

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Nitrous Oxide
CHEMICAL NAME: Nitrous Oxide
CHEMICAL FAMILY: Oxidizer
SYNONYMS: di-Nitrogen monoxide, laughing gas, Nitrogen monoxide
CHEMICAL FORMULA: N₂O
USE: Medical, industrial, food industry

NAME AND ADDRESS: **Refrigeration & Oxygen Co.**
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2. HAZARDS IDENTIFICATION**EMERGENCY OVERVIEW:**

WARNING! High pressure oxidizing liquid and gas.
 Vigorously accelerates combustion.
 Can cause rapid suffocation.
 Can cause anesthetic effects.
 May cause frostbite.

POTENTIAL HEALTH EFFECTS INFORMATION:**ROUTES OF EXPOSURE:**

INHALATION: Simple Asphyxiant.

Nitrous oxide is nontoxic, but may cause suffocation by displacing the oxygen in 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% to 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. Exposure to concentrations of 50% or greater will produce euphoria, loss of coordination, slurred speech, dulling of senses, loss of consciousness, and clinical anesthesia. These symptoms may resemble intoxication, hence the name "laughing gas". At higher concentrations, approaching 100%, inhalation may cause deep breathing, dizziness, nausea, and central nervous system depression.

WARNING: The misuse of nitrous oxide can cause death by reducing the amount of oxygen necessary to support life. Nitrous oxide abuse can impair an individual's ability to make and implement life sustaining decisions.

EYE CONTACT: Contact with liquid or cold vapor can cause freezing of tissue.

SKIN CONTACT: Contact with liquid or cold vapor can cause frostbite.

SKIN ABSORPTION: Not applicable

INGESTION: Not applicable

CHRONIC EFFECTS: Nitrous oxide has been associated with several effects from long term exposure. The most strongly substantiated effect is neuropathy (degenerative changes to the nervous system). Complaints include numbness, tingling of hands and legs, loss of feeling in fingers, poor balance, and muscular weakness. Epidemiological studies also suggest fetotoxic effects and higher incidents of spontaneous abortion in exposed personnel. Although no cause and effect relationship has been firmly established, exposure to the gas should be minimized.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Pregnant women should avoid exposure to nitrous oxide. See Section 11, Toxicological Information.

OTHER EFFECTS OF OVEREXPOSURE: See Section 11, Toxicological Information.

CARCINOGENICITY: Nitrous oxide is not listed by NTP, OSHA, or IARC.

POTENTIAL ENVIRONMENTAL EFFECTS: No adverse ecological effects are expected.

3. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME NITROUS OXIDE

PERCENTAGE >99%

CAS NUMBER 10024-97-2

4. FIRST AID MEASURES

FIRST AID PROCEDURES:

INHALATION: Persons suffering from lack of oxygen should be removed to fresh air. If victim is not breathing, give artificial respiration. Vomiting may occur as the person awakes. In order to prevent aspiration, exposed individuals should be placed on their side with their head at the level or slightly lower than their body. If breathing is difficult, or dulling of senses is present, give oxygen. Obtain prompt medical attention.

Rescue personnel should be aware of the extreme fire hazards associated with oxidizer-enriched atmospheres.

EYE CONTACT: Contact with liquid or cold vapor can cause freezing of tissue. Gently flush eyes with lukewarm water. Obtain medical attention immediately.

SKIN CONTACT: Contact with liquid or cold vapor can cause frostbite. Immediately warm affected area with lukewarm water not to exceed 105°F (40°C).

INGESTION: Not applicable

NOTES TO PHYSICIAN: Nitrous oxide may suppress immunological function when administered for anesthetic purposes. This may reduce the resistance to infection and other immuno-dependent disease processes. Nitrous oxide may cause vitamin B-12 deficiency. Megaloblastic anemia and nervous system disorders can occur as a result of this chemically induced deficiency. More detailed information can be found in Section 11, Toxicological Information.

5. FIREFIGHTING MEASURES

FLAMMABLE PROPERTIES: FLAMMABLE PROPERTIES: Nitrous oxide is nonflammable and will support combustion.

EXTINGUISHING MEDIA: Use extinguishing media appropriate for surrounding fire.

PROTECTION OF FIREFIGHTERS:

SPECIFIC HAZARDS ARISING FROM THE CHEMICAL: Oxidizing agent, vigorously accelerates combustion. Some materials that are noncombustible in air will burn in the presence of an oxidizing agent. Nitrous oxide may form explosive compounds when exposed to combustible materials or oil, grease, and other hydrocarbon materials.

Upon exposure to intense heat or flame, cylinder will vent rapidly and or rupture violently. Most cylinders are designed to vent contents when exposed to elevated temperatures.

Pressure in a container can build up due to heat and it may rupture if pressure relief devices should fail to function.

PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIREFIGHTERS: Evacuate all personnel from the danger area. If possible, shut off flow of nitrous oxide that is supporting the fire. Immediately cool containers with water spray from maximum distance. When cool, move containers from fire area, if without risk.

SENSITIVITY TO STATIC DISCHARGE: None

SENSITIVITY TO MECHANICAL IMPACT: None

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: Use personal protection recommended in Section 8. Before entering area you must check for oxygen-deficient atmospheres. Evacuate all unnecessary personnel from the affected area. Remove sources of heat, ignition and, if possible, separate combustibles from the leak.

Ventilate enclosed area or move leaking container to a well-ventilated area. If leaking from cylinder or its valve, contact your supplier.

ENVIRONMENTAL PRECAUTIONS: Not applicable.

METHODS FOR CONTAINMENT: Shut off source of nitrous oxide, if possible.

METHODS FOR CLEAN-UP: Not applicable.

OTHER INFORMATION: None.

7. HANDLING AND STORAGE

HANDLING: Use a suitable hand truck for cylinder movement or four-wheel cart for liquid container movement. Never attempt to lift a cylinder by its valve protection cap. Keep cylinders and their valves free from oil and grease. Open valve slowly. If user experiences difficulty operating cylinder valve, discontinue use and contact supplier. Never insert an object (e.g., wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing a leak to occur. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit. Use an adjustable strap wrench to remove over-tight or rusted caps. For additional precautions in using nitrous oxide see Section 16, Other Information.

STORAGE: Store and use with adequate ventilation. Compressed gas cylinders shall be separated from materials and conditions that present exposure hazards to or from each other. Cylinders should be separated from flammables by a minimum distance of 20 ft. or by a barrier of noncombustible material at least 5 ft high having a fire resistance rating of at least 1/2 hour. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling or being knocked over. Post "No Smoking or Open Flames" signs in the storage area. Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not allow storage area

temperature to exceed 125 °F (52°C). Full and empty cylinders should be segregated. Use a first-in, first-out inventory system to prevent full containers from being stored for long periods of time. Because of its "laughing gas" anesthetic effect, nitrous oxide is often subject to theft and misuse. Cylinders should be stored and used in a controlled area.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE GUIDELINES:

OSHA PEL-TWA: None

NIOSH IDLH: None

ACGIH TLV: 50 ppm

ENGINEERING CONTROLS:

VENTILATION: Natural or mechanical to prevent accumulation in worker's breathing zone above exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Safety glasses are recommended when handling cylinders.

SKIN PROTECTION: Work gloves are recommended when handling cylinders. If used, gloves must be clean and free of oil and grease. Safety shoes are recommended when handling cylinders.

RESPIRATORY PROTECTION:

General Use: None required

Emergency Use: Self-contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen deficient atmosphere. Air purifying respirators will not provide protection.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless

ODOR: Slightly sweet odor and taste at normal temperature and pressure.

ODOR THRESHOLD: Not known

PHYSICAL STATE: Gaseous

pH: Not applicable

MELTING POINT: -131.5 °F (-90.8 °C) @ 1 atm

BOILING POINT (1 ATM): -127.4 °F (-88.5 °C)

FLASH POINT: Not applicable

EVAPORATION RATE (Butyl Acetate=1): Not applicable

FLAMMABILITY: Nonflammable

FLAMMABLE LIMITS IN AIR BY VOLUME:

LOWER: Not applicable

UPPER: Not applicable

VAPOR PRESSURE: 735 psig (5069 kPa) @ 70 °F (21.1 °C)

GAS DENSITY: 0.1146 lb/ft³ (1.947 kg/m³) @ 70 OF (21.1 °C) and 1 atm

SPECIFIC GRAVITY (Air =1): 1.53@ 70 °F (21.1 °C) and 1 atm

SOLUBILITY IN WATER: Vol/Vol at 32 °F (0 °C): 1.3

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable

AUTOIGNITION: Not applicable

DECOMPOSITION TEMPERATURE: 1200 °F (649°C)

MOLECULAR WEIGHT: 44.013

EXPANSION RATIO: Not applicable

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable.

CONDITIONS TO AVOID: Excess heat. Decomposes at elevated temperature to nitrogen and oxygen. This reaction will occur at lower temperatures in the presence of catalytic surfaces such as silver, platinum, cobalt, copper oxides, or nickel oxides.

INCOMPATIBLE MATERIALS: Flammable materials, hydrocarbons such as oils and grease, asphalt, ethers, alcohol's, acids and aldehydes. Alkali metals, boron, tungsten carbide, and aluminum.

HAZARDOUS DECOMPOSITION PRODUCTS: Nitrogen and oxygen

POSSIBILITY OF HAZARDOUS REACTIONS: Will not occur

11. TOXICOLOGICAL INFORMATION

ACUTE DOSE EFFECTS:

LD50: None; LC50: None

Note: NIOSH has recommended a TWA of 25 ppm during anesthetic administration, and 50 ppm in dental offices.

REPEATED DOSE EFFECTS: Exposure to nitrous oxide has produced embryo fetal toxicity in animals as evidenced by reduced fetal weight, delayed ossification, and increased incidence of visceral and skeletal variations. Exposure may be associated with increased incidence of abortion in humans. Single prolonged exposure to high concentrations of nitrous oxide has resulted in bone marrow injury and adverse effects in blood.

IRRITATION: None

GENETIC EFFECTS: None

DEVELOPMENTAL EFFECTS: See note above

TERATOGENICITY: None

SYNERGISTIC MATERIALS: None

SENSITIZATION TO MATERIAL: None

REPRODUCTIVE EFFECTS: None

TARGET ORGAN EFFECTS: None

MUTAGENICITY: None

12. ECOLOGICAL INFORMATION

ECOTOXICITY: No adverse ecological effects are expected. Acetylene does not contain any Class I or Class II ozone-depleting chemicals (40 CFR Part 82). Acetylene is not listed as a marine pollutant by DOT (49 CFR Part 171).

13. DISPOSAL CONSIDERATIONS

Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.
 For emergency disposal, secure the cylinder and slowly discharge gas to the atmosphere in a well-ventilated area or outdoors away from all sources of ignition.

14. TRANSPORT INFORMATION

BASIC SHIPPING DESCRIPTION:

PROPER SHIPPING NAME: Nitrous oxide

HAZARD CLASS: 2.2 (5.1)

IDENTIFICATION NUMBER: UN 1070

ADDITIONAL INFORMATION:

PRODUCT RQ: None

SHIPPING LABEL(s): Nonflammable Gas and Oxidizer

PLACARD (when required): Nonflammable gas

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position. in a well ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards and should be discouraged.

15. REGULATORY INFORMATION & OTHER INFORMATION

SPECIAL PRECAUTIONS: SPECIAL PRECAUTIONS: All gauges, valves, regulators, piping and equipment to be used in nitrous oxide service must be cleaned for oxygen service. Use piping and equipment adequately designed to withstand pressures to be encountered. Nitrous oxide may cause swelling of some elastomers. Use a check valve or other protective apparatus in any line or piping from the cylinder to prevent reverse flow. Cross contamination of gases, liquids, or both can also create a hazardous condition inside a cylinder, dewar, or vessel (e.g., flammable and oxidizing gases can create an explosive mixture), which may result in rupture.

Shipment of compressed gas cylinders which have not been filled with the owner's consent is a violation of Federal law (49 CFR Part 173.301.b).

MIXTURES: When two or more gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Gases have properties which can cause serious injury or death..

HAZARD RATINGS AND RATING SYSTEMS:

NFPA RATINGS:

HEALTH: =2; FLAMMABILITY: =0; INSTABILITY: =0; SPECIAL: OX

STANDARD VALVE CONNECTIONS:

THREADED:	0-3000 psig	CGA 326
PIN-INDEXED YOKE:	0-3000 psig	CGA 910 (Medical Use)
ULTRA HIGH INTEGRITY:	0-3000 psig	712

MATERIAL SAFETY DATA SHEET - "NITROUS OXIDE"

Use the proper connections; DO NOT USE ADAPTERS, DO NOT FORCE FIT CONNECTION.

The information and recommendations in this Material Safety Data Sheet relate only to the specific material mentioned herein and do not relate to use otherwise ie., in combination with any other material or in any process.

The information and recommendations herein are taken from our extensive experiences and the data contained in recognized references and believed by us to be accurate. Refrigeration group of companies make no warranties either expressed or implied with respect there to and assume no liability in connection with the use of such information and recommendation.

