetrafluoroprop-1-ene	100%	754-12-1	468-710-7	Flam. Gas 1, H220 Press. Gas (Liq.), H280	-	01-0000019665 -61-XXXX	No

3.2 Mixtures

- Not applicable

SECTION 4: First aid measures

Rescuers should put on approved personal protective equipment (PPE) before administering first aid

No action shall be taken involving any personal risk or without suitable training

4.1 Description of first aid measures

Contact with eyes

If substance has got into eyes, immediately wash out with plenty of water
Irrigate eyes thoroughly whilst lifting eyelids
Remove contact lenses, if present and easy to do. Continue rinsing.
Get medical advice/attention.

Contact with skin

In case of contact with liquid, thaw frosted parts with water. Do not attempt to remove clothing which has stuck to the skin
Cover wounds with sterile dressing
If irritation or blistering occur obtain medical attention.

Ingestion

Unlikely route of exposure.
Rinse mouth with water (only if the person is conscious)
Give 200-300mls (half pint) water to drink
Do NOT induce vomiting.
Get immediate medical advice/attention.

Inhalation

Remove person to fresh air and keep comfortable for breathing.
Keep warm and at rest, in a half upright position. Loosen clothing

SECTION 4: First aid measures (....)

If breathing is difficult, oxygen should be given by a trained person
Apply artificial respiration only if patient is not breathing
If heartbeat is absent, give external cardiac compression
Get immediate medical advice/attention.

4.2 Most important symptoms and effects, both acute and delayed

Contact with eyes

Extremely cold material, can cause burns similar to frostbite.

Contact with skin

Extremely cold material, can cause burns similar to frostbite.

Ingestion

No hazard expected under normal conditions of use
As this product is a gas, refer to the inhalation section

Inhalation

Danger of suffocation at high concentrations due to oxygen displacement
Exposure to oxygen deficient atmosphere may cause the following symptoms: dizziness, salivation, nausea, vomiting, loss of mobility/consciousness.
In high concentrations may cause asphyxiation. Victim may not be aware of asphyxiation.
Asphyxiation may bring about unconsciousness without warning and so rapidly that victim may be unable to protect themselves.
May cause CNS depression, narcosis, cardiac disorders.

4.3 Indication of any immediate medical attention and special treatment needed

- Treat symptomatically
- Adrenaline and similar sympathomimetic drugs should be avoided following exposure as cardiac arrhythmia may result with possible subsequent cardiac arrest.

SECTION 5: Firefighting measures

5.1 Extinguishing media

- Suitable extinguishing media: In case of fire use water spray or fog, alcohol resistant foam, dry chemical or carbon dioxide
- Unsuitable extinguishing media: High volume water jet

5.2 Special hazards arising from the substance or mixture

- Extremely flammable gas.
- In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion
- Inform Fire Brigade of potential danger of exploding and rocketing cylinders
- Gas is heavier than air and may collect in low areas or travel along from the substance or the ground where there may be an ignition source present
- If flames are accidentally extinguished, explosive re-ignition may occur; therefore, appropriate measures should be taken (e.g. total evacuation to protect persons from cylinder fragments and toxic fumes should a rupture occur).
- Gives off irritating or toxic fumes (or gases) in a fire.
- Decomposition products may include carbon oxides (CO, CO_2), hydrogen halogenides, carbonyl halogenides, fluorinated compounds

5.3 Advice for firefighters

- Shut off all ignition sources
- Move containers from fire area if this can be done without risk
- Use water spray to keep fire-exposed containers cool
- If possible, shut-off source of gas and allow the fire to burn itself out
- Extinguish fire only if gas flow can be stopped. Do not extinguish a leaking gas flame unless absolutely

SECTION 5: Firefighting measures (....)

necessary. Spontaneous/explosive re-ignition may occur
- Extinguish any other fire
- Fight fire from protected location or maximum possible distance.
- Move away from container and cool with water from a protected position
- Keep adjacent cylinders cool by spraying with large amounts of water until fire burns itself out
- Collect contaminated fire extinguishing water separately. This MUST not be discharged into drains. Prevent fire extinguishing water from contaminating surface or ground water.
- Special protective equipment: Wear self-contained breathing apparatus (SCBA). Wear full protective clothing including chemical protection suit.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

- No action shall be taken involving any personal risk or without suitable training
- Only trained and authorised personnel should carry out emergency response
- Personal precautions for non-emergency personnel: Avoid breathing vapours, mist or gas; Evacuate the area and keep personnel upwind; Shut off all ignition sources; Ventilate area
- Personal precautions for emergency responders: Evacuate the area and keep personnel upwind; Ensure adequate ventilation; Avoid breathing vapours, mist or gas; Gas/vapour is heavier than air and may accumulate in confined spaces, particularly at or below ground level.; Never enter a confined space or other area where the flammable gas concentration is greater than 10% of its lower flammable limit; Monitor oxygen level; Wear protective clothing as per section 8; Allow product to evaporate

6.2 Environmental precautions

- Do not release to the environment except for emergency ventilation.
- Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous
- In confined spaces, sewers, etc., the vapours may collect to form explosive mixtures with air

6.3 Methods and material for containment and cleaning up

- Ventilate area
- Use non-sparking tools
- Use explosion-proof ventilating and lighting equipment.
- Additional advice: If possible, stop flow of product. Increase ventilation to the release area and monitor oxygen level. If leak is from cylinder or cylinder valve, call the SGS Gases telephone number. If the leak is in the user's system, close the cylinder valve and safely vent the pressure, and purge with an inert gas before attempting repairs
- Cylinder should be inspected and tested if leak occurs.

6.4 Reference to other sections

- See section(s): 7, 8 & 13

SECTION 7: Handling and storage

7.1 Precautions for safe handling

- Only experienced and properly instructed persons should handle gases under pressure.
- Wear protective clothing as per section 8
- Do not eat, drink or smoke when using this product.
- Ensure adequate ventilation
- Avoid breathing vapours, mist or gas
- Protect cylinders from physical damage; do not drag, roll, slide or drop.
- Do not allow storage area temperature to exceed 50°C (122°F).
- Before using the product, determine its identity by reading the label. Know and understand the properties and hazards of the product before use.
- When doubt exists as to the correct handling procedure for a particular gas, contact the supplier.
- Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.
- When moving cylinders, even for short distances, use a cart, trolley, hand truck, etc designed to transport cylinders.

SECTION 7: Handling and storage (....)

- Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
- Use an adjustable strap wrench to remove over-tight or rusted caps.
- Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service.
- Purge air from system before introducing gas. Containers, which contain or have contained flammable or explosive substances, must not be inerted with liquid carbon dioxide.
- Before connecting the container, check the complete gas system for suitability, particularly for pressure rating and materials.
- Before connecting the container for use, ensure that back feed from the system into the container is prevented.
- Ensure the complete gas system is compatible for pressure rating and materials of construction.
- Ensure the complete gas system has been checked for leaks before use.
- Employ suitable pressure regulating devices on all containers when the gas is being emitted to systems with lower pressure rating than that of the container.
- Do not use joint paste that may contain peroxides.
- Never insert an object (e.g. wrench, screwdriver, pry bar, etc) into valve cap openings. Doing so may damage valve, causing a leak to occur.
- Open valve slowly. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.
- Close container valve after each use and when empty, even if still connected to equipment.
- Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier.
- Close valve after each use and when empty.
- Replace outlet caps or plugs and container caps as soon as container is disconnected from equipment.
- Do not subject containers to abnormal mechanical shocks which may cause damage to their valve or safety devices.
- Never attempt to lift a cylinder by its valve protection cap or guard.
- Do not use containers as rollers or supports or for any other purpose than to contain the gas as supplied.
- Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit.
- Do not smoke while handling product or cylinders.
- Never re-compress a gas or a gas mixture without first consulting the supplier.
- Never attempt to transfer gases from one cylinder/container to another.
- Always use backflow protective device in piping.
- When returning cylinder install valve outlet cap or plug leak tight.
- Never use direct flame or electrical heating devices to raise the pressure of a container.
- Containers should not be subjected to temperatures above 50°C (122°F).
- Prolonged periods of cold temperature below -30°C (-20°F) should be avoided.
- Never attempt to increase liquid withdrawal rate by pressurizing the container without first checking with the supplier.
- Never permit liquefied gas to become trapped in parts of the system as this may result in hydraulic rupture.
- Liquid refrigerant transfers between refrigerant containers and to and from systems can result in static generation.
- Ensure equipment is adequately earthed.
- Assess the risk of potentially explosive atmospheres and the need for explosion-proof equipment.
- Take precautionary measures against static discharges
- Use non-sparking handtools

7.2 Conditions for safe storage, including any incompatibilities

- Containers should not be stored in conditions likely to encourage corrosion.
- Store in a cool, dry well-ventilated place. Keep container tightly closed.
- Containers should be stored in a purpose build compound which should be well ventilated, preferably in the open air.
- Do not expose to temperatures exceeding 50°C/ 122°F.
- Protect from sunlight.
- Full containers should be stored so that oldest stock is used first.
- Stored containers should be periodically checked for general condition and leakage.
- Observe all regulations and local requirements regarding storage of containers.
- Protect containers stored in the open against rusting and extremes of weather.
- The container valves should be tightly closed and where appropriate valve outlets should be capped or plugged.
- Container valve guards or caps should be in place.

SECTION 7: Handling and storage (....)

- Store containers in location free from fire risk and away from sources of heat and ignition.
- Smoking should be prohibited within storage areas or while handling product or containers.
- Display "No Smoking or Open Flames" signs in the storage areas.
- The amounts of flammable or toxic gases in storage should be kept to a minimum.
- All electrical equipment in the storage areas should be compatible with flammable materials stored.
- Full and empty cylinders should be segregated. Containers should be segregated in the storage area according to the various categories (e.g. flammable, toxic,etc.) and in accordance with local regulations.
- Containers containing flammable gases should be stored away from other combustible materials
- Where necessary containers containing oxygen and oxidants should be separated from flammable gases by a fire resistant partition.
- Return empty containers in a timely manner.
- Do not use joint paste that may contain peroxides.
- Incompatible with strong oxidizing agents, alkali metals, chemically-active metals (such as calcium, powdered aluminum, zinc, and magnesium)

7.3 Specific end use(s)

- Refrigerant

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

- If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.
  Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace exposure - Measurement of exposure by inhalation to chemical agents - Strategy for testing compliance with occupational exposure limit values). European Standard EN 14042 (Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents). European Standard EN 482 (Workplace exposure. General requirements for the performance of procedures for the measurement of chemical agents). Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

2,3,3,3-Tetrafluoroprop-1-ene

DNEL (inhalational) 950 mg/m³ Industry, Long Term, Systemic Effects
DNEL (inhalational) 113.1 mg/m³ Consumer, Long Term, Systemic Effects
PNEC aqua (freshwater) 100 µg/L
PNEC aqua (intermittent releases, freshwater) 1 mg/L
PNEC aqua (marine water) 10 µg/L
PNEC sediment (freshwater) 1.51 mg/kg
PNEC sediment (marine water) 151 µg/kg
PNEC terrestrial (soil) 1.49 mg/kg

8.2 Exposure controls

- Selection and use of personal protective equipment should be based on a risk assessment of exposure potential

- Engineering controls
  Ensure adequate ventilation
  Provide natural or explosion-proof ventilation that is adequate to ensure flammable gas does not reach its lower explosive limit
  Gas detectors should be used when flammable gases/vapours may be released
  Take precautionary measures against static discharges.
  Oxygen detectors should be considered

- Respiratory protection
  Where a full face mask respirator is required, use EN 136, with gas/vapour filter EN 14387 type AX
  Gas filters do not protect against oxygen deficiency
  Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres.
  BS EN 137:2006 Respiratory protective devices. Self-contained open-circuit compressed air breathing apparatus with full face mask.

SECTION 8: Exposure controls/personal protection (....)

- Skin protection
  Wear protective gloves
  Sturdy work gloves are recommended for handling cylinders. Standard EN 388 - Protective gloves against mechanical risk.
  The breakthrough time of the selected glove(s) must be greater than the intended use period.
  Safety shoes are recommended when handling cylinders. Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
  Wear flame resistant and anti-static safety clothing and shoes.
  Standard EN ISO 11612 - Protective clothing: Clothing to protect against heat and flame.
  Standard EN ISO 14116 - Limited flame spread materials.
  Standard EN ISO 1149-5 - Protective clothing: Electrostatic properties.
- Eye/face protection
  Wear safety glasses approved to standard EN 166.
- Thermal hazards
  Wear thermal insulating gloves when handling liquefied gases.
- Hygiene measures
  Use good personal hygiene practices
  Do not eat, drink or smoke when using this product.
  Wash thoroughly after handling.
- Environmental exposure controls
  Do not release to the environment except for emergency ventilation.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

- Physical state: Liquefied gas
- Colour: Colourless
- Odour: Slightly ethereal
- Melting point/freezing point: No data available
- Boiling point or initial boiling point and boiling range: -29.4 °C
- Flammability: Extremely Flammable
- Lower and upper explosion limit: Lower explosive limit: 6.2% (in air); Upper explosive limit: 12.3% (in air)
- Flash point: Not applicable
- Auto-ignition temperature: 405 °C
- Decomposition temperature: No data available
- pH: Not applicable
- Kinematic viscosity: Not applicable
- Solubility: 198.2 mg/L @ 24°C
- Partition coefficient n-octanol/water (log value): Log Pow 2.15
- Vapour pressure: 6.07 bar @ 21.1°C
  14.2 bar @ 54.4°C
- Density and/or relative density: 4.74 @ 20 °C
- Relative vapour density: 4 (air = 1)
- Particle characteristics: Not applicable

9.2 Other information

- Gas/vapour is heavier than air and may accumulate in confined spaces, particularly at or below ground level.
- Molecular weight: 114.04 g/mol
- Density: 1.1 g/cm³ (25°C)
- Minimum ignition energy: 5 - 10 J (Measured)
- Critical temperature: No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

- Considered stable under normal conditions

10.2 Chemical stability

- Stable under normal conditions

10.3 Possibility of hazardous reactions

- Reacts violently with oxidizing substances
- May form explosive vapour/air mixtures

10.4 Conditions to avoid

- Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

10.5 Incompatible materials

- Do not use joint paste that may contain peroxides.
- Incompatible with strong oxidizing agents, alkali metals, chemically-active metals (such as calcium, powdered aluminum, zinc, and magnesium)

10.6 Hazardous decomposition products

- Decomposition products may include carbon oxides (CO, CO_2), hydrogen halogenides, carbonyl halogenides, fluorinated compounds

SECTION 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

- Acute Toxicity
  Based on available data, the classification criteria are not met

Substances

Chemical Name	**LD_{50} (oral, rat)**	**LC_{50} (inhalation, rat)**	**LD_{50} (dermal, rabbit)**
2,3,3,3-Tetrafluoroprop-1-ene	No data available	(4 h) 92.4 mg/L 4 h) 20 345 - 405 000 ppm	No data available

- Skin corrosion/irritation
  Based on available data, the classification criteria are not met

Substances

Chemical Name	**Irritation/corrosion**
2,3,3,3-Tetrafluoroprop-1-ene	No data available

- Serious eye damage/irritation
  Based on available data, the classification criteria are not met

Substances

Chemical Name	**Irritation/corrosion**
2,3,3,3-Tetrafluoroprop-1-ene	No data available

- Respiratory or skin sensitisation
  Based on the available data, the classification criteria are not met

SECTION 11: Toxicological information (....)

Substances

Chemical Name	Skin sensitisation	Respiratory sensitisation
2,3,3,3-Tetrafluoroprop-1-ene	No data available	No data available

- Germ cell mutagenicity
  Based on available data, the classification criteria are not met

Substances

Chemical Name	Toxicity - In Vitro	Toxicity - In Vivo
2,3,3,3-Tetrafluoroprop-1-ene	Adverse effect observed (positive)	No adverse effect observed (negative)

- Carcinogenicity
  Based on available data, the classification criteria are not met

Substances

Chemical Name	NOAEL (oral, rat)	NOAEC (inhalation, rat)	NOAEL (dermal, rat)
2,3,3,3-Tetrafluoroprop-1-ene	No data available	No data available	No data available

- Reproductive toxicity
  Based on available data, the classification criteria are not met

Substances

Chemical Name	NOAEL (oral, rat)	NOAEC (inhalation, rat)	NOAEL (dermal, rat)
2,3,3,3-Tetrafluoroprop-1-ene	No data available	233 000 mg/m³ (Effect on fertility)	No data available

- Specific target organ toxicity (STOT) - single exposure
  Based on the available data, the classification criteria are not met
- Specific target organ toxicity (STOT) - repeated exposure
  Based on the available data, the classification criteria are not met

Substances

Chemical Name	NOAEL (oral, rat)	NOAEC (inhalation, rat)	NOAEL (dermal, rat)
2,3,3,3-Tetrafluoroprop-1-ene	No data available	3.63 mg/L 800 - 50 000 ppm	No data available

- Aspiration hazard
  Based on the available data, the classification criteria are not met
- Contact with eyes
  Extremely cold material, can cause burns similar to frostbite.
- Contact with skin
  Extremely cold material, can cause burns similar to frostbite.
- Ingestion
  No hazard expected under normal conditions of use
- Inhalation
  Danger of suffocation at high concentrations due to oxygen displacement
  Exposure to oxygen deficient atmosphere may cause the following symptoms: dizziness, salivation, nausea, vomiting, loss of mobility/consciousness.
  In high concentrations may cause asphyxiation. Victim may not be aware of asphyxiation.
  Asphyxiation may bring about unconsciousness without warning and so rapidly that victim may be unable to protect themselves.
  May cause CNS depression, narcosis, cardiac disorders.

SECTION 11: Toxicological information (....)

11.2 Information on other hazards

- Does not contain any substances with endocrine disrupting properties

SECTION 12: Ecological information

12.1 Toxicity

- Based on available data, the classification criteria are not met

Substances

Chemical Name	LC_{50} (fish)	EC_{50} (aquatic invertebrates)	EC_{50} (aquatic algae)
2,3,3,3-Tetrafluoroprop-1-ene	(4 days) 33 - 197 mg/L	(48 h) 65 - 100 mg/L	(72 h) 2.5 - 100 mg/L

12.2 Persistence and degradability

Substances

Chemical Name	Biodegradation
2,3,3,3-Tetrafluoroprop-1-ene	Under test conditions no biodegradation observed in water (100%) R1234yf is phototransformed in the air with ~ 100% degradation observed by 11 days

12.3 Bioaccumulative potential

- Bioaccumulation is not expected

Substances

Chemical Name	Bioconcentration Factor (BCF)	Log Kow
2,3,3,3-Tetrafluoroprop-1-ene	Low potential for bioaccumulation (Log Pow < 3)	Log Pow 2.15

12.4 Mobility in soil

- This substance is volatile

Substances

Chemical Name	Adsorption/desorption
2,3,3,3-Tetrafluoroprop-1-ene	Log Koc <1.26 (Koc <18)

12.5 Results of PBT and vPvB assessment

- Not a PBT according to REACH Annex XIII
- Not a vPvB according to REACH Annex XIII

12.6 Endocrine disrupting properties

- No information available

12.7 Other adverse effects

- Global Warming Potential (GWP) = <1 (based on fifth IPCC assessment)
- Ozone depletion potential: ODP (R-11=1) = 0

SECTION 13: Disposal considerations

13.1 Waste treatment methods

- Contact supplier if guidance is required
- Return unused product in original cylinder to supplier
- Do not discharge into areas where there is a risk of forming an explosive mixture with air
- Waste gas should be flared through a suitable burner with flash back arrestor
- Do not discharge into any place where its accumulation could be dangerous

SECTION 13: Disposal considerations (....)

- Disposal should be in accordance with local, state or national legislation
- Cylinders should be returned to suppliers

13.2 Classification

- The waste must be identified according to the List of Wastes (2000/532/EC)
- Hazardous Property Code(s): HP 3 Flammable

SECTION 14: Transport information

14.1 UN number or ID number

- UN No.: 3161

14.2 UN proper shipping name

- Proper Shipping Name: LIQUEFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-Tetrafluoroprop-1-ene)

14.3 Transport hazard class(es)

- Hazard Class: 2.1

14.4 Packing group

- Packing Group: Not applicable

14.5 Environmental hazards

- Not Classified

14.6 Special precautions for user

- Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
- Avoid transport on vehicles where the load space is not separated from the driver's compartment.
- Before transporting product containers ensure there is adequate ventilation and:
  - they are firmly secured and the cylinder valve is closed and not leaking;
  - the valve outlet cap nut or plug (where provided) is correctly fitted;
  - the valve protection device (where provided) is correctly fitted.
- The transportation information is not intended to convey all specific regulatory data relating to this material.
- For complete transportation information, contact a SGS Gases customer service representative.

14.7 Maritime transport in bulk according to IMO instruments

- Not applicable

14.8 Road/Rail (ADR/RID)

- ADR UN No.: 3161
- Proper Shipping Name: LIQUEFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-Tetrafluoroprop-1-ene)
- ADR Hazard Class: 2
- ADR Packing Group: Not applicable
- Tunnel Code: (B/D)

14.9 Sea (IMDG)

- IMDG UN No.: 3161
- Proper Shipping Name: LIQUEFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-Tetrafluoroprop-1-ene)
- IMDG Hazard Class: 2.1
- IMDG Packing Group: Not applicable

14.10 Air (ICAO/IATA)

SECTION 14: Transport information (....)

- ICAO UN No.: 3161
- Proper Shipping Name: LIQUEFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-Tetrafluoroprop-1-ene)
- ICAO Hazard Class: 2.1
- ICAO Packing Group: Not applicable

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

- This safety data sheet is provided in compliance with REACH Regulation (EC) No 1907/2006 (as amended by Regulation (EU) 2020/878) and UK REACH
- The GB Classification, Labelling and Packaging Regulation (GB CLP) applies in Great Britain
- Regulation (EC) No. 1272/2008 on the classification, labelling and packaging of substances and mixtures (CLP Regulation) applies in Europe
- Seveso III Directive (2012/18/EU, Dangerous Substances in Annex I: Listed
- Restrictions on use according to Annex XVII to REACH Regulation: None

15.2 Chemical safety assessment

- A REACH chemical safety assessment has not been carried out

SECTION 16: Other information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. This company shall not be held liable for any damage resulting from handling or from contact with the above product.

Sources of data: Information from published literature and company data

Text not given with phrase codes where they are used elsewhere in this safety data sheet:

- H220: Extremely flammable gas
- H280: Contains gas under pressure; may explode if heated

Acronyms

- ATE: Acute Toxicity Estimate
- CAS: Chemical Abstracts Service
- DNEL: Derived No-Effect Level
- EC: European Community
- EC_{50}: Effective Concentration, 50%
- GHS: Globally Harmonised System
- LC_{50}: Lethal Concentration, 50%
- LD_{50}: Lethal Dose, 50%
- NOAEC: No observed adverse effect concentration
- NOAEL: No observed adverse effect level
- OEL: Occupational Exposure Limit
- PBT: Persistent, Bioaccumulative and Toxic
- PNEC: Predicted No-Effect Concentration
- REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals
- SCL: Specific Concentration Limit
- SVHC: Substances of Very High Concern
- vPvB: very Persistent and very Bioaccumulative
- WEL: Workplace Exposure Limit

--- end of safety datasheet ---