

Precision Gas Products Inc.

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Containing the Following Components:
Hydrogen

MATERIAL SAFETY DATA SHEET

Identification

Revision Date 01-01-09

Products Name: HYDROGEN

CAS Number: 1333-74-0

Chemical Family: Inorganic Flammable Gas

Chemical formula: H₂

MSDS identification Code/ Number: MSDS 149

Health Hazard Information

- Time Weighted Average Exposure Limit: Hydrogen is considered as a simple asphyxiant. Oxygen levels should be maintained at greater than 18 molar percent at normal atmospheric pressure (pO₂>135 torr).
- Symptoms of Exposure: Inhalation: High concentrations of hydrogen so as to exclude an adequate supply of oxygen to the lungs causes dizziness, deeper breathing due to air hunger, possible unconsciousness.
- Toxicological Properties: Hydrogen is inactive biologically and essentially nontoxic. Persons in ill health, where such illness would be aggravated by exposure to these mixtures, should not be allowed to work with or handle these products.
- Recommended First Aid Treatment: Prompt medical attention is mandatory in all cases of overexposure to nitrogen. Rescue personnel should be equipped with self – contained breathing apparatus.
- Inhalation: Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given mouth – to – mouth resuscitation and supplementary oxygen. Medical assistance should be sought immediately.
- Hazardous Mixtures of Other Liquids, Solids or Gases: Hydrogen is flammable over a very wide range in air.

Physical Data

- Boiling Point: -423°F (-252.8°C)
- Liquid Density at Boiling Point: 4.43 lb/ft³ (70.96 kg/m³)
- Vapor Pressure @ 70°F (21.1°C) - Above the critical temperature for: -399.8°F (-239.9°C)
- Gas Density at 70°F 1 atm: .0052 lb/ft³ (.0833 kg/m³)
- Freezing Point: -439.6°F (-259.2°C)
- Solubility in Water: Very slightly
- Evaporating Rate: N/A (Gas)
- Specific Gravity (AIR = 1): @ 70°F (21.1°C) = 0.25 -0.93
- Appearance and Odor: Colorless, odorless gas.

Fire and Explosion Data

- Flash Point (method used): N/A
- Auto Ignition Temperature: 1058F (570C)
- Flammable Limits % by Volume
 - Lower Explosive limit (%): 4%
 - Upper Explosive Limit (5): 74.5%
- Extinguishing Media: Water, carbon dioxide, dry chemical
- Electrical Classification: Class 1, Group B
- Special Fire Fighting procedures: If possible, stop the flow of these mixtures. Use water spray to cool surrounding containers.
- Unusual Fire and Explosion Hazards: Hydrogen is very light and rises very rapidly in water.

Reactivity Data

- Stability: Stable
- Incompatibility (Materials to avoid): oxidizers
- Hazardous Decomposition Products: None
- Hazardous Polymerization: Will no occur
- Conditions to Avoid: None

Spills or Leak Procedures

- Steps to be Taken in Case Material is Released or Spilled: Evacuate all personnel from affected area. Use appropriate protective equipment.
- Waste Disposal Method: Do not attempt to dispose of waste or unused quantities. Return in shipping container properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to Precision Gas Products for proper disposal.

Special Protection Information

- Respiratory Protection: Positive pressure airline with mask or self – contained breathing apparatus should be available for emergency use.
- Ventilation: Hood with forced ventilation.
- Local Exhaust: To prevent accumulation above the LEL
- Protective Gloves Eye Protection Other Protective Equipment
Clothing or leather Safety goggles or glasses Safety shoes, safety shower

Special Precautions

CT (DOT) Shipping Name: Hydrogen, Compressed
CT (DOT) Shipping Label: Flammable gas
I.D. No.: UN 1049
DOT Hazard Class: Division 2.1

- Special Handling Recommendations
Use only in well – ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder to lower pressure (<3,000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge line to prevent hazardous back flow into the cylinder.

- Special Storage Recommendations

Protect cylinders from physical damage. Store in cool, dry, well – ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125F (52C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a “first in – first out” inventory system to prevent full cylinders being stored for excessive periods of time.

- Special Packing Recommendations

These gas mixtures are noncorrosive and may be used with any common structural material.

- Other Recommendations or precautions

Earth – ground and bond all lines and equipment associated with the gas mixture system. Electrical equipment should be non-sparking and explosion proof. Compressed gas cylinders should not be refilled except by qualified procedures of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).

Always secure cylinder in an upright position before transporting them. NEVER transport cylinders in trunks of vehicles, enclosed vans, truck cabs or in passenger compartments. Transport cylinders secured in open flatbed or in open pickup type vehicles.