

Material Safety Data Sheet

Silane



Section 1. Chemical product and company identification

Commercial name(s). : Silane
Synonym : Monosilane; Silicane; Silicon tetrahydride
Material uses : Various.
Supplier/Manufacturer : Air Liquide Canada Inc.
1250, René-Lévesque West, Suite 1700
Montreal, QC H3B 5E6
In case of emergency : (514) 878-1667

Section 2. Hazards identification

Physical state : Gas.
Emergency overview : DANGER!
PYROPHORIC CHEMICAL. CATCHES FIRE IF EXPOSED TO AIR. HIGH PRESSURE GAS. MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CAN CAUSE TARGET ORGAN DAMAGE. GAS REDUCES OXYGEN AVAILABLE FOR BREATHING.
Keep away from sources of ignition. Keep away from heat (<52°C/125°F). Use only with adequate ventilation. Extremely hazardous gas under pressure. Keep cylinder valve closed when the product is not used. Gas may accumulate in confined areas.
Routes of entry : Dermal contact. Eye contact. Inhalation.
Potential acute health effects
Inhalation : Slightly irritating to the respiratory system.
Skin : Slightly irritating to the skin.
Eyes : Slightly irritating to the eyes.
Ingestion : Since the product is a gas, it will probably be inhaled rather than ingested. Consider first the preventive measures in case of inhalation.
Potential chronic health effects : Carcinogenic effects: Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.
Mutagenic effects: Not available.
Teratogenic effects: Not available.
Medical conditions aggravated by over-exposure : Repeated or prolonged exposure to the substance can produce target organs damage.

See toxicological information (section 11)

Section 3. Composition, Information on Ingredients

	CAS number	mole %
Canada Silane	7803-62-5	100

This material is classified hazardous under the WHMIS Controlled Product Regulation in Canada.

See Sections 8, 11, 14 and 15 for details.

Section 4. First aid measures

Prompt medical attention is mandatory in all cases of overexposure to this gas. Rescue personnel should wear a self-contained breathing apparatus and be aware of extreme fire and explosion hazard.

Inhalation : In case of inhalation, all persons, still conscious, must be brought far from the contaminated area and allowed to breath fresh air. The short time taken for this operation is essential. All unconscious persons must be carried outside from the contaminated area and given cardiopulmonary resuscitation (CPR) with a supplementary of oxygen. Others should be treated according to their symptoms and needs.

Skin contact	: In case of contact, immediately flush skin with plenty of water. Get medical attention if symptoms occur.
Eye contact	: Individual in contact with a gas should not wear contact lenses. Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 20 minutes. Get medical attention immediately.
Ingestion	: Since the product is a gas, it will probably be inhaled rather than ingested. Consider first the preventive measures in case of inhalation.
Notes to physician	: Effects of contact or inhalation may be delayed. Provide general supportive measures. Oxygen may be beneficial. The medical doctor must be warned that the person may suffer from anoxia.

Section 5. Fire fighting measures

Flammability of the product	: Flammable.
Products of combustion	: Decomposition products may include the following materials: metal oxide/oxides
Fire hazards in the presence of various substances	: Extremely flammable in the presence of the following materials or conditions: open flames, sparks and static discharge. Highly flammable in the presence of the following materials or conditions: heat.
Fire-fighting media and instructions	: Use dry chemical powder. Will ignite itself if exposed to air. May re-ignite itself after fire is extinguished.
Special protective equipment for fire-fighters	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions	: EVACUATE ALL PERSONNEL FROM AFFECTED AREA. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is on container or container valve, contact the closest Air Liquide Canada location.
Environmental precautions	: Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
Methods for cleaning up	: Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Section 7. Handling and storage

Handling	: Keep away from heat, sparks and flame. To avoid fire, eliminate ignition sources. Use explosion-proof electrical equipment (ventilating, lighting and material handling). Valve protection caps must remain in place unless cylinder is secured with valve outlet piped to usage point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure regulator when connecting cylinder to lower pressure piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow to the cylinder. Do not tamper with (valve) safety device. Close valve after each use and when empty.
Storage	: Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 52°C/125°F. Cylinders must be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in - first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no source of ignition in the storage or use area. Segregate from oxidizing materials.

Section 8. Exposure controls/personal protection

- Engineering controls** : Use only in well-ventilated areas. Gas may accumulate in confined areas.
- Personal protection**
- Respiratory** : Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : Wear suitable gloves for the application.
- Eyes** : Splash goggles.
- Skin/Body** : Wear appropriate personal protective suit. Fire retardant clothing may be required when handling or using flammable products.
Metal cap, safety shoes are recommended when handling cylinders.
Static dissipative footwear is recommended when handling or using flammable products.



Some applications of this product may require additional or other specific protective clothings. Please consult your supervisor.

- Personal protection in case of a major leak** : Safety glasses, goggles or face shield. Impervious gloves. Full suit. Metal cap, safety boots. Wear MSHA/NIOSH-approved self-contained breathing apparatus or equivalent and full protective gear.

Product name

Canada

Silane

Exposure limits

CA Alberta Provincial (Canada, 10/2006).

8 hrs OEL: 5 ppm 8 hour(s).

CA British Columbia Provincial (Canada, 7/2007).

TWA: 0.5 ppm 8 hour(s).

STEL: 1 ppm 15 minute(s).

CA Ontario Provincial (Canada, 3/2007).

TWAEV: 5 ppm 8 hour(s).

CA Quebec Provincial (Canada, 12/2006).

TWAEV: 5 ppm 8 hour(s).

In Canadian provinces where no value is specifically suggested, the lowest value above should be used. Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

- Physical state** : Gas.
- Color** : Colorless.
- Odor** : Repulsive.
- Molecular weight** : 32.13 g/mole
- Molecular formula** : SiH₄
- Boiling/condensation point** : -111.67°C (-169°F)
- Melting/freezing point** : -185.15°C (-301.3°F)
- Specific gravity** : 1.114
- Vapor density** : 1.3 [Air = 1]
- Solubility** : Insoluble in the following materials: cold water and hot water.

Section 10. Stability and reactivity

- Stability and reactivity** : The product is stable.
- Incompatibility with various substances** : Spontaneously flammable in air.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Acute Effects

- Inhalation** : Slightly irritating to the respiratory system.
- Skin** : Slightly irritating to the skin.
- Eyes** : Slightly irritating to the eyes.
- Ingestion** : Since the product is a gas, it will probably be inhaled rather than ingested. Consider first the preventive measures in case of inhalation.
- Potential chronic health effects** : Carcinogenic effects: Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.
Mutagenic effects: Not available.
Teratogenic effects: Not available.
- Target organs** : Causes damage to the following organs: mucous membranes, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.

Section 12. Ecological information




- Products of degradation** : Some metallic oxides.

Section 13. Disposal considerations

- Disposal** : Do not attempt to dispose of waste or unused quantities. Return in the shipping container properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to Air Liquide Canada for proper disposal. For emergency disposal, contact the closest Air Liquide Canada location.

Section 14. Transport information

NAERG : 116

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label
TDG Classification	UN2203	SILANE, COMPRESSED	2.1	-	
IMDG Class	UN2203	SILANE, COMPRESSED	2.1	-	
IATA-DGR Class	UN2203	SILANE, COMPRESSED	2.1	-	

PG* : Packing group

Additional information

Cylinders should be transported in a secure position, in a well ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards and should be discouraged.

UN

TDG

IMDG

IATA

-

Special provisions
38

-

Passenger and Cargo Aircraft
Quantity limitation: Forbidden

Section 15. Regulatory information

Canada

WHMIS (Canada)

- : Class A: Compressed gas.
Class B-6: Reactive flammable material
Class D-2B: Material causing other toxic effects (Toxic).



Canadian lists

- : **CEPA Toxic substances:** This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is not listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Canada inventory (DSL/NDSL)

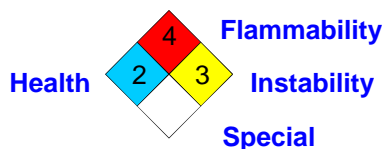
- : This material is listed or exempted.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

Health	2
Fire hazard	4
Physical Hazard	3
Personal protection	G

National Fire Protection Association (U.S.A.)



HAZARD RATINGS

4- Extreme
3- Serious
2- Moderate
1- Slight
0- Minimal

See section 8 for more detailed information on personal protection.

References

- : ANSI Z400.5, MSDS Standard, 2004. - Manufacturer's Material Safety Data Sheet. - Canada Gazette Part II, Vol. 122, No. 2. Registration SOR/88-64, 31 December 1987. Hazardous Products Act "Ingredient Disclosure List" - Canadian Transport of Dangerous Goods, Regulations and Schedules, Clear Language version 2005. CGA C-7 Guide to the Preparation of Precautionary Labels and Marking of Compressed Gas Containers. CGA P-20 Standard for Classification of Toxic Gas Mixtures. CGA P-23 Standard for Categorizing Gas Mixtures Containing Flammable and Nonflammable Components.

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