

Safety Data Sheet (SDS)

Tetrafluoromethane (R14 / CF₄ / Carbon Tetrafluoride)

CAS No.: 75-73-0

UN No.: 1982

Date of issue: Aug 29, 2026

Version: 1.0

1 Identification

1.1 Product identifier

Chemical name	Tetrafluoromethane (Carbon Tetrafluoride)
Common names / synonyms	R14, CFC-14, PFC-14, Freon 14, Carbon Tetrafluoride, Perfluoromethane (CF ₄)
CAS number	75-73-0
UN number	1982 (compressed gas)
Dangerous goods code	Class 2.2 Non-flammable, non-toxic gas
Molecular formula	CF ₄
Molecular weight	88.00 g/mol
Recommended use	Ultra-low temperature refrigerant, semiconductor etching gas, electrical insulating gas, laser gas, etc.

1.2 Details of the supplier of the safety data sheet

Supplier name	Hangzhou Wula Chemical Co., Ltd.
Address	No. 7 Longtan Road, Yuhang District, Hangzhou, Zhejiang Province, China
Postal code	311100
Telephone	+86-571-87024025
Fax	+86-571-87024025
E-mail	safety@wulachem.cn

1.3 Emergency telephone number

National Chemical Emergency Hotline (China): +86-532-83889090 (24 hours)

Zhejiang Province Chemical Emergency Hotline: +86-571-88071797

2 Hazards identification

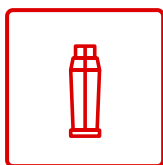
2.1 GHS classification

Hazard classification:

- Gases under pressure (Physical hazard) — Compressed gas

Note: This substance belongs to ASHRAE Safety Group A1 (low toxicity, non-flammable). It is essentially non-toxic ($LC_{50} > 500,000$ ppm). The primary hazards are physical high-pressure gas danger and asphyxiation. The vapor pressure is extremely high (3800 kPa at 25°C), with a very low critical temperature (-45.6°C), meaning it cannot be liquefied at ambient temperature. GWP is as high as 7390, making it an extremely potent greenhouse gas.

2.2 GHS label elements



GHS04 Gas cylinder

Signal word: **WARNING**

Hazard statements:

H280 Contains gas under pressure; may explode if heated.

Precautionary statements:

P102 Read and understand all safety precautions before handling.

P410+P403 Protect from sunlight. Store in a well-ventilated place.

2.3 Other hazards

- Gas is heavier than air (approximately 3.0 times the density of air) and can spread long distances along the ground, creating an oxygen-deficient environment (asphyxiation hazard).
- Non-flammable, but decomposes at high temperatures (> 1000°C) producing toxic hydrogen fluoride and other gases.
- Extremely high internal cylinder pressure (3800 kPa at 25°C); pressure increases further when heated, posing risk of cylinder rupture and explosion.
- Critical temperature is extremely low (-45.6°C); cannot be liquefied at ambient temperature, stored as compressed gas at pressures far higher than typical liquefied gases.

- GWP as high as 7390, making it an extremely potent greenhouse gas; emissions must be strictly controlled.

3 Composition/information on ingredients

3.1 Substance/mixture

This product is a pure substance.

3.2 Composition information

Component name	CAS No.	Concentration (by mass)
Tetrafluoromethane	75-73-0	≥99.9% (semiconductor grade ≥99.999%)

3.3 Impurity information

Impurity	Industrial Grade	Electronic Grade (Semiconductor)
Acidity (as HF)	≤0.1 ppm	≤0.01 ppm
Moisture	≤10 ppm	≤1 ppm
Air (N ₂ +O ₂)	≤100 ppm	≤5 ppm
CO ₂	≤50 ppm	≤1 ppm
Other fluorocarbons	≤500 ppm	≤5 ppm

4 First aid measures

4.1 Description of necessary first aid measures

General advice: Remove victim from contaminated area immediately. Keep warm and at rest. Show this SDS to attending physician.

Inhalation:

- Move victim to fresh air immediately. Keep airway clear.
- Administer oxygen if breathing is difficult.
- If not breathing, give artificial respiration (preferably with bag-valve-mask or pocket mask; avoid mouth-to-mouth).
- If no pulse, start cardiopulmonary resuscitation (CPR) immediately.

- Keep victim warm and at rest. Monitor condition closely.
- Seek medical attention immediately. This substance is a simple asphyxiant; the primary hazard is oxygen-deficient asphyxiation.

Skin contact (frostbite / high-pressure gas injection injury):

- High-pressure gas injection can cause skin frostbite and tissue penetration injury.
- Immediately flush affected area with large amounts of lukewarm water (37–40°C) to promote rewarming.
- Do NOT use hot water (>40°C) or direct heat (e.g., electric heaters).
- Do NOT rub or massage frostbitten area; this may worsen tissue damage.
- Cover with sterile dressing.
- Seek medical attention immediately. High-pressure gas injection injuries may cause deep tissue damage requiring professional medical evaluation.

Eye contact:

- High-pressure gas injection can cause eye frostbite and mechanical injury.
- Immediately hold eyelids open and rinse thoroughly with plenty of water or normal saline for at least 15 minutes.
- Remove contact lenses if present and easily removable.
- Seek medical attention immediately, preferably from an ophthalmologist.

Ingestion:

Not applicable. This substance is a compressed gas; ingestion exposure is not expected.

4.2 Most important symptoms and effects, both acute and delayed

- Asphyxiation: This substance is a simple asphyxiant. High concentrations displace oxygen in the air, causing hypoxia. Symptoms include rapid breathing, dizziness, headache, nausea, loss of consciousness, and death.
- Skin contact with high-pressure gas injection: frostbite, tissue penetration injury, air embolism (rare but severe).
- Eye contact with high-pressure gas injection: severe frostbite, corneal damage, visual impairment.

4.3 Indication of any immediate medical attention and special treatment needed

Notes for physicians:

- Symptomatic and supportive therapy. Maintain airway; administer oxygen if needed.
- This substance is essentially non-toxic; the primary hazard is asphyxiation. Correcting hypoxia is the primary treatment goal.
- High-pressure gas injection injuries may cause deep tissue damage and air embolism; careful assessment and close monitoring are required.
- Treat frostbite with standard protocols: lukewarm water (37–40°C) rewarming. Do NOT use dry heat or massage.

- If air embolism is suspected (high-pressure gas penetrating skin into blood vessels), consider hyperbaric oxygen therapy.

5 Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media: This substance is non-flammable. Use extinguishing agent appropriate for surrounding fire. Carbon dioxide, dry chemical, water fog, and foam are acceptable.

Unsuitable extinguishing media: No specific contraindications.

5.2 Special hazards arising from the substance or mixture

- Non-flammable. No flash point. No explosive limits. Extremely chemically inert.
- Slowly decomposes at extremely high temperatures ($>1000^{\circ}\text{C}$), producing toxic hydrogen fluoride (HF) and other gases.
- Extremely high internal cylinder pressure (3800 kPa at 25°C); pressure rises sharply when heated, potentially causing cylinder rupture. Flying fragments can cause severe injury at high velocity.
- May react with reactive metals (lithium, sodium, etc.) at high temperatures.

5.3 Hazardous combustion products

Hydrogen fluoride (HF) and other fluorinated compounds (only at extremely high temperatures).

5.4 Advice for firefighters

- Firefighters must wear positive-pressure self-contained breathing apparatus (SCBA) and full protective fire-resistant clothing.
- If possible, move containers from fire area to a safe location.
- Cool containers with water spray from a safe distance until fire is extinguished.
- Immediately evacuate if containers show discoloration or if pressure relief devices begin to vent.
- Isolate the area; keep unauthorized personnel out.
- Cylinder rupture can produce high-velocity flying fragments; firefighters must maintain a safe distance and use protective cover.

High-pressure warning: R14 has a vapor pressure of 3800 kPa (approximately 38 atm) at 25°C , far higher than typical refrigerants. Cylinder internal pressure rises sharply when heated, creating an extremely high risk of rupture. Temperature must be strictly controlled during storage and transportation; exposure to direct sunlight and proximity to heat sources are strictly prohibited.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

- Evacuate personnel from the leak area to upwind locations immediately. Establish a perimeter and restrict access.
- Emergency responders should wear positive-pressure SCBA, standard work clothing, protective gloves, and safety goggles.
- Enter from upwind direction.
- Stop leak if it can be done safely. Beware of high-pressure gas injection hazard.
- Do not touch or walk through spilled material.
- Never direct high-pressure gas valves toward any person.
- Maintain emergency contact personnel for external support.

6.2 Environmental precautions

- Prevent gas from entering sewers, basements, or confined spaces.
- Ventilate the area to accelerate dispersion.
- Control emissions of this extremely potent greenhouse gas during large leaks; recover whenever possible.
- Avoid release to atmosphere (GWP = 7390).

6.3 Methods and materials for containment and cleaning up

- **Small leak:** Increase ventilation to accelerate gas dispersion. Monitor oxygen levels to prevent asphyxiation.
- **Large leak:**
 - Close source valve if safe to do so.
 - Recover using dedicated high-pressure gas recovery equipment.
 - If recovery is not possible, dilute to safe concentration through ventilation.
- **Cylinder leak:** Move cylinder to a well-ventilated safe area and vent slowly. If valve cannot be closed, contact supplier for professional handling. Do not approach the front of a high-pressure gas leak.

6.4 Reference

See Section 8 (Exposure controls/personal protection) and Section 13 (Disposal considerations).

Special warning: R14 gas density is approximately 3.0 times that of air and will accumulate in low-lying areas and confined spaces, creating an oxygen-deficient environment (asphyxiation hazard). Always check oxygen levels ($\geq 19.5\%$) and use a buddy system before entering confined spaces or low-lying areas. This substance is a high-pressure compressed gas; leaks pose high-pressure injection hazards.

7.1 Precautions for safe handling

- Handle in closed systems with adequate natural ventilation or local exhaust.
- Personnel must be specially trained and strictly follow operating procedures. Certified personnel only.
- Prevent gas leakage into workplace atmosphere.
- **Pay special attention to high-pressure gas operation safety: open valves slowly; never direct valve outlets toward any person.**
- Use dedicated high-pressure gas regulators and piping; ensure pressure ratings meet requirements.
- Handle cylinders carefully; do not drop, slide, roll, or bump cylinders.
- Equip area with leak emergency response equipment.
- No smoking, eating, or drinking in work areas.
- Use explosion-proof ventilation systems and equipment.
- Periodically inspect cylinders, valves, and piping for leaks and pressure integrity.
- Cylinders must be equipped with valve caps and safety rings.

7.2 Conditions for safe storage, including any incompatibilities

- Store in a cool, dry, well-ventilated non-flammable gas warehouse.
- **Storage temperature should not exceed 30°C.** Keep away from fire, heat sources, and direct sunlight. High-pressure gas is highly sensitive to temperature.
- Store separately from flammable gases, oxidizers, and reactive metals.
- Storage area should be equipped with leak emergency response equipment.
- Cylinders must be stored upright with valve caps and safety rings in place, properly secured to prevent falling.
- Use explosion-proof lighting and ventilation systems.
- Post clear safety warning signs in storage areas.
- Implement two-person receiving/issuing and two-person custody system.
- Warehouse should be equipped with high-pressure gas concentration monitors and oxygen level monitors.

7.3 Specific end uses

For industrial use only. Personnel must be professionally trained. Primarily used for ultra-low temperature refrigeration, semiconductor etching processes, and electrical insulation. Do not use for direct food contact, medical inhalation, or other unapproved applications. Note: This substance is an extremely potent greenhouse gas (GWP = 7390); emissions and leaks must be strictly controlled.

8 Exposure controls/personal protection

8.1 Control parameters

China OEL (Occupational Exposure Limit)	No established legal limit. This substance is a simple asphyxiant; workplace oxygen level should be maintained at $\geq 19.5\%$
ACGIH TLV-TWA (USA)	No specific limit established (simple asphyxiant). Refer to oxygen level guidelines
OSHA PEL-TWA (USA)	Not established (simple asphyxiant)
Biological limit value	Not established

Note: This substance is a simple asphyxiant and is essentially non-toxic. The primary hazard is oxygen displacement at high concentrations leading to asphyxiation. Control measures should focus on monitoring workplace oxygen levels ($\geq 19.5\%$).

8.2 Exposure monitoring methods

Gas chromatography with thermal conductivity detection (GC-TCD) or mass spectrometry (GC-MS), non-dispersive infrared spectroscopy (NDIR), oxygen level monitors.

8.3 Appropriate engineering controls

- Enclosed process design with general ventilation or local exhaust.
- Provide safety shower and eyewash station.
- Install oxygen level detection alarms in areas where leaks may occur (low limit 19.5%).
- Use explosion-proof electrical equipment.
- High-pressure piping systems must be equipped with safety pressure relief devices and pressure monitoring gauges.

8.4 Individual protection measures

Respiratory protection:

- Normal conditions (adequate oxygen): no special protection required.
- Oxygen below 19.5% or concentration unknown: positive-pressure SCBA or supplied-air respirator must be worn.
- Entering high-concentration areas or emergency rescue: positive-pressure SCBA must be worn.

Eye/face protection:

- General handling: wear safety goggles.
- When handling high-pressure gas: chemical safety goggles or face shield must be worn to prevent high-pressure gas injection injuries.

Skin protection:

- Hand protection: wear protective gloves when operating high-pressure valves and piping.
- Body protection: standard work uniform.
- Other: no smoking in work areas; use a buddy system when entering tanks or confined spaces, and monitor oxygen levels.

8.5 Hygiene measures

- Remove contaminated clothing and wash skin thoroughly after work.
- Maintain good personal hygiene.
- Ensure eyewash and emergency shower are available in the workplace.

9 Physical and chemical properties

9.1 Basic physical and chemical properties

Appearance and odor	Colorless, odorless gas; gaseous at ambient temperature and pressure. Extremely chemically inert.
Odor threshold	No odor
pH	Not applicable (gas)
Melting point / Freezing point	-183.6 °C (-298.5 °F)
Boiling point / Boiling range (101.3 kPa)	-128 °C (-198.4 °F)
Flash point	None (non-flammable gas)
Evaporation rate	Not available
Flammability (gas)	Non-flammable
Explosive limits (upper/lower)	Not applicable (non-flammable gas)
Vapor pressure (25°C)	3800 kPa (extremely high, approximately 37.5 atm)
Vapor density (25°C, 1 atm)	3.62 g/L (approximately 3.0, heavier than air)
Gas relative density (air = 1)	Approximately 3.0
Solubility	Very slightly soluble in water (~0.0015 g/L at 25°C); slightly soluble in ethanol and ether
Octanol/water partition coefficient (log P)	~1.2
Auto-ignition temperature	Not applicable (non-flammable)
Decomposition temperature	>1000°C onset of slow decomposition

Viscosity (gas, 25°C)	~17.3 $\mu\text{Pa}\cdot\text{s}$
Thermal conductivity (gas, 25°C)	~0.0159 W/(m·K)

9.2 Thermodynamic properties

Critical temperature	-45.6 °C (-50.1 °F) (extremely low; cannot be liquefied at ambient temperature)
Critical pressure	3740 kPa (3.74 MPa / 543 psia)
Critical density	0.63 g/cm ³
Heat of vaporization (at boiling point)	136 kJ/kg
Gas specific heat (25°C, constant pressure)	0.707 kJ/(kg·°C)
Henry's Law constant (25°C)	Not available

9.3 Other safety data

ASHRAE safety group	A1 (low toxicity, non-flammable)
Ozone Depletion Potential (ODP)	0 (does not deplete ozone layer; see Section 12.6)
Global Warming Potential (GWP, 100-yr)	7390 (extremely potent greenhouse gas; see Section 12.6)

10 Stability and reactivity

10.1 Reactivity

Extremely chemically inert; does not readily undergo any chemical reactions under normal temperature and pressure. One of the most stable organic compounds known.

10.2 Chemical stability

Extremely stable under normal conditions of temperature and pressure. Exhibits high thermal stability even at elevated temperatures.

10.3 Possibility of hazardous reactions

- Slowly decomposes at extremely high temperatures (>1000°C), producing toxic hydrogen fluoride.

- May react with reactive metals (e.g., molten lithium, molten sodium) at high temperatures.
- May react with certain materials under extreme conditions (e.g., plasma, electric arc).

10.4 Conditions to avoid

High temperature, open flame, electric arc, direct heat sources, cylinder overpressure

10.5 Incompatible materials

Reactive metals (lithium, sodium, potassium, etc., especially at high temperatures or in molten state), strong reducing agents

10.6 Hazardous decomposition products

Hydrogen fluoride (HF) and other fluorinated compounds (only at extremely high temperatures)

10.7 Hazardous polymerization

Will not occur.

11 Toxicological information

11.1 Acute toxicity

Rat inhalation LC ₅₀ (4 hr)	> 500,000 ppm (essentially non-toxic, highest concentration tested)
Rabbit dermal LD ₅₀	Not available (gaseous substance)

Note: R14 is essentially non-toxic (LC₅₀ > 500,000 ppm). Its primary health hazard is simple asphyxiation (displacement of oxygen in air at high concentrations leading to hypoxia), not chemical toxicity.

11.2 Skin irritation/corrosion

No skin irritation/corrosion in gaseous state. High-pressure gas injection can cause physical frostbite and mechanical injury.

11.3 Eye irritation/corrosion

No eye irritation/corrosion in gaseous state. High-pressure gas injection can cause physical frostbite and mechanical injury.

11.4 Respiratory or skin sensitization

No sensitization reported.

11.5 Germ cell mutagenicity

No data available. Based on its chemical inertness, no mutagenic effect is expected.

11.6 Carcinogenicity

No evidence of carcinogenicity.

- IARC (International Agency for Research on Cancer): Not listed
- ACGIH (American Conference of Governmental Industrial Hygienists): Not listed
- EPA (U.S. Environmental Protection Agency): Not classified as a carcinogen

11.7 Reproductive toxicity

No data available. Based on its chemical inertness, no reproductive toxicity is expected.

11.8 STOT-single exposure

No specific target organ toxicity. This substance is a simple asphyxiant; the only effect of high-concentration exposure is central nervous system symptoms caused by hypoxia (dizziness, headache, loss of consciousness).

11.9 STOT-repeated exposure

No target organ toxicity observed after repeated exposure. Based on its chemical inertness, no repeated exposure toxicity is expected.

11.10 Aspiration hazard

This substance is a simple asphyxiant; the primary hazard is oxygen displacement at high concentrations leading to asphyxiation. It does not cause chemical lung injury or aspiration pneumonia. Asphyxiation symptoms worsen as oxygen levels decrease: 16–19% causes rapid breathing and decreased attention; 10–14% causes impaired judgment and dizziness; 6–10% causes nausea, vomiting, and loss of consciousness; <6% can be fatal within a short time.

12 Ecological information

12.1 Ecotoxicity

Fish acute toxicity (LC ₅₀ , 96 hr)	Not available (chemically inert, expected to be of low toxicity)
Daphnia acute toxicity (EC ₅₀ , 48 hr)	Not available
Algae growth inhibition (EC ₅₀ , 72 hr)	Not available
Bacterial toxicity	Not available

12.2 Persistence and degradability

- Atmospheric degradation: Extremely persistent; atmospheric lifetime of approximately 50,000 years. Does not readily react with hydroxyl radicals; extremely difficult to degrade naturally.

- Biodegradability: Not biodegradable (chemically inert).
- Hydrolysis: Does not hydrolyze (chemically inert).
- Photodegradation: Extremely resistant to photodegradation.

12.3 Bioaccumulative potential

log P = 1.2. Very low bioaccumulation potential (below the bioconcentration threshold of log P = 4.5).

12.4 Mobility in soil

Highly volatile in gaseous form; practically insoluble in water. Rapidly volatilizes to atmosphere when released to soil.

12.5 Results of PBT and vPvB assessment

This substance is extremely persistent in the environment (atmospheric lifetime ~50,000 years), but has low bioaccumulation and low toxicity. It does not strictly meet the toxicity (T) and bioaccumulation (B) criteria of the PBT standard, but qualifies as a very persistent substance (vP).

12.6 Other adverse effects

- **Ozone Depletion Potential (ODP):** 0 (does not deplete the ozone layer; not an ODS substance)
- **Global Warming Potential (GWP, 100-year time horizon):** 7390 (relative to CO₂ = 1; extremely potent greenhouse effect; belongs to PFC-class perfluorocarbon compounds)
- This substance is an extremely potent greenhouse gas with an atmospheric lifetime of approximately 50,000 years, contributing to global warming with extremely long-term cumulative effects.
- Classified as a perfluorocarbon (PFC), listed under the Kyoto Protocol and Paris Agreement greenhouse gas control lists.
- Large releases will have serious impacts on global climate; emissions must be strictly controlled with priority on recovery and reuse.

13 Disposal considerations

13.1 Waste treatment methods

Product/residues:

- Do NOT release directly to atmosphere (extremely potent greenhouse gas, GWP = 7390, atmospheric lifetime ~50,000 years).
- Recovery and recycling (purification and reuse) is the preferred approach (recommended method).
- If recovery is not feasible, dispose of through a licensed hazardous waste treatment facility.
- High-temperature incineration or plasma decomposition methods may be used; decomposition products are removed through alkaline scrubbers.
- Do not discharge to sewers, waterways, or soil.

Contaminated packaging:

- Empty cylinders must be returned to supplier or a qualified facility for disposal. Do not discard or cut empty cylinders.
- Empty cylinders with residual high-pressure gas are managed as hazardous waste.

13.2 Special precautions for disposal

- Refer to national and local regulations before disposal (e.g., Solid Waste Pollution Prevention and Control Law, Air Pollution Prevention and Control Law, etc.).
- Personnel should wear appropriate personal protective equipment (see Section 8).
- Ensure good ventilation to prevent asphyxiation.
- Disposal must be performed by a qualified and licensed facility.
- Disposal records should be maintained.

14 Transport information

14.1 UN number

1982 (Tetrafluoromethane, compressed gas)

14.2 UN proper shipping name

TETRAFLUOROMETHANE

14.3 Transport hazard class(es)

Class 2.2 Non-flammable, non-toxic gas

14.4 Packing group

Not applicable (Class 2 gases are not assigned a packing group)

14.5 Packing mark / Hazard label

- Primary hazard label: Non-flammable non-toxic gas (green, Class 2.2)
- Subsidiary hazard label: None

14.6 Methods and materials for containment and packaging

- Seamless steel high-pressure cylinders. Cylinders must comply with applicable national standards (e.g., GB 5099). Pressure ratings must meet high-pressure requirements.
- Common package sizes: 10L, 20L, 40L, 50L high-pressure cylinders; tube trailers (ISO tank containers are not applicable as the gas cannot be liquefied at ambient temperature).
- Cylinder valve outlet thread direction: right-hand thread for non-flammable non-toxic gases.
- Filling pressure: typically 15 MPa (150 bar); high-pressure cylinders and valves are required.

14.7 Special requirements for different modes of transport

Road transport:

- Vehicles must have hazardous cargo transport license.

- Cylinders must have valve caps and safety rings in place.
- Cylinders generally laid flat with valves pointing in same direction; do not stack crosswise. Height must not exceed vehicle guardrail.
- Transport during early morning/evening in summer to avoid direct sunlight (high-pressure gas is highly sensitive to temperature).
- Follow designated routes; do not stop in residential or densely populated areas.

Rail transport:

- Prohibit hump shunting (no free-roll classification).
- Transport in boxcars; cylinders upright or laid flat and secured.

Marine transport (IMDG Code):

- UN 1982, Class 2.2
- Marine pollutant: No
- Stowage category: A (on deck or under deck); must be kept away from heat sources

Air transport (ICAO/IATA DGR):

- UN 1982, Class 2.2
- Non-flammable non-toxic gas
- Acceptable on passenger and cargo aircraft (subject to packaging quantity limits and high-pressure cylinder requirements)

14.8 Special precautions for user

- Do not co-transport with oxidizers, reactive metals, or food/feed products.
- Vehicles must be equipped with appropriate fire extinguishing equipment and leak emergency response gear.
- Transport personnel must be specially trained and certified.
- Protect from sunlight, rain, and high temperature during transit (high-pressure gas is highly sensitive to temperature; rising temperature causes sharp pressure increase).
- When stopping en route, stay away from fire, heat sources, and high-temperature areas.
- Exhaust pipes of vehicles carrying this product must be fitted with spark arrestors.
- Load and unload carefully to prevent damage to cylinders and fittings.
- Do not impact cylinders during transport; damage to high-pressure gas cylinders can have severe consequences.

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

International regulations:

- **UN GHS (Globally Harmonized System of Classification and Labelling of Chemicals):** 8th revised edition
- **Montreal Protocol:** Not a controlled ozone-depleting substance (ODP = 0)
- **Kyoto Protocol / Paris Agreement:** Listed as greenhouse gas (PFC-class perfluorocarbon compound, GWP = 7390)
- **EU REACH Regulation (EC 1907/2006):** Registered substance
- **EU CLP Regulation (EC 1272/2008):** Classification, labelling and packaging regulation
- **EU F-Gas Regulation (EC 517/2014):** Fluorinated greenhouse gas control
- **US EPA:** PFC-class greenhouse gas, included in Greenhouse Gas Reporting Rule (40 CFR 98)
- **US OSHA HCS 2012:** Hazard Communication Standard
- **US DOT 49 CFR:** Hazardous Materials Transportation Regulations
- **ADR/RID:** European Agreement concerning the International Carriage of Dangerous Goods by Road/Rail
- **IMDG Code:** International Maritime Dangerous Goods Code
- **IATA DGR:** International Air Transport Association Dangerous Goods Regulations

15.2 Chemical safety assessment

Chemical Safety Assessment has not been carried out for this substance in the context of this SDS. Users should conduct their own assessment based on specific use conditions.

16 Other information

16.1 References

- NIOSH Pocket Guide to Chemical Hazards
- International Chemical Safety Card (ICSC)
- NOAA CAMEO Chemicals Database
- PubChem Compound Database (CID 6393)
- ASHRAE Handbook - Refrigeration Systems and Applications
- GB/T 16483-2008 (Content and order of sections in safety data sheet for chemical products)
- GB 30000 series (Rules for classification and labelling of chemicals)
- United Nations GHS (Globally Harmonized System of Classification and Labelling of Chemicals), 8th revised edition
- IPCC Fifth Assessment Report (greenhouse gas GWP data)

16.2 Abbreviations

Abbreviation	Full term
SDS / MSDS	Safety Data Sheet / Material Safety Data Sheet

GHS	Globally Harmonized System of Classification and Labelling of Chemicals
CAS	Chemical Abstracts Service (registry number)
UN	United Nations (dangerous goods number)
ODP	Ozone Depletion Potential
GWP	Global Warming Potential
PFC	Perfluorocarbon
CFC	Chlorofluorocarbon
LC ₅₀	Lethal Concentration, 50%
LD ₅₀	Lethal Dose, 50%
TLV-TWA	Threshold Limit Value - Time-Weighted Average
PEL	Permissible Exposure Limit
SCBA	Self-Contained Breathing Apparatus
PBT	Persistent, Bioaccumulative, and Toxic

16.3 Disclaimer

This Safety Data Sheet (SDS) has been prepared in accordance with GB/T 16483-2008 and the UN GHS standard, and is intended to provide guidance on the safe use, handling, and disposal of the product. The information serves only as a safe handling guide and does not constitute a guarantee of product specifications or performance. Users should assess its applicability based on specific use conditions and local regulatory requirements, and take necessary safety precautions. The preparer assumes no legal liability for any direct or indirect losses arising from the use of the information in this document. The data in this document may be updated as new research findings and regulatory changes become available; periodic review of the latest version is recommended.