



## Material Safety Data Sheet

# Hydrochloric acid

### Product Identification

Chemical name	Hydrochloric acid, 20%(v/v)
Chemical Formula	HCl
Composition	Hydrogen chloride 4.8-9.12%, Water 90.9-95.2% by weight
WHMIS (Canada)	<b>CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.</b>
Personal Protection	<b>Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.</b>
Protective Equipment	<b>Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.</b>
Storage	<b>Keep container tightly closed. Keep container in a cool, well-ventilated area.</b>

### First Aid Measures

Eye Contact	<b>Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.</b>
Skin Contact	<b>In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.</b>
Serious Skin Contact	<b>Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.</b>
Inhalation	<b>If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.</b>
Serious Inhalation	<b>Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.</b>
Ingestion	<b>Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.</b>
Serious Ingestion	<b>Not Available</b>

### Hazards Identification

Potential Acute Health Effects	Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion. Hazardous in case of skin contact (corrosive), of eye contact (corrosive). Slightly hazardous in case of inhalation (lung sensitizer). Non-corrosive for lungs. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or horthness of breath. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.
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### Potential Chronic Health Effects

Slightly hazardous in case of skin contact (sensitizer). CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Hydrogen chloride]. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, teeth. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

### Fire and Explosion Data

Flammability	Non-flammable.
Auto-Ignition Temperature	Not Available
Flash Points	Not Available
Flammable Limits	Not Available
Products of Combustion	Not Available
Fire Hazards in Presence of Various Substances	Not Available
Explosion Hazards in Presence of Various Substances	Non-explosive in presence of open flames and sparks, of shocks.
Fire Fighting Media and Instructions	Not Available
Special Remarks on Fire Hazards	Not Available
Special Remarks on Explosion Hazards	Not Available

### Accidental Release Measures

Small Spill	Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.
Large Spill	Corrosive liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

### Handling and Storage

Precautions	Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as alkalis, moisture. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.
Storage	Keep container tightly closed. Keep container in a cool, well-ventilated area.

### Exposure Controls and Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
Personal Protection	<b>Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.</b>



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Personal Protection in Case of a Large Spill	Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
Exposure Limits	Hydrogen chloride STEL: 7.5 (mg/m <sup>3</sup> ) from ACGIH (TLV) [United States] STEL: 5 (ppm) from ACGIH (TLV) [United States] CEIL: 5 (ppm) from NIOSH CEIL: 7.5 (mg/m <sup>3</sup> ) from NIOSH CEIL: 5 (ppm) from OSHA (PEL) [United States] CEIL: 7 (mg/m <sup>3</sup> ) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

#### Physical and Chemical Properties

Physical state and appearance	Liquid.
Odor	Disagreeable and choking. (Strong.)
Taste	Acid. (Strong.)
Molecular Weight	Not Available
Color	Clear Colorless.
pH	Acidic.
Boiling Point	The lowest known value is 100 °C (212 °F) (Water).
Melting Point	Not Available
Critical Temperature	Not Available
Specific Gravity	Weighted average: 1.01 (Water = 1)
Vapor Pressure	The highest known value is 2.3 kPa (@ 20 °C) (Water).
Vapor Density	The highest known value is 0.62 (Air = 1) (Water).
Volatility	Not Available
Odor Threshold	Not Available
Water/Oil Dist. Coeff.	Not Available
Ionicity (in Water)	Not Available
Dispersion Properties	See solubility in water, diethyl ether.
Solubility	Easily soluble in cold water, hot water. Soluble in diethyl ether.



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<b>Stability and Reactivity Data</b>	
Stability	The product is stable.
Instability Temperature	Not Available
Conditions of Instability	Incompatible materials
Incompatibility with various substances	Reactive with alkalis. Slightly reactive to reactive with oxidizing agents, organic materials.
Corrosivity	Extremely corrosive in presence of aluminum. Highly corrosive in presence of zinc. Corrosive in presence of steel, of copper. E101 Slightly corrosive in presence of stainless steel(304), of stainless steel(316). Non-corrosive in presence of glass.
Special Remarks on Reactivity	<p>Reacts violently (moderate reaction with heat of evolution) with water especially when water is added to the product. Isolate hydrogen chloride from heat, direct, alkalis (reacts vigorously), organic materials, and oxidizers (especially nitric acid and chlorates), amines, copper and alloys (e.g. brass), hydroxides, zinc (galvanized materials), lithium silicide (incandescence), sulfuric acid(increase in temperature and pressure) Hydrogen chloride causes aldehydes and epoxides to violently polymerize. It reacts with oxidizers releasing chlorine gas. Hydrogen chloride gas is emitted when this product is in contact with sulfuric acid. Adsorption of Hydrochloric Acid onto silicon dioxide results in exothermic reaction. Hydrogen chloride causes aldehydes and epoxides to violently polymerize. Hydrogen chloride or Hydrochloric Acid in contact with the following can cause explosion or ignition on contact or other violent/vigorous reaction: Acetic anhydride, Alcohols + hydrogen cyanide, Aluminum, Aluminum phosphide, Aluminum-titanium alloys (with HCl vapor), 2-Amino ethanol, Ammonium, Ammonium hydroxide, 1,4-Benzoquinone diimine, Calcium acetylide (incandescence upon warming), Calcium carbide, Calcium phosphide, Carbon tetrachloride + silver perchlorate (produce trichloromethyl perchlorate), Cesium acetylene carbide, Cesium carbide, Cesium telluroacylates, Chlorine + dinitroanilines (evolves gas), Chloroacetaldehyde oxime, Chlorosulfonic acid, Cyanogen chloride (when catalyzed by HCl), 1,1-Difluoroethylene, Dinitroanilines, Ethylene, Ethylene diamine, Ethyl 2-formylpropionate oxime (when generated by using HCl as a catalyst), Ethylene imine, Fluorine, HClO<sub>4</sub>, Hexalithium disilicide, Hydrogen peroxide, Lithium silicide, Metal acetylides, carbides, Magnesium boride, Methyl vinyl ether, Mercuric sulfate, Nitric acid + glycerol, Oleum, Perchloric acid, Potassium, Potassium permanganate, beta-Propiolactone, Propylene oxide, Rubidium acetylide, Rubidium carbide, Rubidium acetylene carbide, Silicon dioxide, Silver chlorite, Sodium (with aqueous HCl), Sodium E1022-allyloxy-6-nitrophenylpyruvate oxime, Sodium hydroxide, Sodium tetraselenium, Sulfonic acid, Sulfuric acid, Tetraselenium tetranitride, 2,4,6-Tri(2-acetylhydrazino)-1,3,5-trinitrobenzene, Uranium phosphide, Vinyl acetate. Hydrogen chloride gas can react with formaldehyde to form bis(chloromethyl)ether, a human carcinogen. Most metals, as well as certain coatings, plastics, and rubbers, are attacked by hydrogen chloride. Addition of hydrochloric acid to the following results in an exothermic reaction: Cesium cyanotridecahydrodecarborate(2-), Potassium ferricyanide, Vinylidene fluoride. Addition of hydrochloric acid to potassium ferrocyanide or ammonium hexacyanoferrate(II) results in an endothermic reaction. Hydrochloric acid in the presence of alcohol and glycols results in dehydration reactions. (Hydrogen chloride)</p>
Special Remarks on Corrosivity	This compound is highly corrosive when in solution (especially to most metals except: gold, mercury, platinum, silver, and tantalum). The anhydrous gas is not corrosive. (Hydrogen chloride) Will not occur.
Polymerization	Not Available

## Toxicological Information

Routes of Entry Absorbed through skin. Eye contact. Inhalation. Ingestion.

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Toxicity to Animals	Acute oral toxicity (LD50): 900 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 1108 ppm, 1 hours [Mouse]. Acute toxicity of the vapor (LC50): 3124 ppm, 1 hours [Rat]. (Hydrochloric Acid)
Chronic Effects on Humans	CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Hydrogen chloride]. Contains material which may cause damage to the following organs: kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, , teeth.
Other Toxic Effects on Humans	Very hazardous in case of skin contact (irritant), of ingestion. Hazardous in case of skin contact (corrosive), of eye contact (corrosive). Slightly hazardous in case of inhalation (lung sensitizer, lung corrosive).
Special Remarks on Toxicity to Animals	Lowest Published Lethal Doses (LDL/LCL) LDL [Man] -Route: Oral; 2857 ug/kg LCL [Human] - Route: Inhalation; Dose: 1300 ppm/30M E109LCL [Rabbit] - Route: Inhalation; Dose: 4413 ppm/30M (Hydrochloric Acid)
Special Remarks on Chronic Effects on Humans	May cause adverse reproductive effects (fetotoxicity). May affect genetic material.
Special Remarks on other Toxic Effects on Humans	<p>Acute Potential Health Effects: Skin: Corrosive. Causes severe skin irritation and burns. Eyes: Corrosive. Causes severe eye irritation and burns. May cause permanent damage to the eyes. Inhalation: Inhalation of vapor or mist may be destructive to tissue of the mucous membranes and upper respiratory tract. It may affect the lungs/respiration. Inhalation of mist or vapor may produce nose, throat, and laryngeal burning, and irritation, pain and inflammation, coughing, sneezing, choking sensation, hoarseness, laryngeal spasms, upper respiratory tract edema, chest pains, as well as headache, and palpitations. Inhalation of high concentrations may also cause chemical burns of the upper respiratory tract, constriction of the larynx and bronchi, nasospetal perforation, glottal closure, dyspnea, bronchitis. Chemical pneumonitis and pulmonary edema can also occur, particularly if exposure is prolonged. It may affect the liver Ingestion: Causes irritation and burns of the mouth, throat, esophagous (gastrointestinal tract) with nausea, vomiting abdominal cramps, diarrhea. It can also cause thirst, difficulty swallowing, salivation, chills, fever, uneasiness, shock, strictures and stenosis (esophageal, gastric, pyloric). May affect behavior (excitement), the cardiovascular system (weak rapid pulse, tachycardia), respiration (shallow respiration), and urinary system (kidneys - renal failure, nephritis). Chronic Potential Health Effects: Prolonged or repeated inhalation or ingestion may affect liver, respiration(changes in pulmonary function, chronic bronchitis), teeth (yellowing of teeth and erosion of tooth enamel), kidneys, and behavior. Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated eye contact with vapor/mist may cause conjunctivitis.</p>

### Ecological Information

Ecotoxicity	Not Available
BOD5 and COD	Not Available
Products of Biodegradation	Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.
Toxicity of the Products of Biodegradation	The product itself and its products of degradation are not toxic.
Special Remarks on the Products of Biodegradation	Not Available

### Disposal Considerations

Waste Disposal	Waste must be disposed of in accordance with federal, state and local environmental control regulations.
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### Transport Information

DOT Classification	Class 8: Corrosive material
Identification	Hydrochloric acid, solution UNNA: 1789 PG: II
Special Provisions for Transport	Not Available

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Other Regulatory Information	
Federal and State Regulations	TSCA 8(b) inventory: Hydrochloric acid; Water TSCA 4(a) proposed test rules: Hydrochloric acid SARA 302/304/311/312 extremely hazardous substances: Hydrochloric acid SARA 313 toxic chemical notification and release reporting: Hydrochloric acid 24% CERCLA: Hazardous substances.: Hydrochloric acid: 5000 lbs. (2268 kg);
Other Regulations	OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
WHMIS (Canada)	<b>CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.</b>
DSCL (EEC)	R34- Causes burns. S24/25- Avoid contact with skin and eyes. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S28- After contact with skin, wash immediately with plenty of water. S36/37/39- Wear suitable protective clothing, gloves and eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
HMIS (U.S.A.)	Health Hazard: 3 Fire Hazard: 0 Reactivity: 0 Personal Protection:
National Fire Protection Association (U.S.A.)	Health: 3 Flammability: 0 Reactivity: 0 Specific hazard:
Protective Equipment	<b>Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.</b>

Other Information	
References	Not Available
Other Special Considerations	Not Available
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