

DIETHYLAMINE

DEN

CAUTIONARY RESPONSE INFORMATION

Common Synonyms DEN	Watery liquid Colorless Fishy, ammonia odor Floats and mixes with water. Flammable, irritating vapor is produced.
<p>Keep people away. Avoid contact with liquid and vapor. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). 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.</p>	
Fire	FLAMMABLE. Flashback along vapor trail may occur. Irritating vapors are produced when heated. Vapor may explode if ignited in an enclosed area. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Extinguish with dry chemical, alcohol foam or carbon dioxide. Cool exposed containers with water.
<p>Exposure CALL FOR MEDICAL AID. VAPOR Irritating to eyes, nose and throat. Harmful if inhaled. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. LIQUID Will burn eyes. Harmful if swallowed. 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.</p>	
Water Pollution	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.

1. CORRECTIVE RESPONSE ACTIONS

Dilute and disperse
Stop discharge

2. CHEMICAL DESIGNATIONS

- 2.1 CG Compatibility Group: 7; Aliphatic amine
- 2.2 Formula: $(\text{CH}_2\text{CH}_2)_2\text{NH}$
- 2.3 IMO/UN Designation: 3.1/1154
- 2.4 DOT ID No.: 1154
- 2.5 CAS Registry No.: 109-89-7
- 2.6 NAERG Guide No.: 132
- 2.7 Standard Industrial Trade Classification: 51451

3. HEALTH HAZARDS

- 3.1 Personal Protective Equipment: Chemical safety goggles, rubber gloves, and apron.
- 3.2 Symptoms Following Exposure: Irritation and burning of eyes, skin, and respiratory system. High concentration of vapor can cause asphyxiation.
- 3.3 Treatment of Exposure: In case of contact, flush skin or eyes with plenty of water for at least 15 min.; for eyes, get medical attention.
- 3.4 TLV-TWA: 5 ppm
- 3.5 TLV-STEL: 15 ppm
- 3.6 TLV-Ceiling: Not listed.
- 3.7 Toxicity by Ingestion: Grade 2; $\text{LD}_{50} = 0.5$ to 5 g/kg (rat)
- 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 vapor concentrations.
- 3.11 Liquid or Solid Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.
- 3.12 Odor Threshold: 0.14 ppm
- 3.13 IDLH Value: 200 ppm
- 3.14 OSHA PEL-TWA: 25 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: 5°F O.C.
- 4.2 Flammable Limits in Air: 1.8%-10.1%
- 4.3 Fire Extinguishing Agents: 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: Vapors are irritating
- 4.6 Behavior in Fire: Vapors are heavier than air and may travel considerable distance to a source of ignition and flash back.
- 4.7 Auto Ignition Temperature: 594°F
- 4.8 Electrical Hazards: Currently not available
- 4.9 Burning Rate: 6.7 mm/min.
- 4.10 Adiabatic Flame Temperature: Currently not available
- 4.11 Stoichiometric Air to Fuel Ratio: 36.9 (calc.)
- 4.12 Flame Temperature: Currently not available
- 4.13 Combustion Molar Ratio (Reactant to Product): 10.5 (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: No hazardous reaction
- 5.3 Stability During Transport: Stable
- 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: 85 mg/l/48 hr/creek chub/TL_m/fresh water
- 6.2 Waterfowl Toxicity: Currently not available
- 6.3 Biological Oxygen Demand (BOD): Currently not available
- 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: XXX

7. SHIPPING INFORMATION

- 7.1 Grades of Purity: Technical: 99%
- 7.2 Storage Temperature: Currently not available
- 7.3 Inert Atmosphere: Currently not available
- 7.4 Venting: Currently not available
- 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: Flammable liquid

- 8.2 49 CFR Class: 3

- 8.3 49 CFR Package Group: II

- 8.4 Marine Pollutant: No

- 8.5 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue).....	2
Flammability (Red).....	3
Instability (Yellow).....	0

- 8.6 EPA Reportable Quantity: 100 pounds

- 8.7 EPA Pollution Category: B

- 8.8 RCRA Waste Number: Not listed

- 8.9 EPA FWCRA List: Yes

9. PHYSICAL & CHEMICAL PROPERTIES

- 9.1 Physical State at 15°C and 1 atm: Liquid
- 9.2 Molecular Weight: 73.14
- 9.3 Boiling Point at 1 atm: 132°F = 55.5°C = 328.7°K
- 9.4 Freezing Point: -57.6°F = -49.8°C = 223.4K
- 9.5 Critical Temperature: 434.3°F = 223.5°C = 496.7°K
- 9.6 Critical Pressure: 538 psia = 36.6 atm = 3.71 MN/m²
- 9.7 Specific Gravity: 0.708 at 20°C (liquid)
- 9.8 Liquid Surface Tension: 20.05 dynes/cm = 0.02005 N/m at 20°C
- 9.9 Liquid Water Interfacial Tension: Not pertinent
- 9.10 Vapor (Gas) Specific Gravity: 2.5
- 9.11 Ratio of Specific Heats of Vapor (Gas): 1.079
- 9.12 Latent Heat of Vaporization: 170 Btu/lb = 93 cal/g = 3.9 X 10³ J/kg
- 9.13 Heat of Combustion: -17,990 Btu/lb = -9994 cal/g = -418.4 X 10⁵ J/kg
- 9.14 Heat of Decomposition: Not pertinent
- 9.15 Heat of Solution: -202 Btu/lb = -112 cal/g = -4.69 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: 0.7 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	45.340	20	0.575	35	0.906		
40	45.160	30	0.580	40	0.898		
45	44.980	40	0.585	45	0.890		
50	44.800	50	0.590	50	0.882		
55	44.620	60	0.595	55	0.874		
60	44.440	70	0.601	60	0.866		
65	44.260	80	0.606	65	0.858		
70	44.090	90	0.611	70	0.850		
75	43.910	100	0.616	75	0.842		
80	43.730	110	0.621	80	0.834		
85	43.550	120	0.626	85	0.826		
90	43.370	130	0.632	90	0.818		
95	43.190			95	0.809		
100	43.010			100	0.801		
105	42.840			105	0.793		
110	42.660			110	0.785		
115	42.480			115	0.777		
120	42.300			120	0.769		
				125	0.761		
				130	0.753		

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	35	1.613	35	0.02222		0	0.335
I	40	1.846	40	0.02518		25	0.349
S	45	2.107	45	0.02845		50	0.363
C	50	2.399	50	0.03208		75	0.377
I	55	2.725	55	0.03607		100	0.391
B	60	3.087	60	0.04047		125	0.405
L	65	3.488	65	0.04530		150	0.418
E	70	3.933	70	0.05059		175	0.432
	75	4.425	75	0.05639		200	0.445
	80	4.967	80	0.06271		225	0.458
	85	5.564	85	0.06960		250	0.471
	90	6.220	90	0.07709		275	0.484
	95	6.939	95	0.08523		300	0.497
	100	7.726	100	0.09405		325	0.510
	105	8.586	105	0.10360		350	0.523
	110	9.524	110	0.11390		375	0.535
	115	10.550	115	0.12500		400	0.548
	120	11.660	120	0.13700		425	0.560
						450	0.572
						475	0.584
						500	0.596
						525	0.607
						550	0.619
						575	0.631
						600	0.642