MATERIAL SAFETY DATA SHEET (MSDS)

NITRIOUS OXIDE

(Please ensure that this MSDS is received by the appropriate person)

DATE: March 2017 Version 3 Ref.No.: MS013

1 PRODUCT AND COMPANY IDENTIFICATION

Product Name	NITROUS OXIDE
Chemical Formula	N_2O
Trade Names	Medical Nitrous Oxide Compressed Nitrous Oxide Instrument Grade Nitro-Boost
Colour coding	*Medical Nitrous Oxide* French Blue (F.09) body, white stencilling *Nitrous Oxide, Instrument Grade* French Blue (F.09) body, with the "Instrument Grade" logo affixed centrally to the body of the cylinder *Nitro-Boost* French Blue (F.09) body, with yellow shoulder, and "Nitro-boost" Label stating "Toxic not for Medical Use"
Valve	Medical and Instrument Grades 3SN: Brass 11/16 inch x 20 tpi male. Nitro-boost Neriki: Brass 5/8 inch left hand female, positive pressure
Company Identification	African Oxygen Limited 23 Webber Street Johannesburg, 2001 Tel No: (011) 490-0400 Fax No: (011) 490-0506
EMERGENCY NUMBER	**0860 020202 or +27 (0)11 873 4382 (24 hours)**

2 COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Nitrous Oxide
Chemical Family	Oxidant
CAS No.	10024-97-2
UN No.	1070
ERG No.	122
Hazard Warning	5 A Non Non-flammable Gas

3 HAZARDS IDENTIFICATION

Main Hazards

Nitrous oxide is non-flammable, but readily supports combustion. Never permit oil, grease or other readily combustible substance to come into contact with high concentrations of nitrous oxide.

Adverse Health Effects

Nitrous oxide should not be used with any condition where air is entrapped within 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; maxillofacial injuries.

Chemical Hazards

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

Biological Hazards

Administration of nitrous oxide, 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

Use of nitrous oxide causes inactivation of vitamin B12 which is a co-factor of methionine synthase. Folate metabolism is consequently interfered with DNA synthesis is impaired following prolonged nitrous oxide administration, disturbances result in megaloblastic bone marrow change. Exceptionally heavy occupational exposure or addictions have resulted in myeloneuropathy and subacute combined degeneration.

Ingestion

Depletion of methionine has been implicated in the neurological deficit seen in chronic abusers of nitrous oxide.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Hazards

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

4 FIRST AID MEASURES

Prompt medical attention is mandatory in all cases of overexposure to nitrous oxide. Rescue personnel should be cognisant of extreme fire hazard associated with nitrous oxide-rich atmospheres. Inapplicable, unwitting or deliberate inhalation of nitrous oxide 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. Treatment is removal to fresh air, and if necessary, use of an oxygen resuscitator.

Eye Contact No known effect

Skin Contact No known effect

Ingestion

Inapplicable, unwitting or deliberate inhalation of nitrous oxide 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. Treatment is removal to fresh air, and if necessary, the use of an oxygen resuscitator.

5 FIRE FIGHTING MEASURES

Extinguishing Media

As nitrous oxide is non-flammable but strongly supports combustion, the correct type of extinguishing media should be used depending on the combustible material involved.

Specific Hazards

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

Emergency Actions

If possible, shut off the source of escaping Nitrous oxide. 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 gloves and shoes, or boots, should be worn when handling cylinders.

Environmental Precautions

As the gas is heavier than air, pockets of nitrous oxide- 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 nitrous oxide is not itself combustible, it supports and accelerates combustion. Clothes and other materials, not normally considered flammable, will burn fiercely in the presence of nitrous oxide, and can be set alight by a single spark, or even hot cigarette ash.

Environmental Precautions

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

Small Spills

Shut off the source of escaping nitrous oxide. 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 nitrous oxide should not be stored near cylinders of acetylene or other combustible gases. Nitrous oxide cylinders should only be stacked vertically and be firmly secured. Prevent dirt, grit of any sort, oil or any other lubricant from entering the cylinder valves, 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.

Engineering Control Measures

Engineering control measures are preferred to reduce exposure to nitrous oxide-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

Chemical Symbol	N_2O
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^3
Relative density (Air=1) @ 101,325 kPa	1.5297
Colour	None
Taste	Sweet
Odour	Sweet

10 STABILITY AND REACTIVITY

Conditions to avoid

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

Incompatible Materials

Since dry nitrous oxide is non-corrosive, most materials of construction are suitable. Avoid all flammable materials.

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

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

13 DISPOSAL CONSIDERATIONS

Disposal Methods

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

Disposal of Packaging

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

14 TRANSPORT INFORMATION

ROAD TRANSPORTATION

UN No	1070
ERG No	122
Hazchem warning	5 A Non-flammable Gas

SEA TRANSPORTATION

IMDG	1070
Class	
Packaging group	
Label	Non-flammable Gas

AIR TRANSPORTATION

ICAO/IATA Code	1070
Class	2.2
Packaging group	
Packaging instructions	
- Cargo	200
- Passenger	200
Maximum quantity allowed	
- Cargo	150kg
- Passenger	75kg

15 REGULATORY INFORMATION

EEC Hazard classNon-flammable
National legislation OHSact and Regulations 85 of 1993.
Reference SANS 10234 and its supplement.

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

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