

**TRIFLUOROSILANE, 50-75%**

Safety Data Sheet SIT8373.0

Date of issue: 05/06/2016

Version: 1.0

SECTION 1: Identification**1.1. Identification**

Product name : TRIFLUOROSILANE, 50-75%
 Product code : SIT8373.0
 Product form : Mixture
 Physical state : Gas
 Formula : HF3Si
 Synonyms : TRIFLUOROSILYLHYDRIDE
 Chemical family : SILICON COMPOUND

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**

Gases under pressure Compressed gas	H280 Contains gas under pressure; may explode if heated
Acute toxicity (inhalation:gas) Category 2	H330 Fatal if inhaled
Skin corrosion/irritation Category 1B	H314 Causes severe skin burns and eye damage
Serious eye damage/eye irritation Category 1	H318 Causes serious eye damage
Specific target organ toxicity (single exposure) Category 3	H335 May cause respiratory irritation

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) : Danger

Hazard statements (GHS US) : H280 - Contains gas under pressure; may explode if heated
 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.
 P284 - [In case of inadequate ventilation] wear In case of inadequate ventilation wear respiratory protection..
 P310 - Immediately call a doctor
 P260 - Do not breathe gas.
 P264 - Wash hands thoroughly after handling.
 P271 - Use only outdoors or in a well-ventilated area.
 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
 P320 - Specific treatment is urgent (see first aid instructions on this label)
 P363 - Wash contaminated clothing before reuse.
 P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
 P405 - Store locked up.
 P410+P403 - Protect from sunlight. Store in a well-ventilated place.

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P312 - Call a doctor if you feel unwell
P501 - Dispose of contents/container to licensed waste disposal facility.

2.3. Hazards not otherwise classified (HNOC)

Other hazards not contributing to the classification : Hydrogen fluoride may be formed by reaction with water and moisture in air. The US OSHA PEL (TWA) for hydrogen fluoride is 3 ppm.

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	GHS-US classification
Trifluorosilane	(CAS-No.) 13465-71-9	50 - 75	Press. Gas (Comp.), H280 Skin Corr. 1B, H314 Eye Dam. 1, H318 STOT SE 3, H335
Tetrafluorosilane	(CAS-No.) 7783-61-1	25 - 50	Press. Gas (Liq.), H280 Acute Tox. 2 (Inhalation), H330 Acute Tox. 3 (Inhalation:gas), H331 Skin Corr. 1B, H314 Eye Dam. 1, H318 STOT SE 3, H335

Full text of hazard classes and H-statements : see section 16

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 : Flush with water, then wash with saturated solution of sodium carbonate or 3% aqueous ammonia. 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 if you feel unwell.

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. Danger of serious damage to health by prolonged exposure through inhalation.

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.

Symptoms/effects upon intravenous administration : For ingestion, calcium gluconate intravenously and calcium lactate orally may be considered.

Chronic symptoms : Hydrofluoric acid, the hydrolysis product has demonstrated mutagenicity and teratogenicity in laboratory bioassay.

4.3. Immediate medical attention and special treatment, if necessary

NOTE TO PHYSICIAN: This product reacts with water and human tissues to form hydrofluoric acid. Massage a paste of 20% magnesium oxide in glycerol onto the burned areas. Inject 2-5 cc of 10% calcium gluconate beneath and around the burned areas. Gastric lavage, if swallowed, using 5% calcium chloride followed by saline catharsis.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : Water.

5.2. Specific hazards arising from the chemical

Fire hazard : Contains gas under pressure; may explode if heated. Irritating fumes, hydrogen fluoride and organic acid vapors may develop when material is exposed to moist air.

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions : Exercise caution when fighting any chemical fire.

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Protection during firefighting	: Do not enter fire area without proper protective equipment, including respiratory protection. Avoid contact with skin and eyes. Do not breathe gas.
Other information	: TRIFLUOROSILANE is not combustible.

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".
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6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if product 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.

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 contact with skin and eyes. Do not breathe gas. Use only outdoors or in a well-ventilated area.
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

Storage conditions	: Keep container tightly closed. Store locked up. Store in cylinders. Protect from sunlight. Store in a well-ventilated place.
Incompatible materials	: Moisture. Water.
Storage 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/acid gas (yellow cartridge) respirator.

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SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Appearance	: Colorless gas. Fumes in moist air.
Molecular mass	: 86.09 g/mol
Color	: No data available
Odor	: Pungent suffocating odor.
Odor threshold	: No data available
Refractive index	: No data available
pH	: No data available
Relative evaporation rate (butyl acetate=1)	: No data available
Melting point	: No data available
Freezing point	: -131 °C
Boiling point	: -97.5 °C
Flash point	: not flammable
Auto-ignition temperature	: not combustible
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor pressure	: 515 mm Hg @ -100°C
Relative vapor density at 20 °C	: 3.63
Relative density	: > 1 @ -100°C
% Volatiles	: 100 %
Solubility	: Reacts vigorously 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
Oxidizing properties	: No data available
Explosion limits	: No data available

9.2. Other information

Gas group	: Compressed gas
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SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

Stable in sealed plastic containers.

10.3. Possibility of hazardous reactions

Reacts with water and moisture in air liberating hydrogen fluoride.

10.4. Conditions to avoid

Avoid contact with aluminum, glass.

10.5. Incompatible materials

Moisture. Water.

10.6. Hazardous decomposition products

hydrofluoric acid. Hydrogen fluoride.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity	: Not classified
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ATE US (gases)	200 ppmV/4h
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Tetrafluorosilane (7783-61-1)

LC50 inhalation rat (ppm)	2272 ppm/4h 3 days: Sense organs and special senses (nose, eye, ear, and taste): eye: lacrimation; lungs, thorax, or respiration: acute pulmonary edema; lungs, thorax, or respiration: dyspnea
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Tetrafluorosilane (7783-61-1)	
ATE US (gases)	2272 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 and eye damage.
Serious eye damage/irritation	: Causes serious eye damage.
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity – single exposure	: May cause respiratory irritation.
Specific target organ toxicity – repeated exposure	: Not classified
Aspiration hazard	: Not classified
Potential Adverse human health effects and symptoms	: On contact with water and human tissue this compound liberates hydrogen fluoride (hydrofluoric acid).
Symptoms/effects after inhalation	: Fatal if inhaled. May cause respiratory irritation. Danger of serious damage to health by prolonged exposure through inhalation.
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.
Symptoms/effects upon intravenous administration	: For ingestion, calcium gluconate intravenously and calcium lactate orally may be considered.
Chronic symptoms	: Hydrofluoric acid, the hydrolysis product has demonstrated mutagenicity and teratogenicity in laboratory bioassay.
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
Effect on global warming	: No known effects from this product.
GWPmix comment	: No known effects from this product.

SECTION 13: Disposal considerations

13.1. Disposal 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.
Ecology - waste materials	: Avoid release to the environment.

SECTION 14: Transport information

14.1. UN number

UN-No.(DOT)	: 3304
DOT NA no.	UN3304

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14.2. UN proper shipping name

Transport document description	: UN3304 Compressed gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone A (TRIFLUOROSILANE, 50-75%)), 2.3 (8)
Proper Shipping Name (DOT)	: Compressed gas, toxic, corrosive, n.o.s. Inhalation Hazard Zone A (TRIFLUOROSILANE, 50-75%)
Class (DOT)	: 2.3 - Class 2.3 - Poisonous gas 49 CFR 173.115
Hazard labels (DOT)	: 2.3 - Poison gas 8 - Corrosive



DOT Packaging Non Bulk (49 CFR 173.xxx)	: 192
DOT Packaging Bulk (49 CFR 173.xxx)	: 245
DOT Packaging Exceptions (49 CFR 173.xxx)	: None
DOT Symbols	: G - Identifies PSN requiring a technical name, I - Proper shipping name appropriate for international and domestic transportation

14.3. Additional information

Emergency Response Guide (ERG) Number	: 123
Other information	: No supplementary information available.

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	: 40 - Stow "clear of living quarters"

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

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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.

Trifluorosilane (13465-71-9)
Not listed on the United States TSCA (Toxic Substances Control Act) inventory
Tetrafluorosilane (7783-61-1)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA

No additional information available

Tetrafluorosilane (7783-61-1)	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class A - Compressed Gas Class D Division 1 Subdivision A - Very toxic material causing immediate and serious toxic effects Class E - Corrosive Material

EU-Regulations

No additional information available

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Tetrafluorosilane (7783-61-1)

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

National regulations

Tetrafluorosilane (7783-61-1)

Listed on the AICS (Australian Inventory of Chemical Substances)
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 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)

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

Tetrafluorosilane (7783-61-1)

U.S. - New Jersey - Right to Know Hazardous Substance List

SECTION 16: Other information

Full text of H-phrases::

H280	Contains gas under pressure; may explode if heated
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H330	Fatal if inhaled
H331	Toxic 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 : 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 : 2 Moderate Hazard - Materials that are unstable and may undergo violent chemical changes at normal temperature and pressure with low risk for explosion. Materials may react violently with water or form peroxides upon exposure to air.

Prepared by safety and environmental affairs.

Date of issue: 05/06/2016 Version: 1.0

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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