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

Safety Data Sheet SIB0992.0

Date of issue: 06/08/2015 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)TRIETHOXYSILANE
Product code	:	SIB0992.0
Formula	:	C13H24O3Si
Synonyms	:	NORBORNENYLTRIETHOXYSILANE; 5-TRIETHOXYSILYLBICYCLO[2.2.1]HEPT-2-ENE
Chemical family	:	ORGANOETHOXYSILANE

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@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

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) :

GHS07

Signal word (CLP) : Warning

Hazard statements (CLP) : H319 - Causes serious eye irritation.

Precautionary statements (CLP) : 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.

SECTION 3: Composition/information on ingredients

3.1. Substances

Substance type : Mono-constituent

Name : (5-BICYCLO[2.2.1]HEPT-2-ENYL)TRIETHOXYSILANE

CAS-No. : 18401-43-9

EC-No. : 242-278-8

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
5-Triethoxysilylbicyclo[2.2.1]hept-2-ene	(CAS-No.) 18401-43-9 (EC-No.) 242-278-8	> 95	Eye Irrit. 2, H319
Ethanol	(CAS-No.) 64-17-5 (EC-No.) 200-578-6 (EC Index-No.) 603-002-00-5		Flam. Liq. 2, H225

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. 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 : 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 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

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 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)		
Austria	MAK (mg/m³)	1900 mg/m³
Austria	MAK (ppm)	1000 ppm
Austria	MAK Short time value (mg/m³)	3800 mg/m³
Austria	MAK Short time value (ppm)	2000 ppm
Belgium	Limit value (mg/m³)	1907 mg/m³
Belgium	Limit value (ppm)	1000 ppm
Bulgaria	OEL TWA (mg/m³)	1000 mg/m³
France	VLE (mg/m³)	9500 mg/m³
France	VLE (ppm)	5000 ppm
France	VME (mg/m³)	1900 mg/m³
France	VME (ppm)	1000 ppm
Germany	TRGS 900 Occupational exposure limit value (mg/m³)	960 mg/m³ (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Germany	TRGS 900 Occupational exposure limit value (ppm)	500 ppm (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Greece	OEL TWA (mg/m³)	1900 mg/m³
Greece	OEL TWA (ppm)	1000 ppm
Italy - Portugal - USA ACGIH	ACGIH STEL (ppm)	1000 ppm
Latvia	OEL TWA (mg/m³)	1000 mg/m³
USA IDLH	US IDLH (ppm)	3300 ppm (10% LEL)
USA NIOSH	NIOSH REL (TWA) (mg/m³)	1900 mg/m³
USA NIOSH	NIOSH REL (TWA) (ppm)	1000 ppm
USA OSHA	OSHA PEL (TWA) (mg/m³)	1900 mg/m³

Ethanol (64-17-5)		
USA OSHA	OSHA PEL (TWA) (ppm)	1000 ppm
Spain	VLA-EC (mg/m³)	1910 mg/m³
Spain	VLA-EC (ppm)	1000 ppm
Switzerland	KZGW (mg/m³)	1920 mg/m³
Switzerland	KZGW (ppm)	1000 ppm
Switzerland	MAK (mg/m³)	960 mg/m³
Switzerland	MAK (ppm)	500 ppm
Netherlands	Grenswaarde TGG 8H (mg/m³)	260 mg/m³
Netherlands	Grenswaarde TGG 15MIN (mg/m³)	1900 mg/m³
United Kingdom	WEL TWA (mg/m³)	1920 mg/m³
United Kingdom	WEL TWA (ppm)	1000 ppm
United Kingdom	WEL STEL (mg/m³)	5760 mg/m³ (calculated)
United Kingdom	WEL STEL (ppm)	3000 ppm (calculated)
Czech Republic	Expoziční limity (PEL) (mg/m³)	1000 mg/m³
Denmark	Grænseværdie (langvarig) (mg/m³)	1900 mg/m³
Denmark	Grænseværdie (langvarig) (ppm)	1000 ppm
Finland	HTP-arvo (8h) (mg/m³)	1900 mg/m³
Finland	HTP-arvo (8h) (ppm)	1000 ppm
Finland	HTP-arvo (15 min)	2500 mg/m³
Finland	HTP-arvo (15 min) (ppm)	1300 ppm
Hungary	AK-érték	1900 mg/m³
Hungary	CK-érték	7600 mg/m³
Ireland	OEL (15 min ref) (ppm)	1000 ppm
Lithuania	IPRV (mg/m³)	1000 mg/m³
Lithuania	IPRV (ppm)	500 ppm
Lithuania	TPRV (mg/m³)	1900 mg/m³
Lithuania	TPRV (ppm)	1000 ppm
Norway	Grenseverdier (AN) (mg/m³)	950 mg/m³
Norway	Grenseverdier (AN) (ppm)	500 ppm
Norway	Grenseverdier (Korttidsverdi) (mg/m3)	950 mg/m³
Norway	Grenseverdier (Korttidsverdi) (ppm)	500 ppm
Poland	NDS (mg/m³)	1900 mg/m³
Romania	OEL TWA (mg/m³)	1900 mg/m³
Romania	OEL TWA (ppm)	1000 ppm
Romania	OEL STEL (mg/m³)	9500 mg/m³
Romania	OEL STEL (ppm)	5000 ppm
Slovakia	NPHV (priemerná) (mg/m³)	960 mg/m³
Slovakia	NPHV (priemerná) (ppm)	500 ppm
Slovakia	NPHV (Hraničná) (mg/m³)	1920 mg/m³
Sweden	nivågränsvärde (NVG) (mg/m³)	1000 mg/m³
Sweden	nivågränsvärde (NVG) (ppm)	500 ppm
Sweden	kortidsvärde (KTV) (mg/m³)	1900 mg/m³
Sweden	kortidsvärde (KTV) (ppm)	1000 ppm
Canada (Quebec)	VEMP (mg/m³)	1880 mg/m³
Canada (Quebec)	VEMP (ppm)	1000 ppm
Australia	TWA (mg/m³)	1880 mg/m³
Australia	TWA (ppm)	1000 ppm
Portugal	OEL TWA (ppm)	1000 ppm
Portugal	OEL chemical category (PT)	A4 - Not Classifiable as a Human Carcinogen

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
Colour	:	Straw.
Odour	:	Mild.
Odour threshold	:	No data available
Refractive index	:	1.4486
pH	:	No data available
Relative evaporation rate (butylacetate=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
Vapour pressure	:	< 1 mm Hg @ 25°C
Relative vapour 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
Viscosity, kinematic	:	No data available
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

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
LC50 inhalation rat (ppm)	20000 ppm 10 hrs.
LDLo oral rat	1400 mg/kg (Human)
ATE CLP (oral)	7060 mg/kg bodyweight
ATE CLP (vapours)	124.7 mg/l/4h
ATE CLP (dust,mist)	124.7 mg/l/4h

Skin corrosion/irritation : Not classified

Serious eye damage/irritation : Causes serious eye irritation.

Respiratory or skin sensitisation : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

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

Reproductive toxicity : Not classified

STOT-single exposure : Not classified

STOT-repeated exposure : Not classified

Aspiration hazard : Not classified

Potential adverse human health effects and symptoms : This compound liberates ethanol on contact with moisture.

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 : May be harmful if swallowed.

Reason for classification : Expert judgment

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic toxicity : Not classified

Chronic aquatic toxicity : Not classified

Ethanol (64-17-5)	
LC50 fish 1	> 10000 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [rainbow trout])
LC50 fish 2	> 13400 mg/l (Exposure time: 96 h - Species: Pimephales promelas [fathead minnow])

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. 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.

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

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

(5-BICYCLO[2.2.1]HEPT-2-ENYL)TRIETHOXYSILANE is not on the REACH Candidate List

(5-BICYCLO[2.2.1]HEPT-2-ENYL)TRIETHOXYSILANE is not on the REACH Annex XIV List

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

(5-BICYCLO[2.2.1]HEPT-2-ENYL)TRIETHOXYSILANE is not subject to Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC

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-lijst van kankerverwekkende stoffen	:	The substance is not listed
SZW-lijst van mutagene stoffen	:	The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding	:	The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid	:	The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling	:	The substance is not listed

Denmark

Class for fire hazard	:	Class III-1
Store unit	:	50 liter
Classification remarks	:	Flammable according to the Danish Ministry of Justice; Emergency management guidelines for the storage of flammable liquids must be followed

15.2. Chemical safety assessment

No additional information available

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.: Chemcial 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:

Eye Irrit. 2	Serious eye damage/eye irritation, Category 2

Flam. Liq. 2	Flammable liquids, Category 2
H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.

SDS EU (REACH Annex II) - Custom