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**MATERIAL SAFETY DATA SHEET**

No. 169

<b>PRODUCT NAME</b> Less Than 23.5 % Oxygen in Helium	<b>CAS #</b> O <sub>2</sub> = 7782-42-7 He= 7440-59-7
<b>TRADE NAME AND SYNONYMS</b> Rare Gas and Oxygen Mixture (D.O.T.)	<b>DOT I.D. No.:</b> UN 1980
<b>CHEMICAL NAME AND SYNONYMS</b> < 23.5 Molar % Oxygen in Helium	<b>DOT Hazard Class:</b> Division 2.2
<b>ISSUE DATES AND REVISIONS</b> April 1997	<b>Formula</b> < 23.5 Molar % O <sub>2</sub> in He <b>Chemical Family:</b> Gas Mixtures

**HEALTH HAZARD DATA**

<p><b>TIME WEIGHTED AVERAGE EXPOSURE LIMIT</b>                  Helium is a simple asphyxiant (ACGIH 1996); and Oxygen is the "vital element" in the atmosphere in which we live and breathe. QSHA does not list                  (Continued on Page 4)</p>
<p><b>SYMPTOMS OF EXPOSURE</b>                  Effects of exposure to high concentrations so as to displace the oxygen in air necessary for life may include <u>any, all or none</u> of the following:</p> <ul style="list-style-type: none"> <li>• Loss of balance or dizziness</li> <li>• Tightness in the frontal area of the forehead</li> </ul>
<p><b>TOXICOLOGICAL PROPERTIES</b>                  These mixtures are nontoxic but the liberation of a large amount in a confined area could displace the amount of oxygen in air necessary to support life.</p> <p>Neither oxygen or helium are listed in the IARC, NTP or by OSHA as a carcinogen or potential carcinogen</p> <p>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.</p>
<p><b>RECOMMENDED FIRST AID TREATMENT</b>                  PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO THESE MIXTURES. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.</p> <p><u>Inhalation:</u> 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 assisted respiration and supplemental oxygen. Further treatment should be symptomatic and supportive.</p>

Information contained in this material safety data sheet is offered without charge for use by technically qualified personnel at their discretion and risk. All statements, technical information and recommendations contained herein are based on tests and data which we believe to be reliable, but the accuracy or completeness thereof is not guaranteed and no warranty of any kind is made with respect thereto. This information is not intended as a license to operate under or a recommendation to practice or infringe any patent of this Company or others covering any process, composition of matter or use. Since the Company shall have no control of the use of the product described herein, the Company assumes no liability for loss or damage incurred from the proper or improper use of such product.

<b>HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES</b>	
None	
<b>PHYSICAL DATA</b>	
BOILING POINT O <sub>2</sub> = -297.3°F (-182.9°C) He= -452.1°F (-268.9°C)	LIQUID DENSITY AT BOILING POINT See Page 4
VAPOR PRESSURE See Page 4	GAS DENSITY AT 70°F, 1 atm See Page 4
SOLUBILITY IN WATER O <sub>2</sub> = Slightly He = Negligible	FREEZING POINT See Page 4
EVAPORATION RATE N/A (Gas)	SPECIFIC GRAVITY (AIR=1) See Page 4
APPEARANCE AND ODOR Colorless, odorless gas	

### FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) N/A	AUTO IGNITION TEMPERATURE N/A	FLAMMABLE LIMITS % BY VOLUME (See Page 4) LE N/A UEL N/A
EXTINGUISHING MEDIA Nonflammable, inert gas		ELECTRICAL CLASSIFICATION Nonhazardous
SPECIAL FIRE FIGHTING PROCEDURES If cylinders are involved in a fire, safely relocate or keep cool with water spray.		
UNUSUAL FIRE AND EXPLOSION HAZARDS None		

### REACTIVITY DATA

STABILITY Unstable		CONDITIONS TO AVOID None
Stable	X	
INCOMPATIBILITY (Materials to avoid) None		
HAZARDOUS DECOMPOSITION PRODUCTS None		
HAZARDOUS POLYMERIZATION May Occur		CONDITIONS TO AVOID
Will Not Occur	X	None

### SPILL OR LEAK PROCEDURES

<p><b>STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED</b></p> <p>Evacuate all personnel from a affected area. Use appropriate protective equipment. If leak is in container or container valve, contact your closest supplier location or call the emergency telephone number listed herein.</p>
<p><b>WASTE DISPOSAL METHOD</b></p> <p>Do not attempt to dispose of waste or unused quantities. Return in the shipping container properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to your supplier. For emergency disposal assistance, contact your closest supplier location or call the emergency telephone number listed herein.</p>

**SPECIAL PROTECTION INFORMATION**

<b>RESPIRATORY PROTECTION</b> (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.		
<b>VENTILATION</b>  See local exhaust	<b>LOCAL EXHAUST</b> See Page 5	<b>SPECIAL</b> N/A
	<b>MECHANICAL (Gen.)</b>	<b>OTHER</b> N/A
<b>PROTECTIVE GLOVES</b> Any Material		
<b>EYE PROTECTION</b> Safety goggles or glasses		
<b>OTHER PROTECTIVE EQUIPMENT</b> Safety shoes		

**SPECIAL PRECAUTIONS\***

<b>SPECIAL LABELING INFORMATION</b> DOT Shipping Name: Rare Gas and Oxygen Mixture DOT Shipping Label: Nonflammable Gas	DOT Hazard Class: Division 2.2 I.D.No.: UN 1980
<b>SPECIAL HANDLING RECOMMENDATIONS</b> Use only in well-ventilated areas. Valve protection caps must remain in place unless 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 reducing regulator when connecting cylinder to lower pressure (<3,000 psig) piping systems. Do not heat cylinder by any means to increase the discharge/rate of product from cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.  For additional handling recommendations, consult Compressed Gas Association’s Pamphlets P-1, P-9, P-14, and Safety Bulletin SB-2.	
<b>SPECIAL STORAGE RECOMMENDATIONS</b> 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 125°F (52°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 being stored for excessive periods of time.  For additional storage recommendations, consult Compressed Gas Association’s Pamphlets P-1, P-9, P-14, and Safety Bulletin SB-2.	
<b>SPECIAL PACKAGING RECOMMENDATIONS</b> These mixtures are noncorrosive and may be used with any common structural materials.	
<b>OTHER RECOMMENDATIONS OR PRECAUTIONS</b> Compressed gas cylinders should not be refilled except by qualified producers 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).	

\*Various Government Agencies (i.e. Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, handling, storage or use of this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.



Less Than 23.5 % Oxygen in Helium

SPECIAL PROTECTION INFORMATION

LOCAL EXHAUST:

To prevent accumulation of high concentrations so as to reduce the oxygen level in the air to less than 18 molar percent.

SPECIAL PRECAUTIONS

OTHER RECOMMENDATIONS OR PRECAUTIONS: (Continued)

Always secure cylinders 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 pick-up type vehicles.

Reporting under SARA, Title III, Section 313 not required.

NFPA 704 NO. for these mixtures = 1 0 0 None