



**AIR LIQUIDE**

# MATERIAL SAFETY DATA SHEET

*Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards*

## 1. PRODUCT AND COMPANY INFORMATION

**CHEMICAL NAME; CLASS: OXYGEN**

**SYNONYMS:** Oxygen USP, Aviator's Breathing Oxygen (ABO)

**CHEMICAL FAMILY NAME:** Oxidizing Gas

**FORMULA:** O<sub>2</sub>

**NOTE:** Oxygen may be supplied by pipeline at pressures up to 600 PSIG.

**PRODUCT USE:**

Document Number: 10074  
Medical, welding and general analytical  
or synthetic chemical uses.

**MANUFACTURED/SUPPLIED FOR:**

**ADDRESS:**



**AIR LIQUIDE**

2700 Post Oak Drive  
Houston, TX 77056-8229

**EMERGENCY PHONE:**

CHEMTREC: 1-800-424-9300

**BUSINESS PHONE:**

General MSDS Information 1-713/896-2896

Fax on Demand: 1-800/231-1366

## 2. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:** Oxygen is a colorless, odorless gas. The main health hazard associated with releases of this gas is its powerful oxidizing power. In high oxygen content atmospheres, common combustible materials can become highly flammable. Emergency responders must practice extreme caution when approaching oxygen releases because of the extreme fire potential.

**SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE:** The most significant route of over-exposure for this product is by inhalation.

**INHALATION:** High concentrations (80% or more) of this gas can cause an oxygen-rich environment. Individuals breathing such an atmosphere for durations of 17-24 hours may experience symptoms which include nasal stuffiness, nausea, dizziness, bronchial irritation (cough), sore throat, hypothermia, increased depth of respiration, bradycardia, pulmonary discomfort (including chest pain), peripheral vasoconstriction, amblyopia (loss of vision). Inhalation of pure oxygen at atmospheric pressure or less can cause pulmonary irritation and edema after 24 hours.

**HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms.** Over-exposure to Oxygen may cause the following health effects:

**ACUTE:** Individuals breathing oxygen-enriched atmospheres may experience nasal stuffiness, nausea, dizziness, coughing, sore throat, hypothermia, disturbed breathing, chest pain, and loss of vision.

**CHRONIC:** There are currently no known adverse health effects associated with chronic exposure to this gas.

**TARGET ORGANS:** Respiratory system.

## 3. COMPOSITION and INFORMATION ON INGREDIENTS

| CHEMICAL NAME      | CAS #     | mole % | EXPOSURE LIMITS IN AIR  |             |            |             |             |       |
|--------------------|-----------|--------|---|-------------|------------|-------------|-------------|-------|
|                    |           |        | ACGIH   |             | OSHA       |             |             | OTHER |
|                    |           |        | TLV<br>ppm  | STEL<br>ppm | PEL<br>ppm | STEL<br>ppm | IDLH<br>ppm |       |
| Oxygen             | 7782-44-7 | 99.5%  | There are no specific exposure limits for Oxygen. Oxygen levels should be maintained above 19.5% and below 23.5%  |             |            |             |             |       |
| Maximum Impurities |           | <0.5%  | None of the trace impurities in this product contribute significantly to the hazards associated with the product. All hazard information pertinent to this product has been provided in this Material Safety Data Sheet, per the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200) and State equivalents standards. |             |            |             |             |       |

**This material is classified as hazardous under OSHA regulations in the United States and the WHMIS in Canada.**

NE = Not Established

C = Ceiling Limit

See Section 16 for Definitions of Terms Used.

NOTE: all WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-2004 format.

## 4. FIRST-AID MEASURES

Remove victim(s) to fresh air, as quickly as possible, or if in elevated pressures, reduce oxygen pressure to 1 atmosphere. Physician should be advised of victim's exposure to a high oxygen concentration. Trained personnel should administer medical aid such as cardio-pulmonary resuscitation, if necessary. Supplemental oxygen is not normally appropriate. Victims tend to recover rapidly, when removed from the hypoxic exposure.

Take copy of label and MSDS to physician or other health professional with victim(s). Medical care providers should refer to Section 11 (Toxicology Information) of this MSDS for additional information.

## 5. FIRE-FIGHTING MEASURES

**FLASH POINT:** Not applicable.

**AUTOIGNITION TEMPERATURE:** Not applicable.

**FLAMMABLE LIMITS (in air by volume, %):**

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

**FIRE EXTINGUISHING MATERIALS:** Non-flammable gas. Use extinguishing media appropriate for surrounding fire.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Oxygen does not burn; however, cylinders, when involved in fire, may rupture or burst in the heat of the fire. Oxygen will support and accelerate combustion. Common combustible materials will burn more readily in elevated oxygen environments, and some materials which are non-combustible in air will burn in an oxygen-enriched atmosphere. Direct water onto cylinders to keep cool. Shut-off the flow of oxygen or move cylinders from fire area if it can be done safely. Rescue personnel should be aware of the extreme fire hazards associated with oxygen-enriched atmospheres.

Water Spray: YES

Carbon Dioxide: YES

Foam: YES

Halon: YES

Dry Chemical: YES

Other: Any "ABC" Class.

Explosion Sensitivity to Mechanical Impact: Not Sensitive.

Explosion Sensitivity to Static Discharge: Not Sensitive.

**SPECIAL FIRE-FIGHTING PROCEDURES:** Structural fire-fighters must wear Self-Contained Breathing Apparatus and full protective equipment. Other information for pre-planning can be found in the North American Emergency Response Guidebook.

## 6. ACCIDENTAL RELEASE MEASURES

**LEAK RESPONSE:** Evacuate immediate area. Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a leak, clear the affected area, protect people, eliminate sources of ignition, and respond with trained personnel. Adequate fire protection must be provided.

Minimum Personal Protective Equipment should be **Level B: fire protective clothing, mechanically-resistant, fire protective gloves and Self-Contained Breathing Apparatus**. In general, **DO NOT ENTER AN AREA IF THE OXYGEN CONTENT EXCEEDS 23.5%. USE VENTILATION TO REDUCE THE OXYGEN LEVELS**. Attempt to close the main source valve prior to entering the area. If this does not stop the release (or if it is not possible to reach the valve), allow the gas to release in-place or remove it to a safe area and allow the gas to be released there. Remove sources of heat, ignition, and, if possible, separate combustibles from the leak. Monitor the surrounding area for oxygen levels.

If leaking incidentally from the cylinder or its valve, contact your supplier.

## 7. HANDLING AND STORAGE

**STORAGE AND HANDLING PRACTICES:** Cylinders should be stored upright and be firmly secured to prevent falling or being knocked-over. Cylinders can be stored in the open, but in such cases, should be protected against extremes of weather and from the dampness of the ground to prevent rusting. Cylinders should be stored in dry, well-ventilated areas away from sources of heat, ignition and direct sunlight. Keep storage area clear of materials which can burn. Do not allow area where cylinders are stored to exceed 52°C (125°F). Store containers away from heavily trafficked areas and emergency exits. Store away from process and production areas, away from elevators, building and room exits or main aisles leading to exits. Cylinders should be separated from flammable materials by a minimum distance of 20 ft or by a barrier of non-combustible material at least 5 ft high, having a fire resistance rating of at least ½ hour. Protect cylinders against physical damage. Isolate from other non compatible chemicals (refer to Section 10, Stability and Reactivity). Post “No Smoking or Open Flames” signs in storage or use areas.

Consider installation of leak detection and alarm for storage and use areas. Have appropriate extinguishing equipment in the storage area ( i.e. sprinkler system, portable fire extinguishers).

**SPECIAL PRECAUTIONS FOR USE OF OXYGEN:** All gauges, valves, regulators, piping and equipment to be used in oxygen service must be cleaned for oxygen service in accordance with CGA pamphlet G-4.1 Use piping and equipment adequately designed to withstand pressures to be encountered. Oxygen is not to be used as a substitute for compressed air. Never use an oxygen jet for cleaning purposes of any sort, especially clothing, as it increases the likelihood of an engulfing fire. Use a check valve or other protective apparatus in any line or piping from the cylinder to prevent reverse flow. Never tamper with pressure relief valves and cylinders.

Personnel who have been exposed to high concentrations of oxygen should stay in a well-ventilated or open area for 30 minutes before going into a confined space or near an ignition source. Use non-sparking ventilation systems, approved explosion-proof equipment, and appropriate electrical systems. Electrical equipment used in gas-handling operations, or located in storage areas, should be non-sparking or explosion-proof

Keep the smallest amount necessary on-site at any one time. Full and empty cylinders should be segregated. Use a first-in, first-out inventory systems to prevent full containers from being stored for long periods of time.

**SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS:** Compressed gases can present significant safety hazards. The following rules are applicable to work situations in which cylinders are being used.

**Before Use:** Move cylinders with a suitable hand-truck. Do not drag, slide or roll cylinders. Do not drop cylinders or permit them to strike each other. Secure cylinders firmly. Leave the valve protection cap (where provided) in-place until cylinder is ready for use.

**During Use:** Use designated CGA fittings and other support equipment. Do not use adapters. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder. Do not use oils or grease on gas-handling fittings or equipment. Leak-check system with leak detection solution, never with flame. Immediately contact the supplier if there are any difficulties associated with operating cylinder valve. Never insert an object (e.g wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing a leak to occur. Use an adjustable strap wrench to remove over-tight or rusted caps. Never strike an arc, on a compressed gas cylinder or make a cylinder part of and electric circuit.

**After Use:** Close main cylinder valve. Valves should be closed tightly. Replace valve protection cap. Mark empty cylinders “EMPTY”.

**NOTE:** Use only DOT or ASME code containers. Close valve after each use and when empty. Cylinders must not be recharged except by or with the consent of owner. For additional information, refer to American National Standards (ANSI) Z49.1 *Safety in Welding and Cutting* published by the American Welding Society, PO Box 351040, Miami, FL 33135; National Fire Protection Association (NFPA) 51. See Section 16, (Other Information) for additional pamphlets developed by the Compressed Gas Association (CGA).

## 7. HANDLING AND STORAGE (Continued)

**STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:** Use the proper CGA connections, DO NOT USE ADAPTERS:

|                              |                |                       |
|------------------------------|----------------|-----------------------|
| <u>THREADED:</u>             | 0-3000 psig    | CGA 540               |
|                              | 3001-4000 psig | CGA 577               |
|                              | 4001-5500 psig | CGA 701               |
| <u>PIN-INDEXED YOKE:</u>     | 0-3000 psig    | CGA 870 (Medical Use) |
| <u>ULTRA HIGH INTEGRITY:</u> | 0-3000 psig    | 714                   |

**PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT:** Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely. Purge gas handling equipment with inert gas (i.e. nitrogen) before attempting repairs. Always use product in areas where adequate ventilation is provided.

## 8. EXPOSURE CONTROLS - PERSONAL PROTECTION

**VENTILATION AND ENGINEERING CONTROLS:** Use with adequate ventilation. Local exhaust ventilation is preferred, because it prevents dispersion of this gas into the work place by eliminating it at its source. If appropriate, install automatic monitoring equipment to detect the level of oxygen.

**RESPIRATORY PROTECTION:** Maintain oxygen levels above 19.5% and below 23.5% in the workplace. Use supplied air respiratory protection if oxygen levels are below 19.5%. **DO NOT ENTER AN AREA IF THE OXYGEN CONTENT EXCEEDS 23.5%.**

**EYE PROTECTION:** Safety glasses.

**HAND PROTECTION:** Wear gloves when handling cylinders of this product. Otherwise, wear glove protection appropriate to the specific operation for which this product is used.

**BODY PROTECTION:** Use body protection appropriate for task. Safety shoes are recommended when handling cylinders.

## 9. PHYSICAL and CHEMICAL PROPERTIES

**GAS DENSITY @ 0°C (32°F) and 1 atm:** 0.083 lb/cu ft (1.326 kg/m<sup>3</sup>)

**BOILING POINT:** -183.0°C (-297.4°F)

**FREEZING/MELTING POINT @ 10 psig:** -218.8°C (-361.8°F)

**SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C):** 1.105

**pH:** Not applicable.

**SOLUBILITY IN WATER vol/vol at 0°C and 1 atm:** 0.04.91

**MOLECULAR WEIGHT:** 32.00

**EVAPORATION RATE (nBuAc = 1):** Not applicable.

**EXPANSION RATIO:** Not applicable.

**ODOR THRESHOLD:** Not applicable.

**VOLUME (ft<sup>3</sup>/lb):** 12.1

**VAPOR PRESSURE @ 21.1°C (70°F) psig:** Not applicable.

**COEFFICIENT WATER/OIL DISTRIBUTION:** Not applicable.

**APPEARANCE AND COLOR:** This product is a colorless, odorless gas at normal temperature and pressure.

**HOW TO DETECT THIS SUBSTANCE (warning properties):** There are no unusual warning properties associated with a release of this product. An oxygen monitor can be used to detect oxygen levels.

## 10. STABILITY and REACTIVITY

**STABILITY:** Normally stable.

**DECOMPOSITION PRODUCTS:** None.

**MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:** Oxygen is incompatible with combustible and flammable materials, chlorinated hydrocarbons, hydrazine, reduced boron compounds, ethers, phosphine, phosphorous tribromide, phosphorous trioxide, tetrafluoroethylene, and compounds which readily form peroxides. Oxygen may form explosive compounds when exposed to combustible material, or oil, grease, and other hydrocarbon materials.

**HAZARDOUS POLYMERIZATION:** Will not occur.

**CONDITIONS TO AVOID:** Avoid contact with incompatible materials. Cylinders exposed to high temperatures or direct flame can rupture or burst.

## 11. TOXICOLOGICAL INFORMATION

**TOXICITY DATA:** Oxygen is the vital element in the atmosphere in which we live and breathe. The atmosphere contains approximately 21% oxygen. Breathing higher concentrations could lead to oxygen toxicity and pneumonia. Breathing lower oxygen concentrations could lead to hypoxia. The following toxicity data are for oxygen:

Human toxicological data and teratogenic data are available for Oxygen; however, the effects have occurred after prolonged exposure to Oxygen (inhalation effects of T<sub>CLo</sub> after 14 hours) and with exposure of very high concentration of Oxygen at greater than normal atmosphere.

Premature infants exposed to high oxygen concentrations may suffer delayed retinal damage which can progress to retinal detachment and blindness. Retinal damage may also occur in adults exposed to 100% oxygen for extended periods of time (24 to 48 hours).

At two or more atmospheres, central nervous system (CNS) toxicity occurs. Symptoms include nausea, vomiting, dizziness or vertigo, muscle twitching, vision changes, and loss of consciousness and generalized seizures. At three atmospheres, CNS toxicity occurs in less than two hours, and at six atmospheres in only a few minutes.

**SUSPECTED CANCER AGENT:** Oxygen is not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC; therefore it is not considered to be, nor suspected to be a cancer-causing agent by these agencies.

**IRRITANCY OF PRODUCT:** None.

**SENSITIZATION OF PRODUCT:** Oxygen is not a sensitizer.

**REPRODUCTIVE TOXICITY INFORMATION:** Listed below is information concerning the effects of Oxygen on the human reproductive system.

Mutagenicity: Mutation data have been reported for oxygen; these data have been obtained in studies exposing specific animal tissues to relatively high concentrations (80%) of oxygen.

Embryotoxicity: Oxygen is not expected to cause embryotoxic effects in humans. For further information see following paragraph.

Teratogenicity Human teratogenic effects have been reported after inhalation of 12 pph oxygen for 10 minutes during 26-29 weeks of pregnancy; these effects include developmental abnormalities of the fetal cardiovascular system; Exposure of pregnant hamsters to 3-4 atmospheres of 100% oxygen for periods of 2-3 hours produced teratogenic effects in a small, but significant number of fetuses. One quarter of the mother hamsters developed central nervous system symptoms.

Reproductive Toxicity: Oxygen is not expected to cause adverse reproductive effects in humans.

*A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.*

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Pre-existing respiratory conditions may be aggravated by over-exposure to this product. Persons with chronic obstructive pulmonary disease can retain carbon dioxide abnormally. If oxygen is administered to such persons, raising the oxygen concentration in the blood depresses the breathing rate and raises the retained carbon dioxide levels in the blood to a dangerous level in these persons.

**RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and reduce over-exposure. Symptoms of over-exposure usually are relieved quickly. Immediate sedation and anticonvulsive therapy should be provided, as needed.

**BIOLOGICAL EXPOSURE INDICES (BEIs):** Currently, Biological Exposure Indices (BEIs) are not applicable for this compound.

**ADDITIONAL NOTES TO PHYSICIANS:** Animal studies suggest that the administration of certain drugs, including phenothiazine drugs and chloroquine, increase the susceptibility to toxicity from oxygen at high pressures. Animal studies also indicate that vitamin "E" deficiency may increase susceptibility to toxicity to oxygen toxicity.

Airway obstruction during high oxygen tension may cause alveolar collapse following absorption of the oxygen. Similarly, occlusion of the Eustachian tubes may cause retraction of the eardrum and obstruction of the paranasal sinuses may produce "vacuum-type" headache. All individuals exposed for long periods to oxygen at high pressure and who exhibit overt oxygen toxicity should have ophthalmologic examinations.

## 12. ECOLOGICAL INFORMATION

**ENVIRONMENTAL STABILITY:** Oxygen occurs naturally in the atmosphere. The gas will be dissipated rapidly in well-ventilated areas.

**EFFECT OF MATERIAL ON PLANTS or ANIMALS:** No adverse effect is anticipated to occur to animal or plant-life, except for frost produced in the presence of rapidly expanding gases.

**EFFECT OF CHEMICAL ON AQUATIC LIFE:** No evidence is currently available on this product's effects on aquatic life.

## 13. DISPOSAL CONSIDERATIONS

**PREPARING WASTES FOR DISPOSAL:** Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Return cylinders with any residual product to Air Liquide. Do not dispose of locally.

For emergency disposal, secure the cylinder and slowly discharge the gas to the atmosphere in a well-ventilated area or outdoors, away from all sources of ignition.

## 14. TRANSPORTATION INFORMATION

**THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.**

**PROPER SHIPPING NAME:** Oxygen, compressed  
**HAZARD CLASS NUMBER and DESCRIPTION:** 2.2 (Non-Flammable Gas)  
**UN IDENTIFICATION NUMBER:** UN 1072  
**PACKING GROUP:** Not applicable.  
**DOT LABEL(S) REQUIRED:** Non-Flammable Gas, Oxidizer or Oxygen

**NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996):** 122

**MARINE POLLUTANT:** Oxygen is not classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B).

**SPECIAL SHIPPING INFORMATION:** Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles present serious safety hazards and should be discouraged.

**NOTE:** Shipment of compressed gas cylinders which have not been filled with the owners consent is a violation of Federal law (49 CFR, Part 173.301 (b)).

**TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:** THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian Shipments.

## 15. REGULATORY INFORMATION

**U.S. SARA REPORTING REQUIREMENTS:** Oxygen is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act. This product is subject to the reporting requirements of Sections 311 and 312 of Title III of the Superfund Amendments and Reauthorization Act (40 CFR 370.21).

**U.S. SARA THRESHOLD PLANNING QUANTITY:** Not applicable.

**U.S. CERCLA REPORTABLE QUANTITY (RQ):** Not applicable.

**CANADIAN DSL INVENTORY STATUS:** Oxygen is listed on the DSL Inventory.

**U.S. TSCA INVENTORY STATUS:** Oxygen is listed on the TSCA Inventory.

**OTHER U.S. FEDERAL REGULATIONS:**

- Oxygen USP is regulated by the FDA as a prescription drug.
- Depending on specific operations involving the use of this product, the regulations of the Process Safety Management of Highly Hazardous Chemicals may be applicable (29 CFR 1910.119). Under this regulation Oxygen is not listed in Appendix A.
- Oxygen does not contain any Class I or Class II ozone depleting chemicals (40 CFR part 82).
- Oxygen is not listed as a Regulated Substance, per 40 CFR, Part 68, of the Risk Management for Chemical.

**CALIFORNIA PROPOSITION 65:** Oxygen is not on the California Proposition 65 lists.

## 15. REGULATORY INFORMATION (Continued)

**U.S. STATE REGULATORY INFORMATION:** Oxygen is covered under the following specific State regulations:

Alaska - Designated Toxic and Hazardous Substances: No.

California - Permissible Exposure Limits for Chemical Contaminants: No.

Florida - Substance List: Oxygen.

Illinois - Toxic Substance List: No.

Kansas - Section 302/313 List: No.

Massachusetts - Substance List: Oxygen.

Michigan - Critical Materials Register: No.

Minnesota - List of Hazardous Substances: No.

Missouri - Employer Information/Toxic Substance List: No.

New Jersey - Right to Know Hazardous Substance List: Oxygen.

North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.

Pennsylvania - Hazardous Substance List: Oxygen.

Rhode Island - Hazardous Substance List: Oxygen.

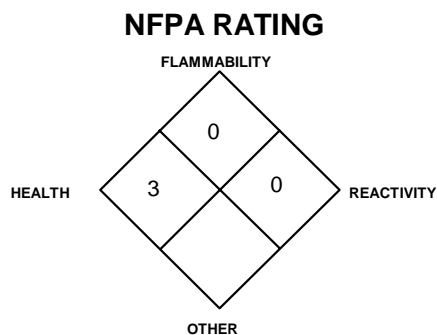
Texas - Hazardous Substance List: No.

West Virginia - Hazardous Substance List: No.

Wisconsin - Toxic and Hazardous Substances: No.

**OTHER CANADIAN REGULATIONS:** Oxygen is categorized as a Controlled Product, Hazard Classes A, and C as per the Controlled Product Regulations.

## 16. OTHER INFORMATION



| HAZARDOUS MATERIAL IDENTIFICATION SYSTEM             |             |       |
|--|-------------|-------|
| <b>HEALTH HAZARD</b>                                 | (BLUE)      | 3     |
| <b>FLAMMABILITY HAZARD</b>                           | (RED)       | 0     |
| <b>PHYSICAL HAZARD</b>                               | (YELLOW)    | 0     |
| <b>PROTECTIVE EQUIPMENT</b>                          |             |       |
| EYES   | RESPIRATORY | HANDS |
| BODY   |             |       |
| See Section 8  |             |       |
| For Routine Industrial Use and Handling Applications |             |       |

**MIXTURES:** When two or more gases or liquefied gases are mixed, their hazardous properties may combine to 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 make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death. Further information about oxygen can be found in the following pamphlets published by: Compressed Gas Association Inc. (CGA), 4221 Walney Road 5<sup>th</sup> floor, Chantilly, VA 20151-2923. Telephone: (703) 788-2700.

- G-4 "Oxygen"
  - G-4.1 "Cleaning Equipment of Oxygen Service"
  - G-4.3 "Commodity Specification for Oxygen"
  - G-4.4 "Industrial Practices for Gaseous Oxygen Transmission and Distribution Piping Systems"
  - G-4.6 "Oxygen Compressor Installation Guide"
  - P-1 "Safe Handling of Compressed Gases in Containers"
  - P-14 "Accident Prevention in Oxygen-Rich and Oxygen Deficient Atmospheres"
  - SB-7 "Rupture of Oxygen Cylinders in the Diving Industry"
  - SB-8 "Use of Oxy-fuel Gas Welding and Cutting Apparatus"
  - AV-1 "Safe Handling and Storage of Compressed Gases"
  - AV-8 "Characteristics and Safe Handling of Cryogenic Liquid and Gaseous Oxygen"
  - AV-10 "Safe Handling and Use of Medical Equipment and Gases in a Homecare Environment"
- 'Handbook of Compressed Gases'*



## 16. OTHER INFORMATION (Continued)

**PREPARED BY:**

CHEMICAL SAFETY ASSOCIATES, Inc.  
9163 Chesapeake Drive, San Diego, CA 92123-1002  
619/565-0302  
Fax on Demand: 1-800/231-1366



This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.