

SIG SOUTHERN INDUSTRIAL GAS SDN BHD

SAFETY DATA SHEET

HYDROGEN

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product name	Hydrogen
Synonyms	None
Chemical Formula	H ₂
CAS No	1333-74-0
Use of Substance	Hydrocracking & refining, hydrogenation of oil & fats, reducing agent in metallurgical processes.
Manufacturer	SOUTHERN INDUSTRIAL GAS SDN. BHD. PLO 137, Kawasan Perindustrian Senai III, 81400 Senai, Johor.
Contact Number	07-598 3863
Emergency Phone Number (24 hr)	07-598 3863

2. HAZARDS IDENTIFICATION

Chemical Name	CAS No.	Classification Code	Labeling		
			H-code	Signal Word	Hazard Pictogram
Hydrogen	1333-74-0	Flam. Gas 1 Press. Gas	H 220 H 280	Danger	

Classification of the substance

Flam. Gas 1	: Flammable gases category 1
Press. Gas	: Gases under pressure (Compressed gas)

Hazard Statement

H 220	: Extremely flammable gas
H 280	: Contains gas under pressure; may explode if heated.

Precautionary Statement	P210	: Keep away from heat/ sparks/ open flames/ hot surfaces – No smoking
	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
Other Hazards	None	

3. COMPOSITION/INFORMATION ON INGREDIENTS

Common Name	Ingredient	CAS Number	% volume	OSHA-PEL
Hydrogen	Hydrogen	1333-74-0	>99.99 %	None established

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

4. FIRST AID MEASURES

Eye Contact	None known or expected
Inhalation	<p>Product is a simple asphyxiant. High concentrations may exclude an adequate supply of oxygen to the lungs. Move exposed person to fresh air. If not breathing, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms occur.</p>
Skin Contact	<p>Flush contaminated skin with water. Contaminated clothing and shoes should be removed. Soak the contaminated clothing thoroughly with water before remove it as to avoid the risk of static discharges and gas ignition. Get medical attention if symptoms occur.</p>
Ingestion	Ingestion is not considered as a potential route of exposure.
Most important symptoms and effects, both acute and delayed	<p>In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/ consciousness. Victim may not be aware of asphyxiation. As asphyxiation progresses, nausea, vomiting, prostration, and loss of consciousness may result, eventually leading to convulsions, coma, and death.</p>

5. FIRE FIGHTING MEASURES

Suitable extinguishing media

Water
Foam
Dry powder
Use water spray or fog to control fire fumes
Do not extinguish until hydrogen source is shut off.

Unsuitable extinguishing media

None known

Special hazards arising from the chemical

Hydrogen is very light and may collect in the upper portions of storage areas. Hydrogen burns with an almost invisible flame. High pressure releases may ignite with no apparent ignition source possibly via static electricity. Continue to cool fire exposed cylinder until flames are extinguished. Cylinders may rupture under extreme heat. Damaged cylinders should be handled only by specialists.

Special protective equipment and precautions for fire fighters

Leaking gas fire: Do not extinguish, unless leak can be stopped safely as otherwise an explosive reignition may occur.
If the fire is extinguished and the flow of gas continues, use increased ventilation to prevent build-up of explosive atmosphere.
Water fog may be used to create ventilation.
Use non-sparking tools to close container valves.
Eliminate all ignition sources if safe to do so.
If possible stop the flow of product.
Continue spray water from protected area until the container stays cool.
Use Self-contained breathing apparatus while in confined space.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Evacuate area.
Provide maximum explosion-proof ventilation.
Eliminate ignition sources.
Post warning notices (including no smoking).

Environmental precautions

Try to stop release.
Prevent from entering sewers, basements and work pits, or any place where its accumulation can be dangerous.
Hydrogen is unlikely to cause an environmental hazard; however emergency responders should be aware of other substances that may be involved in the release.

Clean up methods

Provide adequate ventilation.

7. HANDLING AND STORAGE

Precaution for safe handling

Only properly trained or experienced persons should handle the gases under pressure.

Use only properly specified equipment which is suitable for this product, its supply pressure and temperature.

Use only spark-proof tools and explosion-proof equipment.

Purge system with dry inert gas (e.g. Nitrogen) before gas is introduced and when system is placed out of service.

Protect cylinders from physical damage; do not drag, roll, slide or drop.

Do not heat cylinder by any means to increase the discharge rate of product from the cylinder.

Use a check valve in the discharge line to prevent hazardous back flow into the cylinder.

Contact your gas supplier if in doubt.

To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material.

Condition for safe storage

Store in segregated and approved area.

Keep away from ignition sources (including static discharges).

Keep container below 50°C in a well-ventilated place.

Use a 'first-in-first-out' inventory system to prevent full cylinders being stored for excessive periods of time.

Earth-ground and bond all lines and equipment associated with the hydrogen system.

Separate hydrogen from oxygen and other oxidizers by a minimum distance of 20 ft or by a 5 ft high barrier with a minimum fire resistance rating of a half an hour.

Keep cylinder stored upright.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Limit – None established.

Appropriate engineering controls

Ensure adequate air ventilation.

Use local exhaust and general explosive proof ventilation systems to prevent buildup of flammable concentrations.

Small quantities can be handled in forced ventilation hoods.

If product is handled routinely where the potential for leaks exists, all electrical equipment must be rated for use in potentially flammable atmospheres.

Gas detectors should be used when quantities of flammable gases/vapors may be released.

System under pressure should be regularly checked for leakage.

Always use a flashback arrestor on both the torch and cylinder ends of a hose.

Personal protection equipment

Wear goggles for eye protection.

Contact lens should not be worn when working.

Wear suitable hand, body and head protection.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colorless, gas
Odour	Odorless
Odour threshold	No information available
pH	Not applicable
Melting point / Freezing point	-259.2 °C
Boiling point	-252.8 °C
Flash point	Not applicable for gases and gas mixtures.
Evaporation rate	Not applicable
Flammability	Extremely flammable in the presence of the following materials or conditions: oxidizing materials.
Upper/lower explosive limit	LOWER: 4 % UPPER: 75 %
Vapour pressure	Not applicable
Vapour density (Air =1)	0.07
Relative density	Not applicable
Solubility (H₂O)	0.019 (vol/vol)
Partition coefficient	Not available
Auto ignition temperature	500 – 571 °C
Decomposition temperature	Not available
Viscosity	Not applicable

10. STABILITY AND REACTIVITY

Reactivity	Unreactive under normal conditions.
Chemical Stability	Stable under normal conditions.
Possibility of hazardous reactions	Under normal conditions of storage and use, hazardous reactions will not occur.
Condition to avoid	Heat, flames and sparks. May decompose violently at high temperature and/ or pressure in the presence of a catalyst.
Incompatible materials	Oxidizing agents Lithium Hydrogen ignites in bromine fluoride and explodes in nitrile fluoride.
Hazardous decomposition products	None

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

Acute toxicity	<p>Oral: LD₅₀ > No information available.</p> <p>Dermal: LD₅₀ > No information available.</p> <p>Inhalation: LC₅₀ > No information available.</p> <p>Inhalation: No known significant effects or critical hazards</p>
Skin corrosion / irritation	No specific data.
Serious eye damage/ irritation	No specific data.
Respiratory or skin sensitisation	No specific data.
Germ cell mutagenicity	No specific data.
Carcinogenicity product	No specific data.
Reproductive toxicity product	No specific data.
Specific target organ toxicity – single exposure product.	No specific data.
Specific target organ toxicity – repeated exposure product	No specific data.
Aspiration hazard product	Not applicable to gases and gas mixtures.

12. ECOLOGICAL INFORMATION

Ecotoxicity effect	
Acute toxicity product	No ecological damage caused by this product
Additional ecological information	No ecological damage caused by this product
Persistence and degradability	Not applicable to gases and gas mixtures.
Bioaccumulative potential	Not available
Mobility in soil	Not available
Other adverse effects	<p>No other adverse effects are identified</p> <p>Hydrogen does not contain any class 1 or class II ozone depleting chemicals.</p> <p>Hydrogen is not listed as a marine pollutant.</p>

13. DISPOSAL CONSIDERATIONS**Waste from residue / unused product**

Do not discharge into areas where there is a risk of forming an explosive mixture with air.
Do not discharge into a place where its accumulation could be dangerous.

Contaminated packaging

Do not reuse empty containers.
Empty remaining contents.
Dispose of container and unused contents in accordance with local and national regulation.
Return cylinder to supplier

14. TRANSPORT INFORMATION**UN Number**

UN 1049

UN proper shipping name

Hydrogen, Compressed

Transport hazard class(es)

2.1

Packing group

-

Environmental hazards

None

Special precautions for user

None

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable

Information

Ensure the driver is understand well on the potential hazards of the load and knows what to do in the event of an accident or an emergency.
Secured the product containers before transporting it.
Ensure that the cylinder valve is closed and not leaking.
Container valve guards or caps should be in place.
Ensure adequate air ventilation.

15. REGULATORY INFORMATION

Contact local government authority.

16. OTHER INFORMATION**Date of Preparation / Revision of SDS**

22-October-2014 / Rev. 04

Legend to the abbreviations and acronyms used**Classification of the substance**

Flam. Gas 1 : Flammable gases category 1

Revision Date: 22 October 2014

	Press. Gas	: Gases under pressure (Compressed gas)
Hazard Statement	H 220	: Extremely flammable gas
	H 280	: Contains gas under pressure; may explode if heated.
Precautionary Statement	P210	: Keep away from heat/ sparks/ open flames/ hot surfaces – No smoking
	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
Abbreviations	LC ₅₀	: median lethal concentration
	LD ₅₀	: median lethal dose
	PEL	: Permissible exposure limits

Although reasonable care has been taken in the preparation of this document we extend no warranties and make no representations as to the accuracy or completeness of the information contain herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s)