

MAJOR SUPPLIERS OF CRYOGENICS AND WELDING EQUIPMENT

SECTION 1. MATERIAL IDENTIFICATION

<u>PRODUCT NAME</u> Oxygen		<u>CAS #</u> 7782-44-7	HMIS H: 0 F: 0 R: 0 S: (OX)	
<u>TRADE NAME AND SYNONYMS</u> See Page 4		<u>DOT I.D. NO.</u> UN 1072		
<u>CHEMICAL NAME AND SYNONYMS</u> Oxygen		<u>DOT HAZARD CLASS</u> Division 2.2		
<u>FORMULA</u> O ₂	<u>CHEMICAL FAMILY</u> Oxidizer	<u>DESCRIPTION</u> Oxidant; Vital element.		

SECTION 2. HEALTH HAZARD INFORMATION

TIME WEIGHTED AVERAGE EXPOSURE LIMIT

None established (ACGIH 1993-1994). Oxygen is the "vital element" in the atmosphere in which we live and breathe (approximately 21 molar % of the atmosphere). OSHA 1993 does not list a TWA for oxygen.

SYMPTOMS OF EXPOSURE

Breathing high concentrations (greater than 75 molar percent) causes symptoms of hyperoxia which includes cramps, nausea, dizziness, hypothermia, amblyopia, respiratory difficulties, bradycardia, fainting spells, and convulsions capable of leading to death.

For additional information on hyperoxia, see Compressed Gas Association's Pamphlet P-14.

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TRANSPORTATION

TOXICOLOGICAL PROPERTIES

The property is that of hyperoxia which leads to pneumonia. Concentrations between 25 and 75 molar percent present a risk of inflammation of organic matter in the body.

Oxygen is not listed in the IARC, NTP or by OSHA as a carcinogen or potential carcinogen. (Continued on Page 4)

RECOMMENDED FIRST AID TREATMENT

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO OXYGEN. RESCUE PERSONNEL SHOULD BE COGNIZANT OF EXTREME FIRE HAZARD ASSOCIATED WITH OXYGEN RICH ATMOSPHERES.

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SECTION 3. PHYSICAL DATA	
<u>BOILING POINT</u> -297.3°F (-182.9°C)	<u>LIQUID DENSITY AT BOILING POINT</u> 71.23 lb/ft ³ (1141 kg/m ³)
<u>VAPOR PRESSURE @ 70°F (21.1°C)</u> = Above the critical temp. of -181.1°F (-118.4°C)	<u>GAS DENSITY AT 70°F, 1 ATM</u> 0.828 lb/ft ³ (1.326 kg/m ³)
<u>SOLUBILITY IN WATER</u> Slightly	<u>FREEZING POINT</u> -361.8°F (-218.8°C)
<u>EVAPORATION RATE</u> N/A (Gas)	<u>SPECIFIC GRAVITY (AIR = 1)</u> @ 70°F (21.1°C) = 1.11
<u>APPEARANCE AND ODOR</u> Colorless, odorless gas	

SECTION 4. FIRE AND EXPLOSION HAZARD DATA		
<u>FLASH POINT</u> N/A	<u>AUTO IGNITION TEMPERATURE</u> N/A	<u>FLAMMABLE UNITS % BY VOLUME</u> LEL N/A UEL N/A
<u>EXTINGUISHING MEDIA</u> Copious quantities of water for fires with oxygen as the oxidizer		<u>ELECTRICAL CLASSIFICATION</u> Nonhazardous
<u>SPECIAL FIREFIGHTING PROCEDURES</u> If possible, stop the flow of oxygen which is supporting the fire.		<u>UNUSUAL FIRE AND EXPLOSION HAZARDS</u> See Page 4
<u>HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS OR GASES</u> Oxygen vigorously accelerates combustion. Contact with all flammable materials should be avoided. Some materials which are not flammable in air will burn in pure oxygen or oxygen-enriched atmospheres.		

SECTION 5. REACTIVITY DATA			
<u>STABILITY</u> Unstable <input type="checkbox"/> Stable <input checked="" type="checkbox"/>	<u>CONDITIONS TO AVOID</u> None	<u>HAZARDOUS POLYMERIZATION</u> May Occur <input type="checkbox"/> Will Not Occur <input checked="" type="checkbox"/>	<u>CONDITIONS TO AVOID</u> None
<u>INCOMPATIBILITY (Materials to Avoid)</u> All flammable materials		<u>HAZARDOUS DECOMPOSITION PRODUCTS</u> None	

SECTION 6. SPILL, LEAK AND DISPOSAL PROCEDURES	
<u>STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED</u> Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact your closest supplier location or call the emergency telephone number listed herein.	
<u>WASTE DISPOSAL</u> 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.	

SECTION 7. SPECIAL PROTECTION INFORMATION					
<u>RESPIRATORY PROTECTION:</u> N/A					
<u>VENTILATION</u> See Local Exhaust	<table border="1"> <tr> <td><u>LOCAL EXHAUST</u> To prevent accumulation above 25 molar percent.</td> <td><u>SPECIAL</u> N/A</td> </tr> <tr> <td><u>MECHANICAL</u> N/A</td> <td><u>OTHER</u> N/A</td> </tr> </table>	<u>LOCAL EXHAUST</u> To prevent accumulation above 25 molar percent.	<u>SPECIAL</u> N/A	<u>MECHANICAL</u> N/A	<u>OTHER</u> N/A
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<u>MECHANICAL</u> N/A	<u>OTHER</u> N/A				
<u>PROTECTIVE GLOVES</u> As required, any material	<u>EYE PROTECTION</u> Safety goggles or glasses				
<u>OTHER PROTECTIVE EQUIPMENT</u> Safety shoes, safety shower					

SECTION 8. SPECIAL PRECAUTIONS AND COMMENTS**SPECIAL LABELING INFORMATION**

DOT Shipping Name: Oxygen, Compressed DOT Hazard Class: Division 2.2
 DOT Shipping Label: Nonflammable gas; Oxidizer; OR: Oxygen (2) I.D. No.: UN 1072

SPECIAL HANDLING RECOMMENDATIONS

Use only in well-ventilated areas. Valve protection caps and valve outlet threaded plugs 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 movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3,000 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 back flow into the cylinder.

For additional handling recommendations, consult Compressed Gas Association's Pamphlets P-1, P-14, and G-4.

SPECIAL STORAGE RECOMMENDATIONS

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits and away from full or empty stored cylinders which contain flammable products. 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.

For additional storage recommendations, consult Compressed Gas Association's Pamphlets P-1, P-14, and G-4.

SPECIAL PACKAGING RECOMMENDATIONS

Carbon steels and low alloy steels are acceptable for use at lower pressures. For high pressure applications use stainless steels, copper and its alloys, nickel and its alloys, brass, bronze, silicon alloys, Monel®, Inconel®, or beryllium.
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OTHER RECOMMENDATIONS OR PRECAUTIONS

Oxygen should not be used as a substitute for compressed air in pneumatic equipment since this type generally contains flammable lubricants. Equipment to contain oxygen must be "cleaned for oxygen service." See Compressed Gas Association Pamphlet G-4.1.

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SPECIAL NOTES:

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

About the Information in this Bulletin:

*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.

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.

SPECIAL NOTES:MATERIAL IDENTIFICATION

TRADE NAME AND SYNONYMS: Oxygen; Oxygen, compressed (D.O.T.)

HEALTH HAZARD INFORMATIONTOXICOLOGICAL PROPERTIES: (Continued)

Persons in ill health where such illness would be aggravated by exposure to oxygen should not be allowed to work with or handle this product.

RECOMMENDED FIRST AID TREATMENT: (Continued)

Conscious persons should be assisted to an uncontaminated area and breathe fresh air. They should be kept warm and quiet. The physician should be informed that the victim is experiencing (has experienced) hyperoxia.

Unconscious persons should be moved to an uncontaminated area and given assisted respiration. When breathing has been restored, treatment should be as above. Continued treatment should be symptomatic and supportive.

SPECIAL PRECAUTIONSSPECIAL PACKAGING RECOMMENDATIONS: (Continued)

Lead and silver or lead and tin alloys are good gasketing materials. Teflon® and Kel-F® are the preferred nonmetal gaskets.

Special Note: It should be recognized that the ignition temperature of metals and non-metals in pure oxygen service decreases with increasing oxygen pressure.

OTHER RECOMMENDATIONS OR PRECAUTIONS: (Continued)

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).

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.

FIRE AND EXPLOSION HAZARD DATAUNUSUAL FIRE AND EXPLOSION HAZARDS:

Vigorously accelerates combustion. If cylinders are involved in a fire, safely relocate or keep cool with water spray.