

**TRIETHOXYSilANE**

Safety Data Sheet SIT8185.0

Date of issue: 13/01/2015

Revision date: 26/07/2016

Version: 3.0

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

Product form	: Substance
Physical state	: Liquid
Substance name	: TRIETHOXYSilANE
Product code	: SIT8185.0
Formula	: C ₆ H ₁₆ O ₃ Si
Synonyms	: SILICON TRIETHOXIDE; TRIETHOXYsilylHYDRIDE
Chemical family	: SILICATE ESTER

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]**

Flammable liquids, Category 3	H226
Acute toxicity (inhalation:vapour) Category 1	H330
Skin corrosion/irritation, Category 2	H315
Serious eye damage/eye irritation, Category 1	H318
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) :



GHS02



GHS05



GHS06

Signal word (CLP) :

: Danger

Hazard statements (CLP)

: H226 - Flammable liquid and vapour.
H315 - Causes skin irritation.

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Precautionary statements (CLP)

H318 - Causes serious eye damage.

H330 - Fatal if inhaled.

- : P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P240 - Ground/bond container and receiving equipment.
P260 - Do not breathe vapours.
P264 - Wash hands thoroughly after handling.
P310 - Immediately call a POISON CENTER or doctor/physician

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. 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

Substance type	: Mono-constituent
Name	: TRIETHOXYSilANE
CAS-No.	: 998-30-1
EC-No.	: 213-650-7

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Triethoxysilane	(CAS-No.) 998-30-1 (EC-No.) 213-650-7	95 - 100	Flam. Liq. 3, H226 Acute Tox. 1 (Inhalation), H330 Skin Irrit. 2, H315 Eye Dam. 1, H318

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. Immediately call a POISON CENTER/doctor.
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 immediate 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	: Fatal if inhaled. Danger of serious damage to health by prolonged exposure through inhalation. May cause irritation to the respiratory tract.
Symptoms/effects after skin contact	: Causes skin irritation. May be harmful if absorbed through skin.
Symptoms/effects after eye contact	: Causes serious eye damage.
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

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	: Water spray. Water fog. Foam. Carbon dioxide. Dry chemical.
Unsuitable extinguishing media	: Do not use a heavy water stream.

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5.2. Special hazards arising from the substance or mixture

- Fire hazard : Flammable liquid and vapour. Irritating fumes and organic acid vapors may develop when material is exposed to elevated temperatures or open flame.
- Explosion hazard : May form flammable/explosive vapour-air mixture.

5.3. Advice for firefighters

- Firefighting instructions : Exercise caution when fighting any chemical fire. Use water spray or fog for cooling exposed containers.
- 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. Fire fighters must wear positive pressure self-contained breathing apparatus.
- Other information : Vapors of triethoxysilane cause corneal injury and blindness on even short exposures.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : Eliminate every possible source of ignition. Use special care to avoid static electric charges.

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 : Provide ventilation system and use necessary personal protective equipment as described in "8. EXPOSURE CONTROLS AND PERSONAL PROTECTION". Take up liquid spill into inert absorbent material, e.g.: sand/earth. Use only non-sparking tools.

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

- Additional hazards when processed : Handle empty containers with care because residual vapours are flammable. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- Precautions for safe handling : Avoid all eye and skin contact and do not breathe vapour and mist. Do not handle until all safety precautions have been read and understood. Ground/bond container and receiving equipment. Nitrogen or inerting atmosphere required. Take precautionary measures against static discharge. Use only outdoors or in a well-ventilated area. Use only non-sparking tools.
- 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

- Technical measures : Proper grounding procedures to avoid static electricity should be followed. Use explosion-proof electrical equipment.
- Storage conditions : Keep container tightly closed. Containers may build pressure during storage, vent with caution. Keep in a cool place. Store locked up.
- Incompatible materials : Moist air. 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

Triethoxysilane (998-30-1)		
Italy - Portugal - USA ACGIH	ACGIH TWA (ppm)	0.08 ppm (8H)

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8.2. Exposure controls

Appropriate engineering controls:

Handle in an enclosing hood with exhaust ventilation. Local exhaust is needed at source of vapours.

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 worker's goggles must be worn. Safety glasses are not adequate eye protection. Contact lenses should not be worn

Skin and body protection:

Wear suitable protective clothing

Respiratory protection:

In case of inadequate ventilation wear respiratory protection. NIOSH-certified full-face supplied air respirator.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Clear liquid.
Molecular mass	: 164.28 g/mol
Colour	: No data available
Odour	: characteristic. Pleasant. Fruity.
Odour threshold	: No data available
Refractive index	: 1.3767
pH	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: -170 °C
Freezing point	: No data available
Boiling point	: 131 - 132 °C
Flash point	: 26 °C
Critical temperature	: 244 °C
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: Flammable liquid and vapour.
Vapour pressure	: 20.2 mm Hg @ 20°C
Relative vapour density at 20 °C	: > 1
Relative density	: 0.8753
% Volatiles	: 100 %
Solubility	: 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	: 1.18 vol % (lower)

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.

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10.3. Possibility of hazardous reactions

Material decomposes slowly in contact with moist air or with water liberating ethanol. Strong bases including amines can cause disproportion of this material to pyrophoric products. Platinum, platinum and iron salts, titanate esters and other Lewis acids can potentially cause generation of flammable hydrogen gas in the presence of moisture or, on prolonged storage or heating, pyrophoric compounds including silane.

10.4. Conditions to avoid

Heat. Open flame. Sparks.

10.5. Incompatible materials

Moist air. Water.

10.6. Hazardous decomposition products

Ethanol. Hydrogen. Silicon dioxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Fatal if inhaled.

TRIETHOXSILANE (998-30-1)

ATE CLP (vapours)	0.05 mg/l/4h
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Triethoxysilane (998-30-1)

LD50 oral rat	male: 5400 mg/kg; female: <2000 mg/kg
LD50 intravenous mouse	180 mg/kg
LC50 inhalation rat (mg/l)	500 mg/m ³ (Exposure time: 2 h)
ATE CLP (gases)	10 ppmv/4h
ATE CLP (vapours)	0.05 mg/l/4h
ATE CLP (dust,mist)	0.005 mg/l/4h

Skin corrosion/irritation	: Causes skin irritation.
Serious eye damage/irritation	: Causes serious eye damage.
Respiratory or skin sensitisation	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
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	: Even mild exposures can cause conjunctivitis and corneal scarring. Initial symptoms of exposure may include a "scratchy" feeling in the eyes. Triethoxysilane causes severe eye injuries, as well as necrosis of corneal cells, which can progress after exposure has ceased. These destructive effects resist treatment and permanent blindness is possible from exposure. This material slowly generates ethanol on contact with water and moisture in living tissues.
Symptoms/effects after inhalation	: Fatal if inhaled. Danger of serious damage to health by prolonged exposure through inhalation. May cause irritation to the respiratory tract.
Symptoms/effects after skin contact	: Causes skin irritation. May be harmful if absorbed through skin.
Symptoms/effects after eye contact	: Causes serious eye damage.
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

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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.
Additional information : Handle empty containers with care because residual vapours are flammable.
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) : 3489
UN-No. (IMDG) : 3489
UN-No. (IATA) : 3489
UN-No. (ADN) : 3489
UN-No. (RID) : 3489

14.2. UN proper shipping name

Proper Shipping Name (ADR) : TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S.
Proper Shipping Name (IMDG) : TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S.
Proper Shipping Name (IATA) : Toxic by inhalation liquid, flammable, corrosive, n.o.s.
Proper Shipping Name (ADN) : TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S.
Proper Shipping Name (RID) : TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S.
Transport document description (ADR) : UN 3489 TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. (TRIETHOXSILANE), 6.1 (3+8), I, (C/D)
Transport document description (IMDG) : UN 3489 TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. (TRIETHOXSILANE), 6.1 (3+8), I
Transport document description (IATA) : UN 3489 Toxic by inhalation liquid, flammable, corrosive, n.o.s. (TRIETHOXSILANE), 6.1
Transport document description (ADN) : UN 3489 TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. (TRIETHOXSILANE), 6.1 (3+8), I
Transport document description (RID) : UN 3489 TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. (TRIETHOXSILANE), 6.1 (3+8), I

14.3. Transport hazard class(es)

ADR

Transport hazard class(es) (ADR) : 6.1 (3, 8)
Danger labels (ADR) : 6.1, 3, 8



IMDG

Transport hazard class(es) (IMDG) : 6.1 (3, 8)
Danger labels (IMDG) : 6.1, 3, 8



IATA

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Transport hazard class(es) (IATA) : 6.1 (3, 8)

ADN

Transport hazard class(es) (ADN) : 6.1 (3, 8)

Danger labels (ADN) : 6.1, 3, 8



RID

Transport hazard class(es) (RID) : 6.1 (3, 8)

Danger labels (RID) : 6.1, 3, 8



14.4. Packing group

Packing group (ADR) : I
Packing group (IMDG) : I
Packing group (IATA) : Not applicable
Packing group (ADN) : I
Packing group (RID) : I

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

Classification code (ADR) : TFC
Special provisions (ADR) : 274
Limited quantities (ADR) : 0
Excepted quantities (ADR) : E0
Packing instructions (ADR) : P602
Mixed packing provisions (ADR) : MP8, MP17
Portable tank and bulk container instructions (ADR) : T20
Portable tank and bulk container special provisions (ADR) : TP2
Tank code (ADR) : L10CH
Tank special provisions (ADR) : TU14, TU15, TE19, TE21
Vehicle for tank carriage : FL
Transport category (ADR) : 1
Special provisions for carriage - Loading, unloading and handling (ADR) : CV1, CV13, CV28
Special provisions for carriage - Operation (ADR) : S2, S9, S14
Hazard identification number (Kemler No.) : 663
Orange plates :



Tunnel restriction code (ADR) : C/D

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- Transport by sea

Special provisions (IMDG)	: 274
Limited quantities (IMDG)	: 0
Excepted quantities (IMDG)	: E0
Packing instructions (IMDG)	: P602
Tank instructions (IMDG)	: T20
Tank special provisions (IMDG)	: TP2, TP13
EmS-No. (Fire)	: F-E
EmS-No. (Spillage)	: S-D
Stowage category (IMDG)	: D
Stowage and handling (IMDG)	: SW2
Segregation (IMDG)	: SG5, SG8
Properties and observations (IMDG)	: A variety of toxic liquids which present a highly toxic inhalation hazard as well as being flammable and corrosive. Highly toxic if swallowed, by skin contact or by inhalation. Causes burns to skin, eyes and mucous membranes.

- Air transport

PCA Limited quantities (IATA)	: Forbidden
PCA limited quantity max net quantity (IATA)	: Forbidden
PCA packing instructions (IATA)	: Forbidden
PCA max net quantity (IATA)	: Forbidden
CAO packing instructions (IATA)	: Forbidden
CAO max net quantity (IATA)	: Forbidden
ERG code (IATA)	: 6FC

- Inland waterway transport

Classification code (ADN)	: TFC
Special provisions (ADN)	: 274
Limited quantities (ADN)	: 0
Excepted quantities (ADN)	: E0
Equipment required (ADN)	: PP, EP, EX, TOX, A
Ventilation (ADN)	: VE01, VE02
Number of blue cones/lights (ADN)	: 2

- Rail transport

Classification code (RID)	: TFC
Special provisions (RID)	: 274
Limited quantities (RID)	: 0
Excepted quantities (RID)	: E0
Packing instructions (RID)	: P602
Mixed packing provisions (RID)	: MP8, MP17
Portable tank and bulk container instructions (RID)	: T20
Portable tank and bulk container special provisions (RID)	: TP2
Tank codes for RID tanks (RID)	: L10CH
Special provisions for RID tanks (RID)	: TU14, TU15, TU38, TE21, TE22
Transport category (RID)	: 1
Special provisions for carriage - Loading, unloading and handling (RID)	: CW13, CW28, CW31
Hazard identification number (RID)	: 663

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

TRIETHOXYSilANE is not on the REACH Candidate List

TRIETHOXYSilANE is not on the REACH Annex XIV List

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TRIETHOXSILANE 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.

TRIETHOXSILANE 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

% Volatiles : 100 %

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 II-1
Store unit : 5 liter
Classification remarks : R10 <H226;H315;H318;H330>; Emergency management guidelines for the storage of flammable liquids must be followed
Danish National Regulations : Young people below the age of 18 years are not allowed to use the product

15.2. Chemical safety assessment

No chemical safety assessment has been carried out

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; 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:

Acute Tox. 1 (Inhalation)	Acute toxicity (inhal.), Category 1
Acute Tox. 1 (Inhalation:vapour)	Acute toxicity (inhalation:vapour) Category 1
Eye Dam. 1	Serious eye damage/eye irritation, Category 1
Flam. Liq. 3	Flammable liquids, Category 3
Skin Irrit. 2	Skin corrosion/irritation, Category 2
H226	Flammable liquid and vapour.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H330	Fatal if inhaled.

SDS EU (REACH Annex II) - Custom

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