

FORMALDEHYDE SOLUTION

FMS

CAUTIONARY RESPONSE INFORMATION

Common Synonyms Formalin Formalith Formic aldehyde solution Fyde Methanal solution	Watery liquid Colorless Irritating odor
	Sinks and mixes with water.
<p>Keep people away. Avoid contact with liquid. Avoid inhalation. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Call fire department. Notify local health and pollution control agencies. Protect water intakes.</p>	
Fire	<p>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.</p>
Exposure	<p>CALL FOR MEDICAL AID.</p> <p>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 CONVULSIONS, do nothing except keep victim warm.</p>
Water Pollution	<p>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.</p>

1. CORRECTIVE RESPONSE ACTIONS

Dilute and disperse
Stop discharge

2. CHEMICAL DESIGNATIONS

- 2.1 CG Compatibility Group: 19; Aldehyde
- 2.2 Formula: HCHO/H₂O/CH₂OH
- 2.3 IMO/UN Designation: 3.3/1198 (Flammable Solutions) 3.3/2209 (Solutions)
- 2.4 DOT ID No.: 1198 (Flammable Solutions) 2209 (Solutions)
- 2.5 CAS Registry No.: 50-00-0
- 2.6 NAERG Guide No.: 132
- 2.7 Standard Industrial Trade Classification: 51621

3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Self-contained breathing apparatus; chemical goggles; protective clothing; synthetic rubber or plastic gloves.
- 3.2 **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.
- 3.3 **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.
- 3.4 TLV-TWA: Not listed.
- 3.5 TLV-STEL: Not listed.
- 3.6 TLV-Ceiling: 0.3 ppm
- 3.7 Toxicity by Ingestion: (Formaldehyde solution) Grade 2; LD₅₀ = 0.5 to 5 g/kg
- 3.8 Toxicity by Inhalation: Currently not available.
- 3.9 Chronic Toxicity: None
- 3.10 **Vapor (Gas) Irritant Characteristics:** Vapor is moderately irritating such that personnel will not usually tolerate moderate or high concentrations.
- 3.11 **Liquid or Solid Characteristics:** Causes smarting of the skin and first-degree burns on short exposure. May cause secondary burns on long exposure.
- 3.12 Odor Threshold: 0.8 ppm
- 3.13 IDLH Value: 20 ppm
- 3.14 OSHA PEL-TWA: 0.75 ppm
- 3.15 OSHA PEL-STEL: Not listed.
- 3.16 OSHA PEL-Ceiling: 2 ppm
- 3.17 EPA AEGL: Not listed

4. FIRE HAZARDS

- 4.1 **Flash Point:** (37% formaldehyde) Methanol-free: 182°F C.C. 15% methanol: 122°F C.C.
- 4.2 **Flammable Limits in Air:** 7.0%-73%
- 4.3 **Fire Extinguishing Agents:** Water, dry chemical, carbon dioxide, or alcohol foam
- 4.4 **Fire Extinguishing Agents Not to Be Used:** Currently not available
- 4.5 **Special Hazards of Combustion Products:** Toxic vapors are generated.
- 4.6 **Behavior in Fire:** Not pertinent
- 4.7 **Auto Ignition Temperature:** 806°F
- 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:** 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

6. WATER POLLUTION

- 6.1 **Aquatic Toxicity:** (formaldehyde) 25 mg/1/96 hr/channel cat/TL₅₀/fresh water
32 ppm/24 hr/catfish/TL₅₀/fresh water
100-330 ppm/48 hr/founder/TL₅₀/salt water
- 6.2 **Waterfowl Toxicity:** Currently not available
- 6.3 **Biological Oxygen Demand (BOD):** 37%, 5 days; 47% (theor.), 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: XX

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** 37-50% formaldehyde in water containing 0-15% methyl alcohol
- 7.2 **Storage Temperature:** Ambient
- 7.3 **Inert Atmosphere:** No requirement
- 7.4 **Venting:** Pressure-vacuum
- 7.5 **IMO Pollution Category:** C
- 7.6 **Ship Type:** 3
- 7.7 **Barge Hull Type:** 3

8. HAZARD CLASSIFICATIONS

- 8.1 **49 CFR Category:** Corrosive material
- 8.2 **49 CFR Class:** 8
- 8.3 **49 CFR Package Group:** III
- 8.4 **Marine Pollutant:** No
- 8.5 **NFPA Hazard Classification:**

Category	Classification
Health Hazard (Blue).....	2
Flammability (Red).....	2
Instability (Yellow).....	0
- 8.6 **EPA Reportable Quantity:** 100 pounds
- 8.7 **EPA Pollution Category:** B
- 8.8 **RCRA Waste Number:** U122
- 8.9 **EPA FWPCA List:** Yes

9. PHYSICAL & CHEMICAL PROPERTIES

- 9.1 **Physical State at 15° C and 1 atm:** Liquid
- 9.2 **Molecular Weight:** 18-30
- 9.3 **Boiling Point at 1 atm:** Varies with concentration
- 9.4 **Freezing Point:** Varies with concentration
- 9.5 **Critical Temperature:** Not pertinent
- 9.6 **Critical Pressure:** Not pertinent
- 9.7 **Specific Gravity:** 1.1 at 25°C (liquid)
- 9.8 **Liquid Surface Tension:** Not pertinent
- 9.9 **Liquid Water Interfacial Tension:** Not pertinent
- 9.10 **Vapor (Gas) Specific Gravity:** Not pertinent
- 9.11 **Ratio of Specific Heats of Vapor (Gas):** Not pertinent
- 9.12 **Latent Heat of Vaporization:** Not pertinent
- 9.13 **Heat of Combustion:** Not pertinent
- 9.14 **Heat of Decomposition:** Not pertinent
- 9.15 **Heat of Solution:** (est.) -9 Btu/lb = -5 cal/g = -0.2 X 10⁵ 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:** 0.09 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	69.240	35	0.782		N O T P E R T I N E N T		N O T P E R T I N E N T
40	69.150	40	0.784				
45	69.059	45	0.787				
50	68.980	50	0.790				
55	68.889	55	0.793				
60	68.799	60	0.795				
65	68.719	65	0.798				
70	68.629	70	0.801				
75	68.540	75	0.804				
80	68.459	80	0.807				
85	68.370	85	0.809				
90	68.280	90	0.812				
95	68.200	95	0.815				
100	68.110	100	0.818				

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 I S C I B L E	70	0.028		C U R R E N T L Y		N O T P E R T I N E N T
		75	0.034				
		80	0.042				
		85	0.051				
		90	0.061				
		95	0.074				
		100	0.089				
		105	0.107				
		110	0.128				
		115	0.152				
		120	0.181				
		125	0.214				
		130	0.253				
		135	0.298				
		140	0.350				
		145	0.410				
		150	0.479				
		155	0.558				
		160	0.648				
		165	0.752				
	170	0.870					
	175	1.004					
	180	1.157					
	185	1.329					
	190	1.524					
	195	1.744					
					N O T A V A I L A B L E		