

# Standard Operating Procedure

## Hydrochloric Acid

### Purpose

Hydrochloric acid is a highly corrosive, strong inorganic or mineral acid found in most laboratories. If not stored and handled properly, this can pose a serious threat to the health and safety of laboratory personnel, emergency responders and chemical waste handlers. Hence, it is important to follow safety protocols to handle this chemical. Hydrochloric acid is used in the chemical industry as a chemical reagent in the large-scale production of vinyl chloride for PVC plastic, and MDI/TDI for polyurethane. It has numerous smaller-scale applications, including household cleaning, production of gelatin and other food additives, descaling, and leather processing

### Physical & Chemical Properties/Definition of Chemical Group

CAS#: 7647-01-0

Class: Strong Corrosive

Molecular Formula: HCl

Form (physical state): liquid

Color: clear, colorless

Boiling point: > 100 °C (> 212 °F) - lit.

### Potential Hazards/Toxicity

Corrosive. May be harmful if inhaled, swallowed, or absorbed through skin. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. Causes skin and eye burns.

### Signs and Symptoms of Exposure

Burning sensation, cough, wheezing, laryngitis, shortness of breath, spasm, inflammation and edema of the larynx, inflammation and edema of the bronchi, pneumonitis & pulmonary edema.

### Personal Protective Equipment (PPE)

#### Respirator Protection

Respirators should be equipped with acid gas cartridges.

Respirators should be used only under any of the following circumstances:

- As a last line of defense (i.e., after engineering and administrative controls have been exhausted).

- When Permissible Exposure Limit (PEL) has exceeded or when there is a possibility that PEL will be exceeded.
- Regulations require the use of a respirator.
- An employer requires the use of a respirator.
- There is potential for harmful exposure due to an atmospheric contaminant (in the absence of PEL)
- As PPE in the event of a chemical spill clean-up process

Lab personnel intending to use/wear a respirator mask must be trained and fit-tested by EH&S. This is a regulatory requirement.

### **Hand Protection**

Nitrile gloves are recommended.

**NOTE:** Consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with hydrochloric acid.

Refer to glove selection chart from the links below:

[http://www.ansellpro.com/download/Ansell\\_8thEditionChemicalResistanceGuide.pdf](http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf)

OR

<http://www.allsafetyproducts.biz/page/74172>

OR

<http://www.showabestglove.com/site/default.aspx>

OR

<http://www.mapaglove.com/>

### **Eye Protection**

Safety glasses or chemical splash goggles. Goggles are preferred, but required at high acid concentrations.

### **Skin and Body Protection**

Lab personnel working with the chemical need to wear full-length pants or its equivalent, closed-toe footwear with no skin being exposed, and a lab coat.

### **Hygiene Measures**

Wash hands after working with the substance.

### **Engineering Controls**

Concentrated hydrochloric acid should only be used in a certified fume hood. Dilutions of 6M or less can be used on the open bench.

### **First Aid Procedures**

#### **If inhaled**

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. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

#### **In case of skin contact**

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

**In case of eye contact**

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.

**If swallowed**

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician

**Special Handling and Storage Requirements****Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. Always use inside a chemical fume hood.

Note: In case you need to dilute the concentration of HCl, always add acid to water. Always transfer from container to the receptacle by using an appropriate funnel.

DO NOT mouth-pipette HCl.

**Conditions for safe storage**

Do not store in/with combustible packing material; such as cardboard, styrofoam, plastic and paper.

Keep away from bases, amines, alkali metals, metals, permanganates, e.g. potassium permanganate, fluorine, metal acetylides, hexalithium disilicide.

Keep container upright & tightly closed in a dry and well-ventilated place.

Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Always store HCl in a secondary container. Note: Nalgene/polypropylene tray or a tub is the best suited secondary containment.

**Spill and Accident Procedure****Chemical Spill Dial 9-911 and 228-7864**

**Spill** – Assess the extent of danger. Help contaminated or injured persons. Evacuate the spill area. Avoid breathing vapors. If possible, confine the spill to a small area using a spill kit or absorbent material. Keep others from entering contaminated area (e.g., use caution tape, barriers, etc.).

**Small (<1 L)** – If you have training, you may assist in the clean-up effort. Use appropriate personal protective equipment and clean-up material for chemical spilled. Double bag spill waste in clear plastic bags, label and take to the next chemical waste pick-up.

**Large (>1 L)** – Dial 9-911 and EH&S at 228-7864 for assistance.

**Chemical Spill on Body or Clothes** – Remove clothing and rinse body thoroughly in emergency shower for at least 15 minutes. Seek medical attention. *Notify supervisor and EH&S at 228-7864 immediately.*

**Chemical Splash Into Eyes** – Immediately rinse eyeball and inner surface of eyelid with water from the emergency eyewash station for 15 minutes by forcibly holding the eye open. Seek medical attention. *Notify supervisor and EH&S at 228-7864 immediately.*

## Medical Emergency Dial **9-911** or **228-7864**

**Life Threatening Emergency, After Hours, Weekends And Holidays** – Dial **9-911** *Note: All serious injuries must be reported to EH&S at 228-7864 within 8 hours.*

**Non-Life Threatening Emergency** – Go to the Olivewood Meadows Occupational Health 374 Olive during regular business hours. All other times report to Mercy Medical Center 315 Mercy Ave. *Note: All serious injuries must be reported to EH&S at 228-7864 within 8 hours.*

**Needle stick/puncture exposure** (as applicable to chemical handling procedure) – Wash the affected area with antiseptic soap and warm water for 15 minutes. For mucous membrane exposure, flush the affected area for 15 minutes using an eyewash station. Go to the Olivewood Meadows Occupational Health 374 Olive during regular business hours. All other times report to Mercy Medical Center 315 Mercy Ave. *Note: All needle stick/puncture exposures must be reported to EH&S at 228-7864 within 8 hours.*

## Decontamination/Waste Disposal Procedure

Spills may be neutralized with sodium bicarbonate or baking soda. Do not dispose of HCl by pouring down drains followed by copious amounts of water without neutralization.

*General hazardous waste disposal guidelines:*

### Label Waste

- Affix an on-line hazardous waste tag on all waste containers using the Online Tag Program <http://otp.ucop.edu/> as soon as the first drop of waste is added to the container

### Store Waste

- Store hazardous waste in closed containers, in secondary containment and in a designated location
- Double-bag dry waste using transparent bags
- Waste must be under the control of the person generating & disposing of it

### Dispose of Waste

- Dispose of regularly generated chemical waste within 90 days
- Call EH&S at 228-7864 for questions
- Empty Containers
  - Dispose as hazardous waste if it once held extremely hazardous waste (irrespective of the container size) A list can be found at <http://ehs.ucla.edu/Pub/ExtremelyHazardousWaste.pdf>

Prepare for transport to pick-up location

- Check on-line waste tag
- Use secondary containment

## Safety Data Sheet (SDS) Location

Online SDS can be accessed at <http://ehs.ucmerced.edu/material-safety-data-sheets>.

**Protocol/Procedure**

Add small amounts (i.e. dropwise) to lower pH of electrodeposition solution.

**NOTE**

Any deviation from this SOP requires approval from PI.

**Documentation of Training** (signature of all users is required)

- Prior to conducting any work with hydrochloric acid, designated personnel must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
- The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and a copy of the SDS provided by the manufacturer.
- The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training within the last one year.

I have read and understand the content, requirements, and responsibilities of this SOP:

Name	Signature	Date
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