

# DIMETHYLFORMAMIDE

DMF

CAUTIONARY RESPONSE INFORMATION				4. FIRE HAZARDS	7. SHIPPING INFORMATION								
Common Synonyms N,N-Dimethylformamide DMF	Watery liquid  Floats and mixes with water.	Colorless	Slight ammonia odor	<p>4.1 Flash Point: 153°F O.C. 136°F C.C.          4.2 Flammable Limits in Air: 2.2%-15.2%          4.3 Fire Extinguishing Agents: Water, foam, carbon dioxide, or dry chemical          4.4 Fire Extinguishing Agents Not to Be Used: Not pertinent          4.5 Special Hazards of Combustion Products: Vapors are irritating          4.6 Behavior in Fire: Not pertinent          4.7 Auto Ignition Temperature: 833°F          4.8 Electrical Hazards: Not pertinent          4.9 Burning Rate: 2.2 mm/min.          4.10 Adiabatic Flame Temperature: Currently not available          4.11 Stoichiometric Air to Fuel Ratio: 25.0 (calc.)          4.12 Flame Temperature: Currently not available          4.13 Combustion Molar Ratio (Reactant to Product): 7.5 (calc.)          4.14 Minimum Oxygen Concentration for Combustion (MOCC): Not listed</p>	<p>7.1 Grades of Purity: Currently not available          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: 3          7.7 Barge Hull Type: 3</p>								
Fire	Combustible. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Call fire department. Notify local health and pollution control agencies. Protect water intakes.				8. HAZARD CLASSIFICATIONS								
Exposure	CALL FOR MEDICAL AID.  LIQUID Will burn skin and eyes. 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. DO NOT INDUCE VOMITING.			<p>8.1 49 CFR Category: Flammable liquid          8.2 49 CFR Class: 3          8.3 49 CFR Package Group: III          8.4 Marine Pollutant: No          8.5 NFPA Hazard Classification:</p> <table> <thead> <tr> <th>Category</th> <th>Classification</th> </tr> </thead> <tbody> <tr> <td>Health Hazard (Blue).....</td> <td>1</td> </tr> <tr> <td>Flammability (Red).....</td> <td>2</td> </tr> <tr> <td>Instability (Yellow).....</td> <td>0</td> </tr> </tbody> </table> <p>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</p>	Category	Classification	Health Hazard (Blue).....	1	Flammability (Red).....	2	Instability (Yellow).....	0	9. PHYSICAL & CHEMICAL PROPERTIES
Category	Classification												
Health Hazard (Blue).....	1												
Flammability (Red).....	2												
Instability (Yellow).....	0												
Water Pollution	Effect of low concentrations on aquatic life is unknown. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.			<p>9.1 Physical State at 15°C and 1 atm: Liquid          9.2 Molecular Weight: 73.09          9.3 Boiling Point at 1 atm: 307°F = 153°C = 426°K          9.4 Freezing Point: -78°F = -61°C = 212°K          9.5 Critical Temperature: Not pertinent          9.6 Critical Pressure: Not pertinent          9.7 Specific Gravity: 0.950 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: Not pertinent          9.11 Ratio of Specific Heats of Vapor (Gas): 1.101          9.12 Latent Heat of Vaporization: 248 Btu/lb = 138 cal/g = 5.78 X 10<sup>5</sup> J/kg          9.13 Heat of Combustion: -11,280 Btu/lb = -6267 cal/g = -262.4 X 10<sup>5</sup> J/kg          9.14 Heat of Decomposition: Not pertinent          9.15 Heat of Solution: -63 Btu/lb = -35 cal/g = -1.5 X 10<sup>5</sup> 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: 0.16 psia</p>	NOTES								
1. CORRECTIVE RESPONSE ACTIONS Dilute and disperse Stop discharge	2. CHEMICAL DESIGNATIONS 2.1 CG Compatibility Group: 10; Amide 2.2 Formula: HCON(CH <sub>3</sub> ) <sub>2</sub> 2.3 IMO/UN Designation: Not listed 2.4 DOT ID No.: 2265 2.5 CAS Registry No.: 68-12-2 2.6 NAERG Guide No.: 129 2.7 Standard Industrial Trade Classification: 51471	3. HEALTH HAZARDS 3.1 Personal Protective Equipment: Safety glasses or face shield; rubber apron and boots. 3.2 Symptoms Following Exposure: Irritation of eyes, skin and nose. May cause nausea. 3.3 Treatment of Exposure: INHALATION: remove victim to fresh air; if he is not breathing, give artificial respiration; for difficult breathing give oxygen; call a physician. SKIN OR EYES: flush with plenty of water while removing contaminated clothing and shoes. 3.4 TLV-TWA: 10 ppm 3.5 TLV-STEL: Not listed. 3.6 TLV-Ceiling: Not listed. 3.7 Toxicity by Ingestion: Grade 1; LD <sub>50</sub> = 5 to 15 g/kg (rat) 3.8 Toxicity by Inhalation: Currently not available. 3.9 Chronic Toxicity: Causes abortions in pregnant rats, possibly in humans also. 3.10 Vapor (Gas) Irritant Characteristics: Vapors cause moderate irritation, such that personnel will find high concentrations unpleasant. The effect is temporary. 3.11 Liquid or Solid Characteristics: Causes smarting of the skin and first-degree burns on short exposure and may cause secondary burns on long exposure. 3.12 Odor Threshold: 100 ppm 3.13 IDLH Value: 500 ppm 3.14 OSHA PEL-TWA: 10 ppm 3.15 OSHA PEL-STEL: Not listed. 3.16 OSHA PEL-Ceiling: Not listed. 3.17 EPA AEGL: Not listed	4. WATER POLLUTION 6.1 Aquatic Toxicity: Currently not available 6.2 Waterfowl Toxicity: Currently not available 6.3 Biological Oxygen Demand (BOD): 0.9 lb/lb, 5 days 6.4 Food Chain Concentration Potential: None 6.5 GESAMP Hazard Profile: Bioaccumulation: 0 Damage to living resources: 0 Human Oral hazard: 0 Human Contact hazard: II Reduction of amenities: XX										

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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
40	60.220	0	0.471	85	1.294		N
50	59.880	10	0.474	90	1.289		O
60	59.550	20	0.477	95	1.284		T
70	59.210	30	0.479	100	1.279		
80	58.870	40	0.482	105	1.274		R
90	58.540	50	0.485	110	1.269		E
100	58.200	60	0.488	115	1.264		I
110	57.860	70	0.490	120	1.259		N
120	57.530	80	0.493	125	1.255		E
130	57.190	90	0.496	130	1.250		T
140	56.850	100	0.499	135	1.245		N
150	56.520	110	0.502	140	1.240		E
160	56.180	120	0.504	145	1.235		T
170	55.850	130	0.507	150	1.230		N
180	55.510	140	0.510	155	1.225		E
190	55.170	150	0.513	160	1.220		T
200	54.840	160	0.515	165	1.215		N
210	54.500	170	0.518	170	1.210		E
		180	0.521	175	1.205		T
		190	0.524	180	1.201		N
		200	0.527	185	1.196		E
		210	0.529	190	1.191		T
				195	1.186		N
				200	1.181		E
				205	1.176		T

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	0	0	0.003	0	0.00005	0	0.266
I	10	10	0.005	10	0.00007	25	0.277
S	20	20	0.008	20	0.00011	50	0.288
C	30	30	0.012	30	0.00017	75	0.299
I	40	40	0.018	40	0.00024	100	0.310
B	50	50	0.026	50	0.00035	125	0.321
L	60	60	0.039	60	0.00051	150	0.332
E	70	70	0.055	70	0.00071	175	0.343
	80	80	0.079	80	0.00099	200	0.355
	90	90	0.110	90	0.00136	225	0.366
	100	100	0.152	100	0.00185	250	0.377
	110	110	0.208	110	0.00249	275	0.388
	120	120	0.281	120	0.00330	300	0.399
	130	130	0.376	130	0.00435	325	0.410
	140	140	0.499	140	0.00567	350	0.421
	150	150	0.656	150	0.00732	375	0.432
	160	160	0.854	160	0.00938	400	0.444
	170	170	1.102	170	0.01192	425	0.455
	180	180	1.412	180	0.01503	450	0.466
	190	190	1.794	190	0.01881	475	0.477
	200	200	2.264	200	0.02337	500	0.488
	210	210	2.838	210	0.02885	525	0.499
						550	0.510
						575	0.521
						600	0.532