

(5-BICYCLO[2.2.1]HEPT-2-ENYL)TRIETHOXSILANE

Safety Data Sheet SIB0992.0

Date of issue: 08/06/2015 Version: 1.0

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1. Product identifier**

| | |
|-----------------|--|
| Product form | : Substance |
| Physical state | : Liquid |
| Substance name | : (5-BICYCLO[2.2.1]HEPT-2-ENYL)TRIETHOXSILANE |
| Product code | : SIB0992.0 |
| Formula | : C ₁₃ H ₂₄ O ₃ Si |
| Synonyms | : NORBORNENYLTRIETHOXSILANE; 5-TRIETHOXSILYLBICYCLO[2.2.1]HEPT-2-ENE |
| Chemical family | : ORGANOETHOXSILANE |

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

| | |
|------------------------------|---|
| Use of the substance/mixture | : Chemical intermediate For research and industrial use only |
|------------------------------|---|

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**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 (GHS-US)**

Eye Irrit. 2A H319

Full text of H-phrases: see section 16

2.2. Label elements**GHS-US labeling**

Hazard pictograms (GHS-US)



GHS07

| | |
|-----------------------------------|---|
| Signal word (GHS-US) | : Warning |
| Hazard statements (GHS-US) | : H319 - Causes serious eye irritation |
| Precautionary statements (GHS-US) | : P280 - Wear protective gloves/protective clothing/eye protection/face protection 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 P337+P313 - If eye irritation persists: Get medical advice/attention |

2.3. Other hazards

| | |
|--|---|
| Other hazards not contributing to the classification | : 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. This product contains ethanol which is classified as a carcinogen by IARC in alcoholic beverages. |
|--|---|

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/information on ingredients**3.1. Substance**

| | |
|----------------|---|
| Substance type | : Mono-constituent |
| Name | : (5-BICYCLO[2.2.1]HEPT-2-ENYL)TRIETHOXSILANE |
| CAS No | : 18401-43-9 |

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EC no : 242-278-8

| Name | Product identifier | % | Classification (GHS-US) |
|--|---------------------|------|--|
| 5-Triethoxysilylbicyclo[2.2.1]hept-2-ene | (CAS No) 18401-43-9 | > 95 | Eye Irrit. 2A, H319 |
| Ethanol | (CAS No) 64-17-5 | | Flam. Liq. 2, H225 Carc. 1A, H350 STOT SE 3, H335 Aquatic Acute 2, H401 |

3.2. Mixture

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 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. |
| 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/injuries after inhalation | : May cause irritation to the respiratory tract. Overexposure may cause: Coughing. Headache. Nausea. |
| Symptoms/injuries after skin contact | : May cause skin irritation. |
| Symptoms/injuries after eye contact | : Causes serious eye irritation. |
| Symptoms/injuries after ingestion | : May be harmful if swallowed. |

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

| | |
|--------------------------------|--|
| Suitable extinguishing media | : Water spray. Foam. Carbon dioxide. Dry chemical. |
| Unsuitable extinguishing media | : None known. |

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 vapor 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

| | |
|-------------------------|---|
| 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.

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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 vapor and mist. Provide good ventilation in process area to prevent accumulation of vapors.
- 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

- Storage conditions : Keep container tightly closed.
- Incompatible materials : Moisture. Water.
- 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

| Ethanol (64-17-5) | | |
|-------------------|--------------------------------------|------------------------|
| USA ACGIH | ACGIH STEL (ppm) | 1000 ppm |
| USA NIOSH | NIOSH REL (TWA) (mg/m ³) | 1900 mg/m ³ |
| USA NIOSH | NIOSH REL (TWA) (ppm) | 1000 ppm |
| USA OSHA | OSHA PEL (TWA) (mg/m ³) | 1900 mg/m ³ |
| USA OSHA | OSHA PEL (TWA) (ppm) | 1000 ppm |
| USA IDLH | US IDLH (ppm) | 3300 ppm (10% LEL) |

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 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.
- Molecular mass : 256.42 g/mol
- Color : Straw.
- Odor : Mild.
- Odor threshold : No data available
- Refractive index : 1.4486
- pH : No data available
- Relative evaporation rate (butyl acetate=1) : No data available
- Melting point : No data available
- Freezing point : < 0 °C
- Boiling point : 106 - 108 °C @ 8 mm Hg
- Flash point : 98 °C
- Auto-ignition temperature : No data available
- Decomposition temperature : No data available
- Flammability (solid, gas) : No data available
- Vapor pressure : < 1 mm Hg @ 25°C
- Relative vapor density at 20 °C : > 1
- Relative density : 0.96
- Solubility : Insoluble in water. Reacts with water.
- Log Pow : No data available
- Log Kow : No data available

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| | |
|----------------------|---------------------|
| Viscosity, kinematic | : No data available |
| Viscosity, dynamic | : No data available |
| Explosive properties | : No data available |
| Oxidizing properties | : No data available |
| Explosion limits | : No data available |

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 in sealed containers.

10.3. Possibility of hazardous reactions

Reacts with water and moisture in air, liberating ethanol.

10.4. Conditions to avoid

Heat. Open flame. Sparks.

10.5. Incompatible materials

Moisture. Water.

10.6. Hazardous decomposition products

Ethanol. Organic acid vapors.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

| Ethanol (64-17-5) | |
|----------------------------|----------------------------|
| LD50 oral rat | 7060 mg/kg |
| LC50 inhalation rat (mg/l) | 124.7 mg/l/4h |
| ATE US (oral) | 7060.000 mg/kg body weight |
| ATE US (vapors) | 124.700 mg/l/4h |
| ATE US (dust, mist) | 124.700 mg/l/4h |

| | |
|-----------------------------------|----------------------------------|
| Skin corrosion/irritation | : Not classified |
| Serious eye damage/irritation | : Causes serious eye irritation. |
| Respiratory or skin sensitization | : Not classified |
| Germ cell mutagenicity | : Not classified |
| Carcinogenicity | : Not classified |

| Ethanol (64-17-5) | |
|-------------------|----------------------------|
| IARC group | 1 - Carcinogenic to humans |

| | |
|---|--|
| Reproductive toxicity | : Not classified |
| Specific target organ toxicity (single exposure) | : Not classified |
| Specific target organ toxicity (repeated exposure) | : Not classified |
| Aspiration hazard | : Not classified |
| Potential Adverse human health effects and symptoms | : This compound liberates ethanol on contact with moisture. |
| Symptoms/injuries after inhalation | : May cause irritation to the respiratory tract. Overexposure may cause: Coughing. Headache. Nausea. |
| Symptoms/injuries after skin contact | : May cause skin irritation. |
| Symptoms/injuries after eye contact | : Causes serious eye irritation. |
| Symptoms/injuries after ingestion | : May be harmful if swallowed. |
| Reason for classification | : Expert judgment |

SECTION 12: Ecological information

12.1. Toxicity

| Ethanol (64-17-5) | |
|-------------------|--|
| LC50 fish 1 | 12.0 - 16.0 ml/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [static]) |
| EC50 Daphnia 1 | 9268 - 14221 mg/l (Exposure time: 48 h - Species: Daphnia magna) |

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Ethanol (64-17-5)

| | |
|----------------|--|
| LC50 fish 2 | > 100 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static]) |
| EC50 Daphnia 2 | 2 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static]) |

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

Ethanol (64-17-5)

| | |
|---------|-------|
| Log Pow | -0.32 |
|---------|-------|

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 ozone layer | : No additional information available |
| Effect on the global warming | : No known ecological damage caused by this product. |

SECTION 13: Disposal considerations

13.1. Waste treatment methods

| | |
|--------------------------------|---|
| Waste disposal recommendations | : May be incinerated. 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

Not regulated for transport.

14.2. UN proper shipping name

Not applicable

14.3. Additional information

Other information : No supplementary information available.

Transport by sea

No additional information available

Air transport

No additional information available

SECTION 15: Regulatory information

15.1. US Federal regulations

5-Triethoxysilylbicyclo[2.2.1]hept-2-ene (18401-43-9)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Ethanol (64-17-5)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

5-Triethoxysilylbicyclo[2.2.1]hept-2-ene (18401-43-9)

Listed on the Canadian NDSL (Non-Domestic Substances List)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

Ethanol (64-17-5)

Listed on IARC (International Agency for Research on Cancer)
Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on the Canadian DSL (Domestic Substances List)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
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 the Canadian IDL (Ingredient Disclosure List)
Listed on INSQ (Mexican national Inventory of Chemical Substances)
Listed on Turkish inventory of chemical

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15.3. US State regulations

| (5-BICYCLO[2.2.1]HEPT-2-ENYL)TRIETHOXYSilANE(18401-43-9) | |
|---|----|
| U.S. - California - Proposition 65 - Carcinogens List | No |
| U.S. - California - Proposition 65 - Developmental Toxicity | No |
| U.S. - California - Proposition 65 - Reproductive Toxicity - Female | No |
| U.S. - California - Proposition 65 - Reproductive Toxicity - Male | No |

| 5-Triethoxysilylbicyclo[2.2.1]hept-2-ene (18401-43-9) | | | | |
|---|---|---|---|-----------------------------------|
| U.S. - California - Proposition 65 - Carcinogens List | U.S. - California - Proposition 65 - Developmental Toxicity | U.S. - California - Proposition 65 - Reproductive Toxicity - Female | U.S. - California - Proposition 65 - Reproductive Toxicity - Male | No significance risk level (NSRL) |
| No | No | No | No | |

| Ethanol (64-17-5) | | | | |
|---|---|---|---|-----------------------------------|
| U.S. - California - Proposition 65 - Carcinogens List | U.S. - California - Proposition 65 - Developmental Toxicity | U.S. - California - Proposition 65 - Reproductive Toxicity - Female | U.S. - California - Proposition 65 - Reproductive Toxicity - Male | No significance risk level (NSRL) |
| Yes | Yes | No | No | |

SECTION 16: Other information

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.

Full text of H-phrases::

| | |
|-----------------|--|
| Aquatic Acute 2 | Hazardous to the aquatic environment - Acute Hazard Category 2 |
| Carc. 1A | Carcinogenicity Category 1A |
| Eye Irrit. 2A | Serious eye damage/eye irritation Category 2A |
| Flam. Liq. 2 | Flammable liquids Category 2 |
| STOT SE 3 | Specific target organ toxicity (single exposure) Category 3 |
| H225 | Highly flammable liquid and vapor |
| H319 | Causes serious eye irritation |
| H335 | May cause respiratory irritation |
| H350 | May cause cancer |
| H401 | Toxic to aquatic life |

HMIS III Rating

Health : 2 Moderate Hazard - Temporary or minor injury may occur
Flammability : 2 Moderate Hazard
Physical : 1 Slight Hazard

Prepared by safety and environmental affairs.

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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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Safety Data Sheet

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