LES GAZ INDUSTRIELS LTD.
UNE VALEUR SÛRE
Est. 1952

MATERIAL SAFETY DATA SHEET

HYDROGEN

DATE: April 2001

1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT 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 the above grades have Signal Red (A.11) bodies. The Process, Instrument and Ultra High Purity grades have the relevant decals affixed centrally to the bodies of the cylinders.
Valves	Hydrogen, Compressed has a 3 SH – Brass 5/8inch BSP left-hand female valve. All of the other grades have the Neriki – Brass 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

2 COMPOSITION/INFORMATION ON INGREDIENTS

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

3 HAZARDS IDENTIFICATION

Main Hazards. All cylinders are portable gas containers, and must be regarded as pressure vessels at all times. 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 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 in enclosed areas.

Chemical -hazards. Hydrogen is relatively inert under standard conditions of temperature and pressure. However, it become highly reactive under excessive conditions of temperature and pressures. Ignition of Hydrogen in air can occur with very small energy sources such as heat, static electricity or sparks.

Biological Hazards. Hydrogen is extremely light and disperses very rapidly into the atmosphere. No known hazard.

Vapour Inhalation Hydrogen is a simple asphyxiant, but disperses very rapidly in the atmosphere.

Eye Contact No known effect

Skin Contact No known effect

4 FIRST AID MEASURES

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. They should be kept warm and quiet. 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.

Eye Contact No known effect

Skin Contact No known effect

5 FIRE FIGHTING MEASURES

Extinguishing media. Use fog-water spray. (In the absence of fog equipment a fine spray of water may be used).

Specific Hazards Do not extinguish the fire unless the leakage can be stopped immediately. Highly flammable. May form explosive gas mixtures with air. Is a simple asphyxiant. 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 at source. Evacuate area. Post warnings to prevent persons from approaching with lit cigarettes or open flames. Using water, keep all cylinders in the vicinity of the fire cool. Remove cylinders from the vicinity of the fire if possible. Remove all cylinders with signs of overheating to a safe area. Keep cool. CONTACT THE NEAREST AFROX BRANCH.

Protective Clothing. Exposed fire-fighters should wear approved self-contained breathing apparatus with full face mask. Safety gloves and shoes or boots should be worn when handling cylinders.

Environmental Precautions. As the gas is lighter than air, ensure that it is not trapped in confined spaces, otherwise this could lead to the formation of a highly explosive gas-air mixture. Ventilate all confined spaces using forced-draught if necessary. Ensure that all electrically powered equipment is flameproof.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions. As Hydrogen is a simple asphyxiant, care should be taken when entering confined spaces where leaks have occurred. Do NOT enter any potentially hazardous area with any source of ignition such as a lit cigarette or match.

Environmental Precautions Hydrogen does not pose a hazard to the environment. An 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 valve on the cylinder, or tightening the gland nut. If unable to stop small leaks, the cylinder should be moved into the open well 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 area until completion of the clean-up procedure. Post relevant warning signs. Wear adequate protective clothing when working near the source of the leak. Ventilate the area using forced-draught if necessary. Ensure that all equipment is flameproof.

7 HANDLING AND STORAGE

Do not store with oxygen or other oxidants. Do not allow cylinders to slide or come into contact with sharp edges. Hydrogen cylinders may be stacked horizontally provided that they are firmly secured at each end to prevent rolling. Ensure equipment is adequately earthed. Conspicuous signs should be posted in the storage area forbidding smoking or the use of naked lights. Use a "first in - first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Compliance with all relevant legislation is essential. Keep out of reach of children.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational exposure hazards No known effect.

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

Personal protection. Use self-contained breathing apparatus when fighting large fires.

Eyes. Use safety glasses when working with cylinders.

Hands. Use suitable protective gloves when working with cylinders.

Skin. No known effect.

9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DATA

Chemical Symbol	H_2
Molecular Weight	2,016
Specific Volume @ 20°C & 101,325 kPa	11976 ml/g

Auto ignition temperature	570°C
Relative density (Air=1) @ 101,325 kPa	0,08989
Flammable limits in air (by volume)	4,0 - 75%
Colour	None
Taste	None
Odour	None

10 STABILITY AND REACTIVITY

Conditions to avoid. Overheating of cylinders. Keep sparks and flames away from cylinder, and under no circumstances allow a torch flame to come into contact with any part of the cylinder. Never test for leaks with a flame. Use 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 temperatures by most common metals used in installations designed to have sufficient strength for the working pressures involved.

Hazardous decomposition products. No hazardous compounds are formed when hydrogen/air mixtures 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

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 sources 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 gas
Subsidiary risk	Asphyxiant
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	
Subsidiary risk	2.1 Flammable gas
Packaging group	
Packaging instructions	
- Cargo	200
- Passenger	Forbidden
Maximum quantity allowed	
- Cargo	150 kg
- Passenger	Forbidden

15 REGULATORY INFORMATION

EEC Hazard class	Flammable gas
Risk phrases	R12 Extremely flammable
	R18 In use may form flammable explosive vapour-aid mixture
	R44 Risk of explosion if heated under confinement.
Safety phrases	S2 Keep out of reach of children
	S15 Keep away from heat.
	S16 Keep away from sources 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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