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MATERIAL
SAFETY
DATA SHEET

No. 61

PRODUCT NAME Silicon Tetrafluoride	CAS # 7783-61-1
TRADE NAME AND SYNONYMS Silicon Tetrafluoride, Compressed (D.O.T.)	DOT I.D. No.: UN 1859
CHEMICAL NAME AND SYNONYMS Silicon Tetrafluoride; Tetrafluorosilane	DOT Hazard Class: Division 2.3
ISSUE DATES AND REVISIONS Revised May 1998	Formula SiF ₄
	Chemical Family: Inorganic fluoride

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT

None established. Recommend using hydrogen fluoride which is a hydrolysis product of silicon tetrafluoride.
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SYMPTOMS OF EXPOSURE

Corrosive and irritating to the upper and lower respiratory tracts, skin and eyes. It hydrolyzes very rapidly yielding hydrofluoric acid so that skin burns and mucosal irritation are like that from exposure to that acid. Symptoms include lacrymation, cough, labored breathing and excessive salivary and sputum formation. Excessive irritation of the lungs causes acute pneumonitis and pulmonary edema which could be fatal. Hydrofluoric acid dermal burns exhibit severe pain, redness, possible swelling and early necrosis.

TOXICOLOGICAL PROPERTIES

Silicon tetrafluoride is irritating and corrosive to all living tissues. Toxic level exposure to dermal tissue causes hydrofluoric acid burns and skin lesions resulting in necrosis and eventual scarring. Burns are progressive while any residual active fluorides remain. Chemical pneumonitis and pulmonary edema result from exposure to the lower respiratory tract and deep lung. Residual pulmonary malfunction might also occur. Burns of the eye result in lesions and possible loss of vision. Extended low level systemic absorption of fluorides may cause fluorosis, an abnormal calcification pattern of the skeletal system.
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RECOMMENDED FIRST AID TREATMENT

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

Inhalation: Conscious persons should be assisted to an uncontaminated area and breathe fresh air. Quick removal from contaminated area is most important. Unconscious persons should be moved to an uncontaminated area and given assisted respiration and supplemental oxygen. Keep the victim warm and quiet. Assure that mucous or vomited material does not obstruct the airway by use of positional drainage. Delayed pulmonary edema may occur. Keep patient under medical observation for at least 24 hours.
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SILICON TETRAFLUORIDE

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Reacts with moisture in air or in water to form hydrogen fluoride and silicic acid.

PHYSICAL DATA

BOILING POINT Sublimation @ -139.2°F (-95.1°C)	LIQUID DENSITY AT BOILING POINT See Page 4
VAPOR PRESSURE @ 70°F (21.1°C) = Above the critical temperature of 6.5°F (-14.2°C)	GAS DENSITY AT 70°F, 1 atm .266 lb/ft ³ (4.26 kg/m ³)
SOLUBILITY IN WATER Hydrolyzes	FREEZING POINT -130°F (-90°C)
EVAPORATION RATE N/A (Gas)	SPECIFIC GRAVITY (AIR=1) @ 70°F (21.1°C) = 3.55
APPEARANCE AND ODOR Colorless gas with an irritating odor.	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) N/A	AUTO IGNITION TEMPERATURE N/A	FLAMMABLE LIMITS % BY VOLUME (See Page 4) LEL N/A UEL N/A
EXTINGUISHING MEDIA Nonflammable		ELECTRICAL CLASSIFICATION Nonhazardous
SPECIAL FIRE FIGHTING PROCEDURES If cylinders are involved in a fire, safely relocate or keep cool with water spray.		
UNUSUAL FIRE AND EXPLOSION HAZARDS None		

REACTIVITY DATA

STABILITY Unstable		CONDITIONS TO AVOID Do not allow the free gas (outside of cylinder) to exceed 30 psia. Cylinders should not be exposed to sudden shock or sources of heat.
Stable	X	
INCOMPATIBILITY (Materials to avoid) Alkali and alkaline earth metals and water		
HAZARDOUS DECOMPOSITION PRODUCTS Hydrogen fluoride and silicic acid on hydrolysis		
HAZARDOUS POLYMERIZATION May Occur		CONDITIONS TO AVOID None
Will Not Occur	X	

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact your closest supplier location or call the emergency telephone number listed herein.
WASTE DISPOSAL METHOD Do not attempt to dispose of 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 your supplier. For emergency disposal assistance, contact your closest supplier location or call the emergency telephone number listed herein.

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)		Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.	
VENTILATION Hood with forced ventilation	LOCAL EXHAUST	To prevent accumulation above the TWA for hydrogen fluoride	SPECIAL N/A
	MECHANICAL (Gen.)	N/A	OTHER N/A
PROTECTIVE GLOVES Plastic or rubber			
EYE PROTECTION Safety goggles or glasses			
OTHER PROTECTIVE EQUIPMENT Safety shoes, safety shower, eyewash "fountain," face shield			

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION	
DOT Shipping Name: Silicon Tetrafluoride, Compressed	DOT Hazard Class: Division 2.3
DOT Shipping Label: Toxic Gas, Corrosive	I.D. No.: UN 1859
SPECIAL HANDLING RECOMMENDATIONS	
<p>Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3,000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.</p> <p>For additional handling recommendations, consult Compressed Gas Association's Pamphlet P-1.</p>	
SPECIAL STORAGE RECOMMENDATIONS	
<p>Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of noncombustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125F (52C). Cylinders must be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in - first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no sources of ignition in the storage or use area.</p> <p>For additional recommendations, consult Compressed Gas Association's Pamphlets, G-1, P-1, P-14, and Safety Bulletin SB-2.</p>	
SPECIAL PACKAGING RECOMMENDATIONS	
<p>Most metals form a passive fluoride film that protects the metal from further corrosion. Monel® and nickel are preferred for higher applications. Teflon® is the preferred gasket material.</p>	
OTHER RECOMMENDATIONS OR PRECAUTIONS	
<p>Keep equipment scrupulously dry. Many of the metal fluorides are water soluble so that the passive film corrosion protection may be destroyed if wetted with water. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR). (Continued on Page 4)</p>	

*Various Government Agencies (i.e. Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, handling, storage or use of this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.

SILICON TETRAFLUORIDE

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT: (Continued)

ACGIH (1997) lists a ceiling value for HF of 3 Molar PPM (as F). OSHA1995 lists an 8 Hr. TWA for HF (as F) of 3 Molar PPM.

TOXICOLOGICAL PROPERTIES: (Continued)

Silicon tetrafluoride is not listed in the IARC, NTP or by OSHA as a carcinogen or potential carcinogen.

Persons in ill health where such illness would be aggravated by exposure to silicon tetrafluoride should not be allowed to work with or handle this product.

RECOMMENDED FIRST AID TREATMENT: (Continued)

Eye Contact: PERSONS WITH POTENTIAL EXPOSURE TO SILICON TETRAFLUORIDE SHOULD NOT WEAR CONTACT LENSES.

Flush contaminated eye(s) with copious quantities of water. Part eyelids with fingers to assure complete flushing. Continue for minimum of 30 minutes.

Skin Contact: Flush affected area with copious quantities of water. Remove affected clothing as rapidly as possible. 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 and relieves pain.

PHYSICAL DATA

LIQUID DENSITY AT BOILING POINT:

@ 35 psia (241 kPa) BP is -85°F (-65°C) and liquid density is 95.3 lbs/ft³ (1526 kg/m³)

SPECIAL PRECAUTIONS

OTHER RECOMMENDATIONS OR PRECAUTIONS: (Continued)

Always secure cylinders in an upright position before transporting them. NEVER transport cylinders in trunks of vehicles, enclosed vans, truck cabs or in passenger compartments. Transport cylinders secured in open flatbed or in open pick-up type vehicles.

Reporting under SARA, Title III, Section 313 not required.

NFPA 704 NO. for silicon tetrafluoride = 4 0 0 None