



Nitrous oxide

SDS No.: HKO-008L

Revision date: 17/11/2022

Version no.: 03

SECTION 1: Identification of the substance or mixture and of the company

1.1 Product Identifier

Product name	:	Nitrous oxide
Chemical name	:	Dinitrogen oxide
Chemical formula	:	N ₂ O
CAS no.	:	10024-97-2

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

Identified uses	:	Industrial and professional. Medical use. Aerosol propellant. Calibration gas for analytical equipment electronic industry Formulation of mixtures with gas in pressure receptacles. Refrigerant. Use as pressure gas in airbags. Using gas as feedstock in chemical processes. Exempt from registration requirements. Use of gas to manufacture pharmaceutical products. It is the responsibility of the end user to ensure that the product as supplied is suitable for its intended use.
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1.3 Details of the supplier of the safety data sheet

Supplier name	:	Linde HKO Limited
Address	:	12 Chun Yat Street, Tseung Kwan O Industrial Estate, Tseung Kwan O, Kowloon, Hong Kong
Phone no.	:	(852) 2372-2288
Fax no.	:	(852) 2372-2508

1.3 Emergency telephone number

Emergency no.	:	(852) 2661 0920 (24 hours)
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SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

Oxidising gases (Category 1)	: H270: May cause or intensify fire; oxidizer.
Gases under pressure (Liquefied gas)	: H280: Contains gas under pressure; may explode if heated.
Specific Target Organ Toxicity - Single Exposure (Category 3)	: H336: May cause drowsiness or dizziness.

2.2 Label Elements

Pictograms

:



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

General

: None

Prevention

: P220: Keep away from clothing and other combustible materials.
 : P244: Keep valves and fittings free from oil and grease.
 : P260: Do not breathe gas/vapours.

Response

: P304+P340+P315: IF INHALED: Remove person to fresh air and keep 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.

Disposal

: None

2.3 Other hazards

Contact with evaporating liquid may cause frostbite or freezing of skin.



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SECTION 3: Composition/ information on ingredients

3.1 Substances

Chemical name	:	Dinitrogen oxide
Chemical formula	:	N ₂ O
CAS no.	:	10024-97-2
EC no.	:	233-032-0
INDEX no.	:	----
REACH registration number	:	01-2119970538-25-0002, UK-01-7329405658-2-0001

Ingredient(s)	CAS No.	EC no.	Purity
Dinitrogen oxide	10024-97-2	233-032-0	≥98.0%

3.2 Mixtures

Not Applicable

SECTION 4: First Aid Measures

4.1 Description of first aid measures

Inhalation	:	Move the exposed person to fresh air at once. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
Eye contact	:	Rinse the eye with water immediately. Remove contact lenses, if present and easy to do. Continue rinsing. Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance. If medical assistance is not immediately available, flush an additional 15 minutes.
Skin Contact	:	Contact with evaporating liquid may cause frostbite or freezing of skin.
Ingestion	:	Ingestion is not considered a potential route of exposure.

4.2 Most important symptoms and effects, both acute and delayed

Continuous inhalation of concentrations higher than 75% may cause nausea, dizziness, respiratory difficulty and convulsion. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.



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4.3 Immediate medical attention and special treatment needed

Continuous inhalation of concentrations higher than 75% may cause nausea, dizziness, respiratory difficulty and convulsion. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.

Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

SECTION 5: Firefighting Measures

5.1 Extinguishing media

Suitable extinguishing media : Water Spray or Fog Dry powder. Foam. Carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Non flammable - oxidising agent. Supports combustion and may cause fire/explosion in contact with incompatible substances, strong acids, reducing agents, combustibles and flammables.

Hazardous Combustion Products : If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Nitrogen monoxide ; nitrogen dioxide.

5.3 Advice for firefighters

Special fire fighting procedures : In case of fire, stop leak if safe to do so. Continue water spray from protected position until container stays cool. Use extinguishants to contain the fire. Isolate the source of the fire or let it burn out.

Special protective equipment for firefighters : Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and Self-Contained Breathing Apparatus (SCBA).

SECTION 6: Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Evacuate area. In case of leakage, eliminate all ignition sources. Provide adequate ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Monitor the concentration of the released product.

6.2 Environmental Precautions

Prevent further leakage or spillage if safe to do so.



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6.3 Methods and material for containment and cleaning up

Provide adequate ventilation.

6.4 Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and Storage

7.1 Precautions for safe handling

Only experienced and properly instructed persons should handle gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Keep equipment free from oil and grease. Open valve slowly to avoid pressure shock. Use only oxygen approved lubricants and sealants. Use only with equipment cleaned for oxygen service and rated for the pressure. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Secure cylinders in an upright position at all times, close all valves when not in use. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid suckback of water, acid and alkalis. Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with local/regional/national/international regulations. Never use direct flame or electrical heating devices to raise the pressure of a container. 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. Damaged valves should be reported immediately to the supplier. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminants particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container to another. Container valve guards or caps should be in place.

7.2 Conditions for safe storage, including any incompatibilities

Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions 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



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material. Avoid asphalted locations for storage, transfer and use (ignition risk if spilt). Segregate from flammable gases and other flammable materials being stored.

7.3 Specific end uses

None

SECTION 8: Exposure Controls/Personal Protection

8.1 Control parameters

- Occupational Exposure Limits : 50 ppm (8 hour TWA)
 Source: Code of Practice on Control of Air Impurities (Chemical Substances) in the Workplace. (Published by the Labour Department, Hong Kong)
- Biological limits : No biological limits have been established for this product.

8.2 Exposure controls

- Appropriate engineering controls : Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Gas detectors should be used when quantities of oxidising gases may be released. Systems under pressure should be regularly checked for leakages. Preferably use permanent leak tight connections (eg. welded pipes). Do not eat, drink or smoke when using the product. Heat and impact sensitive - impact or heating can cause decomposition.

Individual protection measures, such as personal protective equipment.

- Eye protection : Wear safety glasses.
- Hand Protection : Wear leather or insulated gloves.
- Body protection : Wear safety boots.
- Respiratory Protection : Where an inhalation risk exists, wear a Type NO (Nitrogen Oxides) respirator. At high vapour levels, wear Self Contained Breathing Apparatus (SCBA) or an Air-line respirator.



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SECTION 9: Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	: Gas
Form	: Liquefied gas
Colour	: Colorless
Odour	: Slightly sweetish odor
Odour Threshold	: No data available.
pH	: No data available.
Melting Point	: -90.81 °C
Boiling Point	: -88.5 °C (1,013 hPa)
Sublimation Point	: No data available.
Critical Temp. (°C)	: 36.4 °C
Flash Point	: No data available.
Evaporation Rate	: No data available.
Flammability (solid, gas)	: This product is not flammable
Flammability limit - upper (%)	: No data available.
Flammability limit - lower (%)	: No data available.
Vapour pressure	: 5,719.51 kPa (25 °C)
Vapour density (air=1)	: 1.53 AIR=1
Relative density	: 1.226 (-89 °C)
Solubility (in Water)	: 1.5 g/l (15 °C)
Partition coefficient (n-octanol/water)	: 0.36
Autoignition Temperature	: No data available.
Decomposition Temperature	: 575 °C
Viscosity	
Kinematic viscosity	: No data available.
Dynamic viscosity	: 0.014 mPa.s (25 °C)
Explosive properties	: No data available.
Oxidising Properties	: Oxidising

9.2 Other information

Additional information : Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level.



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SECTION 10: Stability and Reactivity

10.1 Reactivity

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

10.2 Chemical Stability

Stable under normal conditions. At temperatures above 575°C and at atmospheric pressure, nitrous oxide decomposes into nitrogen and oxygen. Pressurised nitrous oxide can also decompose at temperatures equal to or greater than 300°C.

10.3 Possibility of Hazardous Reactions

Violently oxidises organic material. May react violently with combustible materials. May react violently with reducing agents.

10.4 Conditions to Avoid

Heat.

10.5 Incompatible Materials

May react violently with combustible materials. May react violently with reducing agents. Combustible materials
Catalyst. Reducing Agents. Organic material.

10.6 Hazardous decomposition products

Thermal decomposition yields toxic products which can be corrosive in the presence of moisture. Under normal conditions of storage and use, hazardous decomposition products should not be produced. If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Nitrogen oxides.



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SECTION 11: Toxicological Information

11.1 Information on toxicological effects

Acute toxicity	
Oral	: Based on available data, the classification criteria are not met.
Inhalation	: Based on available data, the classification criteria are not met. LC 50 (Rat): 1068 mg/m ³
Dermal	: Based on available data, the classification criteria are not met.
Skin Corrosion/Irritation	: Based on available data, the classification criteria are not met.
Serious Eye Damage/Eye Irritation	: Based on available data, the classification criteria are not met.
Respiratory or Skin Sensitisation	: Based on available data, the classification criteria are not met.
Germ Cell Mutagenicity	: Based on available data, the classification criteria are not met.
Carcinogenicity	: Based on available data, the classification criteria are not met.
Reproductive toxicity	: Reduced fertility in healthcare personnel has been reported where they have been repeatedly exposed to levels of nitrous oxide above the specified occupational exposure limits in inadequately ventilated rooms. There is no documented evidence to confirm or exclude the existence of any causal connection between these cases and exposure to nitrous oxide.
Specific Target Organ Toxicity	
Single Exposure	: Asphyxiant - anaesthetic. May have short term effects on the central nervous system, including drowsiness, dizziness, euphoria and anxiolytic and analgesic effects.
Repeated Exposure	: Chronic exposure to nitrous oxide can result in some symptoms of pernicious anaemia: Megaloblastic bone-marrow depression or peripheral and central neuropathy (tingling, numbness, impairment of equilibrium, difficulty in thinking clearly).
Aspiration Hazard	: Not applicable to gases and gas mixtures.



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SECTION 12: Ecological Information

12.1 Toxicity

No ecological damage caused by this product.

12.2 Persistence and Degradability

Not applicable.

12.3 Bioaccumulative Potential

The subject product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

12.4 Mobility in Soil

Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5 Other Adverse Effects

Contains greenhouse gas(es). When discharged in large quantities may contribute to the greenhouse effect.

SECTION 13: Disposal Considerations

13.1 Waste treatment methods

Disposal method : Do not discharge into any place where its accumulation could be dangerous. Cylinders should be returned to the supplier for disposal of contents.



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SECTION 14: Transport Information

ADR/RID

14.1 UN Number	:	UN 1070
14.2 UN proper shipping name	:	NITROUS OXIDE
14.3 Transport Hazard Class(es)		
Class	:	2
Label(s)	:	2.2: Non-flammable, non-toxic gases 5.1: Oxidizing substances
Classification Code	:	20
Hazard No.	:	25
14.4 Packaging group	:	None
14.5 Environmental hazards	:	Not Applicable
14.6 Special precautions for user	:	None

IMDG

14.1 UN Number	:	UN 1070
14.2 UN proper shipping name	:	NITROUS OXIDE
14.3 Transport Hazard Class(es)		
Class	:	2.2
Label(s)	:	2.2: Non-flammable, non-toxic gases 5.1: Oxidizing substances
14.4 Packaging group	:	None
14.5 Environmental hazards	:	Not Applicable
14.6 Special precautions for user	:	None

IATA

14.1 UN Number	:	UN 1070
14.2 UN proper shipping name	:	NITROUS OXIDE
14.3 Transport Hazard Class(es)		
Class	:	2.2
Label(s)	:	2.2: Non-flammable, non-toxic gases 5.1: Oxidizing substances
14.4 Packaging group	:	None
14.5 Environmental hazards	:	Not Applicable
14.6 Special precautions for user	:	None



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Other information

- Passenger and cargo aircraft : Allowed
 Cargo aircraft only : Allowed

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

Not Applicable

14.8 Additional information

- 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 that they are firmly secured. Ensure that the container valve is closed and not leaking. Container valve guards or caps should be in place. Ensure adequate air ventilation.

SECTION 15: Regulatory information

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

- Local legislation : Dangerous Goods Ordinance (Chapter 295)

SECTION 16: Other Information

- Other information : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. 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.
- Revision date : 17/11/2022
- Disclaimer : The above information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

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