

MATERIAL SAFETY DATA SHEET (MSDS) LIQUID OXYGEN

Please ensure that this MSDS is received by an appropriate person

DATE: May 2015

Version 2

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Ref. No.: MS014

1 PRODUCT AND COMPANY IDENTIFICATION

Product Name	LIQUID OXYGEN
Chemical Formula	O ₂
Trade Names	Liquid Oxygen Cryogenic Oxygen
Colour coding	The Portable Cryogenic Container (PCC) is made of polished stainless steel, and has the relevant decal affixed to the body of the PCC to clearly identify the contents. There is also a permanent tag fitted to the PCC for traffic ID purposes.
Valve	The vapour outlet valve is Brass 5/8 inch BSP right hand female.
Company Identification	Afrox Moçambique Lda Av. Das Industrias No. 600 A Machava - Matola Tel. No: (+258) 21 752634/1

EMERGENCY NUMBER (+258) 84 3221141

2 COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Oxygen
Chemical Family	Oxidant
Synonyms	LOX
CAS No	7782-44-7
UN No	1073
ERG No	122
Hazchem Warning	5 A Non-flammable Gas

3 HAZARDS IDENTIFICATION

Main Hazards

Excessive exposure to heat could cause the internal pressure to increase significantly with the consequent violent rupturing of the vessel. Due to its extremely low boiling point, -183°C, extreme care must be taken when handling liquid oxygen, otherwise frostbite can occur. Evaporated liquid, i.e. gaseous oxygen, is non-flammable, but readily supports combustion. Never allow liquid oxygen to come into contact with combustible materials, such as oil or grease, as they could react with explosive violence.

Adverse Health Effects

Central nervous systems toxicity including dizziness, convulsions and loss of consciousness after only 2-3 hours of exposure to pure oxygen can occur.

Chemical Hazards

At the temperature of liquid oxygen, ordinary carbon steels, and most alloy steels, lose their ductility, and are therefore considered to be unsatisfactory. Metals and alloys that have satisfactory ductility include austenitic stainless steel and nickel-chromium alloys.

Biological Hazards

Contact between the skin and liquid oxygen, or un-insulated piping, or vessels containing it, can cause severe cold burn injuries.

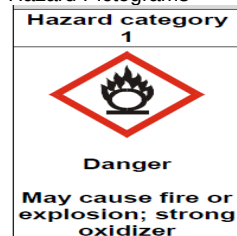
Vapour Inhalation

Inhalation of the cold vapour from liquid oxygen can cause severe damage to mucous membranes.

Eye Contact Can cause severe burn-like injuries

Skin Contact Frostbite can occur from contact with liquid oxygen.

Hazard Pictograms



4 FIRST AID MEASURES

Prompt medical attention is mandatory in all cases of overexposure to oxygen. In case of frostbite from contact with liquid oxygen, place the frost-bitten part in warm water, about 40-42°C. If warm water is not available, or is impractical to use, wrap the affected part gently in blankets. Encourage the patient to exercise the affected part whilst it is being warmed. Do not remove clothing whilst frosted.

Eye Contact

Immediately flush with large quantities of tepid water, or with sterile saline solution. Seek medical attention.

Skin Contact See above for handling of frostbite.

Ingestion

Allow injured areas to warm gently. Seek medical attention. Rescue personnel should be cognisant of extreme fire hazard associated with oxygen-rich atmospheres. The physician should be informed that the patient has experienced hyperoxia.

5 FIRE FIGHTING MEASURES

Extinguishing Media

As oxygen is non-flammable but strongly supports combustion, the correct type of extinguishant should be used depending on the combustible material involved.

Specific Hazards

Oxygen vigorously accelerates combustion. Materials that would not normally burn in air could combust vigorously in atmospheres having high concentrations of oxygen.

Emergency Actions

If possible, shut off source of escaping oxygen. Evacuate area. Prevent liquid oxygen from entering sewer, basements and work-pits. FIRE HAZARD. Do not absorb in sawdust or any other combustible material. Keep the bulk tank, PCC, or tanker cool by spraying with water if exposed to a fire. If tanker has overturned, do not attempt to right or move it. CONTACT THE NEAREST AFROX BRANCH.

Protective Clothing

Safety goggles, or glasses, plus face shield, loose-fitting insulated gloves, and safety shoes, or boots.

Environmental Precautions

If possible, ventilate the affected area.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions

Clothing saturated by cold gas should be removed immediately. Clothes and other materials, will burn fiercely in presence of high concentrations of oxygen.

Environmental Precautions

Oxygen itself does not pose a hazard to the environment. However, because of extreme cold of the liquid, damage to ecology can occur in the immediate environs of the spill. Beware of oxygen-enriched atmospheres coming into contact with readily combustible materials.

Small Spills

Shut off the source of escaping oxygen. Ventilate the area.

Large Spills

Evacuate the area. Shut off the source of the spill if this can be done without risk. Restrict access to the area until completion of the clean-up procedure. Ventilate the area using forced draught if necessary.

7 HANDLING AND STORAGE

Label Elements

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When liquid oxygen is held in any closed vessel or space, there must be an appropriate pressure relief device because of the very large pressure increases that can occur as the liquid oxygen is vapourised. Liquid oxygen must also be handled with all the precautions required for safety with any cryogenic fluid. Keep out of reach of children.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Hazards

Avoid exposure to oxygen-enriched atmospheres, as this could result in clothing becoming saturated by oxygen. On ignition the clothing could burn fiercely resulting in serious burns.

Engineering Control Measures

Engineering control measures are preferred to reduce exposure to oxygen-enriched atmospheres. General methods include forced-draught ventilation, separate from other exhaust ventilation systems.

Personal Protection

Safety goggles or glasses, plus face shield, loose-fitting insulated gloves and safety shoes, or boots.

Skin Wear loose-fitting overalls preferably without pockets.

9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DATA

Chemical Symbol	O ₂
Molecular Weight	32,00
Specific Volume @ 20°C & 101,325 kPa	755 ml/g
Boiling Point 101,325 kPa	-183 °C
Density, gas @ 101,325 kPa and 20°C	1,33 kg/m ³
Relative density (Air = 1) @ 101,325 kPa	1,053
Latent heat of vapouration @ boiling point	213 kJ/kg
Colour	None
Taste	None
Odour	None

10 STABILITY AND REACTIVITY

Conditions to avoid

Oxygen-enriched atmospheres will react with all of the elements, excepting the rare gases, especially at elevated temperatures. These reactions could sometimes be violent, as those when high concentrations of oxygen come into contact with highly combustible materials such as oil and grease.

Incompatible Materials

At the temperature of liquid oxygen, ordinary carbon steels, and most alloy steels, lose their ductility, and are therefore considered to be unsatisfactory. Metals and alloys that have satisfactory ductility include austenitic stainless steel (i.e. types 204 and 216), and nickel-chromium alloys, nickel, Monel 400, copper, brasses, bronze and aluminium alloys.

Hazardous Decomposition Products

None

11 TOXICOLOGICAL INFORMATION

Acute Toxicity	No known effect
Skin & eye contact	No known effect
Chronic Toxicity	No known effect
Carcinogenicity	Severe cold burns could result in carcinoma
Mutagenicity	No known effect
Reproductive Hazards	No known effect

(For further information see Section 3. Adverse Health effects)

12 ECOLOGICAL INFORMATION

Cold spills will cause temporary damage. It does not pose a hazard to the ecology.

13 DISPOSAL CONSIDERATIONS

Disposal Methods

Small amounts may be allowed to evaporate into the atmosphere. In case of large spills consult an expert and allow to evaporation. Large amounts should only be handled by gas supplier.

Disposal of Packaging

The disposal of containers must only be handled by the gas supplier.

14 TRANSPORT INFORMATION

ROAD TRANSPORTATION

UN No	1073
ERG No	122
Hazchem warning	5A Non-flammable Gas

SEA TRANSPORTATION

IMDG	1073
Class	
Packaging group	
Label	Non-flammable Gas

AIR TRANSPORTATION

ICAO/IATA Code	1073
Class	
Packaging group	
Packaging instructions	
- Cargo	Forbidden
- Passenger	Forbidden
Maximum quantity allowed	
- Cargo	Forbidden
- Passenger	Forbidden

15 REGULATORY INFORMATION

EEC Hazard class Non-flammable

Precautionary Statement	Description	Hazard Statement	Description
P220	Keep/Store away from clothing/.../combustible materials (manufacturer/supplier or the competent authority to specify other incompatible materials)	H270	May cause or intensify fire; oxidizer
P244	Keep reduction valves free from grease and oil		
P370+P376	In case of fire: Stop leak if safe to do so		

National legislation: None

Refer to SANS 10234 for explanation of the above.

16 OTHER INFORMATION

Bibliography

SANS 10234 – Globally Harmonized System of Classification and Labelling of Chemicals

17 EXCLUSION OF LIABILITY

Information contained in this publication is accurate at the date of publication. The company does not accept liability arising from the use of this information, or the use, application, adaptation or process of any products described herein.