SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form: Substance
Physical state: Liquid
Substance name: 2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE
Product code: SIE4670.0
Formula: C11H22O4Si
Synonyms: (2-TRIMETHOXYSILYLETHYL)CYCLOHEXYLOXIRANE
Chemical family: ORGANOMETHOXYSILANE

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses
Use of the substance/mixture: Chemical intermediate

1.2.2. Use advised against
No additional information available

1.3. Details of the supplier of the safety data sheet

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

GELEST INC.
Fritz-Klatte-Strasse 8
65933 Frankfurt
Germany
T +49 (0) 69 3535106-500 - F +49 (0) 69 3535106-501 - (M-F): 8:00 AM - 4:00 PM
info@gelestde.com - www.gelestde.com

1.4. Emergency telephone number

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

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

- Serious eye damage/eye irritation, Category 2: H319
- Germ cell mutagenicity, Category 2: H341
- Carcinogenicity, Category 2: H351

Full text of H statements: see section 16

2.2. Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP): GHS07, GHS08

Signal word (CLP): Warning

2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE
Safety Data Sheet

Precautionary statements (CLP)
- P280 - Wear protective gloves/protective clothing/eye protection/face protection.
- P201 - Obtain special instructions before use.
- P202 - Do not handle until all safety precautions have been read and understood.
- P264 - Wash hands thoroughly after handling.
- P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P308+P313 - IF exposed or concerned: Get medical advice/attention.

2.3. Other hazards
No additional information available

SECTION 3: Composition/information on ingredients
3.1. Substances

<table>
<thead>
<tr>
<th>Substance type</th>
<th>Name</th>
<th>CAS-No.</th>
<th>EC-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-constituent</td>
<td>2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE</td>
<td>3388-04-3</td>
<td>222-217-1</td>
</tr>
</tbody>
</table>

Specific concentration limits:

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>Specific concentration limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methanol</td>
<td>(CAS-No.) 67-56-1 (EC-No.) 200-659-6 (EC Index-No.) 603-001-00-X</td>
<td>(3 =&lt;C &lt; 10) STOT SE 2, H371 (10 =&lt;C &lt; 100) STOT SE 1, H370</td>
</tr>
</tbody>
</table>

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.

First-aid measures after inhalation: Remove person to fresh air and keep comfortable for breathing. If you feel unwell, seek medical advice.

First-aid measures after skin contact: Wash with plenty of water/….

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, both acute and delayed

Symptoms/effects after inhalation: May cause irritation to the respiratory tract. Overexposure may cause: Cough. Headache. Nausea.

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

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

Symptoms/effects after ingestion: Oral toxicity is associated with methanol, the solvent and a hydrolysis product which causes nausea, vomiting, headache, visual effects including blindness.

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. Indication of any immediate medical attention and special treatment needed

NOTE TO PHYSICIAN: This product reacts with water in the acid contents of the stomach to form methanol. The combination of visual disturbances, metabolic acidosis and formic acid in urine is evidence of methanol poisoning. The therapeutic intravenous administration of ethanol (10 mls/hour) allows methanol to be preferentially oxidized and reduces production of methanol metabolites. Acidosis must be treated with
intravenous administration of sodium bicarbonate and methanol elimination may be increased by hemodialysis, as indicated. Treatment should be based on blood methanol levels and acid-base balance.

SECTION 5: Firefighting measures

5.1. Extinguishing media

5.2. Special hazards arising from the substance or mixture
Fire hazard: Irritating fumes and organic acid vapors may develop when material is exposed to elevated temperatures or open flame.

5.3. Advice for firefighters
Firefighting instructions: Use water spray to cool exposed surfaces. 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 vapour and mist.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel
Emergency procedures: Evacuate unnecessary personnel.

6.1.2. For emergency responders
Protective equipment: Equip cleanup crew with proper 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
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.

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
Precautions for safe handling: Avoid all eye and skin contact and do not breathe vapour and mist. Provide good ventilation in process area to prevent formation of vapour.
Hygiene measures: Wash hands thoroughly after handling. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities
Storage conditions: Keep container tightly closed.
Storage area: Store in a well-ventilated place. Store away from heat.

7.3. Specific end use(s)
No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th></th>
<th>EU IOELV TWA (mg/m³)</th>
<th>260 mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
<td>EU IOELV TWA (ppm)</td>
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<td>Austria</td>
<td>MAK (mg/m³)</td>
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<tr>
<td>Austria</td>
<td>MAK (ppm)</td>
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</tr>
<tr>
<td>Austria</td>
<td>MAK Short time value (mg/m³)</td>
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<tr>
<td>Austria</td>
<td>MAK Short time value (ppm)</td>
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<tr>
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<td>Limit value (ppm)</td>
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<td>Belgium</td>
<td>Short time value (mg/m³)</td>
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</tr>
<tr>
<td>Cyprus</td>
<td>OEL TWA (mg/m³)</td>
<td>260 mg/m³</td>
</tr>
<tr>
<td>Cyprus</td>
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<td>Exposure Limit</td>
<td>Concentration</td>
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<td>-------------------------</td>
<td>-----------------------------------------------------</td>
<td>----------------</td>
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<td>NIOSH REL (STEL) (mg/m³)</td>
<td>325 mg/m³</td>
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<td>NIOSH REL (STEL) (ppm)</td>
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<td>OSHA PEL (TWA) (mg/m³)</td>
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<td>KZGW (mg/m³)</td>
<td>1040 mg/m³</td>
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<td>KZGW (ppm)</td>
<td>800 ppm</td>
</tr>
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<td>MAK (mg/m³)</td>
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</tr>
<tr>
<td>Switzerland</td>
<td>MAK (ppm)</td>
<td>200 ppm</td>
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<td>Netherlands</td>
<td>Grenswaarde TGG 8H (mg/m³)</td>
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<td>WEL STEL (mg/m³)</td>
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<td>United Kingdom</td>
<td>WEL STEL (ppm)</td>
<td>250 ppm</td>
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<td>Czech Republic</td>
<td>Exposition limit (PEL) (mg/m³)</td>
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<td>Denmark</td>
<td>Grænseværdie (langvarig) (mg/m³)</td>
<td>260 mg/m³</td>
</tr>
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<td>Denmark</td>
<td>Grænseværdie (langvarig) (ppm)</td>
<td>200 ppm</td>
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<tr>
<td>Finland</td>
<td>HTP-arvo (8h) (mg/m³)</td>
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<td>HTP-arvo (8h) (ppm)</td>
<td>200 ppm</td>
</tr>
<tr>
<td>Finland</td>
<td>HTP-arvo (15 min)</td>
<td>330 mg/m³</td>
</tr>
<tr>
<td>Hungary</td>
<td>AK-érték</td>
<td>260 mg/m³</td>
</tr>
<tr>
<td>Ireland</td>
<td>OEL (8 hours ref) (mg/m³)</td>
<td>260 mg/m³</td>
</tr>
<tr>
<td>Ireland</td>
<td>OEL (8 hours ref) (ppm)</td>
<td>200 ppm</td>
</tr>
<tr>
<td>Ireland</td>
<td>OEL (15 min ref) (mg/m3)</td>
<td>780 mg/m³</td>
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<tr>
<td>Ireland</td>
<td>OEL (15 min ref) (ppm)</td>
<td>600 ppm</td>
</tr>
</tbody>
</table>
8.2. Exposure controls

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

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:
NIOSH-certified organic vapor (black cartridge) respirator.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state: Liquid
Appearance: Clear liquid.
2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE
Safety Data Sheet

Molecular mass : 246.38 g/mol
Colour : Straw.
Odour : Mild.
Odour threshold : No data available
Refractive index : 1.449
pH : No data available
Relative evaporation rate (butylacetate=1) : No data available
Melting point : No data available
Freezing point : < 0 °C
Boiling point : 95 - 97 °C @ 0.25 mm Hg
Flash point : 146 °C
Auto-ignition temperature : No data available
Decomposition temperature : No data available
Flammability (solid, gas) : No data available
Vapour pressure : 10 mm Hg @ 152°C
Relative vapour density at 20 °C : > 1
Relative density : 1.065
Solubility : Reacts with water.
Log Pow : No data available
Log Kow : No data available
Viscosity, kinematic : 5.2 cSt
Viscosity, dynamic : No data available
Explosive properties : No data available
Oxidising properties : No data available
Explosive limits : No data available

9.2. Other information
No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity
Can react exothermically with amines.

10.2. Chemical stability
Stable in sealed containers.

10.3. Possibility of hazardous reactions
Reacts with water and moisture in air, liberating methanol. Can polymerize (non-hazardous) in the presence of weak acids.

10.4. Conditions to avoid
Heat. Open flame. Sparks.

10.5. Incompatible materials
Amines. Moisture. Water :

10.6. Hazardous decomposition products
Methanol. Organic acid vapors.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Acute toxicity : Not classified

2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE (3388-04-3)

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 oral rat</td>
<td>8 ml/kg</td>
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Methanol (67-56-1)

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 inhalation rat (ppm)</td>
<td>22500 ppm (Exposure time: 8 h)</td>
</tr>
<tr>
<td>ATE CLP (oral)</td>
<td>100 mg/kg bodyweight</td>
</tr>
<tr>
<td>ATE CLP (dermal)</td>
<td>300 mg/kg bodyweight</td>
</tr>
<tr>
<td>ATE CLP (vapours)</td>
<td>3 mg/l/4h</td>
</tr>
</tbody>
</table>

2-(3,4-Epoxycyclohexyl)ethyltrimethoxysilane (3388-04-3)

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 oral rat</td>
<td>12300 mg/kg</td>
</tr>
<tr>
<td>ATE CLP (oral)</td>
<td>12300 mg/kg bodyweight</td>
</tr>
</tbody>
</table>
2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE
Safety Data Sheet

Skin corrosion/irritation: Not classified
Skin irritation - rabbit: 500 mg open: mild irritant effect

Serious eye damage/irritation: Causes serious eye irritation.

Respiratory or skin sensitisation: Not classified

Germ cell mutagenicity: Suspected of causing genetic defects.

Carcinogenicity: Suspected of causing cancer.

Epoxycyclohexyltrimethoxysilane has been found to be mutagenic in Ames in vitro screening, sister chromatid exchange test in mouse lymphoma cells, unscheduled DNA synthesis in human WI-38 cells, and a forward gene mutation assay in mouse lymphoma cells.

Reproductive toxicity: Not classified

STOT-single exposure: Not classified

STOT-repeated exposure: Not classified

Aspiration hazard: Not classified

Symptoms/effects after inhalation: May cause irritation to the respiratory tract. Overexposure may cause: Cough. Headache. Nausea.

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

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

Symptoms/effects after ingestion: Oral toxicity is associated with methanol, the solvent and a hydrolysis product which causes nausea, vomiting, headache, visual effects including blindness.

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

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic toxicity: Not classified

Chronic aquatic toxicity: Not classified

Methanol (67-56-1)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 fish 1</td>
<td>28200 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])</td>
</tr>
<tr>
<td>LC50 fish 2</td>
<td>&gt; 100 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])</td>
</tr>
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12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

Methanol (67-56-1)

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>BCF fish 1</td>
<td>&lt; 10</td>
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<tr>
<td>Log Pow</td>
<td>-0.77</td>
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</tbody>
</table>

12.4. Mobility in soil

No additional information available

12.5. Results of PBT and vPvB assessment

No additional information available

12.6. Other adverse effects

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

SECTION 13: Disposal considerations

13.1. Waste treatment methods

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

Ecology - waste materials: Avoid release to the environment.

SECTION 14: Transport information

14.1. UN number

In accordance with ADR / RID / IMDG / IATA / ADN

14.1. UN number

UN-No. (ADR): Not applicable
UN-No. (IMDG): Not applicable
### 2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE
Safety Data Sheet

#### UN-No. (IATA)
: Not applicable

#### UN-No. (ADN)
: Not applicable

#### UN-No. (RID)
: Not applicable

#### 14.2. UN proper shipping name
| Proper Shipping Name (ADR) | Not applicable |
| Proper Shipping Name (IMDG) | Not applicable |
| Proper Shipping Name (IATA) | Not applicable |
| Proper Shipping Name (ADN) | Not applicable |
| Proper Shipping Name (RID) | Not applicable |

#### 14.3. Transport hazard class(es)

| ADR | Transport hazard class(es) (ADR) | Not applicable |
| IMDG | Transport hazard class(es) (IMDG) | Not applicable |
| IATA | Transport hazard class(es) (IATA) | Not applicable |
| ADN | Transport hazard class(es) (ADN) | Not applicable |
| RID | Transport hazard class(es) (RID) | Not applicable |

#### 14.4. Packing group

| Packing group (ADR) | Not applicable |
| Packing group (IMDG) | Not applicable |
| Packing group (IATA) | Not applicable |
| Packing group (ADN) | Not applicable |
| Packing group (RID) | Not applicable |

#### 14.5. Environmental hazards

| Dangerous for the environment | No |
| Marine pollutant | No |
| Other information | No supplementary information available |

#### 14.6. Special precautions for user

- **Overland transport**
  No data available

- **Transport by sea**
  No data available

- **Air transport**
  No data available

- **Inland waterway transport**
  No data available

- **Rail transport**
  No data available

#### 14.7. Transport in bulk according to Annex II of Marpol and the IBC Code
Not applicable

### SECTION 15: Regulatory information

#### 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

#### 15.1.1. EU-Regulations
No REACH Annex XVII restrictions

2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE is not on the REACH Candidate List
2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE

Safety Data Sheet

2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE is not on the REACH Annex XIV List
2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE is not subject to REGULATION (EU) No 649/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 concerning the export and import of hazardous chemicals.

15.1.2. National regulations

Germany
12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV 

Netherlands
SZW-lijst van kankerverwekkende stoffen
SZW-lijst van mutagene stoffen
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling

Denmark
Danish National Regulations
Young people below the age of 18 years are not allowed to use the product
Pregnant/breastfeeding women working with the product must not be in direct contact with the product
The requirements from the Danish Working Environment Authorities regarding work with carcinogens must be followed during use and disposal

15.2. Chemical safety assessment

No additional information available

SECTION 16: Other information

Abbreviations and acronyms:

<table>
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<th>Abbreviations:</th>
<th>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</th>
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</table>

Other information 
Prepared by safety and environmental affairs.

Full text of H- and EUH-statements:

| Acute Tox. 3 (Dermal) | Acute toxicity (dermal), Category 3 |
| Acute Tox. 3 (Inhalation:vapour) | Acute toxicity (inhalation:vapour) Category 3 |
| Acute Tox. 3 (Oral) | Acute toxicity (oral), Category 3 |
| Carc. 2 | Carcinogenicity, Category 2 |
| Eye Irrit. 2 | Serious eye damage/eye irritation, Category 2 |
| Flam. Liq. 2 | Flammable liquids, Category 2 |
| Muta. 2 | Germ cell mutagenicity, Category 2 |
| STOT SE 1 | Specific target organ toxicity — single exposure, Category 1 |
| STOT SE 2 | Specific target organ toxicity — Single exposure, Category 2 |
| H225 | Highly flammable liquid and vapour. |
| H301 | Toxic if swallowed |
| H311 | Toxic in contact with skin. |
| H319 | Causes serious eye irritation. |
| H331 | Toxic if inhaled. |
| H341 | Suspected of causing genetic defects. |
| H351 | Suspected of causing cancer. |
| H370 | Causes damage to organs. |
| H371 | May cause damage to organs. |
2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE
Safety Data Sheet

SDS EU (REACH Annex II) - Custom

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