



Silane

Safety Data Sheet E-4649

according to the Hazardous Products Regulation (February 11, 2015)

Date of issue: 10-15-1979

Revision date: 07-28-2023

Supersedes: 01-01-2021

Version: 1.1

SECTION 1: Identification

1.1. Product identifier

Product form : Substance
Substance name : Silane
CAS No : 7803-62-5
Formula : SiH₄
Other means of identification : Monosilane, silicon hydride, silicon tetrahydride, silicane
Product group : Core Products

1.2. Recommended use and restrictions on use

Recommended uses and restrictions : Industrial use, Use as directed.

1.3. Supplier

Linde Canada inc.
500 — 5015 Spectrum Way
Mississauga - Canada L4W 0E4
T 1-905-803-1600 - F 1-905-803-1682
www.lindecana.ca

1.4. Emergency telephone number

Emergency number : 1-800-363-0042
Call emergency number 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product.
For routine information, contact your supplier or Linde sales representative.

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-CA classification

Pyrophoric Gas H250
Flammable gases, Category 1 H220
Gases under pressure : Liquefied gas H280
Acute toxicity (inhalation:gas) Category 4 H332

2.2. GHS Label elements, including precautionary statements

GHS-CA labelling

Hazard pictograms :



GHS02

GHS04

GHS07

Signal word : DANGER

Hazard statements : **EXTREMELY FLAMMABLE GAS**
CATCHES FIRE SPONTANEOUSLY IF EXPOSED TO AIR
CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
HARMFUL IF INHALED

Precautionary statements : Do not handle until all safety precautions have been read and understood
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Do not allow contact with air.
Avoid breathing gas
Use and store only outdoors or in a well-ventilated place.
LEAKING GAS FIRE: Do not extinguish, unless leak can be stopped safely.

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In case of leakage, eliminate all ignition sources
Use a back flow preventive device in the piping.
Close valve after each use and when empty.
Use only with equipment rated for cylinder pressure.
Use only with equipment purged with inert gas or evacuated prior to discharge from cylinder.
Do not open valve until connected to equipment prepared for use.
When returning cylinder, install leak tight valve outlet cap or plug.
Protect from sunlight when ambient temperature exceeds 52°C (125°F).
Read and follow the Safety Data Sheet (SDS) before use.

2.3. Other hazards

Other hazards which do not result in classification : Spontaneously flammable in air. May ignite spontaneously in contact with air.

2.4. Unknown acute toxicity (GHS CA)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	CAS No.	% (Vol.)	Common Name (synonyms)
Silane (Main constituent)	(CAS No) 7803-62-5	100	Silane, compressed / Silicon tetrahydride / Silicon hydride / Monosilane / Hydrogen silicide

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should give oxygen. Call a physician.

First-aid measures after skin contact : Adverse effects not expected from this product.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/injuries : No additional information available

4.3. Immediate medical attention and special treatment, if necessary

Other medical advice or treatment : Obtain medical assistance.

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media : Escaping gas cannot be extinguished.

5.2. Unsuitable extinguishing media

Unsuitable extinguishing media : **Do not use halon fire extinguisher..**

5.3. Specific hazards arising from the hazardous product

Fire hazard : **DANGER! PYROPHORIC, FLAMMABLE, high pressure gas..** If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.

Explosion hazard : **MAY FORM EXPLOSIVE MIXTURES WITH AIR.**

Reactivity : **The substance may spontaneously ignite on contact with air.**

Reactivity in case of fire : No reactivity hazard other than the effects described in sub-sections below.

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5.4. Special protective equipment and precautions for fire-fighters

Firefighting instructions : **DANGER! PYROPHORIC, FLAMMABLE, high pressure gas.**

Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with their provincial and local fire code regulations.

Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

Other information : Containers are equipped with a pressure relief device. (Exceptions may exist where authorized.).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : **DANGER! PYROPHORIC, FLAMMABLE, high pressure gas.** May ignite spontaneously in contact with air.. May form explosive mixtures with air. Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Remove all sources of ignition if safe to do so. Reduce vapors with fog or fine water spray, taking care not to spread liquid with water. Shut off flow if safe to do so. Ventilate area or move container to a well-ventilated area. Flammable vapors may spread from leak and could explode if reignited by sparks or flames. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an appropriate device.

6.2. Methods and materials for containment and cleaning up

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment.

Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g. wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store only where temperature will not exceed 52 °C (125 °F). Post "No Smoking/No Open Flames" signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g.: CSA, TSSA, or NFPA Codes), or according to the provincial requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16.

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.



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SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Silane (7803-62-5)		
USA - ACGIH	ACGIH OEL TWA [ppm]	5 ppm
Canada (Quebec)	VEMP (OEL TWA)	6.6 mg/m ³
Canada (Quebec)	VEMP (OEL TWA) [ppm]	5 ppm
Alberta	OEL TWA	6.6 mg/m ³
Alberta	OEL TWA [ppm]	5 ppm
British Columbia	OEL STEL [ppm]	1 ppm
British Columbia	OEL TWA [ppm]	0.5 ppm
Manitoba	OEL TWA [ppm]	5 ppm
New Brunswick	OEL TWA	6.6 mg/m ³
New Brunswick	OEL TWA [ppm]	5 ppm
New Foundland & Labrador	OEL TWA [ppm]	5 ppm
Nova Scotia	OEL TWA [ppm]	5 ppm
Nunavut	OEL STEL [ppm]	10 ppm
Nunavut	OEL TWA [ppm]	5 ppm
Northwest Territories	OEL STEL [ppm]	10 ppm
Northwest Territories	OEL TWA [ppm]	5 ppm
Ontario	OEL TWA [ppm]	5 ppm
Prince Edward Island	OEL TWA [ppm]	5 ppm
Québec	VEMP (OEL TWA)	6.6 mg/m ³
Québec	VEMP (OEL TWA) [ppm]	5 ppm
Saskatchewan	OEL STEL [ppm]	10 ppm
Saskatchewan	OEL TWA [ppm]	5 ppm
Yukon	OEL STEL	1.5 mg/m ³
Yukon	OEL STEL [ppm]	1 ppm
Yukon	OEL TWA	0.7 mg/m ³
Yukon	OEL TWA [ppm]	0.5 ppm

8.2. Appropriate engineering controls

Appropriate engineering controls

: Use an explosion-proof local exhaust system. Local exhaust and general ventilation must be adequate to meet exposure standards. MECHANICAL (GENERAL): **Inadequate - Use only in a closed system.** Use explosion proof equipment and lighting.

In semiconductor process gas and other suitable applications, Praxair recommends the use of engineering controls such as gas cabinet enclosures, automatic gas panels (used to purge systems on cylinder changeout), excess-flow valves throughout the gas distribution system, double containment for the distribution system, and continuous gas monitors.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment

: Safety glasses. Face shield. Gloves.



Hand protection

: Wear work gloves when handling containers. Wear heavy rubber gloves where contact with product may occur.

Eye protection

: Wear goggles and a face shield when transfilling or breaking transfer connections. Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

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Skin and body protection	: Wear metatarsal shoes for container handling.
Respiratory protection	: Respiratory protection: Use air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below OEL (if applicable). Select in accordance with provincial regulations, local bylaws or guidelines. Respirators should also be approved by NIOSH and MSHA. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).
Thermal hazard protection	: Wear cold insulating gloves when transfilling or breaking transfer connections.
Other information	: Other protection : Safety shoes for general handling at customer sites. Metatarsal shoes and cuffless trousers for cylinder handling at packaging and filling plants. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines. For working with flammable and oxidizing materials, consider the use of flame resistant anti-static safety clothing.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

(a) Physical state	: Gas
(b) Colour	: Colourless.
(c) Odour	: choking.
Odour threshold	: Odour threshold is subjective and inadequate to warn of overexposure.
(d) Melting point	: -186 °C
Freezing point	: No data available
(e) Boiling point	: -111.5 °C
(f) Flammability	: FLAMMABLE GAS
(g) Flammability (solid, gas)	: 1.4 – 96 vol %
(h) Flash point	: Not applicable.
(i) Auto-ignition temperature	: No data available
(j) Decomposition temperature	: No data available
(k) pH	: Not applicable.
(l) Viscosity, kinematic	: Not applicable.
(m) Solubility	: Water: No data available
(n) Partition coefficient – n-octanol/water [log Pow/log Kow]	: Not applicable.
(o) Vapour pressure	: Not applicable.
(p) Density	:
Relative gas density	: 1.1
(r) Particle characteristics	: No data available
(s) Molecular mass	: 32 g/mol
(t) Critical temperature	: -3.4 °C
(u) Critical pressure	: 4840 kPa
(v) Oxidizing properties	: None.
(w) Relative evaporation rate (butylacetate=1)	: No data available
Relative evaporation rate (ether=1)	: Not applicable.

9.2. Other information

Gas group	: Liquefied gas
Additional information	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

Reactivity	: The substance may spontaneously ignite on contact with air.
Chemical stability	: Stable.
Possibility of hazardous reactions	: May occur.
Conditions to avoid	: Air contact. Moisture. Temperatures in excess of 400°C (752°F).
Incompatible materials	: Air. Water, humidity. Bases. Oxidizing agents. Halogens. Chlorine. Halocarbons.

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Hazardous decomposition products : Hydrogen. Silica dust. Silicon dioxide. **Powder produced in the absence of air may be flammable..**

SECTION 11: Toxicological information

11.1 Likely routes of exposure : Inhalation

11.2 Symptoms related to the physical, chemical, and toxicological characteristics : No additional information available

11.3 Delayed and immediate effects and chronic effects

Acute toxicity (oral) : Not classified
Acute toxicity (dermal) : Not classified
Acute toxicity (inhalation) : HARMFUL IF INHALED.
Skin corrosion/irritation : Not classified
pH: Not applicable.
Serious eye damage/irritation : Not classified
pH: Not applicable.
Respiratory or skin sensitization : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified
Reproductive toxicity : Not classified
Specific target organ toxicity (single exposure) : Not classified
Specific target organ toxicity (repeated exposure) : Not classified
Aspiration hazard : Not classified

11.4 Toxicity

Silane (7803-62-5	
LC50 inhalation rat (ppm)	19000 ppm/1h
ATE CA (Gases)	9500 ppmv/4h

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No known ecological damage caused by this product.

12.2. Persistence and degradability

Silane (7803-62-5)	
Persistence and degradability	Not applicable for inorganic gases.

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12.3. Bioaccumulative potential

Silane (7803-62-5)	
Log Pow	Not applicable.
Log Kow	Not applicable.
Bioaccumulative potential	No data available.

12.4. Mobility in soil

Silane (7803-62-5)	
Mobility in soil	No data available.
Log Pow	Not applicable.
Log Kow	Not applicable.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Effect on the ozone layer : None.
Effect on global warming : No known effects from this product.

SECTION 13: Disposal considerations

Product/Packaging disposal recommendations : Do not attempt to dispose of residual or unused quantities. Return container to supplier.

SECTION 14: Transport information

14.1. Basic shipping description

In accordance with TDG

TDG

UN-No. (TDG) : UN2203
TDG Primary Hazard Classes : 2.1 - Class 2.1 - Flammable Gases
Proper shipping name : SILANE

ERAP Index : 25
Explosive Limit and Limited Quantity Index : 0
Passenger Carrying Ship Index : Forbidden
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index : Forbidden

14.2. Air and sea transport

IMDG

UN-No. (IMDG) : 2203
Proper Shipping Name (IMDG) : SILANE
Class (IMDG) : 2 - Gases
MFAG-No : 116

IATA

UN-No. (IATA) : 2203
Proper Shipping Name (IATA) : Silane
Class (IATA) : 2 - Gases

SECTION 15: Regulatory information

15.1. National regulations

Silane (7803-62-5)
Listed on the Canadian DSL (Domestic Substances List)

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15.2. International regulations

Silane (7803-62-5)

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 EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on the Japanese ISHL (Industrial Safety and Health Law)
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 United States TSCA (Toxic Substances Control Act) inventory
Listed on INSQ (Mexican National Inventory of Chemical Substances)

SECTION 16: Other information

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Indication of changes:

Training advice : Ensure operators understand the flammability hazard. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Users of breathing apparatus must be trained.

Other information : When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product.

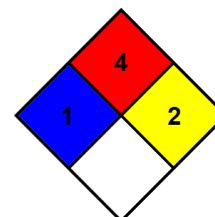
Linde Canada asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Linde Canada Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Linde Canada Inc, it is the user's obligation to determine the conditions of safe use of the product. Linde Canada Inc, SDSs are furnished on sale or delivery by Linde Canada Inc, or the independent distributors and suppliers who package and sell our products. To obtain current SDSs for these products, contact your Linde sales representative, local distributor, or supplier, or download from www.lindecana.ca.

NFPA health hazard : 1 - Exposure could cause irritation but only minor residual injury even if no treatment is given.

NFPA fire hazard : 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

NFPA instability : 2 - Normally unstable and readily undergo violent decomposition but do not detonate. Also: may react violently with water or may form potentially explosive mixtures with water.



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HMIS III Rating

Health	: 0 Minimal Hazard - No significant risk to health
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

SDS Canada (GHS) - Linde NEW

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.