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

1.1. Product identifier

<table>
<thead>
<tr>
<th>Product form</th>
<th>: Substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>: Liquid</td>
</tr>
<tr>
<td>Substance name</td>
<td>: (2-DICYCLOHEXYLPHOSPHINOETHYL)TRIETHOXYLSILANE</td>
</tr>
<tr>
<td>Product code</td>
<td>: SID3385.0</td>
</tr>
<tr>
<td>Formula</td>
<td>: C20H41O3PSi</td>
</tr>
<tr>
<td>Synonyms</td>
<td>: 3-(TRIETHOXYSYLETHYL)DICYCLOHEXYLPHOSPHINE</td>
</tr>
<tr>
<td>Chemical family</td>
<td>: ORGANOSILANE</td>
</tr>
</tbody>
</table>

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. Uses 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@geleste.com - www.geleste.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]

<table>
<thead>
<tr>
<th>Classification</th>
<th>H319</th>
<th>H335</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious eye damage/eye irritation, Category 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Full text of H statements : see section 16

Adverse physicochemical, human health and environmental effects

No additional information available

2.2. Label elements

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

Hazard pictograms (CLP)

<table>
<thead>
<tr>
<th>Signal word (CLP)</th>
<th>: Warning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard statements (CLP)</td>
<td>: H319 - Causes serious eye irritation. H335 - May cause respiratory irritation.</td>
</tr>
<tr>
<td>Precautionary statements (CLP)</td>
<td>: P280 - Wear protective gloves/protective clothing/eye protection/face protection.</td>
</tr>
</tbody>
</table>
P261 - Avoid breathing vapours.
P264 - Wash hands thoroughly after handling.
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.

2.3. Other hazards

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.

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>(2-DICYCLOHEXYLPHOSPHINOETHYL)TRIETHOXYSILANE</td>
<td>55289-47-9</td>
</tr>
</tbody>
</table>

Full text of 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.

First-aid measures after inhalation: Remove person to fresh air and keep comfortable for breathing. Get medical advice/attention if you feel unwell.

First-aid measures after skin contact: Wash with plenty of 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, both acute and delayed

Symptoms/effects after inhalation: May cause respiratory irritation.
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 ethanol 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 ethanol.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Unsuitable extinguishing media: Do not use straight streams.

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: 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 vapour and mist.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

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.

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. Use only outdoors or in a well-ventilated area.
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. Store locked up.
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
No additional information available

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:
Where exposure through inhalation may occur from use, respiratory protection equipment is recommended. NIOSH-certified combination organic vapor - amine gas (brown cartridge) respirator.
(2-DICYCLOHEXYLPHOSPHINOETHYL)TRIETHOXYSILANE
Safety Data Sheet

<table>
<thead>
<tr>
<th>SECTION 9: Physical and chemical properties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>9.1. Information on basic physical and chemical properties</strong></td>
</tr>
<tr>
<td>Physical state: Liquid</td>
</tr>
<tr>
<td>Appearance: Clear liquid.</td>
</tr>
<tr>
<td>Molecular mass: 388.6 g/mol</td>
</tr>
<tr>
<td>Colour: Straw.</td>
</tr>
<tr>
<td>Odour: Mild.</td>
</tr>
<tr>
<td>Odour threshold: No data available</td>
</tr>
<tr>
<td>Refractive index: 1.4811</td>
</tr>
<tr>
<td>pH: No data available</td>
</tr>
<tr>
<td>Relative evaporation rate (butylacetate=1): No data available</td>
</tr>
<tr>
<td>Melting point: No data available</td>
</tr>
<tr>
<td>Freezing point: &lt; 0 °C</td>
</tr>
<tr>
<td>Boiling point: 140 °C @ 0.03 mm Hg</td>
</tr>
<tr>
<td>Flash point: &gt; 135 °C</td>
</tr>
<tr>
<td>Auto-ignition temperature: No data available</td>
</tr>
<tr>
<td>Decomposition temperature: No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas): No data available</td>
</tr>
<tr>
<td>Vapour pressure: &lt; 0.1 mm Hg @ 25°C</td>
</tr>
<tr>
<td>Relative vapour density at 20 °C: No data available</td>
</tr>
<tr>
<td>Relative density: 0.979</td>
</tr>
<tr>
<td>Solubility: Reacts with water.</td>
</tr>
<tr>
<td>Log Pow: No data available</td>
</tr>
<tr>
<td>Log Kow: No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic: No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic: No data available</td>
</tr>
<tr>
<td>Explosive properties: No data available</td>
</tr>
<tr>
<td>Oxidising properties: No data available</td>
</tr>
<tr>
<td>Explosive limits: No data available</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>9.2. Other information</th>
</tr>
</thead>
<tbody>
<tr>
<td>No additional information available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECTION 10: Stability and reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10.1. Reactivity</strong></td>
</tr>
<tr>
<td>No additional information available</td>
</tr>
</tbody>
</table>

| **10.2. Chemical stability** |
| Stable in sealed containers stored under an inert atmosphere. |

| **10.3. Possibility of hazardous reactions** |
| Reacts 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. |

<table>
<thead>
<tr>
<th>SECTION 11: Toxicological information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>11.1. Information on toxicological effects</strong></td>
</tr>
<tr>
<td>Acute toxicity: Not classified</td>
</tr>
<tr>
<td>Skin corrosion/irritation: Not classified</td>
</tr>
<tr>
<td>Serious eye damage/irritation: Causes serious eye irritation.</td>
</tr>
<tr>
<td>Respiratory or skin sensitisation: Not classified</td>
</tr>
<tr>
<td>Germ cell mutagenicity: Not classified</td>
</tr>
<tr>
<td>Carcinogenicity: Not classified</td>
</tr>
<tr>
<td>Reproductive toxicity: Not classified</td>
</tr>
</tbody>
</table>
**STOT-single exposure**: May cause respiratory irritation.

**STOT-repeated exposure**: Not classified

**Aspiration hazard**: Not classified

**Potential adverse human health effects and symptoms**: This material slowly generates ethanol on contact with water and moisture in living tissues. Material generates ethanol on contact with water or moisture in skin, eyes and mucous membranes and has an irritating, dehydrating effect on overexposed tissue.

**Symptoms/effects after inhalation**: May cause respiratory irritation.

**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 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

- **Acute aquatic toxicity**: Not classified
- **Chronic aquatic toxicity**: Not classified

#### 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. 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

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

- **Product/Packaging disposal recommendations**: 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
- **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**: 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:
  Not applicable
- Transport by sea:
  Not applicable
- Air transport:
  Not applicable
- Inland waterway transport:
  Not applicable
- Rail transport:
  Not applicable

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-DICYCLOHEXYLPHOSPHINOETHYL)TRIETHOXYSILANE is not on the REACH Candidate List
(2-DICYCLOHEXYLPHOSPHINOETHYL)TRIETHOXYSILANE is not on the REACH Annex XIV List
(2-DICYCLOHEXYLPHOSPHINOETHYL)TRIETHOXYSILANE 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 : Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

Netherlands
SZW-list van kankerverwekkende stoffen : The substance is not listed
(2-DICYCLOHEXYLPHOSPHINOETHYL)TRIETHOXYSILANE
Safety Data Sheet

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

Other information
Prepared by safety and environmental affairs.

Full text of H- and EUH-statements:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Irrit. 2</td>
<td>Serious eye damage/eye irritation, Category 2</td>
</tr>
<tr>
<td>STOT SE 3</td>
<td>Specific target organ toxicity — Single exposure, Category 3. Respiratory tract irritation</td>
</tr>
<tr>
<td>H319</td>
<td>Causes serious eye irritation.</td>
</tr>
<tr>
<td>H335</td>
<td>May cause respiratory irritation.</td>
</tr>
</tbody>
</table>

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