

HYDRAZINE

HDZ

CAUTIONARY RESPONSE INFORMATION

Common Synonyms	Watery liquid Colorless Ammonia odor
	Mixes with water. Poisonous, flammable vapor is produced. Freezing point is 35°F.
	Evacuate. Keep people away. AVOID CONTACT WITH LIQUID AND VAPOR. Wear chemical protective suit with self-contained breathing apparatus. Shut off ignition sources. Call fire department. Stay upwind and use water spray to "knock down" vapor. Notify local health and pollution control agencies. Protect water intakes.
Fire	FLAMMABLE Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Wear chemical protective suit with self-contained breathing apparatus. Combat fires from safe distance or protected location. Flood discharge area with water. Extinguish with dry chemical, alcohol foam, or carbon dioxide. Cool exposed containers with water. Continue cooling after fire has been extinguished.
Exposure	CALL FOR MEDICAL AID. 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. 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.
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
Chemical and Physical Treatment:
Absorb

2. CHEMICAL DESIGNATIONS

2.1 **CG Compatibility Group:** Not listed.
2.2 **Formula:** N₂H₄
2.3 **IMO/UN Designation:** 8.0/2030
2.4 **DOT ID No.:** 2029
2.5 **CAS Registry No.:** 302-01-2
2.6 **NAERG Guide No.:** 132
2.7 **Standard Industrial Trade Classification:** 52268

3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Ammonia-type gas mask; self-contained breathing apparatus; plastic-coated or rubber gloves, clothes, and apron; safety shower must be available.
- 3.2 **Symptoms Following Exposure:** Vapors cause itching, swelling, and blistering of eyelids, skin, nose and throat; symptoms may be delayed for several hours. Temporary blindness may occur. Liquid causes a caustic-like burn if not washed off at once. Ingestion or absorption through skin causes nausea, dizziness, headache. Severe exposure may cause death.
- 3.3 **Treatment of Exposure:** Call a doctor at once. **INHALATION:** remove to fresh air; observe for development of delayed symptoms. Keep quiet. **INGESTION:** do NOT induce vomiting; give egg whites or other emollient. **SKIN OR EYES:** wash with large amounts of water for at least 15 min.
- 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)
3.8 **Toxicity by Inhalation:** Currently not available.
- 3.9 **Chronic Toxicity:** Causes lung cancer in mice.
- 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:** Severe skin irritant. Causes second-and third-degree burns on short contact; very injurious to the eyes.
- 3.12 **Odor Threshold:** 3-4 ppm
3.13 **IDLH Value:** 50 ppm
3.14 **OSHA PEL-TWA:** 1 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:** 100°F O.C.
4.2 **Flammable Limits in Air:** 4.7%-100%
4.3 **Fire Extinguishing Agents:** Water, alcohol foam, carbon dioxide, or dry chemical
4.4 **Fire Extinguishing Agents Not to Be Used:** Not pertinent
4.5 **Special Hazards of Combustion Products:** Toxic vapor is generated when heated.
4.6 **Behavior in Fire:** May explode if confined.
4.7 **Auto Ignition Temperature:** May ignite spontaneously 518°F (glass)
4.8 **Electrical Hazards:** Not pertinent
4.9 **Burning Rate:** 1 mm/min. (est.)
4.10 **Adiabatic Flame Temperature:** Currently not available
4.11 **Stoichiometric Air to Fuel Ratio:** 14.3 (calc.)
4.12 **Flame Temperature:** Currently not available
4.13 **Combustion Molar Ratio (Reactant to Product):** 4.0 (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:** Can catch fire when in contact with porous materials such as wood, asbestos, cloth, earth and rusty metals.
5.3 **Stability During Transport:** Stable at ordinary temperatures. When heated, can decompose to nitrogen and ammonia gases, but decomposition is not hazardous unless material is confined.
5.4 **Neutralizing Agents for Acids and Caustics:** Flush with water Neutralize the resulting solution with calcium hypochlorite (HTH) (7 lbs per lb of hydrazine).
5.5 **Polymerization:** Not pertinent
5.6 **Inhibitor of Polymerization:** Not pertinent

6. WATER POLLUTION

- 6.1 **Aquatic Toxicity:** 146 ppm/0.5 hr/rainbow trout/died/fresh water
6.2 **Waterfowl Toxicity:** Currently not available
6.3 **Biological Oxygen Demand (BOD):** 100%
6.4 **Food Chain Concentration Potential:** None
6.5 **GESAMP Hazard Profile:**
Bioaccumulation: 0
Damage to living resources: 3
Human Oral hazard: 2
Human Contact hazard: II
Reduction of amenities: XXX

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** Anhydrous; 35-64% water solutions
7.2 **Storage Temperature:** Ambient
7.3 **Inert Atmosphere:** Padded
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:** Corrosive material
8.2 **49 CFR Class:** 8
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)..... | 2 |
- 8.6 **EPA Reportable Quantity:** 1 pound
8.7 **EPA Pollution Category:** X
8.8 **RCRA Waste Number:** U133
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:** 32.05
9.3 **Boiling Point at 1 atm:** 236.3°F = 113.5°C = 386.7°K
9.4 **Freezing Point:** 34.7°F = 1.5°C = 274.7°K
9.5 **Critical Temperature:** 716.0°F = 380°C = 653.2°K
9.6 **Critical Pressure:** 2130 psia = 145 atm = 14.7 MN/m²
9.7 **Specific Gravity:** 1.008 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):** 1.191
9.12 **Latent Heat of Vaporization:** 538 Btu/lb = 299 cal/g = 12.5 X 10⁵ J/kg
9.13 **Heat of Combustion:** -8345 Btu/lb = -4636 cal/g = -194.1 X 10⁵ J/kg
9.14 **Heat of Decomposition:** Not pertinent
9.15 **Heat of Solution:** -218 Btu/lb = -121 cal/g = -5.07 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
45	63.590	40	0.727		N		N
50	63.440	50	0.730		O		O
55	63.290	60	0.733		T		T
60	63.140	70	0.737				
65	62.990	80	0.740		P		P
70	62.840	90	0.743		E		E
75	62.690	100	0.746		R		R
80	62.540	110	0.749		T		T
85	62.380	120	0.752		I		I
90	62.230	130	0.755		N		N
95	62.080	140	0.758		E		E
100	61.930	150	0.761		N		N
105	61.780	160	0.764		T		T
110	61.630	170	0.767				
115	61.480	180	0.770				
120	61.330	190	0.773				
125	61.180	200	0.776				
130	61.030	210	0.779				
135	60.880	220	0.782				
140	60.720	230	0.785				

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	0.064	35	0.00038	0	0.352
	I	40	0.077	40	0.00046	25	0.365
	S	45	0.092	45	0.00055	50	0.378
	C	50	0.111	50	0.00065	75	0.391
	I	55	0.132	55	0.00077	100	0.403
	B	60	0.157	60	0.00090	125	0.415
	L	65	0.187	65	0.00106	150	0.426
	E	70	0.221	70	0.00124	175	0.437
		75	0.260	75	0.00145	200	0.447
		80	0.306	80	0.00169	225	0.458
		85	0.358	85	0.00196	250	0.467
		90	0.419	90	0.00227	275	0.476
		95	0.488	95	0.00262	300	0.485
		100	0.567	100	0.00302	325	0.494
		105	0.657	105	0.00347	350	0.502
		110	0.759	110	0.00398	375	0.509
		115	0.875	115	0.00454	400	0.517
		120	1.006	120	0.00518	425	0.523
		125	1.154	125	0.00589	450	0.530
		130	1.321	130	0.00669	475	0.536
		135	1.509	135	0.00758	500	0.541
		140	1.720	140	0.00856	525	0.546
		145	1.955	145	0.00965	550	0.551
		150	2.219	150	0.01086	575	0.555
		155	2.512	155	0.01220	600	0.559
		160	2.839	160	0.01368		