


SAFETY DATA SHEET

Material Name: Hydrogen, Compressed Gas

SDS ID: UIG-H2-G01-R0

Section 1 – Product and Company Identification	
Product Identifier:	Hydrogen
Other means of identification:	Hydrogen Gas, H ₂ , GHY (Gaseous Hydrogen), Compressed Hydrogen
Product Uses:	Fuel gas, Industrial manufacturing including reducing gas, metals processing, etc.
Supplier Details:	Universal Industrial Gases, Inc 3001 Emrick Blvd, Suite 320 Bethlehem, PA 18020 USA
Emergency Phone Number:	(610) 559-7967

Section 2 – Hazards Identification	
Classification in accordance with paragraph (d) of §1910.1200	Gas Under Pressure – Compressed gas Flammable gas – Category 1 Simple asphyxiant
Signal word	Danger
Hazard statement(s)	Extremely flammable gas Contains under pressure, cylinders/tanks may explode if heated May displace oxygen and cause rapid suffocation May ignite and/or form explosive mixtures in air Burns with invisible flame Harmful if inhaled
Symbol(s)	
Precautionary statement(s)	Read completely and follow all Safety Data Sheets before use. Colorless, odorless gas. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources, NO SMOKING. Use and store outdoors, ensure proper ventilation, may displace oxygen and cause suffocation. Use equipment and materials rated for service. Protect cylinders from sunlight, store in ventilated area.
Hazards not otherwise classified	None
Toxicity	Non-toxic but may displace oxygen which can cause dizziness, unconsciousness and death by asphyxiation.

Section 3 – Compositions / Information of Ingredients	
Chemical Name & Formula	Hydrogen, H ₂
Common Name and Synonyms	Hydrogen Gas, H ₂ , GHY (Gaseous Hydrogen), Compressed Hydrogen, Di-hydrogen, molecular hydrogen
CAS Number	7333-74-0, Hydrogen Compressed
Purity	Nominally 100%, typically provided >99.5%, by volume, often blended with up to 75% N ₂ for various industrial processes.

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Section 4 – First Aid Measures	
Inhalation	Simple asphyxiant, may cause acute effects including dizziness, drowsiness, nausea, rapid breathing, unconsciousness, and death. Immediately remove victim to fresh air containing sufficient oxygen. If not breathing provide artificial respiration or oxygen by trained personnel, get immediate medical attention. Rescuers must not enter an oxygen deficient area without self-contained breathing apparatus.
Skin Contact	No adverse effects expected from gas at normal temperature. Very cold gas may cause frostbite. Get medical attention if symptoms occur.
Eye Contact	No adverse effects normally expected from gas. Avoid high pressure or very cold gas. Remove contact lenses. Flush with water, get medical attention if symptoms occur/ persist.
Ingestion	Not an expected route of exposure, refer to inhalation section above.
Most important symptoms, effects, acute and delayed	Refer to asphyxiation acute effects as per inhalation above.
Immediate medical attention and special treatment needed	If symptoms occur, seek medical advice and attention.

Section 5 – Fire Fighting Measures	
Suitable extinguishing media	Dry chemical or CO ₂ , also water spray (not solid water stream which may scatter and spread fire). Shut off source of gas if safe to do so.
Special hazards arising (e.g. nature of any hazardous combustion process)	Extremely flammable gas, burns with almost invisible flame. Explosive hazard, including mixtures with air. Can ignite from static electricity. If product under pressure in closed contained, heat from fire may cause pressure to rise and container to burst and possible result being an explosion.
Special protective equipment and precautions for firefighters	If venting/leaking gas catches fire, allow to burn if safe to do so. Cool any containers with water if possible from a safe position. Wear appropriate protective gear and self-contained breathing apparatus. Never attempt to rescue a suspected asphyxiation victim without proper precautions, training and equipment to also avoid exposure to oxygen deficient conditions. Isolate the area.

Section 6 – Accidental Release Measures	
Personal precautions, protective equipment, emergency procedures	Evacuate surrounding area, do not allow personnel to walk or drive in area Eliminate any source of ignition. Ventilate the area if possible. First responders should never enter area where flammable conditions exist or where oxygen concentration is less than 19.5%. If possible, prevent vapors from spreading to ventilation systems or confined spaces

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Methods and materials for containment and clean up	Isolate any leaking sources if it can be done safely. Ventilate the area if possible.
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Section 7 – Handling and Storage

Precautions for safe handling	<p>Keep away from heat and ignition sources, NO SMOKING.</p> <p>Protect system components against physical damage.</p> <p>Use adequate ventilation, avoid breathing.</p> <p>Avoid inhalation and potential confined space areas, use oxygen monitors where appropriate.</p> <p>Consider the use of fixed or portable LEL sensors with audible and/or visual alarms in situations where H₂ gas is used, piped, has possibility to leak, or is vented in an area that could be considered a confined space hazard.</p> <p>Never work on a pressurized system.</p> <p>Wear gloves when moving cylinders.</p> <p>Safety glasses always recommended when working with compressed gases.</p> <p>For additional information, refer to CGA Publications G-5, G-5.3 thru G-5.6, G-5.9, G-5.9.</p>
Conditions for safe storage, including any incompatibilities	<p>Protect cylinders against physical damage. Store in cool, dry, well-ventilated, fireproof area, away from flammable materials and corrosive atmospheres. Store away from heat and ignition sources and out of direct sunlight. Do not store near elevators, corridors or loading docks. Do not allow area where cylinders are stored to exceed 52°C (125°F).</p> <p>Move cylinders with a suitable hand-truck. Do not drag, slide or roll cylinders. Do not drop cylinders or permit them to strike each other. Secure cylinders firmly.</p> <p>Leave the valve protection cap in-place (where provided) until cylinder is placed into service and after it is taken out of service.</p> <p>Use designated CGA fittings and other support equipment. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder.</p> <p>Use check valve or trap in discharge line to prevent hazardous backflow into the cylinder. Do not use oils or grease on gas-handling fittings or equipment.</p>

Section 8 – Exposure Controls / Personal Protection

Permissible exposure limits	<p>There are no exposure limits for this product.</p> <p>Oxygen levels should be kept above 19.5% for all personnel.</p>
Appropriate Engineering Controls	<p>Adequate ventilation, either via natural means or explosion proof measures to ensure no flammability conditions can exist.</p> <p>Use proper explosion proof devices/systems.</p> <p>Low Oxygen monitors and alarms in areas where oxygen deficiency is possible.</p> <p>Pressurized systems to have relief valves properly sized, calibrated and vented.</p>
Individual protection measures / personal protective equipment	<p>Use self-contained breathing apparatus for entering any suspected oxygen deficient area provided no explosive conditions exist.</p> <p>Personnel oxygen monitors.</p> <p>Gloves and safety shoes for handling containers/cylinders.</p> <p>Safety glasses / face protection if exposure to discharged gases, eye wash station.</p> <p>Check systems regularly for leaks.</p>

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Section 9 – Physical and Chemical Properties			
Property	Value	Property	Value
Appearance	Colorless	Lower/Upper Explosive Limit	4% to 75% in air
Odor	Odorless	Vapor Pressure	NA
Odor Threshold	NA	Vapor Density	0.005 lb/ft ³ @ 70°F 0.0837 kg/m ³ @ 21.1°C
Molecular Weight	2 g/mol	Specific Volume	191.9 ft ³ /lb @ 70°F 11.95 m ³ /kg @ 21.1°C
pH	NA	Relative Density to Air (=1)	0.07
Melting / Freezing Point	-435°F / -259°C	Water Solubility	0.0016 g/L (1.82%)
Boiling Point	-423°F / -253°C	Partition Coefficient: n-octanol / water	NA
Flash Point	NA	Auto Ignition Temperature	1040°F / 560°C
Evaporation Rate	NA	Decomposition Temperature	NA
Flammability	Highly Flammable	Viscosity (dynamic)	NA

Section 10 – Stability and Reactivity	
Reactivity	Not reactive under normal conditions
Chemical Stability	Stable at normal temperatures and pressures
Possibility of Hazardous Reactions	Can ignite in air, may be explosive when mixed with air, may react violently with oxidizers.
Conditions to Avoid	Ignition sources such as flames, sparks, heat, static electricity Oxidizing materials such as chlorine, fluorine, halogens Reactive metals such as lithium. High concentrations causing oxygen deficiency atmosphere leading to asphyxiation effects (see sections 4, 6, 7 & 8)
Incompatible Materials	Oxidizing materials
Hazardous Decomposition Products	None

Section 11 Toxicology Information	
Information on likely routes of exposure	No chemical toxicity Inhalation – simple asphyxiant in high concentrations Ingestion – not an expected route Skin – no effects expected normally, cold gas may cause frostbite Eye – no effects expected normally, cold gas may cause frostbite
Symptoms related to physical, chemical, toxicological characteristics	As a simple asphyxiant, the presence of high concentrations causing an oxygen deficiency in air has symptoms which include dizziness, drowsiness, nausea, unconsciousness, and death.
Delayed, Immediate, chronic effects from short and long term exposure	As a simple asphyxiant, the immediate effects of high concentrations causing oxygen deficiency in air include dizziness, drowsiness, nausea, unconsciousness, and death.
Numerical measures of toxicity	LD50 – not available LC50 – > 15000 ppm 1 hr
Carcinogen Listing	Not carcinogenic


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Section 12 – Ecological Information	
Ecotoxicity	None
Persistence and degradability	Not applicable
Bio-accumulative potential	No information available
Mobility in Soil	No information available
Other Adverse effects	No known other effects

Section 13 – Disposal Considerations	
Waste residues and disposal guidelines	Product will normally dissipate in air. Dispose of any contents or containers in accordance with applicable regulations. Cylinders should be returned in original shipping container/method with any valves closed and protective plugs or caps securely in place. Do not discharge into area where oxygen deficient or flammable/explosive conditions can occur

Section 14 – Transport Information	
US DOT UN ID Number	UN1049
UN Proper Shipping Name	Hydrogen, compressed
DOT Transportation Hazard Class	DOT Class 2.1 (Flammable compressed gas) Emergency Response Guide No. 115
	
Packing Group	Not Applicable
Environmental Hazards	None
Transport Bulk Codes	Not Applicable
Special Precautions	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. Isolate area to avoid personnel exposure or other vehicles entering the area. High pressure gas cylinders should have outlet valves closed, with plugs/valve caps secured in place. Load space must be separated from driver compartment. Cylinders should be firmly secured from moving or falling during transport.

Section 15 - Regulatory Information	
US Federal TSCA 8(b) US EPA SARA Title III Section 312 Hazard Category: Sudden release of pressure hazard US CAA (Clean Air Act) Accidental Release Prevention – Flammable Substances – 10,000 lbs US States Right-To-Know Lists: Massachusetts, New Jersey, Pennsylvania	

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Section 16 – Other Information

US Nation Fire Protection Agency (NFPA) hazard ratings:

(Scale of 0 to 4, with 0 = lowest increasing to 4 = highest hazard, refer to NFPA for details related to the relative rating for each category)

Health: 0
 Flammability: 4
 Reactivity: 0
 Special: SA (Simple Asphyxiant)



US Hazardous Material Information System (HMIS) ratings:

(Scale: 0 = minimal, 1 = slight, 2 = moderate, 3 = serious, 4 = severe)



New SDS: 11June 2021 Rev 0

USE OF THIS INFORMATION:

Universal Industrial Gases, LLC offers this information to promote the safe use of this product through awareness of hazards and safety information. Those who use or transport or sell this product to others should:

- 1) Disseminate this information internally to all workplace areas, employees, agents and contractors likely to encounter this product
- 2) Provide supplemental hazards awareness, safety information, operation and maintenance procedures to the workplace areas and employees, agents and contractors likely to encounter this product
- 3) Furnish this information to all their customers who purchase this product
- 4) Ask each purchaser or user of the product to notify its employees and customers of the product hazards and safety information.

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