NITROUS OXIDE
Safety Data Sheet

1. IDENTIFICATION

Product identifier
Product Name: NITROUS OXIDE

Other means of identification
Safety data sheet number: IOC-P090
UN / ID no.: UN1070
Synonyms: Dinitrogen Monoxide; Laughing Gas; Factitious Air; Hyponitrous Acid Anhydride; Nitrogen(I) Oxide

Recommended use of the chemical and restrictions on use
Recommended Use: Industrial and professional use.
Uses advised against: Consumer use

Details of the supplier of the safety data sheet

Indiana Oxygen Company
6099 W. Corporate Way
Indianapolis, IN 46278
Phone: 317-290-0003
www.Indianaoxygen.com

* May include subsidiaries or affiliate companies / divisions.

For additional product information contact your local customer service.

Emergency telephone number
Company Phone Number: 1-800-535-5053(Infotrak)

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Specific target organ toxicity (single exposure)	Category 3
Oxidizing gases	Category 1
Gases under pressure	Liquefied gas
Simple asphyxiants	Yes

Label elements

Signal word Danger

Hazard Statements
May cause or intensify fire; oxidizer
Contains gas under pressure; may explode if heated
May displace oxygen and cause rapid suffocation
May cause drowsiness or dizziness
May cause frostbite

Precautionary Statements - Prevention
Do not handle until all safety precautions have been read and understood
Keep and store away from clothing and other combustible materials
Keep valves and fittings free from oil and grease
Avoid breathing gas
Do not get in eyes, on skin, or on clothing
Use and store only outdoors or in a well ventilated place
Use backflow preventive device in piping
Use only equipment of compatible materials of construction and rated for cylinder pressure
Use only with equipment cleaned for oxygen service
Open valve slowly
Close valve after each use and when empty

Precautionary Statements - Response
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor / physician if you feel unwell.
IF ON SKIN:. Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice / attention.
In case of fire: Stop leak if safe to do so

Precautionary Statements - Storage
Protect from sunlight when ambient temperature exceeds 52°C / 125°F

Hazards not otherwise classified (HNOC)
Not applicable

Other Information
Intentional misuse by deliberately concentrating and inhaling contents may be harmful or fatal
This product cotains one or more chemicals known to the State of California to cause cancer, birth defects or other reproductive harm

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	Volume %	Chemical Formula
Nitrous oxide	10024-97-2	100	N_2O

4. FIRST AID MEASURES

Description of first aid measures

General advice — Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Inhalation — Remove to fresh air and keep comfortable for breathing. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get medical attention immediately.

Skin contact — For dermal contact or suspected frostbite, remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER. A physican should see the patient promptly if contact with the product has resulted in blistering of the dermal surface or in deep tissue freezing.

Eye contact — If frostbite is suspected, flush eyes with cool water for 15 minutes and obtain immediate medical attention.

Ingestion — Not an expected route of exposure.

Self-protection of the first aider — RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.

Most important symptoms and effects, both acute and delayed

Symptoms — Simple asphyxiant. May cause suffocation by displacing the oxygen in the air. Exposure to oxygen-deficient atmosphere (<19.5%) may cause dizziness, drowsiness, nausea, vomiting, excess salivation, diminished mental alertness, loss of consciousness and death. Exposure to atmospheres containing 8-10% or less oxygen will bring about unconsciousness without warning and so quickly that the individuals cannot help or protect themselves. Lack of sufficient oxygen may cause serious injury or death. Central nervous system depression. Contact with liquid may cause cold burns / frostbite.

Indication of any immediate medical attention and special treatment needed

Note to physicians — Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Specific extinguishing methods
Continue to cool fire exposed cylinders until flames are extinguished. Damaged cylinders should be handled only by specialists.

Specific hazards arising from the chemical
May cause or intensify fire; oxidizer. Will support and accelerate combustion of combustible materials (wood, paper, oil, debris, etc). May decompose violently at temperatures above 1112°F (600°C). Cylinders may rupture under extreme heat.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA / NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions	Evacuate personnel to safe areas. Ensure adequate ventilation, especially in confined areas. Monitor oxygen level. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Eliminate all ignition sources if safe to do so.
Other Information	Gas / vapor is heavier than air. Prevent from entering sewers, basements and workpits, or any place where accumulation may be dangerous.

Environmental precautions

Environmental precautions	Prevent spreading of vapors through sewers, ventilation systems and confined areas.

Methods and material for containment and cleaning up

Methods for containment	Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. If leak is in container or container valve, contact the appropriate emergency telephone number in Section 1 or call your closest Indiana Oxygen location.
Methods for cleaning up	Return cylinder to Indiana Oxygen Company or an authorized distributor.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling	Due to increased misuse and abuse of nitrous oxide, handling and storage precautions should be implemented to prevent theft and improper use. The following recommendations may not include all precautions which are necessary. Nitrous oxide systems should be installed in accordance with CGA G-8.1, "Standard for Nitrous Oxide Systems at Consumer Sites". Keep full and empty nitrous oxide containers and utilization equipment stored in a secured area. Allow only authorized personnel to remove containers, inventory and account for both full and empty containers and bulk product. Promptly report any theft of nitrous oxide to the police and the supplier. Establish other procedures as necessary to check for unusual use or loss of nitrous oxide. Keep valves and fittings free from oil and grease. Use only with equipment cleaned for oxygen service. Use only equipment of compatible materials of construction. Open valve slowly. "NO SMOKING" signs should be posted in storage and use areas. Separate flammable gas cylinders from oxygen and other oxidizers by a minimum distance of 20 ft. or by a 5 ft. high barrier with a minimum fire resistance rating of a half an hour.

Protect cylinders from physical damage; do not drag, roll, slide or drop. Never attempt to lift a cylinder by its valve protection cap. When moving cylinders, even for short distance, use a cart designed to transport cylinders. Never insert an object (e.g. wrench, screwdriver, pry bar,etc.) into valve cap openings. Doing so may damage valve, causing leak to occur. Use an adjustable strap wrench to remove over-tight or rusted caps. Use only with adequate ventilation. Use backflow preventive device in piping. Close valve after each use and when empty. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Ensure the complete gas system has been checked for leaks before use.

Never put cylinders into trunks of cars or unventilated areas of passenger vehicles. Never attempt to refill a compressed gas cylinder without the owner's written consent. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit.

Only experienced and properly instructed persons should handle gases under pressure. Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, pamphlet CGA-P1, Safe Handling of Compressed Gases in Containers. Use only with equipment rated for cylinder pressure. For additional recommendations, consult Compressed Gas Association's Pamphlet G-8.2 and SB-6.

Conditions for safe storage, including any incompatibilities

Storage Conditions: Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Keep at temperatures below 52°C / 125°F. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Full and empty cylinders should be segregrated. Do not store near combustible materials Stored containers should be periodically checked for general condition and leakage.

Incompatible materials: Combustible materials. Organic material. Reducing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines .

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Nitrous oxide 10024-97-2	TWA: 50 ppm	-	TWA: 25 ppm over the time exposed to waste anesthetic gas TWA: 46 mg / m^3 over the time exposed to waste anesthetic gas

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value. OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits. NIOSH IDLH: Immediately Dangerous to Life or Health

Appropriate engineering controls

Engineering Controls: Local exhaust ventilation to prevent accumulation of high concentrations and maintain air-oxygen levels at or above 19.5%. Consider installation of leak detection systems in areas of use and storage. Systems under pressure should be regularly checked for leakages. Showers. Eyewash stations.

Individual protection measures, such as personal protective equipment

Eye / face protection: Wear safety glasses with side shields (or goggles). If splashes are likely to occur, wear:. Goggles. Face-shield.

Skin and body protection: Work gloves and safety shoes are recommended when handling cylinders. Wear cold insulating gloves when handling liquid. Gloves must be clean and free from grease or oil.

Respiratory protection: Use positive pressure airline respirator with escape cylinder or self contained breathing apparatus for oxygen-deficient atmospheres (<19.5%).

General Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice. Do not get in eyes, on skin, or on clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Compressed gas
Appearance	Colorless.
Odor	Slight sweet.
Odor threshold	No information available
pH	No data available
Melting point	-90.81 °C / -131.5 °F
Evaporation rate	Not applicable
Fire Hazard	Yes
Lower flammability limit:	Not applicable
Upper flammability limit:	Not applicable
Flash point	Not applicable
Autoignition temperature	No data available
Decomposition temperature	No data available
Water solubility	Slightly soluble
Partition coefficient	0.4
Kinematic viscosity	Not applicable

Chemical Name	Molecular weight	Boiling point	Vapor Pressure	Vapor density (air =1)	Gas Density kg / m^3@20°C	Critical Temperature
Nitrous oxide	44.01	-88.56 °C	Gas at atmospheric pressure.	1.53	1.95	36.4 °C

10. STABILITY AND REACTIVITY

Reactivity
Not reactive under normal conditions

Chemical stability
Stable under normal conditions.

Explosion data
Sensitivity to Mechanical Impact None.
Sensitivity to Static Discharge None.

Possibility of Hazardous Reactions
None under normal processing.

Conditions to avoid
Heat, flames and sparks. Nitrous oxide will serve as the oxidant for most flammable materials. Some flammables will have a lower flammable limit in nitrous oxide than in pure oxygen.

Incompatible materials
Combustible materials. Organic material. Reducing agents.

Hazardous Decomposition Products
At elevated temperatures, nitrous oxide decomposes into nitrogen and oxygen, the rate of decomposition being appreciable at about 1112°F (600°C). Nitrous oxide exposed to fire or other intense heat source may decompose violently.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation	Anesthetic effects may occur when mixed with oxygen at a ratio of 80% nitrous oxide to 20% oxygen. Laughter effects seem to occur after incipient asphyxia accompanied by the sudden return of oxygen. Nitrous oxide is a slight narcotic. Intentional misuse by deliberately concentrating and inhaling contents may be harmful or fatal. Product is a simple asphyxiant.
Skin contact	Contact with liquid may cause cold burns / frostbite.
Eye contact	Contact with liquid may cause cold burns / frostbite.
Ingestion	Not an expected route of exposure.

Information on toxicological effects

Symptoms	Central nervous system depression.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation	Not classified.
Sensitization	Not classified.
Germ cell mutagenicity	Not classified.
Carcinogenicity	This product does not contain any carcinogens or potential carcinogens listed by OSHA, IARC or NTP.

Chemical Name	ACGIH	IARC	NTP	OSHA
Nitrous oxide 10024-97-2	-	Group 3	-	-

IARC (International Agency for Research on Cancer)
Not classifiable as a human carcinogen

Reproductive toxicity	Reproductive toxicity has been observed in humans and animals following exposure to nitrous oxide in concentrations in excess of the TLV. Exposure to nitrous oxide alone resulted in a 50% increase in congenital abnormalities and a 100% increase in spontaneous abortion in female dental assistants compared to nonusers of nitrous oxide.
Developmental Toxicity	Fetal mortality increased at all concentrations in pregnant rats exposed to 0, 100, 1000, or 15,000 ppm nitrous oxide (8 or 24 H / day for 5-9 days, 2-3 week of pregnancy) and tertatogenic effects (skeletal abnormalities) were seen at 1000 ppm.
STOT - single exposure	Category 3. Central nervous system.
STOT - repeated exposure	Not classified.
Chronic toxicity	Possible risk of irreversible effects. Prolonged or repeated exposure increases the risk. Contains a known or suspected reproductive toxin.
Target Organ Effects	Central nervous system, Reproductive System, Respiratory system.
Neurological effects	Neurological impairment from nitrous oxide exposure has been reported at concentrations of several hundred to several thousand ppm; however, decrements in human cognitive and psychomotor functions have been reported at much lower concentrations. Dentists exposed to nitrous oxide longer than 3000 hours within the prior 10 years exhibited neurologic symptoms such as weakness, tingling and numbness.
Aspiration hazard	Not applicable.

Numerical measures of toxicity

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50	Inhalation LC50 (CGA P-20)
Nitrous oxide 10024-97-2	-	-	> 250 ppm (Rat) 4 h	-

Product Information

Oral LD50	No information available
Dermal LD50	No information available
Inhalation LC50	No information available

The following values are calculated based on chapter 3.1 of the GHS document .

12. ECOLOGICAL INFORMATION

Ecotoxicity
No known acute aquatic toxicity.

Persistence and degradability
Not applicable.

Bioaccumulation
No information available.

Chemical Name	Partition coefficient
Nitrous oxide 10024-97-2	0.4

Global warming potential (GWP) 298

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to Indiana Oxygen for proper disposal.

14. TRANSPORT INFORMATION

DOT

UN / ID no.	UN1070
Proper shipping name	Nitrous oxide
Hazard Class	2.2
Subsidiary class	5.1
Special Provisions	A14
Description	UN1070, Nitrous oxide, 2.2 (5.1)
Emergency Response Guide Number	122

TDG

UN / ID no.	UN1070
Proper shipping name	Nitrous oxide
Hazard Class	2.2
Subsidiary class	5.1
Description	UN1070, Nitrous oxide, 2.2 (5.1)

MEX

UN / ID no.	UN1070
Proper shipping name	Nitrous oxide
Hazard Class	2.2
Subsidiary class	5.1
Description	UN1070, Nitrous oxide, 2.2 (5.1)

IATA

UN / ID no.	UN1070
Proper shipping name	Nitrous oxide
Hazard Class	2.2
Subsidiary hazard class	5.1

ERG Code	2AX
Description	UN1070, Nitrous oxide, 2.2 (5.1)

IMDG

UN / ID no.	UN1070
Proper shipping name	Nitrous oxide
Hazard Class	2.2
Subsidiary hazard class	5.1
EmS-No.	F-C, S-W
Description	UN1070, Nitrous oxide, 2.2 (5.1)

ADR

UN / ID no.	UN1070
Proper shipping name	Nitrous oxide
Hazard Class	2.2
Classification code	2O
Tunnel restriction code	(C / E)
Special Provisions	584
Description	UN1070, Nitrous oxide, 2.2 (5.1), (C / E)
Labels	5.1

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	Complies
EINECS / ELINCS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL / NDSL - Canadian Domestic Substances List / Non-Domestic Substances List
EINECS / ELINCS - European Inventory of Existing Chemical Substances / European List of Notified Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311 / 312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	Yes
Sudden release of pressure hazard	Yes
Reactive Hazard	No

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product does not contain any substances regulated as hazardous air pollutants (HAPS) under Section 112 of the Clean Air Act Amendments of 1990.

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Risk and Process Safety Management Programs

This material, as supplied, does not contain any regulated substances with specified thresholds under 40 CFR Part 68. This product does not contain any substances regulated as Highly Hazardous Chemicals pursuant to the 29 CFR Part 1910.110.

US State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals

Chemical Name	California Proposition 65
Nitrous oxide - 10024-97-2	Developmental Female Reproductive

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Nitrous oxide 10024-97-2	X	X	X

International Regulations

16. OTHER INFORMATION

NFPA Health hazards 2 Flammability 0 Instability 0 Physical and Chemical Properties OX

Note: Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2009, CGA Recommended Hazard Ratings for Compressed Gases, 3rd Edition.

Issue Date	06-Mar-2015
Revision Date	23-Jul-2015
Revision Note	Initial Release.

General Disclaimer

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Indiana Oxygen Company (or any of their affiliates and subsidiaries) and the purchaser.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

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End of Safety Data Sheet