

**HONG KONG SPECIALTY GASES CO., LTD.**

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**MATERIAL
SAFETY
DATA SHEET**

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| PRODUCT NAME Oxygen | CAS# 7782-44-7 |
| TRADE NAME AND SYNONYMS Oxygen; Oxygen, Compressed | DOT I.D. NO. UN 1072 |
| CHEMICAL NAME AND SYNONYMS Oxygen | DOT HAZARD CLASS Division 2.2 |
| ISSUE DATE AND REVISIONS Revised June 2000 | FORMULA O ₂ |
| | CHEMICAL FAMILY Oxidizer |

HEALTH HAZARD DATA

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| TIME WEIGHTED AVERAGE EXPOSURE LIMIT None established (ACGIH 1990-1991). Oxygen is the “vital element” in the atmosphere in which we live and breathe (approximately 21 molar % of the atmosphere). OSHA 1989 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, and capable of leading to death. |
| 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. 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 FIRSTAID 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. <u>Inhalation:</u> Conscious persons should be assisted to an uncontaminated area and inhale fresh air. They should be kept warm and quiet. The physician should be informed that the victim is experiencing hyperoxia. Unconscious persons should be moved to an uncontaminated area and given assisted respiration. Further treatment should be symptomatic and supportive. |

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

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.

PHYSICAL DATA

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| BOILING POINT -297.3°F | LIQUID DENSITY AT BOILING POINT 1141 kg/m ³ |
| VAPOR PRESSURE @ 70 °F Above the critical temp. of -181.1 °F | GAS DENSITY AT 70 °F, 1 atm 1.326 kg/m ³ |
| SOLUBILITY IN WATER Slightly | FREEZING POINT -361.8°F |
| EVAPORATION RATE N/A | SPECIFIC GRAVITY (AIR=1) 1.11 @ 70°F |
| APPEARANCE AND ODOR Colorless, odorless gas | |

FIRE AND EXPLOSION HAZARD DATA

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| FLASHPOINT (Method used) N/A | AUTO IGNITION TEMPERATURE N/A | FLAMMABLE LIMITS % BY VOLUME LEL N/A UEL N/A | |
| EXTINGUISHING MEDIA Copious quantities of water for fires with oxygen as the oxidizer. | | | ELECTRICAL CLASSIFICATION Nonhazardous |
| SPECIAL FIRE FIGHTING PROCEDURES If possible, stop the flow of oxygen which is supporting the fire. | | | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS Vigorously accelerates combustion. | | | |

REACTIVITY DATA

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| STABILITY | | CONDITIONS TO AVOID |
| Unstable | | N/A |
| Stable | X | |
| INCOMPATIBILITY (Materials to avoid) All flammable materials. | | |
| HAZARDOUS DECOMPOSITION PRODUCTS None | | |
| HAZARDOUS POLYMERIZATION | | CONDITIONS TO AVOID |
| May Occur | | N/A |
| Will Not Occur | X | |

SPECIAL PROTECTION INFORMATION

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| RESPIRATORY PROTECTION (Specify type) N/A | |
| VENTILATION See Local Exhaust | SPECIAL N/A |
| MECHANICAL (Gen.) N/A | OTHER N/A |
| LOCAL EXHAUST To prevent accumulation above 25 molar percent. | |
| PROTECTIVE GLOVES Any material; as required | |
| EYE PROTECTION Safety goggles or glasses | |
| OTHER PROTECTIVE EQUIPMENT Safety shoes, safety shower | |

SPILL OR LEAK PROCEDURES

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| <p>STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED</p> <p>Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in container or container valve, contact HSG for special advice.</p> |
| <p>WASTE DISPOSAL METHOD</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 HSG for special advice.</p> |

SPECIAL PRECAUTIONS*

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| <p>SPECIAL LABELING INFORMATION</p> <p>DOT Shipping Name: Oxygen, Compressed DOT Shipping Label: Nonflammable Gas, Oxidizer</p> | <p>DOT Hazard Class: Division 2.2 I.D. No.: UN 1072</p> |
| <p>SPECIAL HANDLING RECOMMENDATIONS</p> <p>Use only in well-ventilated areas. Valve protection caps 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.</p> | |
| <p>SPECIAL STORAGE RECOMMENDATIONS</p> <p>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.</p> | |
| <p>SPECIAL PACKING RECOMMENDATIONS</p> <p>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, etc.</p> <p>It should be recognized that the ignition temperature of metals and non-metals in pure oxygen service decreases with increasing oxygen pressure.</p> | |
| <p>OTHER RECOMMENDATIONS OR PRECAUTIONS</p> <p>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.”</p> <p>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 Law.</p> | |

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