Nitrous Oxide

Safety Data Sheet 900027

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SECTION 1: Identification

1.1. Identification

Product form	:	Substance
Substance name	:	Nitrous Oxide
Chemical name	:	Nitrous Oxide
CAS-No.	:	10024-97-2
Product code	:	SG-1001-00717
Formula	:	N2O

1.2. Recommended use and restrictions on use

Use of the substance/mixture	:	Medical or Laboratory Purposes

1.3. Supplier

Air Liquide USA LLC and its affiliates
9811 Katy Freeway, Suite 100
Houston, TX 77024 - USA
T 1-800-819-1704
www.us.airliquide.com

1.4. Emergency telephone number

Emergency number	:	Chemtrec: 1-800-424-9300

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Oxidizing 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

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS03 GHS04 GHS07

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) :
H270 - May cause or intensify fire; oxidizer
H280 - Contains gas under pressure; may explode if heated
H336 - May cause drowsiness or dizziness
OSHA-H01 - May displace oxygen and cause rapid suffocation
CGA-HG01 - May cause frostbite

Precautionary statements (GHS-US) :
P202 - Do not handle until all safety precautions have been read and understood.
P220 - Keep/Store away from clothing, Combustible materials
P261 - Avoid breathing gas.
P262 - Do not get in eyes, on skin, or on clothing.
P271 - Use only outdoors or in a well-ventilated area.
P315 - Get immediate medical advice/attention.
P403 - Store in a well-ventilated place.
P405 - Store locked up.
P501 - Dispose of contents/container in accordance with local/regional/national/international regulations
P244 - Keep reduction valves/valves and fittings free from oil and grease
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P312 - Call a doctor if you feel unwell

P370+P376 - In case of fire: Stop leak if safe to do so.
P302+P336 - If on skin: Thaw frosted parts with lukewarm water. Do not rub affected area
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C/125 °F
CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG06 - Close valve after each use and when empty
CGA-PG10 - Use only with equipment rated for cylinder pressure
CGA-PG14 - Approach suspected leak area with caution
CGA-PG20 - Use only with equipment of compatible materials of construction and rated for cylinder pressure
CGA-PG21 - Open valve slowly
CGA-PG22 - Use only with equipment cleaned for oxygen service

2.3. Other hazards which do not result in classification

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Substance type : Mono-constituent
Name : Nitrous Oxide
CAS-No. : 10024-97-2

Name	Product identifier	%	GHS-US classification
Nitrous oxide	(CAS-No.) 10024-97-2	> 99	Ox. Gas 1, H270 Press. Gas (Liq.), H280 STOT SE 3, H336

Full text of hazard classes and H-statements : see section 16

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.
First-aid measures after skin contact : Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.
First-aid measures after eye contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Consult an eye specialist.
First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects after inhalation : May displace oxygen and cause rapid suffocation. May cause drowsiness or dizziness.
Symptoms/effects after skin contact : Contact with the liquefied gas may cause frostbite.
Symptoms/effects after eye contact : Contact with the product may cause cold burns or frostbite.
Symptoms/effects after ingestion : Ingestion is not considered a potential route of exposure.
Symptoms/effects upon intravenous administration : Not known.
Chronic symptoms : None known.
Most important symptoms and effects, both acute and delayed : Refer to section 11.

4.3. Immediate medical attention and special treatment, if necessary

If breathing is difficult, give oxygen. Obtain medical attention if breathing difficulty persists.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.
Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Specific hazards arising from the chemical

Fire hazard : The product is not flammable.

Explosion hazard	:	Product is not explosive. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.
Reactivity	:	None known.
Hazardous combustion products	:	None known

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions	:	In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.
Protection during firefighting	:	Standard protective clothing and equipment (e.g, Self Contained Breathing Apparatus) for fire fighters. Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Ensure adequate ventilation.

6.1.1. For non-emergency personnel

Protective equipment	:	Wear protective equipment consistent with the site emergency plan.
Emergency procedures	:	Evacuate personnel to a safe area. Close doors and windows of adjacent premises. Keep containers closed. Mark the danger area. Seal off low-lying areas. Keep upwind.

6.1.2. For emergency responders

Protective equipment	:	Standard protective clothing and equipment (e.g, Self Contained Breathing Apparatus) for fire fighters. Equip cleanup crew with proper protection.
Emergency procedures	:	Evacuate and limit access. Ventilate area.

6.2. Environmental precautions

Try to stop release if without risk.

6.3. Methods and material for containment and cleaning up

For containment	:	Try to stop release if without risk.
Methods for cleaning up	:	Dispose of contents/container in accordance with local/regional/national/international regulations.
Methods and material for containment and cleaning up	:	None.

6.4. Reference to other sections

See also Sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed	:	Pressurized container: Do not pierce or burn, even after use. Use only with equipment rated for cylinder pressure.
Precautions for safe handling	:	Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area.
Hygiene measures	:	Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	:	Comply with applicable regulations.
Storage conditions	:	Store locked up. Do not expose to temperatures exceeding 52 °C/ 125 °F. Keep container closed when not in use. Protect cylinders from physical damage; do not drag, roll, slide or drop. Store in well ventilated area.
Incompatible products	:	None known.
Incompatible materials	:	Flammable materials. Reducing agents. Combustible materials.
Conditions for safe storage, including any incompatibilities	:	Observe all regulations and local requirements regarding storage of containers. Containers should not be stored in conditions likely to encourage corrosion. Container valve guards or caps should be in place. Containers should be stored in the vertical position and properly secured to prevent them from falling over. Stored containers should be periodically checked for general condition and leakage. Keep container below 50°C in a well ventilated place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible materials.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Nitrous oxide (10024-97-2)		
ACGIH	ACGIH TWA (ppm)	50 ppm
NIOSH	NIOSH REL (TWA) (mg/m³)	46 mg/m³ (over the time exposed to waste anesthetic gas)
NIOSH	NIOSH REL (TWA) (ppm)	25 ppm (over the time exposed to waste anesthetic gas)

8.2. Appropriate engineering controls

Appropriate engineering controls : Ensure exposure is below occupational exposure limits (where available). Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Oxygen detectors should be used when asphyxiating gases may be released. Consider the use of a work permit system e.g. for maintenance activities.

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

8.3. Individual protection measures/Personal protective equipment

Hand protection:

Wear working gloves when handling gas containers. 29 CFR 1910.138: Hand protection

Eye protection:

Wear safety glasses with side shields. 29 CFR 1910.133: Eye and Face Protection

Skin and body protection:

Wear suitable protective clothing, e.g. lab coats, coveralls or flame resistant clothing.

Respiratory protection:

None necessary during normal and routine operations.

Thermal hazard protection:

None necessary.

Other information:

Wear safety shoes while handling containers. 29 CFR 1910.136: Foot Protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Gas

Appearance : Clear, colorless gas.

Color : Colorless

Odor : Slightly sweet

Odor threshold : No data available

pH : No data available

Melting point : -90.81 °C

Freezing point : -90.81 °C

Boiling point : -87.45 °C

Critical temperature : 37.45 °C

Critical pressure : 7255 kPa

Flash point : No data available

Relative evaporation rate (butyl acetate=1) : No data available

Flammability (solid, gas) : See Section 2.1 and 2.2
Non flammable. May cause or intensify fire; oxidizer.

Vapor pressure	:	30350.983591357 mbar
Relative vapor density at 20 °C	:	1.53
Relative density	:	1.2
Specific gravity / density	:	1.977 g/l
Molecular mass	:	44.013 g/mol
Relative gas density	:	1.5
Solubility	:	Water: 0.1 %
Log Pow	:	Not applicable for gas-mixtures. Not applicable for gas-mixtures.
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity, kinematic	:	Not applicable.
Viscosity, dynamic	:	Not applicable.
Explosion limits	:	Not applicable - not flammable
Explosive properties	:	Not flammable.
Oxidizing properties	:	Not combustible but enhances combustion of other substances. May intensify fire. Oxidizer.
Ci	:	0.6

9.2. Other information

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

SECTION 10: Stability and reactivity

10.1. Reactivity

None known.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

May react violently with reducing agents.

10.4. Conditions to avoid

Refer to Section 10 on Incompatible Materials.

10.5. Incompatible materials

Flammable materials. Reducing agents. Combustible materials.

10.6. Hazardous decomposition products

Nitrous oxide explosively decomposes at elevated temperatures (above 1200 deg. F, 650 deg. C) into nitrogen and oxygen.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure	:	Inhalation; Skin and eye contact
Acute toxicity	:	Not classified

Nitrous Oxide (10024-97-2)	
LC50 inhalation rat (ppm)	250000 ppm/4h
ATE US (gases)	250000.000 ppmV/4h

Nitrous oxide (10024-97-2)	
LC50 inhalation rat (ppm)	250000 ppm/4h

Skin corrosion/irritation	:	Not classified
Serious eye damage/irritation	:	Not classified
Respiratory or skin sensitization	:	Not classified
Germ cell mutagenicity	:	Not classified
Carcinogenicity	:	Not classified
Reproductive toxicity	:	Not classified

Specific target organ toxicity – single exposure	:	May cause drowsiness or dizziness.
Specific target organ toxicity – repeated exposure	:	Not classified
Aspiration hazard	:	Not classified
Symptoms/effects after inhalation	:	May displace oxygen and cause rapid suffocation. May cause drowsiness or dizziness.
Symptoms/effects after skin contact	:	Contact with the liquefied gas may cause frostbite.
Symptoms/effects after eye contact	:	Contact with the product may cause cold burns or frostbite.
Symptoms/effects after ingestion	:	Ingestion is not considered a potential route of exposure.
Symptoms/effects upon intravenous administration	:	Not known.
Chronic symptoms	:	None known.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Classification criteria are not met.

12.2. Persistence and degradability

Nitrous Oxide (10024-97-2)	
Persistence and degradability	No data available.

Nitrous oxide (10024-97-2)	
Persistence and degradability	Not applicable for inorganic gases.

12.3. Bioaccumulative potential

Nitrous Oxide (10024-97-2)	
Log Pow	Not applicable for gas-mixtures.
Log Kow	Not applicable for gas-mixtures.
Bioaccumulative potential	No data available.

Nitrous oxide (10024-97-2)	
Log Pow	Not applicable for inorganic gases.
Bioaccumulative potential	No data available.

12.4. Mobility in soil

Nitrous Oxide (10024-97-2)	
Mobility in soil	No data available

Nitrous oxide (10024-97-2)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Effect on ozone layer : None

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste treatment methods	:	Contact supplier if guidance is required. 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.
Product/Packaging disposal recommendations	:	Refer to the CGA Pamphlet P-63 "Disposal of Gases" available at www.cganet.com for more guidance on suitable disposal methods.
Additional information	:	None.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Transport document description	:	UN1070 Nitrous oxide, 2.2
UN-No.(DOT)	:	UN1070

Proper Shipping Name (DOT)	:	Nitrous oxide
Class (DOT)	:	2.2 - Class 2.2 - Non-flammable compressed gas 49 CFR 173.115
Hazard labels (DOT)	:	2.2 - Non-flammable gas 5.1 - Oxidiser

DOT Packaging Non Bulk (49 CFR 173.xxx)	:	304
DOT Packaging Bulk (49 CFR 173.xxx)	:	314;315
DOT Special Provisions (49 CFR 172.102)	:	A14 - This material is not authorized to be transported as a limited quantity or consumer commodity in accordance with 173.306 of this subchapter when transported aboard an aircraft.
DOT Packaging Exceptions (49 CFR 173.xxx)	:	306
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	75 kg
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	150 kg
DOT Vessel Stowage Location	:	A - The material may be stowed ‘‘on deck’’ or ‘‘under deck’’ on a cargo vessel and on a passenger vessel.
DOT Vessel Stowage Other	:	40 - Stow ‘‘clear of living quarters’’
Other information	:	No supplementary information available.
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 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.

Transportation of Dangerous Goods

Transport by sea

Transport document description (IMDG)	:	UN 1070 Nitrous oxide, 2
UN-No. (IMDG)	:	1070
Proper Shipping Name (IMDG)	:	Nitrous oxide
Class (IMDG)	:	2 - Gases
Limited quantities (IMDG)	:	120 ml

Air transport

Transport document description (IATA)	:	UN 1070 Nitrous oxide, 5.1
UN-No. (IATA)	:	1070
Proper Shipping Name (IATA)	:	Nitrous oxide
Class (IATA)	:	2.2 - Gases : Non-flammable, non-toxic

SECTION 15: Regulatory information

15.1. US Federal regulations

Nitrous oxide (10024-97-2)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA

Nitrous oxide (10024-97-2)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

Nitrous oxide (10024-97-2)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

National regulations

Nitrous oxide (10024-97-2)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory Listed on the Japanese ISHL (Industrial Safety and Health Law) Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances) Listed on the Canadian IDL (Ingredient Disclosure List) Listed on INSQ (Mexican National Inventory of Chemical Substances) Listed on the TCSI (Taiwan Chemical Substance Inventory)

15.3. US State regulations

Nitrous oxide (10024-97-2)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significant risk level (NSRL)
No	Yes	Yes	No	

Nitrous oxide (10024-97-2)
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Other information : This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product.

Full text of H-phrases:

H270	May cause or intensify fire; oxidizer
H280	Contains gas under pressure; may explode if heated
H336	May cause drowsiness or dizziness

SDS US (GHS HazCom 2012)

This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide USA LLC and its affiliates' knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.