



MATERIAL SAFETY DATA SHEET

PRODUCT NAME: SILICON TETRAFLUORIDE

1. Chemical Product and Company Identification

**BOC Gases,
Division of
The BOC Group, Inc.
575 Mountain Avenue
Murray Hill, NJ 07974**

**BOC Gases
Division of
BOC Canada Limited
5975 Falbourne Street, Unit 2
Mississauga, Ontario L5R 3W6
TELEPHONE NUMBER: (905) 501-1700**

**TELEPHONE NUMBER: (908) 464-8100
24-HOUR EMERGENCY TELEPHONE NUMBER:
CHEMTREC (800) 424-9300**

**24-HOUR EMERGENCY TELEPHONE NUMBER:
(905) 501-0802
EMERGENCY RESPONSE PLAN NO: 20101**

**PRODUCT NAME: SILICON TETRAFLUORIDE
CHEMICAL NAME: Silicon Tetrafluoride
COMMON NAMES/SYNONYMS: Tetrafluorosilane
TDG (Canada) CLASSIFICATION: 2.3 (8)
WHMIS CLASSIFICATION: A, E, D2B, D1A, F**

**PREPARED BY: Loss Control (908)464-8100/(905)501-1700
PREPARATION DATE: 6/1/95
REVIEW DATES: 6/7/96**

2. Composition, Information on Ingredients

INGREDIENT	% VOLUME	PEL-OSHA ¹	TLV-ACGIH ²	LD ₅₀ or LC ₅₀ Route/Species
Silicon Tetrafluoride FORMULA: SiF ₄ CAS: 7783-61-1 RTECS #: VW2327000	> 99.98	2.5 mg/m ³ TWA as F	2.5 mg/m ³ TWA as F	LC ₅₀ 2272 ppm (rat)

¹ As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)

² As stated in the ACGIH 1994-95 Threshold Limit Values for Chemical Substances and Physical Agents

3. Hazards Identification

EMERGENCY OVERVIEW

Corrosive to exposed tissues. Inhalation of vapors may result in pulmonary edema and chemical pneumonitis. Nonflammable. Decomposes to hydrofluoric acid and other toxic compounds on contact with moisture.

ROUTE OF ENTRY:

Skin Contact Yes	Skin Absorption No	Eye Contact Yes	Inhalation Yes	Ingestion No
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PRODUCT NAME: SILICON TETRAFLUORIDE

HEALTH EFFECTS:

Exposure Limits No	Irritant Yes	Sensitization No
Teratogen No	Reproductive Hazard No	Mutagen No
Synergistic Effects None Reported		

Carcinogenicity: -- NTP: No IARC: No OSHA: No

EYE EFFECTS:

Corrosive and irritating to the eyes. Burns to the eyes result in lesions and possible loss of vision.

SKIN EFFECTS:

Corrosive and irritating to the skin and all living tissue. Skin burns and mucosal irritation are like that from exposure to hydrofluoric acid. Hydrofluoric acid burns exhibit severe pain, redness, possible swelling and early necrosis. Burns are progressive while any residual active fluorides are remaining.

INGESTION EFFECTS:

Ingestion is unlikely. However it is possible that breathing in high levels for prolonged periods may cause the formation of an acidic compound in the mouth, causing irritation of the mucous membranes.

INHALATION EFFECTS:

Corrosive and irritating to the upper and lower respiratory tracts. It hydrolyzes very rapidly, yielding hydrofluoric acid and silicic acid. Symptoms of inhalation exposure include lacrimation, cough, labored breathing excessive salivary and sputum formation. Excessive irritation of the lungs causes acute pneumonitis and pulmonary edema, which could be fatal. Chemical pneumonitis and pulmonary edema result from exposure to the lower respiratory tract and deep lung. Residual pulmonary malfunction might also occur. Extended low level absorption of fluorides may cause fluorosis, manifested as an abnormal calcification pattern of the skeletal system.

NFPA HAZARD CODES

Health: 3
Flammability: 0
Reactivity: 2
WATER REACTIVE

HMIS HAZARD CODES

Health: 3
Flammability: 0
Reactivity: 2

RATINGS SYSTEM

0 = No Hazard
1 = Slight Hazard
2 = Moderate Hazard
3 = Serious Hazard
4 = Severe Hazard

4. First Aid Measures

EYES:

PERSONS WITH POTENTIAL EXPOSURE SHOULD NOT WEAR CONTACT LENSES. Flush contaminated eye(s) with copious quantities of water. Part eyelids to assure complete flushing. Continue for a minimum of 30 minutes. Consult a physician as soon as possible.

SKIN:

Remove contaminated clothing as rapidly as possible. Flush affected area with copious quantities of water. Dermal burns may be treated with a calcium gluconate gel or slurry in water or glycerine. This compound binds the active fluorides in an insoluble form and limits burn extension while relieving pain. Seek immediate medical attention.

MSDS: G-77

Revised: 7/7/96

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INGESTION:

Never give liquids to an unconscious person. Do not induce vomiting. In all cases notify a physician identifying the nature of the hazard and the state of the victim. If conscious, have victim rinse mouth liberally with water, and give water to drink. Keep victim warm and quiet.

INHALATION:

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.

Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Unconscious persons should be moved to an uncontaminated area, and given assisted (artificial) respiration and supplemental oxygen. Keep victim warm and quiet. Assure that mucous or vomited material does not obstruct the airway by positional drainage. Delayed pulmonary edema may occur. Keep patient under medical observation for at least 24 hours.

5. Fire Fighting Measures

Conditions of Flammability: Nonflammable		
Flash point: None	Method: Not Applicable	Autoignition Temperature: None
LEL(%): None	UEL(%): None	
Hazardous combustion products: None		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: None		

FIRE AND EXPLOSION HAZARDS:

None.

EXTINGUISHING MEDIA:

None required. Use media appropriate for surrounding materials. Contact with moisture forms hydrogen fluoride and other toxic compounds.

6. Accidental Release Measures

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest BOC location.

7. Handling and Storage

Any materials suitable for use with anhydrous hydrogen fluoride may be used with silicon tetrafluoride. Systems and equipment must be scrupulously dry.

Valve protection caps must remain in place unless valve is piped to use point. Use only in well ventilated areas. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Do not heat cylinder by any means to increase the discharge rate of product from the container. Use a pressure reducing regulator when connecting cylinder to lower pressure, (<3000 psig) piping.

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Protect containers from physical damage. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperatures where containers are stored to exceed 125°F (52°C). Containers should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use "first in-first out" inventory system to prevent full containers being stored for excessive periods of time.

For additional recommendations, consult Compressed Gas Association Pamphlet P-1.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

8. Exposure Controls, Personal Protection

EXPOSURE LIMITS¹:

INGREDIENT	% VOLUME	PEL-OSHA ²	TLV-ACGIH ³	LD ₅₀ or LC ₅₀ Route/Species
Silicon Tetrafluoride FORMULA: SiF ₄ CAS: 7783-61-1 RTECS #: VW2327000	> 99.98	2.5 mg/m ³ TWA* as F	2.5 mg/m ³ TWA* as F	LC ₅₀ 2272 ppm (rat)

¹ Refer to individual state of provincial regulations, as applicable, for limits which may be more stringent than those listed here.

² As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)

³ As stated in the ACGIH 1994-1995 Threshold Limit Values for Chemical Substances and Physical Agents.

* BOC gases recommends using 3 ppm TWA limit for hydrogen fluoride as F.

ENGINEERING CONTROLS:

Hood with forced ventilation. Use local exhaust to prevent accumulation above the recommended ceiling limit.

EYE/FACE PROTECTION:

Gas tight chemical goggles or full-face piece respirator.

SKIN PROTECTION:

Plastic or rubber.

RESPIRATORY PROTECTION:

Positive pressure air line with full-face mask and escape bottle or self-contained breathing apparatus should be available for emergency use.

OTHER/GENERAL PROTECTION:

Safety shoes, safety shower, eyewash "fountain", face shield.

9. Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure at STP	: Not Available	
Vapor density (Air = 1)	: 3.55	
Evaporation point	: Not Available	
Boiling point	: subl -139	°F
	: subl -95.1	°C
Freezing point	: -130	°F
	: -90.0	°C
pH	: Not Available	
Specific gravity	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H2O)	: Hydrolyzes	
Odor threshold	: Not Available	
Odor and appearance	: Colorless gas with a sharp, irritating odor.	

10. Stability and Reactivity

STABILITY:

Stable

INCOMPATIBLE MATERIALS:

Alkali and alkaline earth metals. Will react with water to form hydrogen fluoride and silicic acid.

HAZARDOUS DECOMPOSITION PRODUCTS:

Hydrolysis liberates hydrogen fluoride and silicic acid.

HAZARDOUS POLYMERIZATION:

Will not occur.

11. Toxicological Information

Toxic effects observed in the respiratory system and kidneys of rats exposed at 300 ppm for 5 hours.

Extended low level absorption of fluorides may cause fluorosis, manifested as an abnormal calcification pattern of the skeletal system.

12. Ecological Information

No data given.

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13. Disposal Considerations

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 BOC Gases or authorized distributor for proper disposal.

14. Transport Information

PARAMETER	United States DOT	Canada TDG
PROPER SHIPPING NAME:	Silicon Tetrafluoride	Silicon Tetrafluoride
HAZARD CLASS:	2.3	2.3 (8)
IDENTIFICATION NUMBER:	UN 1859	UN 1859
SHIPPING LABEL:	POISON GAS, CORROSIVE	POISON GAS, CORROSIVE

Additional Marking Requirement: "Inhalation Hazard"

Additional Shipping Paper Description Requirement: "Poison-Inhalation Hazard, Zone D"

15. Regulatory Information

SARA TITLE III NOTIFICATIONS AND INFORMATION

SARA TITLE III - HAZARD CLASSES:

Acute Health Hazard

Sudden Release of Pressure Hazard

Reactivity Hazard

16. Other Information

Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES:

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