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MATERIAL SAFETY DATA SHEET

Product Name:

**NITROUS OXIDE,
Compressed (N₂O)**

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IDENTIFICATION

Chemical Name:

Nitrous Oxide (N₂O)

Synonyms:

Laughing Gas, Nitrogen Monoxide

UN Number:

1070

Use: Medical Use, Base Anaesthetic.

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 all equipment in contact with nitrous oxide 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.
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.
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	100%

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 Nitrous Oxide may produce euphoria. Large doses mixed with air or oxygen induce anaesthesia. High concentrations inhaled for a few seconds may cause hysterical laughter or apparent intoxication.

Nitrous oxide, despite being an oxidiser, cannot replace oxygen in the human body. By diluting the oxygen concentration in air below the level necessary to support life; nitrous oxide can act as an asphyxiant. Effects of oxygen deficiency are:

- 16%: breathing and pulse rate increased, impaired thinking and attention, reduced coordination;
- 14%: Abnormal fatigue upon exertion, emotional upset, faulty coordination, poor judgement;
- 12.5%: Very poor judgement and coordination, impaired respiration that can cause permanent hearing damage, nausea and vomiting;
- below 10%: Inability to perform various movements, loss of consciousness, convulsions, and death.

First AidInhalation:

In high concentrations may cause headache, nausea and vomiting, which may lead to unconsciousness as well as asphyxiation. Symptoms of asphyxiation may include loss of mobility/consciousness. Remove victim to uncontaminated area whilst wearing self contained breathing apparatus. Victim may not be aware of asphyxiation. Keep victim warm and rested. Call a doctor. Prompt medical attention is mandatory in all cases of overexposure to nitrous oxide. Apply artificial respiration if breathing stopped.

Keep ignition sources away from patient and rescuers as nitrous oxide will saturate their clothing.

Advice to Doctor

Advise doctor that victim has been exposed to carbon dioxide and an oxygen deficient atmosphere.

General:

Rescuers should not enter an oxygen deficient atmosphere without using self-contained full face positive pressure breathing equipment.

FIRE FIGHTING MEASURES**Flammability:**

Nitrous oxide is non-flammable, but vigorously supports combustion of many materials which will not normally burn in air.

Nitrous oxide may react violently with combustible materials.

Nitrous oxide may react violently with reducing materials.

Nitrous oxide violently oxidises organic material.

Store away from flammable products.

Never smoke or carry out hot work in a nitrous oxide rich atmosphere.

Never wear clothing saturated with Nitrous oxide.

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. Nitrous Oxide vigorously supports combustion and may be supporting the combustion.

Hazchem Code:

2P

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 nitrous oxide, 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:**

Nitrous oxide is non-flammable, but vigorously supports combustion of many materials which will not normally burn in air.

Nitrous oxide may react violently with combustible materials.

Nitrous oxide may react violently with reducing materials.

Nitrous oxide violently oxidises organic material.

Store away from flammable products.

Never smoke or carry out hot work in a nitrous oxide rich atmosphere.

Never wear clothing saturated with Nitrous oxide.

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 m³ is stored on site.

Storage

Storage of compressed gas cylinders shall be in compliance with New Zealand HSNO Regulations.

Cylinder 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 nitrous oxide cylinders a minimum of 3 meters away from ignition sources.

Keep nitrous oxide cylinders a minimum of 3 meters away from incompatible materials if less than 200m³ of nitrous oxide is kept on site.

Keep nitrous oxide cylinders a minimum of 5 meters away from incompatible materials if more than 200m³ of nitrous oxide 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 nitrous oxide, 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. All personal protective equipment must be free from oil and grease.

In areas where equipment failure may cause an immediate high concentration of oxygen, ensure adequate ventilation.

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**Physical Properties**

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

Other Properties

Relative Density (at 15°C) (Air = 1):	1.53	Density of Gas (101.3 kPa, 15°C):	1.874 kg/m ³
Molecular Weight:	44.013	Critical Temperature:	36.41°C

STABILITY AND REACTIVITY**Flammability:**

Nitrous oxide is non-flammable, but vigorously supports combustion of many materials which will not normally burn in air.

Nitrous oxide may react violently with combustible materials.

Nitrous oxide may react violently with reducing materials.

Nitrous oxide violently oxidises organic material.

Store away from flammable products.

Never smoke or carry out hot work in a nitrous oxide rich atmosphere.

Never wear clothing saturated with Nitrous oxide.

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 yields toxic products which can be corrosive in the presence of moisture.

May react violently with reducing agents.

Violently oxidises organic material.

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

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 (CO₂=1): 310

DISPOSAL CONSIDERATIONS

To atmosphere in a well ventilated place. Discharge to atmosphere in large quantities should be avoided. Do not discharge into any place where its accumulation could be dangerous.

TRANSPORT INFORMATION

UN Number: 1070

Proper Shipping Name: NITROUS OXIDE

Dangerous Goods Class and Subsidiary Risk: 2.2 sub. 5.1

Packing Group: Not applicable

Hazchem Code: 2P

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:** HSR001065

HSNO Controls: Hazardous Substances (Classes 1 to 5 Controls) Regulations 2001.
Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001.
Hazardous Substances (Disposal) Regulations 2001.
Hazardous Substances (Personnel Qualifications) Regulations 2001.
Hazardous Substances (Emergency Management) Regulations 2001.
Hazardous Substances (Identification) Regulations 2001.
Hazardous Substances (Compressed Gases) Regulations 2004.
Hazardous Substances (Tank Wagon and Transportable Containers) Regulations 2004.
Schedule 12 of the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004.

Approved Handlers: Approved handlers are required if more than 250 kg is stored on site.

OTHER INFORMATION

Nitrous Oxide is supplied in high pressure cylinders.

Cylinder Colour: Medical: AS 2700 B21 Ultramarine
Cylinder Valve Outlet: Medical: AS 2472 Fig. 13

- 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.erna.govt.nz
 - . SNZ HB76:2008 Dangerous Goods – Initial Emergency Response Guide
 - . 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 "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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