Material Safety Data Sheet
Tetraethyl Orthosilicate

ACC# 09230

Section 1 - Chemical Product and Company Identification

MSDS Name: Tetraethyl Orthosilicate
Catalog Numbers: NC9532054, NC9532504, O4617 4, O4617-4, O46174, XXO4617206LI
Synonyms: Ethyl Silicate; Silicic Acid Tetraethyl Ester; TEOS, Tetraethyl Silicate; Tetraethoxysilane.
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
78-10-4	Tetraethyl Orthosilicate	99	201-083-8

Hazard Symbols: XN
Risk Phrases: 10 36/37 20

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: water-white liquid. Flash Point: 99 deg F. **Warning! Flammable liquid and vapor.** Causes eye and skin irritation. May cause liver and kidney damage. May cause lung damage. May cause central nervous system depression. May cause digestive tract irritation. Causes respiratory tract irritation.
Target Organs: Kidneys, central nervous system, liver.

Potential Health Effects
Eye: Causes severe eye irritation. Vapors cause eye irritation.
Skin: Causes skin irritation. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis.
Ingestion: May cause irritation of the digestive tract. May cause effects similar to those for inhalation exposure.
Inhalation: Causes respiratory tract irritation. May cause liver and kidney damage. May cause lung damage. Causes narcotic effects including headache, dizziness, weakness, unconsciousness, and possible death.
Chronic: Prolonged or repeated skin contact may cause defatting and dermatitis.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.
Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Water Reactive. Material will react with water and may release a flammable and/or toxic gas. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. May be ignited by heat, sparks, and flame. Containers may explode when heated.
Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. Use water spray to cool fire-exposed containers. For large fires, use water spray, fog or alcohol-resistant foam. Cool containers with flooding quantities of water until well after fire is out.
Flash Point: 99e deg F (37.22 deg C)
Autoignition Temperature: Not available.
Explosion Limits, Lower:1.3
Upper: 23.0
NFPA Rating: (estimated) Health: 1; Flammability: 3; Instability: 2; Special Hazard: -W-

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Remove all sources of ignition. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as saw dust. A vapor suppressing foam may be used to reduce vapors. Water spray may reduce vapor but may not prevent ignition in closed spaces.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Avoid contact with heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Tetraethyl Orthosilicate	10 ppm TWA	10 ppm TWA; 85 mg/m3 TWA 700 ppm IDLH	100 ppm TWA; 850 mg/m3 TWA

OSHA Vacated PELs: Tetraethyl Orthosilicate: 10 ppm TWA; 85 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: water-white
Odor: sweetish odor - mild odor - alcohol-like
pH: Not available.
Vapor Pressure: 1 mm Hg @ 20C
Vapor Density: 7.2 (air=1)
Evaporation Rate: Not available.
Viscosity: 1.79 cP 20 C
Boiling Point: 165-166C
Freezing/Melting Point:-77 deg C
Decomposition Temperature: Not available.
Solubility: Insoluble in water.
Specific Gravity/Density:0.94 (water=1)
Molecular Formula:C8H20O4Si
Molecular Weight:208.2231

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions.
Conditions to Avoid: Incompatible materials, ignition sources, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents, reacts with water to form a silicone adhesive.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, silicon oxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 78-10-4: VV9450000
LD50/LC50:
CAS# 78-10-4:
Draize test, rabbit, eye: 100 mg Mild;
Draize test, rabbit, eye: 500 mg/24H Mild;
Draize test, rabbit, skin: 500 mg/24H Moderate;
Oral, rat: LD50 = 6270 mg/kg;
Skin, rabbit: LD50 = 6300 uL/kg;

Carcinogenicity:
CAS# 78-10-4: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Neurotoxicity: No information available.
Mutagenicity: No information available.
Other Studies: None.

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.
Environmental: No information reported.
Physical: No information available.
Other: None.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	TETRAETHYL SILICATE				No information available.
Hazard Class:	3				
UN Number:	UN1292				
Packing Group:	III				

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 78-10-4 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 78-10-4: acute, chronic, flammable, reactive.
Section 313
No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 78-10-4 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols:
XN
Risk Phrases:
R 10 Flammable.
R 36/37 Irritating to eyes and respiratory system.

R 20 Harmful by inhalation.

Safety Phrases:
S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)
CAS# 78-10-4: 1
Canada - DSL/NDSL
CAS# 78-10-4 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of B3, D2B.
Canadian Ingredient Disclosure List
CAS# 78-10-4 is listed on the Canadian Ingredient Disclosure List.
Exposure Limits
CAS# 78-10-4: OEL-AUSTRALIA:TWA 10 ppm (85 mg/m3) OEL-BELGIUM:TWA 1
0 ppm (85 mg/m3) OEL-DENMARK:TWA 10 ppm (85 mg/m3) OEL-FINLAND:TWA 1
0 ppm (85 mg/m3);STEL 20 ppm (17 mg/m3) OEL-FRANCE:TWA 10 ppm (85 mg/
m3) OEL-GERMANY:TWA 100 ppm (850 mg/m3) OEL-THE NETHERLANDS:TWA 10 p
pm (85 mg/m3) OEL-THE PHILIPPINES:TWA 100 ppm (850 mg/m3) OEL-POLAND
:TWA 80 mg/m3 OEL-RUSSIA:STEL 20 mg/m3 OEL-SWITZERLAND:TWA 10 ppm (8
5 mg/m3) OEL-TURKEY:TWA 100 ppm (850 mg/m3) OEL-UNITED KINGDOM:TWA 1
0 ppm (85 mg/m3);STEL 30 ppm (255 mg/m3) OEL IN BULGARIA, COLOMBIA, J
ORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM c
heck ACGI TLV

Section 16 - Additional Information

MSDS Creation Date: 7/31/1998
Revision #3 Date: 3/18/2003