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# Hydrogen in Air 0.0001% to 2%

## MATERIAL SAFETY DATA SHEET

### Identification

Product Name: Hydrogen in Air 0.0001% to 2%
Chemical Name: Hydrogen in Air
Chemical Family: Gas Mixture
CAS Number: N/A
Common Names/Synonyms: N/A
MSDS Identification Code/Number: 2270
Prepared by: Quality Dept.

Revision Date: 01/24/05
Last Review Date: 02/13/08

### Composition, Information on Ingredients

**Exposure Limits[1]:**

| Ingredient | % Volume | PEL-OSHA[2] | TLV-ACGIH[3] | $LD_{50}$ or $LC_{50}$ Route/Species |
|---|---|---|---|---|
| Hydrogen<br>Formula: $H_2$<br>CAS: 1333-74-0<br>RTECS#: MW8900000 | 0.0001 to 2% | None Established | Simple Asphyxiant | Not Applicable |
| Air<br>Formula: Mixture<br>CAS: Not Available<br>RTECS#: Not Available | 98 to 99.9999% | Not Applicable | Not Applicable | Not Applicable |

[1] Refer to individual state or provincial regulations, as applicable, for limits that may be more stringent than those listed here.
[2] As stated in 29 CFR 1910, Subpart Z (revised July1, 1993)
[3] As stated in the ACGIH 2007 Threshold Limit Values for Chemical Substances and Physical Agents

OSHA Regulatory Status: This material is classified as hazardous under OSHA regulations.

### Hazards Identification

**Emergency Overview:**

Odorless, colorless, nonflammable gas. Product contains sufficient oxygen to support respiration and combustion. Contents under pressure. Use and store below 125$^{O}$F (52$^{O}$C).

**Route of Entry:**

| Skin Contact | Skin Absorption | Eye Contact | Inhalation | Ingestion |
|---|---|---|---|---|
| No | No | No | No | No |

**Health Effects:**

| Exposure Limits | Irritant | Sensitization |
|---|---|---|
| No | No | No |
| Teratogen | Reproductive Hazard | Mutagen |
| No | No | No |
| Synergistic Effects<br>None reported | | |

## Hazards Identification Continued

Carcinogenicity: NTP: No IARC: No OSHA: No

**Eye Effects:**
None anticipated. Contact with rapidly expanding gas near the point of release may cause frostbite.

**Skin Effects:**
Contact with rapidly expanding gas near the point of release may cause frostbite with redness, skin color change to gray or white, and blistering.

**Ingestion Effects:**
None known. Ingestion is unlikely as product is a gas at room temperature.

**Inhalation Effects:**
Non-toxic-product contains sufficient oxygen to support respiration. Product does not contain sufficient hydrogen to act as a simple asphyxiant.

**Medical Conditions Aggravated by Exposure:** None known.

**Potential Environmental Effects:**
Not expected to be toxic to fish and wildlife.

| **NFPA Hazard Codes** | | **HMIS Hazard Codes** | | **Ratings System** |
|---|---|---|---|---|
| Health: | 0 | Health: | 0 | 0: No Hazard |
| Flammability: | 0 | Flammability: | 0 | 1: Slight Hazard |
| Instability: | 0 | Physical Hazard: | 3 | 2: Moderate Hazard |
| | | | | 3: Serious Hazard |
| | | | | 4: Severe Hazard |

Hazard codes based on recommendations contained in CGA P-19 2004, CGA Recommended Hazard Ratings for Compressed Gases.

## First Aid Measures

**Eyes:**
None required for gas. If frostbite is suspected, flush eyes with cool water for 15 minutes and obtain immediate medical attention.

**Skin:**
None required for gas. For frostbite, immerse skin in lukewarm water. DO NOT USE HOT WATER. Obtain medical attention.

**Ingestion:**
None required.

**Inhalation:**
None required for use at normal atmospheric pressures.

## Fire Fighting Measures

| Conditions of Flammability: Nonflammable | | |
|---|---|---|
| Flash Point:<br>None* | Method:<br>Not Applicable | Autoignition Temperature:<br>None |
| LEL % None | UEL % None | |
| Hazardous Combustion Products: None | | |
| Sensitivity to mechanical shock: None | | |
| Sensitivity to static discharge: None | | |

* Product contains hydrogen in concentrations below the Lower Explosive Limit for hydrogen (4%) in air.

## Fire Fighting Measures Continued

**Fire and Explosion Hazards:**
Nonflammable, non-combustible. Cylinder may rupture violently or vent rapidly from pressure if involved in a fire situation.

**Extinguishing Media:**
None. Use as appropriate for surrounding materials.

**Fire Fighting Instructions:**
If possible, stop the flow of gas supply. Use water spray to cool adjacent cylinders and areas. Fire fighters should wear a full-face piece NIOSH/MSHA approved self-contained breathing apparatus (SCBA) operated in positive pressure mode and full turnout gear.

## Accidental Release Measures

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or valve, contact the appropriate emergency telephone number listed in section 1 or call your closest Norco/NorLab location.

## Handling and Storage

**Electrical Classification:**
Non-hazardous.

Gas mixture is non-corrosive and may be used with any common structural material.

Use only in well-ventilated areas. Valve protection caps must remain in place unless the cylinder is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure regulator when connecting cylinder to lower pressure (<3000 PSIG) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous backflow into the cylinder.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non-combustible construction away from heavy traffic areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed $125^{O}F$ ($52^{0}C$). 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 from being stored for excessive periods of time. Post "NO SMOKING OR OPEN FLAMES" sign in the storage or use area.

For additional recommendations, consult Compressed Gas Association Pamphlets P-1.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid from in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

## Exposure Controls, Personal Protection

**Engineering Controls:**
General ventilation.

**Eye/Face Protection:**
Safety goggles or glasses as appropriate for the job.

**Skin Protection:**
Protective gloves of material appropriate for the job.

**Respiratory Protection:**
Positive pressure air line with full-face mask and escape bottle or self-contained breathing apparatus should be available for emergency use.

**Other/General Protection:**
Safety shoes.

## Physical and Chemical Properties

| Parameter | Value | Units |
|---|---|---|
| Physical state (gas, liquid, solid) | : Gas | |
| Vapor pressure | : Above critical temp. | |
| Vapor density (Air = 1) | : 1.0 | |
| Evaporation point | : Not Available | |
| Boiling point | : -317.8 | $^{O}F$ |
| | : -194 | $^{O}C$ |
| Freezing point | : Not Available | $^{O}F$ |
| | : Not Available | $^{O}C$ |
| pH | : Not Available | |
| Specific gravity | : Not Applicable | |
| Oil/water partition coefficient | : Not Available | |
| Solubility ($H_2O$) | : Slightly soluble | |
| Odor threshold | : Not Applicable | |
| Odor and appearance | : Colorless, odorless gas | |

## Stability and Reactivity

**Stability:**
Stable

**Incompatible Materials:**
None

**Hazardous Polymerization:**
Does not occur.

## Toxicological Information

Air is non-toxic. Hydrogen acts as a simple asphyxiant.

## Ecological Information

Product does not contain Class I or Class II ozone depleting substances. Not toxic. Will not bioconcentrate.

## Disposal Considerations

Do not attempt to dispose of waste or unused quantities in returnable cylinders. Return in the shipping container, properly labeled, with any valve outlet plugs or caps secure and valve protection cap in place, to Norco or NorLab for proper disposal. Non-refillable containers should be vented in a well-ventilated area then disposed of in accordance with local regulations, or returned to NorLab.

## Transport Information

| Parameter | United States DOT | Canada TDG |
|---|---|---|
| **Proper Shipping Name:** | Compressed gases, N.O.S., (Hydrogen in Air) | Compressed gases, N.O. S. |
| **Hazard Class:** | 2.2 | 2.2 |
| **Identification Number:** | UN 1956 | Un 1956 |
| **Shipping Label:** | Nonflammable Gas | Nonflammable Gas |

## Regulatory Information

**SARA Title III Notifications and Information:**
Hydrogen is listed under the accident prevention provisions of section 112(r) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 10,000 pounds.

**SARA Title III – Section 313 Supplier Notification:**
This product does not contain toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and 40 CFR 372.

**SARA Title III – Hazard Classes:**
Sudden Release of Pressure Hazard

**California Proposition 65:**
This product does not contain ingredient(s) known to the State of California to cause cancer or reproductive toxicity.

## Other Information

| | |
|---|---|
| ACGIH | American Conference of Governmental Industrial Hygienists |
| DOT | Department of Transportation |
| IARC | International Agency for Research on Cancer |
| NTP | National Toxicology Program |
| OSHA | Occupational Safety and Health Administration |
| PEL | Permissible Exposure Limit |
| SARA | Superfund Amendments and Reauthorization Act |
| STEL | Short Term Exposure Limit |
| TDG | Transportation of Dangerous Goods |
| TLV | Threshold Limit Value |

Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder that has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

**Disclaimer of Expressed and Implied Warranties:**
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