Praxair™ Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name:	Electron Capture Mixture (H_2-He) (MSDS No. P-4866-B)	**Trade Name:**	Electron Capture Mixture (H_2-He)
Chemical Name:	Hydrogen, Helium Mixtures (Nonflammable)	**Synonyms:**	Not applicable
Formula:	Mixtures of H_2 and He	**Chemical Family:**	Not applicable
Telephone:	**Emergencies:** 1-800-645-4633* **CHEMTREC** 1-800-424-9300* Routine: 1-800-PRAXAIR	**Company Name:**	Praxair, Inc. 39 Old Ridgebury Road Danbury CT 06810-5113

Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information contact your supplier, Praxair sales representative, or call 1-800-PRAXAIR (1-800-772-9247).

2. Composition / Information on Ingredients

This section covers materials of manufacture only. See sections 10 and 16 for information on by-products generated during use, especially use in welding and cutting. For custom mixtures of this product request a Material Safety Data Sheet for each component. See Section 16 for important information about mixtures.

INGREDIENT NAME	CAS NUMBER	PERCENTAGE	OSHA PEL	ACGIH TLV-TWA
Hydrogen	1333-74-0	8.5%	None currently established	Simple asphyxiant
Helium	7440-59-7	91.5%	None currently established	Simple asphyxiant

3. Hazards Identification

EMERGENCY OVERVIEW

CAUTION: High-pressure gas.
Can cause rapid suffocation.
May cause dizziness and drowsiness.
Self-contained breathing apparatus may be required by rescue workers.
Odor: None

THRESHOLD LIMIT VALUE: See section 2. TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations. See section 16 for more information on welding hazards.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION–Asphyxiant. Effects are due to lack of oxygen. Moderate concentrations may cause headache, drowsiness, dizziness, excitation, excess salivation, vomiting, and unconsciousness. Lack of oxygen can kill.

SKIN CONTACT–No harm expected.

SWALLOWING–This product is a gas at normal temperature and pressure.

EYE CONTACT–No harm expected.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: No harm expected

OTHER EFFECTS OF OVEREXPOSURE: This mixture is an asphyxiant. Lack of oxygen can kill.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: The toxicology and the physical and chemical properties of the mixture components suggest that overexposure is unlikely to aggravate existing medical conditions.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION: None known.

CARCINOGENICITY: None of the components of this mixture is listed by NTP, OSHA, or IARC.

4. First Aid Measures

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

SKIN CONTACT: Flush with water.

SWALLOWING: No emergency care anticipated.

EYE CONTACT: Flush eyes with water. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. If discomfort persists, seek medical attention.

NOTES TO PHYSICIAN: *There is no specific antidote. This product is inert. Treatment of over-exposure should be directed at the control of symptoms and the clinical condition. Refer to section 16.*

5. Fire Fighting Measures

FLASH POINT (test method)	Not applicable		**AUTOIGNITION TEMPERATURE**	Not applicable
FLAMMABLE LIMITS IN AIR, % by volume	**LOWER**	Not applicable	**UPPER**	Not applicable

EXTINGUISHING MEDIA: This mixture cannot catch fire. Use media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES:

CAUTION! High-pressure gas. Asphyxiant, will not support life. Evacuate all personnel from danger area. Immediately deluge cylinders with water from maximum distance until cool, then move them away from fire area if without risk. Self-contained breathing apparatus may be required by rescue workers. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This mixture cannot catch fire. Heat of fire can build pressure in cylinder and cause it to rupture. No part of cylinder should be subjected to a temperature higher than 125°F (52°C). Cylinder has a pressure relief device designed to vent contents at elevated temperature and pressure.

HAZARDOUS COMBUSTION PRODUCTS: None known.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:
WARNING! High-pressure gas. Asphyxiant, will not support life. Evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Shut off flow if without risk. Ventilate area or move cylinder to a well-ventilated area. Test for sufficient oxygen, especially in confined spaces, before allowing reentry.

WASTE DISPOSAL METHOD: Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN STORAGE: Store and use with adequate ventilation. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Store only where temperature will not exceed 125°F (52°C). Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

PRECAUTIONS TO BE TAKEN IN HANDLING: Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Open valve slowly. If valve is hard to open, discontinue use and contact your supplier. For other precautions in using this mixture, see section 16.

For additional information on storage and handling, refer to Compressed Gas Association (CGA) pamphlet P-1, "Safe Handling of Compressed Gases in Containers," available from the CGA. Refer to section 16 for the address and phone number along with a list of other available publications.

8. Exposure Controls/Personal Protection

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST–Preferred.
MECHANICAL (general)–Acceptable.
SPECIAL–None
OTHER–None

RESPIRATORY PROTECTION: None required under normal use. An air-supplied respirator must be used in confined spaces or if use of this product may result in hazardous concentrations of other gases or fumes. Respiratory protection must conform to OSHA rules as specified in 29 CFR 1910.134.

SKIN PROTECTION: Wear work gloves when handling cylinders.

EYE PROTECTION: Wear safety glasses when handling cylinders..

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for cylinder handling. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133. Regardless of protective equipment, never touch live electrical parts.

9. Physical and Chemical Properties

MOLECULAR WEIGHT: Not applicable	**EXPANSION RATIO:** Not applicable
SPECIFIC GRAVITY (air=1): At 70°F (21.1°C) and 1 atm: 0.132	**SOLUBILITY IN WATER:** % by wt:, vol/vol at 32°F (0°C): Negligible
GAS DENSITY: At 70°F (21.1°C) and 1 atm: Not applicable	**VAPOR PRESSURE:** AT 68°F (20°C)**:** Not applicable
PERCENT VOLATILES BY VOLUME: 100	**EVAPORATION RATE:** Gas, not applicable
BOILING POINT (1 atm): Not applicable	**pH:** Not applicable
MELTING POINT (1 atm): Not applicable	

APPEARANCE, ODOR, AND STATE: Colorless, odorless gas at normal temperature and pressure.

10. Stability and Reactivity

STABILITY:	**Unstable**		**Stable**	**X**

INCOMPATIBILITY (materials to avoid): None known.

HAZARDOUS DECOMPOSITION PRODUCTS: None.

HAZARDOUS POLYMERIZATION:	**May Occur**		**Will Not Occur**	**X**

CONDITIONS TO AVOID: None known.

11. Toxicological Information

This mixture is a simple asphyxiant.

12. Ecological Information

No adverse ecological effects expected. This Mixture does not contain any Class I or Class II ozone-depleting chemicals. None of the components of this mixture is listed as a marine pollutant by DOT.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier. For emergency disposal, secure cylinder in a well-ventilated area or outdoors, then slowly discharge gas to the atmosphere.

14. Transport Information

DOT/IMO SHIPPING NAME: Compressed gases n.o.s. (hydrogen, helium)	**HAZARD CLASS:** 2.2
IDENTIFICATION NUMBER: UN 1956	**PRODUCT RQ:** Not applicable

SHIPPING LABEL(s): NONFLAMMABLE GAS	**PLACARD (When required):** NONFLAMMABLE GAS

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, nonventilated compartment of a vehicle can present serious safety hazards.

Shipment of compressed gas cylinders that have been filled without the owner's consent is a violation of federal law [49 CFR 173.301(b)].

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, state, and local regulations.

U.S. FEDERAL REGULATIONS:

EPA (Environmental Protection Agency)

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (40 CFR Parts 117 and 302):

Reportable Quantity (RQ): None

SARA: Superfund Amendment and Reauthorization Act:

- **SECTIONS 302/304:** Require emergency planning based on Threshold Planning Quantity (TPQ) and release reporting based on Reportable Quantities (RQ) of extremely hazardous substances (40 CFR Part 355):

  Threshold Planning Quantity (TPQ): None.
  Extremely Hazardous Substances (40 CFR 355): None.

- **SECTIONS 311/312:** Require submission of Material Safety Data Sheets (MSDSs) and chemical inventory reporting with identification of EPA hazard categories. The hazard categories for this products are as follows:

  IMMEDIATE: No
  DELAYED: No
  PRESSURE: Yes
  REACTIVITY: No
  FIRE: No

- **SECTION 313:** Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR Part 372.

  The components of this mixture do not require reporting under Section 313.

40 CFR 68: Risk Management Program for Chemical Accidental Release Prevention**:** Requires development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

None of the components of this mixture is listed as a regulated substance.

TSCA: Toxic Substances Control Act: The components of this mixture are listed on the TSCA inventory.

OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION):

29 CFR 1910.119 : Process Safety Management of Highly Hazardous Chemicals: Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

None of the components of this mixture is listed in Appendix A as a highly hazardous chemical.

STATE REGULATIONS:

CALIFORNIA: None of the components of this mixture is listed by California under the Safe Drinking Water Toxic Enforcement Act of 1986 (Proposition 65).

PENNSYLVANIA: This product is subject to the Pennsylvania Worker and Community Right-To-Know Act (35 P.S. Sections 7301-7320).

16. Other Information

Be sure to read and understand all labels and instructions supplied with all containers of this product.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE: High-pressure gas. ***Can cause rapid suffocation due to oxygen deficiency.*** Store and use with adequate ventilation. Close valve after each use; keep closed even when empty. ***Never work on a pressurized system.*** If there is a leak, close the cylinder valve. Blow the system down in a safe and environmentally sound manner in compliance with all federal, state and local laws; then repair the leak. ***Never ground a compressed gas cylinder or make a it part of an electrical circuit.***

NOTE: *Prior to using any plastics, confirm their compatibility with the components of this mixture.*

MIXTURES: When you mix two or more gases or liquefied gases, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist, or other trained person when you evaluate the end product.

HAZARD RATING SYSTEMS:

NFPA RATINGS:		**HMIS RATINGS:**	
HEALTH	= 0	HEALTH	= 0
FLAMMABILITY	= 0	FLAMMABILITY	= 0
REACTIVITY	= 0	REACTIVITY	= 0
SPECIAL	SA (CGA recommends this rating to designate Simple Asphyxiant.)		

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED:	0-3000 psig	CGA-350
PIN-INDEXED YOKE:	0-3000 psig	Not applicable

ULTRA-HIGH-INTEGRITY CONNECTION:	0-3000 psig	Not applicable

Use the proper CGA connections. **DO NOT USE ADAPTERS.**

Ask your supplier about free Praxair safety literature as referenced on the label for this product; you may also obtain copies by calling 1-800-PRAXAIR. Further information about this mixture can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 1725 Jefferson Davis Highway, Arlington, VA 22202-4102, Telephone (703) 412-0900.

AV-1	*Safe Handling and Storage of Compressed Gases*
G-5	*Hydrogen*
P-1	*Safe Handling of Compressed Gases in Containers*
P-9	*Inert Gases—Argon, Nitrogen, and Helium*
P-14	*Accident Prevention in Oxygen-Rich, Oxygen-Deficient Atmospheres*
SB-2	*Oxygen-Deficient Atmospheres*
V-1	*Compressed Gas Cylinder Valve Inlet and Outlet Connections*
V-7	*Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures*
---	*Handbook of Compressed Gases, Third Edition*

Praxair asks users of this product to study this Material Safety Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents and contractors of the information on this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair MSDSs are furnished on sale or delivery by Praxair or the independent distributors and suppliers who package and sell our products. To obtain current Praxair MSDSs for these products, contact your Praxair sales representative or local distributor or supplier. If you have questions regarding Praxair MSDSs, would like the form number and date of the latest MSDS, or would like the names of the Praxair suppliers in your area, phone or write the Praxair Call Center (**Phone:** 1-800-PRAXAIR; **Address:** Praxair Call Center, Praxair, Inc., PO Box 44, Tonawanda, NY 14150-7891).

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