

Safety Data Sheet

Material Name: Disilane

* * *Section 1 - IDENTIFICATION* * *		
GHS product identifier Chemical name Other means of	: Disilane : Disilane : Disilicane; H3SiSiH3; Si2H6; Silicoethane	
identification Product use	: Semiconductor, Doping Agent, Industrial and Specialty Gas applications, Silicon	
Synonym	: Disilicane; H3SiSiH3; Si2H6; Silicoethane	
Supplier's details	: Electronic Fluorocarbons 3266 Bergey Road Hatfield PA 19440	
Emergency telephone # Outside the US (call collect)	: 1-800-535-5053 1-352-323-3500	
* * *Section 2 - HAZARDS IDENTIFICATION* * *		
OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).	
Classification of the substance or mixture	 According to: Regulation (EC) No 1272/2008 (CLP)/REACH 1907/2006 [Amended by 2015/830] FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Compressed gasPYROPHORIC Liquids - Category 1 	
<u>GHS label elements</u> Hazard pictograms		
Signal word Hazard statements	 Danger Extremely flammable gas. Contains gas under pressure; may explode if heated. Catches fire spontaneously if exposed to ai 	

Material Name: Disilane

Safety Data Sheet

Precautionary statements	
General	: Read and follow all Safety Data Sheets (SDS'S) before use.
	Read label before use.
	DO NOT REMOVE MANUFACTURER PRODUCT LABEL
	If medical advice is needed, have product container or label at hand.
	Close valve after each use and when empty.
	Use equipment rated for cylinder pressure.
	Do not open valve until connected to equipment prepared for use.
	Use a back flow preventative device in the piping.
	Use only equipment of compatible materials of construction.
-	When returning cylinder, install leak tight valve outlet cap or plug
	Protect from -sunlight when ambient temperature exceeds 52 C (125 F)
Prevention Material Name: Disilane	: Never Put cylinders into unventilated areas of passenger vehicles. Keep away from heat, sparks, open flames and hot surfaces No smoking. Use only outdoors or in a well-ventilated area. Keep container tightly closed. Protect from moisture. Handle or store contents under inert gas. Use and store only outdoors or in a well-ventilated place. Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response	: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for
-	breathing.
	: Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.
	: IF ON SKIN: Immerse in cool water or wrap in wet bandages
Storage	: Protect from sunlight. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.
Disposal	: Dispose of in accordance with federal, state, and local regulations.
Hazards not	: In Canada, the product mentioned above is considered hazardous under
UIIEI WISE UIASSIIIEU	the Workplace Hazardous Materials Information System (WJMIS).
	:In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS Substance/mixture : Substance Chemical name : Disilane Other means of identification : Disilicane; H3SiSiH3; Si2H6; Silicoethane : CAS: 1590-87-0 : CAS: 1590-87-0 CAS number/other identifiers: EINECAS 216-466-5

Product code

Ingredient name	%	CAS number
disilane	100	1590-87-0

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

2

* * *Section 4 – FIRST AID MEASURES* * *

Description of necessary first aid measures

Eye contact	: If eye tissue is frozen, seek medical attention immediately; if tissue is not frozen, immediately and thoroughly flush the eyes with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation, pain, swelling, lacrimation or photophobia persist, get medical attention as soon as possible.
Inhalation	: Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. If signs/symptoms continue, get medical attention.: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Get medical attention if symptomsoccur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Skin Contact	: If frostbite has occurred, seek medical attention immediately; do NOT rub the affectedarea(s) or flush them with water. In order to prevent further tissue damage, do NOT attempt to remove frozen clothing from frostbitten areas. If frostbite has not occurred, immediately and thoroughly wash contaminated skin with soap and water.
Ingestion	: If frostbite has occurred, seek medical attention immediately; do NOT rub the affectedarea(s) or flush them with water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Skin contact	: Contact with rapidly expanding gas may cause burns or frostbite.	
Frostbite	: Try to warm up the frozen tissues and seek medical attention.	
Ingestion	: As this product is a gas, refer to the inhalation section.	
Over-exposure signs/symptoms		
Eye contact	: No specific data.	
Inhalation	: No specific data.	
Skin contact	: No specific data.	
Ingestion	: No specific data.	

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician	 Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments	: No specific treatment.
Protection of first-aiders	: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Material Name: Disilane

Safety Data Sheet

	: DO NOT EXTINGUISH burning disilane unless disilane leak can be safely stopped. Use water spray or fog to keep container cooled.
	: None known.
<u>Extinguishing media</u> Suitable extinguishingmedia	DO NOT EXTINGUISH burning disilane unless disilane leak can be safely stopped. Use water spray or fog to keep container cooled
Unsuitable extinguishingmedia	No data available
Specific hazards arising from the chemical	
Unusual Fire and Explosion Hazards	: EXTREMELY FLAMMABLE 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. Vapors may travel to source of ignition and flash back. Cylinders exposed to fire may vent and release flammable gas through pressure relief devices. Containers may explode when heated. Ruptured cylinders may rocket
Hazardous Combustion Products	No data available
Special protective actions for fire-fighters	 Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible. Always wear thermal protective clothing when handling refrigerated/cryogenic liquids. Wear positive pressure self-contained breathing apparatus (SCBA). Move containers from fire area if you can do it without risk. FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions. FIRE INVOLVING TANKS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. FIRE INVOLVING TANKS: Cool containers with flooding quantities of water until well after fire is out. FIRE INVOLVING TANKS: Do not direct water at source of leak or safety devices; icing may occur. FIRE INVOLVING TANKS: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. FIRE INVOLVING TANKS: ALWAYS stay away from tanks engulfed in fire. FIRE INVOLVING TANKS: For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

* * *Section 6 - Accidental Release Measures* * *

Personal precautions, protective equipment and emergency procedures

Personal Precautions	: Ventilate the area before entry. Do not walk-through spilled material. Use appropriate Personal Protective Equipment (PPE). Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. CAUTION: When in contactwith refrigerated/cryogenic liquids, many materials become brittle and are likely to break without warning.	
Emergency Procedures	: ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Keep unauthorized personnel away. Keep out of low areas. Stay upwind. LARGE SPILL: Consider initial downwind evacuation for at least 800 meters (1/2 mile) As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.	
Environmental precautions : Prevent spreading of vapors through sewers, ventilation systems and confined areas.		
Containment/Clean-up		
Measures	: Stop leak if you can do it without risk. Allow substance to evaporate. Isolate area until gas has dispersed. If possible, turn leaking containers so that gas escapes rather than liquid. Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container. Do not direct water at spill or source of leak. All equipment used when handling the product must be grounded.	
Reference to other Sections		
	: Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations	

* * *Section 7 - HANDLING AND STORAGE* * *

Precautions for safe handling

Handling	Ose good safety and industrial hygiene practices. Use only with adequate ventilation. Do not enter storage areas and confined spaces unless adequately ventilated. Use explosion-proof electrical (ventilating, lighting, and material handling) equipment. Use only non-sparking tools. Store and use away from heat, sparks, open flame or any other ignition source. Contains gas under pressure. Put on appropriate personal protective equipment (see section 8). Wear appropriate respirator when ventilation is inadequate. Avoid breathing gas. Avoid contact with skin, eyes, and clothing. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Eating, drinking, and smoking should be prohibited in areas where this material is handled, stored, and processed. Workers should wash hands and face before eating, drinking, and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 fr additional information on hygiene measures. 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 preventer 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/international, state/ provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.
Conditions for safe storage, including any incompatibilities	: Use a first-in, first-out inventory system to prevent storing full containers for long periods. Store only where temperature will not exceed 125°F (52°C). 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, NFPA 30, NFPA 55, NFPA 70, NFPA 221, and/or CGA G-13 in the U.S.) or per requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Always install valve protectioncap firmly in place by hand when the container is not in use. Store full and empty containers separately.

* * *Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION* * *

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
disilane	No applicable exposure limits available for product or components
Appropriate engineering controls	: Use only with adequate ventilation. Engineering controls may be required to control the primary or secondary risks associated with this product. Use process enclosures,local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.
Environmental exposurecontrols	: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipmentwill be necessary to reduce emissions to acceptable levels.
Individual protection mea	asures
Hygiene measures	: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipmentwill be necessary to reduce emissions to acceptable levels.
	Wash contaminated clothing before reusing. Ensure that eyewash stations and safetyshowers are close to the workstation location.
Eye/face protection	: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. Select eye protection in accordance with OSHA 29 CFR 1910.133 orlocal authority.
<u>Skin/ Body</u> protection	: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by aspecialist before handling this product. Select per OSHA 29 CFR 1910.132, 1910.136, and 1910.138 or local authority. Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Select per OSHA 29 CFR 1910.132, 1910.136, and 1910.138 or local authority.
Other skin protection	: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Material Name: Disilane

Safety Data Sheet

Issue Date: 3/10/2022

* * *Section 9 – PHYSICAL AND CHEMICAL PROPERTIES* * *

Appearance	
Physical stateColor Molecular weight	: Gas. [COLORLESS GAS WITH A REPULSIVE ODOR] : Colorless. : 70.17 g/mole : H6Si2
Molecular	: -14.15°C (-6.53°F) : -132.5°C (-206.5°F)
formula Boiling/condensation pointMelting/freezing point Critical temperature	 150.8°C (303.4°F) Repulsive, choking odor Not available.
Odor Odor thresholdpH Flash point Burning time Burning rate Evaporation rate	 Not available. Not available. Not applicable. Not available. Not available. Lower: 0.2% Upper: Not available
Flammability (solid, gas) Lower and upper explosive(flammable) limits	 : 327.8 kPa abs (47.5 psia)(2459 mmHg) at 21.1 C/70 F : 2.1 (Air = 1) 1 atm and 70 F (21.1 C) : 2.0408 : 0.49 : Not applicable.
density Specific Volume (ft ³ /lb) Gas Density (lb/ft ³)	 Not available. Not available. Not available.
Solubility Solubility in water Partition coefficient: n-	 Not available. Not available.
octanol/water Auto-ignition temperature	: Not available.

Other Information : Disilane is pyrophoric; however, it does not always ignite when vented to the atmosphere. Lack of instantaneous ignition may lead to delayed ignition.

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	* * *Section 10 - STABILITY AND REACTIVITY* * *
Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable under normal temperatures and pressures.
Possibility of hazardous reactions	: This product, by reaction with air and without energy supply, is liable to self-heat and may ignite when in large amounts and after long periods of time.
Conditions to avoid	: Do not allow contact with air. Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld,braze, solder, drill, grind or expose containers to heat or sources of ignition.
Incompatibility with various Substances	: Extremely reactive or incompatible with the following materials: oxidizing materials, alkalis, moisture, air, halogenated compounds, chlorine
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced. When released: hydrogen, silica dust, silicon dioxide. Powder produced in the absence of air may be flammable.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.

* * *Section 11 - TOXICOLOGICAL INFORMATION* * *

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
disilane	LC50 Inhalation Gas.	Rat	19200 ppm	1 hours

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure

Potential acute health effects

Acute (Immediate)	: This material is a simple asphyxiant. May displace or reduce oxygen available for breathing, especially in confined spaces. If this material is released in a small, poorly ventilated area (i.e., an enclosed or confined space), an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in the ears, dizziness, drowsiness, unconsciousness, nausea, vomiting
Chronic (Delayed)	No data available Skin
Acute (Immediate)	Contact with gas or liquefied gas will cause burns, severe injury and/or frostbite.
Chronic (Delayed)	No data available
Eye	
Acute (Immediate)	Contact with gas or liquefied gas will cause burns, severe injury and/or frostbite.
Chronic (Delayed)	No data available
Ingestion	
Acute (Immediate)	Contact with gas or liquefied gas will cause burns, severe injury and/or frostbite.
Chronic (Delayed)	No data available

* * *Section 12 - ECOLOGICAL INFORMATION* * *

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Not available.

Mobility in soil

Soil/water partition coefficient (Koc)	: Not available.
Other adverse effects	: No known significant effects or critical hazards.

Section 13 - DISPOSAL CONSIDERATIONS Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN3161	UN3161	UN3161	UN3161	UN3161
UN proper shipping name	Liquefied gas, flammable, n.o.s. (disilane)	LIQUEFIED GAS, FLAMMABLE, N.O.S. (disilane)	LIQUEFIED GAS, FLAMMABLE, N.O.S. (disilane)	LIQUEFIED GAS, FLAMMABLE, N.O.S. (disilane)	Disilane
Transport hazard class(es)	2.1	2.1	2.1	2.1	2.1
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional Information		Explosive Limit and Limited Quantity Index 0.125 ERAP Index 3000 Passenger Carrying Road or Rail Index Forbidden			

* * *Section 14 - Transport Information* * *

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

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

* * *Section 15 - REGULATORY INFORMATION* * *				
U.S. Federal regulations	: TSCA 8(a) CDR Exempt/Partial exemption: Not determined United States inventory (TSCA 8b): This material is listed or exempted. Clean Air Act (CAA) 112 regulated flammable substances: silane			
Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)	: Not listed			
Clean Air Act Section 602 Class I Substances	: Not listed			
Clean Air Act Section 602 Class II Substances	: Not listed			
DEA List I Chemicals (Precursor Chemicals)	: Not listed			
DEA List II Chemicals (Essential Chemicals)	: Not listed			

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ SARA : Not applicable.

_	<u>311/312</u>					-
Component	CAS	Canada DSL	Canada NDSL	EU EINECS	EU ELNICS	TSCA
Disilane	1590-87-0	No	Yes	Yes	No	Yes

Priority Substances List : Disilane

Classification

: Fire hazard

Sudden release of pressure

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
disilane	100	Yes.	Yes.	No.	Yes.	No.

State regulations

CA Prop. 65	: This product does not contain any chemicals known to the State of California to cause
New York	: This material is not listed.
New Jersey	: This material is not listed.
Pennsylvania	: This material is listed.
Canada inventory	: This material is listed.
International regulations	: This material is listed or exempted.
International lists	: Australia inventory (AICS): This material is not detrmined.
	China inventory (IECSC): This material is listed or exempted. Japan inventory: This material is listed or exempted. Korea inventory: This material is listed or exempted. Malaysia Inventory (EHS Register): Not determined. New Zealand Inventory of Chemicals (NZIoC): This material is not determined. Philippines inventory (PICCS): This material is listed or exempted. Taiwan inventory (CSNN): Not determined.
Chemical Weapons Convention List Schedule Chemicals	: Not listed

Safety Data Sheet

Material	Name:	Disilane
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Chemical Weapons Convention List Schedule II Chemicals	: Not listed
Chemical Weapons Convention List Schedule III Chemicals	: Not listed
<u>Canada</u>	
WHMIS (Canada)	: Class A: Compressed gas. Class B-1: Reactive flammable material
	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 Ontario Designated Substances: This material is not
	Quebec Designated Substances: This material is not

* * *Section 16 - OTHER INFORMATION* * *

listed. listed.

Canada Label requirements : Class A: Compressed gas. Class B-1: Flammable material

Hazardous Material Information System (U.S.A)

Health 2* Flammability 4 Physical Hazards 3

NFPA Ratings

Health: 1 Fire: 4 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe **Key / Legend**

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA -Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial ChemicalSubstances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC -International Agencyfor Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG -International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI -List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID

- European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States**Other Information**

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