



# Standard Operating Procedure

## Inorganic Acid

### Hydrochloric Acid (HCl)

Print or link a copy to insert into your *Lab-Specific Chemical Hygiene Plan*.

#### Section 1 – Lab-Specific Information

<b>Chemical(s) covered by this SOP:</b> (Note: all items should be listed in MyChem)	<b>Hydrochloric Acid (HCl)</b>
<b>Building/Room(s) covered by this SOP:</b>	CHDD Clinic Building; CD186D
<b>Department:</b>	Oto-HNS
<b>Principal Investigator Name:</b>	Edwin W Rubel, Jennifer Stone
<b>Principal Investigator Signature:</b>	<a href="#">Click here to enter text.</a>

#### Important Definitions

- **Acid:** Any chemical compound which, when dissolved in water, gives a solution with a pH of less than 7.0.
- **Mineral Acid:** A compound having atoms of hydrogen, identifying nonmetal (typically chlorine, sulfur, or phosphorus), and maybe oxygen. Sulfuric acid ( $H_2SO_4$ ) and hydrochloric acid (HCl) are examples.
- **Oxidizing Acid:** An acid that contains an anion with a higher oxidation potential than the potential of the  $H^+$  ion, or proton, present in all acids. It may intensify fires, and fire conditions may cause the formation of hazardous oxides. It can react violently with organic chemicals such as organic solvents. Bromic ( $HBrO_3$ ) and Sulfuric acid ( $H_2SO_4$ ) are examples.

## Section 2 – Hazards

Inorganic acids may be harmful if inhaled, ingested, or absorbed through the skin. Inhalation may cause irritation to the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. Contact with skin causes burns and irritation. Eye contact causes burns, irritation, and may cause blindness. Ingestion may cause permanent damage to the digestive tract. It is destructive to the tissue of the mucous membranes and upper respiratory tract. **Inorganic acids may have other hazards associated with them, such as flammability, oxidizer, or toxicity.**

**Hydrochloric Acid is an inorganic acid with the following hazards:**

- Corrosive
- Toxic



## Section 3 – Engineering and Personal Protective Equipment (PPE)

**Engineering Controls:** Use of inorganic acids should be conducted in a properly functioning chemical fume hood whenever possible. The chemical fume hood must be approved for use by EH&S.

- Acids are only dispensed in fume hood in CD 186A or CD 186D.

**Hygiene Measures:** Avoid contact with skin, eyes, and clothing. Wash hands before breaks and immediately after handling the product.

- **PPE:** Lab coat, nitrile gloves, eye protection. Heavy duty neoprene gloves should be worn when handling concentrated acids.

**Hand Protection:** Chemical-resistant gloves must be worn, nitrile gloves are recommended for low volume applications. For high volume applications, disposable gloves are not appropriate; a heavy-duty glove is required such as butyl rubber, Viton, or equivalent.

**Eye Protection:** ANSI approved properly fitting safety glasses or chemical splash goggles are required. A face shield may be required for high volume applications.

**Skin and Body Protection:** Laboratory coats must be worn and be appropriately sized for the individual and buttoned to their full length. For high volume applications, additional PPE such as a chemical-resistant apron may be required. Personnel must also wear full length pants, or equivalent, and close-toed shoes. Full length pants and close-toed shoes must be worn at all times by all individuals that are occupying the laboratory area. The area of skin between the shoe and ankle must not be exposed.

**Respiratory Protection:** If inorganic acids are being used outside of a chemical fume hood, respiratory protection may be required. If this activity is necessary, contact EH&S at 206.616.3777 so a respiratory protection analysis can be performed.

## Section 4 – Special Handling and Storage Requirements

- Do not over purchase; only purchase what can be safely stored in the laboratory.
- Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. Avoid formation of dust.
- Always use inside a properly functioning chemical fume hood.
- **Note:** In case you need to dilute the concentration of acids, always add acid to water.
- Keep container upright and tightly closed in a dry and well-ventilated place.
- Opened containers must be carefully resealed and kept upright to prevent leakage.
- Keep away from sources of ignition. Avoid heat and shock or friction when handling.
- Store in original container. Acids should not be stored in metal containers.
- Keep away and store separately from incompatible materials. Incompatible materials include: Organic Acids, Bases, Amines, Alkali metals, Metals, permanganates, e.g. potassium permanganate, sodium hypochlorite (bleach), Fluorine, metal acetylides, hexalithium disilicide.
- Inorganic acids, organic acids, and oxidizing acids must be stored separately or with proper secondary containment (see photo) in acids cabinets.
- Use in the smallest practical quantities for the experiment being performed.
- Work must be conducted in a chemical fume hood if the chemical is irritating to the eyes or respiratory system, and/or is toxic by inhalation.
- Make a current copy of the SDS for the specific toxic chemical being used available to all personnel working in the laboratory at all times.
- Containers should remain closed when not in use.
- Label containers appropriately. Label should indicate the name of the chemical(s) in the container. Avoid using chemical abbreviations (acceptable if a legend is present in the lab) and formulae.
- Containers should be in good condition and compatible with the material.
- Transport all inorganic acids in secondary containment, such as polyethylene or other non-reactive acid/solvent bottle carrier.
- Segregate inorganic acids from all incompatible materials. Incompatibilities will be noted in Section 10 of the SDS, “Stability and Reactivity”.



Demonstration of proper use of secondary containment with Organic and Oxidizing acids

### Lab- specific details:

When diluting acids, gradually add small amounts to the solution being made and mix thoroughly to dissipate heat. Acids are stored in the left- hand cabinet beneath the fume hood in CD 186D.

## Section 5 – Spill and Accident Procedures

Immediately evacuate area and ensure others are aware of the spill. If there is an imminent threat of a fire, pull the nearest fire alarm station to evacuate the building and **dial 911**. If personnel have become exposed and need medical assistance, **dial 911**. If the spill is minor and does not pose a threat to personnel, contact EH&S at 206.543.0467 during normal business hours (Monday – Friday, 8 AM – 5 PM) for spill cleanup assistance (dial 911 if spill occurs after hours and assistance is needed). Refer to EH&S Spill Response Poster <https://www.ehs.washington.edu/resource/spill-response-poster-884>

### Spill and Accident Procedures:

Skin contact: flush with copious amount of water; seek medical attention. Neutralize spills with sodium bicarbonate. Spill kit is in knee well next to the key drawer in CD 186A.

### Section 6 – Waste Disposal Procedures

Store hazardous waste in closed containers that are properly labeled, and in a designated area. Inorganic acids waste should be segregated from all incompatibles (e.g., acids away from bases). No corrosive wastes are permitted to be poured down the drain. Complete a Chemical Waste Collection Request Form to arrange for disposal by EH&S; detailed instructions are provided at the following link:

<http://www.ehs.washington.edu/epowaste/chemwaste.shtm>.

Waste acids are saved in glass container for pick up by EH&S.

### Section 7 – Protocol

Small amounts of acid are stored on the lab bench near the pH meter in CD 186A. Use caution when handling as described above. Consult Safety Data Sheet for additional information regarding exposure and safe handling.

**NOTE:** Any deviation from this SOP requires approval from Principal Investigator.

### Section 8 – Documentation of Training (signature of all users is required)

Prior to conducting any work with inorganic acids, the Principal Investigator must ensure that all laboratory personnel receive training on the content of this SOP.

**I have read and understand the content of this SOP:**

Name	Signature	Date
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