

MATERIAL SAFETY DATA SHEET
Title: LIQUID OXYGEN MATERIAL SAFETY DATA SHEET
Date of Issue: 1 October 2021
Date of Next Review: 1 October 2026

MATERIAL SAFETY DATA SHEET LIQUID OXYGEN



IDENTIFICATION:

Chemical Name: Oxygen, Refrigerated Liquid (Cryogenic Liquid)
Synonyms: LOX, Liquid Oxygen, Bulk Liquid Oxygen.
UN Number: 1073
Use: Industrial, Speciality and Medical Gas Uses. (Oxygen sustains life)

HAZARDS IDENTIFICATION:

Dangerous Goods Class and Subsidiary Risk: 2.2 / 5.1 subsidiary risk

HSNO Classification: 5.1.2A,

Hazard Statement: May support or intensify fire, Oxidizer.
 Contains refrigerated liquid, may cause cryogenic burns or injuries.

Precautionary Statements:

Read label before use.
 Read Safety Data Sheet before use.
 Obtain special instructions before use.
 Wear full body protection.
 Keep/Store away from all combustible materials including heat, sparks and flames.
 Keep valves and all equipment in contact with oxygen free from grease and oil.
 Do not handle until all safety precautions have been read and understood.
 Wear insulating gloves, face shield and eye protection.
 Wear fire retardant clothing.
 In case of fire: Stop leak if safe to do so.
 Cold Burn: Thaw frosted parts with lukewarm water. Do not rub affected area.
 Get immediate medical advice/attention.

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Store in a well-ventilated place.

COMPOSITION / INGREDIENTS:

Chemical Entity	CAS Number	Proportion
Oxygen	7782-44-7	100%

Contains no other components or impurities that will influence the classification of the product.

FIRST AID MEASURES:

Health Effects

Acute

Swallowed: Can cause cold burn if swallowed.
 Eye: Can cause severe cold burn if brought in contact with eye.
 Skin: Can cause severe cold burn if brought in contact with skin..

Inhaled:

Breathing high concentrations of oxygen may cause symptoms of hyperoxia including cramps, nausea, dizziness, hypothermia, ambylopia, respiratory difficulties, brachycardia, fainting spells and convulsions capable of leading to death.

First Aid

Inhalation:

Call doctor. Prompt medical attention is mandatory in all cases of overexposure to oxygen.

If victim is conscious, move to uncontaminated area to breathe fresh air. Keep warm and quiet.

If victim is unconscious, move to uncontaminated area and give assisted respiration.

Continued treatment should be symptomatic and supportive.

Keep ignition sources away from patient and rescuers as oxygen will saturate their clothing.

Swallowed:

Seek medical attention immediately.
 Drink large quantities of water (not hot) to help thaw affected areas.

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Eye Contact:

Immediately flush eyes thoroughly with unheated tap water for at least 15 minutes. Obtain medical assistance.

Skin Contact:

Liquid oxygen can cause severe cold burn upon contact with skin.

In case of cold burn move the victim to a warm place (about 22°C) but do not apply direct heat. **Never use dry heat.**

Do not rub frozen parts, as tissue damage may result.

Gently, flush the affected areas of the skin with large quantities of unheated tap water. Do not use hot water or any other form of direct heat.

The skin **should gradually change colour, via blue, back to pink.**

Loosen any clothing that might restrict the circulation to the affected area but take care not to remove any clothing frozen to flesh.

Apply DRY, sterile, non-adhering dressing with a large bulky protective covering to protect the wounds do not apply dry sterile dressing too tightly in case it restricts blood circulation.

Keep the affected body part at rest. It will become swollen, painful and prone to infection when thawed.

Treat the person for shock.

Do not give person alcohol to drink or tobacco to smoke. Both will restrict blood flow to the wound and retard recovery.

Obtain medical assistance immediately.

Advice to Doctor

The thawing process, depending on the degree of exposure, can be painful and it can be necessary to administer drugs to control pain.

Thawing takes from 15 – 60 minutes.

Administer a tetanus booster after hospitalisation.

Advise doctor that victim has been exposed to an oxygen deficient atmosphere. Specialist advice for treatment of cryogenic burns is available at a Burns Unit.

General:

Low air temperature due to close proximity of liquefied atmosphere gases can cause hypothermia and all persons at risk should be warmly clad.

Avoid liquid spillage as cryogenic liquids embrittle many materials on contact.

When liquid oxygen evaporates it creates an oxygen rich atmosphere and places rescue personnel in extreme fire hazard associated with oxygen rich atmospheres.

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FIRE FIGHTING MEASURES:

Flammability:

Oxygen is non-flammable, but vigorously supports combustion of many materials which will not normally burn in air.

Oxygen may react violently with combustible materials.

Oxygen may react violently with reducing materials.

Oxygen violently oxidises organic material.

Store away from flammable products.

Never smoke or carry out hot work in oxygen rich atmosphere.

Never wear clothing saturated with Oxygen.

Fire/Explosion Hazard:

Container may rupture/explode when heated.

Cool vessel by spraying flooding quantities of water from a protected location. If unable to keep vessel cool.

Evacuate area, minimum distance 800 meters.

Oxygen vigorously supports combustion of many materials which will not normally burn in air.

Never smoke or carry out hot work in oxygen rich atmosphere.

Never wear clothing saturated with oxygen.

Extinguishing Media:

Use extinguishing media appropriate for the substance burning. Oxygen vigorously supports combustion and may be supporting the combustion.

Hazchem Code:

2 P

Recommended Protective Clothing:

Full chemical protection suit and breathing apparatus should be worn.

Thermal protection from cryogenic temperatures required.

ACCIDENTAL RELEASE MEASURES:

Personal Protection:

Personnel handling liquid oxygen shall be provided with safety footwear, safety glasses and leather or PVC gloves. Full cover overalls are recommended.

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All personal protective equipment must be free from oil and grease.

In areas where equipment failure may cause an immediate high concentration of oxygen, ensure adequate ventilation and have approved self-contained, full face respiratory equipment readily available for emergencies.

Spills and Disposal:

Ventilate area. Stop leak if it can be done without risk. Allow gas to dissipate to atmosphere.

Cold vapours are heavier than air. In case of large spillage evacuate nearby trenches, excavations, pits and the like.

Liquid spillage can cause embrittlement of structural materials.

Risk of explosion if spilt on organic materials (e.g. wood or asphalt).

Reference Guide:

Standard SNZ HB 76:2008 Dangerous Goods – Initial Emergency Response Guide.
 AS/NZS 1337 – Eye Protection for Industrial Applications
 AS/NZS 2161.1 – Occupational Protective Gloves – Selection, use and maintenance
 AS/NZS 1715 – Selection, Use and Maintenance of Respiratory Protective Devices
 AS/NZS 1716 – Respiratory Protective Devices

General:

Low air temperature due to close proximity of liquefied atmosphere gases can cause hypothermia and all persons at risk should be warmly clad.

Avoid liquid spillage as cryogenic liquids embrittle many materials on contact.

HANDLING AND STORAGE:

Flammability:

Oxygen is non-flammable, but vigorously supports combustion of many materials which will not normally burn in air.

Oxygen may react violently with combustible materials.

Oxygen may react violently with reducing materials.

Oxygen violently oxidises organic material.

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Store away from flammable products.

Never smoke or carry out hot work in an oxygen rich atmosphere (>21 %).

Never wear clothing saturated with Oxygen.

General:

Low air temperature due to close proximity of liquefied atmosphere gases can cause hypothermia and all persons at risk should be warmly clad.

Avoid liquid spillage as cryogenic liquids embrittle many materials on contact. Only experienced and properly instructed personnel should handle liquefied gases.

Approved Handlers:

Approved handlers are required if more than 200 m3 is stored on site.

Approved Fillers:

Approved fillers are required when transferring liquid oxygen to other storage containers.

Storage:

Storage of compressed gas and cryogenic liquids shall be in compliance with New Zealand HSNO Regulations.

Cylinder will be kept away from ignition sources (including static discharges).

Cylinders shall be stored in a cool, dry, well-ventilated area out of direct sunlight and away from heat and ignition sources.

No part of cylinders shall be exposed to temperatures above 50°C.

Liquid containers shall be stored upright on a level, fireproof floor, secured in position and protected from damage.

Full containers shall be stored separately from empties.

Liquid containers should be moved by hand-truck or cart designed for that purpose.

Separation:

Avoid any contact with oil or grease particularly to the cylinder valve.

Keep oxygen containers a minimum of 3 meters away from ignition sources.

Keep oxygen containers a minimum of 3 meters away from incompatible materials if less than 200m3 of oxygen is kept on site.

Keep oxygen containers a minimum of 5 meters away from incompatible materials if more than 200m3 of oxygen is kept on site.

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Spills and Disposal:

Ventilate area. Stop leak if it can be done without risk. Allow gas to dissipate to atmosphere. Prevent from entering sewers, basements and work pits, or any place where its accumulation can be dangerous

EXPOSURE CONTROLS / PERSONAL PROTECTION:

Exposure Standards:

Not applicable to Oxygen.
Oxygen is not listed in the Work Place Exposure Standards, Effective From 2002, Department of Labour, New Zealand.

Engineering Controls:

Ensure that ventilation of area where oxygen is being used is adequate to maintain the air-oxygen concentration at the normal 21%. Cryogenic liquids can cause material embrittlement.

Personal Protection:

Personnel handling liquid oxygen shall be provided with safety footwear, safety glasses and leather or PVC gloves.

Full cover overalls are recommended. All personal protective equipment must be free from oil and grease.

In areas where equipment failure may cause an immediate high concentration of oxygen ensure adequate ventilation and have approved self-contained, full face respiratory equipment readily available for emergencies

Reference Guide:

Standard SNZ HB 76:2008 Dangerous Goods – Initial Emergency Response Guide.
AS/NZS 1337 – Eye Protection for Industrial Applications
AS/NZS 2161.1 – Occupational Protective Gloves – Selection, use and maintenance
AS/NZS 1715 – Selection, Use and Maintenance of Respiratory Protective Devices
AS/NZS 1716 – Respiratory Protective Devices

PHYSICAL AND CHEMICAL PROPERTIES:
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Physical Properties:

Appearance: Pale Blue liquid, Odourless and Tasteless.

Flashpoint: Non Flammable

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Boiling Point: -183°C

Flammability Limits: Non Flammable

Vapour Pressure: Not Applicable

Solubility in Water (at 0°C): 0.0489 m3/kg

Other Properties

Relative Density :(at 15°C) (Air = 1): 1.105

Density of Liquid: 1141 kg/m³

Molecular Weight: 32.00

Critical Temperature:-118.6 °C

STABILITY AND REACTIVITY:

Flammability:

Oxygen is non-flammable, but vigorously supports combustion of many materials which will not normally burn in air.

Oxygen may react violently with combustible materials.

Oxygen may react violently with reducing materials.

Oxygen violently oxidises organic material.

Store away from flammable products.

Never smoke or carry out hot work in a oxygen rich atmosphere.

Never wear clothing saturated with Oxygen.

Materials Compatibility:

Ensure equipment used to handle oxygen is of a suitable material, Copper and Stainless steel is preferred.

Ensure any grease or lubricant to be Oxygen safe as most lubricants are not.

Ensure O-Ring seals are of suitable material for oxygen. Viton is recommended.

TOXICOLOGY INFORMATION:

No known toxicological effects are known from this product.

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ECOLOGICAL INFORMATION:

Can cause frost bite to vegetation.

DISPOSAL CONSIDERATIONS:

Vent to atmosphere in a well-ventilated place.

Discharge to atmosphere in large quantities should be avoided. Do not discharge into any place where its accumulation could be dangerous

TRANSPORT INFORMATION:

UN Number: 1073

Proper Shipping Name: OXYGEN, REFRIGERATED LIQUID (CRYOGENIC LIQUID)

Dangerous Goods Class and Subsidiary Risk: 2.2 / 5.1

Packing Group: Not applicable

Hazchem Code: 2 P

Other Information:

Avoid transport on vehicles where the load 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 product containers:

Ensure that containers are firmly secured.
Ensure cylinder valve is closed and not leaking.
Ensure there is adequate ventilation.
Compliance with applicable regulations.

REGULATORY INFORMATION:

ERMA Register Approval No: HSR001029

HSNO Controls: Hazardous Substances (Classes 1 to 5 Controls) Regulations 2001.
Hazardous Substances (Disposal) Regulations 2001.
Hazardous Substances (Personnel Qualifications) Regulations 2001.
Hazardous Substances (Emergency Management) Regulations 2001.
Hazardous Substances (Identification) Regulations 2001.
Hazardous Substances (Compressed Gases) Regulations 2004.

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Hazardous Substances (Tank Wagon and Transportable Containers) Regulations 2004.
 Schedule 12 of the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004.

Approved Handlers: Approved handlers are required if more than 200 m³ is stored on site.

Approved Fillers: Approved fillers are required when transferring liquid product from containers to containers

OTHER INFORMATION:

Oxygen is supplied in cryogenic Dewars suitable for Liquid Oxygen service.

Cryogenic Dewar Colour: AS2700 Silver Grey (N24)

References:

- NZS 5433:2007 Transport of Dangerous Goods on Land
- EPA Website – Approvals Register – www.epa.govt.nz
- SNZ HB76:2008 Dangerous Goods – Initial Emergency Response Guide
- AS1678 2C1 Emergency Procedure Guide – Transport – Non-Flammable, Compressed Gas
- AS 4484-2004 - Gas Cylinders for Industrial, Scientific, medical and refrigerant use - Labelling and colour coding
- AS 2473.2-2007 - Valves for compressed gas outlets - Part 2 Outlet connections (threaded) and stem (inlet) threads
- AS 2473.3-2007 - Valves for compressed gas outlets - Part 3 Outlet connections for medical gases (including pin-indexed yoke connections)
- Operators Handbook for the Transport of Dangerous Goods by Road – NZ Road Transport & Logistics Industry Training Organisation
- NZCIC Code of Practice – Preparation of Safety Data Sheets

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MSDS SUMMARY:

This MSDS summarises to our best knowledge, at the date of issue, the health and safety hazard information regarding this product and general guidance on how to safely handle the product in the workplace. All due care has been taken to include accurate and up-to-date information in this MSDS.

Each user should read this MSDS and consider the information in the context of how the product will be handled and used in the workplace in conjunction with other products. If clarification or further information is needed to ensure that an appropriate risk assessment can be made, the user should contact Southern Gas Services Limited.

As far as lawfully possible, no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this MSDS can be accepted.

Our responsibility for products sold is subject to our standard terms and conditions, a copy of which is available on request.

This MSDS has been prepared in accordance with NZCIC Code of Practice – Preparation of Safety Data Sheets.

This MSDS is subject to change without notice.

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