

LABORATORY SAFETY SELF-ASSESSMENT GUIDANCE

Use this guidance document in concert with the General Lab Safety Self-Assessment Checklist; you will find more information regarding each of the assessment criteria and guidance on maintaining a safe, healthy and compliant environment. If you still have questions, please reach out to the EHS Chemical and Lab Safety staff for assistance. *Note: for the purposes of this document, a 'laboratory' includes shops, studios and makerspaces.*

General

Hazard Communication Sign is up to date (NFPA rating, emergency phone #'s, etc.)

Check the emergency contact information on your door sign. There should be a phone number for during the work week (M-F 8AM-5PM), as well as at least one after-hours number. Two additional numbers may be posted, as well.

NFPA rating should indicate the highest risk present in your lab for each of the NFPA hazard ratings.

Door signs should also accurately indicate approval for radioactive material (or X-ray producing equipment), the biosafety approval status of each room, and laser symbol if laser requires registration with EHS.

Personal protective equipment (PPE) is available and utilized appropriately

PPE must be available and be appropriate for the environment and nature of the work underway. It is the responsibility of faculty to ensure PPE is provided and used by personnel. EHS has two online modules on choosing PPE: [Eye Protection](#) and [Hand Protection](#). For further assistance determining appropriate PPE, contact EHS. Special note: EHS has a respiratory protection policy. If you have questions regarding respiratory protection, EHS must be consulted for an assessment.

Laboratory areas, including science refrigerators, freezers AND cold rooms, are free from food and/or drink intended for human consumption

The University policy on prohibition of food or drink in research laboratories is linked below.

<http://uvapolicy.virginia.edu/policy/VPRS-001>

In the interest of health, safety and regulation in any space that has chemicals, the consumption and storage of food and drink (and the application of cosmetics and smoking/vaping) is prohibited in work/research areas where hazardous materials are present. It does not matter if a container is open (e.g. coffee to-go cup) or closed (e.g. ice cream container).

Food or drink product used for research purposes shall be labeled 'Not for Human Consumption'.

Safety Data Sheets (SDS) for hazardous chemicals are accessible to all lab occupants, or lab occupants know how to access SDS on the EHS website

EHS provides a searchable online database through MSDSOnline: www.ehs.virginia.edu/msds

If personnel do not have access to the internet, paper SDS must be provided. SDS can be searched, saved and printed through the above database.

Verify occupants have completed EHS Chemical Safety and Waste Training

- At a minimum, Chemical Safety and Waste training must be completed to work in a lab, shop, studio or makerspace with chemicals at UVA. EHS provides this training as an online module. [Access chemical safety training here](#)
- EHS training records can be verified [here](#), searching by UVA Computing ID.

Lab occupants have received chemical specific hazard training

Training shall also be given by Principal Investigators or lab/space managers on site-specific chemical hazards, i.e. personnel are given an understanding of the specific hazards they may be exposed to, how to safely handle, protect themselves to minimize risk of exposure, and proper disposal of the specific chemicals.

Lab occupants have completed applicable training prior to working in the lab.

- Other training will depend upon other work protocols (Institutional Biosafety Committee, Animal Care and Use Committee, Radioactive material, etc.), or specialized needs (shipping dry ice).
- EHS has also developed a wide range of recommended trainings that faculty and lab managers will find helpful for further safety awareness in the lab.
[Other lab safety trainings available here](#)

Lab occupants know where to access the University Hazard Communication Program and Chemical Hygiene Plan

Both documents are available on the Chemical and Laboratory Safety webpage under the 'About & UVA Policies'

<http://ehs.virginia.edu/Chemical-Safety.html>

Chemicals

Chemicals are stored separately according to their compatibility and hazard class

Hazardous materials should be stored alongside substances with similar hazards. Unintended reactions can occur if incompatible chemicals encounter one another. In some cases, specialized cabinets should be used.

For example, flammable cabinets are designed and certified to protect flammable and combustible material in the case of fire. Corrosive cabinets are designed to be resistant to corrosive materials. If you require guidance regarding what types of chemicals can be safely stored together, consult the SDS. Check out EHS Chemical Storage Guides and [Chemical Storage module](#) for some general information, and contact EHS if you have further questions.

<http://ehs.virginia.edu/Chemical-Safety-Storage.html>

Chemicals in any container are properly labeled, and covered or closed when not in use

Close all containers containing hazardous materials when not in use, and label with their contents. The generator of the unlabeled container may know the content of an unlabeled beaker, but when that person leaves the room, so too does the knowledge of the contents. It does not take long for an unlabeled container to become an unknown, which must be characterized before it can be properly disposed of. It is costly to characterize an unknown chemical, and this cost may be passed on to the originating lab.

Chemical containers are in good condition (i.e. are not cracked, no lids missing, etc.)

Plastic chemical bottles can degrade and crack over time as they age and are exposed to light. Check chemical bottles periodically to ensure that they can safely hold their contents. Reagents in a damaged bottle can result in unnecessary exposure to chemicals or unintended release (spilling) of chemicals. If you have a compromised container, place it in secondary containment such as a bucket or Ziploc bag. EHS will pick up any of these containers for disposal with normal hazardous waste pick-up requests.

Chemicals are stored in a generally safe manner

Avoid storing any chemicals on the floor, and keep hazardous chemicals on shelves below eye level, especially when in glass containers. Safe storage practices prevent accidental drops when having to reach awkwardly for a bottle, prevent accidental kicking of a bottle that could lead to breaks, etc. Consult our [Chemical Storage module](#) for more information.

Flammable liquids are not purchased in 5 gal cans (or larger)

Virginia State Fire Marshal has prohibited storage and use of flammable liquids in 5 gallon cans or larger at UVA. Excessively large containers of solvent can unnecessarily increase the fire load of our research buildings, leading to noncompliance with fire code. Solvents and other flammable liquids should never be ordered in quantities meeting or exceeding 5-gallon containers.

When flammable solvents must be kept cold, they are stored in Flammable Material or Explosion-Proof fridge/freezer (and not a 'standard' unit)

Conventional refrigerators can inadvertently cause an explosion if flammable liquids are stored in them. Solvent vapors can create an explosive atmosphere inside the unit. When the temperature switch on the unit is triggered, a small arc can occur, which can provide an ignition source for an explosion. An explosion did occur in a UVA lab when flammable solvent was being stored in the freezer component of a conventional combination unit. Below are actual photos of the aftermath from the explosion.

Doors ripped off unit



Bottom of freezer compartment



Damage in area front of unit



Compressed Gas

Gas Cylinders are properly secured at all times

There are several ways to properly secure gas cylinders:



- Proper placement of straps or chains is important. Place the chain or strap above the center of gravity, at about 2/3 up the cylinder. Never place the chain around the neck of the cylinder.
- Nesting cylinders with one chain is not recommended, as this can lead to insufficient support
- Cylinders can only be secured to walls or benchtops; never to pipes, electrical conduit, or unstable furniture
- Bungee cords, rope, Ethernet cords, thin chain are NOT acceptable



Incompatible gas cylinders are stored at least 20 feet apart or in separate rooms.

NFPA 55 fire code requires incompatible gases to be stored at least 20 feet apart, or they can be separated by line of sight, provided it is with a material having a 30 minute fire-rated barrier.

Do not store flammable and oxidizing gas next to one another. These gases require a 20 feet separation



Highly toxic and toxic gases stored under ventilation

Highly toxic gases, must always be used and stored in a gas cabinet, gas room, or exhausted enclosure (fume hood)

OSHA Hazard Communication Standard and NFPA 55 define 'Highly toxic': A chemical that has a median lethal concentration (LC(50)) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter

or less of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each.

A highly toxic gas will fall under GHS Acutely Toxic Category 1, but can also fall under Category 2 (range of LC(50) is from >100 to <500 ppm), so check the safety data sheet.

Examples include: Arsine, fluorine, hydrogen cyanide, nitric oxide, phosgene, phosphine, sulfur tetrafluoride

Many toxic gases are also recommended to be stored in the same manner; these include ammonia, chlorine and carbon monoxide.

We recommend conducting a hazard assessment in collaboration with EHS to determine the storage and use requirements for your highly toxic or toxic gas.

Cylinders not in use have regulator removed and are capped.

If a gas cylinder is not in use, the regulator should be removed, and the cap put in place. Only move/transport a cylinder with the valve capped.

Waste

EHS provided, or otherwise appropriate, waste containers are used

Use waste containers provided by EHS, or reuse chemical reagent bottles and affix a Hazardous Waste sticker. Do NOT reuse any type of old food or drink container. Food and drink containers are not designed or rated for storage or shipment of hazardous chemicals and may exhibit poor chemical resistance.



Waste containers are properly labeled

Federal law requires that hazardous waste be labeled 'Hazardous Waste', and have the hazard of the waste indicated. Check the most applicable hazard pictogram, as shown below.

HAZARDOUS WASTE

Major Hazard (check one)

KEEP CONTAINER CLOSED AT ALL TIMES
DO NOT FILL WITHIN 2" OF CONTAINER TOP

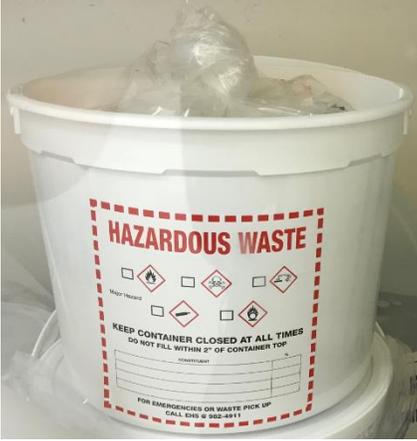
CONSTITUENT	%
Ethanol	65
Acetone	35

FOR EMERGENCIES OR WASTE PICK UP
CALL EHS @ 982-4911

All waste containers must be labeled with contents, as accurately as reasonably possible. Accidental mixing of incompatible materials can result in something minor, such as gentle heating, to something life threatening, such as toxic gas evolution. By labeling waste containers, you (lab personnel) are able to give your colleagues and EHS the information needed to properly and safely separate waste created by the lab.

Waste containers are properly closed

Federal law requires that all waste containers be closed at all times when not being filled to prevent unintended release of chemicals to the environment by evaporation. Failure to obey the law can result in harm to the environment and fines from the Virginia Department of Environmental Quality. Screw tops must tightly screwed on, and lids to buckets must be securely placed. Askew and missing lids are considered open.

YES ✔	NO ✘
 <p style="text-align: center; font-weight: bold;">Properly closed waste.</p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p style="text-align: center;">Do not overfill buckets. Lid must fit tight.</p> </div> <div style="text-align: center;">  <p style="text-align: center;">This bucket is missing a lid. The bag tied in a knot is not considered 'closed'</p> </div> </div>

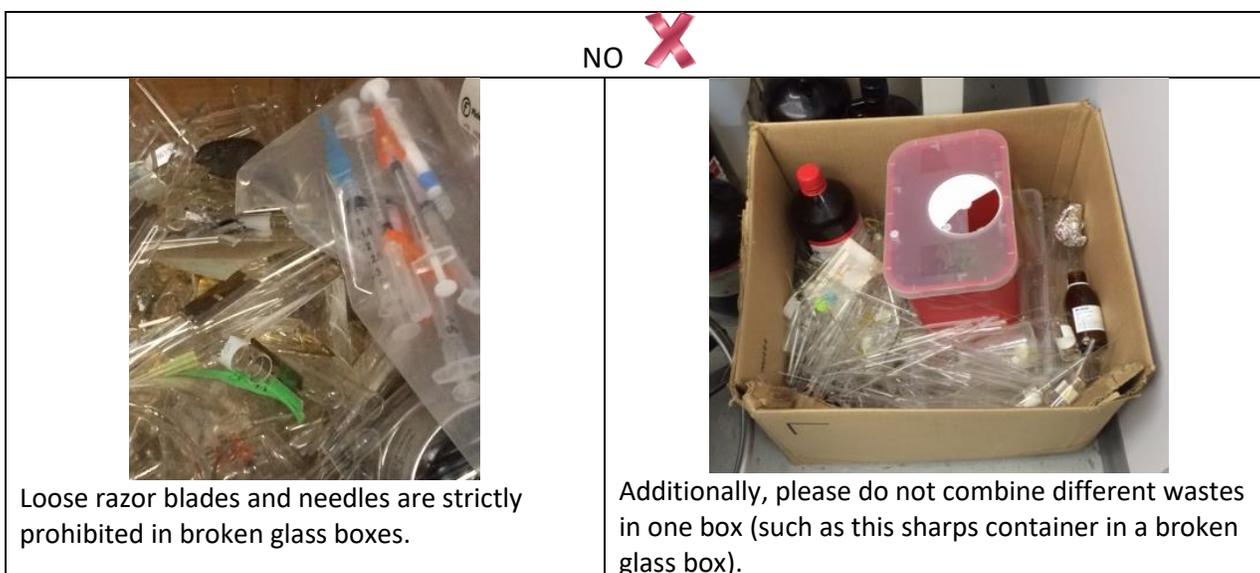
Waste is not excessively accumulated (less than ten 5- gal carboys)

Hazardous waste containers cannot exceed 55 gallons in one accumulation area. Arrange to have your waste picked up regularly. <https://researchcompliance.web.virginia.edu/wpr/>

When you place a waste pickup request, it will be picked up within 3 working days.

Glass waste is placed in a cardboard box lined with a plastic bag and has a 'waste laboratory glassware' sticker

Uncontaminated and/or broken glass, including empty reagent bottles with defaced labels, is considered conventional trash. Glass waste placed in cardboard boxes must not be contaminated, and you must not combine regulated sharps (razor blades, needles, etc.), or chemical bottles with residual liquid in a broken glass box meant for trash. Boxes must be able to be fully closed and taped for pick-up by housekeeping staff.



Sharps containers are not over-filled

To ensure safety when placing sharps into the container and when closing the container, do not over-fill. Close the sharps container when it is approximately 2/3rd full.

Satellite Accumulation Area is posted

A Satellite Accumulation Area (SAA) is simply the area in a lab or workspace where full hazardous waste containers are stored. Per regulations, it must be "near the point of generation." This is not rigidly defined, but is understood to be in the same room or series of rooms, if connected. Areas where containers reside as they are in the process of being filled are not SAAs. The SAA is the area where the containers are stored once they are full. Contact EHS if you do not have a sign and think you need one.

Hazardous Waste Satellite Accumulation Area

This sign must be posted in accordance with 40 CFR §262.34(c)(1)

Remember the Four Ls

Lid

- Close the lid except when filling, so it won't spill if knocked, or tipped over.
- Vent as necessary to prevent buildup of pressure.

Label

- Label the container "Hazardous Waste" or apply an EHS Hazardous Waste Sticker.
- Identify the hazard(s): flammable, corrosive, toxic, etc.
- Describe the contents: e.g. "methanol 50%, acetone 50%"
- Spell out names: i.e. no abbreviations, chemical formulas, chemical structures, etc.

Leaks

- Use waste containers that are compatible with their contents.
- Segregate incompatible materials.
- Use secondary containment to control leaks.

Location

- The Satellite Accumulation Area must be at or near the point of generation. Keep waste in room where it was generated.

Visit EHS online at ehs.virginia.edu (or call (434) 982-4911) to make a request for waste pickup.

Full hazardous waste containers are in SAA, where it was generated, for pickup by EHS

Place hazardous waste containers in the SAA once you have filled out the waste ticket, and have requested pick-up. Always place the waste containers in the SAA for the area (room) where the waste is generated; it is against hazardous waste regulations to move hazardous waste from one SAA to another.

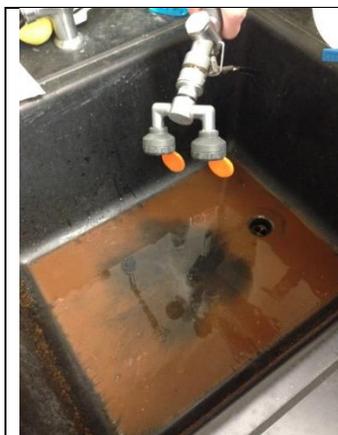
Facility

Eyewash and/or safety shower is accessible

Make sure your eyewash and safety shower is accessible so in case of an emergency you have an unobstructed path. Keep the floor directly under the showerhead free and clear. The eyewash at a sink should not be blocked with bins, carboys or glassware. You should not have to move or knock over anything in the process of accessing the eyewash.

Eyewash is flushed monthly (minimum) and record of check is kept

Verify that each eyewash operates by flushing it at least monthly, and keep a record that it is checked. EHS provides eyewash check tags for your convenience.



Pictured is water from an eyewash with no recorded flush in several months. You would not want your eyes to get a spray of murky water when it matters most. Flush often to keep the lines clear.

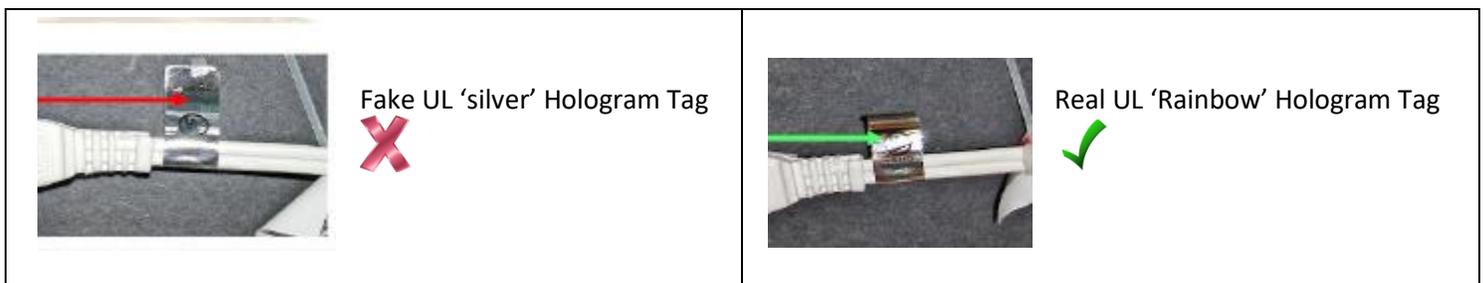
If you detect an issue with your eyewash (low flow, no flow, extreme temperature), place a work order with Facilities Management.

No extension cords are in permanent use.

Extension cords are not permitted for permanent use. If using temporarily, only use one with a built-in circuit breaker. Extension cords must be unplugged and put away when not in use, even when nothing is plugged into it.

Approved power strips are used

When using a power strip at the University, it must be UL 1363 approved for overload protection. There are limitations to the type of equipment that can be plugged into power strips. Check what power your equipment needs to avoid tripping the circuit. Be aware that there are counterfeit UL Labels! See below – look for the real Rainbow hologram tag.



No power strips are 'daisy-chained'

'Daisy-chaining', or connecting power strips in series, can create an electrical current overload resulting in a fire. It can also trip the circuit breaker resulting in equipment shut-off. The same restriction applies to extension cords; do not connect an extension cord to a power strip, or vice versa.

Laboratory equipment cords are free from damage or fraying

Make sure all electrical cords are in good condition, especially on older, portable pieces of equipment. Remove any damaged or frayed cords or plugs from service immediately and tag "do not use". A qualified electrician can replace cords; however, if this is not possible please dispose of the equipment appropriately.

Electrical panels are kept clear

Virginia State Fire Code mandates there be a 36" width and depth from floor to ceiling clearance around electrical panels. No storage of any material is allowed in this area, even if it can be easily moved.

Fire extinguishers are kept clear

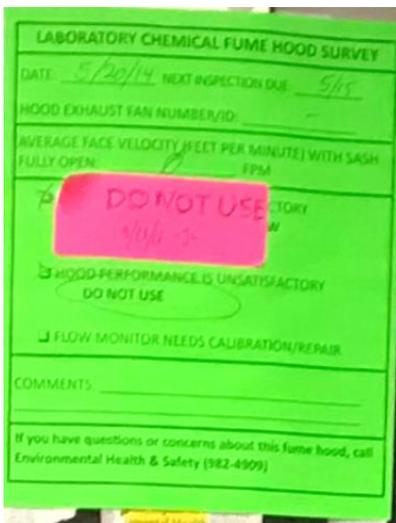
Do not allow portable fire extinguishers to be obstructed or obscured from view. They should be easily accessible in case of an emergency. No boxes, hazardous waste, cleaning supplies, etc. should be in the area around the extinguisher. Never place something on or over the fire extinguisher.

Storage clearance below ceiling is appropriate (clearance to ceiling must be: 18” for sprinklered and 24” for non-sprinklered)

The fire code prohibits the storage of combustible material less than 18” or 24” from a sprinkler head in a lab. Make sure boxes and supplies on center shelves or other lab items are the applicable distance away from the ceiling. Items stored too close to the ceiling will obstruct the spray pattern of the sprinklers in the case of activation. Storage is allowed to the ceiling along the walls of the lab as it is considered an extension of the wall.

Fume hoods are operational and certified annually

Chemical fume hoods are certified annually and should have an EHS sticker displayed confirming the hood is safe to use. If the hood is expired or has a sticker that says “do not use”, contact the EHS office for further information or go to this link: <http://ehs.virginia.edu/Chemical-Safety-Fume-Hoods.html>



LABORATORY CHEMICAL FUME HOOD SURVEY

DATE: 5/20/14 NEXT INSPECTION DUE: 5/15

HOOD EXHAUST FAN NUMBER/ID: _____

AVERAGE FACE VELOCITY (FEET PER MINUTE) WITH SASH FULLY OPEN: 170 FPM

DO NOT USE STORY at 170 fpm

HOOD PERFORMANCE IS UNSATISFACTORY DO NOT USE

FLOW MONITOR NEEDS CALIBRATION/REPAIR

COMMENTS: _____

If you have questions or concerns about this fume hood, call Environmental Health & Safety (982-4909)