

N-BUTYL ALCOHOL

BAN

CAUTIONARY RESPONSE INFORMATION

Common Synonyms		Watery liquid	Colorless	Alcohol odor
Butanol 1-Butanol Butyl alcohol 1-Hydroxybutane n-Propylcarbinol		Floats and mixes slowly with water. Flammable, irritating vapor is produced.		
<p>Restrict access. Keep people away. Shut off ignition sources and call fire department. Avoid contact with liquid and vapor. Stay upwind and use water spray to "knock down" vapor. Notify local health and pollution control agencies. Protect water intakes.</p>				
Fire	<p>FLAMMABLE Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Extinguish with dry chemical or carbon dioxide. Water and alcohol foam may be ineffective on fire. Cool exposed containers with water.</p>			
Exposure	<p>CALL FOR MEDICAL AID.</p> <p>VAPOR Irritating to eyes, nose and throat. If inhaled, will cause nausea, headache, dizziness. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.</p> <p>LIQUID Irritating to skin and eyes. Harmful if swallowed. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED, and victim is CONSCIOUS, have victim drink water or milk.</p>			
Water Pollution	<p>Dangerous to aquatic life in high concentrations. May be dangerous if it enters water intakes. Notify local health and pollution control officials. Notify operators of nearby water intakes.</p>			

<p>1. CORRECTIVE RESPONSE ACTIONS Dilute and disperse Stop discharge Chemical and Physical Treatment: Burn</p>	<p>2. CHEMICAL DESIGNATIONS</p> <p>2.1 CG Compatibility Group: 20; Alcohols, glycols 2.2 Formula: CH₃(CH₂)₃CH₂OH 2.3 IMO/UN Designation: 3.3/1120 2.4 DOT ID No.: 1120 2.5 CAS Registry No.: 71-36-3 2.6 NAERG Guide No.: 129 2.7 Standard Industrial Trade Classification: 51213</p>
<p>3. HEALTH HAZARDS</p> <p>3.1 Personal Protective Equipment: Organic vapor canister or air-supplied mask; chemical goggles or face splash shield. 3.2 Symptoms Following Exposure: Anesthesia, nausea, headache, dizziness, irritation of respiratory passages. Mildly irritating to the skin and eyes. 3.3 Treatment of Exposure: INHALATION: remove from exposure immediately; call a physician; if breathing is irregular or has stopped, start resuscitation and administer oxygen. INGESTION: induce vomiting and call a physician. EYES: flush with water for at least 15 minutes. 3.4 TLV-TWA: Not listed. 3.5 TLV-STEL: Not listed. 3.6 TLV-Ceiling: 50 ppm; Notice of Intended Change: 25 ppm 3.7 Toxicity by Ingestion: Grade 2; LD₅₀ = 0.5 to 5 g/kg (rat) 3.8 Toxicity by Inhalation: Currently not available. 3.9 Chronic Toxicity: None 3.10 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary. 3.11 Liquid or Solid Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin. 3.12 Odor Threshold: 25 ppm 3.13 IDLH Value: 1,400 ppm 3.14 OSHA PEL-TWA: 100 ppm 3.15 OSHA PEL-STEL: Not listed. 3.16 OSHA PEL-Ceiling: Not listed. 3.17 EPA AEGL: Not listed</p>	

<p>4. FIRE HAZARDS</p> <p>4.1 Flash Point: 97°F O.C. 84°F C.C. 4.2 Flammable Limits in Air: 1.4%-11.2% 4.3 Fire Extinguishing Agents: Carbon dioxide, dry chemicals 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: Not pertinent 4.7 Auto Ignition Temperature: 650°F 4.8 Electrical Hazards: Class I, Group D 4.9 Burning Rate: 3.2 mm/min. 4.10 Adiabatic Flame Temperature: Currently not available 4.11 Stoichiometric Air to Fuel Ratio: 28.6 (calc.) 4.12 Flame Temperature: Currently not available 4.13 Combustion Molar Ratio (Reactant to Product): 9.0 (calc.) 4.14 Minimum Oxygen Concentration for Combustion (MOCC): Not listed</p>	<p>7. SHIPPING INFORMATION</p> <p>7.1 Grades of Purity: 99+% 7.2 Storage Temperature: Ambient 7.3 Inert Atmosphere: No requirement 7.4 Venting: Open (flame arrester) 7.5 IMO Pollution Category: D 7.6 Ship Type: Data not available 7.7 Barge Hull Type: Currently not available</p>								
<p>5. CHEMICAL REACTIVITY</p> <p>5.1 Reactivity with Water: No reaction 5.2 Reactivity with Common Materials: No reaction 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</p>	<p>8. HAZARD CLASSIFICATIONS</p> <p>8.1 49 CFR Category: Flammable liquid 8.2 49 CFR Class: 3 8.3 49 CFR Package Group: II 8.4 Marine Pollutant: No 8.5 NFPA Hazard Classification:</p> <table border="0"> <tr> <td>Category</td> <td>Classification</td> </tr> <tr> <td>Health Hazard (Blue).....</td> <td>1</td> </tr> <tr> <td>Flammability (Red).....</td> <td>3</td> </tr> <tr> <td>Instability (Yellow).....</td> <td>0</td> </tr> </table> <p>8.6 EPA Reportable Quantity: 5000 pounds 8.7 EPA Pollution Category: D 8.8 RCRA Waste Number: U031 8.9 EPA FWPCA List: Not listed</p>	Category	Classification	Health Hazard (Blue).....	1	Flammability (Red).....	3	Instability (Yellow).....	0
Category	Classification								
Health Hazard (Blue).....	1								
Flammability (Red).....	3								
Instability (Yellow).....	0								
<p>6. WATER POLLUTION</p> <p>6.1 Aquatic Toxicity: 1000 ppm/24 hr/goldfish/died/fresh water 6.2 Waterfowl Toxicity: Currently not available 6.3 Biological Oxygen Demand (BOD): 1.1-1.92 lb/lb, 5 days; 157%, 5 days 6.4 Food Chain Concentration Potential: None 6.5 GESAMP Hazard Profile: Bioaccumulation: 0 Damage to living resources: 2 Human Oral hazard: 2 Human Contact hazard: II Reduction of amenities: XXX</p>	<p>9. PHYSICAL & CHEMICAL PROPERTIES</p> <p>9.1 Physical State at 15° C and 1 atm: Liquid 9.2 Molecular Weight: 74.12 9.3 Boiling Point at 1 atm: 243.9°F = 117.7°C = 390.9°K 9.4 Freezing Point: -129°F = -89.3°C = 183.9°K 9.5 Critical Temperature: 553.6°F = 289.8°C = 563°K 9.6 Critical Pressure: 640.2 psia = 43.55 atm = 4.412 MN/m² 9.7 Specific Gravity: 0.810 at 20°C (liquid) 9.8 Liquid Surface Tension: 24.6 dynes/cm = .0246 N/m at 20°C 9.9 Liquid Water Interfacial Tension: (est.) 56 dynes/cm = 0.056 N/m at 27°C 9.10 Vapor (Gas) Specific Gravity: Not pertinent 9.11 Ratio of Specific Heats of Vapor (Gas): 1.083 9.12 Latent Heat of Vaporization: 256 Btu/lb = 142 cal/g = 5.95 X 10⁵ J/kg 9.13 Heat of Combustion: -14,230 Btu/lb = -7906 cal/g = -331.0 X 10⁵ J/kg 9.14 Heat of Decomposition: Not pertinent 9.15 Heat of Solution: Currently not available 9.16 Heat of Polymerization: Not pertinent 9.17 Heat of Fusion: 29.93 cal/g 9.18 Limiting Value: Currently not available 9.19 Reid Vapor Pressure: 0.3 psia</p>								
<p>NOTES</p>									

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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
15	51.840	55	0.537	45	1.053	55	3.570
20	51.720	60	0.544	50	1.049	60	3.303
25	51.600	65	0.552	55	1.045	65	3.060
30	51.480	70	0.559	60	1.040	70	2.840
35	51.360	75	0.566	65	1.036	75	2.639
40	51.240	80	0.573	70	1.032	80	2.455
45	51.120	85	0.580	75	1.028	85	2.287
50	51.000	90	0.588	80	1.024	90	2.134
55	50.880	95	0.595	85	1.020	95	1.993
60	50.760	100	0.602	90	1.016	100	1.864
65	50.640	105	0.609	95	1.012	105	1.745
70	50.520	110	0.617	100	1.008	110	1.636
75	50.400	115	0.624	105	1.004	115	1.535
80	50.270	120	0.631	110	1.000	120	1.442
85	50.150	125	0.638	115	0.996	125	1.356
90	50.030	130	0.645	120	0.992	130	1.277
95	49.900	135	0.653	125	0.988	135	1.204
100	49.780	140	0.660	130	0.984	140	1.135
105	49.660	145	0.667			145	1.072
110	49.530	150	0.674			150	1.013
115	49.410	155	0.682			155	0.958
120	49.280	160	0.689			160	0.908
125	49.160	165	0.696			165	0.860
130	49.030	170	0.703			170	0.816
135	48.910	175	0.710			175	0.774
140	48.780						

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
68	7.800	55	0.049	55	0.00065	0	0.318
		60	0.060	60	0.00080	25	0.330
		65	0.074	65	0.00098	50	0.342
		70	0.092	70	0.00119	75	0.354
		75	0.112	75	0.00145	100	0.365
		80	0.137	80	0.00175	125	0.377
		85	0.167	85	0.00211	150	0.388
		90	0.202	90	0.00254	175	0.399
		95	0.244	95	0.00304	200	0.410
		100	0.294	100	0.00362	225	0.420
		105	0.352	105	0.00431	250	0.431
		110	0.421	110	0.00511	275	0.441
		115	0.502	115	0.00604	300	0.452
		120	0.597	120	0.00711	325	0.462
		125	0.708	125	0.00836	350	0.472
		130	0.836	130	0.00979	375	0.481
		135	0.985	135	0.01144	400	0.491
		140	1.158	140	0.01333	425	0.500
		145	1.357	145	0.01550	450	0.510
		150	1.587	150	0.01797	475	0.519
		155	1.850	155	0.02078	500	0.528
						525	0.537
						550	0.545
						575	0.554
						600	0.562