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|---|---|---|---|
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| **Quebec** | Quebec | Tel : 418-834-7447 | Fax : 418-834-3774 |


# Liquid Oxygen

## PRODUCT INFORMATION

**PRODUCT:** Liquid Oxygen

**TRADE NAME:** Liquid Oxygen or LOX

**CHEMICAL NAME:** Oxygen

**SYNONYMS:** Oxygen, Refrigerated Liquid

**FORMULA:** $O_2$

**CHEMICAL FAMILY:** Oxidizer

**SUPPLIER'S NAME:** MEGS Inc.

**SUPPLIER'S ADDRESS:** 2675 De Miniac
Ville St-Laurent, Qc, H4S1E5, Canada

**EMERGENCY PHONE NUMBER:** (514) 956-7503

**MOLECULAR WEIGHT:** 32.00

**PRODUCT USE:** Various

**PRODUCT IDENTIFICATION NUMBER:** UN 1073

## HAZARDOUS INGREDIENTS

| CHEMICAL ID | CONCENTRATION | CAS # | LD(50) | LC(50) |
|---|---|---|---|---|
| | 100% | | | |
| Oxygen | | 7782-44-7 | None | None |

## PHYSICAL DATA

**PHYSICAL STATE:** Cryogenic gas and liquid

**APPEARANCE:** Clear, pale blue, liquid; gas is colorless

**ODOR:** Odorless

**ODOR THRESHOLD:** Not applicable

**SPECIFIC GRAVITY ($H_2O$ = 1):** @ Boiling Point = 1.14

**VAPOR PRESSURE:** Not applicable (gas)

| | |
|---|---|
| **VAPOR DENSITY (air = 1):** | 1.11 |
| **EVAPORATION RATE:** | Varies with condition of container |
| **BOILING POINT:** | -182.97°C |
| **FREEZING POINT:** | -218.57°C |
| **pH:** | Not applicable |
| **GAS DENSITY:** | Liquid @ Boiling Point = 1141 kg/m³<br>Vapor @ 15°C, 101.3 kPa = 1.353 kg.m³ |
| **COEFFICIENT OF WATER/OIL DISTRIBUTION:** | Vapor @ 15°C, Bunsen Coefficient = 0.0342 |

## FIRE OR EXPLOSION HAZARD

| | |
|---|---|
| **CONDITIONS OF FLAMMABILITY:** | Nonflammable gas |
| **MEANS OF EXTINCTION:** | Copious quantities of water for fires with oxygen as the oxidizer. |
| **FLASHPOINT AND METHOD OF DETERMINATION:** | Nonflammable gas |
| **UPPER EXPLOSION LIMIT (% BY VOL):** | Nonflammable gas |
| **LOWER EXPLOSION LIMIT (% BY VOL):** | Nonflammable gas |
| **AUTO-IGNITION TEMPERATURE:** | Nonflammable gas |
| **FLAMMABILITY CLASSIFICATION:** | Nonflammable gas |
| **HAZARDOUS COMBUSTION PRODUCTS:** | Nonflammable gas |
| **EXPLOSION DATA:** | Nonflammable gas |
| **SENSITIVITY TO STATIC DISCHARGE:** | None |

## REACTIVITY DATA

| | |
|---|---|
| **CHEMICAL STABILITY:** | Stable |
| **INCOMPATIBLE MATERIALS:** | All flammable materials |
| **CONDITIONS OF REACTIVITY:** | None |
| **HAZARDOUS DECOMPOSITION PRODUCTS:** | None |

## TOXICOLOGICAL PROPERTIES

**ROUTES OF ENTRY:**

**SKIN CONTACT:** Contact with the cryogenic liquid or cold piping containing the liquid can cause tissue freezing or frostbite on dermal contact or if splashed into the eyes.

**SKIN ABSORPTION:** None

**EYE:** See Skin Contact, above

**INHALATION:** Breathing high concentrations (greater than 75 molar percent) causes symptoms of hyperoxia which include cramps, nausea, dizziness, hypothermia, ambylopia, respiratory difficulties, bradycardia, fainting spells and convulsions capable of leading to death. For additional data on hyperoxia as it relates to oxygen pressure and exposure duration, refer to Liquid Air's Gas Encyclopedia.

**INGESTION:** None

**ACUTE OVER EXPOSURE EFFECTS:** The property is that of hyperixia which leads to pneumonia. Concentrations between 25 and 75 molar percent present a risk of inflammation of organic matter in the body. Frostbite effects are a change in color of the skin to gray or white possibly followed by blistering.

**CHRONIC OVER EXPOSURE EFFECTS:** None

**EXPOSURE LIMITS:** No TWA is established (ACGIH 1995-1996). Oxygen is the "vital element" in the atmosphere in which we live and breathe (approximately 21 molar % of the atmosphere).

**IRRITANCY OF PRODUCT:** None

**SENSITIZATION TO MATERIAL:** None

**CARCINOGENICITY, REPRODUCTIVE EFFECTS:** None

**TERATOGENICITY, MUTAGENICITY:** None

**TOXICOLOGICALLY SYNERGISTIC PRODUCTS:** None



## PREVENTIVE MEASURES

**PERSONAL PROTECTIVE EQUIPMENT:** Loose fitting, insulated gloves. Safety goggles or glasses and face shield. Safety shoes and safety shower.

**SPECIFIC ENGINEERING CONTROLS:** Liquid oxygen cannot be handled in carbon or low alloy steels. Eighteen-eight and 18-10 stainless steels are acceptable as are copper and its alloys, nickel and its alloys, brass, bronze, silicon alloys, Monel®, Inconel®, and beryllium. Teflon® and Kel-F® are the preferred gasket materials. Also see CGA pamphlets G-4.

**LEAK AND SPILL PROCEDURES:** See Handling Procedures and Equipment, below.

**WASTE DISPOSAL:** See Handling Procedures and Equipment, below.

**HANDLING PROCEDURES AND EQUIPMENT:** Liquid oxygen is delivered to a customer in stationary vacuum-jacketed vessels at the customer's location or in portable vacuum-jacketed "liquid cylinders". Stationary customer-site vessels should be operated in accordance with the manufacturer's and MEGS's instructions. Do not attempt to repair, adjust, or in any other way modify the operation of these vessels. If there is a malfunction or other type of operational problem with the vessel, contact the closest MEGS location immediately. No smoking or open flames should be allowed near these vessels.

Liquid oxygen cylinders should be used only in well-ventilated areas and in accordance with the manufacturer's and MEGS's instructions. These cylinders must always be kept in an upright position. Specialized hand trucks are needed for their movement. Full and empty cylinders should be stored away from other flammable products. A "first in - first out" inventory system should be used with these cylinders.

**STORAGE REQUIREMENTS:** See Handling Procedures and Equipment, above.

**TDG CLASSIFICATION:** 2.2 (5.1)

**WHMIS CLASSIFICATION:** A, C

**SPECIAL SHIPPING INFORMATION:** Always ship and handle liquid oxygen cylinders in an upright position.



## FIRST AID MEASURES

**SPECIFIC FIRST AID PROCEDURES:** PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVER EXPOSURE TO OXYGEN. RESCUE PERSONNEL SHOULD BE COGNIZANT OF EXTREME FIRE HAZARD ASSOCIATED WITH OXYGEN-RICH ATMOSPHERES.

**INHALATION:** 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.

**EYE CONTACT:** See Skin Contact

**SKIN CONTACT:** For dermal contact or frostbite, flush affected areas with lukewarm water. DO NOT USE HOT WATER. A physician should see the patient promptly if the cryogenic "burn" has resulted in blistering of the dermal surface or deep tissue freezing.



## PREPARATION INFORMATION

**PREPARED BY:** Safety Department

**DATE PREPARED:** 09/01/2000

**LAST REVISION DATE:** 05/21/2002

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