



LABORATORY CHEMICAL WASTE FAQs

ETHIDIUM BROMIDE

1. Q - *How should I manage and dispose of ethidium bromide waste?*

Answer - Ethidium bromide is a mutagen that requires special storage, handling, and disposal as waste. Further, take appropriate step to minimize your exposure.

- Buffer solutions
- Gels
- Stock solutions
- Crystals and powders
- Contaminated debris

For ethidium bromide waste that is generated at Harvard, each waste stream is to be managed or accumulated as described below.

- Waste buffer solutions and other dilute aqueous solutions (less than 0.01% by wt.) containing very small concentrations of ethidium bromide may be discharged to sinks.
- Gels with trace amounts of ethidium bromide (0.3-0.5 µg/ml) may be disposed of **daily** in double bag-lined containers (e.g., five-gallon pails). This waste is **not** considered a hazardous waste. However, the chemical waste vendor will pick up any vendor-supplied pails that are labeled as "Non-Hazardous Ethidium Bromide Gel Waste". Cambridge labs that have mini-mains will have to bring the pails to the mini-mains when full.
- Sharps must be managed in sharps containers.
- Pipette tips can be disposed of in regular trash
- Stock solutions, crystals, and powders must be accumulated in containers that are stored in secondary containment bins, remain closed when not in use, and are managed and labeled as: "Hazardous Waste: Ethidium Bromide (Mutagen)".

Remember that Ethidium bromide waste exposed to biological hazards and not decontaminated in a manner that would destroy the biological hazard, must be collected and stored in biowaste bags.

Ethidium bromide mixed with other chemicals (e.g., solvents); which are required to be managed as hazardous waste, must be managed and disposed as hazardous waste.

2. Q - *Can I use bench top ethidium bromide extraction/filtration units?*

Answer - Laboratories generating large volumes of ethidium bromide buffers should consider the use of commercially available filter cartridges to remove ethidium bromide from buffers and other dilute aqueous solutions from waste solution prior to discharge to sink. Spent cartridges must be collected in waste containers designated for this purpose.



CHARACTERISTIC OF REACTIVITY

1. Q - *When filling out the hazardous waste label, I often am confused as to which chemicals receive the reactive designation. How do I know if something is reactive?*

Answer - A waste exhibits the characteristic of reactivity if a representative sample of the waste has any of the following properties:

- (1) It is normally unstable and readily undergoes violent change without detonating.
- (2) It reacts violently with water.
- (3) It forms potentially explosive mixtures with water.
- (4) When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health and the environment.
- (5) It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or the environment.
- (6) It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.
- (7) It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

Many examples of functional groups that have been shown to exhibit a certain level of instability and/or unusual reactivity are listed in Material Safety Data Sheets (MSDS's).

DRUG ENFORCEMENT AGENCY REGULATED SUBSTANCES

1. Q - *Will EH&S take and dispose of my DEA controlled substances as part of the hazardous waste operational service they provide to the university?*

Answer - It is against the law for EH&S to take possession of any DEA regulated substances. The DEA strictly regulates all purchase, storage, dispensing and disposal of expired/ unwanted or off spec SCHEDULE 1-5 DRUGS.

Only individuals or institutions that submit an application and are assigned a DEA REGISTRATION NUMBER are allowed to purchase and possess DEA REGULATED SUBSTANCES. See the EH&S section on DEA Disposal.

SHARPS



1. Q - *What is a sharp, and how do I manage them?*

Answer - Sharps are defined by the regulation as medical articles that may cause punctures or cuts including but not limited to, all used and discarded hypodermic needles and syringes, pasteur pipettes, broken medical glassware, scalpel blades, disposable razors, and suture needles. Sharps containers are to be available in the laboratory where sharps are used. These containers must be disposed of as biological waste by placing them into "burn" boxes, location of boxes are typically designated by your lab.

Cambridge/Allston Campus: Sharps containers are sold in the Biological and Chemistry VWR Stockrooms. To set up a Biohazard "burn" box or identify the closest available location for proper disposal of your sharps container call Sid Paula 5-2345.

Longwood Campus: Sharps containers are available through the Longwood EH&S Safety Office (2-1720). To set up a Biohazard "burn" box or identify the closest available location for proper disposal of your sharps container call facilities Harvard Medical School (2-1567) / School of Public Health (2-4720).

Refer to the EH&S Biosafety web site for additional information.

2. Q - *I do not work with biological material, but use and generate sharps (hypodermic needles, Pasteur pipettes, broken medical glassware, scalpel blades, disposable razors, and suture needles) which are put in a sharps container. How do I properly dispose of my sharps container?*

Answer - Sharps containers are to be available in the laboratory where sharps are used. These containers used to collect spent sharps should be disposed of as biological waste by placing them into "burn" boxes located in areas designated by your lab. Ask personnel in your lab where the nearest "burn" box is located.

Cambridge/Allston Campus: Sharps containers are sold in the Biological and Chemistry VWR Stockrooms. To set up a Biohazard "burn" box or identify the closest available location for proper disposal of your sharps container call EH&S (5-2345).

Longwood Campus: Sharps containers are available through the Longwood EH&S Safety Office (2-1720). To set up a Biohazard "burn" box or identify the closest available location for proper disposal of your sharps container call facilities Harvard Medical School (2-1567) / School of Public Health (2-4720).



SECONDARY CONTAINMENT

1. Q - *What happens if our secondary containment bins used for hazardous waste storage and segregation becomes contaminated over time? Should I throw them away?*

Answer - If the secondary containment bins used in your Satellite Accumulation Area becomes grossly contaminated, please call EH&S for its removal and replacement Cambridge (6-3322)/Longwood (2-1720).

2. Q - *How can I properly segregate incompatible waste containers?*

Answer - EH&S has mandated the use of secondary containment bins (plastic bins) at all locations generating hazardous waste. Secondary containment bins are available to laboratories through the VWR Stockrooms on the Cambridge Campus and through the EH&S Office in Longwood (2-1720). These secondary containment bins are used for storage of hazardous waste containers to ensure that the "surface underlying the container shall be free of cracks, gaps, and sufficiently impervious to contain leaks". (310 CMR 30.340(4)(d)). Secondary containment bins are also used to separate incompatible hazardous wastes during accumulation (e.g. use separate trays or bins). By definition incompatible hazardous waste are materials that as a result of commingling under uncontrolled conditions may produce heat or pressure; fire or explosion; violent reaction; toxic dusts, mists, fumes or gasses; or flammable fumes or gasses. Listed below are web-site resources to help you identify possible incompatible storage conditions. You may also call EH&S for additional technical assistance.

LABELS

1. Q - *How can I get a supply of hazardous waste labels?*

Answer - If you reside on the Cambridge Campus hazardous waste labels are available through your local VWR stockroom (Biology Basement).

In Longwood you must call EH&S directly 2-1720, and request hazardous waste labels which will be dropped off during routine hazardous waste pickups (Tuesday & Friday).



TRAINING

1. Q - *Do I need hazardous waste training if I work in a Laboratory that generates hazardous waste even if I don't actually generate any hazardous waste myself? How and when is training offered, and how frequently must I take it?*

Answer – Hazardous waste training is included with Harvard's online Lab Safety training completed on initial hire and every year thereafter. Personnel who generate, handle or may handle hazardous waste must be trained in hazardous waste requirements every year. The training program at Harvard University reviews the key procedures of Harvard's hazardous waste program. These procedures have been developed through a cooperative effort between the Department of Environmental Health & Safety (EH&S), the faculty, and the administrative staff at Harvard and meet the regulatory requirements prescribed by Massachusetts and Federal law. Following these procedures will help to maintain a safe and environmentally responsible workplace by ensuring that wastes are properly identified, stored and removed from the laboratory. These procedures are presented in four sections:

GLASSWARE RINSING

1. Q - *I often wash and dry my glassware with acetone, is it ok to pour the "acetone rinse" down the drain?*

Answer - No. The Environmental Protection Agency (EPA) defines acetone as a volatile organic compound which exhibits the flammability characteristic of (Flash point < 140 F). The EPA considers materials exhibiting the flammability characteristic as hazardous and must be managed and disposed of according to the hazardous waste regulations. In addition the EPA regulates acetone when it is used for its solvent properties. Volatile organic compounds are also strictly prohibited by the Massachusetts Water Resource Authority (e.g. acetone, benzene, toluene, xylene) in concentrations greater than 1.0 milligram per liter. Laboratories may be significant users of toxic organic compounds (e.g. solvents), which cannot be treated by conventional wastewater treatment systems. These toxic organics (also known as TTOs) must be prevented from sink disposal and must be disposed of as hazardous waste. See our web site for instruction in the proper collection, storage and disposal of hazardous waste. For additional information visit on sink disposal visit our web site.

2. Q - *Can acetone be discharged to drain?*

Answer – No, when used to clean glass it is regulated either as ignitable or as F003 hazardous waste, both of which are prohibited from being drain disposed.

3. Q - *Can I treat and rinse glassware that is contaminated with reactive residues or high hazard chemicals so it is no longer contaminated with the compound?*



Answer – Yes, treatment of glassware prior to re-use is not something HW law addresses. However, rinseate and cleaning residue should be evaluated to determine if it is hazardous waste.

EMPTY CONTAINERS

1. Q - *Our lab has quite a few empty glass bottles that used to contain stock solvent. What should we do with them now that they are empty?*

Answer - EH&S recommends keeping a supply of bottles for hazardous waste accumulation. If you have an excess of empty containers they may be disposed through the regular trash as long as 1) The containers are "empty". (All material has been removed that can be removed using the practices commonly employed to remove materials from that type of container. eg, pouring, pumping and aspirating & 2) The containers did not contain a chemical on the acutely hazardous waste P list. If they did contain a P listed chemical either dispose of the "empty" as hazardous waste or triple rinse the container and collect the rinsate as hazardous waste. Contact EH&S for the list of P-Listed Wastes.

TREATMENT

1. Q - *Can quenching be used to react substances prior to disposal?*

Answer - Quenching various reactive chemicals to rendering them less or non-hazardous for the sole purpose of disposal is considered RCRA treatment and prohibited. Quenching, for the purposes of rendering equipment, lab instruments and other devices used in research, clean and safe for use is acceptable and not a RCRA issue. If quenching is necessary to a lab protocol and is documented in the protocol, it would generally be considered part of the experimental process and not subject to RCRA.

2. Q - *Can pH be adjusted via neutralization so that it can be poured down the drain?*

Answer - Lab buildings at Harvard contain wastewater treatment systems for the neutralization of lab wastewater that may be mildly corrosive. Therefore, the discharge of corrosive solutions with pH ranges ($2.0 < \text{pH} < 5.5$) and ($10.5 < \text{pH} < 12.5$) can be discharged only through a laboratory sink drain that has a pH neutralization system. If you are unsure if your lab has a system, contact EH&S. Corrosive solutions with pH ranges ($\text{pH} < 2.0$) and ($\text{pH} > 12.5$) at the conclusion of the lab process must be collected and managed as hazardous waste.

3. Q - *Can compounds be modified structurally so that they are not as hazardous?*

Answer - Personnel modifying compounds need to ensure that not treating a hazardous waste. If original material would be hazardous waste, then any modification to it is considered treatment. Treatment requires a permit unless structural modification is necessary to a lab protocol and is documented in the protocol.



HAZARDOUS WASTE DISPOSAL

1. Q - How much does it cost to analyze and dispose an unknown waste?

Answer - Analytic and hazardous waste disposal costs for unknown substances range from \$200-\$1500.

2. Q - How much does it cost to dispose of hazardous waste?

Answer - Cost of disposal of hazardous waste range \$30/5-gal solvents to \$800-\$1,000/55-gallon drum of reactive hazardous waste.

HAZARDOUS WASTE DETERMINATION

1. Q - What chemicals are considered hazardous (i.e. must be handled as hazardous waste and cannot just be thrown in the trash)?

Answer - Any chemical inclusive of solids, liquids and gases, which are listed by the EPA/DEP or exhibit characteristics of a hazardous waste (Ignitable, Corrosive, and Reactive, Toxic) must be managed and disposed of as hazardous waste.

SINK DISPOSAL

1. Q - Why can't we just throw chemicals that biodegrade when in contact with H₂O, down the drain?

Answer - By law we are required to make a HW determination at point material becomes waste. If listed HW or meets characteristics must be managed as HW - drain disposal prohibited.