



A Group Company of MITSUBISHI CHEMICAL

2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSilANE

Safety Data Sheet SIE4670.0

Issue date: 09/22/2014

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Version: 2.0

SECTION 1: Identification**1.1. Identification**

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

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**

Serious eye damage/eye irritation Category 2A H319 Causes serious eye irritation
 Germ cell mutagenicity Category 2 H341 Suspected of causing genetic defects
 Carcinogenicity Category 2 H351 Suspected of causing cancer
 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) : Warning

Hazard statements (GHS US) : H319 - Causes serious eye irritation
 H341 - Suspected of causing genetic defects
 H351 - Suspected of causing cancer

Precautionary statements (GHS US) : 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.
 P337+P313 - If eye irritation persists: Get medical advice/attention.
 P308+P313 - If exposed or concerned: Get medical advice/attention.
 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

2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSIANE

Safety Data Sheet

SECTION 3: Composition/Information on ingredients

3.1. Substances

Substance type : Multi-constituent
Name : 2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSIANE
CAS-No. : 3388-04-3

Name	Product identifier	%	GHS US classification
2-(3,4-Epoxy cyclohexyl)ethyltrimethoxysilane	(CAS-No.) 3388-04-3	> 97	Eye Irrit. 2A, H319 Muta. 2, H341 Carc. 2, H351
Methanol	(CAS-No.) 67-56-1	< 0.5	Flam. Liq. 2, H225 Acute Tox. 3 (Oral), H301 Acute Tox. 3 (Dermal), H311 Acute Tox. 3 (Inhalation:vapour), H331 Skin Irrit. 2, H315 Eye Dam. 1, H318 STOT SE 1, H370 STOT SE 3, H336

Full text of hazard classes and 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 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 (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. Immediate medical attention and special treatment, if necessary

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: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : Water spray. Foam. Carbon dioxide. Dry chemical.

5.2. Specific hazards arising from the chemical

Fire hazard : Irritating fumes and organic acid vapors may develop when material is exposed to elevated temperatures or open flame.

Reactivity : Can react exothermically with amines.

5.3. Special protective equipment and precautions for fire-fighters

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.

2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE

Safety Data Sheet

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

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.

Incompatible materials : Amines. Moisture. Water.

Storage area : Store in a well-ventilated place. Store away from heat.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Methanol (67-56-1)		
ACGIH	ACGIH OEL TWA [ppm]	200 ppm
ACGIH	ACGIH OEL STEL [ppm]	250 ppm
OSHA	OSHA PEL (TWA) [1]	260 mg/m ³
OSHA	OSHA PEL (TWA) [2]	200 ppm
IDLH	IDLH [ppm]	6000 ppm
NIOSH	NIOSH REL (TWA)	260 mg/m ³
NIOSH	NIOSH REL TWA [ppm]	200 ppm
NIOSH	NIOSH REL (STEL)	325 mg/m ³
NIOSH	NIOSH REL STEL [ppm]	250 ppm

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. Contact lenses should not be worn

Skin and body protection:

Wear suitable protective clothing

Respiratory protection:

NIOSH-certified organic vapor (black cartridge) respirator.

2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE

Safety Data Sheet

Personal protective equipment symbol(s):



SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Clear liquid.
Molecular mass	: 246.38 g/mol
Color	: Straw.
Odor	: Mild.
Odor threshold	: No data available
Refractive index	: 1.449
pH	: No data available
Relative evaporation rate (butyl acetate=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
Vapor pressure	: 10 mm Hg @ 152°C
Relative vapor density at 20 °C	: > 1
Relative density	: 1.065
Solubility	: Reacts with water.
Partition coefficient n-octanol/water (Log Pow)	: No data available
Partition coefficient n-octanol/water (Log Kow)	: No data available
Viscosity, kinematic	: 5.2 cSt
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

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 (oral) : Not classified

2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE

Safety Data Sheet

Acute toxicity (dermal) : Not classified

Acute toxicity (inhalation) : Not classified

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

LD50 oral rat	8 ml/kg
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Methanol (67-56-1)

LC50 Inhalation - Rat [ppm]	22500 ppm (Exposure time: 8 h)
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ATE US (oral)	100 mg/kg body weight
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ATE US (dermal)	300 mg/kg body weight
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ATE US (vapors)	3 mg/l/4h
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2-(3,4-Epoxy cyclohexyl)ethyltrimethoxysilane (3388-04-3)

LD50 oral rat	12300 mg/kg
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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 sensitization : Not classified

Germ cell mutagenicity : Suspected of causing genetic defects.

Epoxy cyclohexyltrimethoxysilane 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.

Carcinogenicity : Suspected of causing cancer.

This material was shown to induce a low incidence of squamous cell carcinomas in a study involving chronic recurrent application of the material to the skin of mice.

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

Methanol (67-56-1)

LC50 - Fish [1]	28200 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])
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LC50 - Fish [2]	> 100 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])
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12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

Methanol (67-56-1)

BCF - Fish [1]	< 10
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Partition coefficient n-octanol/water (Log Pow)	-0.77
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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.

2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE

Safety Data Sheet

SECTION 13: Disposal considerations

13.1. Disposal 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

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

No additional information available

15.2. International regulations

CANADA

Methanol (67-56-1)

Listed on the Canadian DSL (Domestic Substances List)

2-(3,4-Epoxy cyclohexyl)ethyltrimethoxysilane (3388-04-3)

Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

Methanol (67-56-1)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

2-(3,4-Epoxy cyclohexyl)ethyltrimethoxysilane (3388-04-3)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

National regulations

Methanol (67-56-1)

Listed introduction on Australian Industrial Chemicals Introduction Scheme (AICIS Inventory)
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 KECL/KECI (Korean Existing Chemicals Inventory)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Japanese Poisonous and Deleterious Substances Control Law
Listed on INSQ (Mexican National Inventory of Chemical Substances)
Listed on CICR (Turkish Inventory and Control of Chemicals)

2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE

Safety Data Sheet

2-(3,4-Epoxy cyclohexyl)ethyltrimethoxysilane (3388-04-3)

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Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on the TCSI (Taiwan Chemical Substance Inventory)
Listed on the NCI (Vietnam - National Chemical Inventory)
Listed on TECI (Thailand Existing Chemicals Inventory)

15.3. US State regulations

WARNING: This product can expose you to Methanol, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Methanol (67-56-1)					
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 significant risk level (NSRL)	Maximum allowable dose level (MADL)
No	Yes	No	No		

Methanol (67-56-1)	
U.S. - Massachusetts - Right To Know List	
U.S. - New Jersey - Right to Know Hazardous Substance List	
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List	
U.S. - Pennsylvania - RTK (Right to Know) List	

SECTION 16: Other information

Full text of H-phrases::

H225	Highly flammable liquid and vapor
H301	Toxic if swallowed
H311	Toxic in contact with skin
H315	Causes skin irritation
H318	Causes serious eye damage
H319	Causes serious eye irritation
H331	Toxic if inhaled
H336	May cause drowsiness or dizziness
H341	Suspected of causing genetic defects
H351	Suspected of causing cancer
H370	Causes damage to organs

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.

Hazard Rating

Health	: 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
Flammability	: 1 Slight Hazard - Materials that must be preheated before ignition will occur. Includes liquids, solids and semi solids having a flash point above 200 F. (Class IIIB)
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.

2-(3,4-EPOXYCYCLOHEXYL)ETHYLTRIMETHOXYSILANE

Safety Data Sheet

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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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