



An acid bath is a suitable container that holds up to several liters of concentrated acid that is used for cleaning glassware, plastic, and ceramic objects. Metal objects such as tweezers, spatulas, and stirring bars should never be placed in the acid bath as they will corrode. Rubber items should also be excluded since they disintegrate after extended periods in acid.

Potential Hazards

Acids are corrosive substances which cause destruction of living tissue by chemical action at the site of contact causing severe burns. Corrosive effects can occur not only on the skin and eyes, but also in the respiratory tract and may be harmful if inhaled, causing destruction to the tissue of the mucous membranes and upper respiratory tract. For this reason, skin/eye contact with acid and direct inhalation of the noxious fumes should be avoided.

Personal Protective Equipment

Because of the severe hazards associated with strong acids, laboratory users need to wear appropriate personal protective equipment (PPE) at all times. This includes a lab coat, safety goggles, appropriate gloves, closed toe shoes and full leg coverage (i.e. no shorts or skirts). Best practice dictates that when working with stronger acids or during the preparation/disposal of an acid bath chemical resistant gloves and aprons (such as neoprene or PVC) should be worn.

Special Handling and Storage Requirements

- It is essential that all strong corrosives be stored separately from all chemicals with which they may react. Ensure secondary containment (such as a nalgene/polypropylene tray or tub) and segregation of incompatible chemicals. See the "Chemical Storage Safety Instruction" for more information on chemical storage requirements.
- Acid baths should always be done inside a fume hood in order to protect employees from potential inhalation health effects. It also helps prevent erosion in the space.
- Due to the risk of inhaling noxious fumes acid baths should be kept in or near fume hoods or in well ventilated areas.
- When diluting acids **always** add acid to water (**NEVER** water to acid). Transfer from container to the receptacle by using an appropriate funnel to avoid spillage.
- Label the acid bath in plain English (no abbreviations) with its chemical content and percentage. See "Safety Instruction on Chemical Labeling" for more information.
- Make sure all containers/baths have tight fitting lids that are kept closed when not in use. Acid should **NEVER** be left in a container that is open and venting.
- Keep the acid containers/baths out of high traffic areas and ensure it is done near certified eye wash/safety shower in case of emergencies.

Procedure

1. Use the formula $(M1)(V1)=(M2)(V2)$ where M is the molarity and V is the volume to determine amount of concentrated acid needed. The amount of water is determined by the amount of acid plus whatever is needed to bring the solution up to the final desired volume.
2. Wearing full PPE carefully add the desired amount of **acid to water (NEVER** water to acid), preparing enough solution to completely submerge the items.
3. Before placing the items into the bath make they are thoroughly rinsed with distilled water to remove the bulk of contents. Check for any residue, using a scrub brush if necessary.
4. To wash, slowly submerge items into the acid bath to prevent any acid splashing back. Allow to sit a couple of hours, preferably overnight, with the acid bath lid securely fastened. Make sure all surfaces are in contact with the acid and that there are no air pockets.
5. When done, carefully remove items from the acid bath to avoid spillage or splash back. Thoroughly rinse the solution from items, first with tap water then distilled water. Allow to dry.

Spill and Incident Procedures

Assess the extent of danger, help contaminated or injured persons, evacuate the spill area, and 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 (i.e. use caution tape, barriers, etc.).

- *Small* (less than 1 gallon) – If the lab worker has been properly trained and does not perceive the risk to be greater than normal laboratory operations, they should use appropriate personal protective equipment and clean-up materials for the chemical spilled. Cover the spill with sodium carbonate or bicarbonate (be careful of possible strong reaction). When reaction stops, pickup with damp sponge or paper towels or sweep up. Place waste in container, label, and arrange for chemical waste pick-up, or if appropriate dispose of in regular waste.
- *Large* (more than 1 gallon) – Call EH&S at 541-737-7000 via public safety for assistance. Notify others in area of spill. Turn off ignition sources in area. Evacuate the area and post doors as a spill area. Remain on the scene, but at a safe distance to receive and direct safety personnel when they arrive.

Chemical spill on the body or clothes – Remove all contaminated clothing and rinse the affected area with running water or use the emergency shower for at least 15 minutes. Seek medical attention if necessary. Notify supervisor immediately.

Chemical splashes into eyes – Immediately rinse the eyeball and inner surface of eyelid (by forcibly holding the eye open) with water from the emergency eyewash station for at least 15 minutes. Seek medical attention if necessary. Notify supervisor immediately.

Waste Disposal

Best practice is to place a Hazardous Waste request with EH&S when disposing of any acid. However, certain acids may be neutralized and poured into the sanitary sewer, but only when the neutralized mixture is nontoxic and meets the city of Corvallis discharge limits (pH of 6-9.5). During the neutralization of an acid the lab worker should don full PPE and work in a fume hood if possible.

The following is a list of acids and bases that may **not** be neutralized and disposed of by sanitary sewer:

- Perchloric acid at any concentration
- Nitric acid, at concentrations above 70% or red fuming nitric acid.
- Sulfuric acid, fuming (Oleum or disulfuric acid)
- Hydrofluoric acid at any concentration.
- Acids with heavy metals in solution.
- Aqua Regia
- Acids that contain dyes or surfactants
- Any organic acids that are still toxic after neutralization (most organic acids - one exception is acetic acid with a concentration of less than 80%(i.e. do not neutralize glacial acetic acid.)

If a laboratory has any questions or concerns about the proper disposal of an acid they should contact EH&S at 541-737-2273 for assistance, or place a Hazardous Waste request at <http://oregonstate.edu/ehs/waste>.