

**MATERIAL SAFETY DATA SHEET (MSDS)  
ENTONOX**

**Please ensure that this MSDS is received by an appropriate person**

DATE: March 2023  
Ref. No.: MS060

Version 2

**1 PRODUCT AND COMPANY IDENTIFICATION**

<b>Product Name</b>	ENTONOX
<b>Chemical Formula</b>	N <sub>2</sub> O and O <sub>2</sub>
<b>Trade Names</b>	Entonox
<b>Colour coding</b>	French Blue (F.09) Body French blue and white quadrants on the shoulder of the cylinder
<b>Valve</b>	The relevant Pin-Index valve for Entonox shall be fitted
<b>Company Identification</b>	Les Gaz Industriels Ltd Pailles Road G.R.N.W. Republic of Mauritius Tel No: (+230) 212-8306 Fax No: (+230) 212-0235 (+230) 800 1133
<b>EMERGENCY NUMBER</b>	(+230) 800 1133

**2 COMPOSITION/INFORMATION ON INGREDIENTS**

<b>Chemical Name</b>	Oxygen
<b>Chemical Family</b>	Oxidant
<b>CAS No</b>	7782-44-7
<b>UN No</b>	1072
<b>ERG No</b>	122
<b>Hazchem Warning</b>	5 A Non-flammable Gas
<b>Chemical Name</b>	Nitrous Oxide
<b>Chemical Family</b>	Oxidant
<b>CAS No.</b>	10024-97-2
<b>UN No.</b>	1070
<b>ERG No.</b>	122
<b>Hazard Warning</b>	5 A Non Non-flammable Gas

**3 HAZARDS IDENTIFICATION**

**Main Hazards**

Entonox is non-flammable, but readily support combustion. Never permit oil, grease or other readily combustible substance to come into contact with high concentration of Entonox.

**Adverse Health Effects**

Entonox should not be used in any condition where air is entrapped within the body and where its expansion might be dangerous, such as head injuries with impairment of consciousness, artificial, traumatic/spontaneous pneumothorax, air embolism, decompression sickness following a recent dive, following air encephalography, severe bullous emphysema, during myringoplasty, gross abdominal distension, intoxication, and maxillofacial injuries.

**Chemical Hazards**

Entonox is non-flammable, but strongly supports combustion (including some materials which do not normally burn in air). Since dry Entonox is non-corrosive, most materials of construction are suitable. Avoid all combustible materials.

**Biological Hazards**

The administration of Entonox more frequently than every 4 days, should be accompanied by routine blood cell counts for evidence of megaloblastic change in red cells & hyper segmentation of neutrophils.

**Vapour Inhalation**

The nitrous oxide constituent of Entonox is rapidly eliminated but, as a safety precaution, it is recommended that driving, use of machinery and other psychomotor activities should not be undertaken until 12 hours have elapsed after Entonox analgesia.

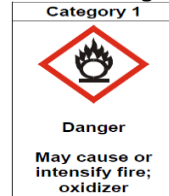
**Eye Contact** No known effect

**Skin Contact** No known effect

**Ingestion** Depletion of methionine has been implicated in neurological deficit seen in chronic abusers of Entonox. Inapplicable, unwitting or deliberate inhalation of Entonox will result in unconsciousness, passing through stages of increased intoxication and light-headedness, and if the victim were to be within a confined space, death from anoxia could result. Remove the victim to an uncontaminated area. If necessary administer oxygen resuscitation.

**Label Elements**

**Hazard Pictograms**



**Precautionary statements:**

- P220: Keep/store away from clothing/ combustible materials
- P244: Keep reduction valves free from grease and oil
- P370+P376: In case of fire, stop leak if safe to do so
- P403: Store in well ventilated space

**4 FIRST AID MEASURES**

Prompt medical attention is mandatory in all cases of overexposure to Entonox. Rescue personnel should be cognizant of extreme fire hazard associated with Entonox-rich atmospheres. Inapplicable, unwitting, deliberate inhalation of Entonox results in unconsciousness passing through stages of increasing light-headedness & intoxication and, if the victim were to be within a confined space, death from anoxia could result. The treatment is removal to fresh air, and if necessary, the use of an oxygen resuscitator.

**5 FIRE FIGHTING MEASURES**

**Extinguishing Media**

As Entonox is non-flammable but strongly support combustion, the correct type of extinguishing medium should be used, depending on the combustible material involved. Carbon dioxide and dry powder are usually the most effective.

**Specific Hazards**

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

**Emergency Actions**

If possible, shut off the source of excess Entonox. Evacuate the area. All cylinders should be removed from the vicinity of the fire. Cylinders that cannot be removed should be cooled by water from a safe distance. Cylinders that have been exposed to excessive heat should be clearly identified and returned to the supplier. CONTACT THE NEAREST AFROX BRANCH.

**Protective Clothing**

Safety goggles, gloves and safety shoes should be worn when handling cylinders.

**Environmental Precautions**

As the gas is heavier than air, pockets of Entonox-enriched air could occur. These could lead to the fire spreading rapidly. If possible, ventilate the affected area.

**6 ACCIDENTAL RELEASE MEASURES**

**Personal Precautions**

Although Entonox is not itself combustible, it supports & accelerates combustion. Clothes and other materials, not normally considered flammable, will burn fiercely in the presence of Entonox and can be set alight by a spark, or even hot cigarette ash.

**Environmental Precautions**

Entonox is known to have an ozone depleting potential. It is a "greenhouse gas" and might contribute to global warming. Beware of Entonox-enriched atmospheres coming into contact with readily combustible materials.

**Small Spills**

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

**Large Spills**

Evacuate the area. Shut off the source of the spill if this can be done without risk. Ventilate the area using force draught if necessary.

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**7 HANDLING AND STORAGE**

Do not allow cylinders to slide or come into contact with sharp edges. Cylinders of Entonox should not be stored near cylinders of acetylene or other combustible materials. Entonox cylinders may be stacked horizontal provided that they are firmly secured at each end to prevent rolling. Prevent dirt, grit of any sort, oil or any other lubricant from entering the cylinder valves and store cylinders well clear of any corrosive influence, e.g. battery acid. Compliance with all relevant legislation is essential. Use a "first in-first-out" inventory system to prevent full cylinders from being stored for excessive periods of time. Keep out of reach of children.

**8 EXPOSURE CONTROLS/PERSONAL PROTECTION**

**Occupational Exposure Hazards**

Scavenging of waste Entonox gas should be used to reduce operating theatre and equivalent treatment room levels to a below 200vpm of ambient nitrous oxide.

**Engineering Control Measures**

Engineering control measures are preferred to reduce exposure to Entonox-enriched atmospheres. General methods include forced-draught ventilation, separate from other exhaust ventilation systems. Ensure that sufficient fresh air enters at, or near floor level.

**Personal Protection**

Safety goggles, gloves and shoes, or boots, should be worn when handling cylinders.

**Skin** No known effect.

**9 PHYSICAL AND CHEMICAL PROPERTIES**

**PHYSICAL DATA**

Chemical Symbol	O <sub>2</sub>
Molecular Weight	32,00
Specific Volume @ 20°C & 101,325 kPa	755 ml/g
Boiling Point 101,325 kPa	90.18 °K; -183 °C; 181.4 °F
Density, gas @ 101,325 kPa and 20°C	1,33 kg/m <sup>3</sup>
Relative density (Air = 1) @ 101,325 kPa	1,053
Solubility in Water @ 101,325 kPa @ 25 °C	
(Partial Pressure of O <sub>2</sub> ) @ 0 °C	4.889 cm <sup>3</sup> O <sub>2</sub> /100 cm <sup>3</sup> water
Colour	None
Taste	None
Odour	None

**PHYSICAL DATA**

Chemical Symbol	N <sub>2</sub> O
Molecular Weight	44.01
Specific volume @ 20°C & 101,325 kPa	543.1 ml/g
Boiling point @ 101,325 kPa	- 88.5°C
Density, gas @ 101,325 kPa & 20°C	1.8432 kg/m <sup>3</sup>
Relative density (Air=1) @ 101,325 kPa	1.5297
Colour	None
Taste	Sweet
Odour	Sweet

**10 STABILITY AND REACTIVITY**

**Conditions to avoid**

Avoid the build-up of Entonox-enriched atmospheres. Never use cylinders as rollers or supports, or for any other purpose other than the storage of Entonox. Never expose cylinders to excessive heat, as this may cause sufficient build-up of pressure to rupture the cylinders.

**Incompatible Materials**

Since dry Entonox is non-corrosive, most materials of construction are suitable. Avoid all combustible materials. (For further information see Section 3, Chemical Hazards).

**Hazardous Decomposition Products**

When involved in a fire, the higher oxides of nitrogen can be formed. Both nitric oxide and nitrogen dioxide are highly toxic.

**11 TOXICOLOGICAL INFORMATION**

Acute Toxicity	See Section 3
Skin & eye contact	No known effect

Chronic Toxicity	See Section 3
Carcinogenicity	No known effect
Mutagenicity	No known effect
Reproductive Hazards	See Section 3

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

**12 ECOLOGICAL INFORMATION**

Entonox is heavier than air and care should be taken to avoid the formation of Entonox-enriched pockets. It does not pose a hazard to the ecology.

**13 DISPOSAL CONSIDERATIONS**

**Disposal Methods**

Small amounts may be blown to the atmosphere under controlled conditions. Large amounts should only be handled by the gas supplier.

**Disposal of Packaging**

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

**14 TRANSPORT INFORMATION**

**ROAD TRANSPORTATION**

ERG No	122
Hazchem warning	5A Non-flammable Gas

**SEA TRANSPORTATION**

Class/Packaging Group	
Label	Non-flammable Gas

**AIR TRANSPORTATION**

ICAO/IATA Code	3156
Class	2.2 Non-flammable Gas
Packaging group/instructions	
-Cargo	200
-Passenger	200
Maximum quantity allowed	
-Cargo	150 kg
-Passenger	75 kg

**15 REGULATORY INFORMATION**

EEC Hazard class Non-flammable Gas

Risk Phrase	Description	Safety Phrase	Description
R8	Contact with combustible material may cause fire	S2	Keep out of reach of Children
R33	Danger of cumulative effects	S3	Keep in a cool place
R44	Risk of explosion if heated under confinement	S9	Keep container in a well-ventilated place
R48	Dangerous of serious damage to health by prolonged exposure	S21	When using do not smoke
		S44	If you feel unwell, seek medical advice [show the label where possible]

National legislation: None  
Refer to SANS 10265 for explanation of the above.

**16 OTHER INFORMATION**

**Bibliography**

SANS 10265 - Labelling of Dangerous Substances

**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.