



Linde Gas (216) 642-6600
 P.O. Box 94737
 Cleveland, Ohio 44101
 www.us.lindegas.com

MATERIAL SAFETY DATA SHEET

No. 51

PRODUCT NAME Nitrous Oxide	CAS # 10024-97-2
TRADE NAME AND SYNONYMS Nitrous Oxide (D.O.T.); Laughing Gas	DOT I.D. No.: UN 1070
CHEMICAL NAME AND SYNONYMS Nitrous Oxide	DOT Hazard Class: Division 2.2
ISSUE DATES AND REVISIONS Revised May 1998	Formula N ₂ O
	Chemical Family: Oxide of Nitrogen

HEALTH HAZARD DATA

<p>TIME WEIGHTED AVERAGE EXPOSURE LIMIT 50 Molar PPM (ACGIH 1997) with an A4 (Not Classifiable as a Human Carcinogen) carcinogen rating. OSHA 1995 PEL (8 hr. TWA) = None listed.</p>
<p>SYMPTOMS OF EXPOSURE <u>Inhalation:</u> High concentrations of nitrous oxide so as to exclude an adequate supply of oxygen to the lungs causes dizziness, deeper breathing due to air hunger, possible nausea and eventual unconsciousness.</p>
<p>TOXICOLOGICAL PROPERTIES Nitrous oxide is a slight narcotic but lacks substantial toxicity. Therefore, its major property is the exclusion of an adequate supply of oxygen to the lungs. (Continued on Page 4) Nitrous oxide is not listed in the IARC, NTP or by OSHA as a carcinogen or potential carcinogen. Persons in ill health where such illness would be aggravated by exposure to nitrous oxide should not be allowed to work with or handle this product. (Continued on Page 4)</p>
<p>RECOMMENDED FIRST AID TREATMENT PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO NITROUS OXIDE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. <u>Inhalation:</u> Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given assisted respiration and supplemental oxygen. Further treatment should be symptomatic and supportive.</p>

Information contained in this material safety data sheet is offered without charge for use by technically qualified personnel at their discretion and risk. All statements, technical information and recommendations contained herein are based on tests and data which we believe to be reliable, but the accuracy or completeness thereof is not guaranteed and no warranty of any kind is made with respect thereto. This information is not intended as a license to operate under or a recommendation to practice or infringe any patent of this Company or others covering any process, composition of matter or use.
 Since the Company shall have no control of the use of the product described herein, the Company assumes no liability for loss or damage incurred from the proper or improper use of such product.

NITROUS OXIDE

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

See Page 4

PHYSICAL DATA

BOILING POINT -127.2°F (-88.44°C)	LIQUID DENSITY AT BOILING POINT 76.8 lb/ft ³ (1230 kg/m ³)
VAPOR PRESSURE @ 70°F (21.1°C): 754 psia (5200 kPa)	GAS DENSITY AT 700F. 1 atm 0.1146 lb/ft ³ (1.836 kg/m ³)
SOLUBILITY IN WATER Slightly soluble	FREEZING POINT -131.6°F (-90.9°C)
EVAPORATION RATE N/A (Gas)	SPECIFIC GRAVITY (AIR=1) @ 70°F (21.10C) = 1.53
APPEARANCE AND ODOR Colorless gas with slightly sweet taste and odor.	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) N/A	AUTO IGNITION TEMPERATURE N/A	FLAMMABLE LIMITS % BY VOLUME (See Page 4) LEL N/A UEL N/A
EXTINGUISHING MEDIA Copious quantities of water for fires with nitrous oxide as the oxidizer		ELECTRICAL CLASSIFICATION Class 1, Group A
SPECIAL FIRE FIGHTING PROCEDURES If possible, stop the flow of nitrous oxide which is supporting the fire. Use water spray to cool surrounding cylinders.		
UNUSUAL FIRE AND EXPLOSION HAZARDS None		

REACTIVITY DATA

STABILITY Unstable		CONDITIONS TO AVOID None
Stable	X	
INCOMPATIBILITY (Materials to avoid) All flammable materials		
HAZARDOUS DECOMPOSITION PRODUCTS See Page 4		
HAZARDOUS POLYMERIZATION May Occur		CONDITIONS TO AVOID
Will Not Occur	X	None

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact your closest supplier location or call the emergency telephone number listed herein.
WASTE DISPOSAL METHOD Do not attempt to dispose of waste or unused quantities. Return in the shipping container properly labeled, with any valve plugs or caps secured and valve outlet plugs or caps secured and valve protection cap in place to your supplier. For emergency disposal assistance, contact your closest supplier location or call the emergency telephone number listed herein.

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.		
VENTILATION See Local Exhaust	LOCAL EXHAUST To prevent accumulation above the TWA	SPECIAL N/A
	MECHANICAL (Gen.) N/A	OTHER N/A
PROTECTIVE GLOVES Any material		
EYE PROTECTION Safety goggles or glasses		
OTHER PROTECTIVE EQUIPMENT Safety shoes		

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION DOT Shipping Name: Nitrous oxide DOT Hazard Class: Division 2.2 DOT Shipping Label: Nonflammable Gas I.D. No.: UN 1070
SPECIAL HANDLING RECOMMENDATIONS Use only in well-ventilated areas. Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use I point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<1,500 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. For additional handling recommendations, consult Compressed Gas Association's Pamphlets P-1, P-2, P-14, and Safety Bulletins SB-2 and SB-6.
SPECIAL STORAGE RECOMMENDATIONS Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits and away from full or empty stored cylinders which contain flammable products. Do not allow the temperature where cylinders are stored to exceed 125F (52C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in - first out" inventory system to prevent full cylinders being stored for excessive periods of time. For additional storage recommendations, consult Compressed Gas Association's Pamphlets P-1, P-2, P-14, and Safety Bulletins SB-2 and SB-6.
SPECIAL PACKAGING RECOMMENDATIONS Nitrous oxide is noncorrosive and may be used with any common structural material. Nitrous oxide oxidizes some metals at elevated temperatures.
OTHER RECOMMENDATIONS OR PRECAUTIONS Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR). (Continued on Page 4)

*Various Government Agencies (i.e. Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, handling, storage or use of this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.

NITROUS OXIDE

HEALTH HAZARD DATA

SYMPTOMS OF EXPOSURE - Continued

It is also employed as an anesthetic when mixed with oxygen. These mixtures are generally 80 molar % N₂O and molar % O₂.

TOXICOLOGICAL PROPERTIES - Continued

Some tests indicate that inhaling nitrous oxide has resulted in spontaneous abortion. Medical personnel should strictly abide by the ACGIH TWA.

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS OR GASES

Nitrous oxide will serve as the oxident for most flammable compounds. Some flammables (general allenes) have a lower flammable limit in nitrous oxide than in pure oxygen. Powerful reducing agents will react violently with nitrous oxide at room temperatures.

REACTIVITY DATA

HAZARDOUS DECOMPOSITION PRODUCTS

Decomposition to N₂ and O₂ will occur at a lower temperature (approximately 650°F), if oxides of silver, copper and nickel are present. Some of these oxides may result from soldering or brazing operations.

SPECIAL PRECAUTIONS

OTHER RECOMMENDATIONS OR PRECAUTIONS - Continued

Always secure cylinders in an upright position before transporting them. NEVER transport cylinders in trucks of vehicles, enclosed vans, truck cabs or in passenger compartments. Transport cylinders secured in open flatbed or in open pick-up type vehicles.

Reporting under SARA, Title III, Section 313 not required.

NFPA 704 No. for nitrous oxide = 1 0 0 OX