# HYDROGEN CHLORIDE

HDC

## CAUTIONARY RESPONSE INFORMATION

**Common Synonyms**
Hydrochloric acid, anhydrous

Liquefied compressed gas | Colorless to slightly yellow | Irritating odor

Sinks and mixes with water. Poisonous visible vapor cloud is produced.

Evacuate.
Keep people away. AVOID CONTACT WITH LIQUID AND VAPOR.
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.

**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
POISONOUS IF INHALED.
Irritating to eyes, nose and throat.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

LIQUID
POISONOUS IF SWALLOWED.
Will burn skin and eyes.
Will cause frostbite.
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.
DO NOT RUB AFFECTED AREAS.

**Water Pollution**

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
Do not add water to undissolved material

### 2. CHEMICAL DESIGNATIONS

**2.1 CG Compatibility Group:** Not listed.
**2.2 Formula:** HCl
**2.3 IMO/UN Designation:** 2.0/1050
**2.4 DOT ID No.:** 1050
**2.5 CAS Registry No.:** 7647-01-0
**2.6 NAERG Guide No.:** 125
**2.7 Standard Industrial Trade Classification:** 52231

### 3. HEALTH HAZARDS

**3.1 Personal Protective Equipment:** Full face mask and acid gas canister; self-contained breathing apparatus; chemical goggles; rubber apron and gloves; acid-proof clothing; safety shower.
**3.2 Symptoms Following Exposure:** Severely irritating to nose and upper respiratory tract; lung injury.
**3.3 Treatment of Exposure:** INHALATION: immediately remove patient to fresh air, keep him warm and quiet, and call a physician immediately; if a qualified person is available to give oxygen, such treatment may be helpful. INGESTION: have victim drink water or milk; do NOT induce vomiting. EYES OR SKIN: immediately flush with plenty of water for at least 15 min.; for eyes get medical attention promptly; air contaminated clothing and wash before reuse.
**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:** Vapors cause severe irritation of eye and throat and can cause eye and lung injury. They cannot be tolerated even at low 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:** Not pertinent
**4.6 Behavior in Fire:** Pressurized container may explode and release toxic, irritating vapors.
**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 Stoichometric 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:** Moderate reaction with evolution of heat.
**5.2 Reactivity with Common Materials:** Rapidly absorbs moisture, forming hydrochloric acid. Highly corrosive to most metals with evolution of flammable hydrogen gas.
**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/$TL_m$/fresh water
100-330 ppm/48 hr/shrimp/$LC_{50}$/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:** Technical: 97.5-99%
**7.2 Storage Temperature:** Ambient or lower
**7.3 Inert Atmosphere:** No requirement
**7.4 Venting:** Safety relief
**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 gas
**8.2 49 CFR Class:** 2.3
**8.3 49 CFR Package Group:** Not pertinent.
**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:** Not listed

### 9. PHYSICAL & CHEMICAL PROPERTIES

**9.1 Physical State at 15° C and 1 atm:** Gas
**9.2 Molecular Weight:** 36.46
**9.3 Boiling Point at 1 atm:** –121°F = –85.0°C = 188.2°K
**9.4 Freezing Point:** –175°F = –115°C = 158°K
**9.5 Critical Temperature:** 124.5°F = 51.4°C = 324.6°K
**9.6 Critical Pressure:** 1200 psia = 81.6 atm = 8.27 $MN/m^2$
**9.7 Specific Gravity:** 1.191 at -85°C (liquid)
**9.8 Liquid Surface Tension:** Not pertinent
**9.9 Liquid Water Interfacial Tension:** Not pertinent
**9.10 Vapor (Gas) Specific Gravity:** 1.3
**9.11 Ratio of Specific Heats of Vapor (Gas):** 1.398
**9.12 Latent Heat of Vaporization:** 185 Btu/lb = 103 cal/g = 4.31 X $10^5$ J/kg
**9.13 Heat of Combustion:** Not pertinent
**9.14 Heat of Decomposition:** Not pertinent
**9.15 Heat of Solution:** –884 Btu/lb = –491 cal/g = –20.6 X $10^5$ 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:** High

**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 |
| | NOT PERTINENT | -144 | 0.420 | | NOT PERTINENT | | NOT PERTINENT |
| | | -142 | 0.420 | | | | |
| | | -140 | 0.420 | | | | |
| | | -138 | 0.420 | | | | |
| | | -136 | 0.420 | | | | |
| | | -134 | 0.420 | | | | |
| | | -132 | 0.420 | | | | |
| | | -130 | 0.420 | | | | |
| | | -128 | 0.420 | | | | |
| | | -126 | 0.420 | | | | |
| | | -124 | 0.420 | | | | |
| | | -122 | 0.420 | | | | |

| 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 |
| | MISCIBLE | -145 | 6.605 | -145 | 0.07129 | 0 | 0.191 |
| | | -140 | 7.878 | -140 | 0.08370 | 20 | 0.191 |
| | | -135 | 9.346 | -135 | 0.09777 | 40 | 0.191 |
| | | -130 | 11.030 | -130 | 0.11360 | 60 | 0.191 |
| | | -125 | 12.950 | -125 | 0.13150 | 80 | 0.191 |
| | | -120 | 15.140 | -120 | 0.15140 | 100 | 0.191 |
| | | -115 | 17.610 | -115 | 0.17360 | 120 | 0.191 |
| | | -110 | 20.410 | -110 | 0.19820 | 140 | 0.191 |
| | | -105 | 23.540 | -105 | 0.22550 | 160 | 0.191 |
| | | -100 | 27.050 | -100 | 0.25550 | 180 | 0.191 |
| | | -95 | 30.970 | -95 | 0.28850 | 200 | 0.191 |
| | | -90 | 35.330 | -90 | 0.32460 | 220 | 0.191 |
| | | -85 | 40.150 | -85 | 0.36400 | 240 | 0.191 |
| | | -80 | 45.480 | -80 | 0.40690 | 260 | 0.191 |
| | | -75 | 51.350 | -75 | 0.45340 | 280 | 0.191 |
| | | -70 | 57.800 | -70 | 0.50380 | 300 | 0.191 |
| | | -65 | 64.860 | -65 | 0.55820 | 320 | 0.191 |
| | | -60 | 72.580 | -60 | 0.61680 | 340 | 0.191 |
| | | -55 | 80.990 | -55 | 0.67980 | 360 | 0.191 |
| | | -50 | 90.139 | -50 | 0.74730 | 380 | 0.191 |
| | | -45 | 100.099 | -45 | 0.81950 | 400 | 0.191 |
| | | -40 | 110.799 | -40 | 0.89660 | 420 | 0.191 |
| | | -35 | 122.400 | -35 | 0.97880 | 440 | 0.191 |
| | | -30 | 134.900 | -30 | 1.06600 | | |
| | | -25 | 148.299 | -25 | 1.15900 | | |