물질안전보건자료
(Material Safety Data Sheet)

Name of the product	DISILANE (Si2H6)

1. Chemical product and corporate information.

A. Name of the product DISILANE

B. Recommended use of the product and limitation of the usage.

Recommended use of the product Semiconductor processing

Limitation of the usage: Usage other than the recommended is prohibited.

C. Supplier's information.(In case of imported product, state the supplier's information for emergency contact)

Name of the corporate: FEWM Co. LTD

Address: 53, Jeungpyeong2sandan-ro, Doan-myeon, . Jeungpyeong-gun, Chungcheongbuk-do

Emergency Contact: 043)838-9562

2. Hazards. Maleficence

A. Hazards. Maleficence classification Inflammable gas: Category 1.
High-pressure gas: liquefied gas.

B. Cautionary statements including the measures for safety.

Symbolics

Signals Warning

Hazards wordings H220: Extremely flammable gas
H280 Includes high-pressure gas: May explode on heating

Preventional wordings

Prevention P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Response P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381: Eliminate all ignition sources if safe to do so.

Storage P410+P403 Avoid sunlight and keep in a well-ventilated area.

Dispoal	No data available.

C. Other hazards and maleficence not included in the standards of the category of hazards and maleficence (NFPA)

Sanitation	No data available.
Fire	No data available.
Reactivity	No data available.

3. Title and content of the component

Name of the component	DISILANE
Nickname (Trivial name)	DISILANE (Si2H6)
CAS no	1590-87-0
Content (%)	100%

4. Emergency measures.

A. If in eyes

Take emergency medical measures.

B. If on skin

Take emergency medical measures.
Melt the frozen cloth stuck on the skin before removing it.
In case of a burn, cool the area with cold water for as long as possible, and do not remove the cloth melted on the skin.
In case of contact with the liquid gas, melt the area with lukewarm water.
When contact with the gas or the liquid gas, it may cause a burn, serious injury, frostbite.

C. If inhaled

Move it to the area with fresh air.
Take emergency medical measures.
In case of not breathing, execute artificial respiration.
Provide oxygen if breathing is difficult.
Keep warm and in rest.

D. If swallowed.

Take emergency medical measures.

E. Other cautions to doctor

Make sure that the medical personnel is aware of the material and take protective measures.

5. Measures in case of explosion, fire.

A. Recommended (prohibited) extinguisher.

In the case of extinguishment concerned with this material, use alcohol foam, carbon dioxide or water spray.
Use dry sand or soil when extinguishment by smothering.

B. Specific hazard from the chemical component

Some of the material could be irritating when inhaled in high-density.
Cylinder exposed to fire could release flammable gas.
The vapor could flashback by moving to the source of ignition.
Easily ignited by heat, spark, flame.
Extremely flammable.
Forms explosive mixture with air.
The container may explode on heating.
May cause fire and explosion by intense polymerization.
Includes high-pressure gas: May explode on heating.
Extremely flammable gas.
The vapor may cause dizziness or suffocation without awareness.
In the case of fire, irritating, corrosive, toxic gas may be formed.

C. Protective equipment when fire-fighting and preventional measures.

Do not extinguish unless the spillage could not be stopped in case of the fire due to gas spillage.
Remove the source of ignition if it could be done safely.
Fight fire away from the region from a reasonable distance.
Be careful as the liquid gas spreads on the ground as it is heavier than the air.
Be careful as the damaged container may fly.
Do not extinguish the fire due to gas spillage if the spillage could not be stopped.
In case of tank fire, if it a large-scale fire, use an unmanned extinguisher and if not possible, refrain and let it burn.
In the case of thank fire, as there is a risk of freezing, doe not wet the source of leakage or safety facility.
In case of tank fire, extinguish at the maximum distance or use an unmanned extinguisher.
In the case of tank fire, cool the container with a large amount of water after the extinguishment.
Immediately refrain in case of tank fire, if there is noise from the pressure relief equipment or discoloration to the tank.
Stay away from the tank in flame in case of tank fire.
Move the container from the area of fire if not dangerous.

6. Measures in case spillage

A. Required measures and protections to protect the body.

Do not extinguish unless the spillage could not be stopped in case of the fire due to gas spillage.
Pay attention to the materials and conditions to avoid.

Eliminate all the sources of ignition as microfine particles could cause fire or explosion.
If possible, turn the container of the leakage and let is release as a gas rather than liquid.
Isolate the contaminated area until the gas completely disperse and dilutes.
The item on contact with the refrigerant liquid could easily break.
Do not touch the spillage or walk around.
Do not wet the source of spillage directly.
Remove all the source of ignition.
Reduce the vapor using water spray, or avoid the contact of water with the spillage by disheveling the steam point.
Graft all the equipment when handling the material.
If not dangerous, stop the spillage.

B. Environmental measures.

Prevent entering the waterway, drainage, basement, confined area.

C. Purification or removal methods.

For fire fighting purposes, build embarkment and collect water.

7. Handling and storage measures.

A. Safety measures.

Do not pressurize, cut, weld, solder, connect, pierce, grind or expose to heat, fire, spark, static or other sources of ignition.
As there could be remains of the material to the container after it has been emptied, hence follow all the MSDS/label preventional measures.
Graft all the equipment when handling the material.
Pay attention to the material and conditions to avoid.
Work with reference to engineering maintenance and personal protection.

B. Safe storage measures.

Avoid direct sunlight and keep in a well-ventilated area.
\Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
The pressure of the container could rise when exposed to heat hence refrain from exposure to heat.
Pay attention to the material and conditions to avoid.
Store it well-sealed.

8. Prevention of spillage and personal protection.

A. Exposure standards of the chemical material, biological exposure standards, etc.

Domestic Regulations	No data available.
ACGIH Regulation	5ppm TWA (Silante)
Biological exposure standards	No data available.

B. Appropriate engineering maintenance. No data available.

C. Personal protection

Respiratory protection	Use the gas mask that has completed the inspection by the Korea Occupational Safety and Health Agency in case there is direct contact to the material or possibility of exposure. In case of processing in the area that lacks oxygen (oxygen density below 19.5%) or in a confined area, wear the air supplied mask or positive air respirator that is approved by the Korea Occupational Safety and Health Agency. [Material to prepare for the accident] In case of a mixture that has disilane and more than 10% of it, wear what is more than the air supplied mask.
Eye protection	Wear safety glasses and safety clothes that are approved by the Korea Occupational Safety and Health Agency in case there is direct contact or the possibility of exposure to the material.
Hand protection	Wear safety gloves for chemical materials that are approved by the Korea Occupational Safety and Health Agency in case there is direct contact or the possibility of exposure to the material. [Material to prepare for the accident] In case of a mixture that has disilane and more than 10% of it, wear what is more than the safety gloves for chemical materials.
Body protection	Wear safety clothes for chemical materials or safety shoes for the chemical materials that are approved by the Korea Occupational Safety and Health Agency in case there is direct contact or the possibility of exposure to the material or wear work clothes in the texture of Nomex to prevent the static electricity. [Material to prepare for the accident] In case of a mixture that has disilane and more than 10% of it, wear the protective clothes for chemical material 3 or 4 (full body)

9. Physicochemical characteristic.

A. External

Shape	Lquefied gas.
Color	No color

B. Odor — Pungent ordor

C. Odor threshold — (NIL)

D. pH — (Not applicable)

E. Melting point/ freezing point — -133 C

F. Initial boiling post and boiling point range -14.3 C
G. Ignition point 0 C (Source: KISCHEM)
H. Vaporization speed No data available.
I. Inflammability (solid, vapor) (Inflammable)
J. Upper limit or lower limit of the range of ignition or explosion 100/1 % (Source: GESTIS)
K. Steam pressure Data: 2,940 mmHg, Additional information: 25 C (Source: KISCHEM)
L. Solubility (Soluble (Solvent Solubility: Solubility: Alcohol, benzene, carbon bisulfide, Tetraethyl orthosilicate))
M. Vapor density (None (Density: 2.865 g/L))
N. Specific gravity (Not Applicable)
O. n-octanol-water partition coefficient (Not Applicable)
P. Auto-ignition temperature No data available.
Q. Decomposition temperature No data available.
R. Viscosity No data available.
S. Molecular weight 62.22

10. Stability and reactivity

A. Chemical stability and hazardous reactivity

Includes high-pressure gas: May explode on heating
Extremely gas.
May cause fire and explosion by intense Polymerization.
In the case of fire, irritating, corrosive, toxic gas may be formed.
The vapor may cause dizziness or suffocation without awareness.
Part of the material could be irritating when inhaled in high-density.
Cylinder exposed to fire may release flammable gas.
The vapor may flashback by moving to the source of ignition.
Easily ignited by heat, spark, flame.
Extremely inflammable.
Forms explosive mixture with air.
The container may explode when heated.

B. Conditions to avoid Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
C. Materials to avoid Contamination by an oxidizing agent must be prevented as there is a risk of flame. Thus nitrates, oxidizing acids, chlorine bleaches, pool chlorine, etc. Air, halogen types, oxidizing agents.
D. Harmful decomposed product Irritating, corrosive, toxic gas Silane, Hydrogen, Silicon dioxide, (SiO2) Silicates.

11. Toxicological information.

A. Information on routes of exposure of high possibility.

Irritation, vomiting, headache.

B. Health hazards information.

Acute toxicity

Oral	No data available.
Skin	No data available.
Inhalation	9600 ppm (rat) 4h (silane)
Skin corrosion or irritation	No data available
Serious eye damage or irritation	No data available
Respiratory sensitization	No data available.
Skin sensitizations	No data available.
Carcinogenicity	No data available.

Occupation safety and health acts

Notice of Ministry of Employment and Labor	No Data Available.
IARC	No Data Available.
OSHA	No Data Available.
ACGIH	No data available
NTP	No data available.
EU CLP	No data available.
Germ-cell mutagenicity	No data available.
Reproductive toxicity	No data available.
Specific target organ systemic toxicity (Single exposure)	No data available.
Specific target organ systemic toxicity (Repeated exposure)	No data available.
Aspirations respiratory tract hazards	No data available.

12. Effects on the environment.

A. Ecotoxicity

Fish	LC50 580.394 mg/l 96 hr. (Source: ECOSAR)
Crustacean	LC50 573.618 mg/l 48 hr Others (Daphind) (Source: ECOSAR)
Algae	EC50335.253 mg/l 96 hr. Others (Green algae) (Source: ECOSAR)

B. Persistent and biodegradable.

Persistent	(Not applicable)
Degradability	No data available.

C. Bio-accumulative potential

Condenasability	3.162 (Source: QSAR)
Biodegradability	No data available.

D. Mobility in soil No data available

E. Other adverse effects No data available

13. Disposal considerations.

A. Methods of waste disposal

1) Incinerate.

2) In case incineration is not possible, bury in the maintained reclamation facility where the waste could be buried after cutting, destructing it to the maximum size lower than 15 centimeters or melted.

B. Cautious measures when disposal.

Consider the regulations if stated in the waste control act.

14. Information required for transport.

A.	UN No.	3161
B.	Proper shipping name	LIQUEFIED GAS, FLAMMABLE N.O.S
C.	Transportation hazard classification	2.1
D.	If applied, the packing group	-
E.	Marin pollution (Marine pollutant material)	No data available.

F. Special transport measures to the transport or the transportation and precautionary conditions that the user should know.

Emergency measures in case of fire	F-D
Emergency measures in case of spillage	S-U

15. Legal regulatory status.

A.	Regulations by occupation safety and health acts Public Safety Reports (PSM)	Material objected to submitting
B.	Regulations by Chemicals control Act	Material to prepare for accident.
C.	Regulations by Safety Control of Dangerous Substances	Not Applicable.
D.	Regulations by waste control act	Specified waste.

E. Regulations by domestic and foreign law.

Other domestic regulations.

Persistent organic pollutants control act	Not Applicable.

Foreign regulations

The USA knowledge management (OSHA Regulations)	Not Applicable.
The USA knowledge management (CERCLA Regulations)	Not Applicable.
The USA knowledge management (EPCRA 302 Regulations)	Not Applicable.
The USA knowledge management (EPCRA 304 Regulations)	Not Applicable.
The USA knowledge management (EPCRA 313 Regulations)	Not Applicable.
The USA knowledge management (EPCRA 302 Regulations)	Not Applicable.
The USA knowledge management (Materials of Rotterdam agreement)	Not Applicable.
The USA knowledge management (Materials of Stockholm agreement)	Not Applicable.
The USA knowledge management (Materials of Montreal protocol)	Not Applicable.
EU Classification(result of definite classification)	Not Applicable.
EU Classification (Hazard text)	Not Applicable.
EU Classification (Safety text)	Not Applicable.

16. Other information.

A. Source of reference.

GESTIS (J. Upper limit or lower limit of the range of ignition or explosion)
ECOSAR (Fish)
ECOSAR (Crustacean)
Material Safety Data Sheet of Korea Occupational Safety and Health Agency, Final revised date 2nd April 2018 LINDE US MSDS, LIND-P050 DISILANE, Revision Date 23rd August 2017 Entire Chemical material
Chemical material safety maintenance information system htt://kischem.nier.go
ECOSAR (Algae)
QSAR (Condenasability)

B. Initial date of preparation 1st August 2017

C. Number of revision and first date of issue

Number of revision times
Last date of revision 9th August 2018.

D. Miscellaneous

The issued Material safety data sheet (MSDS) is document edited and partly amended by referencing the MSDS provided by Korea Occupational Safety and Health Agency