



LABORATORY SAFETY GUIDELINE

Hydrochloric Acid [CAS No. 7643-01-0]

All users of hydrochloric acid must review this document. Hydrochloric acid is a strong acid and a highly corrosive liquid. This chemical compound is the aqueous (water-based) solution of hydrogen chloride gas. 36% hydrochloric acid is highly volatile and is a high-risk inhalation hazard. A 6N solution is considered toxic and causes severe skin burns and serious eye damage. A 1N solution may corrode metal but is not toxic. In addition, 1N solution causes skin and eye irritation. Users should contact their EHS Laboratory Safety Advisor and department safety officer if they have questions before beginning work.

HAZARDS

	Causes severe skin burns and eye damage and can be corrosive to metals.
	Toxic if inhaled.

Concentrated hydrochloric acid (36% or 12N) is a very volatile chemical at room temperature. Hydrogen chloride gas is released from the solution quickly when the cover to a container or bottle is removed. Opening any container of 36% hydrochloric acid must be done in a fume hood or under some local exhaust. A 6N solution should be considered toxic and corrosive and handled as concentrated. A 1N solution is considered to be non-toxic. It is an eye and skin irritant (work in a hood is not required for a 1N solution). The dissolution of inorganic acids in water or the dilution of their concentrated solutions with additional water may generate significant heat.

PRECAUTIONS

Before starting work:

- Determine if you can use a less hazardous substance than hydrochloric acid;
- Review manufacturer's Safety Data Sheet and additional chemical information at ehs.harvard.edu/safety-data-sheets-sds;
- Ensure that a written experimental protocol including safety information is available;
- Be familiar with general University emergency procedures in the [EHS Lab Emergency Response Guide](#);
- Order the most dilute solutions available that will meet experimental needs. Order only the quantity that you need;
- Identify the location of the nearest eyewash and shower and verify that they are accessible;
- Locate and verify that appropriate spill cleanup materials are available, including the following:
 - PPE: acid gloves (see "During Work" section below), safety glasses and face shield and an acid apron over a lab coat
 - Acid neutralizer
 - A plastic scrapper (if acid neutralizer is a solid material)
 - Universal absorbent pads if acid neutralizer (with color indicator) is a liquid
 - Hazardous waste bags and hazardous waste labels
- Ensure another person who knows emergency procedures is in the area.

During work:

- AVOID INHALATION! Perform all operations in a certified chemical fume hood or other approved ventilated enclosure. Sash lowered as much as possible. Always work at least 6 inches into the fume hood and behind the sash; work with 1N solutions (or less) is allowed on open bench.
- AVOID CONTACT! Use appropriate personal protective equipment (PPE):

- PPE recommendations for 1N solutions; safety glasses, lab coat and nitrile gloves
- **Work with 35% and 6N solutions must be done in fume hood and requires the following PPE:**
 - Wear a lab coat, a garment covering to the ankles, and closed-toed shoes, an acid resistant apron;
 - Safety glasses at all times;
 - Face shield when splash is feasible;
 - Immersion protection use Microflex 93-260 or N-Dex Plus 8005 and for splash protection use TouchNTuff 92-600/650 or MAPA roll pruf 760 if in a clean room (reference: Harvard EHS [glove selection guide](#));
 - Gloves must be thoroughly inspected prior to each use. Do not use damaged gloves;
 - Change gloves whenever you suspect they have become contaminated;
 - Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact;
 - Wash hands and forearms thoroughly with soap and water each time gloves are removed.
- Use materials and containers appropriate for hydrochloric acid use and remain aware of potential incompatibilities; reacts strongly with strong oxidizers (releasing chlorine gas), acetic anhydride, caesium cyanotridecahydrodecaborate(2-), ethylidene difluoride, hexalithium disilicide, metal acetylide, sodium, silicon dioxide, tetraselenium tetranitride, and many organic materials. Is incompatible with alkaline materials, acetic anhydride, acetylides, aliphatic amines, alkanolamines, alkylene oxides, aluminium, aluminium-titanium alloys, aromatic amines, amines, amides, 2-aminoethanol, ammonia, ammonium hydroxide, borides, calcium phosphide, carbides, carbonates, cyanides, chlorosulfonic acid, ethylenediamine, ethyleneimine, epichlorohydrin, formaldehyde, isocyanates, metals, metal oxides, metal hydroxides, metal acetylides, metal carbides, oleum, organic anhydrides, potassium permanganate, perchloric acid, phosphides, 3-propiolactone, silicides, sulfides, sulfites, sulfuric acid, uranium phosphide, vinyl acetate, vinylidene fluoride, attacks most metals forming flammable hydrogen gas, and some plastics, brass, galvanised iron, aluminium, copper and copper alloys.
- Keep all containers tightly closed when not in use and during transport.

After completing the work:

- Dispose of hydrochloric acid waste following Harvard University [Hazardous Waste Procedures](#)
 - Hazardous Waste Classification:
 - Corrosive and Toxic for 36% and 6N solutions
 - Corrosive for 1N or less
 - Avoid metal containers, use PVC plastic or original storage container
- Return container to storage area following Harvard University [Laboratory Chemical Storage Guide](#)
 - Storage Group: Inorganic acids;
 - Store in original containers or other appropriate containers;
 - Store primary container in designated and compatible secondary containers;
 - Store away from incompatibles;
- Wash hands and forearms thoroughly with soap and water before leaving the lab.

EMERGENCY PROCEDURES

First Aid

SKIN CONTACT

- Wash with plenty of tepid water for at least 15 minutes using the closest available sink, safety shower or drench hose. Remove any exposed clothing as well as any jewelry.
- Seek medical attention; call 911 on a landline phone for medical assistance (or provide location if calling on a mobile phone).
- In addition, contact University Operations Center at 617-495-5560 or [HMS/HSDM 617-432-1901]

EYE CONTACT

- Using eyewash, flush eyes while holding eyelids open;
- Seek medical attention; call 911 on a landline phone for medical assistance (or provide location if calling on a mobile phone).
- In addition, contact University Operations Center at 617-495-5560 or [HMS/HSDM 617-432-1901]

INHALATION

- Remove victim from contaminated area;
- Seek medical attention immediately; call 911 on a landline phone for medical assistance (or provide location if calling on a mobile phone).
- In addition, contact University Operations Center at 617-495-5560 or [HMS/HSDM 617-432-1901]

INGESTION

- Seek medical attention; call 911 on a landline phone for medical assistance (or provide location if calling on a mobile phone).
- Never give anything by mouth to an unconscious person;
- Seek medical attention; call 911 on a landline phone for medical assistance (or provide location if calling on a mobile phone). In addition, contact University Operations Center at 617-495-5560 or [HMS/HSDM 617-432-1901]

Spill Response

OUTSIDE FUME HOOD OR VENTILATED ENCLOSURE (**for 36% and 6N solutions**)

- Alert others and evacuate to a safe distance and prevent entry.
- Contact the University Operations Center at (617) 495-5560 [HMS/HSDM (617) 432-1901]
- Remain in a safe location until EH&S or other response personnel arrive.

INSIDE FUME HOOD OR VENTILATED ENCLOSURE (< 500 ml)

- If trained and confident, you may assist in the clean-up effort of small amounts, wearing PPE described above and using appropriate spill supplies.
 - Collect debris in appropriate container and move to your Satellite Accumulation Area. Label with appropriately completed hazardous waste tag and request a waste pickup.
- Otherwise close the fume hood sash and await support.
- Contact the University Operations Center at (617) 495-5560 [HMS/HSDM (617) 432-1901] if you need support or technical assistance.