

1. General Statement

Hydrogen is a compressed, colourless, odourless gas. Extremely flammable gas. Forms explosive mixtures with air. Danger of auto ignition if gas emits at high velocity. When mixed with strongly oxidizing gases such as oxygen (oxyhydrogen gas), chlorine (chlorine oxyhydrogen gas), nitrous oxide and nitrogen tetroxide, a violent explosion occurs upon thermal or catalytic ignition, with chlorine already upon exposure to light. The reaction with fluorine can be ignited in the dark and at low temperature by impurities. Only slightly soluble in water.

2. Chemical identity

Name : Hydrogen
CAS number(s) : 1333-74-0
EC number : 215-605-7
Molecular formula : H₂
Structure :



3. Uses and Benefits

Hydrogen is used in the following products Fuel Cells: Hydrogen can be used in fuel cells to generate electricity, producing only water as a byproduct. Combustion Engines: Hydrogen is being explored for use in combustion engines and fuel cell electric vehicles. Transportation: Hydrogen-powered vehicles, including cars, buses, and even larger energy systems, are gaining traction. primarily as a clean energy source and in various industrial processes, including fuel cells for electricity generation and powering vehicles, as well as in the production of chemicals and fertilizers.

4. Physical / chemical properties

Property	Value
Physical state :	Gas
Colour :	No data available
Odour :	No data available
pH :	No data available in the literature
Melting point	-259.2 °C
Boiling point :	-253 °C
Flash point :	NA

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Density :	Vapour Density 0.0899kg/m ³ (0 °C, 1013 m bar)
Solubility in Water:	19,4 ml/l at 20 °C

5. Health Effects

Effect Assessment	Result
Acute toxicity (Oral / inhalation / dermal)	NA
Irritation / corrosion Skin / eye/ respiratory tract	NA
Respiratory or skin sensitisation	NA
Toxicity after repeated exposure Oral / inhalation / dermal	NA
Genotoxicity / Mutagenicity	NA
Carcinogenicity	NA
Toxicity for reproduction	NA

6. Environmental Effects

Effect Assessment	Result
Aquatic toxicity	No
Fate and behavior	Result
Persistence and degradability	Not rapidly degradable
Bioaccumulative potential	No additional information available

7. Exposure

Human health

Exposure to hydrogen is possible nearly exclusively via the inhalative pathway. Relevant exposure to hydrogen is mainly to be expected after its release from pressure gas bottles or during industrial processes which proceed with the use or formation of hydrogen. Workers may be exposed during (un)loading, mixing, sampling, analysis or maintenance operations and particularly in case of batch processes. The exposure must be kept as minimum as possible by the use of appropriate risk management measures as suitable collective and personal protective equipment, good industrial hygiene practices and risk communication through appropriate training of workers. Careless handling or accidental spillage of the chemical could result in exposure to potentially hazardous levels of chemicals. Industrial workers should ensure that they follow the advice found in the extended safety data sheet (SDS).

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Environment

Care should be taken to avoid releases of these products to sewage, drainage systems and water bodies. Spillage shall be quickly collected in the event of an accidental release. More information about release measures and accidental release measures are available in the extended safety data sheet.

8. Risk Management Recommendations

Human health measures

Organizational	A basic standard of occupational hygiene is recommended. Ensure operatives are well informed of the hazards and trained to minimise exposures. Ensure regular inspection and maintenance of equipment and machines. Handle and store according to the indications of the Safety Data Sheet.	
Protection	Eye protection:	Safety glasses
	Skin and body protection:	Wear suitable protective clothing
	Respiratory protection:	In case of insufficient ventilation, wear suitable respiratory equipment.
Engineering controls	Ensure good ventilation of the work station.	
Environment protective measures		
Avoid release to the environment.		

9. First-aid measures

First-aid measures after inhalation: Remove the person to fresh air and keep comfortable for breathing.

First-aid measures after skin contact :Wash skin with plenty of water.

First-aid measures after eye contact : Rinse eyes with water as a precaution.

First-aid measures after ingestion :Call a poison center or a doctor if you feel unwell.

10. Fire-fighting measures

Extinguishing media

Suitable extinguishing media :Water spray. Dry powder. Foam.

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Unsuitable extinguishing media : Do not use a heavy water stream.

Special hazards arising from the substance or mixture

Hazardous decomposition products in case of fire :Toxic fumes may be released.

Advice for firefighters

Precautionary measures fire : Exposure to fire/heat: keep upwind. Exposure to fire/heat: seal off low-lying areas. Exposure to fire/heat: have neighbourhood close doors and windows.

Firefighting instructions :Eliminate all ignition sources if safe to do so. Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Do not enter fire area without proper protective equipment, including respiratory protection.

11. Accidental release measures

Protective equipment: Wear recommended personal protective equipment.

Environmental precautions:Avoid release to the environment.

For containment :Stop leak without risks if possible.

12. Disposal consideration

Regional legislation (waste) : Disposal must be done according to official regulations.

Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.

Sewage disposal recommendations : Disposal must be done according to official regulations.

13. Handling and storage

Precautions for safe handling :Ensure good ventilation of the work station. Wear personal protective equipment. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Eliminate all ignition sources if safe to do so.

Hygiene measures: Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

14. Classification and Labeling

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Hazard pictograms (GHS US)

:



Signal word (GHS US)

: Danger

Hazard statements (GHS US)

: H220 - Extremely flammable gas

H280 - Contains gas under pressure; may explode if heated

Precautionary statements (GHS US)

: P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381 - In case of leakage, eliminate all ignition sources.

P403 - Store in a well-ventilated place.

P410+P403 - Protect from sunlight. Store in a well-ventilated place.

15. Conclusion

Hydrogen is a Extremely flammable gas. Forms explosive mixtures with air. In the case of fire advise firefighters on the presence of gas cylinders. Cool endangered pressure vessels with water spray from a protected position. If possible, take container out of the dangerous zone. Heating causes a rise in pressure, risk of bursting and explosion. Risk of explosion in contact with: bromine, chlorine, fluorine, oxidizing agents. The substance can react dangerously with: iodine, lithium, barium; lead fluoride; bromine fluoride; calcium/heat; palladium oxide; xenon hexafluoride. Care should be taken to avoid releases of these products to sewage, drainage systems and water bodies. The exposure must be kept as minimum as possible by the use of appropriate risk management measures as suitable collective and personal protective equipment, good industrial hygiene practices and risk communication through appropriate training of workers.

16. Contact Information within company

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This GPS safety summary is intended to give general information about the health, safety and environmental and not intended to provide in-depth details. To obtain the most accurate and current information, consult the appropriate Safety Data Sheet (SDS) prior to use of the material named herein.