TETRAETHOXYSILANE, oligomeric hydrolysate

Safety Data Sheet

Date of issue: 08/31/2015
Version: 1.0

SECTION 1: Identification

1.1. Identification

Product name: TETRAETHOXYSILANE, oligomeric hydrolysate
Product code: SIT7110.3
Product form: Substance
Physical state: Liquid
Formula: [(C2H5O)2SiO]
Synonyms: POLY(DIETHOXYSILANE); ETHYLSILICATE
Chemical family: ORGANOETHOXYSILANE

1.2. Recommended use and restrictions on use

Recommended use: Chemical intermediate

1.3. Supplier

GELEST, INC.
11 East Steel Road
Morrisville, PA 19067
USA
T 215-547-1015 - F 215-547-2484 - (M-F): 8:00 AM - 5:30 PM EST
info@gelest.com - www.gelest.com

1.4. Emergency telephone number

Emergency number: CHEMTREC: 1-800-424-9300 (USA); +1 703-527-3887 (International)

SECTION 2: Hazard(s) Identification

2.1. Classification of the substance or mixture

GHS-US classification

Flammable liquids Category 3 H226 - Flammable liquid and vapor
Serious eye damage/eye irritation Category 2A H319 - Causes serious eye irritation
Specific target organ toxicity (single exposure) Category 3 H335 - May cause respiratory irritation

Full text of H statements: see section 16

2.2. GHS Label elements, including precautionary statements

GHS US labeling

Hazard pictograms (GHS US):

Signal word (GHS US): Warning

Hazard statements (GHS US):

H226 - Flammable liquid and vapor
H319 - Causes serious eye irritation
H335 - May cause respiratory irritation

Precautionary statements (GHS US):

P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P210 - Keep away from heat, open flames, sparks. - No smoking.
P240 - Ground/Bond container and receiving equipment
P241 - Use explosion-proof electrical equipment
P242 - Use only non-sparking tools.
P243 - Take precautionary measures against static discharge.
P261 - Avoid breathing vapors.
P264 - Wash hands thoroughly after handling.
P271 - Use only outdoors or in a well-ventilated area.
P303+P361+P335 - If on skin (or hair): take off immediately all contaminated clothing. rinse skin with water/shower
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P312 - Call a doctor if you feel unwell
P337+P313 - If eye irritation persists: Get medical advice/attention.
P370+P378 - In case of fire: Use water spray or fog, foam, carbon dioxide, dry chemical to extinguish.
P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
P403+P235 - Keep in a cool place
P405 - Store locked up.
**TETRAETHOXYSILANE, oligomeric hydrolysate**

**Safety Data Sheet**

**2.3. Hazards not otherwise classified (HNOC)**

Other hazards not contributing to the classification:
Additional ethanol may be formed by reaction with moisture and water. The hydrolysis product of this compound is ethanol. Overexposure to ethanol by skin absorption, inhalation or ingestion may have a narcotic effect (headache, nausea, drowsiness). Ethanol is metabolized to acetaldehyde and acetic acid which in large quantities result in metabolic acidosis, CNS depression and death due to respiratory arrest. The US OSHA PEL (TWA) for ethanol is 1000 ppm. This product contains ethanol which is classified as a carcinogen by IARC in alcoholic beverages.

**2.4. Unknown acute toxicity (GHS US)**

Not applicable

**SECTION 3: Composition/Information on ingredients**

**3.1. Substances**

<table>
<thead>
<tr>
<th>Substance type</th>
<th>Name</th>
<th>CAS-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mono-constituent</td>
<td>TETRAETHOXYSILANE, oligomeric hydrolysate</td>
<td>68412-37-3/11099-06-2</td>
</tr>
<tr>
<td>Mono-constituent</td>
<td>Ethyl silicate</td>
<td>(CAS-No.) 78-10-4</td>
</tr>
</tbody>
</table>

Full text of hazard classes and H-statements : see section 16

**3.2. Mixtures**

Not applicable

**SECTION 4: First-aid measures**

**4.1. Description of first aid measures**

First-aid measures general:
Remove contaminated clothing and shoes. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). If possible show this sheet; if not available show packaging or label. If exposed or concerned: Get medical advice/attention.

First-aid measures after inhalation:
Remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.

First-aid measures after skin contact:
Wash with plenty of soap and water. Get medical advice/attention.

First-aid measures after eye contact:
Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.

First-aid measures after ingestion:
Never give anything by mouth to an unconscious person. Get medical advice/attention.

**4.2. Most important symptoms and effects (acute and delayed)**

- Symptoms/effects after inhalation:
  May cause irritation to the respiratory tract. May be harmful if inhaled.
- Symptoms/effects after skin contact:
  May cause skin irritation.
- Symptoms/effects after eye contact:
  Causes serious eye irritation.
- Symptoms/effects after ingestion:
  May be harmful if swallowed.

Chronic symptoms:
On contact with water this compound liberates methanol which is known to have a chronic effect on the central nervous system.

**4.3. Immediate medical attention and special treatment, if necessary**

No additional information available

**SECTION 5: Fire-fighting measures**

**5.1. Suitable (and unsuitable) extinguishing media**

Suitable extinguishing media:

Unsuitable extinguishing media:
Do not use straight streams.

**5.2. Specific hazards arising from the chemical**

Fire hazard:
Flammable liquid and vapor. Irritating fumes and organic acid vapors may develop when material is exposed to elevated temperatures or open flame.

**5.3. Special protective equipment and precautions for fire-fighters**

Firefighting instructions:
Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.

Protection during firefighting:
Do not enter fire area without proper protective equipment, including respiratory protection. Avoid all eye and skin contact and do not breathe vapor and mist.

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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures: Remove ignition sources. Use special care to avoid static electric charges.

6.1.1. For non-emergency personnel

Protective equipment: Wear protective equipment as described in Section 8.

Emergency procedures: Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment: Do not attempt to take action without suitable protective equipment. Equip cleanup crew with proper protection. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment: Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.

Methods for cleaning up: Clean up any spills as soon as possible, using an absorbent material to collect it. Sweep or shovel spills into appropriate container for disposal. Use only non-sparking tools.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed: Handle empty containers with care because residual vapors are flammable.

Precautions for safe handling: Avoid all eye and skin contact and do not breathe vapor and mist. Provide good ventilation in process area to prevent accumulation of vapors. Ground/bond container and receiving equipment. Take precautionary measures against static discharge. Use only non-sparking tools.

Hygiene measures: Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures: Proper grounding procedures to avoid static electricity should be followed. Use explosion-proof electrical equipment.

Storage conditions: Keep container tightly closed. Keep in a cool place. Store locked up.


Storage area: Store in a well-ventilated place. Store away from heat.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Ethyl silicate (78-10-4)</th>
<th>ACGIH</th>
<th>ACGIH TWA (ppm)</th>
<th>10 ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OSHA</td>
<td>OSHA PEL (TWA) (mg/m³)</td>
<td>850 mg/m³</td>
</tr>
<tr>
<td></td>
<td>OSHA</td>
<td>OSHA PEL (TWA) (ppm)</td>
<td>100 ppm</td>
</tr>
<tr>
<td></td>
<td>IDLH</td>
<td>US IDLH (ppm)</td>
<td>700 ppm</td>
</tr>
<tr>
<td></td>
<td>NIOSH</td>
<td>NIOSH REL (TWA) (mg/m³)</td>
<td>85 mg/m³</td>
</tr>
<tr>
<td></td>
<td>NIOSH</td>
<td>NIOSH REL (TWA) (ppm)</td>
<td>10 ppm</td>
</tr>
</tbody>
</table>

8.2. Appropriate engineering controls

Appropriate engineering controls: Provide local exhaust or general room ventilation.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Avoid all unnecessary exposure. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

Hand protection:

Neoprene or nitrile rubber gloves

Eye protection:
Chemical goggles. Contact lenses should not be worn

**Skin and body protection:**
Wear suitable protective clothing

**Respiratory protection:**
Where exposure through inhalation may occur from use, respiratory protection equipment is recommended. NIOSH-certified organic vapor (black cartridge) respirator.

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Clear liquid.</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>650 - 800 g/mol</td>
</tr>
<tr>
<td>Color</td>
<td>No data available</td>
</tr>
<tr>
<td>Odor</td>
<td>Characteristic.</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>Refractive index</td>
<td>1.398</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative evaporation rate (butyl acetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point</td>
<td>No data available</td>
</tr>
<tr>
<td>Freezing point</td>
<td>&lt; -20 °C</td>
</tr>
<tr>
<td>Boiling point</td>
<td>&gt; 169 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>46 °C</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>260 °C</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Flammable liquid and vapor</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative vapor density at 20 °C</td>
<td>7.2</td>
</tr>
<tr>
<td>Relative density</td>
<td>1.05 - 1.07</td>
</tr>
<tr>
<td>% Volatiles</td>
<td>&lt; 60 %</td>
</tr>
<tr>
<td>Solubility</td>
<td>Insoluble in water. Reacts with water.</td>
</tr>
<tr>
<td>Log Pow</td>
<td>No data available</td>
</tr>
<tr>
<td>Log Kow</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>3 - 5 cSt</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosion limits</td>
<td>No data available</td>
</tr>
</tbody>
</table>

#### 9.2. Other information

No additional information available

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

No additional information available

#### 10.2. Chemical stability

Stable.

#### 10.3. Possibility of hazardous reactions

Material decomposes slowly in contact with moist air or with water liberating ethanol.

#### 10.4. Conditions to avoid

Heat. Open flame. Sparks.

#### 10.5. Incompatible materials


#### 10.6. Hazardous decomposition products

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity: Not classified

<table>
<thead>
<tr>
<th>Compound</th>
<th>Toxicity Endpoint</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TETRAETHOXYSILANE, oligomeric hydrolysate (68412-37-3/11099-06-2)</td>
<td>LD50 oral rat</td>
<td>9280 mg/kg</td>
</tr>
<tr>
<td></td>
<td>ATE US (oral)</td>
<td>9280 mg/kg body weight</td>
</tr>
<tr>
<td>Ethyl silicate (78-10-4)</td>
<td>LD50 oral rat</td>
<td>6270 mg/kg</td>
</tr>
<tr>
<td></td>
<td>LD50 dermal rat</td>
<td>6270 mg/kg body weight</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Compound</th>
<th>Toxicity Endpoint</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TETRAETHOXYSILANE, oligomeric hydrolysate, listed under more than one CAS number (68412-37-3/11099-06-2)</td>
<td>LD50 oral rat</td>
<td>&gt; 2000 mg/kg</td>
</tr>
<tr>
<td></td>
<td>LD50 dermal rat</td>
<td>&gt; 4450 mg/kg</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation: Not classified

Serious eye damage/irritation: Causes serious eye irritation.

Eye Irritation: eye-hmn, 3000 ppm: severe Irritant

Respiratory or skin sensitization: Not classified

Germ cell mutagenicity: Not classified

Carcinogenicity: Not classified

Reproductive toxicity: Not classified

Specific target organ toxicity – single exposure: May cause respiratory irritation.

Specific target organ toxicity – repeated exposure: Not classified

Aspiration hazard: Not classified

Symptoms/effects after inhalation: May cause irritation to the respiratory tract. May be harmful if inhaled.

Symptoms/effects after skin contact: May cause skin irritation.

Symptoms/effects after eye contact: Causes serious eye irritation.

Symptoms/effects after ingestion: May be harmful if swallowed.

Chronic symptoms: On contact with water this compound liberates methanol which is known to have a chronic effect on the central nervous system.

Reason for classification: Expert judgment

SECTION 12: Ecological information

12.1. Toxicity

<table>
<thead>
<tr>
<th>Compound</th>
<th>Toxicity Endpoint</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TETRAETHOXYSILANE, oligomeric hydrolysate, listed under more than one CAS number (68412-37-3/11099-06-2)</td>
<td>EC50 Daphnia 1</td>
<td>&gt; 193 mg/l (Exposure time: 48 h - Species: Daphnia magna)</td>
</tr>
</tbody>
</table>

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

No additional information available

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Other adverse effects: This substance may be hazardous to the environment.

Effect on the ozone layer: No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods

Sewage disposal recommendations: Do not dispose of waste into sewer.

Product/Packaging disposal recommendations: Incinerate. Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to licensed waste disposal facility.

Additional information: Handle empty containers with care because residual vapors are flammable.

Ecology - waste materials: Avoid release to the environment.
TETRAETHYOXYSLANE, oligomeric hydrolysate
Safety Data Sheet

SECTION 14: Transport information

14.1. UN number
UN-No.(DOT) : 1292
DOT NA no. : UN1292

14.2. UN proper shipping name
Transport document description : UN1292 Tetraethyl silicate, 3, III
Proper Shipping Name (DOT) : Tetraethyl silicate
Class (DOT) : 3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120
Packing group (DOT) : III - Minor Danger
Hazard labels (DOT) : 3 - Flammable liquid

DOT Packaging Non Bulk (49 CFR 173.xxx) : 203
DOT Packaging Bulk (49 CFR 173.xxx) : 242
DOT Packaging Exceptions (49 CFR 173.xxx) : 150

14.3. Additional information
Emergency Response Guide (ERG) Number : 129
Other information : No supplementary information available.

Transport by sea
DOT Vessel Stowage Location : A - The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel.

Air transport
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 60 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 220 L

SECTION 15: Regulatory information

15.1. US Federal regulations
Ethyl silicate (78-10-4)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Tetraethoxysilane, oligomeric hydrolysate, listed under more than one CAS number (68412-37-3/11099-06-2)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA
Ethyl silicate (78-10-4)
Listed on the Canadian DSL (Domestic Substances List)

WHMIS Classification
Class B Division 2 - Flammable Liquid
Class B Division 6 - Reactive Flammable Material
Class D Division 2 Subdivision B - Toxic material causing other toxic effects

Tetraethoxysilane, oligomeric hydrolysate, listed under more than one CAS number (68412-37-3/11099-06-2)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations
Ethyl silicate (78-10-4)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Tetraethoxysilane, oligomeric hydrolysate, listed under more than one CAS number (68412-37-3/11099-06-2)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

National regulations
TETRAETHOXY SILANE, oligomeric hydrolysate
Safety Data Sheet

Ethyl silicate (78-10-4)
Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the Japanese I SHL (Industrial Safety and Health Law)
Listed on the Korean ECL (Existing Chemicals List)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on the Canadian IDL (Ingredient Disclosure List)
Listed on INSQ (Mexican National Inventory of Chemical Substances)
Listed on CICR (Turkish Inventory and Control of Chemicals)

Tetraethoxysilane, oligomeric hydrolysate, listed under more than one CAS number (68412-37-3/11099-06-2)
Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the Korean ECL (Existing Chemicals List)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

15.3. US State regulations
California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

Ethyl silicate (78-10-4)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information
Full text of H-phrases:

<table>
<thead>
<tr>
<th>H226</th>
<th>Flammable liquid and vapor</th>
</tr>
</thead>
<tbody>
<tr>
<td>H319</td>
<td>Causes serious eye irritation</td>
</tr>
<tr>
<td>H335</td>
<td>May cause respiratory irritation</td>
</tr>
</tbody>
</table>

Abbreviations and acronyms:
Abbreviations: ND: Not Determined, No Data; NA: Not Applicable; LD: Lethal Dose; LC: Lethal Concentration; ATE: Acute Toxicity Estimates; H: hour; °: °C unless otherwise stated; mm: millimeters Hg, torr; PEL: permissible exposure level; TWA: time weighted average; TLV: threshold limit value; TG: Test Guideline; NIOSH: National Institute for Occupational Safety and Health; IARC: International Agency for Research on Cancer; NTP: National Toxicology Program; HMIS: Hazardous Material Information System; CAS No.: Chemical Abstract Service Registration Number; EC No.: European Commission Registration Number; EC Index No.: European Commission Index Number; OECD: The Organisation for Economic Co-operation and Development; GHS: The Globally Harmonized System of Classification and Labelling; APF: Assigned Protection Factor.

Hazard Rating
Health: 2 Moderate Hazard - Temporary or minor injury may occur
Flammability: 2 Moderate Hazard - Materials which must be moderately heated or exposed to high ambient temperatures before ignition will occur. Includes liquids having a flash point at or above 100 F but below 200 F. (Classes II & IIIA)
Physical: 1 Slight Hazard - Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.

Prepared by safety and environmental affairs.

Date of issue: 08/31/2015 Version: 1.0

SDS US (GHS HazCom 2012) - Custom

According to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

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