

# Laboratory Hazardous Waste Disposal Guidelines

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## Satellite Accumulation Area (SAA)

For safety and environmental reasons, hazardous waste must be stored in a designated "Satellite Accumulation Area." These areas must be inspected weekly for container leakage. Containers must be **removed from the Satellite Accumulation Area within three days after the waste container becomes full**. Closed, properly labeled containers that are partially filled may remain in a Satellite Accumulation Area up to one (1) year.

## **ALL LABORATORIES THAT GENERATE HAZARDOUS WASTE MUST SET UP SATELLITE ACCUMULATION AREAS**

A satellite accumulation area (WAC 173-303) is a designated area within the laboratory or point of generation of the hazardous waste which will store the waste until it is sent out for processing. **This area can be a bench top, small section of the hood, a combination of both or even a previously empty cabinet.**

**NOTE:** An acceptable practice has been to **designate** (label, identify area as an SAA) chemical fume hood as a laboratory's SAA. Regardless of the amount of chemical in a container, if it's within the boundaries of the accumulation area then it must be labeled properly.

Each label must have the following:

1. The words "***Hazardous Waste***";
2. The hazardous waste chemical name in words (e.g., toluene, chloroform, water) no formula, structure, or abbreviations;
3. The type of hazard(s) associated with the waste (e.g., flammable, toxic, reactive, corrosive); and
4. The date upon which each container becomes ***full***.

These labels must be placed on the containers so that they are ***readily seen*** (label facing outwards) for inspection.

**NOTE:** Chemical mixtures must be identified by percent or volume compositions of every component, even those that are not hazardous.

Chemical wastes must be segregated by general waste type (e.g., flammables, poisons, acids, and alkalis) and arranged so that incompatible substances will not mix.

Incompatibles are those pairs of substances that, when mixed, either react violently or emit flammable or poisonous gases or vapors. Below are a few general principles that must be followed for safe hazardous waste storage and chemical storage:

1. Store acids and bases separately
2. Keep acids apart from cyanides or sulfides
3. Acids should never be put into steel containers
4. Water-reactive, strong acids such as organic acid halides, organic acid anhydrides, inorganic acid anhydrides, and strong acidic salts must be kept apart from both alkalis and water
5. Oxidizing agents must be kept apart from reducing agents and organic compounds
6. Water-reactive agents must be stored apart from water, aqueous solutions, and acids
7. Air-reactive materials must be packed in containers that are sealed off from the atmosphere
8. Explosive and shock-sensitive materials present risks that require special handling. Consult with EH&S before handling or preparing for disposal

# Laboratory Hazardous Waste Disposal Guidelines

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## Hazardous Waste Containment

CWU's hazardous waste containment policy includes, but is not limited to, the following:

- All hazardous waste must be properly stored in compatible containers that prevent rupture or leakage of the material contained.
- Containers should **not** be filled beyond the neck or should have at least one inch headroom to allow for expansion.
- Containers should be made of material that does not react with or absorb the contents and have a screw cap of similar material properties.
- The cap must be in "new" condition, with no cracks or any signs of deterioration.
- ALL WASTE CONTAINERS MUST BE SECURELY CAPPED DURING STORAGE, EXCEPT WHEN ADDING OR REMOVING WASTE.
- No foodstuff containers (Mayonnaise jars, Pickle jars, Mason (canning) jars, etc.) may be used to store hazardous waste even if they are compatible with the material. Ideally, the original container should be used if it shows no signs of deterioration. However, some older original containers may not meet current standards, even if they are intact. The responsibility for transferring chemicals into proper containers belongs to SAA personnel. It is the department's responsibility to supply hazardous waste containers. EH&S will assist in locating empty containers whenever possible. **Each SAA must have secondary containment such as a tub, tray, or bucket that will contain at least the quantity of the largest container.**

**NOTE:** Technically, a chemical fume hood cabinet (the "floor" of the fume hood) is considered to be secondary containment. BUT, because of the gaps at either side of the face opening and front airfoil, a spill may not be contained within the cabinet. So I highly recommend that if the waste is a liquid, the container must be within a tray or tub.

- Each SAA is allowed to contain several separate waste streams, as long as they are chemically compatible. If separate waste streams are not compatible, they are to be separated by a physical barrier to prevent interaction in the event of a leak or spill. A separate secondary containment unit may be all that is needed to prevent interaction of some chemicals.

**NOTE:** *Hazardous wastes must NOT be disposed of by evaporation* - this includes evaporation in fume hoods or biosafety cabinets. Remember, hazardous waste containers must be kept closed at all times except to add or remove waste.

## Hazardous Waste Labels

Properly labeled waste containers are critical for managing hazardous waste in a manner that is safe and compliant with regulatory requirements. Each waste container must be labeled with the following:

- The words, "HAZARDOUS WASTE"
- The waste name, building and room number where the material was generated.
- The chemical constituents contained. A generic title may be used only if specific waste profiles have been established with EH&S (i.e., in teaching labs or long term research projects).

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# Laboratory Hazardous Waste Disposal Guidelines

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**NOTE:** Both Biology, Chemistry, and Science Ed have devised their own version of a hazardous waste label or tag. I have no issues in regards to the physical label.

## **When should you label your waste container?**

- The contact, waste stream & chemical constituents sections must be completed when waste is first placed into the container.
- The chemical percentages must be added later.
- The date filled must be completed when the container is full and a pickup request has been submitted or when the container is placed down into the primary HW Area.

## **Why is labeling so important?**

- EH&S staff members need this information to decide how to safely manage the material.
- Environmental laws require the generator to label chemical waste materials.
- Chemical constituents must be known to allow us to dispose of chemicals with minimal cost and impact to the environment

## **Management Guide to Classification**

There are two ways to determine whether a chemical waste is considered to be a ‘Hazardous Waste;’ 1) if it is specifically listed by the Environmental Protection Agency (EPA) or Department of Ecology (DOE) as a hazardous waste, or 2) if it meets any of the four hazardous characteristics: ignitable (flammability), corrosive, reactive, and toxic. If a chemical waste is not on the EPA list of hazardous wastes and does not meet any of the hazardous waste characteristics, it is a non-hazardous waste. Be aware, however, that waste chemicals that aren’t technically ‘hazardous wastes’ are still usually forbidden from sink disposal.

## **What Can Go Down the Drain?**

Certain criteria must be met in order for materials to be safely poured down the drain, including low toxicity, high water solubility, and moderate pH. Only small quantities are allowed in the system at any time and the chemicals must be degradable by the wastewater treatment (a biological process). Large quantities or highly concentrated stock solutions of these materials should be picked up for disposal by the EH&S. Only aqueous solutions of these chemicals can go down the lab drain; solid forms must use other disposal routes (normal trash or pick-up by EH&S).

The only substances allowed down drains are those that meet all of the following criteria:

1. Nonhazardous
  - No hazardous chemical waste
  - No untreated biohazardous waste
2. Liquid
  - No solids, sludges, or viscous substances
3. Will not interfere with sewage treatment operations
  - No corrosive pH levels
  - No grease or oil
  - No hot (150°F or higher) temperatures in volumes of more than 10 gallons

# Laboratory Hazardous Waste Disposal Guidelines

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Chemical	Disposal Down Drain	Options
Corrosive waste with a pH between 2.0 and 5.0	NO, unless it has been adjusted and stabilized	You have 2 disposal options: <ul style="list-style-type: none"><li>Adjust the pH to greater than 5.0 and less than 12.5 and then dispose of it down the drain.</li><li>Store and dispose of non-adjusted waste as hazardous chemical waste.</li></ul>
Corrosive waste with a pH of 2.0 or lower or pH of 12.5 or higher	NO	This kind of waste is always considered hazardous chemical waste. <ul style="list-style-type: none"><li>Do not adjust it.</li></ul>

## General Rules for Corrosives

An acid or base may be neutralized and poured into the sanitary sewer only if the neutralized mixture is not toxic. The following is a list of acids and bases that may *not* be neutralized and disposed of to a sanitary sewer:

- Perchloric acid at any concentration
- Nitric acid, concentrated
- Sulfuric acid, fuming (concentrated)
- Hydrofluoric acid
- Acids or bases with high concentrations of metals or other contaminants
- Acids or bases that contain dyes or surfactants
- Any organic acids and bases that are still toxic after neutralization (most organic acids and bases - one exception is acetic acid with a concentration of less than 80%)

## Non-Hazardous Substances Permitted for Drain Disposal

1. Physiological saline and non-toxic salts in dilute form
2. Inorganic buffers (phosphate or bicarbonate based)
3. Buffer solutions containing ethidium bromide that have been filtered, decontaminated, or destroyed.
4. Organic buffers at use concentrations (e.g., TRIS)
5. Sugar solutions

## Examples of Hazardous Substances Prohibited from Drain Disposal

1. **Ethanol:** an ignitable/flammable chemical that meets the ignitability characteristic of hazardous waste as defined by EPA/DOE, thus must be collected for hazardous waste disposal. As a flammable liquid, it is also forbidden from entering the public sewer (even with copious amount of water). Ethanol is nonhazardous in concentrations less than 24%.
2. **Acetone:** see Ethanol
3. **Methanol, Propanol and Butanol:** see Ethanol
4. **Chromerge:** a sulfuric acid (e.g., corrosive) and chromium trioxide (e.g., toxic) solution use for cleaning laboratory glassware. This mixture is a corrosive, toxic hazardous

# Laboratory Hazardous Waste Disposal Guidelines

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waste. EH&S always recommends laboratories try alternative glass cleaning products (such as Alconox or NoChromix).

5. **Dyes and Stains:** the exact chemical contents of dyes and stains will determine whether they may be drain disposed. For example, Coomassie Blue and “Destain”, which contain methanol and acetic acid, would both be considered hazardous wastes and prohibited from drain disposal. EH&S recommends all dyes and stains be collected for proper waste disposal. Contact EH&S if you have questions concerning a particular dye or stain or concentration. EH&S will evaluate on a case-by-case basis if an argument can be made to justify exclusion from the recommendation.
6. **Ethidium Bromide Solution:** due to its mutagenic properties it must be collected for hazardous waste disposal, unless filtered, decontaminated or destroyed.
7. **Formalin and Formaldehyde:** Formalin solutions containing less than 2.9% formaldehyde. This concentration is nonhazardous and can go down the drain. Dilution of higher concentrations is **not allowed**.
8. **Wash and Rinse Water:** Cannot be discharged unless it has **not** been contaminated by hazardous materials or highly caustic, acidic, or toxic cleaning solutions.

## **Unidentified Waste:**

State and federal transportation regulations for waste haulers prevent EH&S from collecting substances that are unidentified (unknown). **The responsibility for establishing the identity of an unknown substance rests with the department wishing to dispose of it.** Upon request, EH&S will **assist** in testing the unknown to determine the hazardous properties. Containers of unknown materials must be labeled with a chemical waste label. Please provide any available information about what the material could potentially be.

There are two important issues related to drain disposal and hazardous waste collection that must also be mentioned. The EPA and DOE generally DO NOT base decisions on quantities or volume limits, which mean even small quantities of chemical waste, must be collected for proper disposal. Also, the evaporation, intentional dilution or neutralization of a hazardous chemical waste for the purpose of avoiding collection of that chemical as a hazardous waste is illegal.

**All chemical neutralizations must be recorded on a *Treatment Disposal Log* prior to disposal down the drain (into the sanitary sewer).**

## **In Conclusion**

What is a waste? My simple definition is “if you no longer need it nor want it” then it’s a waste. You determine when a chemical is a waste but, are you ready to defend your position?

Hazardous waste will generally include: all organic solvent waste and solid residues containing those solvents; most waste acids, alkalis, and other corrosive materials; some materials containing heavy metals, explosives, highly reactive materials; and many discarded process chemicals or laboratory reagents. All aerosol cans, which are full or partially full, will be disposed of as hazardous waste. Product wastes containing greater than 10% alcohol will be regarded as ignitable material and disposed of as hazardous waste.

Be very careful where you place non-waste container(s). If the container is located in a place outside of its normal or usual place (i.e., shelf, cabinet, countertop), then it can be construed by the Inspector as being a waste.