

Print MSDS Sheet

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SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MG INDUSTRIES
3 GREAT VALLEY PARKWAY
MALVERN, PENNSYLVANIA 19355
PHONE: 610-695-7400
FAX: 610-695-7596
SUBSTANCE: NITROUS OXIDE
TRADE NAMES/SYNONYMS:
DINITROGEN MONOXIDE; FACTITIOUS AIR; LAUGHING GAS; HYPONITROUS ACID ANHYDRIDE;
NITROGEN (I) OXIDE; NITROGEN OXIDE; STCC 4904340; UN 1070; NITROGEN OXIDE
(N2O); DINITROGEN OXIDE; NITROUS OXIDE, COMPRESSED; N2O; MGI16790; RTECS
QX1350000
CHEMICAL FAMILY: inorganic, gas
CREATION DATE: May 07 1990
REVISION DATE: Mar 22 2001

EMERGENCY CONTACT:
CHEMTREC:
1-800-424-9300

SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: NITROUS OXIDE
CAS NUMBER: 10024-97-2
EC NUMBER (EINECS): 233-032-0
PERCENTAGE: 100.0

SECTION 3 HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=0 REACTIVITY=0
EMERGENCY OVERVIEW:
PHYSICAL DESCRIPTION: Colorless gas or liquid with a slightly sweet odor and
taste.
MAJOR HEALTH HAZARDS: potentially fatal if inhaled, central nervous system
depression, difficulty breathing
PHYSICAL HAZARDS: Containers may rupture or explode if exposed to heat.
POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: nausea, vomiting, symptoms of drunkenness,
hyperactivity or drowsiness, hearing loss, suffocation, death
LONG TERM EXPOSURE: tingling sensation, impotence, reproductive effects
SKIN CONTACT:
SHORT TERM EXPOSURE: blisters, frostbite
LONG TERM EXPOSURE: no information is available
EYE CONTACT:
SHORT TERM EXPOSURE: frostbite, blurred vision
LONG TERM EXPOSURE: no information is available
INGESTION:
SHORT TERM EXPOSURE: frostbite
LONG TERM EXPOSURE: no information is available
CARCINOGEN STATUS:
OSHA: No
NTP: No
IARC: No

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SECTION 4 FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give
artificial respiration if not breathing. If breathing is difficult, oxygen
should be administered by qualified personnel. Get immediate medical

attention.

SKIN CONTACT: If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115 F; 41-46 C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention.

EYE CONTACT: Flush eyes with plenty of water.

INGESTION: If a large amount is swallowed, get medical attention.

NOTE TO PHYSICIAN: For inhalation, consider oxygen.

SECTION 5 FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire hazard. Containers may rupture or explode if exposed to heat. Gas/air mixtures are explosive.

EXTINGUISHING MEDIA: carbon dioxide, regular dry chemical

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk.

Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Use extinguishing agents appropriate for surrounding fire. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Do not get water directly on material. Reduce vapors with water spray. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Consider downwind evacuation if material is leaking.

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SECTION 6 ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:

Stop leak if possible without personal risk. Avoid contact with combustible materials. Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering.

SECTION 7 HANDLING AND STORAGE

STORAGE: Cylinder temperature should not exceed 125 F (52 C).

29 CFR Subpart "H"-Hazardous Materials.

National Fire Protection Association publication #55, "Standard for the Storage, Use and Handling of Compressed and Liquified Gases in Portable Cylinders".

Compressed Gas Association publication P-1, "Safe Handling of Compressed Gases in Containers".

Store and handle in accordance with current regulations and standards:

OSHA 29 CFR 1910.101

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:

NITROUS OXIDE:

50 ppm ACGIH TWA

25 ppm (46 mg/m³) NIOSH recommended TWA (halogenated anesthetic gas)

180 mg/m³ (100 ml/m³) DFG MAK (peak limitation category-II, 1)

100 ppm (183 mg/m³) UK OES TWA

MEASUREMENT METHOD: Gas collection bag; Infrared spectrometry; NIOSH IV # 6600

VENTILATION: Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: For the gas: Eye protection not required, but recommended. For

the liquid: Wear splash resistant safety goggles. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: For the gas: Protective clothing is not required. For the liquid: Wear appropriate protective, cold insulating clothing.

GLOVES: Wear insulated gloves.

RESPIRATOR: Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use.

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode.

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Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

For Unknown Concentrations or Immediately Dangerous to Life or Health -

Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.

Any self-contained breathing apparatus with a full facepiece.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION: Colorless gas or liquid with a slightly sweet odor and taste.

MOLECULAR WEIGHT: 44.01

MOLECULAR FORMULA: N₂O

BOILING POINT: -128 F (-89 C)

FREEZING POINT: -132 F (-91 C)

VAPOR PRESSURE: 760 mmHg @ -88 C

VAPOR DENSITY (air=1): 1.530

SPECIFIC GRAVITY: Not applicable

DENSITY: 1.8122 g/L @ 25 C

WATER SOLUBILITY: 59% @ 25 C

PH: Not applicable

VOLATILITY: Not applicable

ODOR THRESHOLD: Not available

EVAPORATION RATE: Not applicable

VISCOSITY: 0.0145 cP @ 25 C

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable

SOLVENT SOLUBILITY:

Soluble: sulfuric acid, alcohol, alkali solutions, ether, oils

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid contact with combustible materials. Protect from physical damage and heat. Containers may rupture or explode if exposed to heat.

INCOMPATIBILITIES: combustible materials, metals, bases, reducing agents, peroxides, metal salts, metal oxides

NITROUS OXIDE:

ACETYLENE: Forms explosive mixture.

ALUMINUM: Oxidizes.

AMMONIA: Forms explosive mixture.

BORON (AMORPHOUS): Ignites when heated.

CADMIUM: Oxidizes @ 300 C.

CARBON MONOXIDE: Explosion hazard.

COBALT: Oxidizes @ 200 C.

COPPER: Oxidizes @ 150 C.

DITUNGSTEN CARBIDE: Incandescent reaction.

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ETHANOL: Mixtures with supercritical nitrous oxide may detonate.
 HYDRAZINE: Ignites.
 HYDROGEN: Forms explosive mixture.
 HYDROGEN + OXYGEN: Ignition reaction with possible explosion.
 HYDROGEN SULFIDE: Forms explosive mixture.
 IRON: Oxidizes @ 170 C.
 LEAD: Oxidizes @ 300 C.
 LITHIUM HYDRIDE: Ignites.
 METHANOL: Mixtures with supercritical nitrous oxide may detonate.
 NICKEL: Oxidizes @ 200 C.
 OXIDIZABLE ORGANIC MATERIALS: Mixtures with supercritical nitrous oxide may detonate.
 ORGANIC PEROXIDES: Incompatable.
 PHENYLLITHIUM: Forms unstable products.
 PHOSPHINE: Explodes when sparked.
 REDUCING AGENTS (STRONG): Violent reaction @ room temperature.
 SODIUM (GASEOUS): Incandesces @ 260 C.
 STANNOUS CHLORIDE: Violent reaction.
 TIN (II) OXIDE: Ignites @ 400 C.
 TUNGSTEN CARBIDE: Ignites with incandescence @ 600 C.

HAZARDOUS DECOMPOSITION:

Thermal decomposition products: oxides of nitrogen

POLYMERIZATION: Will not polymerize.

SECTION 11 TOXICOLOGICAL INFORMATION

NITROUS OXIDE:

TOXICITY DATA:

24 mg/kg/2 hour(s) inhalation-human TCLo; 50 ppm/6 hour(s)-13 week(s) intermittent inhalation-mouse TCLo

CARCINOGEN STATUS: IARC: Human Inadequate Evidence, Animal Inadequate Evidence, Group 3 (Anesthetics, volatile); ACGIH: A4 -Not Classifiable as a Human Carcinogen

TARGET ORGANS: central nervous system

MUTAGENIC DATA:

sex chromosome loss and non disjunction - Drosophila melanogaster inhalation 99 pph 6 minute(s)-continuous; DNA inhibition - human inhalation 50 pph 24 hour(s); DNA inhibition - rat inhalation 75000 ppm 24 hour(s); other mutation test systems - rat inhalation 50 pph 24 hour(s)

REPRODUCTIVE EFFECTS DATA:

5 pph inhalation-rat TCLo/4 hour(s) 6-15 day(s) pregnant female continuous; 20 pph inhalation-rat TCLo/8 hour(s) 28 day(s) male; 50 pph inhalation-rat TCLo/24 hour(s) 8-11 day(s) pregnant female continuous; 50 ppm inhalation-rat TCLo/6 hour(s) 30 day(s) male; 1 pph inhalation-rat TCLo/8 hour(s) 1-21 day(s) pregnant female continuous; 50 pph inhalation-rat TCLo/4 hour(s) 14 day(s) pregnant female continuous; 3 gm/kg subcutaneous-rat TDLo 8 day(s) pregnant female continuous; 3 gm/kg subcutaneous-rat TDLo 8 day(s) pregnant female continuous; 75 pph inhalation-mouse TCLo/6 hour(s) 14 day(s) pregnant female continuous; 5000 ppm inhalation-mouse TCLo/4 hour(s) 14 day(s) pregnant female continuous; 90 pph inhalation-hamster TCLo/24 hour(s) 10 day(s) pregnant female continuous; 95 pph inhalation-hamster TCLo/24

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hour(s) 7 day(s) pregnant female continuous

ADDITIONAL DATA: Central nervous system depressants may enhance the toxic effects.

HEALTH EFFECTS:

INHALATION:

ACUTE EXPOSURE:

NITROUS OXIDE: Inhalation of high concentrations without adequate oxygen can result in headache and serious anoxia causing fatal cardiac arrhythmias or brain damage with cerebral edema, permanent mental deficit,

and visual system involvement. High concentrations mixed with air or oxygen may produce signs of central nervous system depression including drowsiness, lightheadedness, confusion, hysteria, anesthesia, and unconsciousness. Some persons may experience nausea, and occasionally vomiting, following anesthesia. Anesthetic concentrations may produce permanent hearing loss in persons who have had middle ear surgery. Exposure of pregnant rats to 75% nitrous oxide for 8 hours on the 15th day of gestation resulted in permanent alterations in neurobehavioral output of the newborns as exhibited by hyperactivity in males and hypoactivity in females.

CHRONIC EXPOSURE:

NITROUS OXIDE: Prolonged occupational exposure or abuse has resulted in neurologic effects including initial signs of numbness, paresthesias, and loss of pain and temperature sensation, progressing to muscle weakness, loss of balance, gait ataxia, Lhermitte's sign, impotence, sphincter difficulties, loss of bladder and vaginal sensation, and reduction in dexterity, cognition, and motor and audiovisual skills. Recovery may occur in months, but damage may be permanent. Signs of bone marrow depression including fatal aplastic anemia have been reported. There have also been increased incidences of kidney and liver disorders, spontaneous abortions, and fetal malformations reported among dentists and their assistants. Exposure to nitrous oxide in utero prior to organogenesis resulted in physical malformations in rat fetuses; permanent alterations in brain function can result following exposure during a period beyond major organogenesis. Prolonged exposure produced some damage to chromosomes in bone marrow cells and spermatogonial cells in male rats. 500 ppm 8 hrs/day/35 days disrupted hormonal cycles and decreased conception in female rats.

SKIN CONTACT:**ACUTE EXPOSURE:**

NITROUS OXIDE: No adverse effects have been reported from the gas. Due to rapid evaporation, the liquid may cause frostbite with redness, tingling, and pain or numbness. In more severe cases, the skin may become hard and white and blisters may form.

CHRONIC EXPOSURE:

NITROUS OXIDE: No data available.

EYE CONTACT:**ACUTE EXPOSURE:**

NITROUS OXIDE: No adverse effects have been reported from the gas. Due to rapid evaporation, the liquid may cause frostbite with redness, pain, and blurred vision.

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CHRONIC EXPOSURE:

NITROUS OXIDE: No data available.

INGESTION:**ACUTE EXPOSURE:**

NITROUS OXIDE: If the liquid is swallowed, frostbite damage of the lips, mouth, and mucous membranes may occur.

CHRONIC EXPOSURE:

NITROUS OXIDE: No data available.

SECTION 12 ECOLOGICAL INFORMATION

Not available

SECTION 13 DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations.

SECTION 14 TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:

PROPER SHIPPING NAME: Nitrous oxide
ID NUMBER: UN1070
HAZARD CLASS OR DIVISION: 2.2
LABELING REQUIREMENTS: Nonflammable gas; Oxidizer
PACKAGING AUTHORIZATIONS:
EXCEPTIONS: 49 CFR 173.306
NON-BULK PACKAGING: 49 CFR 173.304
BULK PACKAGING: 49 CFR 173.314, 315
QUANTITY LIMITATIONS:
PASSENGER AIRCRAFT OR RAILCAR: 75 kg
CARGO AIRCRAFT ONLY: 150 kg

CANADIAN TRANSPORTATION OF DANGEROUS GOODS: No classification assigned.

LAND TRANSPORT ADR/RID:

SUBSTANCE NAME: Nitrous oxide (N2O)/Nitrous oxide
UN NUMBER: UN1070
ADR/RID CLASS: 2
ITEM NUMBER: 5(a)/20
WARNING SIGN/LABEL: 2; 05/2; 05; 13
HAZARD ID NUMBER: 25

AIR TRANSPORT IATA/ICAO:

PROPER SHIPPING NAME: Nitrous oxide, compressed
UN/ID NUMBER: UN1070
IATA/ICAO CLASS: 2.2

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SUBSIDIARY RISK: 5.1
LABEL: Nonflammable gas; Oxidizer

MARITIME TRANSPORT IMDG:

CORRECT TECHNICAL NAME: Nitrous oxide
UN/ID NUMBER: UN1070
IMDG CLASS: 2(2.2)
SUBSIDIARY RISK LABEL: Oxidizing agent
EmS No.: 2-08
MFAG Table No.: none
IMDG CODE PAGE: 2166

SECTION 15 REGULATORY INFORMATION

U.S. REGULATIONS:

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.
SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):
Not regulated.
SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40):
Not regulated.
SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: Yes
CHRONIC: No
FIRE: No
REACTIVE: No
SUDDEN RELEASE: Yes
SARA TITLE III SECTION 313 (40 CFR 372.65): Not regulated.
OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:

California Proposition 65: Not regulated.

CANADIAN REGULATIONS:

WHMIS CLASSIFICATION: Not determined.

EUROPEAN REGULATIONS:

EC CLASSIFICATION (CALCULATED):
O Oxidizing
DANGER/HAZARD SYMBOL:
O Oxidizing

EC RISK AND SAFETY PHRASES:

R 8 Contact with combustible material may cause fire.

GERMAN REGULATIONS:

WATER HAZARD CLASS (WGK):

STATE OF CLASSIFICATION: VwVwS

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CLASSIFICATION UNDER HAZARD TO WATER: 0

NATIONAL INVENTORY STATUS:

U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

SECTION 16 OTHER INFORMATION

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