SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name: Dichlorosilane
SDS no: SDS-043-CLP
Chemical description: Dichlorosilane
CAS No: 4109-96-0
EC no: 223-888-3
EC index no: --
Registration-No.: Registration deadline not expired.
Chemical formula: SiH2Cl2

1.2. Relevant identified uses of the substance or mixture and uses advised against

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

Uses advised against: Consumer use.

1.3. Details of the supplier of the safety data sheet

Company identification: Air Liquide UK Ltd.
Station Road, Coleshill
B46 1JY Birmingham United Kingdom
01675 462424
genenq.aluk@airliquide.com

1.4. Emergency telephone number

Emergency telephone number: 01675 462695

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Physical hazards: Flammable gases, Category 1 H220
Gases under pressure: Liquefied gas H280

Health hazards: Acute toxicity (inhalation:gas) Category 2 H330
Skin corrosion/irritation, Category 1B H314
Serious eye damage/eye irritation, Category 1 H318

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]
F+; R12

2.2. Label elements

Air Liquide UK Ltd.
Station Road, Coleshill B46 1JY
Birmingham United Kingdom
01675 462424

EN (English) SDS Ref.: SDS-043-CLP 1/10
Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP):

- GHS02
- GHS04
- GHS05
- GHS06

Signal word (CLP): Danger

Hazard statements (CLP):
- 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 (CLP):

- Prevention:
  - 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.
  - P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
  - P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

- Response:
  - 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/doctor/....

- Storage:
  - P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
  - P410+P403 - Protect from sunlight. Store in a well-ventilated place.

- Disposal considerations:
  - P501 - Dispose of contents/container to ... .

2.3. Other hazards

: None.

SECTION 3: Composition/information on ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification according to Directive 67/548/EEC</th>
<th>Classification according to Regulation (EC) No. 1272/2008 [CLP]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dichlorosilane</td>
<td>(CAS No) 4109-96-0</td>
<td>100</td>
<td>F+, R12</td>
<td>Flam. Gas 1, H220, Press. Gas (Liq.), H280, Acute Tox. 2 (Inhalation:gas), H330, Skin Corr. 1B, H314, Eye Dam. 1, H318</td>
</tr>
</tbody>
</table>

Contains no other components or impurities which will influence the classification of the product.

*1: Listed in Annex IV / V REACH, exempted from registration.
*2: Registration deadline not expired.
*3: Registration not required: Substance manufactured or imported < 1t/y.

Full text of R-phrases see section 16. Full text of H-statements see section 16.
3.2. Mixture : Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

- Skin contact : Remove contaminated clothing. Drench affected area with water for at least 15 minutes.

- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.

- Ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

: May cause severe chemical burns to cornea. Suitable first-aid treatment should be immediately available. Seek medical advice before using product. Material is destructive to tissue of the mucous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea. Refer to section 11.

4.3. Indication of any immediate medical attention and special treatment needed

: Treat with corticosteroid spray as soon as possible after inhalation. Obtain medical assistance.

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Water spray or fog. Dry powder.

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

5.2. Special hazards arising from the substance or mixture

Specific hazards : Exposure to fire may cause containers to rupture/explode.

Hazardous combustion products : If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition:
- Silica dust (inert - but may irritate respiratory tract and eyes).
- Hydrogen chloride.

5.3. Advice for fire-fighters

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.

Special protective equipment for fire fighters : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.
- 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.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Dichlorosilane

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safe use of the product

The substance 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.
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 cylinder 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.
Do not breathe gas.
Avoid release of product into atmosphere.
Safe handling of the gas receptacle:

Refer to supplier's container handling instructions. Do not allow backfeed into the container. Protect cylinders 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 cylinder 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 cylinder contents.

7.2. 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.

7.3. Specific end use(s):

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters:

OEL (Occupational Exposure Limits): No data available.
DNEL (Derived-No Effect Level): No data available.
PNEC (Predicted No-Effect Concentration): No data available.

8.2. Exposure controls:

8.2.1. 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 only permanent leak-tight installations (e.g. welded pipes). Systems under pressure should be regularly checked for leakages. Ensure exposure is below occupational exposure limits (where available). Gas detectors should be used when toxic gases may be released. Consider work permit system e.g. for maintenance activities.

8.2.2. Individual protection measures, e.g. personal protective equipment:

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered: PPE compliant to the recommended EN/ISO standards should be selected.
**Eye/face protection**: Wear safety glasses with side shields.
Wear goggles and a face shield when transferring or breaking transfer connections.
Standard EN 166 - Personal eye-protection.
Provide readily accessible eye wash stations and safety showers.

**Skin protection**
- **Hand protection**: Wear working gloves when handling gas containers.
Standard EN 388 - Protective gloves against mechanical risk.
Wear chemically resistant protective gloves.
Standard EN 374 - Protective gloves against chemicals.
Chloroprene rubber (CR)
Consult glove manufacturer’s product information on material suitability and material thickness.
The breakthrough time of the selected gloves must be greater than the intended use period.

- **Other**: Consider the use of flame resistant anti-static safety clothing.
Standard EN ISO 1149-5 - Protective clothing: Electrostatic properties.
Wear safety shoes while handling containers.
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
Keep suitable chemically resistant protective clothing readily available for emergency use.
Standard EN943-1 - Full protective suits against liquid, solid and gaseous chemicals.

**Respiratory protection**: Keep self-contained breathing apparatus readily available for emergency use.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.

**Thermal hazards**: None necessary.

**8.2.3. 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

#### 9.1. Information on basic physical and chemical properties

**Appearance**
- Physical state at 20°C / 101.3kPa: Gas.
- Colour: Colourless. Gives off white fumes in moist air.

**Odour**: Pungent.

**Odour threshold**: Odour threshold is subjective and inadequate to warn of overexposure.

**pH value**: Not applicable.

**Molar mass**: 101 g/mol

**Melting point**: -122 °C

**Boiling point**: 8.4 °C

**Flash point**: Not applicable for gases and gas mixtures.

**Critical temperature [°C]**: 176 °C

**Evaporation rate (ether=1)**: Not applicable for gases and gas mixtures.

**Flammability range**: 2.5 - 80 vol %

**Vapour pressure [20°C]**: 1.6 bar(a)

**Vapour pressure [50°C]**: 3.8 bar(a)

**Relative density, gas (air=1)**: 3.5

**Relative density, liquid (water=1)**: 1.3

**Solubility in water**: Completely soluble.
Partition coefficient n-octanol/water [log Kow] : Not applicable for inorganic gases.
Auto-ignition temperature : 45 - 185 No reliable data available.
Viscosity [20°C] : Not applicable.
Explosive Properties : Not applicable.
Oxidising Properties : None.

9.2. Other information
Other data : Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity
No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability
Stable under normal conditions.

10.3. Possibility of hazardous reactions
May react violently with oxidants. Can form explosive mixture with air.

10.4. Conditions to avoid
Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

10.5. Incompatible materials
Air, Oxidiser.
For additional information on compatibility refer to ISO 11114.

10.6. 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 : Delayed fatal pulmonary oedema possible.

| LC50 inhalation rat (ppm) | 157 ppm/4h |

Skin corrosion/irritation : Severe corrosion to skin at high concentrations.
Serious eye damage/irritation : Severe corrosion to the eyes at high concentrations.
Respiratory or skin sensitisation : No known effects from this product.
Germ cell mutagenicity : No known effects from this product.
Carcinogenicity : No known effects from this product.
Toxic for reproduction : Fertility : No known effects from this product.
Toxic for reproduction : unborn child : No known effects from this product.
STOT-single exposure : May cause nausea and irritation of the respiratory tract. Hydrolysis of silanes in the body forms silicic acid or hydrated silica. Severe corrosion to the respiratory tract at high concentrations.
STOT-repeated exposure : No known effects from this product.
Aspiration hazard : Not applicable for gases and gas mixtures.

SECTION 12: Ecological information

12.1. Toxicity
Assessment : No data available.

12.2. Persistence and degradability

Assessment : Not applicable for inorganic gases.

12.3. Bioaccumulative potential

Assessment : No data available.

12.4. Mobility in soil

Assessment : Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Results of PBT and vPvB assessment

Assessment : No data available.

12.6. Other adverse effects

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

May cause pH changes in aqueous ecological systems.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Consult supplier for specific recommendations.
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.org for more guidance on suitable disposal methods.

List of hazardous waste codes (from Commission Decision 2001/118/EC) : 16 05 04: Gases in pressure containers (including halons) containing dangerous substances.

13.2. Additional information

None.

SECTION 14: Transport information

14.1. UN number

UN-No. : 2189

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : DICHLOROSILANE
Transport by air (ICAO-TI / IATA-DGR) : DICHLOROSILANE
Transport by sea (IMDG) : DICHLOROSILANE

14.3. Transport hazard class(es)
Dichlorosilane

Labelling:

2.3 : Toxic gases
2.1 : Flammable gases
8 : Corrosive substances

Transport by road/rail (ADR/RID)

Class : 2
Classification code : 2TFC
Hazard identification number : 263
Tunnel Restriction : B/D - Tank carriage : Passage forbidden through tunnels of category B, C, D and E. Other carriage : Passage forbidden through tunnels of category D and E

Transport by air (ICAO-TI / IATA-DGR)

Class / Div. (Sub. risk(s)) : 2.3 (2.1, 8)

Transport by sea (IMDG)

Class / Div. (Sub. risk(s)) : 2.3 (2.1, 8)

Emergency Schedule (EmS) - Fire : F-D
Emergency Schedule (EmS) - Spillage : S-U

14.4. Packing group

Transport by road/rail (ADR/RID) : Not applicable
Transport by air (ICAO-TI / IATA-DGR) : Not applicable
Transport by sea (IMDG) : Not applicable

14.5. Environmental hazards

Transport by road/rail (ADR/RID) : None.
Transport by air (ICAO-TI / IATA-DGR) : None.
Transport by sea (IMDG) : None.

14.6. Special precautions for user

Packing Instruction(s)

Transport by road/rail (ADR/RID) : P200
Transport by air (ICAO-TI / IATA-DGR)
  Passenger and Cargo Aircraft : Forbidden
  Cargo Aircraft only : Forbidden
Transport by sea (IMDG) : P200

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 cylinder 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.
14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

: Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

EU-Regulations

Restrictions on use : None.
Seveso directive 96/82/EC : Covered.

National regulations

National legislation : Ensure all national/local regulations are observed.
Water hazard class (WGK) : -
Kenn-Nr. : 557

15.2. Chemical safety assessment

: This product is either exempt from REACH, does not meet the minimum volume threshold for a CSR or the CSA has not yet been carried out.

SECTION 16: Other information


Training advice : Ensure operators understand the flammability hazard. Ensure operators understand the toxicity hazard. Users of breathing apparatus must be trained.

Further information : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.

Full text of R-, H- and EUH-phrases

<table>
<thead>
<tr>
<th>Acute Tox. 2 (Inhalation:gas)</th>
<th>Acute toxicity (inhalation:gas) Category 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Dam. 1</td>
<td>Serious eye damage/eye irritation, Category 1</td>
</tr>
<tr>
<td>Flam. Gas 1</td>
<td>Flammable gases, Category 1</td>
</tr>
<tr>
<td>Press. Gas (Liq.)</td>
<td>Gases under pressure : Liquefied gas</td>
</tr>
<tr>
<td>Skin Corr. 1B</td>
<td>Skin corrosion/irritation, Category 1B</td>
</tr>
<tr>
<td>H220</td>
<td>Extremely flammable gas</td>
</tr>
<tr>
<td>H280</td>
<td>Contains gas under pressure; may explode if heated</td>
</tr>
<tr>
<td>H314</td>
<td>Causes severe skin burns and eye damage</td>
</tr>
<tr>
<td>H318</td>
<td>Causes serious eye damage</td>
</tr>
<tr>
<td>H330</td>
<td>Fatal if inhaled</td>
</tr>
<tr>
<td>R12</td>
<td>Extremely flammable</td>
</tr>
<tr>
<td>F</td>
<td>Extremely flammable</td>
</tr>
</tbody>
</table>

DISCLAIMER OF LIABILITY : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Details given in this document are believed to be correct at the time of going to press. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

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