

Danger



SECTION 1: Identification of the hazardous chemical and of the supplier

1.1. Product identifier

Trade name : Dichlorosilane
Name : Dichlorosilane
CAS-No. : 4109-96-0
Formula : SiH₂Cl₂

1.2. Other means of identification

Product code : ALM/SDS/270

1.3. Recommended use of the chemical and restrictions on use

Recommended use : Industrial and professional uses. Perform risk assessment prior to use.
Test gas/Calibration gas.
Chemical reaction / Synthesis.
Use for manufacture of electronic/photovoltaic components.
Laboratory use.
Contact supplier for more information on uses.

Restrictions on use : Consumer use.

1.4. Supplier details

AIR LIQUIDE MALAYSIA SDN. BHD.
Lot PT 2317, No. 21, Jalan PTB 1
Kawasan Perindustrian Tangga Batu, Mukim Sungai Udang,
76400 Melaka
Malaysia
T +606-3513512

1.5. Emergency phone number

Emergency number : +606-3513512

SECTION 2: Hazards identification

2.1. Classification of the hazardous chemical

Classification according to Industry Code of Practice on chemicals classification and hazard communication (2019)

Flammable gases, Category 1	H220
Gases under pressure : Liquefied gas	H280
Acute toxicity (inhalation:gas) Category 2	H330
Skin corrosion or irritation, Category 1B	H314
Serious eye damage or eye irritation, Category 1	H318

2.2. Label elements

Labelling according to Industry Code of Practice on chemicals classification and hazard communication (2019)

Hazard pictograms (GHS MY) :



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Signal word (GHS MY)	: Danger
Hazard statements (GHS MY)	: H220 - Extremely flammable gas H280 - Contains gas under pressure; may explode if heated H314 - Causes severe skin burns and eye damage H330 - Fatal if inhaled
Precautionary statements (GHS MY)	: P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking P260 - Do not breathe dust/fume/gas/mist/vapours/spray P264 - Wash ... thoroughly after handling P271 - Use only outdoors or in a well-ventilated area P280 - Wear protective gloves/protective clothing/eye protection/face protection P284 - Wear respiratory protection P301+P330+P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting P303+P361+P353 - IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing P310 - Immediately call a POISON CENTER or doctor/physician P320 - Specific treatment is urgent (see ... on this label) P321 - Specific treatment (see ... on this label) P363 - Wash contaminated clothing before reuse P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely P381 - Eliminate all ignition sources if safe to do so P403 - Store in a well-ventilated place P403+P233 - Store in a well-ventilated place. Keep container tightly closed P405 - Store locked up P410+P403 - Protect from sunlight. Store in a well-ventilated place P501 - Dispose of contents/container to ...

2.3. Other hazards that do not result in classification

Other hazards which do not result in classification : None, The substance/mixture has no endocrine disrupting properties.

SECTION 3: Composition and information of the ingredients of the hazardous chemical

3.1. Substances

Name	Product identifier	%
Dichlorosilane (Main constituent)	CAS-No.: 4109-96-0	100

Full text of H-statements: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of necessary first aid measures

First-aid measures after inhalation	: Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Perform cardiopulmonary resuscitation if breathing stopped.
First-aid measures after skin contact	: Remove contaminated clothing. Drench affected area with water for at least 15 minutes.
First-aid measures after eye contact	: Immediately flush eyes thoroughly with water for at least 15 minutes.
First-aid measures after ingestion	: Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms/effects, acute and delayed

Most important symptoms and effects, both acute and delayed	: May cause severe chemical burns to skin and cornea. Suitable first-aid treatment should be immediately available. Seek medical advice before using product. Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea. See section 11.
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4.3. Indication of immediate medical attention and special treatment needed, if necessary

Other medical advice or treatment : Obtain medical assistance. Treat with corticosteroid spray as soon as possible after inhalation.

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media : Water spray or fog. Dry powder. Shutting off the source of the gas is the preferred method of control.

Unsuitable extinguishing media : Carbon dioxide. Do not use water jet to extinguish.

5.2. Physicochemical hazards arising from the chemical

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

Hazardous combustion products : Silica dust (inert - but may irritate respiratory tract and eyes). Hydrogen chloride.

5.3. Special protective equipment and precautions for fire fighters

Hazchem Code : 2WE

Special protective equipment for fire fighters : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus. Standard EN 943-2: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Gas-tight chemical protective suits for emergency teams. Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

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. Use water spray or fog to knock down fire fumes if possible. Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire. Move containers away from the fire area if this can be done without risk.

EAC code : 2WE

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment, and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures : Act in accordance with local emergency plan. Try to stop release. 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. See section 8 of the SDS for more information on personal protective equipment.

6.1.2. For emergency responders

Emergency procedures : Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Use chemically protective clothing. Monitor concentration of released product. Consider the risk of potentially explosive atmospheres. See section 5.3 of the SDS for more information.

6.2. Environmental precautions

Reduce vapour with fog or fine water spray. Try to stop release.

6.3. Methods and materials for containment and cleaning up

Methods and material for containment and cleaning up : Hose down area with water. Dust deposited may be vacuum cleaned or the area hosed down with water. Wash contaminated equipment or sites of leaks with copious quantities of water.

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SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safe handling of the gas receptacle

: Refer to supplier's container handling instructions. Do not allow backfeed into the container. Protect containers 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 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 content of the container. Suck back of water into the container must be prevented. Open valve slowly to avoid pressure shock.

Safe use of the product

: Do not breathe gas. Avoid release of product into work area. The product must be handled in accordance with good industrial hygiene and safety procedures. Only experienced and properly instructed persons should handle gases under pressure. Consider pressure relief device(s) in gas installations. Ensure the complete gas system was (or is regularly) checked for leaks before use. Do not smoke while handling product. Avoid exposure, obtain special instructions before use. Avoid contact with aluminium. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Installation of a cross purge assembly between the container and the regulator is recommended. Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service. Avoid suck back of water, acid and alkalis. Assess the risk of potentially explosive atmospheres and the need for explosion-proof equipment. Purge air from system before introducing gas. Take precautionary measures against static discharge. Keep away from ignition sources (including static discharges). Consider the use of only non-sparking tools. Ensure equipment is adequately earthed.

7.2. Conditions for safe storage, including any incompatibilities

Conditions for safe storage, including any incompatibilities

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

SECTION 8: Exposure controls and personal protection

8.1. Control parameters

No additional information available

Exposure limit values for the other components

No additional information available

8.1.1 Biological monitoring

No additional information available

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8.2. Appropriate engineering controls

Appropriate engineering controls : Product to be handled in a closed system and under strictly controlled conditions. Provide adequate general and local exhaust ventilation. Preferably use permanent leak-tight installations (e.g. welded pipes). Systems under pressure should be regularly checked for leakages. Gas detectors should be used when toxic gases may be released. Consider the use of a work permit system e.g. for maintenance activities.

8.3. Individual protection measures, such as PPE

Hand protection:

Wear working gloves when handling gas containers. Standard EN 388 - Protective gloves against mechanical risks, performance level 1 or higher. Wear chemically resistant protective gloves. Standard EN 374 - Protective gloves against chemicals. Chloroprene rubber (Neoprene®) (CR)

Eye protection:

Wear goggles and a face shield when transfilling or breaking transfer connections. Standard EN 166 - Personal eye-protection - specifications. Provide readily accessible eye wash stations and safety showers.

Respiratory protection:

Gas filters may be used if all surrounding conditions e.g. type and concentration of the contaminant(s) and duration of use are known. Use gas filters with full face mask, where exposure limits may be exceeded for a short-term period, e.g. connecting or disconnecting containers. Consult respiratory device supplier's product information for the selection of the appropriate device. Gas filters do not protect against oxygen deficiency. Standard EN 14387 - Gas filter(s), combined filter(s) and standard EN136, full face masks . Keep self contained breathing apparatus readily available for emergency use. Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems. Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

Personal protective equipment symbol(s):



Thermal hazard protection

: None in addition to the above sections.

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

Physical state	: Gas
Appearance	: No data available
Colour	: Colourless. Gives off white fumes in moist air.
Odour	: Pungent.
Odour threshold	: Odour threshold is subjective and inadequate to warn of overexposure.
pH	: Not applicable for gases and gas mixtures.
Melting point	: -122 °C
Freezing point	: -122 °C
Boiling point	: 8.4 °C
Flash point	: Not applicable for gases and gas mixtures.
Evaporation rate	: Relative evaporation rate (ether=1): Not applicable for gases and gas mixtures.
Flammability (solid, gas)	: Extremely flammable gas.
Explosive limits	: 2.5 – 80 vol %
Vapour pressure	: Vapour pressure: 1.6 bar(a) Vapour pressure at 50°C: 3.8 bar(a)
Relative vapour density at 20°C	: Not applicable.
Relative density	: 1.3 Relative gas density: 3.5
Solubility	: Water: Completely soluble.

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Partition coefficient n-octanol/water (Log Pow)	: Not applicable for inorganic products.
Partition coefficient n-octanol/water (Log Kow)	: .Not applicable for gas mixtures.
Critical temperature	: 176 °C
Auto-ignition temperature	: 45 – 185
Decomposition temperature	: Not applicable.
Viscosity, kinematic	: No reliable data available.
Viscosity, dynamic	: No reliable data available.
Explosive properties	: Not applicable.
Gas group	: Press. Gas (Liq.)
Molecular mass	: 101 g/mol
Oxidising properties	: Not applicable.
Additional information	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

Reactivity	: No reactivity hazard other than the effects described in sub-sections below.
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: Can form explosive mixture with air,May react violently with oxidants.
Conditions to avoid	: Keep away from heat/sparks/open flames/hot surfaces. – No smoking,Avoid moisture in installation systems.
Incompatible materials	: Air, Oxidisers,For additional information on compatibility refer to ISO 11114.
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 (oral)	: Not classified
Acute toxicity (dermal)	: Not classified
Acute toxicity (inhalation)	: Fatal if inhaled.

Dichlorosilane (4109-96-0)	
LC50 Inhalation - Rat [ppm]	157 ppm/4h

Skin corrosion or irritation	: Causes severe skin burns. pH: Not applicable for gases and gas mixtures.
Serious eye damage or eye irritation	: Causes serious eye damage.
Respiratory sensitization	: Not classified
Skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity (STOT) – single exposure	: Not classified
Specific target organ toxicity (STOT) – repeated exposure	: Not classified
Aspiration hazard	: Not classified

Dichlorosilane (4109-96-0)	
Viscosity, kinematic	No reliable data available.

Other information : The substance/mixture has no endocrine disrupting properties.

SECTION 12: Ecological information

12.1. Ecotoxicity

Ecology - general	: No data available.
Hazardous to the aquatic environment, short-term (acute)	: Not classified

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Hazardous to the aquatic environment, long-term (chronic) : Not classified

Dichlorosilane (4109-96-0)	
Partition coefficient n-octanol/water (Log Kow)	.Not applicable for gas mixtures.
Partition coefficient n-octanol/water (Log Pow)	Not applicable for inorganic products.

12.2. Persistence and degradability

Dichlorosilane (4109-96-0)	
Persistence and degradability	Not applicable for inorganic products.

12.3. Bioaccumulative potential

Dichlorosilane (4109-96-0)	
Partition coefficient n-octanol/water (Log Pow)	Not applicable for inorganic products.
Partition coefficient n-octanol/water (Log Kow)	.Not applicable for gas mixtures.
Bioaccumulative potential	No data available.

12.4. Mobility in soil

Dichlorosilane (4109-96-0)	
Mobility in soil	No additional information available
Partition coefficient n-octanol/water (Log Pow)	Not applicable for inorganic products.
Partition coefficient n-octanol/water (Log Kow)	.Not applicable for gas mixtures.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution. Partition into soil is unlikely.

12.5. Other adverse effects

Ozone : Not classified
Effect on global warming : No known effects from this product.
Effect on the ozone layer : None.
Other adverse effects : May cause pH changes in aqueous ecological systems.

SECTION 13: Disposal information

13.1. Disposal methods

Waste treatment methods : Contact supplier if guidance is required. Must not be discharged to atmosphere. Toxic and corrosive gases formed during combustion should be scrubbed before discharge to atmosphere. Gas may be scrubbed in alkaline solution under controlled conditions to avoid violent reaction. Gases formed by combustion should be washed with water to remove silica. Ensure that the emission levels from local regulations or operating permits are not exceeded. Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.eu> for more guidance on suitable disposal methods. Return unused product in original container to supplier.

Additional information : External treatment and disposal of waste should comply with applicable local and/or national regulations.

SECTION 14: Transportation information

14.1. UN number

UN-No.(UN RTDG) : 2189
UN-No. (IMDG) : 2189
UN-No. (IATA) : 2189

14.2. UN proper shipping name

Proper Shipping Name (UN RTDG) : DICHLOROSILANE

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Proper Shipping Name (IMDG) : DICHLOROSILANE
Proper Shipping Name (IATA) : Dichlorosilane

14.3. Transport hazard class(es)

UN RTDG

Transport hazard class(es) (UN RTDG) : 2.3 (2.1, 8)

Danger labels (UN RTDG) : 2.3, 2.1, 8



IMDG

Transport hazard class(es) (IMDG) : 2.3 (2.1, 8)

Danger labels (IMDG) : 2.3, 2.1, 8



IATA

Transport hazard class(es) (IATA) : 2.3 (2.1, 8)

14.4. Packing Group, if applicable

Packing group (UN RTDG) : Not applicable

Packing group (IMDG) : Not applicable

Packing group (IATA) : Not applicable

14.5. Environmental hazards

Dangerous for the environment : No

Marine pollutant : No

Other information : No supplementary information available

14.6. Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code)

Special transport precautions : 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 there is adequate ventilation, - Ensure that containers are firmly secured, - Ensure 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.

UN RTDG

Limited quantities (UN RTDG) : 0

Excepted quantities (UN RTDG) : E0

Packing instruction (UN RTDG) : P200

IMDG

Limited quantities (IMDG) : 0

Excepted quantities (IMDG) : E0

Packing instructions (IMDG) : P200

EmS-No. (Fire) : F-D - FIRE SCHEDULE Delta - FLAMMABLE GASES

EmS-No. (Spillage) : S-U - SPILLAGE SCHEDULE Uniform - GASES (FLAMMABLE, TOXIC OR CORROSIVE)

Stowage category (IMDG) : D

Stowage and handling (IMDG) : SW2

Segregation (IMDG) : SG4, SG9, SG72

Properties and observations (IMDG) : Flammable, toxic and corrosive gas. Reacts with water, evolving hydrogen chloride. Highly irritating to skin, eyes and mucous membranes.

MFAG-No : 119

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IATA

PCA Limited quantities (IATA)	: Forbidden
PCA limited quantity max net quantity (IATA)	: Forbidden
PCA packing instructions (IATA)	: Forbidden
PCA max net quantity (IATA)	: Forbidden
CAO packing instructions (IATA)	: Forbidden
CAO max net quantity (IATA)	: Forbidden
Special provisions (IATA)	: A2
ERG code (IATA)	: 10P

14.7. Special precautions for user

IBC code : Not applicable.

14.8. Hazchem or Emergency Action Code

EAC code : 2WE.
Hazchem Code : 2WE

SECTION 15: Regulatory information

15.1. Safety, health, and environmental regulations specific for the hazardous chemical in question

Dichlorosilane (4109-96-0)	
EHS Notification and Registration Scheme	Not applicable
EHS Notification and Registration Scheme	Not applicable
Environmental Quality (Chlorofluorocarbons Prohibition) Order 1993	
Environmental Quality (Industrial Effluent) Regulations 2009	
Environmental Quality (Scheduled Wastes) Regulations 2007	
Control of Industrial Major Accident Hazards Regulations 1996	
Prohibition of Use of Substance Order 1999	
Use and Standards of Exposure of Chemical Hazardous to Health Regulations 2000	
Chemical Weapons Convention Act	
Corrosive and Explosive Substances and Offensive Weapons Act	
Dangerous Drugs Act	
Pesticides Act	
Petroleum (Safety Measures) Act	
Poisons Act 1952	
Poisons (Psychotropic Substances) Regulations 1989	

15.2. International agreements

No additional information available

SECTION 16: Other information

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Abbreviations and acronyms

- : ATE - Acute Toxicity Estimate
 - CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
 - REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
 - EINECS - European Inventory of Existing Commercial Chemical Substances
 - CAS# - Chemical Abstract Service number
 - PPE - Personal Protection Equipment
 - LC50 - Lethal Concentration to 50 % of a test population
 - RMM - Risk Management Measures
 - PBT - Persistent, Bioaccumulative and Toxic
 - vPvB - Very Persistent and Very Bioaccumulative
 - STOT- SE : Specific Target Organ Toxicity - Single Exposure
 - CSA - Chemical Safety Assessment
 - EN - European Standard
 - UN - United Nations
 - ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road
 - IATA - International Air Transport Association
 - IMDG code - International Maritime Dangerous Goods
 - RID - Regulations concerning the International Carriage of Dangerous Goods by Rail
 - WGK - Water Hazard Class
 - STOT - RE : Specific Target Organ Toxicity - Repeated Exposure
 - UFI : Unique Formula Identifier
- Training advice : Users of breathing apparatus must be trained. Ensure operators understand the flammability hazard. Ensure operators understand the toxicity hazard.
- Other information : Classification in accordance with the procedures and calculation methods of Regulation (EC) 1272/2008 (CLP). Key literature references and sources of data are maintained in EIGA doc 169 : 'Classification and Labelling Guide', downloadable at <http://www.Eiga.eu> .

Safety Data Sheet (SDS), Malaysia_AL

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.