

HYDROGEN CYANIDE

HCN

CAUTIONARY RESPONSE INFORMATION

Common Synonyms	Watery liquid, or gas Colorless Bitter almond odor Hydrocyanic acid Prussic acid
Sinks and mixes with water. Poisonous, flammable vapor is produced and rises. Boiling point is 78°F.	
<p>KEEP PEOPLE AWAY. AVOID CONTACT WITH LIQUID AND VAPOR. WEAR CHEMICAL PROTECTIVE SUIT WITH SELF-CONTAINED BREATHING APPARATUS. Shut off ignition sources and call fire department. Evacuate area. Stay upwind and use water spray to "knock down" vapor. Notify local health and pollution control agencies. Protect water intakes.</p>	
Fire	<p>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. Stop discharge if possible. Cool exposed containers and protect men effecting shutoff with water. Let fire burn.</p>
Exposure	<p>CALL FOR MEDICAL AID.</p> <p>VAPOR POISONOUS IF INHALED OR IF SKIN IS EXPOSED. Irritating to eyes. Move to fresh air. If breathing has stopped, give artificial respiration (but NOT mouth to mouth). If breathing is difficult, give oxygen.</p> <p>LIQUID POISONOUS IF SWALLOWED OR IF SKIN IS EXPOSED. Irritating to 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 and have victim induce vomiting. IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.</p>
Water Pollution	<p>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.</p>

1. CORRECTIVE RESPONSE ACTIONS

Dilute and disperse
Stop discharge

2. CHEMICAL DESIGNATIONS

- 2.1 **CG Compatibility Group:** Not listed.
- 2.2 **Formula:** HCN
- 2.3 **IMO/UN Designation:** 2.0/1051
- 2.4 **DOT ID No.:** 1051
- 2.5 **CAS Registry No.:** 74-90-8
- 2.6 **NAERG Guide No.:** 117
- 2.7 **Standard Industrial Trade Classification:** 52381

3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** CAUTION-Class A poison; asphyxiation can be caused by ingestion, inhalation, or absorption of liquid or vapor through skin (particularly eyes, mucous membranes, and feet). Escape purposes only-air escape mask with 5-minute air cylinder. Work purposes-vapor-proof emergency suit or vinyl-coated coverall, plus air mask with clear-view facepiece, speaking diaphragm, demand regulator, and 30-minute air cylinder. Rubber gloves; chemical safety goggles; quick-opening safety shower.
- 3.2 **Symptoms Following Exposure:** Irritation of throat, palpitation, difficult breathing, reddening of eyes, salivation, nausea, headache, weakness of arms and legs, giddiness-followed by collapse and convulsions.
- 3.3 **Treatment of Exposure:** Call a doctor. If breathing has stopped, give artificial respiration until doctor arrives. **INHALATION:** remove patient to fresh air. **SKIN CONTACT:** remove contaminated clothing and wash skin thoroughly with copious quantities of water and soap. **EYE CONTACT:** hold eyelids apart and wash eye with continuous gentle stream of water for at least 15 min. If patient is unconscious, administer amyl nitrite by crushing a pearl (ampule) in a cloth and holding this under patient's nose for 15 seconds in every minute. Do not interrupt artificial respiration. Replace amyl nitrite pearl when its strength is spent. Continue treatment until patient's condition improves or doctor arrives.
- 3.4 **TLV-TWA:** Not listed.
- 3.5 **TLV-STEL:** Not listed.
- 3.6 **TLV-Ceiling:** 4.7 ppm
- 3.7 **Toxicity by Ingestion:** Grade 4; LD₅₀ less than 50 mg/kg
- 3.8 **Toxicity by Inhalation:** Currently not available.
- 3.9 **Chronic Toxicity:** Currently not available.
- 3.10 **Vapor (Gas) Irritant Characteristics:** Vapor is not very irritating but is extremely poisonous.
- 3.11 **Liquid or Solid Characteristics:** Liquid is not irritating but is extremely poisonous if absorbed through skin or eyes.
- 3.12 **Odor Threshold:** 1 mg/m³
- 3.13 **IDLH Value:** 50 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 AEG1:** Not listed

4. FIRE HAZARDS

- 4.1 **Flash Point:** 0°F C.C.
- 4.2 **Flammable Limits in Air:** 5.6%-40.0%
- 4.3 **Fire Extinguishing Agents:** Stop flow of gas
- 4.4 **Fire Extinguishing Agents Not to Be Used:** None
- 4.5 **Special Hazards of Combustion Products:** Extremely toxic vapors are generated even at ordinary temperatures.
- 4.6 **Behavior in Fire:** Containers may explode with ignition of contents.
- 4.7 **Auto Ignition Temperature:** 1004°F
- 4.8 **Electrical Hazards:** Currently not available
- 4.9 **Burning Rate:** 1.8 mm/min.
- 4.10 **Adiabatic Flame Temperature:** Currently not available
- 4.11 **Stoichiometric Air to Fuel Ratio:** 10.7 (calc.)
- 4.12 **Flame Temperature:** Currently not available
- 4.13 **Combustion Molar Ratio (Reactant to Product):** 2.5 (calc.)
- 4.14 **Minimum Oxygen Concentration for Combustion (MOCC):** Not listed

5. CHEMICAL REACTIVITY

- 5.1 **Reactivity with Water:** Dissolves with a moderate reaction.
- 5.2 **Reactivity with Common Materials:** None
- 5.3 **Stability During Transport:** May become unstable and subject to explosion if stored for extended time or exposed to high temp. and pressure.
- 5.4 **Neutralizing Agents for Acids and Caustics:** The weak acidity can be neutralized by slaked lime, but this does not destroy the poisonous property.
- 5.5 **Polymerization:** Not pertinent
- 5.6 **Inhibitor of Polymerization:** Not pertinent

6. WATER POLLUTION

- 6.1 **Aquatic Toxicity:**
0.16 ppm/72 hr/young bass/TL_m/fresh water
0.069 ppm/24 hr/pin perch/TL_m/salt 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: 4
Human Oral hazard: 3
Human Contact hazard: II
Reduction of amenities: X

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** 96%; sometimes shipped as a water solution, or absorbed on an inert solid. All forms are extremely toxic.
- 7.2 **Storage Temperature:** Currently not available
- 7.3 **Inert Atmosphere:** May be padded
- 7.4 **Venting:** Currently not available
- 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:** Poison
- 8.2 **49 CFR Class:** 6.1
- 8.3 **49 CFR Package Group:** I
- 8.4 **Marine Pollutant:** Yes
- 8.5 **NFPA Hazard Classification:**

Category	Classification
Health Hazard (Blue)	4
Flammability (Red)	4
Instability (Yellow)	2
- 8.6 **EPA Reportable Quantity:** 10 pounds
- 8.7 **EPA Pollution Category:** A
- 8.8 **RCRA Waste Number:** P063
- 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:** 27.03
- 9.3 **Boiling Point at 1 atm:** 78.3°F = 25.7°C = 298.9°K
- 9.4 **Freezing Point:** 8.1°F = -13.3°C = 259.9°K
- 9.5 **Critical Temperature:** 362.3°F = 183.5°C = 456.7°K
- 9.6 **Critical Pressure:** 735 psia = 50 atm = 5.07 MN/m²
- 9.7 **Specific Gravity:** 0.689 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:** 0.9
- 9.11 **Ratio of Specific Heats of Vapor (Gas):** 1.303
- 9.12 **Latent Heat of Vaporization:** 444 Btu/lb = 247 cal/g = 10.3 X 10⁵ J/kg
- 9.13 **Heat of Combustion:** -10,560 Btu/lb = -5864 cal/g = -245.3 X 10⁵ J/kg
- 9.14 **Heat of Decomposition:** Not pertinent
- 9.15 **Heat of Solution:** Not pertinent
- 9.16 **Heat of Polymerization:** Not pertinent
- 9.17 **Heat of Fusion:** 74.38
- 9.18 **Limiting Value:** Currently not available
- 9.19 **Reid Vapor Pressure:** Currently not available

NOTES

HYDROGEN CYANIDE

HCN

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
10	45.620	15	0.621		N		N
15	45.400	20	0.622		O		O
20	45.170	25	0.624		T		T
25	44.950	30	0.625				
30	44.720	35	0.626		P		P
35	44.500	40	0.627		E		E
40	44.270	45	0.628		R		R
45	44.050	50	0.629		T		T
50	43.820	55	0.630		I		I
55	43.600	60	0.631		N		N
60	43.370	65	0.632		E		E
65	43.150	70	0.633		N		N
70	42.920	75	0.634		T		T
75	42.690						

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	15	3.274	15	0.01737	0	0.303
	I	20	3.742	20	0.01964	25	0.308
	S	25	4.265	25	0.02216	50	0.313
	C	30	4.847	30	0.02493	75	0.317
	I	35	5.495	35	0.02797	100	0.322
	B	40	6.214	40	0.03132	125	0.327
	L	45	7.010	45	0.03498	150	0.331
	E	50	7.990	50	0.03898	175	0.335
		55	8.859	55	0.04334	200	0.339
		60	9.925	60	0.04809	225	0.343
		65	11.100	65	0.05325	250	0.347
		70	12.380	70	0.05884	275	0.351
		75	13.780	75	0.06490	300	0.354
		80	15.310	80	0.07144	325	0.358
		85	16.980	85	0.07849	350	0.361
		90	18.790	90	0.08609	375	0.364
		95	20.760	95	0.09426	400	0.367
		100	22.900	100	0.10300	425	0.370
		105	25.210	105	0.11240	450	0.372
		110	27.710	110	0.12250	475	0.375
		115	30.400	115	0.13320	500	0.377
		120	33.310	120	0.14470	525	0.380
						550	0.382
						575	0.384
						600	0.386