

Safety Data Sheet (SDS)

Ethylene (R1150)

CAS No.: 74-85-1 UN No.: 1962 Date of issue: Aug 29, 2026 Version: 1.0

1 Identification

1.1 Product identifier

Chemical name	Ethylene (Ethene)
Common names / synonyms	R1150, HC-1150, Ethylene, Ethene
CAS number	74-85-1
UN number	1962 (Ethylene, compressed)
Dangerous goods code	Class 2.1 Flammable gas
Molecular formula	C ₂ H ₄
Molecular weight	28.05 g/mol
Recommended use	Ultra-low temperature refrigerant (cascade system low-temperature stage), petrochemical feedstock (polyethylene, ethylene oxide, ethylene glycol, etc.), welding/cutting gas, plant ripening agent

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)

2 Hazards identification

2.1 GHS classification

Hazard classification:

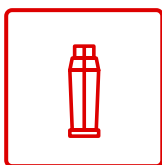
- Flammable gas (Physical hazard) — Category 1A (extremely flammable)
- Compressed gas (Physical hazard) — Liquefied gas
- Specific target organ toxicity - single exposure (Health hazard, narcotic effect) — Category 3
- May cause cancer (Health hazard) — Category 1B

Note: Regarding the carcinogenicity classification, IARC classifies ethylene as Group 3 (not classifiable). However, based on its metabolism to ethylene oxide (IARC Group 1 carcinogen), some GHS frameworks classify it as suspected carcinogen Category 1B. This classification is controversial; see Section 11.6.

2.2 GHS label elements



GHS02 Flammable



GHS04 Gas cylinder



GHS08 Health hazard

Signal word: **DANGER**

Hazard statements:

- H220** Extremely flammable gas.
- H280** Contains gas under pressure; may explode if heated.
- H336** May cause drowsiness or dizziness.
- H350** May cause cancer.

Note: H350 (may cause cancer) is based on the mechanism of ethylene metabolism to ethylene oxide (a known human carcinogen, IARC Group 1). This classification is controversial in some regulatory frameworks; see Section 11.6 for details.

Precautionary statements:

- P101** If medical advice is needed, have product container or label at hand.
- P102** Keep out of reach of children.
- P201** Obtain special instructions before use.
- P210** Keep away from heat, sparks, open flames, and other ignition sources. No smoking.
- P271** Use only outdoors or in a well-ventilated area.

P308+P313 If exposed or concerned: Get medical advice/attention.

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381 Eliminate all ignition sources if safe to do so.

P403 Store in a well-ventilated place.

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

P405 Store locked up.

2.3 Other hazards

Extremely flammable gas warning (extremely wide explosive limits):

- This is an A3 safety group refrigerant (ASHRAE), with **explosive limits of 2.7%~36.0% by volume in air — an extremely wide range. Explosive mixtures can form at nearly any common concentration, making it extremely dangerous.**
- Vapor density is close to that of air (gas density 1.261 g/L, approximately 0.98 times air). It can remain suspended and disperse at any height in air for extended periods; can flash back to ignition source.
- Critical temperature is 9.2°C, well below room temperature. At 25°C it is in a supercritical state with extremely high vapor pressure. Stored in cylinders as a compressed gas.
- High concentrations can cause asphyxiation and central nervous system depression (dizziness, drowsiness, loss of consciousness).
- Ethylene itself is essentially non-toxic (rat LC₅₀ > 200,000 ppm), but long-term high-concentration exposure may pose carcinogenic risk (metabolism to ethylene oxide).
- Liquid contact with skin or eyes can cause severe frostbite.
- Cylinders may explode when heated due to rapidly increasing internal pressure.

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)
Ethylene	74-85-1	≥99.5% (refrigerant grade)

3.3 Impurity information

Impurity	Specification limit
Moisture	≤ 10 ppm
Acidity (as HCl)	≤ 1 ppm
Evaporation residue	≤ 100 ppm
Non-condensable gas (25°C, vol%)	$\leq 1.5\%$
Other hydrocarbons (methane, ethane, etc.)	$\leq 0.5\%$
Acetylene	≤ 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. Caution: Confirm no explosion hazard and eliminate all ignition sources before entering the leak area.

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. Inform physician of potential carcinogenic risk for long-term high-concentration exposure.

Skin contact (frostbite):

- 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.
- Carefully remove frozen clothing. If clothing sticks to skin, do NOT pull it off; cut around it.
- Cover with sterile dressing.
- Seek medical attention immediately.

Eye contact:

- Immediately hold eyelids open and rinse thoroughly with plenty of water or normal saline for at least 15 minutes.
- Ensure complete irrigation of all eye surfaces by lifting upper and lower lids.
- Remove contact lenses if present and easily removable.
- Seek medical attention immediately, preferably from an ophthalmologist.

Ingestion:

Not applicable. This substance is a gas at ambient temperature; ingestion exposure is not expected.

4.2 Most important symptoms and effects, both acute and delayed

- Acute inhalation: asphyxiation, dizziness, drowsiness, headache, nausea, ataxia, loss of consciousness.
- Skin contact (liquid): frostbite (pale, hard skin, pain, blistering).
- Eye contact (liquid): severe frostbite, corneal damage, visual impairment.
- Long-term high-concentration exposure: potential carcinogenic risk (ethylene metabolized to ethylene oxide).

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.
- Ethylene itself is essentially non-toxic; primary hazards are asphyxiation and flammability. Correcting hypoxemia is the key treatment priority.
- Monitor ECG and blood oxygen saturation.
- Treat frostbite with standard protocols: lukewarm water (37–40°C) rewarming. Do NOT use dry heat or massage.
- For long-term high-concentration exposure, conduct cancer screening and periodic follow-up.
- If burn injuries are present (fire accident), follow thermal burn treatment principles.

5

Firefighting measures

Extremely flammable gas! Extremely wide explosive limits! This is an A3 safety group refrigerant with **explosive limits of 2.7%~36.0% by volume in air — an extremely wide range; explosive mixtures can form at nearly any concentration.** Flash point -136°C, auto-ignition temperature 490°C. Any ignition source (open flame, static electricity, electrical spark, hot surface) can ignite or cause explosion. Ethylene has one of the widest explosive limit ranges among common flammable gases — extremely dangerous.

5.1 Extinguishing media

Suitable extinguishing media: Dry chemical, carbon dioxide, water fog (for cooling containers). For large gas fires, **the preferred approach is to stop the gas flow first, then extinguish.**

Unsuitable extinguishing media: Direct water streams (may spread the flame and enlarge the accident area).

5.2 Special hazards arising from the substance or mixture

- **Extremely flammable; explosive limits range is extremely wide (2.7%~36.0%), one of the widest among common flammable gases.**
- Forms explosive mixtures with air across an extremely wide concentration range.
- Vapor density is close to that of air (~0.98 times); can remain suspended at any height in air for extended periods; can flash back to ignition source.
- Cylinders may rupture or explode when heated due to rapidly increasing internal pressure.
- Incomplete combustion produces carbon monoxide (CO), a toxic gas.
- Combustion in confined spaces can cause gas explosion with severe destructive force.
- High flame propagation speed; high risk of deflagration-to-detonation transition (DDT).

5.3 Hazardous combustion products

Carbon dioxide (CO₂), water (H₂O), carbon monoxide (CO, from incomplete combustion).

5.4 Advice for firefighters

- Firefighters must wear positive-pressure self-contained breathing apparatus (SCBA) and full protective fire-resistant clothing.
- **If a leaking gas is on fire, do NOT extinguish the flame unless the leak can be stopped safely.** Continued burning prevents gas accumulation that could lead to a larger explosive mixture. Once the leak is stopped, the flame will extinguish itself.
- 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.
- Cool burning containers with large amounts of water from a distance; personnel must stay upwind.
- Special note: Due to the extremely wide explosive limits of ethylene (2.7%~36.0%), even very low concentrations can form explosive mixtures; the area must be thoroughly ventilated before entry.

6

Accidental release measures

Extremely flammable! Extremely wide explosive limits! First principle of leak response:

Immediately eliminate all ignition sources (open flame, static electricity, electrical sparks, mechanical sparks, etc.), evacuate downwind personnel, prohibit use of spark-producing tools and equipment,

and use explosion-proof electrical equipment. Since the lower explosive limit of ethylene is as low as 2.7%, even very small leaks can form explosive gas mixtures.

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.
- Eliminate all ignition sources immediately: cut power, no open flame, no smoking, no use of non-explosion-proof equipment.
- Emergency responders should wear SCBA, anti-static clothing, cryogenic gloves, and eye protection.
- Enter from upwind direction.
- Stop leak if it can be done safely. If valve cannot be closed, move away from the leak point and wait for professional handling.
- Do not touch or walk through spilled material.
- Use non-sparking tools only.
- Special attention to static elimination: wear anti-static clothing and footwear; all equipment must be grounded.

6.2 Environmental precautions

- Prevent gas from entering sewers, basements, courtyards, or confined spaces.
- Ventilate the area to accelerate dispersion. Since ethylene vapor density is close to air, comprehensive ventilation at all heights is required.
- Minimize releases; recover whenever possible.
- Avoid release to atmosphere, waterways, or soil.

6.3 Methods and materials for containment and cleaning up

- **Small leak:** Increase ventilation to accelerate gas dispersion. Monitor combustible gas concentration (LEL) to prevent explosion and asphyxiation. Since the lower explosive limit is as low as 2.7%, combustible gas concentration in the area must be strictly controlled.
- **Large leak:**
 - Close source valve if safe to do so.
 - Recover using dedicated gas recovery equipment.
 - If recovery is not possible, controlled burning may be used (requires professional personnel and equipment).
 - Use water fog/mist to dilute leaked gas.
- **Cylinder leak:** Move cylinder to a well-ventilated safe area and vent slowly. If valve cannot be closed, contact supplier for professional handling.

6.4 Reference

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

Critical hazard: Ethylene vapor density is close to that of air (~0.98 times). It neither rises rapidly nor sinks readily; it can remain suspended at any height in air for extended periods. The lower explosive limit is as low as 2.7%, and the upper limit reaches 36.0% — even very small leaks can form explosive gas mixtures. Combustible gas detectors must be installed at multiple heights in the leak area, and comprehensive ventilation must be ensured. Ethylene is one of the highest explosion-risk refrigerants.

7 Handling and storage

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.
- Avoid contact with strong oxidizing agents.
- 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.
- Wear insulated gloves and eye/face protection when handling liquid to prevent frostbite.
- Use explosion-proof ventilation systems and equipment.
- Periodically inspect cylinders, valves, and piping for leaks.
- All electrical equipment must meet the appropriate explosion-proof rating.
- Eliminate static electricity hazards; personnel must wear anti-static clothing and footwear; all equipment must be properly grounded.
- Due to the extremely wide explosive limits, combustible gas concentrations in the operating area must be strictly controlled.

7.2 Conditions for safe storage, including any incompatibilities

- Store in a cool, dry, well-ventilated flammable gas warehouse.
- Storage temperature should not exceed 30°C. Keep away from fire, heat sources, and direct sunlight.
- Store separately from oxidizers, halogens, and strong acids. Do not co-store with incompatible materials.
- Storage area should be equipped with leak emergency response equipment and combustible gas detectors.
- 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.
- Prohibit use of equipment and tools that can generate sparks.
- Post clear "No Open Flames" and "Explosion-Proof Zone" safety warning signs in storage areas.

- Implement two-person receiving/issuing and two-person custody system.

7.3 Specific end uses

For industrial use only. Personnel must be professionally trained. Primarily used as ultra-low temperature refrigerant in cascade refrigeration systems and as petrochemical feedstock. Do not use for direct food contact, medical inhalation, or other unapproved applications.

8 Exposure controls/personal protection

8.1 Control parameters

China OEL	No established legal limit. Ethylene is a simple asphyxiant; recommended control benchmark: oxygen content not less than 18%
ACGIH TLV-TWA (USA)	1000 ppm (approx. 1150 mg/m ³), 8-hour TWA (based on asphyxiation and narcotic effects)
OSHA PEL-TWA (USA)	No specific limit established (simple asphyxiant)
Simple asphyxiant limit	Atmospheric oxygen content should be maintained at 19.5%~23.5%
Biological limit value	Not established

Note: ACGIH classifies ethylene as Category A4 (Not classifiable as a human carcinogen). Based on its metabolism to ethylene oxide, some agencies recommend lowering the exposure limit.

8.2 Exposure monitoring methods

Combustible gas detector (catalytic combustion or infrared type, measuring LEL%); gas chromatography (GC-FID or GC-MS); oxygen monitor (electrochemical sensor).

8.3 Appropriate engineering controls

- Enclosed process design with general ventilation or local exhaust.
- Provide safety shower and eyewash station.
- Install combustible gas detection alarms at multiple heights in areas where large leaks may occur.
- Use explosion-proof electrical equipment meeting the appropriate rating.
- Install oxygen monitoring and alarm devices.
- All equipment must be properly grounded to eliminate static.

8.4 Individual protection measures

Respiratory protection:

- Normal conditions (below exposure limit, normal oxygen): no special protection required.
- Elevated concentrations or oxygen-deficient atmosphere: positive-pressure SCBA or supplied-air respirator must be worn.

- Emergency rescue/evacuation: positive-pressure SCBA must be worn.

Eye/face protection:

- General handling: safety goggles.
- When handling liquid or potential liquid exposure: chemical safety goggles or face shield must be worn to prevent frostbite.

Skin protection:

- Hand protection: general work gloves for normal handling; cryogenic-insulated gloves for liquid contact.
- Body protection: anti-static work clothing; cold-resistant clothing for liquid contact.
- Other: no smoking in work areas; wear anti-static footwear to eliminate static hazards; use a buddy system when entering tanks, confined spaces, or other high-concentration areas with SCBA.

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.
- Personnel with long-term exposure should undergo periodic occupational health examinations.

9 Physical and chemical properties

9.1 Basic physical and chemical properties

Appearance and odor	Colorless gas with a faint sweet odor; gaseous at ambient temperature and pressure; colorless transparent liquid under pressure (critical temperature 9.2°C, cannot be liquefied at room temperature)
Odor threshold	Faint sweet odor
pH	Not applicable (gas)
Melting point / Freezing point	-169.2 °C (-272.6 °F)
Boiling point / Boiling range (101.3 kPa)	-103.7 °C (-154.7 °F)
Flash point	-136 °C (-213 °F)
Evaporation rate	Not available
Flammability (gas)	Extremely flammable

Explosive limits (upper/lower)	Upper 36.0% / Lower 2.7% (by volume in air — extremely wide range)
Vapor pressure (25°C)	Extremely high (supercritical state; critical temperature 9.2°C is well below 25°C, saturated vapor pressure cannot be expressed; stored in cylinders as compressed gas)
Vapor density (air = 1)	~0.98 (close to air)
Gas density (0°C, 1 atm)	1.261 g/L
Relative density (liquid, at boiling point)	0.568 g/cm ³ (liquid density at boiling point)
Solubility	Slightly soluble in water (~131 mg/L at 25°C); soluble in ethanol, ether, and other organic solvents
Octanol/water partition coefficient (log P)	~1.13
Auto-ignition temperature	490 °C (914 °F)
Decomposition temperature	>500 °C onset of thermal decomposition (polymerization)
Viscosity (gas, 25°C)	~10.3 µPa·s
Surface tension (liquid, at boiling point)	~16.5 mN/m
Thermal conductivity (gas, 25°C)	0.0221 W/(m·K)

9.2 Thermodynamic properties

Critical temperature	9.2 °C (48.6 °F) — well below room temperature; supercritical state at 25°C
Critical pressure	5042 kPa (5.04 MPa / 731 psia)
Critical density	0.215 g/cm ³
Heat of vaporization (at boiling point)	483 kJ/kg
Liquid specific heat (at boiling point)	2.96 kJ/(kg·°C)
Gas specific heat (25°C, constant pressure)	1.55 kJ/(kg·°C)

Net heat of combustion	50.3 MJ/kg
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9.3 Other safety data

ASHRAE safety group	A3 (low toxicity, high flammability)
Ozone Depletion Potential (ODP)	0 (does not deplete ozone layer)
Global Warming Potential (GWP, 100-yr)	~4 (relative to CO ₂ = 1)

10 Stability and reactivity

10.1 Reactivity

Relatively stable under normal temperature and pressure, but can undergo polymerization under high temperature, high pressure, and catalyst conditions. Ethylene contains a carbon-carbon double bond (C=C) and has higher chemical reactivity than saturated alkanes.

10.2 Chemical stability

Stable under normal conditions of temperature and pressure. However, it is an extremely flammable gas that ignites on contact with any ignition source. Under specific conditions (high temperature, high pressure, catalyst), self-polymerization may occur.

10.3 Possibility of hazardous reactions

- Forms explosive mixtures with air (explosive limits 2.7%~36.0%); can ignite or explode on contact with open flame or high heat.
- Reacts violently with strong oxidizing agents, causing combustion or explosion.
- Can undergo polymerization (polyethylene) under high temperature, high pressure, and catalyst, releasing large amounts of heat. Industrial polymerization requires inhibitors to prevent runaway reaction.
- Undergoes addition reactions with halogens (chlorine, bromine) to form halogenated hydrocarbons.
- Can undergo hydration reaction with steam under catalyst to produce ethanol.
- Thermal decomposition at high temperatures (>500°C) produces methane, ethane, hydrogen, and carbon.

10.4 Conditions to avoid

High temperature, open flame, sparks, static electricity, direct heat sources, cylinder overpressure, high pressure (polymerization risk), contact with strong oxidizing agents, contact with polymerization catalysts (without inhibitor)

10.5 Incompatible materials

Strong oxidizing agents (liquid oxygen, fluorine, chlorine, peroxides, etc.), halogens, strong acids, alkali metals, polymerization catalysts (e.g., triethylaluminum, titanium tetrachloride)

10.6 Hazardous decomposition products

High-temperature cracking can produce methane (CH₄), ethane (C₂H₆), hydrogen (H₂), and carbon (C). Incomplete combustion produces carbon monoxide (CO).

10.7 Hazardous polymerization

Can undergo polymerization under high temperature, high pressure, and catalyst (the basis of polyethylene production). Inhibitors are generally added during storage to prevent self-polymerization. Under uncontrolled conditions without inhibitor, polymerization can generate large amounts of heat, causing rapid pressure increase and explosion risk.

11 Toxicological information

11.1 Information on toxicological effects

Acute toxicity:

Rat inhalation LC ₅₀ (4 hr)	>200,000 ppm (essentially non-toxic)
Mouse inhalation LC ₅₀ (2 hr)	>200,000 ppm
Rabbit dermal LD ₅₀	Not available (gaseous substance)

Ethylene is a simple asphyxiant and is essentially non-toxic. Acute toxic effects are primarily caused by oxygen deprivation (asphyxiation).

11.2 Skin irritation/corrosion

No skin irritation/corrosion in gaseous state. Liquid contact can cause frostbite (physical injury), but is not a chemical corrosive.

11.3 Eye irritation/corrosion

No eye irritation/corrosion in gaseous state. Liquid contact can cause severe frostbite and corneal damage.

11.4 Respiratory or skin sensitization

No sensitization reported. Available data show no sensitization effect.

11.5 Germ cell mutagenicity

Limited mutagenicity data for ethylene itself. Its metabolite ethylene oxide is mutagenic (positive in Ames test and mammalian cell chromosome aberration test). Ethylene is metabolized to ethylene oxide via cytochrome P450 2E1, indirectly producing mutagenic effects.

11.6 Carcinogenicity

Carcinogenicity note (controversial):

- **IARC (International Agency for Research on Cancer):** Group 3 (Not classifiable as to its carcinogenicity to humans). IARC considers existing evidence insufficient to determine ethylene's carcinogenicity in humans.
- **ACGIH:** Category A4 (Not classifiable as a human carcinogen).
- **EPA:** Not classified as a carcinogen.
- **Controversy explanation:** Ethylene is metabolized in vivo via cytochrome P450 2E1 to ethylene oxide, which is an IARC Group 1 known human carcinogen. Based on this metabolic pathway, some GHS frameworks classify ethylene as "May cause cancer, Category 1B" (H350). However, this classification is controversial because ethylene itself has weak mutagenicity, and ethylene oxide production may only reach biologically significant levels under high-concentration exposure.

11.7 Reproductive toxicity

Animal studies show no significant reproductive or developmental toxicity at very high concentrations. No human reproductive toxicity data available. Hypoxia from high-concentration exposure may indirectly affect fetal development.

11.8 STOT-single exposure

- Narcotic/asphyxiation effect (Category 3): High-concentration inhalation displaces oxygen in air, causing hypoxia. Symptoms include dizziness, drowsiness, headache, breathing difficulty, and loss of consciousness. Ethylene concentrations above 10% in air can cause asphyxiation symptoms.
- Ethylene itself has weak central nervous system chemical depressant effect; neurological symptoms primarily result from hypoxia.

11.9 STOT-repeated exposure

Repeated low-concentration exposure shows no significant target organ toxicity. However, under long-term high-concentration exposure, ethylene metabolism to ethylene oxide may produce mutagenic and potentially carcinogenic effects. Periodic occupational health examinations are recommended for long-term exposed personnel.

11.10 Aspiration hazard

Not expected to cause aspiration pneumonia in gaseous form. However, high-concentration inhalation can cause asphyxiation and death in severe cases. Ethylene itself does not cause chemical lung injury.

12 Ecological information

12.1 Ecotoxicity

Fish acute toxicity (LC ₅₀ , 96 hr)	Not available (gas has low water solubility; expected to be of low toxicity to aquatic organisms)
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: Primarily degraded by reaction with hydroxyl radicals (OH·); atmospheric lifetime ~4.4 months (132 days).
- Biodegradability: Can be oxidized and degraded by specific microorganisms under aerobic conditions.
- Hydrolysis: Not hydrolyzed at ambient temperature.
- Photodegradation: Atmospheric photochemical degradation.

12.3 Bioaccumulative potential

log P = 1.13. Low bioaccumulation potential (below the bioconcentration threshold of log P = 4.5).

12.4 Mobility in soil

Highly volatile in gaseous form; low water solubility. Volatilizes readily to atmosphere when released to soil.

12.5 Results of PBT and vPvB assessment

Does not meet PBT / vPvB criteria.

12.6 Other adverse effects

- **Ozone Depletion Potential (ODP):** 0 (does not deplete the ozone layer)
- **Global Warming Potential (GWP, 100-year time horizon):** ~4 (relative to CO₂ = 1, very low GWP)
- Ethylene has a very low GWP value; its impact on global warming is minimal.
- Ethylene is a plant hormone; high-concentration emissions may affect surrounding plant growth (ripening effect).
- Not a controlled substance under the Montreal Protocol (ODS).

13 Disposal considerations

13.1 Waste treatment methods

Product/residues:

- Recovery and recycling (purification and reuse) is the preferred approach.

- If recovery is not feasible, controlled burning under safe conditions (requires professional personnel and equipment); combustion products are carbon dioxide and water.
- If recovery and burning are not feasible, dispose of through a licensed hazardous waste treatment facility.
- 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 pressure and gas are managed as hazardous waste.
- Do NOT cut, weld, or heat cylinders containing residual ethylene.

13.2 Special precautions for disposal

- Refer to national and local regulations before disposal.
- Personnel should wear appropriate personal protective equipment (see Section 8).
- Ensure good ventilation to prevent asphyxiation and combustible gas accumulation.
- Disposal must be performed by a qualified and licensed facility.
- When burning, ensure no leak or explosion risk; have fire-fighting equipment available.
- Disposal records should be maintained.

14 Transport information

14.1 UN number

1962 (Ethylene, compressed)

14.2 UN proper shipping name

ETHYLENE, COMPRESSED

14.3 Transport hazard class(es)

Class 2.1 Flammable 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: Flammable gas (red, Class 2.1)
- Subsidiary hazard label: None

14.6 Methods and materials for containment and packaging

- Seamless steel cylinders. Cylinders must comply with applicable national standards (e.g., GB 5099).
- Common package sizes: 40 L, 50 L high-pressure cylinders (working pressure 15–20 MPa).

- Cylinder valve outlet thread direction: left-hand thread for flammable gases.
- Tube trailers (tube bundle containers) for bulk transport.

14.7 Special requirements for different modes of transport

Road transport (ADR):

- Vehicles must have hazardous cargo transport license; exhaust pipes must be fitted with spark arrestors.
- 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.
- Follow designated routes; do not stop in residential or densely populated areas.
- ADR classification: 2.1F (flammable gas).

Rail transport (RID):

- Prohibit hump shunting (no free-roll classification).
- Transport in boxcars; cylinders upright or laid flat and secured.
- RID classification: 2.1F.

Marine transport (IMDG Code):

- UN 1962, Class 2.1
- Marine pollutant: No
- Stowage category: E (on deck only, away from living quarters)

Air transport (ICAO/IATA DGR):

- UN 1962, Class 2.1
- Flammable compressed gas
- Passenger aircraft: Forbidden
- Cargo aircraft: Cargo aircraft only (subject to packing instruction 200 and quantity limits)

14.8 Special precautions for user

- Do not co-transport with oxidizers, halogens, strong acids, or food/feed products.
 - Vehicles must be equipped with appropriate fire extinguishing equipment (dry chemical extinguishers) and leak emergency response gear.
 - Transport personnel must be specially trained and certified.
 - Protect from sunlight, rain, and high temperature during transit.
 - 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.
 - Vehicles should be equipped with combustible gas detection alarms.
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15 Regulatory information

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

International regulations:

- **UN GHS:** 8th revised edition
- **Montreal Protocol:** Not a controlled ozone-depleting substance (ODP = 0)
- **Kyoto Protocol / Paris Agreement:** Greenhouse gas (GWP $\approx$ 4, minimal impact)
- **IARC (International Agency for Research on Cancer):** Group 3 (Not classifiable as to its carcinogenicity to humans)
- **EU REACH Regulation (EC 1907/2006):** Registered substance
- **EU CLP Regulation (EC 1272/2008):** Classification, labelling and packaging regulation
- **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) No. 0475
- NOAA CAMEO Chemicals Database
- PubChem Compound Database (CID 6325)
- ASHRAE Handbook - Refrigeration Systems and Applications
- IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Vol. 60 (Ethylene)
- 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, 8th revised edition

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
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
LEL	Lower Explosive Limit
UEL	Upper Explosive Limit
IARC	International Agency for Research on Cancer
ACGIH	American Conference of Governmental Industrial Hygienists
DDT	Deflagration-to-Detonation Transition

16.3 Disclaimer

This Safety Data Sheet (SDS) has been prepared in accordance with the UN GHS standard and applicable regulatory requirements. The information contained herein is based on publicly available chemical databases, technical literature, and national standards, and is believed to be accurate and complete as of the date of issuance. However, no warranty, express or implied, is made as to the absolute accuracy, completeness, or reliability of the information. Users should verify the applicability of the information for their specific use conditions and refer to the official SDS provided by the manufacturer/supplier for compliance purposes. The information in this document may be updated as new research findings and regulatory changes become available; periodic review of the latest version is recommended.