

**TRISILYLAMINE****Safety Data Sheet SIT8715.8**

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Version: 1.1

SECTION 1: Identification**1.1. Identification**

Product name : TRISILYLAMINE
 Product code : SIT8715.8
 Product form : Substance
 Physical state : Liquid
 Formula : H₉NSi₃
 Synonyms : DISILAZANE, 2-SILYL-SILANE, NITRILOTRIS-SILANAMINE, N,N-DISILYL-
 Chemical family : HYDRIDOSILANE

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**

Flammable liquids Category 2
 Substances and mixtures which in contact with water emit flammable gases Category 1
 Acute toxicity (inhalation:vapor) Category 2
 Skin corrosion/irritation Category 1B
 Serious eye damage/eye irritation Category 1
 Specific target organ toxicity (single exposure) Category 3

Full text of H statements : see section 16

H225 Highly flammable liquid and vapor
 H260 In contact with water releases flammable gases which may ignite spontaneously
 H330 Fatal if inhaled
 H314 Causes severe skin burns and eye damage
 H318 Causes serious eye damage
 H335 May cause respiratory irritation

2.2. GHS Label elements, including precautionary statements**GHS US labeling**

Hazard pictograms (GHS US) :



Signal word (GHS US) : Danger

Hazard statements (GHS US) :
 H225 - Highly flammable liquid and vapor
 H260 - In contact with water releases flammable gases which may ignite spontaneously
 H314 - Causes severe skin burns and eye damage
 H330 - Fatal if inhaled
 H335 - May cause respiratory irritation

Precautionary statements (GHS US) :
 P280 - Wear protective gloves/protective clothing/eye protection/face protection.
 P310 - Immediately call a doctor.
 P210 - Keep away from heat, open flames, sparks. - No smoking.
 P223 - Do not allow contact with water.
 P231+P232 - Handle under inert gas. Protect from moisture.
 P240 - Ground/Bond container and receiving equipment.
 P241 - Use explosion-proof electrical equipment.
 P242 - Use only non-sparking tools.
 P243 - Take precautionary measures against static discharge.
 P260 - Do not breathe vapors.
 P264 - Wash hands thoroughly after handling.
 P271 - Use only outdoors or in a well-ventilated area.
 P284 - [In case of inadequate ventilation] wear In case of inadequate ventilation wear

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respiratory protection..

P301+P330+P331 - If swallowed: rinse mouth. Do NOT induce vomiting.

P303+P361+P353 - If on skin (or hair): take off immediately all contaminated clothing. rinse skin with water/shower

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.

P320 - Specific treatment is urgent (see first aid instructions on this label).

P321 - Specific treatment (see first aid instructions on this label).

P335+P334 - Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages.

P363 - Wash contaminated clothing before reuse.

P370+P378 - In case of fire: Use water spray, foam, carbon dioxide, dry chemical to extinguish.

P402+P404 - Store in a dry place. Store in a closed container.

P403+P233 - Store in a well-ventilated place. Keep container tightly closed.

P403+P235 - Keep in a cool place

P405 - Store locked up.

P501 - Dispose of contents/container to licensed waste disposal facility..

2.3. Hazards not otherwise classified (HNOC)

Other hazards not contributing to the classification : This compound reacts with moisture in living tissue to generate ammonia. The US ACGIH (TWA) for ammonia is 25 ppm.

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Substance type : Mono-constituent

Name : TRISILYLAMINE

CAS-No. : 13862-16-3

Name	Product identifier	%	GHS US classification
Trisilylamine	(CAS-No.) 13862-16-3	95 – 100	Flam. Liq. 2, H225 Water-react. 1, H260 Acute Tox. 2 (Inhalation), H330 Skin Corr. 1B, H314 Eye Dam. 1, H318 STOT SE 3, H335

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. Get immediate 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 (acute and delayed)

Symptoms/effects : Causes severe skin burns and eye damage.

Symptoms/effects after inhalation : Fatal if inhaled. May cause respiratory irritation.

Symptoms/effects after skin contact : Causes (severe) skin burns.

Symptoms/effects after eye contact : Causes serious eye damage.

Symptoms/effects after ingestion : May be harmful if swallowed.

4.3. Immediate medical attention and special treatment, if necessary

No additional information available

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

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

Unsuitable extinguishing media : Water.

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5.2. Specific hazards arising from the chemical

- Fire hazard : Highly flammable liquid and vapor. In contact with water releases flammable gases which may ignite spontaneously. Irritating fumes and organic acid vapors may develop when material is exposed to elevated temperatures or open flame. Liquid generates strong static charge when poured.
- Explosion hazard : May form flammable/explosive vapor-air mixture.

5.3. Special protective equipment and precautions for fire-fighters

- 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 vapor and mist.

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 : Clean up any spills as soon as possible, using an absorbent material to collect it. Sweep or shovel spills into appropriate container for disposal. 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 vapors are flammable. Keep away from any possible contact with water, because of violent reaction and possible flash fire. This compound is known to have an exceptional tendency to accumulate static charge. The user must take extreme care to dissipate static charge by grounding of all equipment involved in liquid transfer.
- Precautions for safe handling : Avoid all eye and skin contact and do not breathe vapor and mist. Do not allow contact with water. Ground/bond container and receiving equipment. Handle under inert gas. Protect from moisture. 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. Keep in a cool place. Store locked up. Store in a dry place. Store in a closed container.
- Incompatible materials : Acids. Alcohols. Metal salts. Oxidizing agent. Peroxides. Platinum (Pt).
- Storage area : Store in a cool area. Store in a well-ventilated place. Store away from heat.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

- No additional information available

8.2. Appropriate engineering controls

- Appropriate engineering controls : Handle in an enclosing hood with exhaust ventilation.

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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 or face shield. 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.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Clear liquid.
Molecular mass	: 107.33 g/mol
Color	: No data available
Odor	: Ammonia.
Odor threshold	: No data available
Refractive index	: No data available
pH	: No data available
Relative evaporation rate (butyl acetate=1)	: > 1
Melting point	: No data available
Freezing point	: -106 °C
Boiling point	: 52 °C
Flash point	: -48 °C
Auto-ignition temperature	: > 101 °C
Decomposition temperature	: No data available
Flammability (solid, gas)	: Highly flammable liquid and vapor, In contact with water releases flammable gases which may ignite spontaneously
Vapor pressure	: 109 mm Hg @ 0°C
Relative vapor density at 20 °C	: 4.46
Relative density	: 0.895
% Volatiles	: 100 %
Solubility	: Insoluble in water. Reacts violently with water.
Partition coefficient n-octanol/water (Log Pow)	: No data available
Partition coefficient n-octanol/water (Log Kow)	: No data available
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 in a cool place.

10.3. Possibility of hazardous reactions

Reacts with water and moisture in air, liberating ammonia. In the presence of strong alkalis will generate flammable hydrogen gas.

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10.4. Conditions to avoid

Heat. Open flame. Sparks.

10.5. Incompatible materials

Acids. Alcohols. Metal salts. Oxidizing agent. Peroxides. Platinum (Pt).

10.6. Hazardous decomposition products

Ammonia. Hydrogen. Silicon dioxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral) : Not classified
Acute toxicity (dermal) : Not classified
Acute toxicity (inhalation) : Fatal if inhaled.

TRISILYLAMINE (13862-16-3)	
ATE US (vapors)	0.5 mg/l/4h
Trisilylamine (13862-16-3)	
LC50 inhalation rat (ppm)	439 ppm/1h
ATE US (gases)	219.5 ppmV/4h
ATE US (vapors)	0.5 mg/l/4h
ATE US (dust, mist)	0.05 mg/l/4h

Skin corrosion/irritation : Causes severe skin burns.
Serious eye damage/irritation : Causes serious eye damage.
Respiratory or skin sensitization : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified
None of the components in this product at concentrations >0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.
Reproductive toxicity : Not classified
STOT-single exposure : May cause respiratory irritation.
STOT-repeated exposure : Not classified
Aspiration hazard : Not classified
Symptoms/effects after inhalation : Fatal if inhaled. May cause respiratory irritation.
Symptoms/effects after skin contact : Causes (severe) skin burns.
Symptoms/effects after eye contact : Causes serious eye damage.
Symptoms/effects after ingestion : May be harmful if swallowed.
Reason for classification : Expert judgment

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

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. Other adverse effects

Other adverse effects : This substance may be hazardous to the environment.
Effect on the ozone layer : No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods

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

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Additional information	: Handle empty containers with care because residual vapors are flammable.
Ecology - waste materials	: Avoid release to the environment.

SECTION 14: Transport information

14.1. UN number

UN-No.(DOT)	: 3491
DOT NA No	UN3491

14.2. UN proper shipping name

Transport document description	: UN3491 Toxic by inhalation liquid, water-reactive, flammable, n.o.s. (TRISILYLAMINE), 6.1 (4.3;3), I
Proper Shipping Name (DOT)	: Toxic by inhalation liquid, water-reactive, flammable, n.o.s. (TRISILYLAMINE)
Class (DOT)	: 6.1 - Class 6.1 - Poisonous materials 49 CFR 173.132
Packing group (DOT)	: I - Great Danger
Hazard labels (DOT)	: 6.1 - Poison 4.3 - Dangerous when wet 3 - Flammable liquid



DOT Packaging Non Bulk (49 CFR 173.xxx)	: 227
DOT Packaging Bulk (49 CFR 173.xxx)	: 244
DOT Packaging Exceptions (49 CFR 173.xxx)	: None
DOT Symbols	: G - Identifies PSN requiring a technical name

14.3. Additional information

Emergency Response Guide (ERG) Number	: 155
Other information	: IMDG: 6270-5 EmS no. 6.1-107 MFAG Table No. subsection: 4.2. TOXIC INHALATION HAZARD ZONE B AIR TRANSPORT IS FORBIDDEN.

Transport by sea

DOT Vessel Stowage Location	: D - The material must be stowed "on deck only" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded.
DOT Vessel Stowage Other	: 13 - Keep as dry as reasonably practicable, 21 - Segregation same as for flammable liquids, 28 - Stow "away from" flammable liquids, 40 - Stow "clear of living quarters", 49 - Stow "away from" corrosives

Air transport

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	: Forbidden
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	: Forbidden

SECTION 15: Regulatory information

15.1. US Federal regulations

TRISILYLAMINE (13862-16-3)

TSCA Exemption/Exclusion	CAUTION: This material is supplied for research and development purposes subject to the R&D exemption under TSCA, 40 CFR 720.36, and must meet the requirements of the exemption, including supervision by a "technically qualified individual" as defined by 40 CFR 720.3(ee). The use of this material for "commercial purposes" as defined by 40 CFR 720.3(r) is not permitted in the United States.
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Trisilylamine (13862-16-3)

Not listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA

No additional information available

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EU-Regulations

No additional information available

National regulations

Trisilylamine (13862-16-3)

Listed on KECL/KECI (Korean Existing Chemicals Inventory)

Listed on the TCSI (Taiwan Chemical Substance Inventory)

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

SECTION 16: Other information

Full text of H-phrases::

H225	Highly flammable liquid and vapor
H260	In contact with water releases flammable gases which may ignite spontaneously
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H330	Fatal if inhaled
H335	May cause respiratory irritation

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	: 4 Severe Hazard - Life-threatening, major or permanent damage may result from single or repeated overexposures
Flammability	: 4 Severe Hazard - Flammable gases, or very volatile flammable liquids with flash points below 73 F, and boiling points below 100 F. Materials may ignite spontaneously with air. (Class IA)
Physical	: 3 Serious Hazard - Materials that may form explosive mixtures with water and are capable of detonation or explosive reaction in the presence of a strong initiating source. Materials may polymerize, decompose, self-react, or undergo other chemical change at normal temperature and pressure with moderate risk of explosion

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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