ETHYLENEDIAMINE

EDA

CAUTIONARY RESPONSE INFORMATION

Common Synonyms
1,2-Diaminoethane
1,2-Ethanediamine
Ethylenediamine (Dow
Ethyleneamine 1302)

Liquid | Colorless | Mild ammonia odor

Floats and mixes with water. Irritating vapor is produced. Freezing point is 52°F.

Keep people away. Avoid contact with liquid and vapor.
Avoid inhalation.
Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves).
Shut off ignition sources and call fire department.
Notify local health and pollution control agencies.
Protect water intakes.

Fire

Combustible.
Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves).
Extinguish with water, dry chemical, alcohol foam, or carbon dioxide.
Cool exposed containers with water.

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 skin and 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.
DO NOT INDUCE VOMITING.

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: $NH_2CH_2CH_2NH_2$
2.3 IMO/UN Designation: 8.0/1604
2.4 DOT ID No.: 1604
2.5 CAS Registry No.: 107-15-3
2.6 NAERG Guide No.: 132
2.7 Standard Industrial Trade Classification: 51452

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Full rubber protective clothing, incl. gloves and boots; chemical worker's goggles; face shield where contact with face islikely. If necessary to enter closed area for 1/2 hr or less with mist, wear full-faced gas mask with canister approved by Bureau of Standards for use with ammonia.
3.2 Symptoms Following Exposure: High concentration of vapor burns eyes and irritates nose and throat. Liquid burns eyes and skin.
3.3 Treatment of Exposure: Get medical help immediately] INGESTION: drink large amounts of water or milk quickly, induce vomiting only if instructed by physician. EYES: flush immediately and thoroughly with flowing water for at least 15 min. SKIN: remove clothing and flush affected area with copious amounts of flowing water, then wash with soap and water; severe exposure may require showering.
3.4 TLV-TWA: 10 ppm
3.5 TLV-STEL: Not listed.
3.6 TLV-Ceiling: Not listed.
3.7 Toxicity by Ingestion: Grade 2; LD_{50} = 0.5 to 5 g/kg (female rat)
3.8 Toxicity by Inhalation: Currently not available.
3.9 Chronic Toxicity: Currently not available
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: Fairly severe skin irritant; may cause pain and second- degree burns after a few minutes' contact.
3.12 Odor Threshold: 10 ppm
3.13 IDLH Value: 1,000 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. FIRE HAZARDS

4.1 Flash Point: 99°F O.C. 150°F C.C.
4.2 Flammable Limits in Air: 5.8%–11.1%
4.3 Fire Extinguishing Agents: Carbon dioxide, dry chemicals, foam or water
4.4 Fire Extinguishing Agents Not to Be Used: Do not use water in case of drum or tank fires.
4.5 Special Hazards of Combustion Products: Irritating vapors are generated when heated.
4.6 Behavior in Fire: Not pertinent
4.7 Auto Ignition Temperature: 715°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 Stoichometric Air to Fuel Ratio: 28.6 (calc.)
4.12 Flame Temperature: Currently not available
4.13 Combustion Molar Ratio (Reactant to Product): 8.0 (calc.)
4.14 Minimum Oxygen Concentration for Combustion (MOCC): Not listed

5. CHEMICAL REACTIVITY

5.1 Reactivity with Water: Gives off heat, but reaction is not hazardous.
5.2 Reactivity with Common Materials: No 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: 60 ppm/24 hr/chub/killed/fresh water
6.2 Waterfowl Toxicity: Currently not available
6.3 Biological Oxygen Demand (BOD): 75% (theor.), 5 days
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: XX

7. SHIPPING INFORMATION

7.1 Grades of Purity: 99+%
7.2 Storage Temperature: Ambient
7.3 Inert Atmosphere: No requirement
7.4 Venting: Pressure-vacuum
7.5 IMO Pollution Category: C
7.6 Ship Type: 2
7.7 Barge Hull Type: 3

8. HAZARD CLASSIFICATIONS

8.1 49 CFR Category: Corrosive material
8.2 49 CFR Class: 8
8.3 49 CFR Package Group: II
8.4 Marine Pollutant: No
8.5 NFPA Hazard Classification:

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

8.6 EPA Reportable Quantity: 5000 pounds
8.7 EPA Pollution Category: D
8.8 RCRA Waste Number: Not listed
8.9 EPA FWPCA List: Yes

9. PHYSICAL & CHEMICAL PROPERTIES

9.1 Physical State at 15° C and 1 atm: Liquid
9.2 Molecular Weight: 60.10
9.3 Boiling Point at 1 atm: 243°F = 117°C = 390°K
9.4 Freezing Point: 51.8°F = 11.0°C = 284.2°K
9.5 Critical Temperature: 608.0°F = 320°C = 593.2°K
9.6 Critical Pressure: 941 psia = 64 atm = 6.4 MN/m^2
9.7 Specific Gravity: 0.909 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): 1.087
9.12 Latent Heat of Vaporization: 288 Btu/lb = 160 cal/g = 6.70 X 10^5 J/kg
9.13 Heat of Combustion: –12,290 Btu/lb = –6830 cal/g = –286.0 X 10^5 J/kg
9.14 Heat of Decomposition: Not pertinent
9.15 Heat of Solution: (est.) –9 Btu/lb = –5 cal/g = –0.2 X 10^5 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: 0.6 psia

NOTES

ETHYLENEDIAMINE

EDA

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
60	57.000	60	0.689		N		N
70	56.650	70	0.694		O		O
80	56.290	80	0.698		T		T
90	55.940	90	0.703				
100	55.590	100	0.707		P		P
110	55.230	110	0.712		E		E
120	54.880	120	0.716		R		R
130	54.520	130	0.720		T		T
140	54.170	140	0.725		I		I
150	53.820	150	0.729		N		N
160	53.460	160	0.734		E		E
170	53.110	170	0.738		N		N
180	52.760	180	0.743		T		T
190	52.400	190	0.747				
200	52.050	200	0.752				
210	51.690	210	0.756				
		220	0.760				
		230	0.765				
		240	0.769				

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	60	0.151	60	0.00162	0	0.381
	I	70	0.216	70	0.00228	25	0.392
	S	80	0.304	80	0.00315	50	0.404
	C	90	0.420	90	0.00428	75	0.415
	I	100	0.573	100	0.00573	100	0.426
	B	110	0.771	110	0.00757	125	0.437
	L	120	1.023	120	0.00988	150	0.448
	E	130	1.340	130	0.01273	175	0.459
		140	1.737	140	0.01621	200	0.470
		150	2.226	150	0.02044	225	0.480
		160	2.824	160	0.02552	250	0.491
		170	3.550	170	0.03156	275	0.501
		180	4.422	180	0.03870	300	0.511
		190	5.461	190	0.04706	325	0.521
		200	6.692	200	0.05679	350	0.531
		210	8.138	210	0.06804	375	0.540
		220	9.827	220	0.08095	400	0.550
		230	11.790	230	0.09568	425	0.559
		240	14.050	240	0.11240	450	0.569
		250	16.640	250	0.13130	475	0.578
		260	19.600	260	0.15250	500	0.587
		270	22.950	270	0.17610	525	0.595
		280	26.750	280	0.20250	550	0.604
		290	31.020	290	0.23160	575	0.613
		300	35.800	300	0.26380	600	0.621