



DISILANE

Material Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	DISILANE
Product Code(s)	G-30, 1041
UN-Number	UN3161
Recommended Use	Compressed gas.
Synonyms	Silicon Hexahydride; Disilicane; Silicon Hydride (Si ₂ H ₆); Disilicon Hexahydride; Silicoethane; Disilicoethane
Supplier Address*	Linde Gas North America LLC - Linde Merchant Production Inc. - Linde LLC 575 Mountain Ave. Murray Hill, NJ 07974 Phone: 908-464-8100 www.lindeus.com Linde Gas Puerto Rico, Inc. Las Palmas Village Road No. 869, Street No. 7 Catano, Puerto Rico 00962 Phone: 787-641-7445 www.pr.lindegas.com Linde Canada Limited 5860 Chedworth Way Mississauga, Ontario L5R 0A2 Phone: 905-501-1700 www.lindecana.com

* May include subsidiaries or affiliate companies / divisions.

For additional product information contact your local customer service.

Chemical Emergency Phone Number Chemtrec: 1-800-424-9300 for US / 703-527-3887 outside US

2. HAZARDS IDENTIFICATION

DANGER!		
Emergency Overview		
Extremely flammable liquid and vapor		
Pyrophoric gas		
Irritating to eyes, respiratory system and skin		
Contents under pressure		
Keep at temperatures below 52°C / 125°F		
Appearance	Colorless	Physical State
		Compressed gas.
		Odor
		Odorless

OSHA Regulatory Status

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Potential Health Effects

Principle Routes of Exposure Inhalation. Eye contact. Skin contact.

Acute Toxicity

Inhalation Effects of exposure by inhalation not well defined. It has been reported that breathing this gas may cause headache or nausea. The hydrolysis of disilane in the body tissues would form silicic acid or hydrated silica. Effects may be similar to those caused by silane.

Eyes Contact may form silicic acid causing irritation.

Skin Contact may form silicic acid causing irritation.

Skin Absorption Hazard No known hazard in contact with skin.

Ingestion Not an expected route of exposure.

Chronic Effects None known

Aggravated Medical Conditions Skin disorders. Respiratory disorders. Pre-existing eye disorders.

Environmental Hazard See Section 12 for additional Ecological Information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Volume %	Chemical Formula
Disilane	1590-87-0	>99	Si ₂ H ₆

4. FIRST AID MEASURES

Eye Contact Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Get medical attention if irritation persists.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention if irritation develops and persists.

Inhalation PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF INHALATION OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Conscious inhalation victims should be assisted to an uncontaminated area and inhale fresh air. If breathing is difficult, administer oxygen. Unconscious persons should be moved to an uncontaminated area and, as necessary, given artificial resuscitation and supplemental oxygen. Treatment should be symptomatic and supportive.

Ingestion None under normal use. Get medical attention if symptoms occur.

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flammable Properties Extremely flammable liquefied gas. Pyrophoric gas. Spontaneously flammable in air. Containers may explode when heated.

Suitable Extinguishing Media It may be safer to allow the fire to burn itself out. Use water spray to knock down vapors and cool fire-exposed containers.

Hazardous Combustion Products Hydrogen gas. Silicon dioxide.

Explosion Data

Sensitivity to Mechanical Impact None

Sensitivity to Static Discharge Yes.

Specific Hazards Arising from the Chemical Will be easily ignited by heat, sparks or flames. Will form explosive mixtures with air. Vapors from liquefied gas are initially heavier than air and spread along ground. Ruptured cylinders may rocket.

Protective Equipment and Precautions for Firefighters

If possible, stop the flow of gas. Do not extinguish the fire until supply is shut off as otherwise an explosive-ignition may occur. If the fire is extinguished and the flow of gas continues, use increased ventilation to prevent build-up of explosive atmosphere. Ventilation fans must be explosion proof. Use non-sparking tools to close container valves.

Isolate spill or leak area for at least 100 meters (330 feet) in all directions.

Vapors from liquefied gas are initially heavier than air and spread along ground. Vapors may accumulate in confined areas (basement, tanks, hopper / tank cars, etc.). Vapors may travel to source of ignition and flash back. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible withdraw from area and let fire burn.

Use water spray to cool surrounding containers. Be cautious of a Boiling Liquid Evaporating Vapor Explosion, BLEVE, if flame is impinging on surrounding containers.

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA / NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Stop leak if you can do it without risk. Combustible gas concentration must be below 19% of the LEL (0.2%) prior to entry without fire risk.

Environmental Precautions Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material. Prevent entry into waterways, sewers, basements or confined areas.

Methods for Containment Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. If leak is in container or container valve, contact the appropriate emergency telephone number in Section 1 or call your closest Linde location.

Methods for Cleaning Up Return cylinder to Linde or an authorized distributor.

Other Information Ventilate the area.

7. HANDLING AND STORAGE

Handling

Ground and bond all lines and equipment associated with product system. All equipment should be non-sparking and explosion proof. Remove all sources of ignition. Use only in ventilated areas. "NO SMOKING" signs should be posted in storage and use areas.

Never attempt to lift a cylinder by its valve protection cap. Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distance, use a cart designed to transport cylinders. Use equipment rated for cylinder pressure. Use backflow preventive device in piping.

Use an adjustable strap wrench to remove over-tight or rusted caps. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing leak to occur. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.

Never put cylinders into trunks of cars or unventilated areas of passenger vehicles. Never attempt to refill a compressed gas cylinder without the owner's written consent. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit.

Storage

Outside or detached storage is preferred. Protect from physical damage. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Keep at temperatures below 52°C / 125°F. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, pamphlet CGA-P1, Safe Handling of Compressed Gases in Containers.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Disilane 1590-87-0	5 ppm TWA (Silane)	None available	None available

Engineering Measures

Explosion proof ventilation systems. Local exhaust ventilation to prevent accumulation of high concentrations and maintain air-oxygen levels at or above 19.5%. Exhaust gas should be vented to a gas treatment system.

Ventilation

Use ventilation adequate to keep exposures below recommended exposure limits.

Personal Protective Equipment

Eye / Face Protection

Wear protective eyewear (safety glasses).

Skin and Body Protection

Work gloves and safety shoes are recommended when handling cylinders. Cotton or Nomex® clothing is recommended to prevent static build-up.

Respiratory Protection

General Use

If exposure limits are exceeded or irritation is experienced, NIOSH / MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Emergency Use

Use positive pressure airline respirator with escape cylinder or self contained breathing apparatus for oxygen-deficient atmospheres (<19.5%).

Hygiene Measures

Wear suitable gloves and eye / face protection.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colorless.	Odor	Odorless.
Odor Threshold	No information available	Physical State	Compressed gas
Flash Point	No information available.	Autoignition Temperature	No information available.
Decomposition Temperature	No information available.	Boiling Point / Boiling Range	-14.3 °C / -6.3 °F
Freezing Point	-132.6 °C / -206.7 °F	Molecular Weight	62.22
Water Solubility	Insoluble in water	Evaporation Rate	No information available
Vapor Pressure	50 Psia @ STP	Vapor Density	No data available.
Gas Density	@ 21.1°C (70°F): 0.162 lb / ft ³ (0.073 kg / m ³)	VOC Content (%)	Not applicable.
Flammability Limits in Air			
Upper	Unknown		
Lower	0.2%		

10. STABILITY AND REACTIVITY

Stability	Stable.
Incompatible Products	Oxidizing agents. Bases. Halogens. Spontaneously combustible in air.
Conditions to Avoid	Heat, flames and sparks.
Hazardous Decomposition Products	Hydrogen gas. Silane.
Hazardous Polymerization	Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

LD50 Oral:	No information available.
LD50 Dermal:	No information available.
LC50 Inhalation:	Toxicological data was unavailable for disilane. A similar compound, silane has a four hour LC50 of 9600 ppm in the rat. There is limited information for silane and no subacute or chronic data.
Repeated Dose Toxicity	No information available.

Chronic Toxicity

Chronic Toxicity	None known.
Carcinogenicity	Contains no ingredient listed as a carcinogen.
Irritation	May cause skin and eye irritation.
Sensitization	No information available.
Reproductive Toxicity	No information available.
Developmental Toxicity	No information available.

Synergistic Materials	None known.
Target Organ Effects	Central nervous system (CNS).

12. ECOLOGICAL INFORMATION

Ecotoxicity

The environmental impact of this product has not been fully investigated.

Ozone depletion potential; ODP; (R-11 = 1): Does not contain ozone depleting chemical (40 CFR Part 82).

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods	Do not attempt to dispose of residual 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 Linde for proper disposal.
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14. TRANSPORT INFORMATION

DOT

Proper shipping name	Liquefied gas, flammable, n.o.s.
Hazard Class	2.1
Subsidiary Class	None
UN-Number	UN3161
Packing Group	None
Description	UN3161,Liquefied gas, flammable, n.o.s.(Disilane),2.1
Emergency Response Guide Number	115

TDG

Proper Shipping Name	Liquefied gas, flammable, n.o.s.
Hazard Class	2.1
UN-Number	UN3161
Description	UN3161,LIQUEFIED GAS, FLAMMABLE, N.O.S.(Disilane),2.1

MEX

Proper Shipping Name	Liquefied gas, flammable, n.o.s.
Hazard Class	2.1
UN-Number	UN3161
Description	UN3161 Liquefied gas, flammable, n.o.s.(Disilane),2.1

IATA

UN-Number	UN3161
Proper Shipping Name	Liquefied gas, flammable, n.o.s.
Hazard Class	2.1
ERG Code	10L
Description	UN3161,Liquefied gas, flammable, n.o.s.(Disilane),2.1
Maximum Quantity for Passenger	Forbidden

Maximum Quantity for Cargo Only	150 kg
Limited Quantity	Forbidden

IMDG / IMO

Proper Shipping Name	Liquefied gas, flammable, n.o.s.
Hazard Class	2.1
UN-Number	UN3161
EmS No.	F-D, S-U
Description	UN3161, Liquefied gas, flammable, n.o.s.(Disilane),2.1

ADR

Proper Shipping Name	Liquefied gas, flammable, n.o.s.
Hazard Class	2.1
UN-Number	UN3161
Classification Code	2F
Description	UN3161 Liquefied gas, flammable, n.o.s.(Disilane),2.1,

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	Does not Comply
EINECS / ELINCS	Complies

NOTE: This material is supplied under the manufacturer's "Low Volume Exemption" (40 CFR 723) of TSCA. As such, its use is restricted to the formation of silicon and silicon compounds.

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL / NDSL - Canadian Domestic Substances List / Non-Domestic Substances List
EINECS / ELINCS - European Inventory of Existing Commercial Chemical Substances / EU List of Notified Chemical Substances

U.S. Federal RegulationsSARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311 / 312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	Yes
Sudden Release of Pressure Hazard	Yes
Reactive Hazard	No

Clean Water Act

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

Risk and Process Safety Management Programs

This material, as supplied, does not contain any regulated substances with specified thresholds under 40 CFR Part 68.

This product does not contain any substances regulated as Highly Hazardous Chemicals pursuant to the 29 CFR Part 1910.110.

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product does not contain any substances regulated as hazardous air pollutants (HAPS) under Section 112 of the Clean Air Act Amendments of 1990.

CERCLA / SARA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

U.S. State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

This product does not contain any substances regulated by state right-to-know regulations.

International Regulations

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class
Non-controlled
A Compressed gases



Prepared By Product Stewardship
 23 British American Blvd.
 Latham, NY 12110
 1-800-572-6501

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Revision Number 2

Revision Note Not applicable.

<u>NFPA</u>	Health Hazard 1	Flammability 4	Stability 1	Physical and Chemical Hazards -
<u>HMIS</u>	Health Hazard 1	Flammability 4	Physical Hazard 2	Personal Protection -

Note: Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2009, CGA Recommended Hazard Ratings for Compressed Gases, 3rd Edition.

General Disclaimer

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde LLC, Linde Merchant Production, Inc. or Linde Gas North America LLC (or any of their affiliates and subsidiaries) and the purchaser.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

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End of Safety Data Sheet