

Silane**SILANE_107-SE**

2.1 : Flammable gases

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

Trade name : Silane , Silan N40
SDS Nr : SILANE_107-SE replaces SILANE 107-SE 25 / 7 / 2014
Chemical description : Silane
CAS No :7803-62-5
EC No :232-263-4
Index No :---
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. Perform risk assessment prior to use.
Test gas/Calibration gas.
Laboratory use. Chemical reaction / Synthesis.
Use for manufacture of electronic/photovoltaic components.
Contact supplier for more information on uses.

1.3. Details of the supplier of the safety data sheet

Company identification : AIR LIQUIDE GAS AB
Lundavägen 151
212 24 Malmö SWEDEN
Tfn. 040 - 38 10 00, efter kontorstid 0220- 396 00
E-Mail address (competent person) : Info.sweden@airliquide.com

1.4. Emergency telephone number

Emergency telephone number : 112

SECTION 2. Hazards identification**2.1. Classification of the substance or mixture****Hazard Class and Category Code Regulation EC 1272/2008 (CLP)**

• Physical hazards : Flammable gases - Category 1 - Danger - (CLP : Flam. Gas 1) - H220
Gases under pressure - Liquefied gas - Warning - (CLP : Press. Gas) - H280

2.2. Label elements**Labelling Regulation EC 1272/2008 (CLP)**

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SECTION 2. Hazards identification (continued)

• Hazard pictograms



• Hazard pictograms code

: GHS02 - GHS04

• Signal word

: Danger

• Hazard statements

: H220 - Extremely flammable gas.
H280 - Contains gas under pressure; may explode if heated.

• Supplemental hazard information

: Spontaneously flammable in air.

• Precautionary statements

- Prevention

: 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 - Eliminate all ignition sources if safe to do so.

- Storage

: P403 - Store in a well-ventilated place.

2.3. Other hazards

: Spontaneously flammable in air.

SECTION 3. Composition/information on ingredients

3.1. Substance / 3.2. Mixture

Substance.

Substance name	Content [Vol-%]	CAS No	EC No	Index No	Registration No.	Classification
Silane	100 %	7803-62-5	232-263-4	----	01-2119436667-29-	Flam. Gas 1 (H220) Press. Gas (Liq.) (H280)

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

* 1: Listed in Annex IV / V REACH, exempted from registration.

* 2: Registration deadline not expired.

* 3: Registration not required: Substance manufactured or imported < 1t/y.

Full text of R-phrases see section 16. Full text of H-statements see section 16.

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. Apply artificial respiration if breathing stopped.

- Skin contact

: For liquid spillage - flush with water for at least 15 minutes.

- 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.

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

: None.

Silane**SILANE_107-SE****SECTION 5. Fire-fighting measures****5.1. Extinguishing media**

- Suitable extinguishing media : Shutting off the source of the gas is the preferred method of control.
Water spray or fog.
Dry powder.
- Unsuitable extinguishing media : Do not use water jet to extinguish.
Carbon dioxide.

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** : Silica dust (inert - but may irritate respiratory tract and eyes).

5.3. Advice for fire-fighters

- 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.
Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.
Use water spray or fog to knock down fire fumes if possible.
Move containers away from the fire area if this can be done without risk.
- Special protective equipment for fire fighters** : None necessary.

In confined space use self-contained breathing apparatus.
Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

SECTION 6. Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

- : Try to stop release.
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Consider the risk of potentially explosive atmospheres.
Evacuate area.
Ensure adequate air ventilation.
Eliminate ignition sources.
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
Stay upwind.
Act in accordance with local emergency plan.

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.

Silane**SILANE_107-SE****SECTION 7. Handling and storage****7.1. Precautions for safe handling****Safe use of the product**

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

Safe handling of the gas receptacle

: Refer to supplier's container handling instructions.
Do not allow backfeed into the container.
Protect cylinders 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 cylinder 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 cylinder contents.

7.2. Conditions for safe storage, including any incompatibilities

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

7.3. Specific end use(s)

: None.

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SECTION 8. Exposure controls/personal protection

8.1. Control parameters

DNEL: Derived no effect level (Workers) : No data available.

PNEC: Predicted no effect concentration : No data available.

8.2. Exposure controls

8.2.1. Appropriate engineering controls : 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.
Optical flame detection systems shall be provided to detect a fire at potential leak points.
Provide adequate general and local exhaust ventilation.
Consider work permit system e.g. for maintenance activities.

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:
PPE compliant to the recommended EN/ISO standards should be selected.

- **Eye/face protection** : Wear safety glasses with side shields.
Wear goggles and a face shield when transfilling or breaking transfer connections.
Standard EN 166 - Personal eye-protection.
- **Skin protection**
 - **Hand protection** : Wear working gloves when handling gas containers.
Standard EN 388 - Protective gloves against mechanical risk.
 - **Other** : Consider the use of flame resistant anti-static safety clothing.
Standard EN ISO 14116 - Limited flame spread materials.
Standard EN ISO 1149-5 - Protective clothing: Electrostatic properties.
Wear safety shoes while handling containers.
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
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.
- **Thermal hazards** : None necessary.

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.
Odour threshold	: Odour threshold is subjective and inadequate to warn for overexposure.
pH value	: Not applicable for gases and gas-mixtures.
Molar mass [g/mol]	: 32
Melting point [°C]	: -186
Boiling point [°C]	: -111
Critical temperature [°C]	: -3.5
Flash point [°C]	: Not applicable for gases and gas-mixtures.
Evaporation rate (ether=1)	: Not applicable for gases and gas-mixtures.
Flammability range [vol% in air]	: 1.37 - 96 Pyrophoric.

Silane**SILANE_107-SE****SECTION 9. Physical and chemical properties)continued)**

Vapour pressure [20°C]	: Not applicable.
Relative density, gas)air=1)	: 1.1
Relative density, liquid)water=1)	: 0.55
Solubility in water [mg/l]	: No reliable data available.
Partition coefficient n-octanol/water [log Kow]	: Not applicable for inorganic gases.
Auto-ignition temperature [°C]	: -50
Viscosity at 20°C [mPa.s]	: Not applicable.
Explosive Properties	: Not applicable.
Oxidising Properties	: None.

9.2. Other information

Other data	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.
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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. Can ignite spontaneously in air (fire cannot be put out). Can form spontaneous, violently explosive mixture in air.
May react violently with oxidants.**10.4. Conditions to avoid**

: Keep away from heat, sparks, open flames, hot surfaces. – No smoking.

10.5. Incompatible materials: Air, Oxidiser.
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 toxicological effects**

Acute toxicity	: No known toxicological effects from this product.
Rat inhalation LC50 [ppm/4h]	: 9500
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.
Carcinogenicity	: No known effects from this product.
Germ cell mutagenicity	: No known effects from this product.
Reproductive toxicity	: No known effects from this product.

Silane**SILANE_107-SE****SECTION 11. Toxicological information)continued)**

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.

SECTION 12. Ecological information**12.1. Toxicity**

: No data available.

12.2. Persistence and degradability

: Not applicable for inorganic gases.

12.3. Bioaccumulative potential

: No data available.

12.4. Mobility in soil

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

12.5. Results of PBT and vPvB assessment

: Not classified as PBT or vPvB.

12.6. Other adverse effects

Effect on the ozone layer : None.

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

SECTION 13. Disposal considerations**13.1. Waste treatment methods**

: Gases formed by combustion should be washed with water to remove silica.
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.
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.
Ensure that the emission levels from local regulations or operating permits are not exceeded.
Consult supplier for specific recommendations.

List of hazardous waste codes)from
Commission Decision 2001/118/EC)

: 16 05 04: Gases in pressure containers (including halons) containing dangerous substances.

13.2. Additional information

: None.

Silane**SILANE_107-SE****SECTION 14. Transport information**

UN number : 2203

Labelling ADR, IMDG, IATA



: 2.1 : Flammable gases

Transport by road/rail (ADR/RID)

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

Transport by sea (IMDG)

Classification code : 2 F

H.I. nr : 23

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

Emergency Schedule (EmS) - Fire : F-D

Emergency Schedule (EmS) - Spillage : S-U

14.6 Special precautions for user

Packing Instruction(s) : P200

Passenger and Cargo Aircraft : FORBIDDEN.

Cargo Aircraft only : FORBIDDEN.

Special precautions for user : 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 that containers are firmly secured.
- Ensure cylinder 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.
- Ensure there is adequate ventilation.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not applicable.

UN proper shipping name : SILANE

Transport hazard class(es) : 2

Environmental hazards : None.

Proper shipping name : SILANE

Class : 2.1

Packing instruction : P200

IMDG-Marine pollutant : -

Proper shipping name (IATA) : SILANE

Class : 2.1

Silane**SILANE_107-SE****SECTION 15. Regulatory information****15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**EU legislation

Restrictions on use : None.
Seveso directive 2012/18/EC : Covered.

National legislation

National legislation : Ensure all national/local regulations are observed.

15.2. Chemical safety assessment

: This product is either exempt from REACH, does not meet the minimum volume threshold for a CSR or the CSA has not yet been carried out.

SECTION 16. Other information

Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 2015/830.
Training advice : Ensure operators understand the flammability hazard.
The hazard of asphyxiation is often overlooked and must be stressed during operator training.
List of full text of H-statements in section 3. : H220 - Extremely flammable gas.
H280 - Contains gas under pressure; may explode if heated.
Further information : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.
DISCLAIMER OF LIABILITY : 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.
Details given in this document are believed to be correct at the time of going to press. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

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