



SULFUR HEXAFLUORIDE

Safety Data Sheet

1. IDENTIFICATION

Product identifier

Product Name SULFUR HEXAFLUORIDE

Other means of identification

Safety data sheet number LIND-P112
UN/ID no. UN1080
Synonyms Sulfur Fluoride; Sulphur Hexafluoride

Recommended use of the chemical and restrictions on use

Recommended Use Industrial and professional use.
Uses advised against Consumer use

Details of the supplier of the safety data sheet

Linde Gas North America LLC - Linde Merchant Production Inc. - Linde LLC
575 Mountain Ave.
Murray Hill, NJ 07974
Phone: 908-464-8100
www.lindeus.com

Linde Gas Puerto Rico, Inc.
Road 869, Km 1.8
Barrio Palmas, Catano, PR 00962
Phone: 787-641-7445
www.pr.lindegas.com

Linde Canada Limited
5860 Chedworth Way
Mississauga, Ontario L5R 0A2
Phone: 905-501-1700
www.lindecanada.com

* May include subsidiaries or affiliate companies/divisions.

For additional product information contact your local customer service.

Emergency telephone number

Company Phone Number 800-232-4726 (Linde National Operations Center, US)
905-501-0802 (Canada)

CHEMTREC: 1-800-424-9300 (North America) +1-703-527-3887 (International)

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Gases under pressure	Liquefied gas
Simple asphyxiants	Yes

Label elements

Signal word

Warning

Hazard Statements

Contains gas under pressure; may explode if heated
May displace oxygen and cause rapid suffocation
May cause frostbite

Precautionary Statements - Prevention

Do not handle until all safety precautions have been read and understood
Do not get in eyes, on skin, or on clothing
Use and store only outdoors or in a well ventilated place
Use backflow preventive device in piping
Close valve after each use and when empty

Precautionary Statements - Response

IF INHALED: Remove person to fresh air and keep comfortable for breathing. Get medical attention/advice.
IF ON SKIN: Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

Precautionary Statements - Storage

Protect from sunlight when ambient temperature exceeds 52°C/125°F

Hazards not otherwise classified (HNOC)

Not applicable

Other Information**3. COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical Name	CAS No.	Volume %	Chemical Formula
Sulfur Hexafluoride	2551-62-4	100	SF ₆

4. FIRST AID MEASURESDescription of first aid measures

General advice

Show this safety data sheet to the doctor in attendance.

Inhalation	Remove to fresh air and keep comfortable for breathing. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get medical attention immediately.
Skin contact	For dermal contact or suspected frostbite, remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER. A physician should see the patient promptly if contact with the product has resulted in blistering of the dermal surface or in deep tissue freezing.
Eye contact	If frostbite is suspected, flush eyes with cool water for 15 minutes and obtain immediate medical attention.
Ingestion	Not an expected route of exposure.
Self-protection of the first aider	RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.

Most important symptoms and effects, both acute and delayed

Symptoms	Simple asphyxiant. May cause suffocation by displacing the oxygen in the air. Exposure to oxygen-deficient atmosphere (<19.5%) may cause dizziness, drowsiness, nausea, vomiting, excess salivation, diminished mental alertness, loss of consciousness and death. Exposure to atmospheres containing 8-10% or less oxygen will bring about unconsciousness without warning and so quickly that the individuals cannot help or protect themselves. Lack of sufficient oxygen may cause serious injury or death. Contact with liquid may cause cold burns/frostbite.
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Indication of any immediate medical attention and special treatment needed

Note to physicians	Treat symptomatically.
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5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Specific extinguishing methods

Continue to cool fire exposed cylinders until flames are extinguished. Damaged cylinders should be handled only by specialists.

Specific hazards arising from the chemical

Non-flammable gas. Cylinders may rupture under extreme heat.

Hazardous combustion products Sulfur oxides. Fluorine compounds.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions	Evacuate personnel to safe areas. Ensure adequate ventilation, especially in confined areas. Monitor oxygen level. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
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Environmental precautions

Environmental precautions	Prevent spreading of vapors through sewers, ventilation systems and confined areas.
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Methods and material for containment and cleaning up

Methods for containment	Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. If leak is in container or container valve, contact the appropriate emergency telephone number in Section 1 or call your closest Linde location.
Methods for cleaning up	Return cylinder to Linde or an authorized distributor.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling	<p>Aluminum, stainless steel, copper, brasses and silver recommended for temperatures above 400°F (204°C) to prevent decomposition to toxic fluoride compounds.</p> <p>Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distance, use a cart designed to transport cylinders. Never attempt to lift a cylinder by its valve protection cap. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing leak to occur. Use an adjustable strap wrench to remove over-tight or rusted caps. Use only with adequate ventilation. Use backflow preventive device in piping. Use only with equipment rated for cylinder pressure. Close valve after each use and when empty. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Ensure the complete gas system has been checked for leaks before use.</p> <p>Never put cylinders into trunks of cars or unventilated areas of passenger vehicles. Never attempt to refill a compressed gas cylinder without the owner's written consent. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit.</p> <p>Only experienced and properly instructed persons should handle gases under pressure. Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, pamphlet CGA-P1, Safe Handling of Compressed Gases in Containers.</p> <p>For additional recommendations consult Compressed Gas Association's (CGA) Safety Bulletin SB-2, Oxygen-Deficient Atmospheres.</p>
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Conditions for safe storage, including any incompatibilities

Storage Conditions	Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Keep at temperatures below 52°C / 125°F. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Stored containers should be periodically checked for general condition and leakage.
Incompatible materials	Reported to explode in contact with disilane. Oxygen and certain metals cause slow decomposition to toxic fluorides.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Sulfur Hexafluoride 2551-62-4	TWA: 1000 ppm TWA: 2.5 mg/m ³ F	TWA: 1000 mg/m ³ TWA: 6000 mg/m ³	TWA: 1000 ppm TWA: 6000 mg/m ³

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value. OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits. NIOSH IDLH: Immediately Dangerous to Life or Health

Other Information	Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).
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Appropriate engineering controls

Engineering Controls Ventilation systems. Local exhaust ventilation to prevent accumulation of high concentrations and maintain air-oxygen levels at or above 19.5%. Oxygen detectors should be used when asphyxiating gases may be released. Systems under pressure should be regularly checked for leakages. Showers. Eyewash stations.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles). If splashes are likely to occur, wear: Goggles. Face-shield.

Skin and body protection Work gloves and safety shoes are recommended when handling cylinders. Wear cold insulating gloves when handling liquid.

Respiratory protection Use positive pressure airline respirator with escape cylinder or self contained breathing apparatus for oxygen-deficient atmospheres (<19.5%). If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

General Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice. Do not get in eyes, on skin, or on clothing.

9. PHYSICAL AND CHEMICAL PROPERTIESInformation on basic physical and chemical properties

Physical state	Compressed gas
Appearance	Colorless.
Odor	Odorless.
Odor threshold	No information available
pH	No data available
Melting point	-50.8 °C / -59.4 °F
Evaporation rate	Not applicable
Lower flammability limit:	Not applicable
Upper flammability limit:	Not applicable
Flash point	Not applicable °C
Autoignition temperature	No data available
Decomposition temperature	No data available
Water solubility	Slightly soluble
Partition coefficient	1.68
Kinematic viscosity	Not applicable

Chemical Name	Molecular weight	Boiling point	Vapor Pressure	Vapor density (air =1)	Gas Density Kg/m ³ @20°C	Critical Temperature
Sulfur Hexafluoride	146.05	-63.7 °C	21.60 bar @ 20 °C	5.11	6.17	45.56 °C

10. STABILITY AND REACTIVITYReactivity

Not reactive under normal conditions.

Chemical stability

Stable below 204°C / 400°F.

Explosion data

Sensitivity to Mechanical Impact None.
Sensitivity to Static Discharge None.

Possibility of Hazardous Reactions

None under normal processing.

Conditions to avoid

None under recommended storage and handling conditions (see Section 7).

Incompatible materials

Reported to explode in contact with disilane. Oxygen and certain metals cause slow decomposition to toxic fluorides.

Hazardous Decomposition Products

Thionyl fluoride compounds.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation Product is a simple asphyxiant. Sulfur hexafluoride is considered to be chemically and physiologically inert in its pure state. Fifty rats exposed to an atmosphere consisting of 80% sulfur hexafluoride and 20% oxygen for 16 to 25 hours exhibited no effects from exposure.

Skin contact Contact with liquid may cause cold burns/frostbite.

Eye contact Contact with liquid may cause cold burns/frostbite.

Ingestion Not an expected route of exposure.

Information on toxicological effects

Symptoms No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Not classified.
Sensitization Not classified.
Germ cell mutagenicity Not classified.
Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Chemical Name	ACGIH	IARC	NTP	OSHA
Sulfur Hexafluoride 2551-62-4	-	Group 3	-	-

IARC (International Agency for Research on Cancer)

Not classifiable as a human carcinogen

Reproductive toxicity Not classified.
STOT - single exposure Not classified.
STOT - repeated exposure Not classified.
Chronic toxicity None known.
Target Organ Effects Respiratory system.
Aspiration hazard Not applicable.

Numerical measures of toxicity

Product Information
Oral LD50 No information available
Dermal LD50 No information available
Inhalation LC50 No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity

No known acute aquatic toxicity.

Persistence and degradability

Not applicable.

Bioaccumulation

Will not bioconcentrate.

Chemical Name	Partition coefficient
Sulfur Hexafluoride 2551-62-4	1.68

Other adverse effects

Contains fluorinated greenhouse gas.

Global warming potential (GWP) 22800

13. DISPOSAL CONSIDERATIONSWaste treatment methods

Disposal of wastes Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to Linde for proper disposal.

14. TRANSPORT INFORMATIONDOT

UN/ID no. UN1080
Proper shipping name Sulfur hexafluoride
Hazard Class 2.2
Description UN1080, Sulfur hexafluoride, 2.2
Emergency Response Guide Number 126

TDG

UN/ID no. UN1080
Proper shipping name Sulfur hexafluoride
Hazard Class 2.2
Description UN1080, Sulfur hexafluoride, 2.2

MEX

UN/ID no. UN1080
Proper shipping name Sulphur hexafluoride
Hazard Class 2.2
Description UN1080, Sulphur hexafluoride, 2.2

IATA

UN/ID no. UN1080
Proper shipping name Sulphur hexafluoride
Hazard Class 2.2
ERG Code 2L
Description UN1080, Sulphur hexafluoride, 2.2

IMDG

UN/ID no. UN1080

Proper shipping name	Sulphur hexafluoride
Hazard Class	2.2
EmS-No.	F-C, S-V
Description	UN1080, Sulphur hexafluoride, 2.2

ADR

UN/ID no.	UN1080
Proper shipping name	Sulphur hexafluoride
Hazard Class	2.2
Classification code	2A
Tunnel restriction code	(C/E)
Description	UN1080, Sulphur hexafluoride, 2.2, (C/E)

15. REGULATORY INFORMATIONInternational Inventories

TSCA	Complies
DSL	Complies
EINECS/ELINCS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDL - Canadian Domestic Substances List/Non-Domestic Substances List

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

US Federal RegulationsSARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden release of pressure hazard	Yes
Reactive Hazard	No

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product does not contain any substances regulated as hazardous air pollutants (HAPS) under Section 112 of the Clean Air Act Amendments of 1990.

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Risk and Process Safety Management Programs

This material, as supplied, does not contain any regulated substances with specified thresholds under 40 CFR Part 68.

This product does not contain any substances regulated as Highly Hazardous Chemicals pursuant to the 29 CFR Part 1910.110.

US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Sulfur Hexafluoride 2551-62-4	X	X	X

Canada

Legend

NPRI - National Pollutant Release Inventory

16. OTHER INFORMATION

NFPA Health hazards 2 Flammability 0 Instability 0 Physical and Chemical Properties -

Note: Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2009, CGA Recommended Hazard Ratings for Compressed Gases, 3rd Edition.

Issue Date 17-Feb-2015
Revision Date 17-Feb-2015
Revision Note Initial Release.

General Disclaimer

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde LLC, Linde Merchant Production, Inc. or Linde Gas North America LLC (or any of their affiliates and subsidiaries) and the purchaser.

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End of Safety Data Sheet