

Hydrogen, compressed

UN	1049
HAZCHEM	2.1E
CLASS	2.1

T E C H S P E C S

CONTAINER	'G'	'E'	PACK 16
CONTENT m ³ (101.325 kPa @ 15° C)	6.0	3.0	96.0
GAUGE PRESSURE (kPa @ 15° C)	13,800	13,800	13,800
AVERAGE WEIGHT kg (full)	55.5	28.3	1,028
AVERAGE WEIGHT kg (empty)	55	28	1,020
OUTLET CONNECTION A.S. 2473 Type 20	VERTICAL	VERTICAL	HORIZ.

NOTE: The above data is typical of the most common containers.

SPECIFICATION

Hydrogen	> 98.8%
Moisture	< 100 ppm

PHYSICAL DATA

Chemical Symbol	H ₂
Boiling Point	-252.8°C
Relative Density (Air = 1)	0.070
Molecular Weight	2.016
Critical Temperature	-239.9°C
Density of Gas (@101.3 kPa & 15°C)	0.085 kg/m ³
Solubility in Water (@101.3 kPa & 20°C)	0.018
Specific Volume (@101.3 kPa & 15°C)	12.0 m ³ /kg
Flammability Limits (%) in air	4.0 - 75.0
Auto-ignition Temperature	571°C

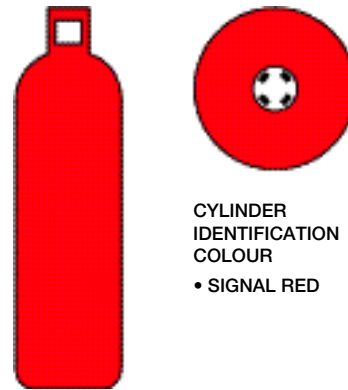
PROPERTIES

Hydrogen is a colourless, odourless, flammable gas. It is supplied as a gas at high pressure in cylinders.

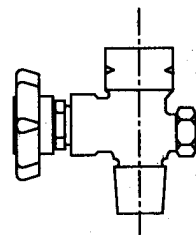
USES

Hydrogen gas is employed mainly for its reducing properties.

- Combustion
 - In industry, it is used to supply oxygen-hydrogen torches for glassworking (quartz, Pyrex®, etc) in the fabrication of artificial precious stones (ruby, etc.) and for underwater oxycutting.
 - In the laboratory, it is used in analyzer flames, reducing flame photometry detection instruments, flame ionization detection instruments, and fuel cells.
- Reducing Atmospheres
 - It is used in the metallurgical industry to create reducing atmospheres for heat treatment (it is used pure or in a mixture with inert gases, argon or nitrogen). It is used in the production of carbon steels, stainless steels, special metals and semi-conductors. It is also employed to reduce oxides in the manufacture of sintered metals and in the processing of iron ores,
 - It is used in the chemical industry for hydrogenation of oil and fats, hydrotreatment of petroleum products and hydrosulfuration of fuels in order to eliminate sulfur.



CYLINDER
IDENTIFICATION
COLOUR
• SIGNAL RED



OUTLET
CONNECTION
AS 2473 TYPE 20
FEMALE L.H. THREAD



CLASS LABEL

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UN	1049
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CLASS	2.1

TECH SPECS

HANDLING & SAFETY

USES Continued

Extremely pure hydrogen is employed in the chemical industry for fine reduction processes.

Miscellaneous uses

- In the laboratory: carrier gas in chromatography.
- In electrical power plants: coolant gas in turbo-generators.

HAZARDS

Hydrogen is highly flammable. A hydrogen flame is nearly invisible. At high concentration acts as a simple asphyxiant.

CYLINDER STORAGE AND HANDLING

Store cylinders upright in a cool, well ventilated area away from sources of heat and combustible materials.

Protect cylinders, particularly the valve, against physical damage whether full or empty.

Do not artificially heat cylinder. Keep away from artificial heat.

Do not allow any part of the cylinder to be exposed to temperatures above 55°C.

Check that cylinders are clearly labelled.

Keep outlet seals in place on full cylinders.

Close valves on empty cylinders.

LEAKING CYLINDERS

Move to a well ventilated area.

Stop leak if possible to do so.

Evacuate area way from direction of movement of gas.

No smoking or naked lights.

If leak cannot be stopped, move cylinder to a safe area and allow to empty.

MATERIALS COMPATIBILITY

Hydrogen is non-corrosive and so any common metal is acceptable, provided equipment is designed to withstand process pressure.

PRECAUTIONS IN USE

Never allow oil or grease on cylinder or valve.

Close cylinder valve when not in use.

Always use regulator to connect to system.

Secure cylinders to prevent falling over.

Open cylinder valve slowly.

Use only in well ventilated area.

No smoking or naked lights.

PERSONAL PROTECTION

Personnel regularly engaged in the use and movement of gas cylinders must be provided with:

- Safety footwear
- Leather or PVC gloves

Full cover overalls & safety glasses are recommended.

FIRE

Hydrogen is highly flammable and burns with an almost invisible flame.

Shut off hydrogen supply if safe to do so.

Call fire brigade.

Cool cylinders with water from a protected location.

Do not approach cylinders suspected to be hot.

Remove cool cylinders from path of the fire.

If unable to keep cylinders cool, evacuate area.

FIRST AID

If victim is conscious:

- Move to uncontaminated area to breathe fresh air.
- Keep warm and quiet.
- Call doctor.

If victim is unconscious:

- Move to uncontaminated area and give assisted respiration.
- When breathing is restored, treatment as above. Continued treatment should be symptomatic and supportive.

For skin burns, immediately flood area with plenty of water. Cover with a clean, dry dressing.

ADDITIONAL INFORMATION

The information, recommendations and data contained in this publication are intended to give basic guidance to users of Air Liquide gases for their safe handling and use.

Material Safety Data Sheets (MSDS) for gases and gas mixtures supplied by Air Liquide are also available.

It is essential for the safe use of gases that personnel are properly trained and are fully aware of the possible hazards.

Further information and advice on any matter relating to the safe handling or use of these products may be obtained from the nearest Air Liquide office.

