

# HYDROCHLORIC ACID

HCL

## CAUTIONARY RESPONSE INFORMATION

<b>Common Synonyms</b> Muriatic acid	Watery liquid Colorless Sharp, irritating odor
Sinks and mixes with water. Irritating vapor is produced.	
<p>Evacuate. Keep people away. <b>AVOID CONTACT WITH LIQUID AND VAPOR.</b> Wear chemical protective suit with self-contained breathing apparatus. Stay upwind and use water spray to "knock down" vapor. Notify local health and pollution control agencies. Protect water intakes.</p>	
<b>Fire</b>	Not flammable. Flammable gas may be produced on contact with metals. Wear chemical protective suit with self-contained breathing apparatus.
<b>Exposure</b>	CALL FOR MEDICAL AID.  VAPOR Irritating to eyes, nose and throat. If inhaled, will cause coughing or difficult breathing. 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.
<b>Water Pollution</b>	Dangerous to aquatic life in high 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:  
Neutralize

### 2. CHEMICAL DESIGNATIONS

- 2.1 CG Compatibility Group: 1; Non-oxidizing mineral acid
- 2.2 Formula: HCl-H<sub>2</sub>O
- 2.3 IMO/UN Designation: 8.0/1789
- 2.4 DOT ID No.: 1789
- 2.5 CAS Registry No.: 7647-01-0
- 2.6 NAERG Guide No.: 157
- 2.7 Standard Industrial Trade Classification: 52231

### 3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Self-contained breathing equipment, air-line mask, or industrial canister-type gas mask; rubber or rubber-coated gloves, apron, coat, overalls, shoes.
- 3.2 **Symptoms Following Exposure:** Inhalation of fumes results in coughing and choking sensation, and irritation of nose and lungs. Liquid causes burns.
- 3.3 **Treatment of Exposure:** INHALATION: remove person to fresh air; keep him warm and quiet and get medical attention immediately; start artificial respiration if breathing stops. INGESTION: have person drink water or milk; do NOT induce vomiting. EYES: immediately flush with plenty of water for at least 15 min. and get medical attention; continue flushing for another 15 min. if physician does not arrive promptly. SKIN: immediately flush skin while removing contaminated clothing; get medical attention promptly; use soap and wash area for at least 15 min.
- 3.4 TLV-TWA: Not listed.
- 3.5 TLV-STEL: Not listed.
- 3.6 TLV-Ceiling: 5 ppm
- 3.7 Toxicity by Ingestion: Currently not available
- 3.8 Toxicity by Inhalation: Currently not available.
- 3.9 Chronic Toxicity: None
- 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: 1-5 ppm
- 3.13 IDLH Value: 50 ppm
- 3.14 OSHA PEL-TWA: Not listed.
- 3.15 OSHA PEL-STEL: Not listed.
- 3.16 OSHA PEL-Ceiling: 5 ppm
- 3.17 EPA AEGL: Not listed

### 4. FIRE HAZARDS

- 4.1 Flash Point: Not flammable
- 4.2 Flammable Limits in Air: Not flammable
- 4.3 Fire Extinguishing Agents: Not pertinent
- 4.4 Fire Extinguishing Agents Not to Be Used: Not pertinent
- 4.5 Special Hazards of Combustion Products: Toxic and irritating vapors are generated when heated.
- 4.6 Behavior in Fire: Not pertinent
- 4.7 Auto Ignition Temperature: Not flammable
- 4.8 Electrical Hazards: Not pertinent
- 4.9 Burning Rate: Not flammable
- 4.10 Adiabatic Flame Temperature: Currently not available
- 4.11 Stoichiometric Air to Fuel Ratio: Not pertinent
- 4.12 Flame Temperature: Currently not available
- 4.13 Combustion Molar Ratio (Reactant to Product): Not pertinent
- 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: Corrosive to most metals with evolution of hydrogen gas, which may form explosive mixtures with air.
- 5.3 Stability During Transport: Stable
- 5.4 Neutralizing Agents for Acids and Caustics: Flush with water; apply powdered limestone, slaked lime, soda ash, or sodium bicarbonate.
- 5.5 Polymerization: Not pertinent
- 5.6 Inhibitor of Polymerization: Not pertinent

### 6. WATER POLLUTION

- 6.1 Aquatic Toxicity: 282 ppm/96 hr/mosquito fish/TL<sub>50</sub>/fresh water  
100-330 ppm/48 hr/shrimp/LC<sub>50</sub>/salt water
- 6.2 Waterfowl Toxicity: Currently not available
- 6.3 Biological Oxygen Demand (BOD): None
- 6.4 Food Chain Concentration Potential: None
- 6.5 GESAMP Hazard Profile:  
Bioaccumulation: 0  
Damage to living resources: 1  
Human Oral hazard: 1  
Human Contact hazard: 0  
Reduction of amenities: 0

### 7. SHIPPING INFORMATION

- 7.1 Grades of Purity: Food processing or technical: 18° Be-27.9%, 20 Be-31.5%, 22° Be-35.2%; Reagent, ACS, and USP: 23° Be-37.1%
- 7.2 Storage Temperature: Ambient
- 7.3 Inert Atmosphere: No requirement
- 7.4 Venting: Open
- 7.5 IMO Pollution Category: D
- 7.6 Ship Type: 3
- 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).....	0
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: 36.46
- 9.3 Boiling Point at 1 atm: 123°F = 50.5°C = 323.8°K
- 9.4 Freezing Point: Not pertinent
- 9.5 Critical Temperature: Not pertinent
- 9.6 Critical Pressure: Not pertinent
- 9.7 Specific Gravity: 1.19 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): Not pertinent
- 9.12 Latent Heat of Vaporization: 178 Btu/lb = 98.6 cal/g = 4.13 X 10<sup>5</sup> J/kg
- 9.13 Heat of Combustion: Not pertinent
- 9.14 Heat of Decomposition: Not pertinent
- 9.15 Heat of Solution: -860 Btu/lb = -480 cal/g = -20 X 10<sup>5</sup> J/kg
- 9.16 Heat of Polymerization: Not pertinent
- 9.17 Heat of Fusion: 13.0 cal/g
- 9.18 Limiting Value: Currently not available
- 9.19 Reid Vapor Pressure: 8.0 psia \*Physical properties apply to 37 % solution.

### 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
40	74.770	35	0.417		N		N
50	74.599	40	0.429		O		O
60	74.419	45	0.441		T		T
70	74.250	50	0.453				
80	74.080	55	0.465		P		P
90	73.900	60	0.477		E		E
100	73.730	65	0.489		R		R
110	73.559	70	0.501		T		T
120	73.381	75	0.513		I		I
		80	0.525		N		N
		85	0.537		E		E
		90	0.548		N		N
		95	0.560		T		T
		100	0.572				
		105	0.584				
		110	0.596				
		115	0.608				
		120	0.620				

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	52	1.844		N		N
	I	54	1.970		O		O
	S	56	2.104		T		T
	C	58	2.246				
	I	60	2.396		P		P
	B	62	2.555		E		E
	L	64	2.723		R		R
	E	66	2.901		T		T
		68	3.088		I		I
		70	3.287		N		N
		72	3.496		E		E
		74	3.717		N		N
		76	3.951		T		T
		78	4.197				
		80	4.456				
		82	4.730				
		84	5.018				
		86	5.321				
		88	5.640				
		90	5.975				
		92	6.328				
		94	6.699				
		96	7.089				
		98	7.499				
		100	7.929				
		102	8.380				