

PROPYLENEIMINE

PII

CAUTIONARY RESPONSE INFORMATION

Common Synonyms 2-Methylaziridine 2-Methylethyleneimine		Liquid	Colorless	Strong ammonia-like odor
Mixes with water. Flammable, irritating vapor is produced.				
<p>Evacuate. KEEP PEOPLE AWAY. AVOID CONTACT WITH LIQUID AND VAPOR. Wear rubber overclothing (including gloves). Shut off ignition sources. Call fire department. Stay upwind. Use water spray to "knock down" vapor. Notify local health and pollution control agencies. Protect water intakes.</p>				
Fire	<p>FLAMMABLE. Irritating gases are produced when heated. Containers may explode in fire. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Combat fires from safe distance or protected location. Extinguish with dry chemicals or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.</p>			
Exposure	<p>CALL FOR MEDICAL AID.</p> <p>VAPOR Irritating to eyes, nose and throat. If inhaled will cause nausea, vomiting or difficult breathing. Move victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.</p> <p>LIQUID POISONOUS IF SWALLOWED. 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>			
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: $\text{NH}_2\text{CH}_2\text{CH}(\text{NH}_2)\text{CH}_3$
- 2.3 IMO/UN Designation: 3.2/1921
- 2.4 DOT ID No.: 1921
- 2.5 CAS Registry No.: 75-55-8
- 2.6 NAERG Guide No.: 131P
- 2.7 Standard Industrial Trade Classification: 51453

3. HEALTH HAZARDS

- 3.1 Personal Protective Equipment: Self-contained breathing apparatus; goggles or face shield; rubber gloves
- 3.2 Symptoms Following Exposure: Inhalation causes vomiting, breathing difficulty, and irritation of eyes, nose, and throat; on prolonged exposure, vapors tend to redden the whites of the eyes. Contact with liquid causes eye irritation, like that caused by strong ammonia. Liquid causes skin burns, which are slow to heal. Ingestion causes burns of mouth and stomach.
- 3.3 Treatment of Exposure: INHALATION: move victim to fresh air; if he is not breathing, apply artificial respiration, oxygen; if breathing is difficult, administer oxygen; call physician. EYES: flush with plenty of water for at least 30 min. and obtain prompt medical attention. SKIN: remove all contaminated clothing and flush with water; rinse with vinegar and water. INGESTION: drink large amounts of milk or water; get prompt medical attention.
- 3.4 TLV-TWA: 2 ppm
- 3.5 TLV-STEL: Not listed.
- 3.6 TLV-Ceiling: Not listed.
- 3.7 Toxicity by Ingestion: Grade 4; oral LD_{50} = 19 mg/kg (rat)
- 3.8 Toxicity by Inhalation: Currently not available.
- 3.9 Chronic Toxicity: Not pertinent
- 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: 100 ppm
- 3.14 OSHA PEL-TWA: 2 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: 92°F O.C.
- 4.2 Flammable Limits in Air: Currently not available
- 4.3 Fire Extinguishing Agents: Dry chemical or carbon dioxide
- 4.4 Fire Extinguishing Agents Not to Be Used: Water or foam may be ineffective.
- 4.5 Special Hazards of Combustion Products: Irritating nitrogen oxides are produced.
- 4.6 Behavior in Fire: Containers may explode.
- 4.7 Auto Ignition Temperature: Currently not available
- 4.8 Electrical Hazards: Currently not available
- 4.9 Burning Rate: 4.1 mm/min.
- 4.10 Adiabatic Flame Temperature: Currently not available
- 4.11 Stoichiometric Air to Fuel Ratio: 27.4 (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

5. CHEMICAL REACTIVITY

- 5.1 Reactivity with Water: Reacts slowly to form propanolamine. The reaction is not hazardous.
- 5.2 Reactivity with Common Materials: No reaction
- 5.3 Stability During Transport: Stable if kept in contact with solid caustic soda (sodium hydroxide)
- 5.4 Neutralizing Agents for Acids and Caustics: Dilute with water, rinse with vinegar
- 5.5 Polymerization: Polymerizes explosively when in contact with any acid
- 5.6 Inhibitor of Polymerization: Solid sodium hydroxide (caustic soda)

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: -
 Human Oral hazard: 3
 Human Contact hazard: II
 Reduction of amenities: XXX

7. SHIPPING INFORMATION

- 7.1 Grades of Purity: Technical
- 7.2 Storage Temperature: Ambient
- 7.3 Inert Atmosphere: Exclude air
- 7.4 Venting: Pressure-vacuum
- 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: Flammable liquid
- 8.2 49 CFR Class: 3
- 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).....	0
- 8.6 EPA Reportable Quantity: 1 pound.
- 8.7 EPA Pollution Category: X
- 8.8 RCRA Waste Number: U067
- 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: 57.1
- 9.3 Boiling Point at 1 atm: 151°F = 66°C = 339°K
- 9.4 Freezing Point: Not pertinent
- 9.5 Critical Temperature: Not pertinent
- 9.6 Critical Pressure: Not pertinent
- 9.7 Specific Gravity: 0.802 at 25°C (liquid)
- 9.8 Liquid Surface Tension: (est.) 25 dynes/cm = 0.025 N/m at 20°C
- 9.9 Liquid Water Interfacial Tension: Not pertinent
- 9.10 Vapor (Gas) Specific Gravity: 2
- 9.11 Ratio of Specific Heats of Vapor (Gas): Currently not available
- 9.12 Latent Heat of Vaporization: 250 Btu/lb = 139 cal/g = 5.82 X 10⁵ J/kg
- 9.13 Heat of Combustion: (est.) -15,500 Btu/lb = -8,600 cal/g = -360 X 10⁵ J/kg
- 9.14 Heat of Decomposition: Not pertinent
- 9.15 Heat of Solution: -140 Btu/lb = -78 cal/g = -3.3 X 10⁵ J/kg
- 9.16 Heat of Polymerization: (est.) -720 Btu/lb = -400 cal/g = -17 X 10⁵ J/kg
- 9.17 Heat of Fusion: Currently not available
- 9.18 Limiting Value: Currently not available
- 9.19 Reid Vapor Pressure: Currently not available

NOTES

PROPYLENEIMINE

PII

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	51.520	51	0.411	51	1.048	52	0.470
40	51.350	52	0.411	52	1.048	54	0.465
45	51.170	53	0.412	53	1.048	56	0.461
50	51.000	54	0.412	54	1.048	58	0.457
55	50.830	55	0.413	55	1.048	60	0.452
60	50.650	56	0.413	56	1.048	62	0.448
65	50.480	57	0.414	57	1.048	64	0.444
70	50.310	58	0.414	58	1.048	66	0.440
75	50.130	59	0.415	59	1.048	68	0.436
80	49.960	60	0.416	60	1.048	70	0.432
85	49.790	61	0.416	61	1.048	72	0.428
90	49.610	62	0.417	62	1.048	74	0.424
95	49.440	63	0.417	63	1.048	76	0.421
100	49.260	64	0.418	64	1.048	78	0.417
105	49.090	65	0.418	65	1.048	80	0.413
110	48.920	66	0.419	66	1.048	82	0.410
115	48.740	67	0.419	67	1.048	84	0.406
120	48.570	68	0.420	68	1.048	86	0.403
		69	0.421	69	1.048		
		70	0.421	70	1.048		
		71	0.422	71	1.048		
		72	0.422	72	1.048		
		73	0.423	73	1.048		
		74	0.423	74	1.048		
		75	0.424	75	1.048		
		76	0.424	76	1.048		

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	55	1.516	55	0.01567	0	0.307
	I	60	1.742	60	0.01783	25	0.324
	S	65	1.997	65	0.02025	50	0.340
	C	70	2.284	70	0.02294	75	0.356
	I	75	2.605	75	0.02592	100	0.371
	B	80	2.964	80	0.02922	125	0.386
	L	85	3.365	85	0.03286	150	0.401
	E	90	3.811	90	0.03688	175	0.416
		95	4.306	95	0.04129	200	0.430
		100	4.855	100	0.04614	225	0.444
		105	5.462	105	0.05146	250	0.458
		110	6.133	110	0.05727	275	0.471
		115	6.872	115	0.06361	300	0.484
	R	120	7.685	120	0.07052	325	0.497
	E	125	8.578	125	0.07804	350	0.509
	A	130	9.557	130	0.08621	375	0.521
	C	135	10.630	135	0.09507	400	0.533
	T	140	11.800	140	0.10470	425	0.545
	S	145	13.080	145	0.11500	450	0.556
		150	14.470	150	0.12620	475	0.567
		155	15.980	155	0.13830	500	0.578
						525	0.588
						550	0.598
						575	0.608
						600	0.618