Safety Data Sheet

MEDICAL NITROUS OXIDE, Compressed & Liquified Gas

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SDS reference: ALH612

Danger

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name	:	Medical Nitrous Oxide, EP Grade
SDS no	:	ALH612
Chemical description	:	Nitrous oxide CAS-No. : 10024-97-2
Chemical formula	:	N2O

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	:	Medical: General anaesthesia, Analgesia gas (with medical oxygen) used for pain relief.
Uses advised against	:	Do not intentionally inhale product due to the risk of asphyxiation. Do not intentionally inhale product due to the risk of narcotic effects. Uses other than those listed above are not supported; contact your supplier for more information on other uses.

1.3. Details of the supplier of the safety data sheet

Company identification	:	Air Liquide Healthcare Pty Limited Level 4, Suite 4 247 Coward Street MASCOT NSW 2020 Australia 1300 36 02 02 ALHEnquiries@AirLiquide.com

1.4. Emergency telephone number

Emergency telephone number	:	1800 812 588

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to WHS Regulation

Physical hazards	Oxidising Gases, Category 1	H270
	Gases under pressure : Liquefied gas	H280
Health hazards	Specific target organ toxicity – Single exposure, Category 3, Narcosis	H336

2.2. Label elements

Classification according to WHS Regulation

Hazard pictograms :

GHS03 GHS04 GHS07

Signal word : Danger

Hazard statements : H270 - May cause or intensify fire; oxidiser.
H280 - Contains gas under pressure; may explode if heated.
H336 - May cause drowsiness or dizziness.

Precautionary statements

- Prevention : P260 - Do not breathe gas, vapours.
P244 - Keep valves and fittings free from oil and grease.
P220 - Keep away from clothing and other combustible materials.
- Response : P304+P340+P315 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get immediate medical advice / attention.
P370+P376 - In case of fire: Stop leak if safe to do so.
- Storage : P403 - Store in a well-ventilated place.

2.3. Other hazards

: Contact with liquid may cause cold burns/frostbite.
The substance/mixture has no endocrine disrupting properties.

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	%	Classification according to WHS Regulation
Nitrous oxide	(CAS-No.) 10024-97-2	100	Ox. Gas 1, H270 Press. Gas (Liq.), H280 STOT SE 3, H336

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

Full text of R-phrases see section 16. Full text of H-statements see section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Perform cardiopulmonary resuscitation if breathing stopped.
- Skin contact : In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
- Ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

: In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination.
See section 11.

4.3. Indication of any immediate medical attention and special treatment needed

: Obtain medical assistance.

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Water spray or fog.
  Product does not burn, use fire control measures appropriate for the surrounding fire.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

Specific hazards : Exposure to fire may cause cylinders to rupture/explode.
Supports combustion.

Hazardous combustion products : If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition:
Nitric oxide/nitrogen dioxide.

5.3. Advice for fire-fighters

Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
If possible, stop flow of product.
Use water spray or fog to knock down fire fumes if possible.
Move cylinders away from the fire area if this can be done without risk.

Special protective equipment for fire fighters : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.
Standard EN 943-2: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Gas-tight chemical protective suits for emergency teams.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

Hazchem Code : 2P

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

No additional information available

6.2. Environmental precautions

: Try to stop release.

6.3. Methods and material for containment and cleaning up

: Ventilate area.

6.4. Reference to other sections

: See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safe use of the product	:	Use only lubricants and sealings approved for the specific gas service. The product must be handled in accordance with good industrial hygiene and safety procedures. Only experienced and properly instructed persons should handle gases under pressure. Consider pressure relief device(s) in gas installations. Ensure the complete gas system was (or is regularly) checked for leaks before use. Do not smoke while handling product. Keep equipment free from oil and grease. For more guidance, refer to the EIGA Doc. 33 - Cleaning of Equipment for Oxygen Service downloadable at http://www.eiga.eu. Use no oil or grease. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Avoid suck back of water, acid and alkalis. Do not breathe gas. Avoid release of product into atmosphere. For more guidance on safe use, refer to the EIGA Doc.176 “Safe practices for storage and handling of Nitrous oxide", downloadable at http://www.eiga.org.” and consult your supplier. Temperatures above 150°C shall be avoided by all practical means, to reduce the likelihood of an explosive decomposition of the nitrous oxide. Clean all surfaces in direct contact with nitrous oxide as for oxygen service. Nitrous oxide transfer pumps shall be provided with an interlock to prevent dry running. Use self-limiting heating devices. Direct contact electric immersion heaters are not allowed.
Safe handling of the gas cylinder	:	Refer to supplier's cylinder handling instructions. Do not allow backfeed into the cylinder. Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Leave valve protection caps in place until the cylinder has been secured against either a wall or bench or placed in a container stand and is ready for use. If user experiences any difficulty operating valve discontinue use and contact supplier. Never attempt to repair or modify cylinder valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Keep cylinder valve outlets clean and free from contaminants particularly oil and water. Replace valve outlet caps or plugs and cylinder caps where supplied as soon as cylinder is disconnected from equipment. Close cylinder valve after each use and when empty, even if still connected to equipment. Never attempt to transfer gases from one cylinder to another. Never use direct flame or electrical heating devices to raise the pressure of a cylinder. Do not remove or deface labels provided by the supplier for the identification of the content of the cylinder. Suck back of water into the cylinder must be prevented. Open valve slowly to avoid pressure shock.

7.2. Conditions for safe storage, including any incompatibilities

: Observe all regulations and local requirements regarding storage of cylinders.
Cylinders should not be stored in conditions likely to encourage corrosion.
Cylinder valve guards or caps should be in place.
Cylinders should be stored in the vertical position and properly secured to prevent them from falling over.
Stored cylinders should be periodically checked for general condition and leakage.
Keep cylinder below 50°C in a well ventilated place.
Segregate from flammable gases and other flammable materials in store.
Store cylinders in location free from fire risk and away from sources of heat and ignition.
Keep away from combustible materials.

7.3. Specific end use(s)

: None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

MEDICAL NITROUS OXIDE		
OEL : Occupational Exposure Limits		
Australia	OES TWA [1]	45 mg/m³

	OES TWA [2]	25 ppm

Nitrous oxide (10024-97-2)	
DNEL: Derived no effect level (Workers)	
Long-term - systemic effects, inhalation	183 mg/m³

PNEC (Predicted No-Effect Concentration) : No data available.

8.2. Exposure controls

8.2.1. Appropriate engineering controls

: Provide adequate general and local exhaust ventilation.
Product to be handled in a closed system.
Systems under pressure should be regularily checked for leakages.
Ensure exposure is below occupational exposure limits (where available).
Gas detectors should be used when oxidising gases may be released.
Consider the use of a work permit system e.g. for maintenance activities.

8.2.2. Individual protection measures, e.g. personal protective equipment

: A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered:
PPE compliant to the recommended Australian or EN/ISO standards should be selected.

• Eye/face protection : Wear goggles when transfilling or breaking transfer connections.
Standard EN 166 - Personal eye-protection - specifications; AS/NZS 1337.1 – Eye and face protectors for occupational applications.

• Skin protection

- Hand protection : Wear working gloves when handling gas cylinders.
Standard EN 388 - Protective gloves against mechanical risk, performance level 1 or higher; AS/NZS 2161.3 – Occupational protective gloves: Protection against mechanical risks
Wear cold insulating gloves when transfilling or breaking transfer connections.
Standard EN 511 - Cold insulating gloves.

- Other : Consider the use of flame resistant safety clothing.
Standard EN ISO 14116 - Limited flame spread materials.
Wear safety shoes while handling cylinders.
Standard EN ISO 20345 - Personal protective equipment - Safety footwear; AS/NZS 2210.1 – Safety, protective and occupational footwear: Guide to selection, care and use.

• Respiratory protection : Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
Consult respiratory device supplier´s product information for the selection of the appropriate device.
Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres.
Keep self contained breathing apparatus readily available for emergency use.
Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.

• Thermal hazards : None in addition to the above sections

8.2.3. Environmental exposure controls

: Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

- Physical state at 20°C / 101.3kPa : Gas.
- Colour : Colourless.

Odour : Sweetish. Poor warning properties at high concentrations.

Odour threshold	:	Odour threshold is subjective and inadequate to warn of overexposure.
pH value	:	Not applicable for gases and gas mixtures.
Molar mass	:	44 g/mol
Melting point	:	-90.81 °C
Boiling point	:	-88.5 °C
Flash point	:	Not applicable for gases and gas mixtures.
Critical temperature [°C]	:	36.4 °C
Evaporation rate (ether=1)	:	No data available
Flammability range	:	Non flammable.
Vapour pressure [20°C]	:	50.8 bar(a)
Vapour pressure [50°C]	:	Not applicable.
Relative density, gas (air=1)	:	1.5
Relative density, liquid (water=1)	:	1.2
Solubility in water	:	1500 mg/l
Partition coefficient n-octanol/water [log Kow]	:	0.4
Auto-ignition temperature	:	Non flammable.
Decomposition point [°C]	:	Not applicable.
Viscosity [20°C]	:	No reliable data available.
Explosive Properties	:	No data available
Oxidising Properties	:	Oxidiser.
- Coefficient of oxygen equivalency (Ci)	:	0.6

9.2. Other information

Other data	:	Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity

: No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

: Stable under normal conditions.
At temperatures over 575°C and at atmospheric pressure, nitrous oxide decomposes into nitrogen and oxygen.
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.

10.3. Possibility of hazardous reactions

: Violently oxidises organic material.

10.4. Conditions to avoid

: Avoid moisture in installation systems.

10.5. Incompatible materials

: Keep equipment free from oil and grease. For more guidance, refer to the EIGA Doc. 33 - Cleaning of Equipment for Oxygen Service downloadable at http://www.eiga.eu.
May react violently with combustible materials.
May react violently with reducing agents.
For additional information on compatibility refer to ISO 11114.

10.6. Hazardous decomposition products

: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Classification criteria are not met.

LC50 Inhalation - Rat [ppm]	500000 ppm/4h

Skin corrosion/irritation : No known effects from this product.

Serious eye damage/irritation : No known effects from this product.

Respiratory or skin sensitisation : No known effects from this product.

Germ cell mutagenicity : No known effects from this product.

Carcinogenicity : No known effects from this product.

Toxic for reproduction : Fertility : No known effects from this product.

Toxic for reproduction : unborn child : No known effects from this product.

STOT-single exposure : May cause drowsiness or dizziness.

STOT-repeated exposure : Hemotoxic effect.
Neurologic effect.
At low concentrations:

Target organ(s) : Central nervous system.
Erythrocytes.
Kidneys.
liver

Aspiration hazard : Not applicable for gases and gas mixtures.

Other information : Inhalation causes narcotic effects. The substance/mixture has no endocrine disrupting properties.

Neurological toxicity can occur after single exposure during general anaesthesia in patients having a deficiency of vitamin B12 or following frequent use of analgesia/anaesthesia in the context of occupational use.

Prolonged and frequent use causes inactivation of vitamin B12 and may result in megaloblastic bone marrow changes and possible myeloneuropathy and subacute combined degeneration of the spinal cord.

SECTION 12: Ecological information

12.1. Toxicity

Assessment : No ecological damage caused by this product.

12.2. Persistence and degradability

Assessment : Not applicable for inorganic products. Study scientifically unjustified.

12.3. Bioaccumulative potential

Assessment : Not expected to bioaccumulate due to the low log Kow (log Kow < 4). See section 9.

12.4. Mobility in soil

Assessment : Because of its high volatility, the product is unlikely to cause ground or water pollution. Partition into soil is unlikely.

12.5. Results of PBT and vPvB assessment

Assessment : Not classified as PBT or vPvB.

12.6. Other adverse effects

: No known effects from this product.

Effect on the ozone layer : No effect on the ozone layer.

Global warming potential [CO2=1] : 298

Effect on global warming : When discharged in large quantities may contribute to the greenhouse effect.
Contains greenhouse gas(es).

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Contact supplier if guidance is required.
May be vented 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.
Ensure that the emission levels from local regulations or operating permits are not exceeded.
Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at http://www.eiga.org for more guidance on suitable disposal methods.
Return unused product in original cylinder to supplier.

13.2. Additional information

: External treatment and disposal of waste should comply with applicable local and/or national regulations

SECTION 14: Transport information

14.1. UN number

UN-No. : 1070

14.2. UN proper shipping name

Transport by road/rail (ADG) : NITROUS OXIDE

Transport by air (ICAO-TI / IATA-DGR) : Nitrous oxide

Transport by sea (IMDG) : NITROUS OXIDE

14.3. Transport hazard class(es)

Labelling :

2.2 : Non-flammable, non-toxic gases
5.1 : Oxidizing substances

Transport by road/rail (ADG)

Class : 2
Hazchem Code : 2P
Hazard identification number : 25
Tunnel Restriction : C/E - Tank carriage : Passage forbidden through tunnels of category C, D and E. Other carriage : Passage forbidden through tunnels of category E

Transport by air (ICAO-TI / IATA-DGR)

Class / Div. (Sub. risk(s)) : 2.2 (5.1)

Transport by sea (IMDG)

Class / Div. (Sub. risk(s)) : 2.2 (5.1)
Emergency Schedule (EmS) - Fire : F-C
Emergency Schedule (EmS) - Spillage : S-W

14.4. Packing group

Transport by road/rail (ADR/RID) : Not applicable

Transport by air (ICAO-TI / IATA-DGR) : Not applicable

Transport by sea (IMDG) : Not applicable

14.5. Environmental hazards

Transport by road/rail (ADR/RID) : None.

Transport by air (ICAO-TI / IATA-DGR) : None.

Transport by sea (IMDG) : None.

14.6. Special precautions for user

No additional information availablePacking Instruction(s)

Transport by road/rail (ADR/RID) : P200

Transport by air (ICAO-TI / IATA-DGR)

Passenger and Cargo Aircraft : 200

Cargo Aircraft only : 200

Transport by sea (IMDG) : P200

Special transport precautions : Avoid transport on vehicles where the load space 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 there is adequate ventilation.
- Ensure that containers are firmly secured.
- Ensure valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.

Do not load or transport cylinders other than in accordance with load restraint guidelines and relevant road safety laws.

HAZCHEM CODE : 2P

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

: Not applicable.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Poison Schedule : Classified as a Schedule 4 (S4) Poison in accordance with the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP)

Therapeutic Goods : Registered prescription medicine on the Australian Register of Therapeutic Goods (ARTG ID 32752)

15.2. Chemical safety assessment

: A CSA has been carried out.

SECTION 16: Other information

Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010 and relevant work, health and safety regulations.

Abbreviations and acronyms : ATE - Acute Toxicity Estimate. CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008. REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006. EINECS - European Inventory of Existing Commercial Chemical Substances. CAS# - Chemical Abstract Service number. PPE - Personal Protection Equipment. LC50 - Lethal Concentration to 50 % of a test population. RMM - Risk Management Measures. PBT - Persistent, Bioaccumulative and Toxic. vPvB - Very Persistent and Very Bioaccumulative. STOT- SE : Specific Target Organ Toxicity - Single Exposure. CSA - Chemical Safety Assessment. EN - European Standard. UN - United Nations. ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road. IATA - International Air Transport Association. IMDG code - International Maritime Dangerous Goods. RID - Regulations concerning the International Carriage of Dangerous Goods by Rail. WGK - Water Hazard Class. STOT - RE : Specific Target Organ Toxicity - Repeated Exposure. UFI : Unique Formula Identifier.

Training advice : None.

Full text of H-statements

H270	May cause or intensify fire; oxidiser.
H280	Contains gas under pressure; may explode if heated.
H336	May cause drowsiness or dizziness.
Ox. Gas 1	Oxidising Gases, Category 1
Press. Gas (Liq.)	Gases under pressure : Liquefied gas
STOT SE 3	Specific target organ toxicity – Single exposure, Category 3, Narcosis

DISCLAIMER OF LIABILITY : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Details given in this document are believed to be correct at the time of going to press.
Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

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