Material Name: NITROUS OXIDE

Manufacturer Information
MATHESON TRI-GAS, INC.
150 Allen Road, Suite 302
Basking Ridge, NJ 07920

General Information: 1-800-416-2505
Emergency #: 1-800-424-9300 (CHEMTREC)
Outside the US: 703-527-3887 (Call collect)

Chemical Family
inorganic, gas

Synonyms
MTG MSDS 70; DINITROGEN MONOXIDE; FACTITIOUS AIR; LAUGHING GAS; HYPONITROUS ACID ANHYDRIDE; NITROGEN (I) OXIDE; NITROGEN OXIDE; UN 1070; NITROGEN OXIDE (N2O); DINITROGEN OXIDE; NITROUS OXIDE, COMPRESSED; N2O; RTECS: QX1350000

Product Use
industrial

Usage Restrictions
None known.

*** Section 2 - HAZARDS IDENTIFICATION ***

EMERGENCY OVERVIEW
Color: colorless
Physical Form: gas
Odor: sweet odor
Health Hazards: potentially fatal if inhaled, central nervous system depression, difficulty breathing
Physical Hazards: Containers may rupture or explode if exposed to heat. Oxidizer.

POTENTIAL HEALTH EFFECTS

Inhalation
Short Term: central nervous system effects, nausea, vomiting, headache, drowsiness, dizziness, loss of coordination, hyperactivity or drowsiness, hearing loss, suffocation
Long Term: tingling sensation, impotence, liver effects, kidney effects, reproductive effects, blood disorders

Skin
Short Term: blisters, frostbite
Long Term: no information is available

Eye
Short Term: frostbite, blurred vision
Long Term: no information is available

Ingestion
Short Term: frostbite
Long Term: no information is available
**Safety Data Sheet**

Material Name: NITROUS OXIDE

**Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS**

<table>
<thead>
<tr>
<th>CAS</th>
<th>Component</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>10024-97-2</td>
<td>NITROUS OXIDE</td>
<td>100</td>
</tr>
</tbody>
</table>

**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**
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.

**Eyes**
Flush eyes with plenty of water.

**Ingestion**
If a large amount is swallowed, get medical attention.

**Note to Physicians**
For inhalation, consider oxygen.

**Section 5 - FIRE FIGHTING MEASURES**

See Section 9 for Flammability Properties

**NFPA Ratings:**
- Health: 3 Fire: 0 Reactivity: 0
- Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

**Flammable Properties**
- Oxidizer. May ignite or explode on contact with combustible materials. Gas/air mixtures are explosive.

**Extinguishing Media**
- carbon dioxide, regular dry chemical
- Large fires: Use regular foam or flood with fine water spray.

**Unsuitable Extinguishing Media**
- None known.

**Protective Equipment and Precautions for Firefighters**
- Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

**Fire Fighting Measures**
- Flood with water. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Evacuate if fire gets out of control or containers are directly exposed to fire. Evacuation radius: 800 meters (1/2 mile). 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.

**Thermal Decomposition Products**
Safety Data Sheet

Material Name: NITROUS OXIDE
SDS ID: MAT16790

Combustion: oxides of nitrogen

*** Section 6 - ACCIDENTAL RELEASE MEASURES***

Water Release
Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

Occupational spill/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***

Handling Procedures
Explosive when mixed with combustible material.

Storage Procedures

*** Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION***

Component Analysis
NITROUS OXIDE (10024-97-2)
ACGIH: 50 ppm TWA
NIOSH: 25 ppm TWA (over the time exposed to waste anesthetic gas); 46 mg/m3 TWA (over the time exposed to waste anesthetic gas)

Component Biological Limit Values
There are no biological limit values for any of this product's components.

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

PERSONAL PROTECTIVE EQUIPMENT

Eyes/Face
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.

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

Glove Recommendations
Wear insulated gloves.

Respiratory Protection
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. Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
**Safety Data Sheet**

**Material Name: NITROUS OXIDE**  
SDS ID: MAT16790

For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

***Section 9 - PHYSICAL AND CHEMICAL PROPERTIES***

<table>
<thead>
<tr>
<th>Physical State:</th>
<th>Gas</th>
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</thead>
<tbody>
<tr>
<td>Color:</td>
<td>colorless</td>
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<tr>
<td>Odor:</td>
<td>sweet odor</td>
</tr>
<tr>
<td>Taste:</td>
<td>sweet taste</td>
</tr>
<tr>
<td>Melting/Freezing Point:</td>
<td>-91 °C</td>
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<td>Decomposition:</td>
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<tr>
<td>Vapor Pressure:</td>
<td>760 mmHg @ -88 °C</td>
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<tr>
<td>Density:</td>
<td>1.8122 g/L @ 25 °C</td>
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<tr>
<td>Log KOW:</td>
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<tr>
<td>Viscosity:</td>
<td>0.0145 cP @25 °C</td>
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<td>Molecular Formula:</td>
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<td>Appearance:</td>
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<tr>
<td>Physical Form:</td>
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<tr>
<td>Odor Threshold:</td>
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<tr>
<td>pH:</td>
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<tr>
<td>Boiling Point:</td>
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<tr>
<td>Evaporation Rate:</td>
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<tr>
<td>Vapor Density (air = 1):</td>
<td>1.530</td>
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<tr>
<td>Water Solubility:</td>
<td>59 % @ 25 °C</td>
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<tr>
<td>Auto Ignition:</td>
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<tr>
<td>Molecular Weight:</td>
<td>44.01</td>
</tr>
</tbody>
</table>

**Solvent Solubility**
Soluble: sulfuric acid, alcohol, alkali solutions, ether, oils

***Section 10 - STABILITY AND REACTIVITY***

**Chemical Stability**
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. May ignite or explode on contact with combustible materials.

**Materials to Avoid**
combustible materials, metals, bases, reducing agents, peroxides, metal salts, metal oxides

**Combustion:** oxides of nitrogen

**Possibility of Hazardous Reactions**
Will not polymerize.

***Section 11 - TOXICOLOGICAL INFORMATION***

**Component Analysis - LD50/LC50**
The components of this material have been reviewed in various sources and the following selected endpoints are published:

**NITROUS OXIDE (10024-97-2)**
Inhalation LC50 Rat >250 ppm 4 h

**Component Carcinogenicity**

**NITROUS OXIDE (10024-97-2)**
ACGIH: A4 - Not Classifiable as a Human Carcinogen

**Irritation**
No animal testing data available for skin or eyes.
Safety Data Sheet

Material Name: NITROUS OXIDE
SDS ID: MAT16790

Medical Conditions Aggravated by Exposure
- central nervous system disorders, reproductive disorders, kidney disorders, liver disorders, blood system disorders

*** Section 12 - ECOLOGICAL INFORMATION***

Component Analysis - Aquatic Toxicity
No LOLI ecotoxicity data are available for this product's components.

*** Section 13 - DISPOSAL CONSIDERATIONS***

Disposal Methods
Dispose in accordance with all applicable regulations.

Component Waste Numbers
The U.S. EPA has not published waste numbers for this product's components.

*** Section 14 - TRANSPORT INFORMATION***

US DOT Information
- Shipping Name: Nitrous oxide
- UN/NA #: UN1070
- Hazard Class: 2.2
- Required Label(s): 2.2, 5.1

TDG Information
- Shipping Name: Nitrous oxide
- UN #: UN1070
- Hazard Class: 2.2
- Required Label(s): 2.2, (5.1)

*** Section 15 - REGULATORY INFORMATION***

U.S. Federal Regulations
None of this product's components are listed under SARA Sections 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), or require an OSHA process safety plan.

SARA 311/312
- Acute Health: Yes
- Chronic Health: Yes
- Fire: Yes
- Pressure: Yes
- Reactive: No

U.S. State Regulations
The following components appear on one or more of the following state hazardous substances lists:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>CA</th>
<th>MA</th>
<th>MN</th>
<th>NJ</th>
<th>PA</th>
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<tbody>
<tr>
<td>NITROUS OXIDE</td>
<td>10024-97-2</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):
WARNING! This product contains a chemical known to the state of California to cause reproductive/developmental effects.

Canada WHMIS
The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List
NITROUS OXIDE (10024-97-2)
0.1 %
Safety Data Sheet
Material Name: NITROUS OXIDE
SDS ID: MAT16790

Component Analysis - Inventory

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<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>US</th>
<th>CA</th>
<th>EU</th>
<th>AU</th>
<th>PH</th>
<th>JP</th>
<th>KR</th>
<th>CN</th>
<th>NZ</th>
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</thead>
<tbody>
<tr>
<td>NITROUS OXIDE</td>
<td>10024-97-2</td>
<td>Yes</td>
<td>DSL</td>
<td>EIN</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*** Section 16 - OTHER INFORMATION***

SDS Update: 3/4/2011

Key / Legend
ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LQL - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

Other Information
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End of Sheet MAT16790