SAFETY DATA SHEET

1. Identification

Product Name
Tetraethyl orthosilicate

Cat No.:
AC157810000; AC157810010; AC157810025; AC157810050;
AC157810100; AC157811000; AC157812500

CAS-No
78-10-4

Synonyms
Ethyl silicate; TEOS; Tetraethoxysilane

Recommended Use
Laboratory chemicals.

Uses advised against
Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information US call: 001-800-ACROS-01 / Europe call: +32 14 57 52 11
Emergency Number US:001-201-796-7100 / Europe: +32 14 57 52 99
CHEMTREC Tel. No.US:001-800-424-9300 / Europe:001-703-527-3887

2. Hazard(s) identification

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

<table>
<thead>
<tr>
<th>Hazard Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable liquids</td>
<td>Category 3</td>
</tr>
<tr>
<td>Acute Inhalation Toxicity - Vapors</td>
<td>Category 3</td>
</tr>
<tr>
<td>Specific target organ toxicity (single exposure)</td>
<td>Category 3</td>
</tr>
<tr>
<td>Target Organs - Respiratory system.</td>
<td>Category 3</td>
</tr>
<tr>
<td>Serious Eye Damage/Eye Irritation</td>
<td>Category 2</td>
</tr>
</tbody>
</table>

Label Elements

Signal Word
Warning

Hazard Statements
Flammable liquid and vapor
Causes serious eye irritation
Harmful if inhaled
May cause respiratory irritation

Precautionary Statements
Prevention
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wash face, hands and any exposed skin thoroughly after handling
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Wear protective gloves/protective clothing/eye protection/face protection
Keep cool
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl silicate</td>
<td>78-10-4</td>
<td>&gt;95</td>
</tr>
</tbody>
</table>

4. First-aid measures

Eye Contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact
Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

Inhalation
Remove to fresh air. Do not use mouth-to-mouth method if victim ingested or inhaled the
substance; give artificial respiration with the aid of a pocket mask equipped with a one-way
valve or other proper respiratory medical device. Immediate medical attention is required. If
not breathing, give artificial respiration.

Ingestion

Do NOT induce vomiting. Get medical attention.

Most important symptoms and
effects

Difficulty in breathing. Symptoms of overexposure may be headache, dizziness, tiredness,
nausea and vomiting

Notes to Physician

Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media

Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam. Water mist may
be used to cool closed containers.

Unsuitable Extinguishing Media

No information available

Flash Point

45 °C / 113 °F

Method -

No information available

Autoignition Temperature

225 °C / 437 °F

Explosion Limits

Upper

23 vol %

Lower

1.3 vol %

Sensitivity to Mechanical Impact

No information available

Sensitivity to Static Discharge

No information available

Specific Hazards Arising from the Chemical

Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of
ignition and flash back.

Hazardous Combustion Products

Carbon monoxide (CO), Carbon dioxide (CO2), Silicon dioxide. Ethanol.

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. Thermal decomposition can lead to release of irritating gases and vapors.

6. Accidental release measures

Personal Precautions

Use personal protective equipment as required. Remove all sources of ignition. Take
precautionary measures against static discharges.

Environmental Precautions

Should not be released into the environment. See Section 12 for additional Ecological
Information.

Methods for Containment and Clean
Up

Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.
Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling

Use only under a chemical fume hood. Wear personal protective equipment/face protection.
Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Keep away from
open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Use
spark-proof tools and explosion-proof equipment. Take precautionary measures against
static discharges.
Tetraethyl orthosilicate

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Storage
Keep containers tightly closed in a dry, cool and well-ventilated place. Flammables area. Keep away from heat, sparks and flame.

8. Exposure controls / personal protection

Exposure Guidelines

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
<th>Mexico OEL (TWA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl silicate</td>
<td>TWA: 10 ppm</td>
<td>(Vacated) TWA: 10 ppm</td>
<td>IDLH: 700 ppm</td>
<td>TWA: 10 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Vacated) TWA: 85 mg/m³</td>
<td>TWA: 10 ppm</td>
<td>TWA: 85 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA: 100 ppm</td>
<td>TWA: 850 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

Legend
ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures
Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection
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 and body protection
Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection
Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Physical State</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Clear</td>
</tr>
<tr>
<td>Odor</td>
<td>Slight aromatic</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>85 mg/m³</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Melting Point/Range</td>
<td>-77 °C / -106.6 °F</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>166 - 169 °C / 330.8 - 336.2 °F @ 760 mmHg</td>
</tr>
<tr>
<td>Flash Point</td>
<td>45 °C / 113 °F</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>No information available</td>
</tr>
<tr>
<td>Flammability (solid,gas)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammability or explosive limits</td>
<td>Upper 23 vol %, Lower 1.3 vol %</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>1.7 mbar @ 20°C</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>No information available</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>0.940</td>
</tr>
<tr>
<td>Solubility</td>
<td>Hydrolyses</td>
</tr>
<tr>
<td>Partition coefficient; n-octanol/water</td>
<td>No data available</td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>225 °C / 437 °F</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>No information available</td>
</tr>
</tbody>
</table>
### 10. Stability and reactivity

**Reactive Hazard**
None known, based on information available

**Stability**
Stable under normal conditions. Moisture sensitive.

**Conditions to Avoid**

**Incompatible Materials**
Strong oxidizing agents, Strong acids

**Hazardous Decomposition Products**
Carbon monoxide (CO), Carbon dioxide (CO₂), Silicon dioxide, Ethanol

**Hazardous Polymerization**
Hazardous polymerization does not occur.

**Hazardous Reactions**
Reacts with water and forms Ethanol.

### 11. Toxicological information

**Acute Toxicity**

**Product Information**

**Component Information**

<table>
<thead>
<tr>
<th>Component</th>
<th>LD50 Oral</th>
<th>LD50 Dermal</th>
<th>LC50 Inhalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl silicate</td>
<td>LD50 = 6270 mg/kg (Rat)</td>
<td>LD50 = 5878 mg/kg (Rabbit)</td>
<td>LC50 = 10 mg/l 4h (Rat; male)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LD50 = 6300 µL/kg (Rabbit)</td>
<td>LC50 = 16.8 mg/l 4h (Rat; female)</td>
</tr>
</tbody>
</table>

**Toxicologically Synergistic Products**
No information available

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

**Irritation**
Irritating to eyes and respiratory system

**Sensitization**
No information available

**Carcinogenicity**
The table below indicates whether each agency has listed any ingredient as a carcinogen.

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>IARC</th>
<th>NTP</th>
<th>ACGIH</th>
<th>OSHA</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl silicate</td>
<td>78-10-4</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

**Mutagenic Effects**
No information available

**Reproductive Effects**
No information available.

**Developmental Effects**
No information available.

**Teratogenicity**
No information available.

**STOT - single exposure**
Respiratory system

**STOT - repeated exposure**
None known

**Aspiration hazard**
No information available

**Symptoms / effects, both acute and delayed**
Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting

**Endocrine Disruptor Information**
No information available
Other Adverse Effects

The toxicological properties have not been fully investigated.

### 12. Ecological information

**Ecotoxicity**
Do not empty into drains.

<table>
<thead>
<tr>
<th>Component</th>
<th>Freshwater Algae</th>
<th>Freshwater Fish</th>
<th>Microtox</th>
<th>Water Flea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl silicate</td>
<td>Not listed</td>
<td></td>
<td>LC50 &gt;245 mg/L/96h (Brachydanio rerio)</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

**Persistence and Degradability**
No information available

**Bioaccumulation/ Accumulation**
No information available.

**Mobility**
No information available.

### 13. Disposal considerations

Waste Disposal Methods
Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

### 14. Transport information

**DOT**
- UN-No: UN1292
- Proper Shipping Name: TETRAETHYL SILICATE
- Hazard Class: 3
- Packing Group: III

**TDG**
- UN-No: UN1292
- Proper Shipping Name: TETRAETHYL SILICATE
- Hazard Class: 3
- Packing Group: III

**IATA**
- UN-No: UN1292
- Proper Shipping Name: TETRAETHYL SILICATE
- Hazard Class: 3
- Packing Group: III

**IMDG/IMO**
- UN-No: UN1292
- Proper Shipping Name: TETRAETHYL SILICATE
- Hazard Class: 3
- Packing Group: III

### 15. Regulatory information

**United States of America Inventory**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>TSCA</th>
<th>TSCA Inventory notification - Active/Inactive</th>
<th>TSCA - EPA Regulatory Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl silicate</td>
<td>78-10-4</td>
<td>X</td>
<td>ACTIVE</td>
<td>-</td>
</tr>
</tbody>
</table>

**Legend:**
- TSCA - Toxic Substances Control Act, (40 CFR Part 710)
- X - Listed
- ‘-’ - Not Listed

**TSCA 12(b) - Notices of Export**
Not applicable

**International Inventories**
Tetraethyl orthosilicate

Revision Date 22-Feb-2019

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>DSL</th>
<th>NDSL</th>
<th>EINECS</th>
<th>PICCS</th>
<th>ENCS</th>
<th>AICS</th>
<th>IECSC</th>
<th>KECL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl silicate</td>
<td>78-10-4</td>
<td>X</td>
<td>-</td>
<td>201-083-8</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>KE-33411</td>
</tr>
</tbody>
</table>

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

<table>
<thead>
<tr>
<th>Component</th>
<th>Massachusetts</th>
<th>New Jersey</th>
<th>Pennsylvania</th>
<th>Illinois</th>
<th>Rhode Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl silicate</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

U.S. Department of Transportation

Reportable Quantity (RQ): N

DOT Marine Pollutant N

DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 27-May-2010
Revision Date 22-Feb-2019
Print Date 22-Feb-2019
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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End of SDS