SAFETY DATA SHEET

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

CARBON DIOXIDE REFRIGERATED LIQUID

Issue date: 10/14/2021 Revision date: 10/14/2021 Version: 6.0

SDS reference: EIGA018B

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

1.1. Product identifier

Trade name	Refrigerated liquid carbon dioxide
MSDS No.	EIGA061B
Chemical description	
	CAS number: 124-38-9
	N°ONE: 2187
	EC number: 204-696-9
Registration number	Listed in Annex IV/V of REACH, exempt from registration
Chemical formula	CO_2

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

Relevant uses identified	Extinguishing agent
	Industrial and professional. Carry out a risk analysis before use
	Test or calibration gas
	Purge, dilution, inerting gas.
	Protective gas for welding processes.
	Use in the manufacture of electronic or photovoltaic components.
	Food applications.
	Contact the supplier for more information on use
Uses advised against	None)

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	Gas under pressure: Refrigerated liquid gas	H281

2.2. Label elements

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

Hazard pictograms (CLP)

GHS04

Signal word (CLP)		: Attention
Hazard statements (CLP)		: H281 - Contains refrigerated gas; can cause cryogenic burns or injuries
Precautionary statements (CLP)		
	– Prevention	P282 - Wear cold-insulating gloves and face or eye protection.
	– Intervention	P336+P315 - Thaw frozen parts with lukewarm water. Do not rub the affected areas. Seek medical attention immediately.
	– Storage :	P403 - Store in a well-ventilated area.
Additional Information		Do not inhale the product intentionally, due to the risk of asphyxiation.

2.3. Other dangers

: Asphyxiant at high concentration.
Contact with liquid can cause cold burns and frostbite
At high concentrations, CO_2 quickly causes circulatory failure, even at normal oxygen concentrations. Symptoms include headache, nausea and vomiting, which can lead to loss of consciousness and death.

SECTION 3: Composition/information on ingredients

3.1. Substances

NAME	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Refrigerated liquid carbon dioxide	(CAS No.) 124-38-9 (EC No.) 204-696-9	≥99.5	Press. Gas (Ref. Liq.), H281

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.
- Perform cardiopulmonary resuscitation if the victim stops breathing breathe more
- 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

May cause asphyxiation at high concentrations. Symptoms may include loss of consciousness or motor skills. The victim may not be aware of the asphyxiation.
Low concentrations of carbon dioxide cause rapid breathing and headaches.
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
  The product does not burn, use fire-fighting measures appropriate for the surrounding fire.
- Unsuitable extinguishing agents: Do not use a jet of water to extinguish

5.2. Special hazards arising from the substance or mixture

Specific risks: 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

Move containers from fire area if it can be done without risk.

Special protective equipment for firefighters: In confined spaces use a personal self-contained breathing apparatus (SCBA)
Protective clothing and self-contained breathing equipment for firefighters
Standard EN 137 - Autonomous open circuit compressed air device with a full face mask.
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

For non-rescuers: Act according to the local emergency plan.
Try to stop the leak
Evacuate the area.
Ensure adequate air ventilation.
Use protective clothing.
Stay upwind.
See section 8 of the SDS for more information on personal protective equipment

For first aiders: Wear a self-contained breathing apparatus (SCBA) when entering the area unless you have verified that it is safe.
Oxygen detectors should be used when asphyxiating gases may be released.
See section 5.3 of the SDS for more information

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.
Use only specified equipment appropriate for this product and its operating pressure and temperature. Contact your gas supplier if in doubt.
Avoid the return of water, acids and alkalis
Use only with cleaned equipment approved for oxygen use and calculated for cylinder pressures
Avoid the return of water, acids and alkalis.
Do not breathe the gas.
Avoid letting the product into the air
Containers which contain or have contained flammable or explosive products must not be inerted with liquid carbon dioxide. Any formation of solid carbon dioxide particles must be excluded. To avoid the risk of electrostatic discharge, the system must be properly grounded.
Be aware of the risk of static electricity formation with the use of fire extinguishers
CO2. Do not use them in locations where a flammable atmosphere may be present.

Safety when handling the gas container

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

For further recommendations for the safe storage of liquid oxygen, liquid nitrogen or liquid argon, see EIGA Doc. 115 “Storage of Cryogenic Air Gases at Users Premises” downloadable from http://www.eiga.eu and consult the supplier.
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.

Carbon dioxide (124-38-9)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	Carbon dioxide
IOEL TWA	9000 mg/m³
IOEL TWA [ppm]	5000ppm
Regulatory reference	COMMISSION DIRECTIVE 2006/15/EC

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
Ensure that exposure limits are not exceeded (if available).
Gas detectors should be used when oxidizing gases are likely to be released
Think about work permits, e.g. for maintenance.
CO2 detectors should be used when CO2 may be released.

8.2.2. Personal protective equipment

A risk analysis of the use of the product must be conducted and documented in all workplaces affected by the use of the product in order to choose personal safety equipment regarding the identified risks. The following recommendations should be considered
Choose Personal Protective Equipment that complies with recommended EN/ISO standards.

- Eye/face protection: Wear tight safety glasses and a face shield when transferring or disconnecting transfer lines.
  Standard EN 166 - Individual eye protection - Specifications.
- Skin protection
  - –Hand protection: Wear protective gloves when handling gas cylinders.
    Standard EN 388-Protective gloves against mechanical risks.
    Wear cold-insulating gloves during transfer or disconnection operations.
    transfer lines
  - –Miscellaneous: Wear safety shoes when handling cylinders.
    Standard EN ISO 20345: Personal Protective Equipment - safety shoes.
- Respiratory protection: Gas filters can be used if all surrounding conditions are known e.g. concentration and type of impurities and duration of use
  Use gas filters and a face mask when exposure limits can be exceeded for a short period e.g. connecting, disconnecting cylinders.
  Consult the product information of the respiratory equipment supplier to choose the most appropriate
  Gas filters do not protect against under-oxygenation.
  Self-contained breathing apparatus (SCBA) or mask with positive pressure air supply should be used in under-oxygenated atmospheres.
  Standard EN 14387 - Respiratory protective devices - Anti-gas filters and combined filters and Standard EN 136 - Respiratory protective devices - full masks.
  Standard EN 137 - Autonomous open circuit compressed air device with a full face mask.
- Thermal risks: No additions to previous sections

8.2.3. Ambient exposure controls

None are necessary.

SECTION 9: Physical and chemical properties

Information on essential physical and chemical properties

Appearance
- Physical state at 20°C / 101.3kPa : Gaseous
- Color : Colorless.

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 : -78.5 °C at atmospheric pressure, dry ice sublimates into gaseous CO2
Boiling point : -56.6°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]	: 57.3 bar(a)
Vapor pressure [50°C]	: Not applicable.
Vapor density	: Not applicable.
Relative density, liquid (water=1)	: 0.82
Relative density, gas (air=1)	: 1.52
Water solubility	: 2000 mg/l
Partition coefficient n-octanol/water (Log Kow)	: 0.83
Auto-ignition temperature	: Non-flammable.
Decomposition temperature	: Not applicable.
Viscosity	: No reliable data available.
Explosive properties	: Not applicable.
Oxidizing properties	: Not applicable.

Other information

Molar mass	44 g/mol
Critical temperature [°C]	30°C
Other data	Gas or vapor heavier than air. May accumulate in confined areas, particularly in low areas and basements.

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

None).

10.4. Conditions to avoid

Avoid humidity in installations.

10.5. Incompatible materials

None).

For further information on compatibility, refer to ISO 11114.

10.6. Hazardous decomposition products : None).

SECTION 11: Toxicological information

11.1. Information on toxicological effects

acute toxicity	: Unlike only asphyxiating materials, carbon dioxide can cause death, even when the oxygen content is normal (20-21%). It has been found that at a content of 5%, CO2 can lead to an increase in the toxicity of other gases (CO, NO2). CO2 has been shown to increase the production of carboxyhemoglobin or bind to hemoglobin, possibly due to CO2's stimulatory effects on the respiratory and circulatory systems.
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.

12.3. Bioaccumulation potential

Assessment: This product is ecologically safe.

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: Not classified as PBT or vPvB.

12.6. Other adverse effects

Other adverse effects: No known effects with this product
Effect on the ozone layer: : No effect on the ozone layer
Global warming potential [CO2=1]: : 1
Effect on global warming: : May contribute to the greenhouse effect when discharged in large quantities.
Contains greenhouse gas(es)

SECTION 13: Disposal Considerations

13.1. Waste treatment methods

Can be placed in a well-ventilated area
Do not discharge into any location where its accumulation could be hazardous.
Return the uneaten product to the supplier in its original container

List of hazardous waste: 16 05 04: Gases in pressure vessels (including halons) containing substances Dangerous.

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: : 2187

14.2. UN proper shipping name

Transport by road/rail (ADR/RID): REFRIGERATED LIQUID CARBON DIOXIDE
Air transport (ICAO-TI / IATA-DGR): Carbon dioxide, refrigerated liquid
Transport by sea (IMDG): CARBON DIOXIDE, REFRIGERATED LIQUID

14.3. Transport hazard class(es)

Labeling

2.2: Non-flammable, non-toxic gases.

Transport by road/rail (ADR/RID)

Class: :2
Classification code: : 3A
Danger no.: :22
Restriction of passage in tunnels: : C/E - Tanker transport: passage prohibited in category C, D and E tunnels. Other transport: passage prohibited in category E tunnels

Transport by sea (IMDG)

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

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: : 202
Cargo plane only: : 202
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) : Not covered

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 : The risks of asphyxiation are often underestimated and must be emphasized during operator training.

DISCLAIMER OF LIABILITY Before using this product for a new application or for testing, a thorough material compatibility study and risk analysis should be performed.
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