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MATERIAL SAFETY DATA SHEET

Product Name:

NITRONOX ™,

IDENTIFICATION

Chemical Name: 50% Nitrous Oxide (N_2O) / 50% Oxygen (O_2)
Synonyms: Nitronox ™, Entonox ™
UN Number: 3156

Use: General analgesic for first aid, in ambulances, nursing services, obstetrics and in doctors and dentists surgeries.

HAZARDS IDENTIFICATION

Dangerous Goods Class and Subsidiary Risk: 2.2 sub. 5.1
HSNO Classification: 5.1.2A, 6.8B, 6.9B

Hazard Statement:
Contains gas under pressure; may explode if heated.
May cause or intensify fire; oxidiser. Supports Combustion.
Suspected of damaging fertility or the unborn child.
May cause damage to organs through prolonged or repeated exposure.

Precautionary Statements:
Read label before use.
Read Material Safety Data Sheet before use.
Obtain special instructions before use.
Keep/Store away from all combustible materials.
Keep reduction valves and NITRONOX™ system components free from grease and oil.
Do not handle until all safety precautions have been read and understood.
Use personal protective equipment as required.
Do not breathe gas, unless under medical supervision.
Do not eat, drink or smoke when using this product.
In case of fire: Stop leak if safe to do so. Move away from cylinder and cool with water from a protected position.
If exposed/concerned/unwell: Get medical advice/attention.
Store in a well ventilated place away from sunlight.
Store locked up.
Do not discharge to atmosphere in large quantities.
Do not discharge into any place where its accumulation could be dangerous.

COMPOSITION

Ingredients

Chemical Entity	CAS Number	Proportion
Nitrous Oxide	10024-97-2	50%
Oxygen	7782-44-7	50%

Contains no other components or impurities that will influence the classification of the product.

FIRST AID MEASURES

Health Effects

Acute

Swallowed: Not applicable to gases.
Eye: Not irritating to the eye.
Skin: Not irritating to the skin.
Inhaled: Inhalation of small amounts of Nitronox™ may produce euphoria. Large doses induced anaesthesia.

Chronic

Epidemiological studies suggest an increased risk of spontaneous abortion and low birth weight in off-spring in female workers employed in operating theatres and dental surgeries. These findings are controversial.

First Aid

In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Advice to Doctor

Advise doctor that victim has been breathing high levels of Nitronox™.

General:

Rescue personnel should be aware of extreme fire hazard associated with Nitronox™ rich atmospheres.

FIRE FIGHTING MEASURES

Flammability:

Nitronox™ is non-flammable, but vigorously supports combustion of many materials which will not normally burn in air.
Nitronox™ may react violently with combustible materials.
Nitronox™ may react violently with reducing materials.
Nitronox™ violently oxidises organic material.
Store away from flammable products.
Never smoke or carry out hot work in Nitronox™ atmosphere.
Never wear clothing saturated with Nitronox™.
If involved in a fire the following toxic and or corrosive fumes may be produced by thermal decomposition: Nitric Oxide and Nitrogen Dioxide.

Fire/Explosion Hazard:
Exposure to fire may cause container to rupture/explode. Cylinders involved in a fire/explosion may rocket. Move cylinders from vicinity of fire if safe to do so. Cool cylinders by spraying flooding quantities of water from a protected location. If unable to keep cylinders cool, evacuate area, minimum distance 200 meters.
If involved in a fire the following toxic and or corrosive fumes may be produced by thermal decomposition: Nitric Oxide and Nitrogen Dioxide.

Extinguishing Media:
Use extinguishing media appropriate for the substance burning. Nitronox™ vigorously supports combustion and may be supporting the combustion.

Hazchem Code:
2 S

Recommended Protective Clothing:
In confined space use self-contained breathing apparatus.

ACCIDENTAL RELEASE MEASURES

Personal Protection:
Do not smoke while handling this product. Personnel engaged in the movement of cylinders shall be provided with safety footwear, safety glasses and leather or PVC gloves. Full cover overalls are recommended. All personal protective equipment must be free from oil and grease.
In areas where equipment failure may cause an immediate high concentration of Nitronox™, ensure adequate ventilation.

Spills and Disposal:
Ventilate area. Eliminate ignition sources. Stop leak if it can be done without risk. Allow gas to dissipate to atmosphere. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

Reference Guide:
Standard SNZ HB 76:2008 Dangerous Goods – Initial Emergency Response Guide.
AS/NZS 1337 – Eye Protection for Industrial Applications
AS/NZS 2161.1 – Occupational Protective Gloves – Selection, use and maintenance
AS/NZS 1715 – Selection, Use and Maintenance of Respiratory Protective Devices
AS/NZS 1716 – Respiratory Protective Devices

General:
Only experienced and properly instructed personnel should handle compressed gases. Use no oil or grease. Open valve slowly to avoid pressure shock. Cylinder contents and identification labels provided by the supplier must not be removed or defaced. Colour coding should not be the only criterion used for content identification.

HANDLING AND STORAGE

Handling

Flammability:
Nitronox™ is non-flammable, but vigorously supports combustion of many materials which will not normally burn in air.
Nitronox™ may react violently with combustible materials.
Nitronox™ may react violently with reducing materials.
Nitronox™ violently oxidises organic material.
Store away from flammable products.
Never smoke or carry out hot work in Nitronox™ rich atmosphere.
Never wear clothing saturated with Nitronox™.
If involved in a fire the following toxic and or corrosive fumes may be produced by thermal decomposition: Nitric Oxide and Nitrogen Dioxide.

General:
Only experienced and properly instructed personnel should handle compressed gases. Use no oil or grease. Open valve slowly to avoid pressure shock. Cylinder contents and identification labels provided by the supplier must not be removed or defaced. Colour coding should not be the only criterion used for content identification.

Approved Handlers:
Approved handlers are required if more than 200 m^3 is stored on site.

Storage
Storage of compressed gas cylinders shall be in compliance with New Zealand HSNO Regulations.
Cylinders will be kept away from ignition sources (including static discharges).
Cylinders shall be stored in a cool, dry, well ventilated area out of direct sunlight and away from heat and ignition sources.
No part of cylinders shall be exposed to temperatures above 50°C.
Cylinders shall be stored upright on a level, fireproof floor, secured in position and protected from damage.
Full cylinders shall be stored separately from empties.
Cylinders should be moved by hand-truck or cart designed for that purpose.

Separation
Avoid any contact with oil or grease particularly to the cylinder valve.
Keep Nitronox™ cylinders a minimum of 3 meters away from ignition sources.
Keep Nitronox™ cylinders a minimum of 3 meters away from incompatible materials if less than 200m^3 of Nitronox™ is kept on site.
Keep Nitronox™ cylinders a minimum of 5 meters away from incompatible materials if more than 200m^3 of Nitronox™ is kept on site.

Spills and Disposal:
Ventilate area. Stop leak if it can be done without risk. Allow gas to dissipate to atmosphere. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Standards:
Work safe exposure standard TWA for nitrous oxide is 25 ppm.

Engineering Controls:
Do not allow backfeed into the cylinder. Use only properly specified equipment which is suitable for Nitronox™, its supply pressure and temperature.
Ensure that ventilation of area where nitrous oxide is being used is adequate to maintain the air-oxygen concentration at the normal 21%.

Personal Protection:
Do not smoke while handling this product. Personnel engaged in the movement of cylinders shall be provided with safety footwear, safety glasses and leather or PVC gloves. Full cover overalls are recommended. In areas where equipment failure may cause an immediate high concentration of Nitronox™, ensure adequate ventilation. Avoid oxygen rich (>21%) atmospheres.

Reference Guide:
Standard SNZ HB 76:2008 Dangerous Goods – Initial Emergency Response Guide.
AS/NZS 1337 – Eye Protection for Industrial Applications
AS/NZS 2161.1 – Occupational Protective Gloves – Selection, use and maintenance
AS/NZS 1715 – Selection, Use and Maintenance of Respiratory Protective Devices
AS/NZS 1716 – Respiratory Protective Devices

PHYSICAL AND CHEMICAL PROPERTIES

Where ranges are given, oxygen data is shown first followed by nitrous oxide data.

Physical Properties

Appearance:	Colourless, Sweetish Odour	Flashpoint:	Non Flammable
Boiling Point:	-183 – -88.47°C	Flammability Limits:	Non Flammable
Vapour Pressure:	Not Determined	Solubility in Water (at 0°C):	0.0489 – 1.37 m^3/kg

Other Properties

Relative Density (at 15°C) (Air = 1):	1.105 – 1.53	Density of Gas (101.3 kPa, 15°C):	1.354 – 1.874 kg/m^3
Molecular Weight:	32 – 44.013	Critical Temperature:	Not Determined

STABILITY AND REACTIVITY

Nitronox™ is non-flammable, but vigorously supports combustion of many materials which will not normally burn in air.
Nitronox™ may react violently with combustible materials.
Nitronox™ may react violently with reducing materials.
Nitronox™ violently oxidises organic material.
Store away from flammable products.
Never smoke or carry out hot work in Nitronox™ rich atmosphere.
Never wear clothing saturated with Nitronox™.
If involved in a fire the following toxic and or corrosive fumes may be produced by thermal decomposition:
Nitric Oxide and Nitrogen Dioxide.

Materials Compatibility:
May react violently with combustible materials.
Thermal decomposition of nitrous oxide yields toxic products which can be corrosive in the presence of moisture.
May react violently with reducing agents.
Nitronox™ violently oxidises organic material.
At temperatures over 575°C and at atmospheric pressure, nitrous oxide decomposes into nitrogen and oxygen. Pressurised nitrous oxide can also decompose at temperatures equal or greater than 300°C. In the presence of catalysts (e.g. halogen products, mercury, nickel, platinum) the rate of decomposition increases and decomposition can occur at even lower temperatures. Nitrous oxide dissociation is irreversible and exothermic, leading to a considerable rise in pressure.
Equipment to handle Nitronox™ must be constructed of suitable material. Copper and stainless steel are most commonly used.
Most lubricants are NOT compatible. All plastics are flammable in oxygen – minimise use.

TOXICOLOGY INFORMATION

Suspected of damaging fertility or the unborn child.
May cause damage to organs through prolonged or repeated exposure.

ECOLOGICAL INFORMATION

When discharged in large quantities may contribute to the greenhouse effect.
Global warming factor (CO_2=1): 310

DISPOSAL CONSIDERATIONS

To atmosphere in a well ventilated place. Do not discharge into any place where its accumulation could be dangerous.

TRANSPORT INFORMATION

UN Number: 3156
Proper Shipping Name: COMPRESSED GAS, OXIDISING, N.O.S (CONTAINS OXYGEN AND NITROUS OXIDE)
Dangerous Goods Class and Subsidiary Risk: 2.2 sub. 5.1
Packing Group: Not applicable
Hazchem Code: 2 S
Other Information: Avoid transport on vehicles where the load is not separated from the driver's compartment.
Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
Before transporting product containers:

- Ensure that containers are firmly secured.
- Ensure cylinder valve is closed and not leaking.
- Ensure there is adequate ventilation.
- Compliance with applicable regulations.
- Ensure separation from flammable products.

REGULATORY INFORMATION

ERMA Register Approval No: HSR002534

HSNO Controls: Compressed Gas Mixtures (Oxidising [5.1.2]) Group Standard 2006
Hazardous Substances and New Organisms Act 1996

Approved Handlers: Approved handlers are required if more than 200 m^3 is stored on site.

OTHER INFORMATION

Nitronox™ is supplied in high pressure cylinders.

Cylinder Colour: AS 2700 B 21 Ultramarine Body & Ultramarine and white shoulder quadrants

Cylinder Valve Outlet: AS 2473.3 Fig. 8

References:

. L'Air Liquide Gaz Encyclopaedia - Elsevier Scientific Publishing Co. Amsterdam
. NZS 5433:2007 Transport of Dangerous Goods on Land
. ERMA Website – Approvals Register – www.erma.govt.nz
. SNZ HB76:2008 Dangerous Goods – Initial Emergency Response Guide
. Air Liquide Group MSDS – Oxygen AL097A Rev. 1
. Air Liquide Group MSDS – Nitrous Oxide AL093A Rev. 1
. ISO 10156 Gases and Gas mixtures – Determination of Fire Potential and Oxidising Ability for the Selection of Cylinder Valve Outlets
. Air Liquide Australia "Oxygen" MSDS June 2008
. Air Liquide Australia "Nitrous Oxide" MSDS June 2008
. AS1678 2C1 Emergency Procedure Guide – Transport – Non-Flammable, Compressed Gas
. AS 4484-2004 - Gas Cylinders for Industrial, Scientific, medical and refrigerant use - labelling and colour coding
. AS 2473.3-2007 - Valves for compressed gas outlets - Part 3 Outlet connections for medical gases (including pin-indexed yoke connections)
. Operators Handbook for the Transport of Dangerous Goods by Road – NZ Road Transport & Logistics Industry Training Organisation
. ALNZ - Transport of Gas cylinders in Non-Dedicated Vehicles Customer Information Guide
. Work Place Exposure Standards Effective From 2002, Department of Labour, New Zealand
. NZCIC Code of Practice – Preparation of Safety Data Sheets

END MSDS

This MSDS summarises to our best knowledge, at the date of issue, the health and safety hazard information regarding this product and general guidance on how to safely handle the product in the workplace. All due care has been taken to include accurate and up-to-date information in this MSDS.

Each user should read this MSDS and consider the information in the context of how the product will be handled and used in the workplace in conjunction with other products. If clarification or further information is needed to ensure that an appropriate risk assessment can be made, the user should contact Air Liquide New Zealand.

As far as lawfully possible, no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this MSDS can be accepted.

Our responsibility for products sold is subject to our standard terms and conditions, a copy of which is available on request.

This MSDS has been prepared in accordance with NZCIC Code of Practice – Preparation of Safety Data Sheets.

This MSDS is subject to change without notice. For the latest version of this MSDS visit http://www.airliquide.com.au/en/technical/new-zealand-msds.html

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