

NITROGEN

NXX

CAUTIONARY RESPONSE INFORMATION			
Common Synonyms Liquid nitrogen	Gas	Colorless	Odorless
Floats and boils on water.			
Keep people away. Avoid contact with liquid.			
Fire	Not flammable.		
Exposure	Call for medical aid. VAPOR Not harmful. In high concentrations may cause dizziness, difficult breathing, or loss of consciousness. LIQUID Will cause frostbite. Flush affected areas with plenty of water. DO NOT RUB AFFECTED AREAS.		
Water Pollution	Not harmful to aquatic life.		

1. CORRECTIVE RESPONSE ACTIONS	2. CHEMICAL DESIGNATIONS	3. HEALTH HAZARDS
Stop discharge	2.1 CG Compatibility Group: Not listed. 2.2 Formula: N ₂ 2.3 IMO/UN Designation: 2/1977 2.4 DOT ID No.: 1066 2.5 CAS Registry No.: 7727-37-9 2.6 NAERG Guide No.: 121 2.7 Standard Industrial Trade Classification: 52221	3.1 Personal Protective Equipment: Safety glasses or face shield; insulated gloves; long sleeves; trousers worn outside boots or over high-top shoes to shed spilled liquid; self-contained breathing apparatus where insufficient air is present. 3.2 Symptoms Following Exposure: Inhalation can cause asphyxiation, if atmosphere does not contain oxygen; dizziness, unconsciousness, or even death can result. Contact of liquid with skin or eyes causes frostbite burns. 3.3 Treatment of Exposure: INHALATION: remove to fresh air; apply artificial respiration if breathing has stopped; call physician. EYES: treat for frostbite burns caused by liquid. SKIN: treat for frostbite; soak in lukewarm water. 3.4 TLV-TWA: Not listed. 3.5 TLV-STEL: Not listed. 3.6 TLV-Ceiling: Not listed. 3.7 Toxicity by Ingestion: Not pertinent 3.8 Toxicity by Inhalation: Currently not available. 3.9 Chronic Toxicity: None 3.10 Vapor (Gas) Irritant Characteristics: None 3.11 Liquid or Solid Characteristics: Frostbite 3.12 Odor Threshold: Odorless 3.13IDLH 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	7. SHIPPING INFORMATION								
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: 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	7.1 Grades of Purity: 99.5+%								
	7.2 Storage Temperature: -320°F 7.3 Inert Atmosphere: No requirement 7.4 Venting: Open 7.5 IMO Pollution Category: Currently not available 7.6 Ship Type: 3 7.7 Barge Hull Type: 3								
	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: <table> <tr> <td>Category</td> <td>Classification</td> </tr> <tr> <td>Health Hazard (Blue)</td> <td>3</td> </tr> <tr> <td>Flammability (Red)</td> <td>0</td> </tr> <tr> <td>Instability (Yellow)</td> <td>0</td> </tr> </table>	Category	Classification	Health Hazard (Blue)	3	Flammability (Red)	0	Instability (Yellow)	0
Category	Classification								
Health Hazard (Blue)	3								
Flammability (Red)	0								
Instability (Yellow)	0								
	8.6 EPA Reportable Quantity: Not listed. 8.7 EPA Pollution Category: Not listed. 8.8 RCRA Waste Number: Not listed 8.9 EPA FWCNA List: Not listed								
5. CHEMICAL REACTIVITY	9. PHYSICAL & CHEMICAL PROPERTIES								
5.1 Reactivity with Water: Heat of water will vigorously vaporize liquid nitrogen. 5.2 Reactivity with Common Materials: No chemical reaction. Low temperature may cause brittleness in rubber and plastics. 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	9.1 Physical State at 15°C and 1 atm: Gas 9.2 Molecular Weight: 28.0 9.3 Boiling Point at 1 atm: -320.1°F = -195.6°C = 77.6°K 9.4 Freezing Point: -354°F = -215°C = 58°K 9.5 Critical Temperature: -232.6°F = -147.0°C = 126.2°K 9.6 Critical Pressure: 493 psia = 33.5 atm = 3.40 MN/m ² 9.7 Specific Gravity: 0.807 at -195.5°C (liquid) 9.8 Liquid Surface Tension: 8.3 dynes/cm = 0.083 N/m at -193°C 9.9 Liquid Water Interfacial Tension: Not pertinent 9.10 Vapor (Gas) Specific Gravity: 0.965 9.11 Ratio of Specific Heats of Vapor (Gas): 1.3962 9.12 Latent Heat of Vaporization: 95 Btu/lb = 53 cal/g = 2.2 X 10 ³ 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: 6.15 cal/g 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
-327	51.850	-327	0.240	-326	0.993	-325	0.170
-326	51.640	-326	0.240	-324	0.983	-320	0.155
-325	51.440	-325	0.240	-322	0.973	-315	0.143
-324	51.230	-324	0.240	-320	0.964	-310	0.132
-323	51.020	-323	0.240	-318	0.954	-305	0.123
-322	50.810	-322	0.240	-316	0.944	-300	0.114
-321	50.600	-321	0.240	-314	0.934	-295	0.107
-320	50.400	-320	0.240	-312	0.924	-290	0.101
-319	50.190	-319	0.240	-310	0.914	-285	0.095
-318	49.980	-318	0.240	-308	0.904	-280	0.090
-317	49.770	-317	0.240	-306	0.895	-275	0.086
-316	49.560	-316	0.240	-304	0.885	-270	0.082
-315	49.360	-315	0.240	-302	0.875	-265	0.078
-314	49.150	-314	0.240	-300	0.865	-260	0.075
-313	48.940	-313	0.240	-298	0.855		
-312	48.730	-312	0.240	-296	0.845		
-311	48.520	-311	0.240	-294	0.835		
-310	48.320	-310	0.240	-292	0.826		

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
I		-344	1.931	-344	0.04355	0	0.250
N		-342	2.356	-342	0.05223	20	0.250
S		-340	2.855	-340	0.06224	40	0.250
O		-338	3.438	-338	0.07372	60	0.250
L		-336	4.116	-336	0.08681	80	0.250
U		-334	4.899	-334	0.10170	100	0.250
B		-332	5.799	-332	0.11850	120	0.250
L		-330	6.828	-330	0.13740	140	0.250
E		-328	8.000	-328	0.15850	160	0.250
		-326	9.330	-326	0.18210	180	0.250
		-324	10.830	-324	0.20820	200	0.250
		-322	12.520	-322	0.23720	220	0.250
		-320	14.410	-320	0.26910	240	0.250
		-318	16.520	-318	0.30410	260	0.250
		-316	18.870	-316	0.34250	280	0.250
		-314	21.470	-314	0.38440	300	0.250
		-312	24.340	-312	0.43000	320	0.250
		-310	27.510	-310	0.47950	340	0.250
		-308	30.990	-308	0.53300	360	0.250
		-306	34.800	-306	0.59080	380	0.250
		-304	38.970	-304	0.65300	400	0.250
		-302	43.510	-302	0.71980	420	0.250
		-300	48.440	-300	0.79130	440	0.250
		-298	53.790	-298	0.86780		
		-296	59.570	-296	0.94940		
		-294	65.820	-294	1.03600		