



MATERIAL SAFETY DATA SHEET

SOAL-OPR-FR-008

CHEMICAL NAME; CLASS: NITROUS OXIDE

SYNONYMS: Nitrogen Monoxide; Nitrogen Oxide; Dinitrogen Monoxide; Hyponitrous Acid Anhydride; Laughing Gas; Nitrous Oxide USP

CHEMICAL FAMILY NAME: Inorganic Oxide

FORMULA: N₂O

PRODUCT USE:	Document Number: 10072 Used for anesthesia and analgesia; Oxidizing gas for atomic absorption photometry, propellant for aerosols, food additive and in manufacture of
SUPPLIER/MANUFACTURER'S NAME: ADDRESS:	Société d'Oxygène et D'acétylène du Liban SOAL <ul style="list-style-type: none">• Chekka (North Lebanon), Industrial Area, SOAL Building, Al Sahl Street• Dekwaneh (Mount Lebanon), Industrial Area, SOAL Building, Al Midane Street
EMERGENCY PHONE:	customer.care@soal.com.lb +961 26 543381-4 // +961 01 692380-5

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					OTHER
			ACGIH		OSHA			
			TLV ppm	STEL ppm	PEL ppm	STEL ppm	IDLH ppm	
Nitrous Oxide	10024-97-2	> 99.6%	50, A4 (Not Classifiable as a Human Carcinogen)	NE	NE	NE	NE	NIOSH REL: 25 ppm DFG MAK: 100 ppm
Maximum Impurities		< 0.4%	None of the trace impurities in this product contribute significantly to the hazards associated with the product. All hazard information pertinent to this product has been provided in this Material Safety Data Sheet, per the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200) and State equivalents standards.					

NE = Not Established

C = Ceiling Limit

See Section 16 for Definitions of Terms Used.

NOTE: all WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: Nitrous Oxide is a colorless, liquefied gas. The gas has a sweet odor. At high concentrations, Nitrous Oxide is an anesthetic and over-exposure will produce symptoms of drowsiness, weakness, and loss of coordination. At higher concentrations, the gas will act as an asphyxiant by displacing oxygen. Nitrous Oxide is a reproductive toxin. Escape of rapidly expanding gas from the cylinder can cause frostbite to any contaminated tissue. Nitrous Oxide is not flammable, but at elevated temperatures or if involved in a fire, the gas can act as an oxidizer to initiate and sustain the combustion of flammable materials. Adequate fire protection must be provided.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant route of over-exposure for this product is by inhalation.

INHALATION: Prolonged or repeated over-exposures to Nitrous Oxide has produced injury to the nervous system. Symptoms of such over-exposure include numbness, tingling of the hands and legs, loss of feeling in the fingers, and muscular weakness. Other effects of inhalation exposure include potential reproductive effects. Exposure to Nitrous Oxide may be associated with an increase in spontaneous abortions in humans. Single, prolonged exposures to Nitrous Oxide have resulted in bone marrow damage and adverse effects on the blood.

When Nitrous Oxide is inhaled in high concentrations, the gas acts as a central nervous system depressant. Exposure to concentrations of 50% or greater will produce symptoms such as excitation, euphoria, dizziness, drowsiness, slurred speech, dulling of senses and narcosis. Inhalation of small amounts of this gas often produces a type of hysteria; therefore, a common name for Nitrous Oxide is "Laughing Gas". At higher concentrations approaching 100%, inhalation may cause deep breathing, dizziness, nausea and central nervous system effects.

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.

High concentrations of this gas can cause an oxygen-deficient environment. Individuals breathing an oxygen deficient atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The following effects associated with various levels of oxygen are as follows:

<u>CONCENTRATION</u>	<u>SYMPTOM OF EXPOSURE</u>
2-16% Oxygen:	Breathing and pulse rate increased, muscular coordination slightly disturbed.
10-14% Oxygen	Emotional upset, abnormal fatigue, disturbed respiration.
6-10% Oxygen:	Nausea and vomiting, collapse or loss of consciousness.
Below 6%:	Convulsive movements, possible respiratory collapse, and death.

OTHER POTENTIAL HEALTH EFFECTS: Contact of the skin or eyes with liquid or rapidly gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside. Ingestion and absorption through the skin are not considered significant routes of entry of oxygen into the body.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. Over-exposure to Nitrous Oxide may cause the following health effects:

ACUTE: The most significant hazard associated with this gas is inhalation of oxygen-deficient atmospheres and effects on the central nervous system. Symptoms of oxygen deficiency or central nervous system depression include respiratory difficulty, ringing in ears, headaches, shortness of breath, wheezing, headache, dizziness, indigestion, nausea, fatigue weakness and, at high concentrations, unconsciousness or death may occur. The skin of a victim of over-exposure may have a blue color.

HAZARDOUS MATERIAL INFORMATION SYSTEM			
HEALTH	(BLUE)		2
FLAMMABILITY	(RED)		0
REACTIVITY	(YELLOW)		0
PROTECTIVE EQUIPMENT			B
EYES	RESPIRATORY	HANDS	BODY
See Section 8			
For routine industrial applications			

3. HAZARD IDENTIFICATION (Continued)

Contact with liquid or rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside.

CHRONIC: Chronic repeated over-exposures to Nitrous Oxide can produce injury to the nervous system. Symptoms of such over-exposure include numbness, tingling of the hands and legs, loss of feeling in the fingers, poor balance and muscular weakness. Other effects of inhalation exposure include potential reproductive effects. Exposure to Nitrous Oxide may be associated with an increase in spontaneous abortions in humans. Prolonged exposures to Nitrous Oxide can result in damage to the bone marrow and blood system. Refer to Section 11 (Toxicological Information) of this MSDS for additional information.

TARGET ORGANS: Respiratory system, central nervous system, blood system, reproductive system.

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS PRODUCT WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus should be worn.

Remove victim(s) to fresh air, as quickly as possible. Persons suffering from lack of oxygen should be removed to fresh air. If victim is not breathing, or a dulling of senses occurs to the victim, administer artificial respiration. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary. 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.

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

SKIN EXPOSURE: Remove any clothing that may restrict circulation to any frozen area. Do not rub frozen parts as tissue damage may occur. As soon as practicable, place any affected area in warm water bath which has a temperature that does not exceed 105°F (40°C). NEVER USE HOT WATER. NEVER USE DRY HEAT. If area of frostbite is extensive, and if possible, remove clothing while showering with warm water. If warm water is not available, or is impractical to use, wrap the affected parts gently in blankets. Alternatively, if the fingers or hands are frostbitten, place the affected area of the body in the armpit. Encourage victim to gently exercise the affected part while being warmed. Seek immediate medical attention.

Frozen tissue is painless and appears waxy, with a possible yellow color. Frozen tissue will become swollen, painful and prone to infection when thawed. If the frozen part of the body has been thawed by the time medical attention has been obtained, cover the area with a dry sterile dressing and a large bulky protective covering.

Victim(s) must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to physician or other health professional with victim(s).

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

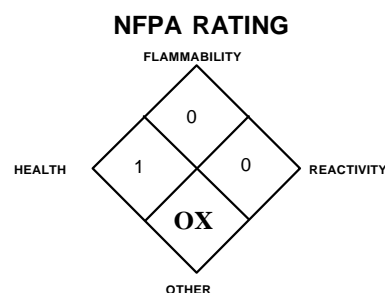
FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS: Non-flammable gas. Use extinguishing media appropriate for surrounding fire. In the event of fire, cool containers of this product with water to prevent failure. Use a water spray or fog to reduce or direct vapors.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Nitrous Oxide does not burn; however, containers, when involved in fire, may rupture or burst in the heat of the fire. Additionally, at temperatures above 200 °C or when involved in a fire, Nitrous Oxide is an oxidizer. At elevated temperatures, the product can act to initiate and sustain the combustion of combustible materials. At elevated temperatures, Nitrous Oxide will decompose to nitrogen and oxygen. Nitrous Oxide may form explosive compounds when exposed to combustible materials or grease and other hydrocarbon materials.



5. FIRE-FIGHTING MEASURES (Continued)

Explosion Sensitivity to Mechanical Impact: Not Sensitive.

Explosion Sensitivity to Static Discharge: Not Sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural fire-fighters must wear Self-Contained Breathing Apparatus and full protective equipment. Other information for pre-planning can be found in the North American Emergency Response Guidebook.

6. ACCIDENTAL RELEASE MEASURES

LEAK RESPONSE: Evacuate immediate area. Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a spill, clear the affected area, protect people, and respond with trained personnel. Adequate fire protection must be provided.

Minimum Personal Protective Equipment should be **Level B: protective clothing, gloves and Self-Contained Breathing Apparatus**. Locate and seal the source of the leaking gas. Allow the gas to dissipate. Monitor the surrounding area for oxygen levels and the level of Nitrous Oxide. The atmosphere must have at least 19.5 percent oxygen before personnel can be allowed in the area without Self-Contained Breathing Apparatus. Reading should also indicate that Nitrous Oxide is not present in the atmosphere above acceptable levels before non-emergency personnel are permitted to re-enter the area. Attempt to close the main source valve prior to entering the area. If this does not stop the release (or if it is not possible to reach the valve), allow the gas to release in-place or remove it to a safe area and allow the gas to be released there.

7. HANDLING and USE

WORK PRACTICES AND HYGIENE PRACTICES: Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of this product could occur without any significant warning symptoms, due to oxygen deficiency. Non-sparking tools should be used.

STORAGE AND HANDLING PRACTICES: Cylinders should be stored upright and be firmly secured to prevent falling or being knocked-over. Cylinders can be stored in the open, but in such cases, should be protected against extremes of weather and from the dampness of the ground to prevent rusting.

Cylinders should be stored in dry, well-ventilated areas away from sources of heat, ignition and direct sunlight. Keep storage area clear of materials which can burn. Do not allow area where cylinders are stored to exceed 52°C (125°F). Store containers away from heavily trafficked areas and emergency exits. Store away from process and production areas, away from elevators, building and room exits or main aisles leading to exits.

Consider installation of leak detection and alarm for storage and use areas. Have appropriate extinguishing equipment in the storage area (i.e. sprinkler system, portable fire extinguishers).

Use non-sparking ventilation systems, approved explosion-proof equipment, and appropriate electrical systems. Electrical equipment used in gas-handling operations, or located in storage areas, should be non-sparking or explosion-proof. Use a check valve in the discharge line to prevent hazardous backflow. Never tamper with pressure relief valves and cylinders.

Keep the smallest amount necessary on-site at any one time. Full and empty cylinders should be segregated. Use a first-in, first-out inventory systems to prevent full containers from being stored for long periods of time.

WARNING: 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.

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: Compressed gases can present significant safety hazards. The following rules are applicable to work situations in which cylinders are being used.

Before Use: Move cylinders with a suitable hand-truck. Do not drag, slide or roll cylinders. Do not drop cylinders or permit them to strike each other. Secure cylinders firmly. Leave the valve protection cap (where provided) in-place until cylinder is ready for use.

During Use: Use designated CGA fittings and other support equipment. Do not use adapters. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder. Do not use oils or grease on gas-handling fittings or equipment. Leak-check system with leak detection solution, never with flame. Immediately contact the supplier if there are any difficulties associated with operating cylinder valve. 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. Use an adjustable strap wrench to remove over-tight or rusted caps. Never strike an arc, on a compressed gas cylinder or make a cylinder part of and electric circuit.

After Use: Close main cylinder valve. Replace valve protection cap. Mark empty cylinders “EMPTY”.

7. HANDLING and USE (Continued)

NOTE: Use only DOT or ASME code containers. Earth-ground and bond all lines and equipment associated with this product. Close valve after each use and when empty.

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA: Use the proper CGA connections, DO NOT USE ADAPTERS:

<u>THREADED:</u>	0-3000 psig	CGA 326
<u>PIN-INDEXED YOKE:</u>	0-3000 psig	CGA 910
<u>ULTRA HIGH INTEGRITY:</u>	0-3000 psig	712

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely. Purge gas handling equipment with inert gas (i.e. nitrogen) before attempting repairs. Always use product in areas where adequate ventilation is provided.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation. Local exhaust ventilation is preferred, because it prevents dispersion of this gas into the work place by eliminating it at its source. If appropriate, install automatic monitoring equipment to detect the level of oxygen.

RESPIRATORY PROTECTION: Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection if oxygen levels are below 19.5% or during emergency response to a release of this product. If respiratory protection is required, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), or equivalent State standards

EYE PROTECTION: Safety glasses.

HAND PROTECTION: Wear gloves when handling cylinders of this product, or specific gloves that are appropriate to the specific operation for which this product is used. If used, gloves must be free and clean of oil and grease.

BODY PROTECTION: Use body protection appropriate for task. Safety shoes are recommended when handling cylinders.

9. PHYSICAL and CHEMICAL PROPERTIES

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

BOILING POINT: -88.5°C (-127.4°F)

FREEZING/MELTING POINT @ 10 psig: -90.8°C (-131.5°F)

SPECIFIC GRAVITY (air = 1) @ 21.1°C (70°F): 1.53

pH: Not applicable.

SOLUBILITY IN WATER vol/vol @ 0°C (32°F) and 1 atm: 1.3

MOLECULAR WEIGHT: 44.013

EVAPORATION RATE (nBuAc = 1): Not applicable.

EXPANSION RATIO: Not applicable.

ODOR THRESHOLD: Not applicable.

SPECIFIC VOLUME (ft³/lb): 8.7

VAPOR PRESSURE @ 70°F (21.1°C) psig: 745

COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

APPEARANCE AND COLOR: : This product is a colorless, liquefied gas with a sweet odor.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no unusual warning properties associated with a release of this product. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.

10. STABILITY and REACTIVITY

STABILITY: Normally stable.

DECOMPOSITION PRODUCTS: Nitrogen and oxygen.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Flammable materials, oils, grease, alkali metals, aluminum, boron, tin oxide, lithium hydride tungsten carbide. Nitrous Oxide forms explosive mixtures with phosphine, ammonia, carbon monoxide, hydrogen sulfide, hydrogen, and acetylene. This compound decomposes explosively at high temperatures, producing nitrogen and oxygen. This reaction will occur at lower temperatures in the presence of catalytic surfaces (i.e. silver, platinum, cobalt, copper oxides, or nickel oxides). Mixtures of Nitrous Oxide and silane are stable, but such mixtures will detonate explosively when exposed to the atmosphere or elevated temperatures. Flashback into the cylinder resulting in catastrophic failure of the cylinder containing such mixtures can occur. Nitrous Oxide/Fuel gas mixtures are subject to all of the restrictions and precautions governing Fuel/Oxidizer mixtures.

10. STABILITY and REACTIVITY (Continued)

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid contact with incompatible materials. Cylinders exposed to high temperatures or direct flame can rupture or burst.

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following information is available for Nitrous Oxide.

SLN (*Drosophila melanogaster*,
inhalation) = 99 pph/6 months-C
DNA Inhibition Systems Test (rat,
inhalation) - 75000 ppm/24 hours

TCLo (inhalation, mouse) = 5000 ppm/4
hours (female, 14 day post);
reproductive effects
TCLo (inhalation, mouse) = 75 pph/6
hours (female, 14 day post);
teratogenic effects

TDLo (inhalation, human) = 24 mg/kg/2
hours; central nervous system,
cardiovascular system, metabolic
system effects.
LCLo (inhalation, rat) = 1068 mg/m³/4
hours

SUSPECTED CANCER AGENT: Nitrous Oxide is not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC; therefore it is not considered to be, nor suspected to be a cancer-causing agent by these agencies.

IRRITANCY OF PRODUCT: Contact with rapidly expanding gases can cause frostbite and damage to exposed skin and eyes.

SENSITIZATION OF PRODUCT: Nitrous Oxide is not a sensitizer.

REPRODUCTIVE TOXICITY INFORMATION: Epidemiological studies suggest fetotoxic effects and higher rates of spontaneous abortions in humans who have been over-exposed to Nitrous Oxide. Although a definite causal relationship between Nitrous Oxide exposures and reproductive problems have not been established, exposure to the gas should be minimized. Listed below is additional information concerning the effects of Nitrous Oxide on the human reproductive system.

Mutagenicity: Nitrous Oxide is not expected to cause mutagenic effects in humans.

Embryotoxicity: Nitrous Oxide is reported to cause embryotoxic effects in laboratory animals. Refer to following paragraph for additional information.

Teratogenicity: Nitrous Oxide may cause teratogenic effects in humans. Exposure to Nitrous Oxide has caused embryo and fetal toxicity effects in laboratory animals. Such effects include reduced fetal weight, delayed ossification, and an increased incidence of visceral and skeletal variations.

Reproductive Toxicity: Nitrous Oxide may cause adverse reproductive effects in humans.

*A **mutagen** is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An **embryotoxin** is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A **teratogen** is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A **reproductive toxin** is any substance which interferes in any way with the reproductive process.*

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing respiratory conditions, central nervous system disorders, blood and immune system disorders, and pregnancies may be aggravated or adversely effected by over-exposure to this product. **Pregnant women should avoid any exposure to Nitrous Oxide.**

RECOMMENDATIONS TO PHYSICIANS: Provide oxygen, treat symptoms and reduce over-exposure. 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.

BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, Biological Exposure Indices (BEIs) are not applicable for Nitrous Oxide.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: The gas will be dissipated rapidly in well-ventilated areas.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: Any adverse effect on animals would be related to oxygen deficient environments, effects on the central nervous system, and potential reproductive problems. Symptoms of exposure would be similar for those described for humans. No adverse effect is anticipated to occur to plant-life, except for frost produced in the presence of rapidly expanding gases.

12. ECOLOGICAL INFORMATION (Continued)

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on this product's effects on aquatic life. This gas is only slightly soluble in water.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Return cylinders with any residual product to Air Liquide. Do not dispose of locally.

For emergency disposal, secure the cylinder and slowly discharge the gas to the atmosphere in a well-ventilated area or outdoors, away from all sources of ignition.

14. TRANSPORTATION INFORMATION

THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

For Nitrous Oxide, Gas:

PROPER SHIPPING NAME: Nitrous oxide
HAZARD CLASS NUMBER & DESCRIPTION: 2.2 (Non-Flammable Gas)
UN IDENTIFICATION NUMBER: UN 1070
PACKING GROUP: Not applicable.
DOT LABEL(S) REQUIRED: Non-Flammable Gas, Oxidizer
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996): 122

For Liquefied Nitrous Oxide:

Nitrous Oxide, refrigerated liquid
2.2 (Non-Flammable Gas)
UN 2201
Not applicable.
Non-Flammable Gas, Oxidizer

MARINE POLLUTANT: Nitrous Oxide is not classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B).

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 present serious safety hazards and should be discouraged.

NOTE: Shipment of compressed gas cylinders which have not been filled with the owners consent is a violation of Federal law (49 CFR, Part 173.301 (b)).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian Shipments.

15. REGULATORY INFORMATION

SARA REPORTING REQUIREMENTS: Nitrous Oxide is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act.

SARA THRESHOLD PLANNING QUANTITY: Not applicable.

TSCA INVENTORY STATUS: Nitrous Oxide is listed on the TSCA Inventory.

CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

OTHER U.S. FEDERAL REGULATIONS:

- Nitrous Oxide is generally recognized as safe (GRAS) per 29 CFR 184.1545, as a direct human food ingredient when used as a propellant, aerating agent, dairy product, analog agent and gas.
- Nitrous Oxide USP is regulated by the FDA as a prescription drug.
- Depending on specific operations involving the use of this product, the regulations of the Process Safety Management of Highly Hazardous Chemicals may be applicable (29 CFR 1910.119). Under this regulation Nitrous Oxide is not listed in Appendix A.
- Nitrous Oxide does not contain any Class I or Class II ozone depleting chemicals (40 CFR part 82).
- Nitrous Oxide is not listed as a Regulated Substance, per 40 CFR, Part 68, of the Risk Management for Chemical Releases.

CALIFORNIA PROPOSITION 65: Nitrous Oxide is not on the California Proposition 65 lists.

15. REGULATORY INFORMATION (Continued)

STATE REGULATORY INFORMATION: Nitrous Oxide is covered under the following specific State regulations:

Alaska - Designated Toxic and Hazardous Substances: No.
California - Permissible Exposure Limits for Chemical Contaminants: Nitrous Oxide.
Florida - Substance List: No.
Illinois - Toxic Substance List: Nitrous Oxide.
Kansas - Section 302/313 List: No.
Massachusetts - Substance List: No.

Minnesota - List of Hazardous Substances: Nitrous Oxide.
Missouri - Employer Information/Toxic Substance List: No.
New Jersey - Right to Know Hazardous Substance List: Nitrous Oxide.
North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.

Pennsylvania - Hazardous Substance List: No.
Rhode Island - Hazardous Substance List: No.
Texas - Hazardous Substance List: No.
West Virginia - Hazardous Substance List: No.
Wisconsin - Toxic and Hazardous Substances: No.

OTHER CANADIAN REGULATIONS: Nitrous Oxide is categorized as a Controlled Product, Hazard Classes A, C and D2A as per the Controlled Product Regulations.

16. OTHER INFORMATION

SPECIAL PRECAUTIONS: All gauges, valves, regulators, piping and equipment to be used in Nitrous Oxide service must be cleaned for Oxygen service in accordance with CGA pamphlet G-4.1. Use piping and equipment adequately designed to withstand pressures and temperatures 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.

MIXTURES: When two or more gases or liquefied 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. Remember, gases and liquids have properties which can cause serious injury or death.

Further information about Nitrous Oxide can be found in the following pamphlets published by: Compressed Gas Association Inc. (CGA), 4221 Walney Road 5th floor, Chantilly, VA 20151-2923. Telephone: (703) 788-2700.

- G-4.1 "Cleaning Equipment of Oxygen Service"
- G-8.1 "Standard for Nitrous Oxide Systems at Consumer Sites"
- G-8.2 "Commodity Specification for Nitrous Oxide"
- P-1 "Safe Handling of Compressed Gases in Containers"
- P-14 "Accident Prevention in Oxygen-Rich and Oxygen Deficient Atmospheres"
- SB-2 "Oxygen Deficient Atmospheres"
- SB-6 "Nitrous Oxide Security and Control"
- AV-1 "Safe Handling and Storage of Compressed Gases"
- "Handbook of Compressed Gases"

