

ETHYL ALCOHOL

EAL

CAUTIONARY RESPONSE INFORMATION

Common Synonyms	Watery liquid Alcohol Cologne spirit Denatured alcohol Ethanol Fermentation alcohol Grain alcohol	Colorless Floats and mixes with water. Flammable, irritating vapor is produced.	Alcohol odor
Keep people away. Shut off ignition sources and call fire department. Stay upwind and use water spray to "knock down" vapor. Notify local health and pollution control agencies. Protect water intakes.			
Fire	FLAMMABLE. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Extinguish with dry chemical, alcohol foam, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.		
Exposure	CALL FOR MEDICAL AID. VAPOR Irritating to eyes, nose and throat. Move to fresh air. LIQUID Not harmful.		
Water Pollution	Dangerous to aquatic life in high concentrations. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.		

1. CORRECTIVE RESPONSE ACTIONS	2. CHEMICAL DESIGNATIONS
Dilute and disperse Stop discharge	2.1 CG Compatibility Group: 20; Alcohol, glycol 2.2 Formula: C ₂ H ₅ OH 2.3 IMO/UN Designation: 3.2/1170 2.4 DOT ID No.: 1170 2.5 CAS Registry No.: 64-17-5 2.6 NAERG Guide No.: 127 2.7 Standard Industrial Trade Classification: 51215
3. HEALTH HAZARDS	
3.1 Personal Protective Equipment: All-purpose canister; safety goggles. Avoid contact with liquid and inhalation of vapors. 3.2 Symptoms Following Exposure: Irritation of eyes, nose and throat. Headache and drowsiness may occur. Liquid causes intoxication. 3.3 Treatment of Exposure: INHALATION: if breathing is affected, remove victim to fresh air; call physician; administer oxygen. Speed is of primary importance. EYES OR SKIN: flush with water. 3.4 TLV-TWA: 1,000 ppm 3.5 TLV-STEL: Not listed. 3.6 TLV-Ceiling: Not listed. 3.7 Toxicity by Ingestion: Grade 1; LD ₅₀ = 5 to 15 g/kg 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: No appreciable hazard. Practically harmless to the skin. 3.12 Odor Threshold: 10 ppm 3.13 IDLH Value: 3,300 ppm 3.14 OSHA PEL-TWA: 1,000 ppm 3.15 OSHA PEL-STEL: Not listed. 3.16 OSHA PEL-Ceiling: Not listed. 3.17 EPA AEGL: Not listed	
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4. FIRE HAZARDS	7. SHIPPING INFORMATION
4.1 Flash Point: 64°F O.C. 55°F C.C. 4.2 Flammable Limits in Air: 3.3%-19% 4.3 Fire Extinguishing Agents: Carbon dioxide, dry chemical, water spray, alcohol foam	7.1 Grades of Purity: Anhydrous (200 proof); 190 proof; specially denatured; completely denatured 7.2 Storage Temperature: Ambient 7.3 Inert Atmosphere: No requirement 7.4 Venting: Open (flame arrester) or pressure-vacuum 7.5 IMO Pollution Category: Currently not available 7.6 Ship Type: Currently not available 7.7 Barge Hull Type: Currently not available
4.4 Fire Extinguishing Agents Not to Be Used: None 4.5 Special Hazards of Combustion Products: None 4.6 Behavior in Fire: Not pertinent 4.7 Auto Ignition Temperature: 689°F 4.8 Electrical Hazards: Class I, Group D 4.9 Burning Rate: 3.9 mm/min. 4.10 Adiabatic Flame Temperature: Currently not available 4.11 Stoichiometric Air to Fuel Ratio: 14.3 (calc.) 4.12 Flame Temperature: Currently not available 4.13 Combustion Molar Ratio (Reactant to Product): 5.0 (calc.) 4.14 Minimum Oxygen Concentration for Combustion (MOCC): N ₂ diluent: 10.5-10.6%; CO ₂ diluent: 13.0%	8. HAZARD CLASSIFICATIONS
4.15 Critical Pressure: 351.5 K 4.16 Freezing Point: -173°F = -114°C = 159°K 4.17 Melting Point: 516.3°K 4.18 Boiling Point at 1 atm: 172.9°F = 78.3°C = 351.5°K 4.19 Specific Gravity: 0.790 at 20°C (liquid) 4.20 Liquid Surface Tension: Not pertinent 4.21 Water Interfacial Tension: Not pertinent 4.22 Vapor (Gas) Specific Gravity: 1.6 4.23 Ratio of Specific Heats of Vapor (Gas): 1.128 4.24 Latent Heat of Vaporization: 360 Btu/lb = 200 cal/g = 516.3°K 4.25 Heat of Combustion: 8.37 X 10 ⁵ J/kg = -11,570 Btu/lb = 6425 cal/g = -268.8 X 10 ⁵ J/kg 4.26 Heat of Decomposition: Not pertinent 4.27 Heat of Solution: -99 Btu/lb = -55 cal/g = -2.3 X 10 ⁵ J/kg 4.28 Heat of Polymerization: Not pertinent 4.29 Heat of Fusion: Currently not available 4.30 Limiting Value: Currently not available 4.31 Reid Vapor Pressure: 2.3 psia	9. PHYSICAL & CHEMICAL PROPERTIES
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	9.1 Physical State at 15° C and 1 atm: Liquid 9.2 Molecular Weight: 46.07 9.3 Boiling Point at 1 atm: 172.9°F = 78.3°C = 351.5°K 9.4 Freezing Point: -173°F = -114°C = 159°K 9.5 Critical Temperature: 469.6°F = 243.1°C = 516.3°K 9.6 Critical Pressure: 926 psia = 63.0 atm = 6.38 MN/m ² 9.7 Specific Gravity: 0.790 at 20°C (liquid) 9.8 Liquid Surface Tension: Not pertinent 9.9 Liquid Water Interfacial Tension: Not pertinent 9.10 Vapor (Gas) Specific Gravity: 1.6 9.11 Ratio of Specific Heats of Vapor (Gas): 1.128 9.12 Latent Heat of Vaporization: 360 Btu/lb = 200 cal/g = 516.3°K 9.13 Heat of Combustion: 8.37 X 10 ⁵ J/kg = -11,570 Btu/lb = 6425 cal/g = -268.8 X 10 ⁵ J/kg 9.14 Heat of Decomposition: Not pertinent 9.15 Heat of Solution: -99 Btu/lb = -55 cal/g = -2.3 X 10 ⁵ J/kg 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: 2.3 psia

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
35	50.220	35	0.539	-40	1.289		N
40	50.080	40	0.545	-30	1.277		O
45	49.930	45	0.552	-20	1.265		T
50	49.780	50	0.558	-10	1.253		
55	49.630	55	0.564	0	1.242		
60	49.490	60	0.571	10	1.230		P
65	49.340	65	0.577	20	1.218		E
70	49.190	70	0.583	30	1.206		R
75	49.040	75	0.590	40	1.194		I
80	48.900	80	0.596	50	1.182		N
85	48.750	85	0.603	60	1.171		E
90	48.600	90	0.609	70	1.159		N
95	48.460	95	0.615	80	1.147		E
100	48.310	100	0.622	90	1.135		N
105	48.160	105	0.628	100	1.123		E
110	48.010	110	0.635	110	1.112		N
115	47.870	115	0.641	120	1.100		E
120	47.720	120	0.647	130	1.088		N
125	47.570						
130	47.420						
135	47.280						
140	47.130						
145	46.980						
150	46.830						
155	46.690						
160	46.540						

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
M	40	0.304	40	0.00261		0	0.351
I	50	0.441	50	0.00371		25	0.362
S	60	0.629	60	0.00520		50	0.373
C	70	0.884	70	0.00716		75	0.384
I	80	1.224	80	0.00973		100	0.395
B	90	1.671	90	0.01305		125	0.406
L	100	2.253	100	0.01728		150	0.417
E	110	3.001	110	0.02261		175	0.427
	120	3.952	120	0.02926		200	0.437
	130	5.148	130	0.03747		225	0.447
	140	6.640	140	0.04752		250	0.457
	150	8.482	150	0.05971		275	0.467
	160	10.740	160	0.07438		300	0.477
	170	13.480	170	0.09188		325	0.487
	180	16.790	180	0.11260		350	0.496
	190	20.740	190	0.13700		375	0.505
	200	25.450	200	0.16560		400	0.514
	210	31.010	210	0.19870		425	0.523
						450	0.532
						475	0.541
						500	0.549
						525	0.558
						550	0.566
						575	0.574
						600	0.582