

MATERIAL  
SAFETY  
DATA SHEET

<b>PRODUCT NAME</b> Tetraethyl Orthosilicate (TEOS)	<b>CAS#</b> 78-10-4
<b>TRADE NAME AND SYNONYMS</b> Ethyl Silicate; Tetraethoxysilane; Tetraethyl Silicate	<b>DOT I.D. NO.</b> UN 1292
<b>CHEMICAL NAME AND SYNONYMS</b> Tetraethyl Orthosilicate (TEOS)	<b>DOT HAZARD CLASS</b> Division 3
<b>ISSUE DATE AND REVISIONS</b> Revised July 2007	<b>FORMULA</b> TEOS

### HEALTH HAZARD DATA

<p><b>EMERGENCY OVERVIEW</b></p> <p>TEOS is a clear, colorless liquid. Alcohol-like odor. Irritating to the eyes, skin, respiratory system and mucous membranes. Combustible liquid. Vapor may flash back. Emits silicon dioxide and ethanol, a flammable liquid, under fire conditions.</p>
<p><b>SYMPTOMS OF EXPOSURE</b></p> <p>Potential health effects of exposure of TEOS:</p> <p><u>Inhalation</u>: Irritating to the mucous membranes. May cause coughing, difficulty breathing, dizziness, headaches, nausea, vomiting and central nervous system depression.</p> <p><u>Eye Contact</u>: Irritating to the eyes.</p> <p><u>Skin Contact</u>: Can cause severe irritation.</p> <p><u>Ingestion</u>: May irritate the mouth, throat, esophagus and stomach. Nausea, vomiting, diarrhea, headache and dizziness may be noted.</p> <p><u>Chronic/ Carcinogenicity</u>: Chronic exposure can cause liver, blood, kidney and lung damage.</p>
<p><b>TOXICOLOGICAL PROPERTIES</b></p> <p>Toxic by ingestion, inhalation and eye or skin contact. May irritate the eyes, skin, digestive tract, respiratory system and mucous membrane.</p> <p>Acute exposure may cause narcosis, anemia, tremors, and central nervous system depression.</p> <p>Target Organs: eyes, skin, respiratory system, central nervous system, gastrointestinal system, kidney and liver.</p>
<p><b>RECOMMENDED FIRST AID TREATMENT</b></p> <p>PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO TETRAETHYL ORTHOSILICATE. RESCUERS SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.</p> <p><u>Inhalation</u>: Remove to 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. Give artificial respiration if not breathing. Qualified personnel may give oxygen if breathing is difficult. Get immediate medical attention.</p> <p><u>Eye Contact</u>: Immediately flush eyes with plenty of water for at least 15 minutes.</p> <p><u>Skin Contact</u>: Remove contaminated clothing as rapidly as possible and flush affected area with copious quantities of water.</p> <p><u>Ingestion</u>: Drink several glasses of water and induce vomiting. Administer water until vomit is clear. Get immediate medical attention.</p>

**HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES**

It will decompose to Ethanol and Silicon Dioxide when release to atmosphere or water.
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**PHYSICAL DATA**

<b>BOILING POINT</b> 329-336 °F (165-169 °C)	<b>MOLECULAR WEIGHT</b> 208.33
<b>VAPOR PRESSURE</b> 2 mmHg @ 20 °C	<b>FREEZING POINT</b> -123 to -107 °F (-86 to -77 °C)
<b>SOLUBILITY IN WATER</b> Decomposes slowly	<b>VAPOR DENSITY (air=1)</b> 7.2
<b>EVAPORATION RATE</b> 0.3 (butyl acetate=1)	<b>SPECIFIC GRAVITY (WATER=1)</b> 0.920-0.950
<b>APPEARANCE AND ODOR</b> Clear, colorless liquid with an alcohol odor.	

**FIRE AND EXPLOSION HAZARD DATA**

<b>FLASH POINT (Method used)</b> 37 °C	<b>AUTO IGNITION TEMPERATURE</b> 260 °C	<b>FLAMMABLE LIMITS % BY VOLUME</b> LEL 0.9% UEL 5.75%
<b>EXTINGUISHING MEDIA</b> Dry chemical, carbon dioxide or foam. For larger fires, flood fire area with water from a distance.		<b>ELECTRICAL CLASSIFICATION</b> N/A
<b>SPECIAL FIRE FIGHTING PROCEDURES</b> Use positive pressure self-contained breathing apparatus (SCBA) and appropriate personal protective equipment (PPE).		
<b>UNUSUAL FIRE AND EXPLOSION HAZARDS</b> Combustible liquid. Emits toxic fumes under fire conditions. Vapors may travel a considerable distance to an ignition source and flash back. Emits toxic fumes under fire conditions.		

**REACTIVITY DATA**

<b>STABILITY</b>		<b>CONDITIONS TO AVOID</b> Avoid heat, flames, sparks and other sources of ignition. Minimize contact with material. Keep out of water supplies and sewers.
Unstable		
Stable	X	
<b>INCOMPATIBILITY (Materials to avoid)</b> Water, moisture, air, oxidizers, strong acids and strong bases.		
<b>HAZARDOUS DECOMPOSITION PRODUCTS</b> Combustion: Silicon oxides, carbon monoxide, and carbon dioxide. Hydrolysis: Ethanol, Silicon Dioxide		
<b>HAZARDOUS POLYMERIZATION</b>		<b>CONDITIONS TO AVOID</b> None
May Occur		
Will Not Occur	X	

**SPILL OR LEAK PROCEDURES**

<b>STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED</b> Avoid heat, flames, sparks and other sources of ignition. Do not touch spilled material. Stop leak if possible without personal risk. Reduce vapors with water spray. Do not get water inside container. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry.
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**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 HSG. For emergency disposal assistance, contact HSG for specific advice.

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**SPECIAL PROTECTION INFORMATION****RESPIRATORY PROTECTION** (Specify type)

Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.

**VENTILATION**

Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

**SPECIAL**

N/A

**OTHER**

N/A

**MECHANICAL** (Gen.)

N/A

**LOCAL EXHAUST**

N/A

**PROTECTIVE GLOVES**

Wear appropriate chemical resistant gloves.

**EYE PROTECTION**

Wear splash resistant safety goggles with a faceshield.

**OTHER PROTECTIVE EQUIPMENT**

Wear rubber – safety shoes, rubber apron for splash protection.

**SPECIAL PRECAUTIONS\*****SPECIAL LABELING INFORMATION**

DOT Shipping Name: Tetraethyl Silicate  
DOT Shipping Label: Toxic Gas

DOT Hazard Class: Division 3  
I.D. No.: UN 1292

**SPECIAL HANDLING RECOMMENDATIONS**

Use only in well-ventilated areas. Valve protection caps must remain in place unless cylinder 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 piping or system. 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.

**SPECIAL STORAGE RECOMMENDATIONS**

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 125°F (°C). Cylinders should 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.

**OTHER RECOMMENDATIONS OR PRECAUTIONS**

Most metals form a passive fluoride film that protects the metal from further corrosion. 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.

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