

**MATERIAL SAFETY DATA SHEET (MSDS)
HYDRROGEN**

(Please ensure that this MSDS is received by an appropriate person)

DATE: March 2023
Ref. No.: MS094

Version: 4

1 PRODUCT AND COMPANY IDENTIFICATION

Product Name	Hydrogen
Chemical Formula	H ₂
Trade Names	Hydrogen, compressed Hydrogen-process (N4.8) Hydrogen, instrument grade (N5.0) Hydrogen, ultra High purity (N5.0)
Colour coding	All above grades have signal red (A.11) bodies. The process, instrument and ultra high purity grades have relevant decals affixed centrally to bodies of cylinders.
Valve	5/8 inch BSP left hand female valves fitted.
Company Identification	Les Gaz Industriels Ltd Pailles Road G.R.N.W. Republic of Mauritius Tel No: (+230) 212-8306 Fax No: (+230) 212-0235
EMERGENCY NUMBER	(+230) 800 1133

2 COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Hydrogen
CAS No.	133-74-0
UN No.	1049
ERG No.	115
Hazard Warning	2 A Flammable Gas

3 HAZARDS IDENTIFICATION

Main Hazards

All cylinders are transportable gas container. Hydrogen is highly flammable and is the lightest gas known. It burns in air with an intensely hot, almost invisible flame. The flammability limits in the air are between 4.0-75.0% by volume and flammable explosive gas-air mixtures may be formed.

Adverse Health Effects

Hydrogen is non-toxic but could act as a simple asphyxiant under confine space.

Chemical Hazards

Hydrogen is relatively inert under standard condition. However it becomes highly reactive under excessive temperature and pressure. Ignition of hydrogen in air can occur with very small energy sources such as heat static electricity or sparks.

Biological Hazards

Hydrogen has a smallest density compare to the other element known and disperses very rapidly into the atmosphere. Hydrogen has unknown biological hazards.

Vapour Inhalation

Hydrogen is a simple asphyxiant, but disperses rapidly into the atmosphere.

Label Elements

Hazard Pictograms



Precautionary Statements

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

P410+P403: Protect from sunlight and store in a well-ventilated place.

4 FIRST AID MEASURES

Eye/Skin Contact

No known effect.

Prompt medical attention is mandatory in all cases of overexposure to hydrogen. Rescue personnel should be equipped with self-contained breathing apparatus. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be removed to an uncontaminated area, and given mouth-to-mouth resuscitation and supplemental oxygen. The patient should be kept still and warm.

5 FIRE FIGHTING MEASURES

Extinguishing Media

Use fog-water spray, (in the absence of fog equipment a fine spray of water may be used to fight hydrogen flame).

Specific Hazards

Do not extinguish the fire unless the leakage can be stopped immediately. Hydrogen is highly flammable. May form explosive gas mixture with air. Hydrogen can act as a simple asphyxiant "by reducing the oxygen concentration in the air below a level where it support life". Beware of auto-ignition if leak rate is high. The flame of burning hydrogen is very difficult to see in daylight.

Emergency Actions

If possible shut off ignition source of excess hydrogen. Evacuate the area. Post warnings signs to prevent persons from approaching with lit cigarettes or open flames. Use water to keep all cylinders cool. Remove cylinders from the vicinity of the fire if possible. Remove all cylinders with signs of overheating to a safe area. Keep the cylinder cool by spraying with water at a safe distance. CONTACT THE NEAREST AFROX BRANCH.

Protective Clothing

Self-contained breathing apparatus, safety gloves and shoes/boots should be worn when handling containers.

Environmental Precautions

As the gas is lighter than air, ensure that hydrogen gas is not trapped in confine space. Otherwise this could lead to the formation of a highly explosive gas-air mixture. Ventilate all confined area using forced draught if necessary. Ensure that all electrically powered equipment are flameproof.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions

As hydrogen is a simple asphyxiant, care should be taken when entering confined areas where leaks have occurred. Do not enter any potentially hazardous area with any source of ignition such as lit cigarette or non-flame proof equipment including matches and powered equipment.

Environmental Precautions

Hydrogen does not pose a hazard to the environment. Explosive gas-air mixture could be formed when leaks occur, so eliminate all forms of ignition.

Small Spills

Small leaks should be extinguished by shutting off the source of supply, e.g. closing the cylinder valve or tightening the gland nut. If unable to stop the small leaks, the cylinder should be moved to an open well ventilated area, away from any source of ignition.

Large Spills

Stop the source if it can be done without risk. Eliminate all sources of ignition and static discharges. Restrict access to the affected area until completion of the clean-up procedure. Post relevant warning signs. Wear adequate protective clothing when working near the source of leak. Ventilate the area using forced-draught if necessary. Ensure that all electrical powered equipment are flameproof.

7 HANDLING AND STORAGE

Do not store hydrogen cylinder with oxygen or other oxidant cylinders. Do not allow cylinder to slide or come into contact with sharp edge

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objects. Hydrogen cylinders may be stacked horizontally provided that they are firmly secured at each end to avoid rolling. Ensure equipment is adequately earthed. Conspicuous signs should be posted in the storage area forbidding smoking or use of naked flame. Use a first in-first out inventory system to prevent full cylinders from being stored for excessive period of time. Compliance with all relevant legislation is essential. Keep out of reach of children.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Hazards Unknown effect

Engineering Control Measures

Engineering control measures are preferred to reduce exposures. General methods include mechanical ventilation, process or personal enclosure & control of process conditions. Administrative control and personal protective equipment may also be required. Use a suitable flameproof ventilation system separate from other exhaust ventilation systems. Exhaust directly to outside environment. Supply sufficient replacement air to make up for air removed by exhaust system.

Personal Protection

Use self-contained breathing apparatus when fighting large fire.

Eyes

Use safety glasses when working with cylinders.

Hands

Use suitable protective gloves when working with cylinder.

Skin

Unknown effect

9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DATA

Chemical Symbol	H ₂
Molecular weight	2.016 g/mol
Specific volume @ 20°C & 101,325 pka	11976 ml/g
Auto ignition temperature	570°C
Relative density (air=1) @ 1atm	0.08989 g/ml
Flammable limits in air (by volume)	4.0-75.0%
Colour	Unknown
Taste	Unknown
Odour	Unknown

10 STABILITY AND REACTIVITY

Conditions to avoid

Overheating of cylinders. Keep sparks & flames away from cylinders and under no circumstances allow a torch flame to come into contact with any part of the cylinder. Never test leaks with flame. Use a soapy water when testing for leaks. Never use cylinders as rollers or supports or for any other purpose other than the storing of hydrogen.

Incompatible Materials

Hydrogen is non-corrosive and may be contained in ambient temperature by most common metals used in installations design to have sufficient strength for the working pressure involved.

Hazardous Decomposition Products

No hazardous compounds are formed when hydrogen/air mixture burn.

11 TOXICOLOGICAL INFORMATION

Acute Toxicity	No known effect
Skin & eye contact	No known effect
Chronic Toxicity	No known effect
Carcinogenicity	No known effect
Mutagenicity	No known effect
Reproductive Hazards	No known effect

(For further information see Section 3. Adverse Health effects)

12 ECOLOGICAL INFORMATION

As hydrogen is lighter than air it will disperse rapidly in open areas. It does not pose a hazard to the ecology.

13 DISPOSAL CONSIDERATIONS

Disposal Methods

Small amounts may be blown to the atmosphere under controlled conditions. No source of ignition should be in the vicinity. Large amounts should only be handled by the gas supplier.

Disposal of Packaging

The disposal of cylinders must only be handled by the gas supplier.

14 TRANSPORT INFORMATION

ROAD TRANSPORTATION

UN No	1049
Class	2A Flammable
Subsidiary Risk	2.1 Flammable
ERG No	115
Hazchem warning	2A Flammable Gas

SEA TRANSPORTATION

IMDG	1049
Class	
Packaging group	
Label	Flammable Gas

AIR TRANSPORTATION

ICAO/IATA Code	1049
Class	2.1 Flammable
Packaging group	
Packaging instructions	
- Cargo	200
- Passenger	Forbidden
Maximum quantity allowed	
- Cargo	500kg
- Passenger	Forbidden

15 REGULATORY INFORMATION

EEC Hazard class Flammable Gas

Risk Phrase	Description	Safety Phrase	Description
R12	Extremely flammable	S2	Keep out of reach of Children
R18	In use may form flammable explosive vapour-aid mixture	S15	Keep away from heat source
R44	Risk of explosion if heated under confinement	S16	Keep away from source of ignition
		S21	When using do not smoke
		S37	Wear suitable gloves
		S51	Use only in well ventilated areas

National legislation None

Refer to SABS 0265 for explanation of the above.

16 OTHER INFORMATION

Bibliography

Compressed Gas Association, Arlington, Virginia
Handbook of Compressed Gases – 3rd Edition
Matheson. Matheson Gas Data Book – 6th Edition
SABS 0265 - Labelling of Dangerous Substances

17 EXCLUSION OF LIABILITY

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