

SAFETY DATA SHEET

Complies with Regulation (EC) No. 1907/2006 (REACH) as amended by Regulation (EU) 2015/830

REFRIGERATED LIQUID OXYGEN

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SDS reference:: EIGA097B

SECTION 1: Identification of the substance/mixture and company/undertaking

1.1. Product identifier

Trade name : REFRIGERATED LIQUID OXYGEN
 MSDS No. : EIGA097B
 Chemical description
 CAS number: 7782-44-7
 N°ONE: 1073
 EC number: 231-956-9
 Registration number Listed in Annex IV/V of REACH, exempt from registration
 Chemical formula O2

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

Relevant uses identified : Industrial and professional. Carry out a risk analysis before use
 Test or calibration gas
 Welding, cutting and brazing.
 Protective gas for welding processes.
 Water treatment.
 Use in the manufacture of electronic or photovoltaic components.
 Laboratory use
 Food applications
 Contact the supplier for more information on use
 Uses advised against Consumer use

1.3. Information regarding the supplier of the safety data sheet

Company identification : SARL RAYANOX
 ZA Bethioua Wilaya of Oran, Algeria
 Tel: 041-79-35-22
 Fax: 041-79-32-23
Contact@rayanox.co
sarlrayanox@gmail.com

1.4. Emergency call number

Emergency call number Tel: +21365550342

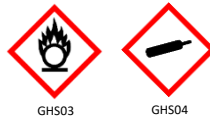
SECTION 2: Hazard Identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]
 Physical hazards Oxidizing gases, Category 1 H270
 Gas under pressure: Refrigerated liquid gas H281

2.2. Label elements

Labeling according to Regulation (EC) No. 1272/2008 [CLP]
 Hazard pictograms (CLP)



Signal word (CLP) : Hazard
 Hazard statements (CLP) : H270 - May cause or aggravate a fire; oxidant.
 : H281 - Contains refrigerated gas; may cause cryogenic burns or injuries.

Precautionary statements (CLP)
 – Prevention: : P220 - Keep away from combustible materials.
 P244 - No oil or grease on taps and fittings.
 P282 - Wear cold-insulating gloves and face or eye protection. Insulating gloves against the cold, facial protective equipment, eye protection equipment.
 – Intervention: : P336+P315 - Thaw the frozen parts with lukewarm water. Do not rub the affected areas.
 Seek medical attention immediately.
 P370+P376 - In the event of fire: close the leak if it can be done without danger.
 – Storage : : P403 - Store in a well-ventilated area.

2.3. Other dangers

: None).

SECTION 3: Composition/information on ingredients

3.1. Substances

NAME	Product identifier	%	Impurities (ppm v/v)	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Refrigerated liquid oxygen	[CAS No. 7782-44-7 (EC No.) 231-956-9	99,995	H ₂ O ≤ 67	Ox. Gas 1, H270 Press. Gas (Ref. Liq.), H281
			CO ≤ 5	
			CO ₂ ≤ 300	

Does not contain other components or impurities which could modify the classification of the product.

3.2. Mixtures: Not applicable

SECTION 4: First aid

4.1. Description of first aid

- Inhalation
Move the victim to an uncontaminated area, putting on a breathing apparatus Individual autonomy (ARI). Keep the victim warm and at rest. Call a doctor. Perform cardiopulmonary resuscitation if the victim stops breathing. Evacuate the victim to a non-contaminated area.
- Skin contact
In case of frostbite, spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.
- Eye contact
Immediately flush eyes with plenty of water for at least 15 minutes
- Ingestion
Ingestion is not considered a possible mode of exposure

4.2. Most important symptoms and effects, both acute and delayed

Continued inhalation of concentrations above 75% may cause nausea, dizziness, difficulty breathing and convulsions.
Refer to section 11.

4.3. Indication of any immediate medical attention and special treatment needed

: None).

SECTION 5: Fire-fighting measures

5.1. Extinguishing media

- Suitable extinguishing agents : Water spray or cloud
- Unsuitable extinguishing agents : do not use a jet of water to extinguish.

5.2. Special hazards arising from the substance or mixture

Specific risks : Maintains combustion.
Exposure to fire may cause containers to rupture and explode

Hazardous combustion products : None).

5.3. Advice for firefighters

Specific methods : Use extinguishing media suitable for the surrounding fire. Exposure to fire and heat may cause gas containers to rupture. Cool exposed containers with water spray from a protected location. Do not allow watering water used in emergency cases to flow into the gutters. If possible, stop the gas flow.
Use water spray or cloud to reduce the fumes to the ground if possible
In the event of a leak, do not spray the container with water. Water the surrounding area (from a protected location) to contain the fire.
Move containers from fire area if it can be done without risk.

Special protective equipment for firefighters : Protective clothing and self-contained breathing equipment for firefighters
Standard EN 469: protective clothing for firefighters. Standard EN 659: Protective gloves
For firefighters

SECTION 6: Measures to be taken in the event of accidental release

6.1. Personal precautions, protective equipment and emergency procedures

Try to stop the leak
Evacuate the area.
Check the concentration of the released product.

Wear a self-contained breathing apparatus (SCBA) when entering the area unless you have verified that it is safe.
Eliminate sources of ignition
Use protective clothing
Ensure adequate air ventilation.
Act according to the local emergency plan.
Stay upwind of the wind

6.2. Precautions for environmental protection

Try to stop the leak.
Liquid spills can cause embrittlement of building materials

6.3. Methods and material for containment and cleaning up

Ventilate the area

6.4. Reference to other SECTIONS

See also sections 8 and 13

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safety when using the product

The product must be handled in accordance with good industrial hygiene and safety procedures. Only persons with appropriate experience and training should handle gases under pressure. Consider adding pressure safety valve(s) to the installation.
You ensure that the entire gas installation has been (or is regularly) checked for the absence of leaks, before use
Do not smoke while handling the product.
Keep equipment free of oil and grease
Do not use oil or grease.
Use only specified equipment appropriate for this product and its operating pressure and temperature. Contact your gas supplier if in doubt.
Use only lubricants and seals approved for oxygen service
Use only with cleaned equipment approved for oxygen use and calculated for cylinder pressures
Avoid the return of water, acids and alkalis.

Safety when handling the gas container

Do not breathe the gas.
Refer to the supplier's instructions for handling the container.
Prohibit products from rising into the container
Protect cylinders from physical damage, do not pull, roll, slide, drop
To move the bottles even a short distance, use a cart (bottle rolls, etc.), designed for transporting bottles
Leave the tap protection cap in place until the container is again secured either by a wall or support or placed in a container or placed in position for use.
If the user encounters any difficulty opening or closing the cylinder valve, the user should discontinue use and contact the supplier
Never attempt to repair or modify a container valve or its pressure relief devices.
Damaged faucets should be reported immediately to the supplier
Keep tap outlets from containers clean and not contaminated, particularly with oil or water.
If the container has been equipped with one, as soon as it has been disconnected from the installation, replace the cap or the tap outlet cap.
Close the container tap after each use and when empty, even if it is still connected to the equipment.
Never attempt to transfer gases from a bottle/container into another container.
Never use a direct flame or electric heater to increase the pressure in the container.
Do not remove or damage the labels put by the supplier to identify the contents of the bottle.
Prevent water from being drawn into the container.
Open the tap slowly to avoid a sudden build-up of pressure (water hammer).

7.2. Conditions for safe storage, including any incompatibilities

Follow all local regulations and requirements for container storage.
Containers should not be stored in conditions likely to aggravate corrosion.
Container valve covers or caps must be in place.
Containers must be stored in an upright position and secured to prevent falling.
Containers in stock should be periodically checked for general condition and absence of leaks.
Store the container in a well-ventilated area, at a temperature below 50°C
In storage, separate flammable gases and other flammable materials
Store containers in areas not exposed to the risk of fire and away from sources of heat and ignition.
Keep away from combustible materials

7.3. Specific end use(s)

: None).

SECTION 8: Exposure controls/personal protection

8.1. Control Settings

OEL (Occupational Exposure Limits)	: Not available.
DNEL (Derived No Effect Dose)	: Not available.
PNEC (Predicted No Effect Concentration(s))	: Not available.

8.2. Exposure controls

8.2.1. Appropriate technical controls

Maintain appropriate exhaust ventilation locally and overall.
Pressure equipment should be checked regularly for leaks
Avoid atmospheres enriched in oxygen (>23.5%)
Gas detectors should be used when oxidizing gases are likely to be released
Think about work permits, e.g. for maintenance.

8.2.2. Personal protective equipment

- Eye/face protection
- Skin protection
 - Hand protection
 - Miscellaneous
- Respiratory protection
- Thermal risks

A risk analysis of the use of the product must be carried out and documented in all workplaces affected by the use of the product in order to choose personal equipment regarding the identified risks. The following recommendations should be considered
Choose Personal Protective Equipment that complies with recommended EN/ISO standards.
Wear tight safety glasses and a face shield when transferring or disconnecting transfer lines.
Standard EN 166 - Individual eye protection - Specifications.

Wear protective gloves when handling gas cylinders.
Standard EN 388-Protective gloves against mechanical risks.
Wear cold-insulating gloves during transfer or disconnection of transfer lines.
Standard EN 511 - Insulating gloves against the cold.
Consider the use of fire-resistant safety clothing.
Standard EN ISO 14116 - Materials with limited flame expansion.
Wear safety shoes when handling cylinders.
Standard EN ISO 20345: Personal Protective Equipment - safety shoes.
None required for normal use. Self-contained breathing apparatus should be used when working with this product in confined spaces.
Wear insulating gloves against the cold. Wear cold-insulating gloves when transferring or breaking the transfer.

8.2.3. Ambient exposure controls

Refer to local regulations for atmospheric emission restrictions. See Section 13 for specific methods for treating waste gases.

SECTION 9: Physical and chemical properties

Information on essential physical and chemical properties

Appearance	
• Physical state at 20°C / 101.3kPa	: Gas
• Color	: Blue liquid
Smell	: Not detectable by odor
Olfactory threshold	: Detection of thresholds by smell is subjective and inappropriate for warning in the event of overexposure
pH	: Not applicable to gases and gas mixtures.
Melting point / Freezing point	: -219°C / -218.4°C
Boiling point	: -183°C
Flash point	: Not applicable to gases and gas mixtures.
Evaporation rate	: Not applicable to gases and gas mixtures.
Flammability (solid, gas)	: Non-flammable.
Explosive limits	: Non-flammable.
Vapor pressure [20°C]	: Not applicable.
Vapor pressure [50°C]	: Not applicable.
Vapor density	: Not applicable.
Relative density, liquid (water=1)	: 1.1
Relative density, gas (air=1)	: 1.1
Water solubility	: 39 mg/l
Partition coefficient n-octanol/water (Log Kow)	: Not applicable to inorganic gases
Auto-ignition temperature	: Non-flammable.

Decomposition temperature	: Not applicable.
Viscosity	: No reliable data available.
Explosive properties	: Not applicable.
Oxidizing properties	: Oxidizing.
Other information	
Molar mass	32 g/mol
Critical temperature [°C]	-118°C
Oxygen equivalence coefficient (Ci)	1

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in the sections below

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Violently oxidizes organic matter.

Risk of explosion if the product spills on structures made of organic materials (e.g. wood or asphalt).

10.4. Conditions to avoid

Avoid humidity in installations.

10.5. Incompatible materials

May react violently with combustible materials.

May react violently with reducing agents.

Keep equipment free of oil and grease

Take into account, in the event that there is inflammation, the potential risk of toxicity due to the presence of chlorinated or fluorinated polymers in high pressure oxygen pipes (>30 bar).

For further information on compatibility, refer to ISO 11114.

Materials such as carbon steels, low alloy steels and plastic materials become brittle at low temperatures and are likely to break. Use

suitable materials resistant to the cryogenic conditions present in the systems of refrigerated liquefied gases

Consult supplier for specific recommendations

10.6. Hazardous decomposition products

: None).

SECTION 11: Toxicological information

11.1. Information on toxicological effects

acute toxicity	: This product has no known toxicological effects.
Skin corrosion/irritation	: No known effects with this product.
Serious eye damage/eye irritation	: No known effects with this product.
Respiratory or skin sensitization	: No known effects with this product.
Cell mutagenicity	: No known effects with this product.
Carcinogenicity	: No known effects with this product.
Toxic for reproduction: fertility	: No known effects with this product.
Toxic for reproduction: fetus	: No known effects with this product.
Specific target organ toxicity — single exposure	: No known effects with this product.
Specific target organ toxicity – repeated exposure	: No known effects with this product.
Inhalation hazard	: Not applicable to gases and gas mixtures

SECTION 12: Ecological information

12.1. Toxicity

Assessment	This product is ecologically safe.
EC50 48h - Daphnia magna [mg/l]	No data available.
EC50 72h - Algae [mg/l]	No data available.
LC50 96 Hours - fish [mg/l]	No data available.

12.2. Persistence and degradability

Assessment	This product is ecologically safe.
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12.3. Bioaccumulation potential

Assessment	This product is ecologically safe.
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12.4. Mobility in the ground

Assessment Due to its high volatility, pollution of soil or water by this product is unlikely. Penetration into the ground not likely.

12.5. Results of PBT and VPVB assessments

Assessment No data available.

12.6. Other adverse effects

Other adverse effects May cause frost damage to vegetation.
Effect on the ozone layer : None).
Effect on global warming : None).

SECTION 13: Disposal Considerations

13.1. Waste treatment methods

Contact the supplier if instructions are needed.
Can be placed in a well-ventilated area
Do not discharge into any location where its accumulation could be hazardous.
Check that the emission levels imposed by local regulations or operating permits are not exceeded.
For further recommendations on gas disposal methods, refer to the EIGA code of practice Doc 30 "Disposal of gases", downloadable from <http://www.eiga.eu>.
Return the uneaten product to the supplier in its original container
16 05 04: Gases in pressure vessels (including halons) containing substances Dangerous.

List of hazardous waste

13.2. Further information

The treatment and disposal of waste by third parties must be in accordance with local and/or national legislation.

SECTION 14: Transport information

14.1. UN number

UN number : 1073

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) REFRIGERATED LIQUID OXYGEN
Air transport (ICAO-TI / IATA-DGR) Oxygen, refrigerated liquid
Transport by sea (IMDG) OXYGEN, REFRIGERATED LIQUID

14.3. Transport hazard class(es)

Labeling



2.2: Non-flammable, non-toxic gases.
5.1: Oxidizing materials.

Transport by road/rail (ADR/RID)

Class :2
Classification code : 30
Danger no. : 225
Restriction of passage in tunnels : C/E - Prohibition on crossing tunnels of categories C, D and E for transport in tanks. Prohibition on crossing category E tunnels.

Transport by sea (IMDG)

Class or division / Subsidiary risk(s) : 2.2 (5.1)

14.4. Packing group

Transport by road/rail (ADR/RID) : Not applicable
Air transport (ICAO-TI / IATA-DGR) : Not applicable
Transport by sea (IMDG) : Not applicable

14.5. Environmental hazards

Transport by road/rail (ADR/RID) : None).
Air transport (ICAO-TI / IATA-DGR) : None).
Transport by sea (IMDG) : None).

14.6. Special precautions to be taken by the user

Packaging instruction(s)

Transport by road/rail (ADR/RID) : P203
Air transport (ICAO-TI / IATA-DGR)
Passenger and cargo aircraft : Forbidden

Cargo plane only	: forbidden
Transport by sea (IMDG)	P203
Precautionary measures for transport	Avoid transport in vehicles where the load compartment is not separated from the driver's cab. Ensure that the vehicle driver is aware of the potential hazards of the load and the steps to take in the event of an accident or other emergency situation. Before transporting containers: - Ensure there is adequate ventilation. - Make sure containers are firmly secured - Make sure the cylinder valve is closed and not leaking - Make sure that the faucet outlet protection cap (if it exists) is correctly in place. - Ensure that the tap protection device (if it exists) is correctly put in place

14.7. Transport in bulk in accordance with Annex II of the Marpol Convention and the IBC Code

: Not applicable.

SECTION 15: Regulatory information

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

EU regulations

Employment restrictions : None).
Seveso Directive 2012/18/EU (Seveso III) : List.

National guidelines

National regulations: : Ensure that all national or local regulations are followed.

Chemical Safety Assessment

:A Chemical Risk Assessment (CSA) does not need to be carried out for this product.

SECTION 16: Other information

Indications of change : None).

Abbreviations and acronyms

ETA-Estimate of Acute Toxicity

CLP- Classification Labeling Packaging - Regulation (EC) No 1272/2008 relating to classification, labeling and packaging.

REACH - Registration, Evaluation, Authorization and Restriction of Chemicals – Regulation (EC) No 1907/2006 concerning the registration, evaluation and authorization of chemical substances, as well as the restrictions applicable to these substances.

EINECS - European Inventory of Existing Commercial Chemical Substances - Inventory

European marketed chemical substances

CAS number - numerical identifier assigned by the Chemical Abstract Service (USA)

PPE - Personal protective equipment

LC50 - Lethal Concentration - Lethal concentration for 50% of the population tested

RMM-Risk Management Measures

PBT - Persistent, Bioaccumulative and Toxic.

vPvB - very (very) Persistent and very (very) Bioaccumulative.

STOT - SE: Specific Target Organ Toxicity - Single Exposure; Specific target organ toxicity - Single exposure.

CSA - Chemical Safety Assessment

EN - European Norm - European Standard

UN - United Nations - United Nations

ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road

IATA - International Air Transport Association - International Air Transport Association

IMDG Code - International Maritime Dangerous Goods Code - Code for maritime transport

Training Tips

: Ensure operators understand the risks of oxygen enrichment

DISCLAIMER OF LIABILITY

Before using this product for a new application or for testing, a thorough material compatibility study and risk analysis should be carried out.

The information given in this document is believed to be accurate at the time of publication.
his impression
Despite the care taken in drafting this document, no liability can be assumed.
accepted in the event of damage or accident resulting from its use