

STOODY INDUSTRIAL AND WELDING SUPPLY, INC.

MATERIAL SAFETY DATA SHEET (MSDS)

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Oxygen, refrigerated liquid**CHEMICAL NAME:** Oxygen**CHEMICAL FAMILY:** Oxidizer**FORMULA:** O₂**SYNONYMS:** Oxygen USP, LOX, Cryogenic Liquid Oxygen, Refrigerated Liquid Oxygen, Aviators Breathing Oxygen (ABO)**NAME AND ADDRESS:**

STOODY INDUSTRIAL AND WELDING SUPPLY, INC.

3316 National Avenue

San Diego, CA 92113

TELEPHONE:**Emergency Phone: (800) 633-8253 (24 hr.)****Routine information call: (619) 234-6750**

Weekdays 7:30 AM – 5:00 PM

[USE]: Medical, welding

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	PERCENTAGE	OSHA	ACGIH
/CAS NUMBER		PEL	TLV
OXYGEN/7782-44-7	>99%	None	Not
			Applicable

[LD₅₀]: None. **[LC₅₀]:** None.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

WARNING! Extremely cold oxidizing liquid and gas under pressure.
 Vigorously accelerates combustion.
 Combustibles in contact with liquid oxygen may explode on ignition or impact.
 Can cause severe frostbite.

POTENTIAL HEALTH EFFECTS INFORMATION:**ROUTES OF EXPOSURE:**

INHALATION: Breathing 80% or more oxygen at atmospheric pressure for more than a few hours may cause nasal stuffiness, cough, sore throat, chest pain and breathing difficulty. Breathing oxygen at higher pressure increases the likelihood of adverse effects within a shorter time period. Breathing pure oxygen under pressure may cause lung damage and also central nervous system effects resulting in dizziness, poor coordination, tingling sensation, visual and hearing disturbances, muscular twitching, unconsciousness and convulsions. Breathing oxygen under pressure may cause prolongation of adaptation to darkness and reduced peripheral vision.

EYE CONTACT: Tissue freezing and severe cryogenic burns of eyes.**SKIN CONTACT:** Tissue freezing and severe cryogenic burns of skin.**[SKIN ABSORPTION]:** Not applicable.**[INGESTION]:** Not applicable.**CHRONIC EFFECTS:** None established.**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** None.**OTHER EFFECTS OF OVEREXPOSURE:** See Section 11 "Toxicological Information".**CARCINOGENICITY:** Oxygen is not listed by NTP, OSHA or IARC.

4. FIRST AID MEASURES

INHALATION: Move victim to fresh air. Call a physician. The physician should be advised that the victim has been exposed to a high concentration of oxygen.

Rescue personnel should be aware of the extreme fire hazards associated with oxygen-enriched atmospheres.

EYE CONTACT: In case of splash contamination, immediately flush eyes with water for at least 15 minutes. See a physician, preferably an ophthalmologist, immediately.

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SKIN CONTACT: Remove any clothing that may restrict circulation to frozen area. Do not rub frozen parts as tissue damage may result. As soon as practical place the affected area in a warm water bath which has a temperature not to exceed 105°F (40°C). Never use dry heat. Remove and thoroughly air out contaminated clothing. In case of massive exposure, remove clothing while showering with warm water. Call a physician as soon as possible.

Frozen tissue is painless and appears waxy with a possible yellow color. It will become swollen, painful, and prone to infection when thawed. If the frozen part of the body has been thawed by the time medical attention has been obtained, cover the area with dry sterile dressing with a large bulky protective covering

INGESTION: Not applicable.

NOTES TO PHYSICIAN: Supportive treatment should include immediate sedation, anti-convulsive therapy if needed, and rest. More detailed information can be found in Section 11 "Toxicological Information".

5. FIRE FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION: Not applicable.

FLAMMABLE LIMITS IN AIR BY VOLUME:

LOWER: Not applicable. **UPPER:** Not applicable.

EXTINGUISHING MEDIA: Oxygen is nonflammable and will accelerate combustion. Use extinguishing media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING INSTRUCTIONS: Evacuate all personnel from the danger area. If possible, shut off flow of oxygen which is supporting the fire. Immediately cool containers with water spray from maximum distance. Do not direct water spray at the container vent. When cool, move containers from fire area, if without risk. Liquid oxygen when spilled will vaporize rapidly forming an oxygen-enriched vapor cloud. Evacuate this vapor cloud area.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Oxidizing agent, vigorously accelerates combustion. Some materials which are noncombustible in air will burn in the presence of an oxygen enriched atmosphere (over 23%). Oxygen may form explosive compounds when exposed to combustible materials or oil, grease, and other hydrocarbon materials. Liquid oxygen, when spilled, will vaporize rapidly, forming an oxygen-rich vapor cloud. Evacuate this vapor cloud area. Visibility may be obscured in its vapor cloud.

Pressure in a container can build up due to heat and it may rupture if pressure relief devices should fail to function. Contact with cold liquid or gaseous oxygen may cause frostbite.

HAZARDOUS COMBUSTION PRODUCTS: None known.

[SENSITIVITY TO STATIC DISCHARGE]: Not applicable.

[SENSITIVITY TO MECHANICAL IMPACT]: None.

6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Evacuate all unnecessary personnel from the affected area. Shut off source of oxygen, if possible. Remove sources of heat, ignition and, if possible, separate combustibles from the leak. Ventilate area or remove leaking container to a well-ventilated area.

If possible, prevent liquid oxygen from contacting grease, oil, asphalt and other combustibles. To increase rate of vaporization, spray large amounts of water onto the spill from an upwind position. Avoid contact with liquid oxygen or cold gas.

7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN STORAGE: Store and use with adequate ventilation. Do not store in a confined space. Post "No Smoking or Open Flames" signs in the storage area. Cryogenic containers are equipped with pressure relief devices to control internal pressure. Under normal conditions these containers will periodically vent product. Some metals such as carbon steel may become brittle at low temperatures and will easily fracture. Prevent entrapment of liquid in closed system or piping without pressure relief.

PRECAUTIONS TO BE TAKEN IN HANDLING: Never allow any unprotected part of the body to touch uninsulated pipes or vessels which contain cryogenic fluids. The extremely cold metal will cause the flesh to stick fast and tear when one attempts to withdraw from it. Use a suitable hand truck for container movement. Containers shall be handled and stored in an upright position. Do not drop, tip, or roll containers on their side. If user experiences any difficulty operating container valve discontinue use and contact supplier. Containers of liquid oxygen should be separated from flammable gas containers 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 ½ hour. For additional precautions in using liquid oxygen see Section 16 - Other Information.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

VENTILATION: Natural or mechanical to prevent oxygen-enriched atmospheres over 21% oxygen.

RESPIRATORY PROTECTION (SPECIFY TYPE):

General Use: Not required.

Emergency Use: Self-contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmosphere. Air purifying respirators will not provide protection.

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PROTECTIVE GLOVES: Loose fitting thermal insulated or leather gloves. Gloves must be clean and free of oil and grease.

EYE PROTECTION: Full face shield and safety glasses are recommended.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling containers. Long sleeve shirts and trousers without cuffs.

STOODY INDUSTRIAL AND WELDING SUPPLY, INC.**9. PHYSICAL AND CHEMICAL PROPERTIES**

MOLECULAR WEIGHT: 32.00

BOILING POINT (1 ATM): -297.3°F (-183.0°C)

SPECIFIC GRAVITY (Air =1): At 70° F (21.1° C) and 1 atm: 1.14

FREEZING POINT/MELTING POINT: At 1 atm: -361.1°F (-218.4°C)

VAPOR PRESSURE (AT 20° C): Not applicable

GAS DENSITY: At 70° F (21.1° C) and 1 atm: 0.083 lb/ft³ (1.326 kg/m³)

EVAPORATION RATE (Butyl Acetate=1): Gas, not applicable.

SOLUBILITY IN WATER: Vol/Vol at 32° F (0° C): 0.0489

EXPANSION RATIO: (for liquid to gas) 70°F (21.1°C): 1 to 860.5

[pH]: Not applicable.

APPEARANCE, ODOR AND STATE: Pale blue, odorless cryogenic liquid.

[COEFFICIENT OF WATER/OIL DISTRIBUTION]: Not available.

[ODOR THRESHOLD]: Not applicable.

10. STABILITY AND REACTIVITY

STABILITY: Stable

CONDITIONS TO AVOID: None

INCOMPATIBILITY (Materials to Avoid): Flammable materials, hydrocarbons such as oils and grease, asphalt, ethers, alcohol's, acids and aldehydes. Oxygen reacts with many materials. Refer to NFPA 491M *Manual of Hazardous Chemical Reactions*.

REACTIVITY:

A) **HAZARDOUS DECOMPOSITION PRODUCTS:** None

B) **HAZARDOUS POLYMERIZATION:** Will not occur.

11. TOXICOLOGICAL INFORMATION

At atmospheric concentration and pressure, oxygen poses no toxicity hazards.

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 (24 to 48 hr).

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.

ADDITIONAL NOTES TO PHYSICIAN: 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 oxygen toxicity.

Patients with chronic obstructive pulmonary disease retain carbon dioxide abnormally. If oxygen is administered to them, raising the oxygen concentration in the blood depresses their breathing and raises their retained carbon dioxide to a dangerous level.

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.

[IRRITANCY OF MATERIAL]: None.

[SENSITIZATION TO MATERIAL]: None.

[REPRODUCTIVE EFFECTS]: None.

[TERATOGENICITY]: None.

[MUTAGENICITY]: None.

[SYNERGISTIC MATERIALS]: None.

12. ECOLOGICAL INFORMATION

The atmosphere contains approximately 21% oxygen. No adverse ecological effects are expected. Oxygen does not contain any Class I or Class II ozone depleting chemicals(40 CFR Part 82). Oxygen is not listed as a marine pollutant by DOT (49 CFR Part 171).

13. DISPOSAL CONSIDERATIONS

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WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Contact your supplier.

For emergency disposal, discharge slowly to the atmosphere in a well ventilated area or outdoors.

14. TRANSPORT INFORMATION

DOT/IMO SHIPPING NAME: Oxygen, refrigerated liquid

HAZARD CLASS: 2.2 (Nonflammable Gas)

IDENTIFICATION NUMBER: UN 1073

[PIN]: 1073

PRODUCT RQ: Not applicable

SHIPPING LABEL(s): Oxygen. An oxygen label may be used for domestic shipment in the United States and Canada in place of the nonflammable and oxidizer labels, (49CFR Part 172).

PLACARD (When required): Non-flammable gas or oxygen.

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 can present serious safety hazards and should be discouraged.

15. REGULATORY INFORMATION

The following information concerns selected regulatory requirements potentially applicable to this product. Not all such requirements are identified. Users of this product are responsible for their own regulatory compliance on a federal, state [provincial], and local level.

U.S. FEDERAL REGULATIONS:**EPA - ENVIRONMENTAL PROTECTION AGENCY**

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (40 CFR Parts 117 and 302)

Reportable Quantity (RQ): None

SARA: Superfund Amendment and Reauthorization Act

Emergency Planning and Notification (SECTIONS 302/304): Requires emergency planning on threshold planning quantities (TPQ) and release reporting based on reportable quantities (RQ) of EPA's extremely hazardous substances (40 CFR Part 355).

Extremely Hazardous Substances: None

Threshold Planning Quantity (TPQ): None

Hazardous Chemical Reporting (SECTIONS 311/312): Require submission of material safety data sheets (MSDSs) and chemical inventory reporting with identification of EPA defined hazard classes (40 CFR Part 370). The hazard classes for this product are:

IMMEDIATE:	Yes	PRESSURE:	Yes
DELAYED:	No	REACTIVITY:	Yes
		FIRE:	Yes

Toxic Chemical Release Reporting (SECTION 313): Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR Part 372.

Oxygen does not require reporting under Section 313

40 CFR PART 68: Risk Management Programs for Chemical Accidental Release Prevention. Requires the development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

Oxygen is not listed as a regulated substance.

TSCA: Toxic Substance Control Act: Oxygen is listed on the TSCA inventory.

OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

29 CFR Part 1910.119: Process Safety Management of Highly Hazardous Chemicals. Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals as listed in Appendix A.

Oxygen is not listed in Appendix A as a highly hazardous chemical.

FDA - FOOD AND DRUG ADMINISTRATION:

Liquid oxygen is regulated by the FDA as a prescription drug.

[CANADIAN REGULATIONS:]

[Controlled Product Hazard Class A, C. This MSDS has been prepared in compliance with Controlled Product Regulations.]

16. OTHER INFORMATION

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SPECIAL PRECAUTIONS: 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. To prevent cryogenic liquids or cold gas from being trapped in piping between valves, the piping shall be equipped into pressure relief devices. Only transfer lines designated for cryogenic liquids shall be used. It is recommended that all vents be piped to the exterior of the building.

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.

Shipment of compressed gas cylinders which have not been filled with the owner's consent is a violation of Federal law (49 CFR Part 173.301(b)).

OTHER INFORMATION:

NFPA RATINGS:

HEALTH: = 3
FLAMMABILITY: = 0
REACTIVITY: = 0
SPECIAL: = OX (Oxidizer)

HMS RATINGS:

HEALTH: = 3
FLAMMABILITY: = 0
REACTIVITY: = 0

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED:	CGA 440
PIN-INDEXED YOKE:	Not applicable
ULTRA HIGH INTEGRITY:	Not applicable

Use the proper CGA connections, DO NOT USE ADAPTERS

For information on bulk oxygen systems refer to NFPA 50 "Bulk Oxygen Systems at Customer Sites".

Further information about oxygen can be found in the following pamphlets published by: Compressed Gas Association Inc. (CGA), 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102. Telephone: (703)412-0900.

G-4	<i>Oxygen</i>
G-4.1	<i>Cleaning Equipment for Oxygen Service</i>
G-4.3	<i>Commodity Specification for Oxygen</i>
P-1	<i>Safe Handling of Compressed Gases in Containers</i>
P-12	<i>Safe Handling of Cryogenic Liquids</i>
P-14	<i>Accident Prevention in Oxygen-Rich and Oxygen-Deficient Atmospheres</i>
SB-2	<i>Oxygen-Deficient Atmospheres</i>
SB-8	<i>Use of Oxy-Fuel Gas Welding and Cutting Apparatus</i>
AV-1	<i>"Safe Handling and Storage of Compressed Gases"</i>
AV-8	<i>"Characteristics and Safe Handling of Cryogenic Liquid and Gaseous Oxygen"</i>

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