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MATERIAL SAFETY DATA SHEET

Product Name:

**OXYGEN,
Refrigerated Liquid (O₂)**

Issued: August 2009

Revision: 11

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IDENTIFICATION

Chemical Name:	Oxygen, Refrigerated Liquid
Synonyms:	LOX, Liquid Oxygen, Bulk Oxygen
UN. Number:	1073
Poisons Schedule Number:	None allocated

Use: Oxygen sustains life, supports combustion. Used in steel making, welding, cutting, medical applications and pulp and paper, waste treatment, etc.

HAZARDS IDENTIFICATION

Dangerous Goods Class and Subsidiary Risk:	2.2 sub. 5.1
HSNO Classification:	5.1.2A

Hazard Statement: May cause or intensify fire: oxidiser.
Contains refrigerated gas; may cause cryogenic burns or injury.

Precautionary Statements: Read label before use.
Read Material Safety Data Sheet before use.
Wear full body protection
Keep away from heat, sparks and open flames.
Keep away from combustible materials and clothing.
No Smoking.
Take any precautions to avoid mixing with combustibles.
Keep reduction valves and all oxygen system components free from grease and oil.
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.
Store in a well ventilated place.

COMPOSITION

Ingredients	CAS Number	Proportion
Chemical Entity 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, amblyopia, respiratory difficulties, brachycardia, fainting spells and convulsions capable of leading to death.

First AidInhalation:

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

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.

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:

Exposure to fire may cause container to rupture/explode.

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. 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).

Issued: August 2009**Revision: 11****Page 4 of 8****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**Handling****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.

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 200m³ is stored on site.

Approved Fillers:

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

Storage:

Keep containers below 50°C in a well ventilated place.

Separation

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

Keep nitrous oxide cylinders a minimum of 3 meters away from ignition sources.

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

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

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 workpits, or any place where its accumulation can be dangerous.

EXPOSURE CONTROLS / PERSONAL PROTECTION**Exposure Standards:**

Not applicable to oxygen.

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 embrittle many materials on contact.

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 nitrogen, 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**Physical Properties**

Appearance:	Pale blue liquid, odourless, tasteless	Flashpoint:	non flammable
Boiling Point:	-183°C	Flammability Limits:	non flammable
Vapour Pressure:	Not applicable	Solubility in Water (at 0°C):	0.0489 m ³ /m ³

Other Properties

Relative Density (at 15°C)		Density of Liquid (B.P.):	1141 kg/m ³
(Air = 1):	1.105	Critical Temperature:	-118.6°C
Molecular Weight:	32.00		

STABILITY AND REACTIVITY**Flammability:**

Non Flammable, but may cause or intensify fire: Oxidiser.

Materials Compatibility:

Equipment to handle oxygen must be constructed of suitable material. Copper and stainless steel are most commonly used. Most lubricants are NOT compatible.

TOXICOLOGY INFORMATION

No toxicological effects from this product.

ECOLOGICAL INFORMATION

Can cause frost damage to vegetation.

DISPOSAL CONSIDERATIONS

To atmosphere in a well ventilated place. Do not discharge into any place its accumulation could be dangerous.

TRANSPORT INFORMATION

UN. Number:	1073
Proper Shipping Name:	OXYGEN, REFRIGERATED LIQUID
Dangerous Goods Class and Subsidiary Risk:	2.2 sub. 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: <ul style="list-style-type: none">• Ensure that containers are firmly secured.• Ensure container valve is closed and not leaking.• Ensure there is adequate ventilation.• Compliance with applicable regulations.

REGULATORY INFORMATION

ERMA Register Approval No: HSR001029

HSNO Controls: Controls applying to this substance are given in the:
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.
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 200m³ is stored on site.

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

OTHER INFORMATION

- References:
- . L'Air Liquide Gaz Encyclopaedia - Elsevier Scientific Publishing Co. Amsterdam
 - . NZS 5433:2007 Transport of Dangerous Goods on Land
 - . ERMA Website – Approvals Register – www.erna.govt.nz
 - . SNZ HB76:2008 Dangerous Goods – Initial Emergency Response Guide
 - . Air Liquide Group MSDS – Oxygen (Liquid) AL097B Rev. 1
 - . Air Liquide Australia "Oxygen - Liquid" MSDS June 2008
 - . AS1678 2C1 Emergency Procedure Guide – Transport – Non-Flammable, Compressed Gas
 - . Operators Handbook for the Transport of Dangerous Goods by Road – NZ Road Transport & Logistics Industry Training Organisation
 - . AS1894 The Storage and Handling of Non-Flammable Cryogenic and Refrigerated Liquids – Appendix G
 - . Work Place Exposure Standards Effective From 2002, Department of Labour, New Zealand
 - . NZCIC Code of Practice – Preparation of Safety Data Sheets

END MSDS

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 Air Liquide New Zealand.

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. For the latest version of this MSDS visit <http://www.airliquide.com.au/en/technical/new-zealand-msds.html>

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