

# NITROUS OXIDE

NTO

## CAUTIONARY RESPONSE INFORMATION

<b>Common Synonyms</b> Dinitrogen monoxide Laughing gas	Gas	Colorless	Odorless or mild sweet odor
Sinks and boils in water. Visible vapor cloud is produced.			
<p>Evacuate.                  Keep people away. Avoid contact with liquid.                  Avoid inhalation.                  Shut off ignition sources and call fire department.                  Notify local health and pollution control agencies.</p>			
<b>Fire</b>	Not flammable but will intensify fires.		
<b>Exposure</b>	Call for medical aid. VAPOR If inhaled will cause dizziness, difficult breathing, or loss of consciousness. Move victim to fresh air. If breathing is difficult, give oxygen. LIQUID Will cause frostbite. Flush affected areas with plenty of water. DO NOT RUB AFFECTED AREAS.		
<b>Water Pollution</b>	Not harmful to aquatic life.		

### 1. CORRECTIVE RESPONSE ACTIONS

Stop discharge

### 2. CHEMICAL DESIGNATIONS

- 2.1 CG Compatibility Group: Not listed.
- 2.2 Formula: N<sub>2</sub>O
- 2.3 IMO/UN Designation: 2/1070
- 2.4 DOT ID No.: 1070
- 2.5 CAS Registry No.: 10024-97-2
- 2.6 NAERG Guide No.: 122
- 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<sub>50</sub> >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) Irritant Characteristics:** Vapors are nonirritating 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

### 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:** Not pertinent
- 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

### 5. CHEMICAL REACTIVITY

- 5.1 **Reactivity with Water:** No reaction
- 5.2 **Reactivity with Common Materials:**  
Supports combustion but does not cause spontaneous ignition.
- 5.3 **Stability During Transport:** Stable
- 5.4 **Neutralizing Agents for Acids and Caustics:** Not pertinent
- 5.5 **Polymerization:** Not pertinent
- 5.6 **Inhibitor of Polymerization:** Not pertinent

### 6. WATER POLLUTION

- 6.1 **Aquatic Toxicity:**  
None
- 6.2 **Waterfowl Toxicity:** None
- 6.3 **Biological Oxygen Demand (BOD):** None
- 6.4 **Food Chain Concentration Potential:**  
None
- 6.5 **GESAMP Hazard Profile:** 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 = -89.5°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 = 309.7°K
- 9.6 **Critical Pressure:** 1,054 psia = 71.7 atm = 7.28 MN/m<sup>2</sup>
- 9.7 **Specific Gravity:** 1.266 at -89°C (liquid)
- 9.8 **Liquid Surface Tension:** 10.1 dynes/cm = 0.0101 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):** 1.303 at 25°C
- 9.12 **Latent Heat of Vaporization:** 161.7 Btu/lb = 89.9 cal/g = 3.76 X 10<sup>5</sup> 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

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9.20 SATURATED LIQUID DENSITY		9.21 LIQUID HEAT CAPACITY		9.22 LIQUID THERMAL CONDUCTIVITY		9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit inch per hour-square foot-F	Temperature (degrees F)	Centipoise
	C U R R E N T L Y  N O T  A V A I L A B L E		N O T  P E R T I N E N T		N O T  P E R T I N E N T		N O T  P E R T I N E N T

9.24 SOLUBILITY IN WATER		9.25 SATURATED VAPOR PRESSURE		9.26 SATURATED VAPOR DENSITY		9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
32	0.250	-125	16.510	-125	0.20220	90	0.211
		-120	19.220	-120	0.23200	100	0.211
		-115	22.290	-115	0.26510	110	0.211
		-110	25.740	-110	0.30170	120	0.211
		-105	29.600	-105	0.34210	130	0.211
		-100	33.910	-100	0.38640	140	0.211
		-95	38.700	-95	0.43490	150	0.211
		-90	44.000	-90	0.48790	160	0.211
		-85	49.870	-85	0.54560	170	0.211
		-80	56.330	-80	0.60810	180	0.211
		-75	63.430	-75	0.67580	190	0.211
		-70	71.200	-70	0.74890	200	0.211
		-65	79.690	-65	0.82760	210	0.211
		-60	88.940	-60	0.91220	220	0.211
		-55	99.000	-55	1.00300	230	0.211
		-50	109.900	-50	1.10000	240	0.211
		-45	121.700	-45	1.20300	250	0.211
		-40	134.500	-40	1.31300	260	0.211