



# MATERIAL SAFETY DATA SHEET

## ENTONOX

DATE: April 2001

### 1 PRODUCT AND COMPANY IDENTIFICATION

#### PRODUCT IDENTIFICATION

Product Name	ENTONOX
Chemical Formula	N <sub>2</sub> O and O <sub>2</sub>
Trade Name	Entonox
Colour Coding	French Blue (F.09) body, with French Blue and White quadrants on the shoulder of the cylinder
Valve	The relevant Pin-Index valve for Entonox shall be fitted.

Company Identification	Les Gaz Industriels Ltd Pailles Road G.R.N.W. – Republic of Mauritius Tel. No: (+230) 212 8306 Fax No: (+230) 212 0235
------------------------	------------------------------------------------------------------------------------------------------------------------------------

### 2 COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Family	Oxidant
ERG No	122
Hazchem Warning	5 A Non-flammable gas

### 3 HAZARDS IDENTIFICATION

**Main Hazards.** All cylinders are portable gas containers, and must be regarded as pressure vessels at all times. Entonox is non-flammable, but readily supports combustion. Never permit oil, grease or other readily combustible substance to come into contact with high concentrations of Entonox.

**Adverse Health effects.** Entonox should not be used with 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 or spontaneous pneumothorax, air embolism, decompression sickness following a recent dive, following air encephelography, severe bullous emphysema, during myringoplasty, gross abdominal distension, intoxication, 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.** 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 and hypersegmentation 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 the neurological deficit seen in chronic abusers of Entonox.

### 4 FIRST AID MEASURES

Prompt medical attention is mandatory in all cases of overexposure to Entonox. Rescue personnel should be cognisant of extreme fire hazard associated with Entonox-rich atmospheres. Inapplicable, unwitting or deliberate inhalation of Entonox will result in unconsciousness, passing through stages of increasing light-headedness and 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.

**Eye Contact** No known effect.

**Skin Contact** No known effect.

**Ingestion** Inapplicable, unwitting or deliberate inhalation of Entonox will result in unconsciousness,

passing through stages of increasing light-headedness and 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 supports 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 area. All cylinders should be removed from the vicinity of the fire. Cylinders that cannot be removed should be cooled with water from a safe distance. Cylinders which have been exposed to excessive heat should be clearly identified and returned to 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 and 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 single spark, or even hot cigarette ash.

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

**Small spills.** Shut off the source of 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 forced-draught if necessary.

### 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 gases. Entonox cylinders may be stacked horizontally 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 level 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 should be worn when handling cylinders.

**Skin.** No known effect.

## 9 PHYSICAL AND CHEMICAL PROPERTIES

### PHYSICAL DATA

#### Nitrous Oxide

Chemical Symbol	N <sub>2</sub> O
Molecular Weight	44,01
Specific Volume @ 20°C & 101,325 kPa	543,1 ml/g
Relative density (Air = 1) @ 101,325 kPa	1,5297
Colour	None
Taste	Sweet
Odour	Sweet

#### Oxygen

Chemical Symbol	O <sub>2</sub>
Molecular Weight	32,00
Specific Volume @ 20°C & 101,325 kPa	755 ml/g
Relative density (Air = 1) @ 101,325 kPa	1,053
Colour	None
Taste	None
Odour	None

## 10 STABILITY AND REACTIVITY

**Conditions to avoid.** The build-up of Entonox-enriched atmospheres. Never use cylinders as rollers or supports, or for any other purpose 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	1070 and 1072
Class	2.2 Non-flammable
Packaging group	
Packaging instructions	
- Cargo	200
- Passenger	200
Maximum quantity allowed	
- Cargo	150kg
- Passenger	75kg

## 15 REGULATORY INFORMATION

EEC Hazard class	Non-flammable
Risk phrases	R8 Contact with combustible material may cause fire R33 Danger of cumulative effects R44 Risk of explosion if heated under confinement R48 Danger of serious damage to health by prolonged exposure.
Safety phrases	S2 Keep out of reach of children S3 Keep in a cool place S9 Keep container in a well-ventilated place S21 When using do not smoke S44 If you feel unwell, seek medical advice (show the label where possible)

National legislation. None  
Refer to SABS 0265 for explanation of the above.

## 16 OTHER INFORMATION

Bibliography  
Compressed Gas Association, Arlington, Virginia  
Handbook of Compressed Gases - 3rd Edition  
Matheson. Matheson Gas Data Book - 6th Edition

## 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.

A member of The AFROX Group  
For product and safety enquiries please phone

**EMERGENCY N°:**

**+230 800 1133 (business hours)**

**+230 212 8306 (business hours)**

**+230 5421 5944 (24 hours)**

**+230 5729 3846 (24 hours)**

**+230 5729 3845 (24 hours)**

**+230 5421 1511 (24 hours)**

**+230 5497 5432 (24 hours)**

**+230 5421 9526 (24 hours)**