

REFRIGERATED NITROGEN PROTOXYDE

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SDS reference: EIGA093B

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

1.1. Product identifier

Trade name	REFRIGERATED NITROGEN PROTOXYDE
MSDS No.	EIGA003A
Chemical description	CAS number: 10024-97-2 N°ONE: 2201 EC number: 233-032-0
Registration number	Listed in Annex IV/V of REACH, exempt from registration
Chemical formula	N2O

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

Relevant uses identified	See the list of identified uses and exposure scenarios in the appendix of the SDS.
Uses advised against	Do not inhale the product intentionally, due to the risk of asphyxiation. Do not inhale the product intentionally due to its narcotic effects.

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
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1.4. Emergency call number

Emergency call number	Tel: +21365550342
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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
Health hazards	Specific target organ toxicity — Single exposure, category 3,	H336
	Narcotic effects	

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.
	: H336 - May cause drowsiness or dizziness.

Precautionary statements (CLP)

– Prevention:	P260 - Do not breathe gases, vapors P244 - No oil or grease on taps and fittings. P220 - Keep away from clothing and other combustible materials. P282 - Wear cold-insulating gloves and face or eye protection. Insulating gloves against the cold, facial protective equipment, eye protection equipment.
– Intervention:	P304+P340+P315 - IF INHALED: remove victim to fresh air and keep at rest in a position where they can breathe comfortably. Seek medical attention immediately.
–	P336+P315 - Thaw frozen parts with lukewarm water. Do not rub the affected areas. Seek medical attention immediately.
– Storage :	P370+P376 - In the event of fire: close the leak if it can be done without danger. P403 - Store in a well-ventilated area.

Additional Information	Do not inhale the product intentionally, due to the risk of asphyxiation. Do not inhale the product intentionally due to its narcotic effects.
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2.3. Other dangers

: None).

SECTION 3: Composition/information on ingredients

3.1. Substances

NAME	Product identifier	%	Impurities in ppm				Classification according to Regulation (EC) No. 1272/2008 [CLP]
			H2O	NO	CO	CO2	
Refrigerated nitrous oxide	(CAS No.) 10024-97-2	> 98	H2O	NO	CO	CO2	Ox. Gas 1, H270 Press. Gas (Ref. Liq.), H281 STOT SE 3, H336
	(EC No.) 233-032-0 REACH registration number: 01-2119970538-25		≤ 67	≤ 2	≤ 5	≤ 300	

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.
- 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 have narcotic effects at low concentrations. Symptoms may be dizziness, headache, nausea and loss of coordination.
Refer to section 11.

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

: Obtain medical assistance.

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

Hazardous combustion products
Nitric oxide/nitrogen dioxide

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.
Use a self-contained breathing apparatus (SCBA) and gas-tight, chemical-resistant protective clothing
Standard EN 943-2: Protective clothing against liquid or gaseous chemicals, aerosols and solid particles. Gas-tight protective clothing for rescue teams.
Standard EN 137 - Autonomous open circuit compressed air device with a mask full face.
Standard EN 469: protective clothing for firefighters. Standard EN 659: Protective gloves For firefighters

Special protective equipment 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.
Eliminate sources of ignition
Ensure adequate air ventilation.
Use protective clothing
Prevent the product from entering sewers, basements, pits, or any other location where its accumulation could be dangerous.
Stay upwind of the wind
See section 8 of the SDS for more information on personal protective equipment
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.
See section 5.3 of the SDS for more information.

For first aiders

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
Temperatures above 150°C (300°F) should be avoided by all means possible to reduce the occurrence of explosive decomposition of nitrous oxide. Clean all surfaces in direct contact with nitrous oxide as for oxygen service.
Transfer pumps must be equipped with a shut-off system to avoid running dry
Use self-limiting heating systems. Electric heaters with direct contact with the product are not permitted.
Avoid the return of water, acids and alkalis.
Do not breathe the gas.

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 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)

:

Local Name

Nitrous oxide

OEL TWA

180 mg/m³

OEL TWA [ppm]

: 100 ppm

Reference

: ILO and WHO 2018 ICSC: 0067 (June 2015)

DNEL (Derived No Effect Dose)

: None established.

PNEC (Predicted No Effect Concentration(s))

: None established.

8.2. Exposure controls

8.2.1. Appropriate technical controls

Maintain appropriate exhaust ventilation locally and overall.

Product to be handled in a closed system.

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.

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 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.

- 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.

- Thermal risks

8.2.3. Ambient exposure controls

Standard EN 14387 - Respiratory protective devices - Anti-gas filters and combined filters and Standard EN 136 - Respiratory protective devices - full masks.
Have a personal self-contained breathing apparatus (SCBA) ready for use in an emergency
Self-contained breathing apparatus recommended when there is a risk of unknown exposure during maintenance activities on installation equipment.
Standard EN 137 - Autonomous open circuit compressed air device with a full face mask.
Wear insulating gloves against the cold. Wear cold-insulating gloves when transferring or breaking the transfer.

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
- Color

Smell

Olfactory threshold

pH

Melting point / Freezing point

Boiling point

Flash point

Evaporation rate

Flammability (solid, gas)

Explosive limits

Vapor pressure [20°C]

Vapor pressure [50°C]

Vapor density

Relative density, liquid (water=1)

Relative density, gas (air=1)

Water solubility

Partition coefficient n-octanol/water (Log Kow)

Auto-ignition temperature

Decomposition temperature

Viscosity

Explosive properties

Oxidizing properties

Other information

Molar mass

Critical temperature [°C]

Oxygen equivalence coefficient (Ci)

Other data

: Gas

: Colorless liquid.

: Sweetish. Difficult to detect at high concentration.

: Detection of thresholds by smell is subjective and inappropriate for warning in the event of overexposure

: Not applicable to gases and gas mixtures.

: -90.81°C

: -88.5°C

: Not applicable to gases and gas mixtures.

: Not applicable to gases and gas mixtures.

: Non-flammable.

: Non-flammable.

: 50.8 bar(a).

: Not applicable.

: Not applicable.

: 1.2

: 1.5

: 1500 mg/l

: 0.4

: Non-flammable.

: Not applicable.

: No reliable data available.

: Not applicable.

: Oxidizing.

44 g/mol

-36.4°C

0.6

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.

At temperatures above 575°C and atmospheric pressure, nitrous oxide decomposes into nitrogen and oxygen.

In the presence of catalysts (e.g.: halogenated products, mercury, nickel, platinum), the speed decomposition rate increases and decomposition can then occur at even lower temperatures.

The decomposition of nitrous oxide is an irreversible phenomenon and of exothermic causing a considerable rise in pressure.

10.3. Possibility of hazardous reactions

May react violently with reducing agents

Violently oxidizes organic matter.

10.4. Conditions to avoid

10.5. Incompatible materials

Avoid humidity in installations.

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

: No dangerous decomposition products under normal conditions of use and storage

SECTION 11: Toxicological information

11.1. Information on toxicological effects

acute toxicity

: The classification criteria are not met.

LC50 Inhalation - Rat [ppm]

: 500000 ppm/4h

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

: May cause drowsiness or dizziness.

Specific target organ toxicity – repeated exposure

: Hemotoxic effect.

Neurological effect.

Target organ(s)

At low concentrations:

Central nervous system.

Erythrocytes (red blood cells).

Kidneys.

Liver.

Inhalation hazard

: Not applicable to gases and gas mixtures

Other information

Inhalation has narcotic effects

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

Not applicable to non-organic products

12.3. Bioaccumulation potential

Assessment

No bioaccumulation to be expected in the event of a low log Kow (log Kow<4).
See section 9.

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

: No effect on the ozone layer.

Global warming potential [CO2=1]

: 298

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

List of hazardous waste

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.

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 : 2201

14.2. UN proper shipping name

Transport by road/rail (ADR/RID)

REFRIGERATED LIQUID NITROGEN PROTOXYDE

Air transport (ICAO-TI / IATA-DGR)

Nitrous oxide, refrigerated liquid

Transport by sea (IMDG)

NITROUS OXIDE, 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.
- 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

: None).

Training Tips

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.

The information given in this document is believed to be accurate at the time of printing.

Despite the care taken in drafting this document, no liability can be accepted in the event of damage or accident resulting from its use.