

# HEXAMETHYLENIMINE

HMI

## CAUTIONARY RESPONSE INFORMATION

<b>Common Synonyms</b> Azacycloheptane Hexahydroazepine Homopiperidine		Liquid	Colorless to light yellow	Ammonia-like odor
Floats and mixes slowly with water. Irritating vapor is produced.				
<b>KEEP PEOPLE AWAY. AVOID CONTACT WITH LIQUID AND VAPOR.</b> Shut off ignition sources. Call fire department. Notify local health and pollution control agencies. Protect water intakes.				
<b>Fire</b>	Combustible. <b>POISONOUS GASES MAY BE PRODUCED IN FIRE.</b> Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Wear goggles and self-contained breathing apparatus. Extinguish with dry chemicals, alcohol foam, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.			
<b>Exposure</b>	CALL FOR MEDICAL AID.  <b>VAPOR</b> Irritating to eyes, nose and throat. If inhaled will cause coughing, difficult breathing, or loss of consciousness. If in eyes, hold eyelids open and flush with plenty of water. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.  <b>LIQUID</b> <b>POISONOUS IF SWALLOWED.</b> Will burn skin and eyes. If swallowed will cause nausea. 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. IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm. <b>DO NOT INDUCE VOMITING.</b>			
<b>Water Pollution</b>	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.			

### 1. CORRECTIVE RESPONSE ACTIONS

Dilute and disperse  
Stop discharge  
Do not burn

### 2. CHEMICAL DESIGNATIONS

2.1 **CG Compatibility Group:** 7; Aliphatic amine  
 2.2 **Formula:** CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>NH  
 2.3 **IMO/UN Designation:** Not listed  
 2.4 **DOT ID No.:** 2493  
 2.5 **CAS Registry No.:** 111-49-9  
 2.6 **NAERG Guide No.:** 132  
 2.7 **Standard Industrial Trade Classification:** 51577

### 3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Self-contained breathing apparatus; impervious gloves; chemical safety goggles; impervious apron and boots
- 3.2 **Symptoms Following Exposure:** Inhalation of vapor irritates respiratory tract; high concentrations may cause disturbance of the central nervous system. Ingestion causes burns of mouth and stomach. Contact with concentrated vapor may cause severe eye injury. Contact with liquid causes burns of eyes and skin.
- 3.3 **Treatment of Exposure:** INHALATION: remove victim to uncontaminated atmosphere; get medical attention. INGESTION: give large amount of water; do NOT induce vomiting; get medical attention if large amount was swallowed. EYES: flush with water for 15 min. and get medical attention. SKIN: flush with water; wash with soap and water.
- 3.4 **TLV-TWA:** Not listed.  
 3.5 **TLV-STEL:** Not listed.  
 3.6 **TLV-Ceiling:** Not listed.  
 3.7 **Toxicity by Ingestion:** Grade 4; oral LD<sub>50</sub> = 32 mg/kg (rat)  
 3.8 **Toxicity by Inhalation:** Currently not available.  
 3.9 **Chronic Toxicity:** Currently not available  
 3.10 **Vapor (Gas) Irritant Characteristics:** Currently not available  
 3.11 **Liquid or Solid Characteristics:** Currently not available  
 3.12 **Odor Threshold:** Currently not available  
 3.13 **IDLH Value:** Not listed.  
 3.14 **OSHA PEL-TWA:** Not listed.  
 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:** 99°F O.C.  
 4.2 **Flammable Limits in Air:** 1.6%-2.3%  
 4.3 **Fire Extinguishing Agents:** Dry chemical, alcohol foam, carbon dioxide  
 4.4 **Fire Extinguishing Agents Not to Be Used:** Water may be ineffective.  
 4.5 **Special Hazards of Combustion Products:** Toxic oxides of nitrogen may form in fire.  
 4.6 **Behavior in Fire:** Vapor is heavier than air and may travel to a source of ignition and flash back.  
 4.7 **Auto Ignition Temperature:** Currently not available  
 4.8 **Electrical Hazards:** Currently not available  
 4.9 **Burning Rate:** Currently not available  
 4.10 **Adiabatic Flame Temperature:** Currently not available  
 4.11 **Stoichiometric Air to Fuel Ratio:** 48.8 (calc.)  
 4.12 **Flame Temperature:** Currently not available  
 4.13 **Combustion Molar Ratio (Reactant to Product):** 13.5 (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:** Currently not available  
 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:** 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:** None  
 6.5 **GESAMP Hazard Profile:**  
 Bioaccumulation: 0  
 Damage to living resources: 2  
 Human Oral hazard: 3  
 Human Contact hazard: II  
 Reduction of amenities: X

### 7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** Commercial; Pure  
 7.2 **Storage Temperature:** Ambient  
 7.3 **Inert Atmosphere:** No requirement  
 7.4 **Venting:** Open (flame arrester)  
 7.5 **IMO Pollution Category:** C  
 7.6 **Ship Type:** 2  
 7.7 **Barge Hull Type:** 2

### 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:** Not listed  
 8.6 **EPA Reportable Quantity:** Not listed.  
 8.7 **EPA Pollution Category:** Not listed.  
 8.8 **RCRA Waste Number:** Not listed  
 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:** 99  
 9.3 **Boiling Point at 1 atm:** 270°F = 132°C = 405°K  
 9.4 **Freezing Point:** Not pertinent  
 9.5 **Critical Temperature:** Not pertinent  
 9.6 **Critical Pressure:** Not pertinent  
 9.7 **Specific Gravity:** 0.880 at 20°C (liquid)  
 9.8 **Liquid Surface Tension:** Currently not available  
 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:** Currently not available  
 9.13 **Heat of Combustion:** Currently not available  
 9.14 **Heat of Decomposition:** Not pertinent  
 9.15 **Heat of Solution:** Currently not available  
 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:** 4.2 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
42	55.830		N		N		N
44	55.760		O		O		O
46	55.690		T		T		T
48	55.630						
50	55.560		P		P		P
52	55.490		E		E		E
54	55.420		R		R		R
56	55.350		T		T		T
58	55.280		I		I		I
60	55.210		N		N		N
62	55.140		E		E		E
64	55.070		N		N		N
66	55.000		T		T		T
68	54.930						
70	54.860						
72	54.790						
74	54.720						
76	54.650						

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
68	5.000	60	0.089	60	0.00157		N
		70	0.124	70	0.00216		O
		80	0.171	80	0.00292		T
		90	0.234	90	0.00392		
		100	0.316	100	0.00520		P
		110	0.422	110	0.00683		E
		120	0.558	120	0.00888		R
		130	0.731	130	0.01144		T
		140	0.950	140	0.01460		I
		150	1.223	150	0.01850		N
		160	1.562	160	0.02324		E
		170	1.979	170	0.02899		R
		180	2.489	180	0.03589		T
		190	3.109	190	0.04414		I
		200	3.858	200	0.05393		N
		210	4.756	210	0.06549		E
		220	5.826	220	0.07906		N
		230	7.096	230	0.09489		T
		240	8.594	240	0.11330		
		250	10.350	250	0.13450		
		260	12.400	260	0.15900		