

Safety Data Sheet

Nitrous Oxide

SECTION 1

Identification

GHS product identifier	Nitrous Oxide
Chemical name	dinitrogen oxide
Other means of identification	Nitrogen oxide (N ₂ O); Nitrogen oxide; Nitrous oxide; Laughing gas; Hyponitrous acid anhydride; Dinitrogen monoxide; nitrous oxide, E 942; R744A; FACTITIOUS AIR; Nitrogen monoxide
Product type	Liquefied gas.
Product use	Synthetic/Analytical chemistry.
Synonym	Nitrogen oxide (N ₂ O); Nitrogen oxide; Nitrous oxide; Laughing gas; Hyponitrous acid anhydride; Dinitrogen monoxide; nitrous oxide, E 942; R744A; FACTITIOUS AIR; Nitrogen monoxide
SDS #	001042
Supplier's details	EsPRI Gas 500 Northridge Road, Suite 200 Atlanta, GA 30350 1.800.720.1563 Inside the US: 1-800-424-9300 (Chemtrec, 24 hours) Outside the US: 1-703-527-3887 (Chemtrec, 24 hours)
24-hour telephone	EsPRI Gas Customer Support Center: 1.800.720.1563

SECTION 2

Hazards Identification

OSHA/HCS status	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	OXIDIZING GASES – Category 1 GASES UNDER PRESSURE – Liquefied gas SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) – Category 3
GHS Label Elements	
Hazard pictograms	Flame over circle (oxidizer), Gas cylinder, Exclamation mark
Signal word	Danger

Hazard statements

H270 – May cause or intensify fire; oxidizer.
H280 – Contains gas under pressure; may explode if heated.
H336 – May cause drowsiness or dizziness.
May cause frostbite.
May displace oxygen and cause rapid suffocation.

Precautionary Statements

General

Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Open valve slowly. Use only with equipment cleaned for Oxygen service. Always keep container in upright position.

Prevention

P220 – Keep away from clothing and other combustible materials.
P244 – Keep valves and fittings free from oil and grease.
P271 – Use only outdoors or in a well-ventilated area.
P261 – Avoid breathing gas.

Response

P370 + P376 – In case of fire: Stop leak if safe to do so.
P304 + P340, P312 – IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor if you feel unwell.

Storage

P405 – Store locked up.
P410 + P403 – Protect from sunlight.
P403 + P233 – Store in a well-ventilated place. Keep container tightly closed.

Disposal

P501 – Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified

Liquid can cause burns similar to frostbite.

Hazards identified when used

No known significant effects or critical hazards.

SECTION 3

Composition / Information on Ingredients

Substance/mixture

Substance

Chemical name

dinitrogen oxide

Other means of identification

Nitrogen oxide (N₂O); Nitrogen oxide; Nitrous oxide; Laughing gas; Hyponitrous acid anhydride; Dinitrogen monoxide; nitrous oxide, E 942; R744A; FACTITIOUS AIR; Nitrogen monoxide

Product code

001042

Ingredient name	%	CAS number
Nitrous Oxide	100	10024-97-2

Any concentration shown as a range is to protect confidentiality or is due to batch variation. There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section. Occupational exposure limits, if available, are listed in Section 8.

SECTION 4

First Aid Measures

Description of Necessary First Aid Measures

Eye contact	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Skin contact	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. In case of contact with liquid, warm frozen tissues slowly with lukewarm water and get medical attention. Do not rub affected area. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Ingestion	Get medical attention. If necessary, call a poison center or physician. Ingestion of liquid can cause burns similar to frostbite. If frostbite occurs, get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. As this product rapidly becomes a gas when released, refer to the inhalation section.

Most Important Symptoms/Effects, Acute and Delayed

Potential Acute Health Effects

Eye contact	Liquid can cause burns similar to frostbite.
Inhalation	Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness.
Skin contact	Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.
Frostbite	Try to warm up the frozen tissues and seek medical attention.
Ingestion	Can cause central nervous system (CNS) depression. Ingestion of liquid can cause burns similar to frostbite.

Over-Exposure Signs/Symptoms

Eye contact	Adverse symptoms may include the following: frostbite.
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Inhalation	Adverse symptoms may include the following: nausea or vomiting; headache; drowsiness/fatigue; dizziness/vertigo; unconsciousness.
Skin contact	Adverse symptoms may include the following: frostbite.
Ingestion	Adverse symptoms may include the following: frostbite.
Indication of Immediate Medical Attention and Special Treatment Needed, If Necessary	
Notes to physician	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Specific treatments	No specific treatment.
Protection of first-aiders	No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
See toxicological information (Section 11).	

SECTION 5

Fire-Fighting Measures

Suitable extinguishing media	Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	Contains gas under pressure. Oxidizing material. This material increases the risk of fire and may aid combustion. Contact with combustible material may cause fire. In a fire or if heated, a pressure increase will occur and the container may burst or explode.
Hazardous thermal decomposition products	Decomposition products may include the following materials: nitrogen oxides.
Special protective actions for fire-fighters	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact the supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
Special protective equipment for fire-fighters	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. For incidents involving large quantities, thermally insulated undergarments and thick textile or leather gloves should be worn.

SECTION 6

Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures

For non-emergency personnel

No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders

If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel."

Environmental precautions

Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and Materials for Containment and Cleaning Up

Small spill

Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

Large spill

Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

SECTION 7

Handling and Storage

Precautions for Safe Handling

Protective measures

Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Do not get in eyes or on skin or clothing. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement. Never allow any unprotected part of the body to touch uninsulated pipes or vessels that contain cryogenic liquids. Prevent entrapment of liquid in closed systems or piping without pressure relief devices. Some materials may become brittle at low temperatures and will easily fracture. Empty containers retain product residue and can be hazardous. Keep away from clothing, incompatible materials and combustible materials. Keep reduction valves free from grease and oil.

Advice on general occupational hygiene

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Store locked up. Separate from reducing agents and combustible materials. Store away from grease and oil. Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52°C (125°F).

SECTION 8

Exposure Controls / Personal Protection

Occupational Exposure Limits

Ingredient name	Exposure limits
nitrous oxide	NIOSH REL (United States, 10/2020): TWA 10 hours: 25 ppm; TWA 10 hours: 46 mg/m ³ . CAL OSHA PEL (United States, 1/2025): TWA 8 hours: 90 mg/m ³ ; TWA 8 hours: 50 ppm. ACGIH TLV (United States, 1/2025) A4: TWA 8 hours: 50 ppm; TWA 8 hours: 90 mg/m ³ .

Biological exposure indices: No exposure indices known.

Appropriate engineering controls

Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual Protection Measures

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eyeface protection

Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with sideshields.

Hand protection

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection	Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.
Thermal hazards	If there is a risk of contact with the liquid, all protective equipment worn should be suitable for use with extremely low temperature materials.

SECTION 9

Physical and Chemical Properties

Physical state	Gas. [Liquefied gas.]
Color	Colorless.
Odor	Characteristic.
Odor threshold	Not available.
pH	Not applicable.
Melting point/freezing point	-90.8°C (-131.4°F)
Boiling point or initial boiling point and boiling range	-88.5°C (-127.3°F)
Flash point	[Product does not sustain combustion.]
Evaporation rate	Not available.
Flammability (solid, gas)	Extremely flammable in the presence of the following materials or conditions: reducing materials and combustible materials.
Lower and upper explosive (flammable) limits	Not available.
Vapor pressure	745 (psig)
Relative vapor density	1.53 [Air = 1]
Specific volume (ft³/lb)	505.0505
Gas density (lb/ft³)	0.00198
Relative density	Not applicable.
Solubility in water	1.2 g/l
Partition coefficient: n-octanol/water	0.36 [Calculated]

Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Flow time (ISO 2431)	Not available.
Molecular weight	44.01 g/mole

SECTION 10

Stability and Reactivity

Reactivity	No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	The product is stable.
Possibility of hazardous reactions	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	No specific data.
Incompatible materials	Highly reactive or incompatible with the following materials: combustible materials; reducing materials; grease; oil.
Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	Under normal conditions of storage and use, hazardous polymerization will not occur.

SECTION 11

Toxicological Information

Information on Toxicological Effects

Acute toxicity – conclusion/summary	Not available.
Skin corrosion/irritation – conclusion/summary	Not available.
Serious eye damage/eye irritation – conclusion/summary	Not available.
Respiratory corrosion/irritation – conclusion/summary	Not available.
Respiratory or skin sensitization – skin	Not available.
Respiratory or skin sensitization – respiratory	Not available.

Germ cell mutagenicity – conclusion/summary Not available.

Carcinogenicity – conclusion/summary Not available.

Carcinogenicity Classification

Product/ingredient name	OSHA	IARC	NTP
nitrous oxide	–	3	–

Specific target organ toxicity (repeated exposure) Not available.

Aspiration hazard Not available.

Information on the likely routes of exposure Not available.

Specific Target Organ Toxicity (Single Exposure)

Product/ingredient name	Result
nitrous oxide	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) – Category 3

Potential Acute Health Effects

Eye contact Liquid can cause burns similar to frostbite.

Inhalation Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness.

Skin contact Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.

Ingestion Can cause central nervous system (CNS) depression. Ingestion of liquid can cause burns similar to frostbite.

Symptoms Related to the Physical, Chemical and Toxicological Characteristics

Eye contact Adverse symptoms may include the following: frostbite.

Inhalation Adverse symptoms may include the following: nausea or vomiting; headache; drowsiness/fatigue; dizziness/vertigo; unconsciousness.

Skin contact Adverse symptoms may include the following: frostbite.

Ingestion Adverse symptoms may include the following: frostbite.

Delayed and Immediate Effects and Also Chronic Effects from Short and Long Term Exposure

Short term exposure – potential immediate effects Not available.

Short term exposure – potential delayed effects Not available.

Long term exposure – potential immediate effects	Not available.
Long term exposure – potential delayed effects	Not available.
Potential chronic health effects – conclusion/summary	Not available.
General	No known significant effects or critical hazards.
Carcinogenicity	No known significant effects or critical hazards.
Mutagenicity	No known significant effects or critical hazards.
Reproductive toxicity	No known significant effects or critical hazards.
Numerical measures of toxicity – acute toxicity estimates	N/A

SECTION 12

Ecological Information

Toxicity	Not available.
Persistence and degradability	Not available.

Bioaccumulative Potential

Product/ingredient name	LogPow	BCF	Potential
nitrous oxide	0.36	–	Low

Mobility in soil – soil/water partition coefficient	Not available.
Other adverse effects	No known significant effects or critical hazards.

SECTION 13

Disposal Considerations

Disposal methods

The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty pressure vessels should be returned to the supplier. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

SECTION 14

Transport Information

Regulatory Info	UN Number	Proper Shipping Name	Class	Packing Group
DOT	UN1070	Nitrous Oxide	2.2 (5.1)	–
TDG	UN1070	NITROUS OXIDE	2.2 (5.1)	–
Mexico	UN1070	NITROUS OXIDE	2.2 (5.1)	–
IMDG	UN1070	NITROUS OXIDE	2.2 (5.1)	–
IATA	UN1070	Nitrous Oxide	2.2 (5.1)	–

DOT – limited quantity

Yes.

DOT – quantity limitation

Passenger aircraft/rail: 75 kg. Cargo aircraft: 150 kg.

TDG – classification

Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13–2.17 (Class 2), 2.23–2.25 (Class 5).

TDG – explosive limit and limited quantity index

0

TDG – ERAP index

3000

TDG – passenger carrying vessel index

450

TDG – passenger carrying road or rail index

75

IATA – quantity limitation

Passenger and Cargo Aircraft: 75 kg. Cargo Aircraft Only: 150 kg.

Environmental hazards

No.

Special precautions for user

Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments

Not available.

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

SECTION 15

Regulatory Information

U.S. Federal Regulations

TSCA 8(a) CDR exempt/partial exemption	Not determined.
TSCA 12(b) – chemical export notification	Not applicable.
Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)	Not listed
Clean Air Act Section 602 Class I Substances	Not listed
Clean Air Act Section 602 Class II Substances	Not listed
DEA List I Chemicals (Precursor Chemicals)	Not listed
DEA List II Chemicals (Essential Chemicals)	Not listed
SARA 302/304 – composition/information on ingredients	No products were found.
SARA 304 RQ	Not applicable.
SARA 311/312 classification	Refer to Section 2: Hazards Identification of this SDS for classification of substance.

State Regulations

Massachusetts	This material is listed.
New York	This material is not listed.
New Jersey	This material is listed.
Pennsylvania	This material is listed.
California Prop. 65	WARNING: This product can expose you to Nitrous oxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov .

Ingredient name	No significant risk level	Maximum acceptable dosage level
Nitrous oxide	–	–

International Regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals	Not listed.
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Montreal Protocol	Not listed.
Stockholm Convention on Persistent Organic Pollutants	Not listed.
Rotterdam Convention on Prior Informed Consent (PIC)	Not listed.
UNECE Aarhus Protocol on POPs and Heavy Metals	Not listed.
Inventory List	
Australia	This material is listed or exempted.
Canada	This material is listed or exempted.
China	This material is listed or exempted.
Eurasian Economic Union	Russian Federation inventory: This material is listed or exempted.
Japan	Japan inventory (CSCL): This material is listed or exempted. Japan inventory (ISHL): Not determined.
New Zealand	This material is listed or exempted.
Philippines	This material is listed or exempted.
Republic of Korea	This material is listed or exempted.
Taiwan	This material is listed or exempted.
Thailand	This material is listed or exempted.
Turkey	Not determined.
United States	This material is active or exempted.
Viet Nam	This material is listed or exempted.

SECTION 16

Other Information

Date of issue/date of revision	12/3/2025
Date of previous issue	10/10/2025
Version	2

Hazard and Instability Classification Ratings

System	Health	Flammability	Physical Hazards / Instability	Special
HMIS® (U.S.A.)	1	0	3	–
NFPA 704 (U.S.A.)	1	0	0	OX

Caution: HMIS® ratings are based on a 0–4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc. The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

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Procedure Used to Derive the Classification

Classification	Justification
OXIDIZING GASES – Category 1	Expert judgment
GASES UNDER PRESSURE – Liquefied gas	Expert judgment
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) – Category 3	Expert judgment

Key to Abbreviations

ATE = Acute Toxicity Estimate; BCF = Bioconcentration Factor; GHS = Globally Harmonized System of Classification and Labelling of Chemicals; IATA = International Air Transport Association; IBC = Intermediate Bulk Container; IMDG = International Maritime Dangerous Goods; LogPow = logarithm of the octanol/water partition coefficient; MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978; UN = United Nations.

Notice to Reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.