1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Identification of the substance/preparation:	Oxygen (Refrigerated)
Chemical formula :	O2
Synonyms :	Oxygen, Oxygen gas, Gaseous Oxygen, GOX
Use of theSubstance/Preparation:	General Industrial
Manufacturer/Importer/Distributor:	CryoService Ltd Warndon Business Park Worcester
Email Address – Technical:	info@cryoservice.co.uk
Telephone:	+44(0)1905 758300
Emergency telephone number:	(24h): +44(0)1905 758300

2. HAZARDS IDENTIFICATION

Classification

O Oxidizing.
R 8 Contact with combustible material may cause fire.

Emergency Overview

High pressure, oxidizing gas.
Vigorously accelerates combustion.
Keep oil, grease, and combustibles away.
May react violently with combustible materials.

Potential Health Effects

Inhalation:	Breathing 75% 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 pure oxygen under pressure may cause lung damage and also central nervous system effects.
Eye contact:	No adverse effect.
Skin contact:	No adverse effect.
Ingestion:	Ingestion is not considered a potential route of exposure.
Aggravated Medical Condition:	If oxygen is administered to persons with chronic obstructive pulmonary disease, raising the oxygen concentration in the blood depresses their breathing and raises their retained carbon dioxide to a dangerous level.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Preparation: Substance

Components	EINECS / ELINCS Number	CAS Number	Concentration (volume)	Classification
Oxygen	231-956-9	7782-44-7	100 %	O R 8

Refer to section 16 for full text of each relevant R-phrase.

Concentration is nominal. For the exact product composition, please refer to CryoService technical specifications.

4. FIRST AID MEASURES

General Advice:	Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
Eye contact:	Seek medical advice.
Skin contact:	Seek medical advice.
Ingestion:	Ingestion is not considered a potential route of exposure.
Inhalation:	Consult a physician after significant exposure. Move to fresh air. If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media:	All known extinguishing media can be used.
Specific hazards:	Upon exposure to intense heat or flame, cylinder will vent rapidly and or rupture violently. Oxidant. Strongly supports combustion. May react violently with combustible materials. Some materials which are noncombustible in air may burn in the presence of an oxidizer. Move away from container and cool with water from a protected position. Keep adjacent cylinders cool by spraying with large amounts of water until the fire burns itself out. If possible, stop flow of product.
Special protective equipment	Wear self contained breathing apparatus for fire fighting if necessary.
Further information:	Some materials that are noncombustible in air will burn in the presence of an oxygen enriched atmosphere (greater than 23.5%). Fire resistant clothing may burn and offer no protection in oxygen rich atmospheres.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Clothing exposed to high concentrations may retain oxygen 30 minutes or longer and become a potential fire hazard. Stay away from ignition sources. Evacuate personnel to safe areas. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ventilate the area.
Environmental precautions:	Do not discharge into any place where its accumulation could be dangerous.
Methods for cleaning up:	Ventilate the area.
Additional advice:	If possible, stop flow of product. Increase ventilation to the release area and monitor concentrations. If leak is from cylinder or cylinder valve, call the CryoService emergency telephone number. If the leak is in the user's system, close the cylinder valve, safely vent the pressure, and purge with an inert gas before attempting repairs.

7. HANDLING AND STORAGE

Handling

All gauges, valves, regulators, piping and equipment to be used in oxygen service must be cleaned for oxygen service. 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. Only experienced and properly instructed persons should handle compressed gases. Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not allow storage area temperature to exceed 50°C (122°F). Before using the product, determine its identity by

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reading the label. Know and understand the properties and hazards of the product before use. When doubt exists as to the correct handling procedure for a particular gas, contact the supplier. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Use an adjustable strap wrench to remove over-tight or rusted caps. Before connecting the container, check the complete gas system for suitability, particularly for pressure rating and materials. Before connecting the container for use, ensure that back feed from the system into the container is prevented. Ensure the complete gas system has been checked for leaks before use. Employ suitable pressure regulating devices on all containers when the gas is being emitted to systems with lower pressure rating than that of the container. 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. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Do not use containers as rollers or supports or for any other purpose than to contain the gas as supplied. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit. Do not smoke while handling product or cylinders. Never recompress a gas or a gas mixture without first consulting the supplier. Never attempt to transfer gases from one cylinder/container to another. Always use backflow protective device in piping. When returning cylinder install valve outlet cap or plug leak tight. Never permit oil, grease, or other readily combustible substances to come into contact with valves or containers containing oxygen or other oxidants. Do not use rapidly opening valves (e.g. ball valves). Open valve slowly to avoid pressure shock. Never pressurize the entire system at once. Use only with equipment cleaned for oxygen service and rated for cylinder pressure. Never use direct flame or electrical heating devices to raise the pressure of a container. Containers should not be subjected to temperatures above 50°C (122°F). Prolonged periods of cold temperature below -30°C (-20°F) should be avoided.

Storage

Containers should be stored in a purpose build compound which should be well ventilated, preferably in the open air. Full containers should be stored so that oldest s tock is used first. Stored containers should be periodically checked for general condition and leakage. Observe all regulations and local requirements regarding storage of containers. Protect containers stored in the open against rusting and extremes of weather. Containers should not be stored in conditions likely to encourage corrosion. Containers should be stored in the vertical position and properly secured to prevent toppling. The container valves should be tightly closed and where appropriate valve outlets should be capped or plugged. Container valve guards or caps should be in place. Keep containers tightly closed in a cool, well-ventilated place. Store containers in location free from fire risk and away from sources of heat and ignition. Full and empty cylinders should be segregated. Do not allow storage temperature to exceed 50°C (122°F). Display "No Smoking or Open Flames" signs in the storage areas. Return empty containers in a timely manner.

Technical measures/Precautions

Containers should be segregated in the storage area according to the various categories (e.g. flammable, toxic, etc.) and in accordance whit local regulations.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures

Provide natural or rmechanical ventilation to prevent oxygen-enriched atmospheres above 23.5% oxygen.

Personal protective equipment

Respiratory protection:	Not required provided use is in a well ventilated area and/or protected by monitoring equipment. Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-enriched atmosphere. Air purifying respirators will not provide protection. Users of breathing apparatus must be trained.
Hand protection:	Sturdy work gloves are recommended for handling cylinders. The breakthrough time of the selected glove(s) must be greater than the intended use period.
Eye protection:	Safety glasses recommended when handling pressurised containers.
Skin and body protection:	Safety shoes are recommended when handling pressurised containers.
Special instructions for protection and hygiene:	Ensure adequate ventilation, especially in confined areas. Gloves must be clean and free of oil and grease.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form:	Compressed gas.
Color:	Colorless gas.
Odor:	No odor warning properties.
Molecular Weight:	32 g/mol
Relative vapor density:	1.1 (air = 1)
Relative density:	1.1 (water = 1)
Vapor pressure:	Not applicable.
Density:	0.0013 g/cm3 (0.081 lb/ft3) at 21 °C (70 °F) Note: (as vapor)
Specific Volume:	0.7540 m3/kg (12.08 ft3/lb) at 21 °C (70 °F)
Boiling point/range:	-183 °C (-297 °F)
Critical temperature:	-118 °C (-180 °F)
Melting point/range:	-219 °C
Autoignition temperature:	Not applicable.
Water solubility:	0.039 g/l

10. STABILITY AND REACTIVITY

Stability:	Stable under normal conditions.
Materials to avoid:	Flammable materials. Organic materials. Avoid oil, grease and all other combustible materials.

11. TOXICOLOGICAL INFORMATION

Acute Health Hazard

Ingestion:	No data is available on the product itself.
Inhalation:	No data is available on the product itself.
Skin:	No data is available on the product itself.

Chronic Health Hazard

Premature infants exposed to high oxygen concentrations may suffer delayed retinal damage that 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.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Aquatic toxicity:	No data is available on the product itself.
Toxicity to other organisms:	No data available.

Persistence and degradability

Mobility:	No data available.
Bioaccumulation:	No data is available on the product itself.

Further information

No ecological damage caused by this product.

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products:	Return unused product in original container to supplier. Contact supplier if guidance is required.
Contaminated packaging:	Return container to supplier.

14. TRANSPORT INFORMATION

ADR

Proper shipping name: OXYGEN, COMPRESSED
Class: 2.2 (5.1)
UN/ID No: UN1072
ADR/RID Hazard ID No: 25

IATA

Proper shipping name: OXYGEN, COMPRESSED
Class: 2.2 (5.1)
UN/ID No: UN1072

IMDG

Proper shipping name: OXYGEN, COMPRESSED
Class: 2.2 (5.1)
UN/ID No: UN1072

RID

Proper shipping name: OXYGEN, COMPRESSED
Class: 2.2 (5.1)
UN/ID No: UN1072

Further Information

Avoid transport on vehicles where the load space is not separated from the driver's compartment by a gas tight bulk head. 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. The transportation information is not intended to convey all specific regulatory data relating to this material. For complete transportation information, contact CryoService.

15. REGULATORY INFORMATION

Labelling according to EEC Directive

Number in Annex I of Dir: 67/548 008-001-00-8
Hazard symbol: O Oxidizing
R-phrase(s): R 8 Contact with combustible material may cause fire.
S-phrase(s): S17 Keep away from combustible material.

Country	Regulatory List	Notification
USA	TSCA	Included on Inventory
EU	EINECS	Included on Inventory
Canada	DSL	Included on Inventory
Australia	AICS	Included on Inventory
South Korea	ECL	Included on Inventory
China	SEPA	Included on Inventory
Philippines	PICCS	Included on Inventory
Japan	ENCS	Included on Inventory

WGK Identification Number: Not water endangering.

16. OTHER INFORMATION

Ensure all national/local regulations are observed.

Prepared by: CryoService Limited

For additional information, please visit our web site at http://www.cryoservice.co.uk

This Safety Data Sheet has been established in accordance with the applicable European Directives and applies to all countries that have translated the Directives in their national laws.

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