

1,1-DIMETHYLHYDRAZINE

DMH

CAUTIONARY RESPONSE INFORMATION

Common Synonyms			
Dimazine unsym-Dimethylhydrazine UDMH	Watery liquid	Colorless	Fishy or ammonia-like odor
Floats and mixes with water.			
<p>Keep people away. AVOID CONTACT WITH LIQUID AND VAPOR. Avoid inhalation. Wear chemical protective suit with self-contained breathing apparatus. Shut off ignition sources and call fire department. Stay upwind and use water spray to "knock down" vapor. Evacuate area in case of large discharge. Notify local health and pollution control agencies. Protect water intakes.</p>			
Fire	<p>FLAMMABLE. POISONOUS GASES ARE PRODUCED WHEN HEATED. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Wear chemical protective suit with self-contained breathing apparatus. Flood discharge area with water. Extinguish with water.</p>		
Exposure	<p>CALL FOR MEDICAL AID.</p> <p>VAPOR POISONOUS IF INHALED OR IF SKIN IS EXPOSED. Irritating to eyes. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.</p> <p>LIQUID POISONOUS IF SWALLOWED OR IF SKIN IS EXPOSED. Will burn 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>		
Water Pollution	<p>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>		

1. CORRECTIVE RESPONSE ACTIONS

Dilute and disperse
 Stop discharge
 Do not burn

2. CHEMICAL DESIGNATIONS

- 2.1 CG Compatibility Group: Not listed.
- 2.2 Formula: (CH₃)₂NNH₂
- 2.3 IMO/UN Designation: 3.2/1163
- 2.4 DOT ID No.: 1163
- 2.5 CAS Registry No.: 57-14-7
- 2.6 NAERG Guide No.: 131
- 2.7 Standard Industrial Trade Classification: 51486

3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Rubber gloves, boots, and apron; plastic face shield. Gas mask with ammonia (GMD) canister protects for 30 min. against 1% concentration; for longer periods or higher concentrations, use self-contained breathing apparatus.
- 3.2 **Symptoms Following Exposure:** Breathing of vapor causes pulmonary irritation, delayed gastrointestinal irritation, tremors, and convulsions. Contact with skin or mucous membranes causes chemical burns. Can be absorbed through skin to cause systemic intoxication and convulsions.
- 3.3 **Treatment of Exposure:** INHALATION: remove victim from contaminated area, give artificial respiration and oxygen if needed; watch for signs of pulmonary edema; enforce absolute rest. INGESTION: do NOT induce vomiting; hospitalize. SKIN OR EYES: flood with water and treat as alkaline burn.
- 3.4 TLV-TWA: 0.01 ppm
- 3.5 TLV-STEL: Not listed.
- 3.6 TLV-Ceiling: Not listed.
- 3.7 **Toxicity by Ingestion:** Grade 3; LD₅₀ = 50 to 500 mg/kg (rat, mouse)
- 3.8 **Toxicity by Inhalation:** Currently not available.
- 3.9 **Chronic Toxicity:** Mild anemia, upper respiratory irritation, and muscle tremors in dogs following chronic exposure.
- 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:** Severe skin irritant. Causes second- and third-degree burns on short contact and is very injurious to the eyes.
- 3.12 **Odor Threshold:** 6-14 ppm
- 3.13 IDLH Value: 15 ppm
- 3.14 OSHA PEL-TWA: 0.5 ppm
- 3.15 OSHA PEL-STEL: Not listed.
- 3.16 OSHA PEL-Ceiling: Not listed.
- 3.17 EPA AEGL: Not listed

4. FIRE HAZARDS

- 4.1 **Flash Point:** 34°F C.C.
- 4.2 **Flammable Limits in Air:** 2%-95%
- 4.3 **Fire Extinguishing Agents:** Flood with water
- 4.4 **Fire Extinguishing Agents Not to Be Used:** In large fires, water fog, carbon dioxide, and bicarbonate types may allow flashback and explosive re-ignition.
- 4.5 **Special Hazards of Combustion Products:** None
- 4.6 **Behavior in Fire:** Tends to re-ignite unless diluted with much water.
- 4.7 **Auto Ignition Temperature:** 452-482°F
- 4.8 **Electrical Hazards:** Class I, Group D
- 4.9 **Burning Rate:** 3.8 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):** 7.0 (calc.)
- 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:** Dissolves, swells, and disintegrates many plastics
- 5.3 **Stability During Transport:** Stable below 112°F
- 5.4 **Neutralizing Agents for Acids and Caustics:** Flush with water
- 5.5 **Polymerization:** Not pertinent
- 5.6 **Inhibitor of Polymerization:** Not pertinent

6. WATER POLLUTION

- 6.1 **Aquatic Toxicity:** Currently not available
- 6.2 **Waterfowl Toxicity:** Currently not available
- 6.3 **Biological Oxygen Demand (BOD):** Currently not available
- 6.4 **Food Chain Concentration Potential:** Currently not available
- 6.5 **GESAMP Hazard Profile:**
 Bioaccumulation: 0
 Damage to living resources: (4)
 Human Oral hazard: 2
 Human Contact hazard: II
 Reduction of amenities: XXX

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** Propellant-grade: 98% min.
- 7.2 **Storage Temperature:** Below 120°F
- 7.3 **Inert Atmosphere:** Inerted
- 7.4 **Venting:** Currently not available
- 7.5 **IMO Pollution Category:** Currently not available
- 7.6 **Ship Type:** Currently not available
- 7.7 **Barge Hull Type:** Currently not available

8. HAZARD CLASSIFICATIONS

- 8.1 49 CFR Category: Poison
- 8.2 49 CFR Class: 6.1
- 8.3 49 CFR Package Group: I
- 8.4 Marine Pollutant: No
- 8.5 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue).....	3
Flammability (Red).....	3
Instability (Yellow).....	1
- 8.6 EPA Reportable Quantity: 10 pounds
- 8.7 EPA Pollution Category: A
- 8.8 RCRA Waste Number: U098
- 8.9 EPA FWPCA List: Not listed

9. PHYSICAL & CHEMICAL PROPERTIES

- 9.1 **Physical State at 15° C and 1 atm:** Liquid
- 9.2 **Molecular Weight:** 60.11
- 9.3 **Boiling Point at 1 atm:** 146.0°F = 63.3°C = 336.5°K
- 9.4 **Freezing Point:** -71°F = -57°C = 216°K
- 9.5 **Critical Temperature:** 480.2°F = 249°C = 522.2°K
- 9.6 **Critical Pressure:** 865 psia = 53.5 atm = 5.40 MN/m²
- 9.7 **Specific Gravity:** 0.791 at 20°C (liquid)
- 9.8 **Liquid Surface Tension:** 28 dynes/cm = 0.028 N/m at 25°C
- 9.9 **Liquid Water Interfacial Tension:** Not pertinent
- 9.10 **Vapor (Gas) Specific Gravity:** 2.1
- 9.11 **Ratio of Specific Heats of Vapor (Gas):** (est.) 1.152
- 9.12 **Latent Heat of Vaporization:** 261 Btu/lb = 145 cal/g = 6.07 X 10⁵ J/kg
- 9.13 **Heat of Combustion:** -14,170 Btu/lb = -7870 cal/g = -329.3 X 10⁵ J/kg
- 9.14 **Heat of Decomposition:** Not pertinent
- 9.15 **Heat of Solution:** (est.) -30 Btu/lb = -10 cal/g = -0.6 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:** Currently not available

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	50.580	55	0.640		N		N
40	50.410	60	0.642		O		O
45	50.240	65	0.645		T		T
50	50.060	70	0.648				
55	49.890	75	0.651		P		P
60	49.720	80	0.654		E		E
65	49.540	85	0.656		R		R
70	49.370	90	0.659		T		T
75	49.200	95	0.662		I		I
80	49.020	100	0.665		N		N
85	48.850	105	0.667		E		E
90	48.680	110	0.670		N		N
95	48.500	115	0.673		T		T
100	48.330	120	0.676				
105	48.160						
110	47.980						
115	47.810						
120	47.640						

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	0.300	0	0.00366	90	0.250
	I	5	0.357	5	0.00430	100	0.250
	S	10	0.423	10	0.00504	110	0.250
	C	15	0.499	15	0.00589	120	0.250
	I	20	0.587	20	0.00685	130	0.250
	B	25	0.688	25	0.00795	140	0.250
	L	30	0.804	30	0.00920	150	0.250
	E	35	0.937	35	0.01060	160	0.250
		40	1.088	40	0.01219	170	0.250
		45	1.260	45	0.01398	180	0.250
		50	1.454	50	0.01598	190	0.250
		55	1.674	55	0.01822	200	0.250
		60	1.923	60	0.02072	210	0.250
		65	2.202	65	0.02350	220	0.250
		70	2.515	70	0.02659	230	0.250
		75	2.865	75	0.03001	240	0.250
		80	3.257	80	0.03379	250	0.250
		85	3.693	85	0.03797	260	0.250
		90	4.179	90	0.04257		
		95	4.717	95	0.04762		
		100	5.314	100	0.05317		
		105	5.973	105	0.05923		
		110	6.700	110	0.06586		
		115	7.501	115	0.07309		
		120	8.381	120	0.08096		
		125	9.347	125	0.08952		