

FORMALDEHYDE SOLUTION

FMS

Common Synonyms Formalith Fyda Formalin Formic aldehyde solution Methanal solution		Watery liquid Colorless Irritating odor
Sinks and mixes with water.		
Avoid contact with liquid. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Stop discharge if possible. Call fire department. Isolate and remove discharged material. Notify local health and pollution control agencies.		
Fire	Combustible. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Extinguish with water, dry chemical, alcohol foam, or carbon dioxide. Cool exposed containers with water.	
	CALL FOR MEDICAL AID. LIQUID Will burn skin and eyes. If swallowed, will cause nausea, vomiting or loss of consciousness. 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, and have victim induce vomiting. IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CON-	
Exposure	HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.	
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Water Pollution	1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-water contaminant Disperse and flush	2. LABEL 2.1 Category: None 2.2 Class: Not pertinent
	3. CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Aldehyde 3.2 Formula: HCHO/H ₂ O/CH ₃ OH 3.3 IMO/UN Designation: 3.3/1198 3.4 DOT ID No.: 1198 3.5 CAS Registry No.: 50-00-0	4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Pungent, irritating; characteristic, pungent
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Self-contained breathing apparatus; chemical goggles; protective clothing; synthetic rubber or plastic gloves. 5.2 Symptoms Following Exposure: INHALATION: vapors are irritating and will cause coughing, chest pain, nausea, and vomiting. INGESTION: causes nausea, vomiting, abdominal pain, and collapse. Contact with skin and eyes causes severe irritation. 5.3 Treatment of Exposure: INHALATION: remove victim to fresh air; give oxygen if breathing is difficult; call a physician. INGESTION: induce vomiting at once and repeat until vomit is clear; then give milk or raw egg and call a physician. SKIN OR EYES: flush immediately with plenty of water for at least 15 min; remove contaminated clothing; call a physician for eyes. 5.4 Threshold Limit Value: 2 ppm 5.5 Short Term Inhalation Limits: 5 ppm for 5 min., 3 ppm for 60 min. (tentative). 5.6 Toxicity by Ingestion: (Formaldehyde solution) Grade 2; LD ₅₀ = 0.5 to 5 g/kg 5.7 Late Toxicity: None 5.8 Vapor (Gas) Irritant Characteristics: Vapor is moderately irritating such that personnel will not usually tolerate moderate or high concentrations. 5.9 Liquid or Solid Irritant Characteristics: Causes smarting of the skin and first-degree burns on short exposure. May cause secondary burns on long exposure. 5.10 Odor Threshold: 0.8 ppm 5.11 IDLH Value: 100 ppm		

6. FIRE HAZARDS 6.1 Flash Point: (37% formaldehyde) Methanol-free: 182°F C.C. 15% methanol: 122°F C.C. 6.2 Flammable Limits in Air: 7.0%-73% 6.3 Fire Extinguishing Agents: Water, dry chemical, carbon dioxide, or alcohol foam 6.4 Fire Extinguishing Agents Not to be Used: Data not available 6.5 Special Hazards of Combustion Products: Toxic vapors are generated. 6.6 Behavior in Fire: Not pertinent 6.7 Ignition Temperature: 806°F 6.8 Electrical Hazard: Not pertinent 6.9 Burning Rate: Not pertinent 6.10 Adiabatic Flame Temperature: Data Not Available 6.11 Stoichiometric Air to Fuel Ratio: Data Not Available 6.12 Flame Temperature: Data Not Available
7. CHEMICAL REACTIVITY 7.1 Reactivity With Water: No reaction 7.2 Reactivity with Common Materials: No reaction 7.3 Stability During Transport: Stable 7.4 Neutralizing Agents for Acids and Caustics: Not pertinent 7.5 Polymerization: Not pertinent 7.6 Inhibitor of Polymerization: Not pertinent 7.7 Molar Ratio (Reactant to Product): Data Not Available 7.8 Reactivity Group: 19
8. WATER POLLUTION 8.1 Aquatic Toxicity: (formaldehyde) 25 mg/1/96 hr/channel cal/TL ₅₀ /fresh water 32 ppm/24 hr/catfish/TL ₅₀ /fresh water 100-330 ppm/48 hr/founder/TL ₅₀ /salt water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 37%, 5 days; 47% (theor.), 5 days 8.4 Food Chain Concentration Potential: None
9. SHIPPING INFORMATION 9.1 Grades of Purity: 37-50% formaldehyde in water containing 0-15% methyl alcohol 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Pressure-vacuum

10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-P-Q																																				
11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Combustible liquid 11.2 NAS Hazard Rating for Bulk Water Transportation: <table border="1"> <thead> <tr> <th>Category</th> <th>Rating</th> </tr> </thead> <tbody> <tr> <td>Fire.....</td> <td>2</td> </tr> <tr> <td>Health</td> <td></td> </tr> <tr> <td>Vapor Irritant.....</td> <td>3</td> </tr> <tr> <td>Liquid or Solid Irritant.....</td> <td>2</td> </tr> <tr> <td>Poisons.....</td> <td>3</td> </tr> <tr> <td>Water Pollution</td> <td></td> </tr> <tr> <td>Human Toxicity.....</td> <td>3</td> </tr> <tr> <td>Aquatic Toxicity.....</td> <td>3</td> </tr> <tr> <td>Aesthetic Effect.....</td> <td>2</td> </tr> <tr> <td>Reactivity</td> <td></td> </tr> <tr> <td>Other Chemicals.....</td> <td>2</td> </tr> <tr> <td>Water.....</td> <td>0</td> </tr> <tr> <td>Self Reaction.....</td> <td>1</td> </tr> </tbody> </table> 11.3 NFPA Hazard Classification: <table border="1"> <thead> <tr> <th>Category</th> <th>Classification</th> </tr> </thead> <tbody> <tr> <td>Health Hazard (Blue).....</td> <td>2</td> </tr> <tr> <td>Flammability (Red).....</td> <td>2</td> </tr> <tr> <td>Reactivity (Yellow).....</td> <td>0</td> </tr> </tbody> </table>	Category	Rating	Fire.....	2	Health		Vapor Irritant.....	3	Liquid or Solid Irritant.....	2	Poisons.....	3	Water Pollution		Human Toxicity.....	3	Aquatic Toxicity.....	3	Aesthetic Effect.....	2	Reactivity		Other Chemicals.....	2	Water.....	0	Self Reaction.....	1	Category	Classification	Health Hazard (Blue).....	2	Flammability (Red).....	2	Reactivity (Yellow).....	0
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12. PHYSICAL AND CHEMICAL PROPERTIES 12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: 18-30 12.3 Boiling Point at 1 atm: Not pertinent 12.4 Freezing Point: Not pertinent 12.5 Critical Temperature: Not pertinent 12.6 Critical Pressure: Not pertinent 12.7 Specific Gravity: 1.1 at 25°C (liquid) 12.8 Liquid Surface Tension: Not pertinent 12.9 Liquid Water Interfacial Tension: Not pertinent 12.10 Vapor (Gas) Specific Gravity: Not pertinent 12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent 12.12 Latent Heat of Vaporization: Not pertinent 12.13 Heat of Combustion: Not pertinent 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: (est.) -9 Btu/lb = -5 cal/g = -0.2 X 10 ⁴ J/kg 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: Data Not Available 12.26 Limiting Value: Data Not Available 12.27 Reid Vapor Pressure: 0.09 psia																																				
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12.17 SATURATED LIQUID DENSITY		12.18 LIQUID HEAT CAPACITY		12.19 LIQUID THERMAL CONDUCTIVITY		12.20 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	69.240	35	.782		N		N
40	69.150	40	.784		O		O
45	69.059	45	.787		T		T
50	68.980	50	.790				
55	68.889	55	.793		P		P
60	68.799	60	.795		E		E
65	68.719	65	.798		R		R
70	68.629	70	.801		T		T
75	68.540	75	.804		I		I
80	68.459	80	.807		N		N
85	68.370	85	.809		E		E
90	68.280	90	.812		N		N
95	68.200	95	.815		T		T
100	68.110	100	.818				

12.21 SOLUBILITY IN WATER		12.22 SATURATED VAPOR PRESSURE		12.23 SATURATED VAPOR DENSITY		12.24 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	70	.028		D		N
	I	75	.034		A		O
	S	80	.042		T		T
	C	85	.051		A		
	I	90	.061				
	B	95	.074		N		P
	L	100	.089		O		E
	E	105	.107		T		R
		110	.128				T
		115	.152		A		I
		120	.181		V		N
		125	.214		A		E
		130	.253		I		
		135	.298		L		
		140	.350		A		
		145	.410		B		
		150	.479		L		
		155	.558		E		
		160	.648				
		165	.752				
		170	.870				
		175	1.004				
		180	1.157				
		185	1.329				
		190	1.524				
		195	1.744				