Oxygen, Refrigerated Liquid

1 PRODUCT AND COMPANY IDENTIFICATION

Product Identifier:	Oxygen, Refrigerated Liquid
Common Name:	Oxygen
SDS Number:	25
Revision Date:	10/21/2015
Version:	2.0
CAS Number:	7782-44-7
Chemical Formula:	O2
Product Use:	Industrial Use, Medical and Food Applications
Supplier Details:	Roberts Oxygen Company, Inc. P.O. Box 5507 Rockville, MD 20855
Emergency:	Chemtrec: 24hr/day 7days/wk (800) 424-9300: for spills, leaks, fire, exposure or accidents involving this product
Phone:	Customer Service (301) 948-8100, Mon to Fri from 7:30am to 5:00pm EST
Web:	www.robertsoxygen.com

2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS):

Physical, Gases Under Pressure, Refrigerated Liquefied Gas
Physical, Oxidizing Gases, 1

GHS Label elements, including precautionary statements

GHS Signal Word: DANGER

GHS Hazard Pictograms:

GHS Hazard Statements:

H281 - Contains refrigerated gas; may cause cryogenic burns or injury
H270 - May cause or intensify fire; oxidizer
OSHA-H01 - MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION.
CGA-HG13 - COMBUSTIBLES IN CONTACT WITH LIQUID OXYGEN MAY EXPLODE ON IGNITION OR IMPACT.

GHS Precautionary Statements:

P410+403 - Protect from sunlight. Store in a well ventilated place.
P271+P403 - Use only outdoors or in a well-ventilated area.
P202 - Do not handle until all safety precautions have been read and understood.
P282 - Wear cold insulating gloves/face shield/eye protection.
P220 - Keep/Store away from clothing/combustible materials.
P244 - Keep reduction valves free from grease and oil.
OSHA-PG01 - DO NOT REMOVE THIS PRODUCT LABEL (or equivalent wording).
CGA-PG05 - Use a back flow preventive device in the piping.
CGA-PG24 - DO NOT change or force fit connections.
CGA-PG06 - Close valve after each use and when empty.
CGA-PG23 - Always keep container in upright position.
CGA-PG27 - Read and follow the Safety Data Sheet (SOS) before use.
CGA-PG10 - Use only with equipment rated for cylinder pressure.
CGA-PG21 - Open valve slowly.
CGA-PG22 - Use only with equipment cleaned for oxygen service.

CGA-PG28 - Avoid spills. Do not walk on or roll equipment over spills.

Hazards not otherwise classified (HNOC) or not covered by GHS

3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients:

Cas#	%	Chemical Name
7782-44-7	100%	Oxygen, refrigerated liquid (cryogenic liquid)

4 FIRST AID MEASURES

Inhalation: Remove to fresh air and keep comfortable for breathing. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get medical attention immediately.

Skin Contact: For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.

Eye Contact: Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Get immediate medical attention.

Ingestion: Ingestion is not considered a potential route of exposure

5 FIRE FIGHTING MEASURES

Flammability:	N/a
Flash Point:	N/a
Flash Point Method:	N/a
Burning Rate:	N/a
Autoignition Temp:	N/a
LEL:	N/a

Fire Fighting Instructions:

DANGER! Extremely cold liquid and gas under pressure. Take care not to direct spray onto vents on top of container. Do not discharge sprays directly into liquid; cryogenic liquid can freeze water rapidly. Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L-Fire Protection.

Protection During Fire Fighting:

Compressed gas: Asphyxiant, suffocation hazard by lack of oxygen

Special Protective Equipment for Fire Fighters: Use SCBA. Standard protective clothing and equipment (SCBA) for fire fighters.

Specific methods: Stop flow of product if safe to do so. Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems. Use water spray or fog to knock down fire fumes if possible. If leaking do not spray water onto container. Water surrounding area (from protected position) to contain fire. Exposure to fire may cause containers to rupture/explode.

Other information: Cryogenic liquid causes severe frostbite, a burn-like injury. Heat of fire can build pressure in a closed container and cause it to rupture. Venting vapors may obscure visibility. Air will condense on surfaces such as vaporizers or piping exposed to liquid or cold gas. Do not walk on or roll equipment over a spill; any impact could cause an explosion. Smoking, flames, and electric sparks are potential explosion hazards in oxygen-enriched atmospheres. Containers are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.)

6 ACCIDENTAL RELEASE MEASURES

Stop the release or leak if safe to do so.
Evacuate the area.
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
Eliminate ignition sources.
Wear self-contained breathing apparatus (SCBA) when entering area, unless the atmosphere is proven to be safe. Monitor concentration of released product.
Ensure adequate air ventilation.

7 HANDLING AND STORAGE

Handling Precautions:

Never use oxygen as a substitute for compressed air. Never use an oxygen jet for any type of cleaning, especially for cleaning clothing. Oxygen-saturated clothing may burst into flame at the slightest spark and be quickly consumed in an engulfing fire. Do not get liquid in eyes, on skin, or on clothing. Persons exposed to high concentrations of liquid oxygen should stay in a well-ventilated or open area for 30 minutes before entering a confined space or going near any source of ignition. Immediately remove clothing exposed to oxygen and air it out to reduce the likelihood of an engulfing fire. Prevent ignition sources, such as static electricity generated in clothing while walking.

Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never remove or alter any tamper evident device. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents.

For additional handling recommendations, consult Compressed Gas Association's Pamphlet P-1.

Storage Requirements:

Store in a cool, well-ventilated place. Store and use with adequate ventilation. Store only where temperature will not exceed 125°F (52°C). Post No Smoking or Open Flame signs in storage and use areas. There must be no source of ignition. Separate packages to protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g. NFPA 30, NFPA 55, NFPA 70 and/or NFPA 221) or according to requirements determined by the Authority Having Jurisdiction.

Firmly secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods.

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a backflow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; and then repair the leak. Never place a container where it may become part of an electrical circuit.

For additional storage recommendations, consult Compressed Gas Association's Pamphlet P-1.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls:

Avoid oxygen rich (>23.5%) atmospheres. Systems under pressure should be regularly checked for leakages. Ensure exposure is below occupational exposure limits (where available). Gas detectors should be used when oxidizing gases may be released. Oxygen detectors should be used when asphyxiating gases may be released. Provide adequate general and local exhaust ventilation. Consider work permit system e.g. for maintenance activities

Personal Protective Equipment:

Eye protection: Wear safety glasses with side shields. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Hand protection: Handle gas containers with working gloves. Gloves must be inspected prior to use.

Respiratory Protections: Self-contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres.

Skin and body protection: Wear hand, head, and body protection to help prevent injury from process associated hazards. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace and the user process and may include arm protectors, hats, and shoulder protection worn over substantial clothing. Wear loose-fitting, cryogenic gloves, metatarsal shoes for container handling and protective clothing where needed. Cuffless trousers should be worn outside the shoes. Gloves must be free of oil and grease. Select in accordance with OSHA 29 CFR 1910.134 and ASNI Z88.2

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Other: Consider the use of flame resistant safety clothing. Wear leather cryogenic safety gloves and safety shoes when handling cylinders.

Oxygen, refrigerated liquid (cryogenic liquid) (7782-44-7) [100%] : no data available

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Bluish liquid		
Physical State:	Cryogenic Liquid	**Odor:**	No odor
Odor Threshold:	Not applicable	**Molecular Formula:**	O2
Particle Size:	Not applicable	**Solubility:**	Water: .39 mg/l
Spec Grav./Density:	0.08279 lb/ft³	**Softening Point:**	Not applicable
Viscosity:	Not applicable	**Percent Volatile:**	Not applicable
Sat. Vap. Conc.:	Not applicable	**Heat Value:**	Not applicable
Boiling Point:	-183.0 °C	**Freezing/Melting Pt.:**	-218.4°C
Flammability:	Non-Flammable	**Flash Point:**	No data available
Partition Coefficient:	Not applicable	**Octanol:**	Not applicable
Vapor Pressure:	Not applicable	**Vapor Density:**	No data available
pH:	Not applicable	**VOC:**	Not applicable
Evap. Rate:	Not applicable	**Bulk Density:**	Not applicable
Molecular weight:	32 g/mol	**Auto-Ignition Temp:**	Not applicable
Decomp Temp:	Not applicable	**UFL/LFL:**	Not applicable

Gas/vapor is heavier than air. May accumulate in confined spaces, particularly at or below ground level

10 STABILITY AND REACTIVITY

Stability:	No reactivity
Conditions to Avoid:	None under recommended storage and handling conditions
Materials to Avoid:	Consult supplier for specific recommendations. Consider the potential toxicity hazard due to the presence of chlorinated or fluorinated polymers in high pressure (> 30 bar) oxygen lines in case of combustion. Keep equipment free from oil and grease. May react violently with com bustible materials. May react violently with reducing agents.
Hazardous Decomposition:	None
Hazardous Polymerization:	None

11 TOXICOLOGICAL INFORMATION

Oxygen, refrigerated liquid (cryogenic liquid) (7782-44-7): [100%]
Information on toxicological effects
Acute toxicity:
Oral LD50 no data available
Inhalation LC50
Dermal LD50
Other information on acute toxicity
Skin corrosion/irritation: No data available
Serious eye damage/eye irritation: No data available
Respiratory or skin sensitization: No data available
Germ cell mutagenicity: No data available
Carcinogenicity: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC, ACGIH, NTP, OSHA
Reproductive toxicity: No data available
Teratogenicity: No data available
Specific target organ toxicity - single exposure (Globally Harmonized System): No data available
Specific target organ toxicity - repeated exposure (Globally Harmonized System): No data available
Aspiration hazard: No data available
Potential health effects: Inhalation May be harmful if inhaled. May cause respiratory tract irritation. Ingestion May be harmful if swallowed. Skin May be harmful if absorbed through skin. May cause skin irritationand eye irritation.
Medical Signs and Symptoms of Exposure: Nausea, Dizziness, Unconsciousness
Synergistic effects: No data available

12 ECOLOGICAL INFORMATION

Oxygen, refrigerated liquid (cryogenic liquid) (7782-44-7): [100%]
Information on ecological effects
Toxicity: no data available
Persistence and degradability: no data available
Bioaccumulative potential: no data available
Mobility in soil: no data available
PBT and vPvB assessment: no data available
Other adverse effects: no data available

13 DISPOSAL CONSIDERATIONS

Waste treatment methods:
May be vented to atmosphere in a well ventilated place. Do not discharge into any place where its accumulation could be dangerous.

Waste disposal recommendations:
Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

14 TRANSPORT INFORMATION

UN1073, Oxygen, refrigerated liquid (cryogenic liquid), 2.2,(5.1)

Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting cylinders: Ensure there is adequate ventilation. Ensure that cylinders are firmly secured. Ensure cylinder valve is closed and not leaking. Ensure valve outlet cap cap (where provided is correctly fitted. Ensure valve protection device (where provided) is correctly fitted.

15 REGULATORY INFORMATION

Component (CAS#) [%] - CODES

Oxygen, refrigerated liquid (cryogenic liquid) (7782-44-7) [100%] MASS, PA, TSCA

Listed on the United States TSCA (Toxic Substances Control Act) inventory
SARA Section 311/312 Hazard Classes: Sudden release of pressure hazard Fire hazard

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Regulatory CODE Descriptions
-----------------------------------------------------------------
MASS = MA Massachusetts Hazardous Substances List
PA = PA Right-To-Know List of Hazardous Substances
TSCA = Toxic Substances Control Act
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16 OTHER INFORMATION

NFPA Health = 3, Fire = 0, Reactivity = 0, Specific Hazard = OXY
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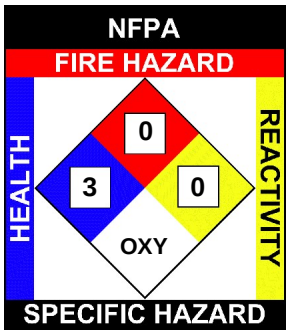

When two or more chemicals are mixed, additional, unexpected hazards can be created. It is the User's responsibility to obtain and understand the safety information for all mixture components prior to mixing. It may be necessary for the User to consult a trained professional to determine the hazards from mixing chemicals.

The information contained in this Safety Data Sheet is believed reliable, based on technical information and industry experience. Roberts Oxygen Company, Inc. provides no warranties or guarantees pertaining to the information provided in connection with the safety suggestions made. Moreover it should not be assumed that every acceptable safety procedure, precaution, or device is listed. Abnormal or unusual circumstances may warrant or suggest further requirements or additional precautions. Roberts Oxygen Company, Inc. requests users to thoroughly review this SDS and become aware of the product hazards and safety information. It is the User's responsibility to determine the conditions for safe use of the product and to confirm the compatibility of any other materials in their use or processes that come in contact with this product.

User acknowledges that the chemicals listed may be hazardous and must be handled accordingly. User further acknowledges its understanding that the chemicals listed may be classified by OSHA as hazardous chemicals, and that there are hazards associated with the possession, transportation and use of the chemical(s), containers, and related equipment and that the User must take proper account of those hazards and deal with them appropriately.

User shall warn all persons who may be exposed to any hazards relating to the chemical(s), containers, and related equipment. User acknowledges that the Seller has supplied the User with all relevant (Material) Safety Data Sheets (SDS) relating to the Products, and that additional copies of the SDS are available on request. OSHA regulations require User to develop and implement a written chemical hazard communications program for its employees regarding all hazardous chemicals.

Further, federal, state and local regulations may exist which are not addressed.