

Danger



SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name : Silane
SDS no : SDS-107-CLP
Other means of identification : Silane
CAS-No. : 7803-62-5
EC-No. : 232-263-4
EC Index-No. : ---
REACH registration No : 01-2119436667-29
Chemical formula : SiH₄

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses : Industrial and professional uses. Perform risk assessment prior to use.
Test gas/Calibration gas.
Chemical reaction / Synthesis.
Laboratory use.
Use for manufacture of electronic/photovoltaic components.
Contact supplier for more information on uses.
Industrial use. Perform risk assessment prior to use.

Uses advised against : Consumer use.
Uses other than those listed above are not supported, contact your supplier for more information on other uses.

1.3. Details of the supplier of the safety data sheet

Air Liquide UK Ltd.
Station Road Coleshill
B46 1JY Birmingham
United Kingdom
safety.aluk@airliquide.com

1.4. Emergency telephone number

Emergency telephone number : 01675 462695 (Available 24/7)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

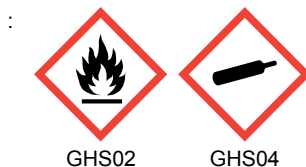
Classification according to Regulation (EC) No. 1272/2008 [CLP]

Physical hazards	Flammable gases, Category 1A, Pyrophoric Gas	H220;H232
	Gases under pressure : Liquefied gas	H280

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP)



GHS02

GHS04

Signal word (CLP)

: Danger

Hazard statements (CLP)

: H232 - May ignite spontaneously if exposed to air.
H220 - Extremely flammable gas.
H280 - Contains gas under pressure; may explode if heated.

Precautionary statements (CLP)

- Prevention

: P280 - Wear eye protection, face protection, protective clothing, protective gloves.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources.
No smoking.

- Response

: P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 - In case of leakage, eliminate all ignition sources.

- Storage

: P403 - Store in a well-ventilated place.

2.3. Other hazards

Asphyxiant in high concentrations.
Contact with liquid may cause cold burns/frostbite.
These high concentrations are within the flammability range.

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Silane	CAS-No.: 7803-62-5 EC-No.: 232-263-4 EC Index-No.: --- REACH registration No: 01-2119436667-29	100	Flam. Gas 1A - Pyr. Gas, H220;H232 Press. Gas (Liq.), H280

Contains no other components or impurities which will influence the classification of the product.

Not applicable

3.2. Mixtures

SECTION 4: First aid measures

4.1. Description of first aid measures

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Perform cardiopulmonary resuscitation if breathing stopped.
- Skin contact : In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
- Ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation.
May cause headache, nausea and irritation of respiratory tract.
See section 11.

4.3. Indication of any immediate medical attention and special treatment needed

None.

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Water spray or fog.
Carbon dioxide.
Shutting off the source of the gas is the preferred method of control.
Be aware of the risk of formation of static electricity with the use of CO2 extinguishers. Do not use them in places where a flammable atmosphere may be present.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

- Specific hazards : Exposure to fire may cause containers to rupture/explode.
Escaping gas cannot be extinguished.
- Hazardous combustion products : Selenium and its oxides. Hydrogen fluoride.

5.3. Advice for firefighters

- Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
If possible, stop flow of product.
Use water spray or fog to knock down fire fumes if possible.
Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.
Move containers away from the fire area if this can be done without risk.
- Special protective equipment for fire fighters : In confined space use self-contained breathing apparatus.
Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel : Act in accordance with local emergency plan.
Try to stop release.
Evacuate area.
Eliminate ignition sources.
Ensure adequate air ventilation.
Stay upwind.
See section 8 of the SDS for more information on personal protective equipment.
- For emergency responders : Monitor concentration of released product.
Consider the risk of potentially explosive atmospheres.
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
See section 5.3 of the SDS for more information.

6.2. Environmental precautions

Try to stop release.

6.3. Methods and material for containment and cleaning up

Ventilate area.

Dust deposited may be vacuum cleaned or the area hosed down with water.

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safe use of the product

- : Do not breathe gas.
- Avoid release of product into atmosphere.
- Gas cabinets, rooms or indoor areas where product is stored or used shall be protected by an automatic sprinkler system.
- For more guidance on safe use, refer to the EIGA Doc.160 "Storage and handling of silane and silane mixtures", downloadable at <http://www.eiga.org> and consult your supplier.
- The product must be handled in accordance with good industrial hygiene and safety procedures.
- Only experienced and properly instructed persons should handle gases under pressure.
- Consider pressure relief device(s) in gas installations.
- Ensure the complete gas system was (or is regularly) checked for leaks before use.
- Do not smoke while handling product.
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
- Avoid suck back of water, acid and alkalis.
- Assess the risk of potentially explosive atmospheres and the need for explosion-proof equipment.
- Purge air from system before introducing gas.
- Take precautionary measures against static discharge.
- Keep away from ignition sources (including static discharges).
- Consider the use of only non-sparking tools.
- A manually activated deluge water spray fire protection system shall be provided to protect bulk product delivery systems.
- Ensure equipment is adequately earthed.

Safe handling of the gas receptacle

- : Refer to supplier's container handling instructions.
- Do not allow backfeed into the container.
- Protect containers from physical damage; do not drag, roll, slide or drop.
- When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.
- Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
- If user experiences any difficulty operating valve discontinue use and contact supplier.
- Never attempt to repair or modify container valves or safety relief devices.
- Damaged valves should be reported immediately to the supplier.
- Keep container valve outlets clean and free from contaminants particularly oil and water.
- Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
- Close container valve after each use and when empty, even if still connected to equipment.
- Never attempt to transfer gases from one cylinder/container to another.
- Never use direct flame or electrical heating devices to raise the pressure of a container.
- Do not remove or deface labels provided by the supplier for the identification of the content of the container.
- Suck back of water into the container must be prevented.
- Open valve slowly to avoid pressure shock.

7.2. Conditions for safe storage, including any incompatibilities

Observe all regulations and local requirements regarding storage of containers.
Containers should not be stored in conditions likely to encourage corrosion.
Container valve guards or caps should be in place.
Containers should be stored in the vertical position and properly secured to prevent them from falling over.
Stored containers should be periodically checked for general condition and leakage.
Keep container below 50°C in a well ventilated place.
Store containers in location free from fire risk and away from sources of heat and ignition.
Keep away from combustible materials.
Segregate from oxidant gases and other oxidants in store.
All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Silane (7803-62-5)	
DNEL: Derived no effect level (Workers)	
Acute - systemic effects, inhalation	0.67 mg/m ³
Long-term - systemic effects, inhalation	0.67 mg/m ³

PNEC (Predicted No-Effect Concentration) : None established.

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Provide adequate general and local exhaust ventilation.
Product to be handled in a closed system.
Systems under pressure should be regularly checked for leakages.
Ensure exposure is below occupational exposure limits (where available).
Gas detectors should be used when flammable gases/vapours may be released.
Consider the use of a work permit system e.g. for maintenance activities.
Optical flame detection systems shall be provided to detect a fire at potential leak points.

8.2.2. Individual protection measures, e.g. personal protective equipment

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk.
The following recommendations should be considered:

- Eye/face protection : PPE compliant to the recommended EN/ISO standards should be selected.
: Wear goggles and a face shield when transfilling or breaking transfer connections.
Standard EN 166 - Personal eye-protection - specifications.
- Skin protection :
- Hand protection : Wear working gloves when handling gas containers.
Standard EN 388 - Protective gloves against mechanical risk, performance level 1 or higher.
Standard EN 511 - Cold insulating gloves.
- Other : Depending on operations that e.g. involve opening of valves or opening of process silane systems the following additional PPE shall be considered: Hard hat, fire resistant hood, face shield, leather gauntlet.
Consider the use of flame resistant anti-static safety clothing.
Standard EN ISO 14116 - Limited flame spread materials.
Standard EN 1149-5 - Protective clothing: Electrostatic properties.
Wear safety shoes while handling containers.
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

- Respiratory protection : Consult respiratory device supplier's product information for the selection of the appropriate device.
- Thermal hazards : None in addition to the above sections.

8.2.3. Environmental exposure controls

Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	
- Physical state at 20°C / 101.3kPa	: Gas.
- Colour	: Colourless.
Odour	: No odour warning properties.
Melting point / Freezing point	: -186 °C -186 °C
Boiling point	: -111 °C
Flammability	: Extremely flammable gas.
Lower explosion limit	: Not available.
Upper explosion limit	: Not available.
Flash point	: Not applicable for gases and gas mixtures.
Auto-ignition temperature	: -50 °C
Decomposition temperature	: Not applicable.
pH	: Not applicable for gases and gas mixtures.
Viscosity, kinematic	: No reliable data available.
Water solubility [20°C]	: Not available.
Partition coefficient n-octanol/water (Log Kow)	: Not available.
Vapour pressure [20°C]	: Not applicable.
Vapour pressure [50°C]	: Not applicable.
Density and/or relative density	: Not applicable.
Relative vapour density (air=1)	: 1.1
Particle characteristics	: Not applicable.

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Explosive properties	: Not applicable.
Explosion limits	: Flammability range not available.
Oxidising properties	: Not applicable.
Critical temperature [°C]	: -3.5 °C

9.2.2. Other safety characteristics

Molar mass	: 32 g/mol
Evaporation rate	: Not applicable for gases and gas mixtures.
Gas group	: Press. Gas (Liq.).

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Can form explosive mixture with air.
May react violently with oxidants.
Can ignite spontaneously in air (fire cannot be put out). Can form spontaneous, violently explosive mixture in air.

10.4. Conditions to avoid

Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
Avoid moisture in installation systems.

10.5. Incompatible materials

Air, Oxidisers.
For additional information on compatibility refer to ISO 11114.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity : Classification criteria are not met.

LC50 Inhalation - Rat [ppm]	9500 ppm/4h
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Skin corrosion/irritation : No known effects from this product.

Serious eye damage/irritation : No known effects from this product.

Respiratory or skin sensitisation : No known effects from this product.

Germ cell mutagenicity : No known effects from this product.

Carcinogenicity : No known effects from this product.

Toxic for reproduction : Fertility : No known effects from this product.

Toxic for reproduction : unborn child : No known effects from this product.

STOT-single exposure : May cause nausea and irritation of the respiratory tract. Hydrolysis of silanes in the body forms silicic acid or hydrated silica.

STOT-repeated exposure : No known effects from this product.

Aspiration hazard : Not applicable for gases and gas mixtures.

11.2. Information on other hazards

No additional information available

SECTION 12: Ecological information

12.1. Toxicity

Assessment : No ecological damage caused by this product.

EC50 48h - Daphnia magna [mg/l] : No data available.

EC50 72h - Algae [mg/l] : No data available.

LC50 96 h - Fish [mg/l] : No data available.

12.2. Persistence and degradability

Assessment : Not applicable for inorganic products.

12.3. Bioaccumulative potential

Assessment : No data available.

12.4. Mobility in soil

Assessment : Because of its high volatility, the product is unlikely to cause ground or water pollution.
Partition into soil is unlikely.

12.5. Results of PBT and vPvB assessment

Assessment : Not classified as PBT or vPvB.

12.6. Endocrine disrupting properties

Assessment :

12.7. Other adverse effects

Other adverse effects : No known effects from this product.

Effect on the ozone layer : No effect on the ozone layer.

Effect on global warming : No known effects from this product.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Contact supplier if guidance is required.
Do not discharge into areas where there is a risk of forming an explosive mixture with air.
Waste gas should be flared through a suitable burner with flash back arrestor.
Do not discharge into any place where its accumulation could be dangerous.
Gases formed by combustion should be washed with water to remove silica.
Ensure that the emission levels from local regulations or operating permits are not exceeded.
Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org> for more guidance on suitable disposal methods.
Return unused product in original container to supplier.
List of hazardous waste codes (from Commission Decision 2000/532/EC as amended) : 16 05 04 *: Gases in pressure containers (including halons) containing hazardous substances.

13.2. Additional information

External treatment and disposal of waste should comply with applicable local and/or national regulations.

SECTION 14: Transport information

14.1. UN number or ID number

In accordance with ADR / RID / IMDG / IATA / ADN
UN-No. : 2203

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : SILANE

Transport by air (ICAO-TI / IATA-DGR) : Silane

Transport by sea (IMDG) : SILANE

14.3. Transport hazard class(es)

Labelling :



2.1 : Flammable gases.

Transport by road/rail (ADR/RID)

Class : 2

Classification code : 2F

Hazard identification number : 23

Tunnel Restriction : B/D - Tank carriage : Passage forbidden through tunnels of category B, C, D and E. Other carriage : Passage forbidden through tunnels of category D and E

Transport by sea (IMDG)

Class / Div. (Sub. risk(s)) : 2.1
Emergency Schedule (EmS) - Fire : F-D
Emergency Schedule (EmS) - Spillage : S-U

14.4. Packing group

Transport by road/rail (ADR/RID) : Not applicable.
Transport by air (ICAO-TI / IATA-DGR) : Not applicable.
Transport by sea (IMDG) : Not applicable.

14.5. Environmental hazards

Transport by road/rail (ADR/RID) : None.
Transport by air (ICAO-TI / IATA-DGR) : None.
Transport by sea (IMDG) : None.

14.6. Special precautions for user

Packing Instruction(s)

Transport by road/rail (ADR/RID) : P200.
Transport by air (ICAO-TI / IATA-DGR)
Passenger and Cargo Aircraft : Forbidden.
Cargo Aircraft only : Forbidden.
Transport by sea (IMDG) : P200.

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment.
Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
Before transporting product containers:
- Ensure there is adequate ventilation.
- Ensure that containers are firmly secured.
- Ensure valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.

14.7. Maritime transport in bulk according to IMO instruments

Not applicable.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

EU-Regulations

Restrictions on use : None.
Other information, restriction and prohibition regulations : Silane 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.
Seveso Directive : 2012/18/EU (Seveso III) : Covered.

National regulations

Regulatory reference : Ensure all national/local regulations are observed.

15.2. Chemical safety assessment

A CSA has been carried out.

SECTION 16: Other information

Indication of changes : Safety data sheet in accordance with commission regulation (EU) No 2020/878.

Abbreviations and acronyms

- : ATE - Acute Toxicity Estimate.
 - CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008.
 - REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006.
 - EINECS - European Inventory of Existing Commercial Chemical Substances.
 - CAS# - Chemical Abstract Service number.
 - PPE - Personal Protection Equipment.
 - LC50 - Lethal Concentration to 50 % of a test population.
 - RMM - Risk Management Measures.
 - PBT - Persistent, Bioaccumulative and Toxic.
 - vPvB - Very Persistent and Very Bioaccumulative.
 - STOT- SE : Specific Target Organ Toxicity - Single Exposure.
 - CSA - Chemical Safety Assessment.
 - EN - European Standard.
 - UN - United Nations.
 - ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road.
 - IATA - International Air Transport Association.
 - IMDG code - International Maritime Dangerous Goods.
 - RID - Regulations concerning the International Carriage of Dangerous Goods by Rail.
 - WGK - Water Hazard Class.
 - STOT - RE : Specific Target Organ Toxicity - Repeated Exposure.
 - UFI : Unique Formula Identifier.
- Training advice : Ensure operators understand the flammability hazard.
- Further information : Classification in accordance with the procedures and calculation methods of Regulation (EC) 1272/2008 (CLP).
Key literature references and sources of data are maintained in EIGA doc 169 : 'Classification and Labelling Guide', downloadable at <http://www.Eiga.eu> .

Full text of H- and EUH-statements	
Flam. Gas 1A - Pyr. Gas	Flammable gases, Category 1A, Pyrophoric Gas
H220	Extremely flammable gas.
H232	May ignite spontaneously if exposed to air.
H280	Contains gas under pressure; may explode if heated.
Press. Gas (Liq.)	Gases under pressure : Liquefied gas

DISCLAIMER OF LIABILITY

- : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
- Details given in this document are believed to be correct at the time of going to press.
- Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

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