NITROUS OXIDE

4. FIRE HAZARDS
4.1 Flash Point: Not pertinent (nonflammable compressed gas)
4.2 Flammable Limits in Air: Not pertinent
4.3 Fire Extinguishing Agents: Not pertinent
4.4 Fire Extinguishing Agents Not to Be Used: Not pertinent
4.5 Special Hazards of Combustion Products: Not pertinent
4.6 Behavior in Fire: Will support combustion, and may increase intensity of fire. Containers may explode when heated.
4.7 Auto Ignition Temperature: Currently not available
4.8 Electrical Hazards: Not pertinent
4.9 Burning Rate: Not pertinent
4.10 Adiabatic Flame Temperature: Currently not available
4.11 Stoichiometric Air to Fuel Ratio: Not pertinent
4.12 Flame Temperature: Currently not available
4.13 Combustion Molar Ratio (Reactant to Product): Not pertinent
4.14 Minimum Oxygen Concentration for Combustion (MOCC): Not listed

7. SHIPPING INFORMATION
7.1 Grades of Purity: 98.0+%
7.2 Storage Temperature: Ambient
7.3 Inert Atmosphere: No requirement
7.4 Venting: Safety relief
7.5 IMO Pollution Category: Currently not available
7.6 Ship Type: Currently not available
7.7 Barge Hull Type: Currently not available

8. HAZARD CLASSIFICATIONS
8.1 49 CFR Category: Nonflammable gas
8.2 49 CFR Class: 2.2
8.3 49 CFR Package Group: Not pertinent
8.4 Marine Pollutant: No
8.5 NFPA Hazard Classification: Not listed
8.6 EPA Reportable Quantity: Not listed
8.7 EPA Pollution Category: Not listed
8.8 RCRA Waste Number: Not listed
8.9 EPA FWPCA List: Not listed

9. PHYSICAL & CHEMICAL PROPERTIES
9.1 Physical State at 15°C and 1 atm: Gas
9.2 Molecular Weight: 44.0
9.3 Boiling Point at 1 atm: −129.1°F = −90.5°C = 183.7 K
9.4 Freezing Point: −131.5°F = −90.8°C = 182.4 K
9.5 Critical Temperature: 97.7°F = 36.5°C = 593.7 K
9.6 Critical Pressure: 1.054 psia = 71.7 atm = 7.28 Mpa
9.7 Specific Gravity: 1.266 at −9°C (liquid)
9.8 Liquid Surface Tension: 10.1 dynes/cm = 0.001 N/m at −25°C
9.9 Liquid Water Interfacial Tension: Currently not available
9.10 Vapor (Gas) Specific Gravity: 1.53
9.11 Ratio of Specific Heats of Vapor (Gas): 1.030 at 20°C
9.12 Latent Heat of Vaporization: 161.7 Btu/lb = 89.9 kJ/kg = 3.76 X 10^5 J/kg
9.13 Heat of Combustion: Not pertinent
9.14 Heat of Decomposition: Not pertinent
9.15 Heat of Solution: Not pertinent
9.16 Heat of Polymerization: Not pertinent
9.17 Heat of Fusion: Currently not available
9.18 Limiting Value: Currently not available
9.19 Reid Vapor Pressure: Currently not available

NOTES

1. CORRECTIVE RESPONSE ACTIONS
Stop discharge

2. CHEMICAL DESIGNATIONS
2.1 CG Compatibility Group: Not listed
2.2 Formula: N\(_2\)O
2.3 IMO UN Designation: 2/1070
2.4 DOT ID No.: 1070
2.5 CAS Registry #: 10024-97-2
2.6 NAERG Guide No.: 102
2.7 Standard Industrial Trade Classification: 52239

3. HEALTH HAZARDS
3.1 Personal Protective Equipment: Self-contained breathing apparatus for high vapor concentrations
3.2 Symptoms Following Exposure: Inhalation causes intense analgesia; concentrations of over 40-60% cause loss of consciousness preceded by hysteria. Contact of liquid with eyes or skin causes frostbite burn.
3.3 Treatment of Exposure: INHALATION: remove to fresh air. EYES: get medical attention for frostbite burn. SKIN: treat frostbite burn; soak in lukewarm water.
3.4 TLV TWA: 50 ppm.
3.5 TLV-STEL: Not listed
3.6 TLV-Ceiling: Not listed
3.7 Toxicity by Ingestion: Grade 0; LD\(_50\) >15 g/kg
3.8 Toxicity by Inhalation: Currently not available
3.9 Chronic Toxicity: Causes birth defects in rats; can cause lethal effects in chick eggs
3.10 Vapor (Gas) Ignitability Characteristics: Vapors are noninflammable to eyes and throat.
3.11 Liquid or Solid Characteristics: No appreciable hazard; practically harmless to the skin
3.12 Odor Threshold: Currently not available
3.13 IDLH Value: Not listed
3.14 OSHA PEL-TWA: Not listed
3.15 OSHA PEL-STEL: Not listed
3.16 OSHA PEL-Ceiling: Not listed
3.17 EPA AEGL: Not listed

NTO
<table>
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<tr>
<th>Temperature (degrees F)</th>
<th>Pounds per cubic foot</th>
<th>Temperature (degrees F)</th>
<th>Pounds per cubic inch</th>
<th>Temperature (degrees F)</th>
<th>Pounds per cubic foot</th>
<th>Temperature (degrees F)</th>
<th>British thermal unit per pound-F</th>
<th>Temperature (degrees F)</th>
<th>British thermal unit per hour-square foot-F</th>
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**9.20 SATURATED LIQUID DENSITY**

**9.21 LIQUID HEAT CAPACITY**

**9.22 LIQUID THERMAL CONDUCTIVITY**

**9.23 LIQUID VISCOSITY**

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<th>Temperature (degrees F)</th>
<th>Pounds per 100 pounds of water</th>
<th>Temperature (degrees F)</th>
<th>Pounds per square inch</th>
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**9.24 SOLUBILITY IN WATER**

**9.25 SATURATED VAPOR PRESSURE**

**9.26 SATURATED VAPOR DENSITY**

**9.27 IDEAL GAS HEAT CAPACITY**

**JUNE 1999**