

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

Product Identifier: Oxygen (Refrigerated)
Chemical formula: O₂
Synonyms: Oxygen (refrigerated), Oxygen USP, LOX, Cryogenic Liquid Oxygen

Relevant identified uses of the substance or mixture and uses advised against

Use of the Substance/Mixture: General Industrial
Restrictions on Use: No data available
Details of the supplier of the safety data sheet: 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 according to Regulation 1272/2008 (CLP)

Oxidising gases - Category 1 H270: May cause or intensify fire; oxidiser.
Gases under pressure - Refrigerated liquefied gas H281: Contains refrigerated gas; may cause cryogenic burns or injury.

Label Elements according to Regulation 1272/2008 (CLP)

Hazard pictograms/symbols.



Signal Word: Danger
Hazard Statements: H270: May cause or intensify fire; oxidiser.
H281: Contains refrigerated gas; may cause cryogenic burns or injury.
Precautionary Statements:
Prevention: P220: Keep away from clothing and other combustible materials.
P244: Keep valves and fittings free from grease and oil.
P282: Wear cold insulating gloves/face shield/eye protection.
Response: P370+P376: In case of fire: Stop leak if safe to do so.
P315: Get immediate medical advice/attention.
P336: Thaw frosted parts with lukewarm water. Do not rub affected area.
Storage: P403: Store in a well-ventilated place

Classification (Directive)

Oxidising.
R8 Contact with combustible material may cause fire.

Other hazards

Extremely cold liquid and gas under pressure.
Direct contact with liquid can cause frostbite.
May react violently with combustible materials.
Keep oil, grease, and combustibles away.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Mixture:

Substance

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

Components	Classification (Directive)	Classification (CLP)	REACH Reg. #
Oxygen	O R 8	Ox. Gas 1 Press. Gas	

If REACH registration numbers do not appear the substance is either exempt from registration, does not meet the minimum volume threshold for registration, or the registration date has not yet come due.

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

4. FIRST AID MEASURES

Description of 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:

In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Keep eye wide open while rinsing.

Skin contact:

In case of frostbite, obtain medical treatment immediately. As soon as practical, place the affected area in a warm water bath- which has a temperature not to exceed 40°C (105 °F). Do not rub frozen parts as tissue damage may result. Cover wound with sterile dressing.

Ingestion:

Ingestion is not considered a potential route of exposure.

Inhalation:

Consult a physician after significant exposure. Move to fresh air.

Most important symptoms and effects, both acute and delayed

Symptoms:

No data available.

Indication of any immediate medical attention and special treatment needed

No data available

5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media:

All known extinguishing media can be used.

Extinguishing media which must not be used for safety reasons:

No data available.

Special hazards arising from the substance or mixture:

Combustibles in contact with liquid oxygen may explode on ignition or impact. Some materials which are noncombustible in air may burn in the presence of an oxidiser. Contact with organic and most inorganic materials may cause fire. Vapour cloud may obscure visibility. Keep area evacuated and free from ignition sources until any spilled liquid has evaporated. (Ground free from frost). Move away from container and cool with water from a protected position. Do not direct water spray at container vent. if possible, stop flow of product.

Advice for fire-fighters:

Wear self contained breathing apparatus for fire fighting if necessary. Fire resistant clothing may burn and offer no protection in oxygen rich atmospheres.

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, protective equipment and emergency procedures:

Clothing exposed to high concentrations may retain oxygen for 30 minutes or longer and become a potential fire hazard. Stay away from ignition sources. Evacuate personnel to safe areas. Ventilate the area. Monitor oxygen level. Spill will rapidly vapourise forming an oxygen rich vapour cloud. Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level. 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.

Environmental precautions:

No data available

Methods and material for containment and cleaning up:

Ventilate the area. Keep area evacuated and free from ignition sources until any spilled liquid has evaporated (ground free of frost).

Additional advice:

If possible, stop flow of product. Increase ventilation to the release area and monitor oxygen level. Vapor cloud may obscure visibility. Do not spray water directly at leak. If leak is from container or container valve, call the CryoService emergency telephone number. If the leak is in the user's system, close the supply valve and safely vent the pressure before attempting repairs.

7. HANDLING AND STORAGE

Precautions for safe 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. Know and understand the properties and hazards of the product before use. Only experienced and properly instructed persons should handle compressed gases / cryogenic liquid. Before using the product, determine its identity by reading the label. Do not remove or deface labels provided by the supplier for the identification of the container contents. 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. 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. If user experiences any difficulty operating container valve discontinue use and contact supplier. Do not remove or interchange connections or use adapters. Ensure the complete gas system has been checked for leaks before use. Prevent entrapment of cryogenic liquid in closed systems not protected with relief device. A small quantity of liquid produces large volumes of vaporised gas at atmospheric pressure. Under normal conditions, these containers will periodically vent product to limit pressure build-up. Ensure that the container is in a well-ventilated area to avoid creating an oxygen-deficient atmosphere. Use adequate pressure relief in systems and piping to prevent pressure build-up; liquid in a closed container can generate extremely high pressures when vapourised by warming. When moving containers, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport containers. When doubt exists as to the correct handling procedure for a particular gas, contact the supplier. 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. Do not subject containers to abnormal mechanical shocks which may cause damage to their valve or safety devices. Only transfer lines designed for cryogenic liquids shall be used.

Conditions for safe storage, including any incompatibilities

Do not allow storage temperature to exceed 50°C (122°F). Containers should be stored in a designated area which should be well ventilated, preferably in the open air. Where this is not possible fixed Oxygen depletion monitors or permanent forced air ventilation should be considered. Full containers should be stored so that oldest stock is used first. Do not store in a confined space. Store containers in location free from fire risk and away from sources of heat and ignition. Stored containers should be periodically checked for general condition and leakage. Containers should not be stored in conditions likely to encourage corrosion. All vents should be piped to the exterior of the building. Cryogenic containers are equipped with pressure relief devices to control internal pressure. Under normal conditions these containers will periodically vent product. Observe all regulations and local requirements regarding storage of containers.

Specific end use(s)

Refer to section 1 or the extended SDS if applicable.

For further information on storage, handling, and use, consult CryoService Limited.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

If applicable, refer to the extended section of the SDS for further information on CSA.

Exposure controls

Engineering measures

Natural or mechanical ventilation to prevent oxygen deficient 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.

Hand protection: Loose fitting thermal insulated or leather gloves.
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.
Protect eyes, face and skin from liquid splashes.

Skin and body protection: 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. 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. Safety shoes are recommended when handling containers.

Special instructions for protection and hygiene: Ensure adequate ventilation, especially in confined areas.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance:	Liquefied gas. Blue.
Odor:	No odor warning properties.
Odor threshold:	No data available.
pH:	Not applicable.
Melting point/range:	-219 °C (-362 °F)
Boiling point/range:	-183 °C (-297 °F)
Flash point:	Not applicable.
Evaporation rate:	Not applicable.
Flammability (solid, gas):	No data available.
Upper/lower explosion/flammability limit:	No data available.
Vapour pressure:	No applicable.
Water solubility:	0.039 g/l
Relative vapor density:	1.1 (air = 1)
Relative density:	1.1 (water = 1)
Partition coefficient (n-octanol/water):	Not applicable.
Autoignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	Not applicable.
Explosive properties:	No data available.
Oxidising properties:	Cl = 1
Molecular Weight:	32 g/mol

10. STABILITY AND REACTIVITY

Reactivity:	Refer to possibility of hazardous reactions and/or incompatible materials sections.
Chemical stability:	Stable under normal conditions.
Possibility of hazardous reactions:	No data available.
Conditions to avoid:	No data available.
Incompatible materials:	Avoid oil, grease and all other combustible materials. Flammable materials. Organic materials. Finely divided aluminium Carbon Steel. Reducing agents.
Hazardous decomposition Products:	No data available.

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

Likely routes of exposure

Effects on eye:	Contact with liquid may cause cold burns/frostbite.
Effects on skin:	Contact with liquid may cause cold burns/frostbite. May cause severe frostbite.
Inhalation effects:	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.
Ingestion effects:	Ingestion is not considered a potential route of exposure.
Symptoms:	No data available

Acute Toxicity

Acute Oral Toxicity:	No data is available on the product itself.
Inhalation:	No data is available on the product itself.
Acute Dermal Toxicity:	No data is available on the product itself.
Skin corrosion/irritation:	No data available.
Serious eye damage/ eye irritation:	No data available.
Sensitisation:	No data available.

Chronic toxicity or effects from long term exposures

Carcinogenicity:	No data available.
Reproductive toxicity:	No data available on the product itself.
Germ cell mutagenicity:	No data available on the product itself.
Specific target organ systemic toxicity (repeated exposure):	No data available.
Specific target organ systemic toxicity (repeated exposure):	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 generalised seizures. At three atmospheres, CNS toxicity occurs in less than two hours and at six atmospheres in only a few minutes.
Aspiration hazard:	No data available.

12. ECOLOGICAL INFORMATION

Toxicity

Aquatic toxicity: Not applicable.

Toxicity to other organisms: Not applicable.

Persistence and degradability

No data available.

Bioaccumulative potential

No data is available on the product itself.

Mobility in soil

No data available.

Reults of PBT and vPvB assessment

If applicable, refer to the extended section of the SDS for further information on CSA.

Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods: Return unused product in original container to supplier. Contact supplier if guidance is required.

Contaminated packaging: Return container to supplier.

14. TRANSPORT INFORMATION

ADR

UN/ID No: UN1073
Proper shipping name: OXYGEN, REFRIGERATED LIQUID
Class or Division: 2
Tunnel Code: (C/E)
Label(s): 2.2 (5.1)
ADR/RID Hazard ID No: 225

IATA

Transport forbidden

IMDG

UN/ID No: UN1073
Proper shipping name: OXYGEN, REFRIGERATED LIQUID
Class or Division: 2.2
Label(s): 2.2 (5.1)

RID

UN/ID No: UN1073
Proper shipping name: OXYGEN, REFRIGERATED LIQUID
Class or Division: 2
Label(s): 2.2 (5.1)

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

Safety, health and environmental regulations/legislation specific for the substance or mixture

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.

Chemical Safety Assessment

Refer to extended SDS for CSA information.

This product is either exempt from REACH, does not meet the minimum volume threshold for a CSA, or the CSA has not yet been completed.

16. OTHER INFORMATION

Ensure all national/local regulations are observed.

R-phrase(s) - Components.

R 8 Contact with combustible material may cause fire.

Hazard Statements:

H270 May cause or intensify fire; oxidiser.

Prepared by: CryoService Limited Safety Department

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. Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directive 91/155/EEC, 93/67/EEC and 2000/21/EC.

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