

MATERIAL SAFETY DATA SHEET

Product Name:

HYDROGEN, Compressed (H₂)

Issued: May 2014

Revision: 9

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Label 2.1 : flammable
gas.**IDENTIFICATION**

Chemical Name: Hydrogen
Synonyms: None
UN Number: 1049
Poisons Schedule Number: None Allocated
G.T. EPG. (Group Text. Emergency Procedure Guide): AS 1678 2A1

Use: None Allocated**HAZARDS IDENTIFICATION**

Dangerous Goods Class and Subsidiary Risk: 2.1
HSNO Classification: 2.1.1A

Hazard Statement: Extremely flammable gas.
Explosive; fire, blast or projection hazard.

Precautionary Statements: Read before label before use.
Read material safety data sheet before use.
Keep away from heat, sparks, open flames and hot surfaces.
No smoking.
Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
Eliminate all ignition sources if safe to do so.
Store in a well ventilated place.

COMPOSITION

Ingredients	CAS Number	Proportion
Chemical Entity		
Hydrogen	1333-74-0	99.8%

FIRST AID MEASURES**Health Effects****Acute**

Swallowed: Not applicable to gases.
Eye: Not irritating to the eye.
Skin: Not irritating to the skin.

Inhaled: Hydrogen is non-toxic at normal temperature and pressure. By diluting the oxygen concentration in air below the level necessary to support life, it can act as an asphyxiant. Effects of oxygen deficiency are: 12-16%: breathing and pulse rate increased, muscular coordination slightly disturbed; 10-14%: emotional upset, abnormal fatigue, disturbed respiration; 6-10%: nausea and vomiting, collapse or loss of consciousness; below 6%: convulsive movements, possible respiratory collapse and death.

Chronic

Long term exposure to hydrogen has no known health effects. Prolonged exposure to an oxygen deficient atmosphere (below 18% oxygen in air) may affect the heart and nervous system.

First AidInhaled:

Call doctor. If victim is conscious: Move to uncontaminated area to breathe fresh air. Keep warm and quiet. If victim is unconscious: Move to uncontaminated area and give assisted respiration. When normal breathing is restored, treatment as above. Continued treatment should be symptomatic and supportive.

Skin Contact:

Remove contaminated clothing and shoes immediately.

Eye Contact:

If eyes become affected gently flood with tap water for at least 15 minutes, call doctor

Advice to Doctor

Advise doctor that victim has been exposed to an oxygen deficient atmosphere and exposed to acetylene which is a known anaesthetic.

FIRE FIGHTING MEASURES**Flammability:**

Highly flammable. Spontaneously flammable in air. Avoid all ignition sources.

Fire/Explosion Hazard:

Hydrogen is highly flammable and burns with almost invisible flame. Container may rupture when heated. Move cylinders from fire if safe to do so. Cool cylinders with water from a protected location. If unable to keep cylinders cool, Evacuate Area.

Extinguishing Media:

Water fog or fine water spray.

Hazchem Code:

2SE

Recommended Protective Clothing:

Breathing apparatus need only be worn if the substance is involved in a fire or in confined space.

ACCIDENTAL RELEASE MEASURES**Personal Protection:**

Personnel engaged in the movement of cylinders shall be provided with safety footwear and leather or PVC gloves. Full cover overalls and safety glasses recommended. In areas where equipment failure may cause an immediate high concentration of hydrogen, approved self-contained full face respiratory equipment should be readily available.

Spills and Disposal:

Ventilate area. Stop leak if it can be done without risk. Allow gas to dissipate to atmosphere. Evacuate Area.

Reference Guide:

Standard SNZ HB 76:2008 Dangerous Goods – Initial Emergency Response Guide.

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General:

Only experienced and properly instructed personnel should handle compressed gases. Cylinder contents and identification labels provided by the supplier must not be removed or defaced. Colour coding should not be the only criterion used for content identification.

HANDLING AND STORAGE**Handling****Flammability:**

Highly flammable. Spontaneously flammable in air. Avoid all ignition sources.

General:

Only experienced and properly instructed personnel should handle compressed gases. Cylinder contents and identification labels provided by the supplier must not be removed or defaced. Colour coding should not be the only criterion used for content identification.

Approved Handlers:

Approved handlers are required if more than 100 m³ is stored on site.

Storage**Separation:**

Storage of compressed gas cylinders shall be in compliance with New Zealand regulations. Cylinders shall be stored in a cool, dry, well ventilated area out of direct sunlight and away from heat and ignition sources. No part of cylinders shall be exposed to temperatures above 50°C. Cylinders shall be stored upright on a level, fireproof floor, secure in position and protected from damage. Full cylinders shall be stored separately from empties. Segregate from oxidant gases and other oxidants in store. Avoid any contact with oil or grease particularly to the cylinder valve. Ensure equipment is adequately earthed. Suck back of water into the container must be prevented. Purge air from system before introducing gas. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Keep away from ignition sources (including static discharges). Cylinders should be moved by hand-truck or cart designed for that purpose.

Spills and Disposal:

Ventilate area. Stop leak if it can be done without risk. Allow gas to dissipate to atmosphere. Evacuate Area.

EXPOSURE CONTROLS / PERSONAL PROTECTION**Exposure Standards:**

Simple asphyxiant.

Engineering Controls:

Provide adequate local exhaust and dilution (general) ventilation and supply sufficient replacement air to maintain oxygen concentration above 18%.

Personal Protection:

Personnel engaged in the movement of cylinders shall be provided with safety footwear and leather or PVC gloves. Full cover overalls and safety glasses recommended. In areas where equipment failure may cause an immediate high concentration of hydrogen, approved self-contained full face respiratory equipment should be readily available.

PHYSICAL AND CHEMICAL PROPERTIES**Physical Properties**

Appearance:	Colourless, Odourless, Tasteless	Flashpoint:	Not Applicable
Boiling Point:	-252.8°C	Flammability Limits in Air:	4% to 75%
Vapour Pressure:	Not Applicable	Solubility in Water (at 0°C):	0.0210 m ³ /kg

Other Properties

Relative Density (at 15°C) (Air = 1):	0.070	Density of Gas (101.3 kPa, 15°C):	0.0852 kg/m ³
Molecular Weight:	2.016	Critical Temperature:	-239.9°C

STABILITY AND REACTIVITY**Flammability:**

Highly flammable. Spontaneously flammable in air. Avoid all ignition sources.

Materials Compatibility:

None recorded.

TOXICOLOGY INFORMATION

No known toxicological effects from this product.

ECOLOGICAL INFORMATION

No known ecological damage caused by this product.

DISPOSAL CONSIDERATIONS

Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor. Do not discharge into any place where its accumulation could be dangerous.

TRANSPORT INFORMATION

UN Number:	1049
Proper Shipping Name:	HYDROGEN, COMPRESSED
Dangerous Goods Class and Subsidiary Risk:	2.1
Packing Group:	Not applicable
Hazchem Code:	2SE

Other Information: Avoid transport on vehicles where the load is not separated from the driver's compartment.
Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
Before transporting product containers:

- Ensure that containers are firmly secured.
- Ensure cylinder valve is closed and not leaking.
- Ensure there is adequate ventilation.
- Compliance with applicable regulations.

REGULATORY INFORMATION**ERMA Register Approval No:** HSR001002

HSNO Controls: Hazardous Substances (Classes 1 to 5 Controls) Regulations 2001.
Hazardous Substances (Disposal) Regulations 2001.
Hazardous Substances (Personnel Qualifications) Regulations 2001.
Hazardous Substances (Emergency Management) Regulations 2001.
Hazardous Substances (Identification) Regulations 2001.
Hazardous Substances (Compressed Gases) Regulations 2004.
Hazardous Substances (Tank Wagon and Transportable Containers) Regulations 2004.
Schedule 10 of the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004.
Schedule 12 of the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004.

Approved Handlers:

Approved handlers are required if more than 100 m³ is stored on site.

OTHER INFORMATION

Compressed Hydrogen is supplied in high pressure cylinders.

Cylinder Colour: AS 4484-2004 Red PMS 485C
Cylinder Valve Outlet: AS 2473 Type 20

References:

- . L'Air Liquide Gas Encyclopaedia - Elsevier Scientific Publishing Co. Amsterdam
- . Cheminfo Database
- . New Zealand Code for the Transport of Dangerous Goods by Road and Rail
- . NHMRC Threshold Limit Values - Commonwealth Dept Health
- . SAA Safe Storage and Handling Information Cards
- . SAA Emergency Procedure Cards
- . Matheson Gas Data Book, 6th Edition, Matheson 1980
- . Canadian Liquid Air Montreal, Canada - Gas Products Safety Data Sheets
- . AS 1894 Code of Practice for Safe Handling of Cryogenic fluids
- . NZCIC Code of Practice – Preparation of Safety Data Sheets

END MSDS

This MSDS summarises our best knowledge of the health and safety hazard information of the product and how to safely handle and use the product in the workplace. Each user should read this MSDS and consider the information in the context of how the product will be handled and used in the workplace in conjunction with other products.

If clarification or further information is needed to ensure that an appropriate risk assessment can be made, the user should contact this company.

Our responsibility for products sold is subject to our standard terms and conditions, a copy of which is sent to our customers and is also available on request.

This MSDS has been prepared in accordance with NZCIC Code of Practice – Preparation of Safety Data Sheets

Air Liquide regional offices contact details on following page

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