# HYDROCHLORIC ACID

## HCL

### Common Synonyms
- Water soluble
- Colorless
- Sharp, irritating odor
- Sinks and mixes with water. Immersing vapor is produced.

### Fire
- Not flammable
- Flammable gas may be produced on contact with metals. Wear chemical protective suit with self-contained breathing apparatus.

### Exposure
- CALL FOR MEDICAL AID
  - VAPOR: Inhale by nose, mouth, or throat.
  - If inhaled, call for medical aid immediately. Inhaling may cause death.
  - If breathing is stopped, give artificial respiration.
  - If breathing is difficult,给予氧气.

### Water Pollution
- Dangerous to aquatic life in high concentrations. May be dangerous if it enters water supplies. Not a local health and wildlife officials. Notify operators of nearby waterways.

### RESPONSE TO DISCHARGE
- (See Response Methods Handbook)
  - Issue warning-cone
  - Restrict access

### CHEMICAL DESIGNATIONS
- Material Handling: 6.01
- DOT Designation: 6.2
- UN Number: 1789
- CERCLA: 7667-0

### OBSERVABLE CHARACTERISTICS
- Physical State: (as shipped): Liquid
- Color: Colorless to yellow
- Odor: Pungent, sharp, pungent, irritating

### HEALTH HAZARDS
- Personal Protective Equipment: Self-contained breathing apparatus, eyewash, gloves, coveralls, rubber or coated gloves, aprons, coveralls, boots, shoes.
- Symptoms Following Exposure: Inhaling of fumes results in coughing and choking sensation.
- Treatment of Exposure: Exposure... remove person to fresh air. Keep warm and quiet and get medical attention immediately. Start artificial respiration if breathing stops. Ingestion... 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, SUX immediately high skin and when removing contaminated clothing, get medical attention promptly, use soap and wash water for at least 15 min.
- Threshold Limit Value: 5 ppm
- Short Term Exposure Limit: 5 ppm for 5 min.
- Toxicity by Ingestion: Data not available
- Late Toxicity: None
- Vapor [Gas] Irritants: Skin is moderately irritating such as personnel will not usually lose moderate or high concentrations.
- Liquid or Solid Irritants: Exposed to skin irritation, may cause pain and second-degree burns after a few minutes contact.
- Flash Point: Not flammable
- Flammable Limits in Air: Not flammable
- Fire Extinguishing Agents: Agent is not to be used: Not flammable
- Special Hazards of Combustion: Productive Toxic and eating vapors are generated when heated.
- Behavior in Fire: Not pertinent
- Ignition Temperature: Not flammable
- Electrical Hazard: Not pertinent
- Burning Rate: Not flammable
- Flash Point Temperature: Data not available
- Smoke Point: Data not available
- Explosibility: Data not available
- Inerting Agents: No data available
- Water Reactivity: Not pertinent
- Reactivity Rate: Data not available
- Reactivity: Not pertinent
- Reactivity Rate: Data not available
- Reactivity: Not pertinent

### PHYSICAL AND CHEMICAL PROPERTIES
- Physical State at 15°C and 1 atm: Liquid
- Molecular Weight: 36.46
- Boiling Point at 1 atm: 123°F = 50.5°C = 228.9K
- Freezing Point: Not pertinent
- Critical Temperature: Not pertinent
- Critical Pressure: Not pertinent
- Specific Gravity: 1.19 at 20°C (24C)
- Liquid Surface Tension: Not pertinent
- Liquid Water Interfacial Tension: Not pertinent
- Vapor (Gas) Specific Gravity: Not pertinent
- Ratio of Specific Heats of Vapor (Gas): Not pertinent
- Latent Heat of Vaporization: 176 BTU/lb = 86.6 kcal/kg = 4.13 X 10^3 J/kg
- Heat of Combustion: Not pertinent
- Heat of Decomposition: Not pertinent
- Heat of Solution: 180 BTU/lb = -480 kcal/kg = -20 X 10^3 J/kg
- Limiting Value: Data not available
- Vapour Pressure: Data not available
- Physical Properties: Apply to 37% solution

### NOTES
# HYDROCHLORIC ACID

## COMMON SYNONYMS

- Muriatic Acid

## WATER SOLUBILITY

- Colorless
- Sharp, irritating odor
- Sinks and mixes with water, irritating vapor is produced.

## AVOID CONTACT WITH LIQUID AND VAPOR

- Keep people away
- Wear chemical protective suit with self-contained breathing apparatus
- Stop discharge if possible
- Stay upwind and use water spray to "knock down" vapor
- Notify local health and pollution control agencies

## FIRE

- Not flammable
- Flammable gas may be produced on contact with metals.
- Wear chemical protective suit with self-contained breathing apparatus

### 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 eyes open and flush with plenty of water. If SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.

### EXPOSURE

- Toxic to metal with evolution of hydrogen gas, which may form explosive mixtures with air.

## WATER POLLUTION

- Dangerous to aquatic life in high concentrations. May be dangerous if it enters waterways.
- Notify local health and wildlife officials.
- Notify operators of nearby waterways.

## RESPONSE TO DISCHARGE

(See Response Methods Handbook)

- Issue warning-corriscive
- Restrict access
- Disperse and flush

## LABEL

- Category: Corrosive
- Class: 8

## CHEMICAL DESIGNATIONS

- CG Compatibility Class: Non-corroding mineral acid

## OBSERVABLE CHARACTERISTICS

- Physical State: Liquid
- Color: Colorless to light yellow
- Odor: Sharp, irritating odor

## PHYSICAL AND CHEMICAL PROPERTIES

- Physical State at 15°C and 1 atm:
  - Liquid
- Molecular Weight: 36.46
- Boiling Point at 1 atm:
  - 122°F (50.5°C) = 323.8 K
- Freezing Point: Not pertinent
- Critical Temperature: Not pertinent
- Critical Pressure: Not pertinent
- Specific Gravity:
  - 1.19 at 20°C (liquid)
- Liquid Surface Tension: Not pertinent
- Liquid Water Interface Tension: Not pertinent
- Vapor (Gas) Specific Gravity: Not pertinent
- Ratio of Specific Heats of Vapor (Gas):
  - Not pertinent
- Latent Heat of Vaporization:
  - 178 Btu/lb = 98.6 cal/g = 4.11 X 10^4 J/kg

## HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

- A-P

## HAZARD CLASSIFICATIONS

### CODE OF FEDERAL REGULATIONS

- Corrosive material

### WAS HAZARD RATING FOR BULK WATER TRANSPORTATION

- Category: Rating
  - Fire: 0
  - Health: 0
  - Vapor Inert: 0
  - Liquid or Solid Inert: 0
  - Poison: 0
  - Water Pollution: 0
  - Human Toxicity: 0
  - Aquatic Toxicity: 0
  - Aesthetic Effects: 0
  - Reactivity: 0
  - Other Chemicals: 0
  - Water: 0
  - Self Reactivity: 0

### NFPA HAZARD CLASSIFICATION

- Category: Classification
  - Health Hazard (Blue): 0
  - Flammability (Red): 0
  - Reactivity (Yellow): 0

## WATER POLLUTION

- Aquatic Toxicity:
  - 262 ppm lethal to mosquitos
  - 100-300 ppm lethal to freshwater shrimp
  - 15-40 ppm lethal to estuarine shrimp

- Waterfowl Toxicity: Data not available

- Biological Oxygen Demand (BOD): None

- Food Chain Concentration Potential: None
Exposure

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

Dangers 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. RESPONSE TO DISCHARGE
(See Response Methods Handbook)
Remove clothing contaminated with product. Issue warning—corrosive. Issue warning—irritant. Restrict access. Discourage entry. Do not use water to flush spills or disperse spills.

2. LABEL
2.1 Category: Corrosive
2.2 Class: 8

3. CHEMICAL DESIGNATIONS
3.1 CG Compatibility Class: Non-oxygenizing mineral acid
3.2 Formula: HCl + H₂O
3.3 IMO/UN Designation: 8.0/1789
3.4 DOT ID No.: 1789
3.5 CAS Registry No.: 7647-01-0

4. OBSERVABLE CHARACTERISTICS
4.1 Physical State (as shipped): Liquid
4.2 Color: Colorless to light yellow
4.3 Odor: Pungent; sharp, pungent, irritating

5. HEALTH HAZARDS
5.1 Personal Protective Equipment: Self-contained breathing equipment, airline mask, or industrial carvintype gas mask; rubber or rubber-coated gloves, apron, coat, overalls, shoes.
5.2 Symptoms Following Exposure: Inhalation: irritation of nose and throat, coughing, irritation of eyes. Ingestion: irritation of mouth, stomach, and intestine. Skin: irritation of skin, burning, redness, itching, swelling.
5.3 Treatment of Exposure: Inhalation: remove person to fresh air, keep him warm and quiet and give 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 give medical attention; continue flushing for another 15 min. If physician does not arrive promptly, SKIN: immediately flush skin with water; remove contaminated clothing; give medical attention promptly; use soap and wash area for at least 15 min.
5.4 Threshold Limit Value: 5 ppm
5.5 Short Term Inhalation Limit: 5 ppm for 5 min.
5.6 Toxicity by Ingestion: Data not available
5.7 Late Toxicity: None
5.8 Vapor (Gas) Inflammability Characteristics: Vapor is moderately irritating such that personnel will not usually tolerate moderate or high vapor concentrations.
5.9 Liquid or Solid Inflammability Characteristics: Fairly severe skin irritant; may cause pain and second-degree burns after a few minutes' contact.
5.10 Odor Threshold: 1.5 ppm
5.11 IDLH Value: 100 ppm

6. WATER POLLUTION
6.1 Aquatic Toxicity:
282 ppm/96 hr/mosquito
fish/Tilapia/fresh water
100-300 ppm/48 hr/shrimp/LC50/salt water
6.2 Watertable Toxicity: Data not available
6.3 Biological Oxygen Demand (BOD): None
6.4 Food Chain Concentration Potential: None

8. WATER POLLUTION
8.1 Aquatic Toxicity:
282 ppm/96 hr/mosquito
fish/Tilapia/fresh water
100-300 ppm/48 hr/shrimp/LC50/salt water
8.2 Watertable Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): None
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION
9.1 Grades of Purity: Food processing or technical: 18° Be-27.8°, 20 Be-31.5°, 22° Be-35.2°; Reagent, ACS, and USP: 23° Be-37.1°
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open

12. PHYSICAL AND CHEMICAL PROPERTIES
12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: 36.46
12.3 Boiling Point at 1 atm: 113°F = 50.6°C = 323.5 K
12.4 Freezing Point: Not pertinent
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 1.19 at 20°C (Liquid)
12.8 Liquid Surface Tension: Not pertinent
12.9 Liquid Water / Interfacial Tension: Not pertinent
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: 178 Btu/lb = 8.6 cal/g = 4.13 X 10⁷ J/kg
12.13 Heat of Combustion: Not pertinent
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: —80 Btu/lb = —80 cal/g = —20 X 10⁴ J/kg
12.16 Heat of Polymerization: Not pertinent
12.17 Heat of Fusion: 13.0 cal/g
12.18 Limiting Value: Data not available
12.19 Rared Vapor Pressure: 8.0 psia

NOTES

Physical properties apply to 37°C solution.

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