SECTION 1: Identification

1.1. Identification
Product name: SIVATE™ E610: ENHANCED AMINE FUNCTIONAL SILANE
Product code: SIA0610.E1
Product form: Mixture
Physical state: Liquid
Chemical family: ORGANOSILANE

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 4
Skin corrosion/irritation Category 1B
Serious eye damage/eye irritation Category 1
Specific target organ toxicity (single exposure) Category 3
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): Danger
Hazard statements (GHS US):
H227 - Combustible liquid
H314 - Causes severe skin burns and eye damage
H318 - Causes serious eye damage
H335 - May cause respiratory irritation
Precautionary statements (GHS US):
P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P260 - Do not breathe vapors.
P261 - Avoid breathing dust/fume/gas/mist/vapors/spray.
P264 - Wash hands thoroughly after handling.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P331 - If swallowed: rinse mouth. Do NOT induce vomiting
P303+P361+P353 - 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
P310 - Immediately call a doctor
P312 - Call a poison center or doctor if you feel unwell
P321 - Specific treatment (see supplemental first aid instruction on this label)
P363 - Wash contaminated clothing before reuse.
P370+P378 - In case of fire: Use media other than water 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.
P501 - Dispose of contents/container to licensed waste disposal facility.
2.3. Hazards not otherwise classified (HNOC)
No additional information available

2.4. Unknown acute toxicity (GHS US)
Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances
Not applicable

3.2. Mixtures

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-Aminopropyliethoxysilane</td>
<td>(CAS-No.) 919-30-2</td>
<td>70 - 75</td>
<td>Acute Tox. 4 (Oral), H302</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Skin Corr. 1B, H314</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Eye Dam. 1, H318</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>STOT SE 3, H335</td>
</tr>
<tr>
<td>1,2-Bis(triethoxysilyl)ethane</td>
<td>(CAS-No.) 16068-37-4</td>
<td>20 - 25</td>
<td>Acute Tox. 3 (Oral), H301</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Acute Tox. 4 (Dermal), H312</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Eye Irrit. 2B, H320</td>
</tr>
<tr>
<td>Bis(3-triethoxysilylpropyl)amine</td>
<td>(CAS-No.) 13497-18-2</td>
<td>5 - 7</td>
<td>Skin Corr. 1C, H314</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Eye Dam. 1, H318</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>STOT SE 3, H335</td>
</tr>
</tbody>
</table>

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

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.

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 immediate medical advice/attention.

First-aid measures after eye contact: Immediately flush eyes thoroughly with water for at least 15 minutes. Get immediate 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: Causes severe skin burns and eye damage.
Symptoms/effects after inhalation: May cause respiratory irritation.
Symptoms/effects after skin contact: Causes (severe) skin burns. May be harmful in contact with skin.
Symptoms/effects after eye contact: Causes serious eye damage.
Symptoms/effects after ingestion: May be harmful if swallowed.

Chronic symptoms: On contact with water this compound liberates ethanol 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


Unsuitable extinguishing media: Do not use straight streams.

5.2. Specific hazards arising from the chemical

Fire hazard: Combustible liquid. 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: Exercise caution when fighting any chemical fire. Use water spray to cool exposed surfaces.

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.

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. 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: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

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

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

7.2. Conditions for safe storage, including any incompatibilities

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>1,2-Bis(triethoxysilyl)ethane (16068-37-4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA PEL (TWA) (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 or face shield. 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 combination organic vapor - amine gas (brown cartridge) respirator.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Physical state</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Clear liquid.</td>
</tr>
<tr>
<td>Color</td>
<td>Colorless to straw.</td>
</tr>
</tbody>
</table>
**Odor** : No data available

**Odor threshold** : No data available

**Refractive index** : No data available

**pH** : No data available

**Relative evaporation rate (butyl acetate=1)** : No data available

**Melting point** : No data available

**Freezing point** : No data available

**Boiling point** : No data available

**Flash point** : 91 °C

**Auto-ignition temperature** : No data available

**Decomposition temperature** : No data available

**Flammability (solid, gas)** : Combustible liquid

**Vapor pressure** : No data available

**Relative vapor density at 20 °C** : No data available

**Relative density** : 0.948

**Solubility** : Reacts with water.

**Log Pow** : No data available

**Log Kow** : No data available

**Viscosity, kinematic** : 2 cSt

**Viscosity, dynamic** : No data available

**Explosive properties** : No data available

**Oxidizing properties** : No data available

**Explosion limits** : No data available

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

No additional information available

#### 10.2. Chemical stability

Stable when stored in sealed containers. Moisture sensitive.

#### 10.3. Possibility of hazardous reactions

React with water and moisture in air, liberating ethanol.

#### 10.4. Conditions to avoid

Heat. Sparks. Open flame.

#### 10.5. Incompatible materials


#### 10.6. Hazardous decomposition products

Ethanol. Organic acid vapors.

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

**Acute toxicity** : Not classified

<table>
<thead>
<tr>
<th>Substance</th>
<th>Route</th>
<th>LD50/ATF US</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-Aminopropyltriethoxysilane</td>
<td>Oral</td>
<td>1780 mg/kg</td>
<td>Causes severe skin burns and eye damage.</td>
</tr>
<tr>
<td></td>
<td>ATE US (oral)</td>
<td>1780 mg/kg</td>
<td></td>
</tr>
<tr>
<td>1,2-Bis(triethoxysilyl)ethane</td>
<td>Oral</td>
<td>161 mg/kg</td>
<td>Causes serious eye damage.</td>
</tr>
<tr>
<td></td>
<td>Dermal rabbit</td>
<td>1971 mg/kg</td>
<td></td>
</tr>
</tbody>
</table>

**Skin corrosion/irritation** : Not classified

**Serious eye damage/irritation** : Not classified

**Respiratory or skin sensitization** : Not classified

**Germ cell mutagenicity** : Not classified

**Carcinogenicity** : None of the components in this product at concentrations >0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.
SIVATE™ E610: ENHANCED AMINE FUNCTIONAL SILANE
Safety Data Sheet

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 respiratory irritation.
Symptoms/effects after skin contact: Causes (severe) skin burns. May be harmful in contact with skin.
Symptoms/effects after eye contact: Causes serious eye damage.
Symptoms/effects after ingestion: May be harmful if swallowed.
Chronic symptoms: On contact with water this compound liberates ethanol 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
No additional information available

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: Dispose of contents/container to licensed waste disposal facility. Dispose in a safe manner in accordance with local/national regulations.
Ecology - waste materials: Avoid release to the environment.

SECTION 14: Transport information

14.1. UN number
UN-No.(DOT): 3267
DOT NA No: UN3267

14.2. UN proper shipping name
Transport document description: UN3267 Corrosive liquid, basic, organic, n.o.s. (SIVATE™ E610: ENHANCED AMINE FUNCTIONAL SILANE), 8, III
Proper Shipping Name (DOT): Corrosive liquid, basic, organic, n.o.s. (SIVATE™ E610: ENHANCED AMINE FUNCTIONAL SILANE)
Class (DOT): 8 - Class 8 - Corrosive material 49 CFR 173.136
Packing group (DOT): III - Minor Danger
Hazard labels (DOT): 8 - Corrosive

DOT Packaging Non Bulk (49 CFR 173.xxx): 203
DOT Packaging Bulk (49 CFR 173.xxx): 241
DOT Packaging Exceptions (49 CFR 173.xxx): 154
DOT Symbols: G - Identifies PSN requiring a technical name
14.3. Additional information

Emergency Response Guide (ERG) Number : 153
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.
DOT Vessel Stowage Other : 40 - Stow “clear of living quarters”, 52 - Stow “separated from” acids

Air transport
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 5 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 60 L

SECTION 15: Regulatory information

15.1. US Federal regulations
Contains chemical(s) subject to TSCA 12b export notification if product is shipped outside the U.S

| 1,2-Bis(triethoxysilyl)ethane | CAS-No. 16068-37-4 | 20 - 25% |

3-Aminopropyltriethoxysilane (919-30-2)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Bis(3-triethoxysilyl)propyl)amine (13497-18-2)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

1,2-Bis(triethoxysilyl)ethane (16068-37-4)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

EPA TSCA Regulatory Flag
S - S - indicates a substance that is identified in a final Significant New Use Rule.

15.2. International regulations

CANADA
3-Aminopropyltriethoxysilane (919-30-2)
Listed on the Canadian DSL (Domestic Substances List)

WHMIS Classification
Class E - Corrosive Material

Bis(3-triethoxysilyl)propyl)amine (13497-18-2)
Listed on the Canadian NDSL (Non-Domestic Substances List)

1,2-Bis(triethoxysilyl)ethane (16068-37-4)
Listed on the Canadian NDSL (Non-Domestic Substances List)

EU-Regulations
3-Aminopropyltriethoxysilane (919-30-2)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Bis(3-triethoxysilyl)propyl)amine (13497-18-2)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

1,2-Bis(triethoxysilyl)ethane (16068-37-4)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

National regulations
3-Aminopropyltriethoxysilane (919-30-2)
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 Japanese ENCS (Existing & New Chemical Substances) inventory
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 INSQ (Mexican National Inventory of Chemical Substances)
Listed on CICR (Turkish Inventory and Control of Chemicals)

Bis(3-triethoxysilyl)propyl)amine (13497-18-2)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
1,2-Bis(triethoxysilyl)ethane (16068-37-4)
Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on the IECS (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the Japanese ISHL (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)

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

SECTION 16: Other information

Full text of H-phrases:

<table>
<thead>
<tr>
<th>H227</th>
<th>Combustible liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>H301</td>
<td>Toxic if swallowed</td>
</tr>
<tr>
<td>H302</td>
<td>Harmful if swallowed</td>
</tr>
<tr>
<td>H312</td>
<td>Harmful in contact with skin</td>
</tr>
<tr>
<td>H314</td>
<td>Causes severe skin burns and eye damage</td>
</tr>
<tr>
<td>H318</td>
<td>Causes serious eye damage</td>
</tr>
<tr>
<td>H320</td>
<td>Causes eye irritation</td>
</tr>
<tr>
<td>H335</td>
<td>May cause respiratory irritation</td>
</tr>
</tbody>
</table>

Abbreviations and acronyms:
- Abbreviations: ND: Not Determined; NA: Not Applicable; LD: Lethal Dose; LC: Lethal Concentration; ATE: Acute Toxicity Estimates; H: hour; °: °C unless otherwise stated; mm: millimeters; 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: 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given

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: 11/16/2016               Revision date: 07/08/2019               Version: 1.3

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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