

MEDICAL NITROUS OXIDE, Refrigerated Liquid (N2O)**ALH611****Danger****SECTION 1. Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Trade name : MEDICAL NITROUS OXIDE, Refrigerated Liquid (N2O)
SDS Nr : ALH611
Chemical formula : N2O

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

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.
Test gas / Calibration gas. Laboratory use Contact supplier for more uses information
Use : Medical applications.

1.3. Details of the supplier of the safety data sheet

Company identification : Air Liquide Healthcare Pty Limited
Unit 5, 476 Gardeners Road
Alexandria NSW 2015 Australia
Tel: +61 2 9364 7474
Fax: +61 2 8338 9797
ALAEquiries@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****Hazard Class and Category Code Regulation EC 1272/2008 (CLP)**

R Phrase(s) : R8 : Contact with combustible material may cause fire.
• Physical hazards : Gases under pressure - Refrigerated liquefied gas - Warning - (CLP : Press. Gas) - H281
Oxidizing liquids - Category 1 - Danger - (CLP : Ox. Liq. 1) - H271

Classification EC 67/548 or EC 1999/45

: O; R8

2.2. Label elements**Labelling Regulation EC 1272/2008 (CLP)**

• Hazard pictograms



• Hazard pictograms code : GHS03
• Signal word : Danger
• Hazard statements : H271 - May cause fire or explosion; strong oxidizer.
H281 - Contains refrigerated gas; may cause cryogenic burns or injury.
• Supplemental hazard information : Asphyxiant in high concentrations.
• Precautionary statements
- Prevention : P282 - Wear cold insulating gloves, face shield, eye protection.
P210 - Keep away from heat.

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SECTION 2. Hazards identification (continued)

- Response : P336+P315 - Thaw frosted parts with lukewarm water. Do no rub affected area. Get immediate medical advice / attention.
- Storage : P403 - Store in a well-ventilated place.

2.3. Other hazards

: Asphyxiant in high concentrations.

SECTION 3. Composition/information on ingredients

3.1. Substance / 3.2. Mixture

Substance.

Substance name	Contents	CAS No	EC No	Annex No	Classification
Nitrous oxide (refrigerated)	: 100 %	10024-97-2	233-032-0	-----	* 2 O; R8 ----- Ox. Gas 1 (H270) Press. Gas (H281)

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

* 1: Listed in Annex IV / V REACH, exempted from registration.

* 2: Registration deadline not expired.

* 3: Registration not required: Substance manufactured or imported < 1t/y

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

SECTION 4. First aid measures

4.1. Description of first aid measures

First aid measures

- Inhalation : In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/ consciousness. Victim may not be aware of asphyxiation. 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.
- Skin/eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.
- Skin contact : Refrigerated liquefied gas. Contact with product may cause cold burns or frostbite.
- Eye contact : Direct contact with liquefied gas may cause severe and possibly permanent eye injury due to frostbite from rapid liquid evaporation.
- Ingestion : Ingestion is not considered a potential route of exposure.

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

: Refer to section 11.

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

: None.

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SECTION 5. Fire-fighting measures
5.1. Extinguishing media
Extinguishing media

- Suitable extinguishing media : All known extinguishants can be used.

5.2. Special hazards arising from the substance or mixture
Specific hazards : Exposure to fire may cause containers 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 : Coordinate fire measure to the surrounding fire. Cool endangered containers with water spray jet from a protected position. Do not empty contaminated fire water into drains.
If possible, stop flow of product.
Move away from the container and cool with water from a protected position.
If leaking do not spray water onto container. Water surrounding area (from protected position) to contain fire.

Special protective equipment for fire fighters : Use self-contained breathing apparatus and chemically protective clothing.

SECTION 6. Accidental release measures
6.1. Personal precautions, protective equipment and emergency procedures
Personal precautions : Try to stop release.
: Evacuate area.
Ensure adequate air ventilation.
Eliminate ignition sources.
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Use protective clothing.

6.2. Environmental precautions

 : None.
: Try to stop release.
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3. Methods and material for containment and cleaning up
Clean up methods : None.
: Ventilate area.
Keep area evacuated and free from ignition sources until any spilled liquid has evaporated. (Ground free from frost).

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 properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
Only experienced and properly instructed persons should handle gases under pressure.
The product must be handled in accordance with good industrial hygiene and safety procedures.
Do not smoke while handling product.
Ensure the complete gas system was (or is regularly) checked for leaks before use.

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SECTION 7. Handling and storage (continued)

- Safe handling of the gas receptacle** :
- Refer to supplier's container handling instructions.
 - Do not allow backfeed into the container.
 - 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 container 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 cylinder valve discontinue use and contact supplier.
 - Never attempt to repair or modify container valves or safety relief devices.
 - Damaged valves should be reported immediately to the supplier.
 - Keep container valve outlets clean and free from contaminants particularly oil and water.
 - Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
 - Close container valve after each use and when empty, even if still connected to equipment.
 - Never attempt to transfer gases from one cylinder/container to another.
 - Never use direct flame or electrical heating devices to raise the pressure of a container.
 - Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.
- Handling** :
- Use no oil or grease.
 - Open valve slowly to avoid pressure shock.
 - Suck back of water into the container must be prevented.
 - Do not allow backfeed into the container.
 - Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
 - Keep away from ignition sources (including static discharges).
 - Refer to supplier's container handling instructions.

7.2. Conditions for safe storage, including any incompatibilities

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

7.3. Specific end use(s)

: None.

SECTION 8. Exposure controls/personal protection
8.1. Control parameters
Occupational Exposure Limits
Nitrous oxide (refrigerated)

- : Value 15min. (CZ) [mg/m³] : 360
- : Value 8h (CZ) [mg/m³] : 180
- : MAK (AU) Tagesmittelwert (ml/m³) : 100
- : MAK (AU) Kurzzeitwerte (mg/m³) : 720
- : MAK (AU) Tagesmittelwert (mg/m³) : 180
- : MAK (AU) Kurzzeitwerte (ml/m³) : 400
- : TLV© - TWA [ppm] : 50
- : LTEL - UK [mg/m³] : 183
- : LTEL - UK [ppm] : 100
- : AGW (8h) - Germany [mg/m³] TRGS 900 : 180
- : AGW (8h) - Germany [ppm] TRGS 900 : 100

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SECTION 8. Exposure controls/personal protection (continued)

	: VLA-ED - Spain [ppm] : 50
	: VLA-ED - Spain [mg/m ³] : 92
	: NGV - [ppm] : 100
	: NGV - [mg/m ³] : 180
	: KTV - [ppm] : 500
	: KTV - [mg/m ³] : 500
	: Grænserværdier (DK) (ppm) : 50
	: HTP-värden (FI) - 8 H - [ppm] : 100
	: HTP-värden (FI) - 8 H - [mg/m ³] : 180
	: Grænserværdier (DK) : 90
	: GV Value Limit (Norway) [ppm] : 50
	: GV Value Limit (Norway) [mg/m ³] : 90
	: TLV-TWA (Belgium) (ppm) : 50

DNEL: Derived no effect level : None available.

PNEC: Predicted no effect concentration : None available.

8.2. Exposure controls

8.2.1. Appropriate engineering controls	: Systems under pressure should be regularly checked for leakages. Provide adequate general and local exhaust ventilation. Consider 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. Wear safety glasses with side shields Wear leather safety gloves and safety shoes when handling cylinders.
Personal protection	: Do not smoke while handling product. Ensure adequate ventilation. Protect eyes, face and skin from liquid splashes.
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 liquid.
Odour	: Sweetish. Poor warning properties at high concentrations.
Odour threshold	: Odour threshold is subjective and inadequate to warn for overexposure.
pH value	: Not applicable for gases and gas-mixtures.
Molar mass [g/mol]	: 44
Melting point [°C]	: -90.81
Boiling point [°C]	: -88.5
Critical temperature [°C]	: 36.4
Flash point [°C]	: Not applicable for gases and gas-mixtures.
Evaporation rate (ether=1)	: Not applicable for gases and gas-mixtures.
Flammability range [vol% in air]	: Oxidiser.
Vapour pressure [20°C]	: 50.8 bar Not applicable.
Relative density, gas (air=1)	: 1.5

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Relative density, liquid (water=1)	: 1.2
Solubility in water [mg/l]	: 2.2
Partition coefficient n-octanol/water	: Not applicable for gases and gas-mixtures.
Auto-ignition temperature [°C]	: Not applicable.
Viscosity at 20°C [mPa.s]	: Not applicable.
Explosive Properties	: Not applicable.

9.2. Other information

Other data	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.
Molecular weight	: 44

SECTION 10. Stability and reactivity**10.1. Reactivity**

Stability and reactivity	: No reactivity hazard other than the effects described in sub-sections below. : May react violently with combustible materials. : May react violently with reducing agents. : Violently oxidises organic material. : Thermal decomposition yields toxic products which can be corrosive in the presence of moisture. 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. : Liquid spillages can cause embrittlement of structural materials.
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10.2. Chemical stability

: Stable under normal conditions.

10.3. Possibility of hazardous reactions

: Avoid oil, grease and all other combustible materials.

10.4. Conditions to avoid

: Avoid oil, grease and all other combustible materials.

10.5. Incompatible materials: Avoid oil, grease and all other combustible materials.
: Accelerate violently the burning of other combustible materials.**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**

Toxicity information	: No known toxicological effects from this product.
Acute toxicity	: No known toxicological effects from this product.
Rat inhalation LC50 [ppm/4h]	: No data available.
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.
Carcinogenicity	: No known effects from this product.

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SECTION 11. Toxicological information (continued)

Germ cell mutagenicity	: 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	: No known effects from this product.
STOT-repeated exposure	: No known effects from this product.
Aspiration hazard	: Not applicable for gases and gas-mixtures.

SECTION 12. Ecological information
12.1. Toxicity

: No data available.

12.2. Persistence - degradability

: No data available.

12.3. Bioaccumulative potential

: No data available.

12.4. Mobility in soil

: No data available.

12.5. Results of PBT and vPvB assessment

: No data available.

12.6. Other adverse effects

Ecological effects information	: Can cause frost damage to vegetation. When discharged in large quantities may contribute to the greenhouse effect.
Global warming potential [CO2=1]	: 296

SECTION 13. Disposal considerations
13.1. Waste treatment methods

	: May be vented to atmosphere in a well ventilated place. Do not discharge into any place where its accumulation could be dangerous. Refer to the code of practice of EIGA (Doc. 30/10 "Disposal of Gases, downloadable at http://www.eiga.org) for more guidance on suitable disposal methods Contact supplier if guidance is required.
General	: May be vented to atmosphere in a well ventilated place. Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required. Discharge to atmosphere in large quantities should be avoided.

13.2. Additional information

: None.

SECTION 14. Transport information

UN number	: 2201
Labelling ADR, IMDG, IATA	


 : 2.2 : Non flammable, non toxic gas.
5.1 : Oxidizing substances.

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SECTION 14. Transport information (continued)
Land transport (ADR/RID)

H.I. nr : 225
UN proper shipping name : NITROUS OXIDE, REFRIGERATED LIQUID
Transport hazard class(es) : 2
Classification code : 3 O
Packing Instruction(s) : P203
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
HAZCHEM - Emergency Action Code : 2P
 2 = Fine water spray.
 P = Risk of violent reaction or explosion. Recommended personal protective equipment : Liquid-tight chemical protective clothing and breathing apparatus. Appropriate measures : dilute.

Sea transport (IMDG)

Proper shipping name : NITROUS OXIDE, REFRIGERATED LIQUID
Class : 2.2
Emergency Schedule (EmS) - Fire : F-C
Emergency Schedule (EmS) - Spillage : S-W
Packing instruction : P203

Air transport (ICAO-TI / IATA-DGR)

Proper shipping name (IATA) : NITROUS OXIDE, REFRIGERATED LIQUID
Class : 2.2
Passenger and Cargo Aircraft : DO NOT LOAD IN PASSENGER AIRCRAFT.
Cargo Aircraft only : FORBIDDEN.

Special precautions for user

: 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 cylinder 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.

- IMO-IMDG code

- ICAO/IATA

Other transport information

: 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 that containers are firmly secured.
- Ensure cylinder 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.
- Ensure there is adequate ventilation.
- Compliance with applicable regulations.

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SECTION 15. Regulatory information
15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
EU legislation
Seveso directive 96/82/EC : Not covered.

National legislation

: Ensure all national/local regulations are observed.

15.2. Chemical Safety Assessment

: A CSA does not need to be carried out for this product.

SECTION 16. Other information

Indication of changes	: Revised safety data sheet in accordance with commission regulation (EU) No 453/2010
Training advice	: Asphyxiant in high concentrations. Receptacle under pressure. May cause frostbite. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Ensure all national/local regulations are observed. Receptacle under pressure.
List of full text of R-phrases in section 3.	: R8 : Contact with combustible material may cause fire.
List of full text of H-statements in section 3.	: H270 - May cause or intensify fire; oxidizer. H281 - Contains refrigerated gas; may cause cryogenic burns or injury.
Further information	: Classification in accordance with calculation methods of regulation (EC) 1272/2008 CLP / (EC) 1999/45 DPD. This Safety Data Sheet has been established in accordance with the applicable European Union legislation.
Note	: This Safety Data Sheet has been established in accordance with the applicable European Union legislation.
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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