



Material Safety Data

Product Name :HYDROGEN

긴급전화번호 (Emergency Telephone Number)
061 - 688 - 6117 (24 hours)

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1. Product

- ☐ Product Name : HYDROGEN
- ☐ UN NO. : 1049

2. Advisable use and Restriction

- ☐ Advisable use : FUEL
- ☐ Restriction : Do not handle until all safety precautions have been read and understood.

3. Manufacturer information

- ☐ Manufacture company : YEOCHUN NCC
- ☐ Address: 2 Yeosusandan-3ro(205-6,Pyeongyeo-dong), Yeosu, Jeollanam-Do, Korea (555-210)
- ☐ Telephone: 82-61-688-6117

2. HAZARD IDENTIFICATION

1. Hazard classification

- FLAMMABLE GASES Category 1
- GASES UNDER PRESSURE Compressed gas

2. Allocation label elements

- ☐ Symbol



- ☐ Signal Word : Danger

- ☐ Hazard statements

H220 Extremely flammable gas.

H280 Contains gas under pressure; may explode if heated.

- ☐ Precautionary statements

- 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

P403 Store in a well-ventilated place.

P410 + P403 Protect from sunlight. Store in a well-ventilated place.

3. Other hazard information not included in hazard classification (NFPA)

Chemical Name	NFPA Level		
	Health	Flammability	Reactivity
HYDROGEN	0	4	0

3. INGREDIENT INFORMATION

Components	Common name	CAS No.	PCT(M%)
HYDROGEN	HYDROGEN	1333-74-0	95 ~ 100

4. FIRST AID MEASURES

1. Following eye contact

- It is unlikely that emergency treatment will be required for contact with the gas form.
- If contact with liquefied or compressed gas occurs, flush eyes with large amounts of water for at least 15–20 minutes until no evidence of chemical remains.
- Get medical attention immediately.

2. Following skin contact

- It is unlikely that emergency treatment will be required for contact with the gas form.
- If contact with liquefied or compressed gas occurs, flush skin with large amounts of water for at least 15–20 minutes until no evidence of chemical remains.
- Get medical aid immediately.
- Wash skin with soap and water.
- If frostbite or cryogenic burns occur, warm affected area in warm water at a temperature of 107°F(41.7°C).
- Seek immediate medical assistance.

3. Following inhalation

- Administer oxygen if breathing is difficult.
- Give artificial respiration if victim is not breathing.
- Keep victim warm and quiet.
- Move to fresh air.
- Seek immediate medical assistance.

4. Following ingestion

- It is unlikely that emergency treatment will be required for contact with the gas form..
- It is unlikely that emergency treatment will be required.

5. Advice to physician

- Do not apply drugs of the adrenaline ephedrine group.

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- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
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5. FIRE FIGHTING MEASURES

1. Suitable/Unsuitable extinguishing media

○ Suitable extinguishing media

- CO2.
- Dry chemical.
- Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.
- Use dry sand or earth to smother fire.

○ Unsuitable extinguishing media

2. Specific hazards arising from the chemical

○ Pyrolytic product

○ Risk of fire and explosion

- Containers may explode when heated.
- Contains gas under pressure; may explode if heated.
- Cylinders exposed to fire may vent and release flammable gas through pressure relief devices.
- Extremely flammable gas.
- Extremely flammable.
- Fire may produce irritating and/or toxic gases.
- May ignited from heat, friction or contamination.
- May violently polymerize and result in fire and explosion.
- Some may burn but none ignite readily.
- When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
- Will be easily ignited by heat, sparks or flames.
- Will form explosive mixtures with air.

3. Special protective equipment for firefighters

- Contact may cause burns to skin and eyes.
 - DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.
 - Damaged cylinders should be handled only by specialists.
 - Evacuate area and fight fire from a safe distance.
 - Fire involving Tanks: ALWAYS stay away from tanks engulfed in fire.
 - 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: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
 - Fire involving Tanks: For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
 - Fire involving Tanks: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
 - Move containers from fire area if you can do it without risk.
 - Runoff may cause pollution.
 - Ruptured cylinders may rocket.
 - Substance may be transported hot.
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- Use extinguishing agent suitable for type of surrounding fire.
- vapors from liquefied gas are initially heavier than air and spread along ground.

6. ACCIDENTAL RELEASE MEASURES

1. Health considerations and protective equipment
 - All equipment used when handling the product must be grounded.
 - Allow substance to evaporate.
 - Do not direct water at source of leak.
 - Do not enter areas which have more than 23.5% oxygen in the atmosphere, without respirator or air supplied mask.
 - Do not touch or walk through spilled material.
 - ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
 - If possible, turn leaking containers so that gas escapes rather than liquid.
 - Isolate area until gas has dispersed.
 - Please note that materials and conditions to be avoided.
 - Stop leak if you can do it without risk.
 - The very fine particles can cause a fire or explosion, eliminate all ignition sources.
 - Ventilate the contaminated area.
2. Environmental precautions
 - Prevent entry into waterways, sewers, basements or confined areas.
3. For cleaning up
 - Dike and collect water used to fight fire.
 - Small Spill: Flush area with flooding quantities of water.

7. HANDLING AND STORAGE

1. Precautions for safe handling
 - Caution: Dangerous fire hazard when exposed to heat, or flame, sparks.
 - Use adequate machine for prevention when package handling.
 - Wear an appropriate Personal protection. (See Exposure Controls/Personal Protection section.)
2. Conditions for safe storage (including any incompatibilities)
 - Choose a place that can be protected from strong oxidizers and acid.
 - Store containers: AVOID the place where can be damage and contamination.
 - Store in a cool/low-temperature, well-ventilated {dry} place {away from heat and ignition sources}

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

1. Exposure exposure limits, Biological exposure standard :

Components	Occupational exposure	ACGIH	Biological standard
HYDROGEN	No data available	Simple Asphyxiant	No data available

2. Appropriate engineering controls
 - Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

3. Personal protection equipment

○ Respiratory protection

- If high frequency of use or exposure, wear air respirator.
- Wear breathing protection, which needs a confirmation from the Korea Occupational Safety and Health Agency.

○ Eye protection

- Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
- Provide emergency showers and eyewash.
- Wear suitable protective goggles and face shields.

○ Hand protection

- Wear Non-moisture permeable chemical resistance protective gloves(latex, nitrile rubber, PC) for prevent skin contact.
- Wear insulated gloves.
- Wear suitable protective gloves.

○ Body protection

- Wear suitable protective clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colorless gas
Odour	Odorless
Odour threshold	N/A
pH Values	N/A
Melting point/freezing point	-259℃
Initial boiling point and boiling range	-253℃
Flash point	< -150 °C (Closed cup)
Evaporation rate	N/A
Flammability(solid, gas)	Flammable gas
Upper/lower flammability or explosive limits	4~75 Vol %
Vapour pressure	$1.65 \times 10^5 \text{ kPa} (1240000 \text{ mmHg} (25^\circ\text{C}))$
Solubility(ies)	$1.62 \times 10^{-4} \text{ g/100ml} (21^\circ\text{C}, \text{Water})$
Vapor Densities	0.069 (Air =1)
Relative density	70.96 kg/m ³ , BP
n-octanol/water partition coefficient	0.45 (Log Kow)
Auto ignition temperature	560℃
Decomposition temperature	No data available
Viscosity	$2.56 \times 10^{-2} \text{ cP} (26.8^\circ\text{C})$
Molecular weight(mass)	2

10. STABILITY AND REACTIVITY

1. Stability and hazardous reactivity

- Containers may explode when heated.
- Contains gas under pressure; may explode if heated.
- Cylinders exposed to fire may vent and release flammable gas through pressure relief devices.
- Extremely flammable gas.
- Extremely flammable.
- Fire may produce irritating and/or toxic gases.
- Fire may produce irritating, corrosive and/or toxic gases.
- May cause toxic effects if inhaled.
- May violently polymerize and result in fire and explosion.
- Will form explosive mixtures with air.
- Stable under normal temperatures and pressures.
- When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
- Will be easily ignited by heat, sparks or flames.

2. Conditions to avoid

- Ignition source(heat, spark, flame, etc.).

3. Materials to avoid

- Combustibles.
- Irritating and/or toxic gas.

4. Hazardous decomposition products

- Irritating, corrosive and/or toxic gas.

11. TOXICOLOGICAL INFORMATION

1. Exposure route information

- ☐ Dermal, Inhalation exposure is possible since GAS

2. Health hazard information

- ※ No data of the product. thus data was described by the product component.

☐ Acute toxicity

● Oral PRODUCT : N/A

- HYDROGEN : No data

● Dermal PRODUCT : N/A

- HYDROGEN : No data

● Inhalation-Gases PRODUCT : N/A

- HYDROGEN : N/A / LC50 >15000 ppm/1h Mouse

● Inhalation-Vapours PRODUCT : N/A

- HYDROGEN : N/A

● Inhalation-Dust/mist PRODUCT : N/A

- HYDROGEN : N/A

- SKIN CORROSION/IRRITATION PRODUCT : No data
 - HYDROGEN : No data
- SERIOUS EYE DAMAGE/EYE IRRITATION PRODUCT : No data
 - HYDROGEN : No data
- RESPIRATORY SENSITIZATION PRODUCT : No data
 - HYDROGEN : No data
- SKIN SENSITIZATION PRODUCT : No data
 - HYDROGEN : No data
- CARCINOGENICITY PRODUCT : No data
 - HYDROGEN : No data
 - OSHA : No data
 - Notice of Employment and Labor : No data
 - NTP : No data
 - IARC : No data
 - EU CLP : No data
 - ACGIH : No data
- GERM CELL MUTAGENICITY PRODUCT : No data
 - HYDROGEN : No data
- REPRODUCTIVE TOXICITY PRODUCT : No data
 - HYDROGEN : No data
- SPECIFIC TARGET ORGAN TOXICITY SINGLE EXPOSURE PRODUCT : No data
 - HYDROGEN : No data
- SPECIFIC TARGET ORGAN TOXICITY REPEATED EXPOSURE PRODUCT : No data
 - HYDROGEN : No data
- ASPIRATION HAZARD PRODUCT : No data
 - HYDROGEN : No data

12. ECOLOGICAL INFORMATION

1. Aquatic toxicity PRODUCT
 - ACUTE AQUATIC HAZARD : Not classified, LONG-TERM AQUATIC HAZARD : Not classified
 - Fish
 - HYDROGEN : No data
 - Crustacea
 - HYDROGEN : No data
 - Aquatic algae
 - HYDROGEN : No data
2. Persistence and degradation
 - Degradation
 - HYDROGEN : N/A
 - n-octanol water partition coefficient
 - HYDROGEN : 0.45 log Kow

3. Bioaccumulative potential

- Bioaccumulation
 - HYDROGEN : No data
- Biodegradation
 - HYDROGEN : No data

4. Mobility in soil

- Soil adsorption coefficient(Koc)
 - HYDROGEN : No data

5. Other adverse effects

- Hazardous to ozone layer
 - HYDROGEN : No data
- Others
 - HYDROGEN : N/A

13. DISPOSAL CONSIDERATIONS

1. Disposal methods

- Dispose of container and unused contents in accordance with all applicable regulations.

2. Precautions (including disposal of contaminated container or package)

- Empty containers may explode and residues can be ignited when pressured, cut, weld, heated.
- Empty containers may rupture when pressured.
- Empty containers recycled under environmental laws.
- Wear an appropriate Personal protection. (See Exposure Controls/Personal Protection section.)

14. TRANSPORT INFORMATION

1. UN No : 1049

2. Proper shipping name : HYDROGEN, COMPRESSED

3. Class or division : 2.1

4. Packing group : Not established

5. Marine pollutant : Not established

6. Special safety response for transportation or transportation measure :

- ☐ Emergency measures in case of fire : F-D
- ☐ Emergency measures in the effluent : S-U

15. REGULATORY INFORMATION

- EU Classification (CLASSIFICATION) PRODUCT : Not established
 - HYDROGEN : F+; R12
- EU Classification (Risk Phrases) PRODUCT : Not established
 - HYDROGEN : R12
- EU Classification (Safety Phrases) PRODUCT : Not established

- HYDROGEN : S:(2)-9-16-33
- 2006/507/EC PRODUCT : Not established
 - HYDROGEN : Not established
- 689/2008/EC PRODUCT : Not established
 - HYDROGEN : Not established
- Designation, Reportable Quantities, and Notification PRODUCT : Not established
 - HYDROGEN : Not established
- Emergency Planning and Notification PRODUCT : Not established
 - HYDROGEN : Not established
- Toxic Chemical Release Reporting – Community Right-to-Know PRODUCT : Not established
 - HYDROGEN : Not established
- Process Safety Management of Highly Hazardous Chemicals PRODUCT : Not established
 - HYDROGEN : Not established

16. OTHER INFORMATION

1. Reference

- ACGIH
- EU CLP
- IARC
- IUCLID
- NTP
- OSHA

2. Prepare date : 2017.03.16

3. Revised date

0.0.0 : 2017.03.16
 1.0.0 : 2018.01.31
 2.0.0 : 2020.12.01

4. Other

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