Environmental Health and Safety
Fume Hood FAQ's

Purpose

The University of Idaho is Idaho's only Carnegie R1 research institution. There are over 360 fume hoods university wide. This FAQ is created to assist you with our most common inquiries. For any other information that is not covered here, please reach out to EHS at 208-885-6524 or email us at safety@uidaho.edu. A training course is also available through EHS.

1. When should I use a fume hood?

Use a fume hood anytime your work involves:

- Chemicals with a National Fire Protection Association (NFPA) Health rating of 2, 3 or 4
- Any volatile materials (chloroform, formaldehyde, etc.)
- Toxic materials
- Flammable materials
- Carcinogens or other particularly hazardous substances
- A procedure that may create an aerosol of a toxic substance
- Reactive or explosive materials or chemicals that may spatter
- Toxic gases (NH_3, CO, F_2, Cl_2, H_2S, NO_2, etc.)
- Odorous materials, both hazardous and non-hazardous, and aerosols
- SDS' indication to use a fume hood or ensure supplemental ventilation

2. Why do I have to keep the fume hood sash closed?

The sash is the shield that provides primary containment in the event of fire or other loss of containment. All fume hood sashes must be closed unless lab personnel are actively working in the hood.

When experiments may present an explosion hazard, you should use a portable blast shield inside the hood and close the sash. Fellow lab occupants should also be notified when you are performing especially hazardous procedures. Closing the sash will also reduce energy consumption. Yellow "Shut the Sash" stickers are posted on each hood to remind you.

3. Why do I have to keep the sash so low when working in the hood?

The sash, in combination with the bypass grille located above the sash, determines the airflow characteristics of the fume hood. Although the sash position does not control the volume of air that passes through the fume hood, it does control the velocity of air that enters the face of the hood. Face velocity is a primary factor affecting chemical vapor containment. The higher the sash is, the greater the risk is for loss of containment and possible lab air contamination.

4. What can I store in the hood?

In general, only ongoing experiments should be in the hood. If you must have other equipment for your experiments, make sure that it does not block the slots in the back of the hood. Try to keep equipment along the side walls and away from contaminant generation. Do not store anything that blocks the sash from closing. Fume hoods are not for long-term storage.

5. Can I work at the front edge of the fume hood?
No. The hood may not provide adequate containment of chemical use toward the front of the hood. Materials should be handled at least 6 inches deep inside the edge of the sash to ensure proper ventilation.

6. What is the "face velocity" of a fume hood?
The face of the hood is the opening where air capture takes place. Face Velocity is the speed at which air moves through the front of the face when the sash is open. It is used as an indicator of the hood's performance and is a measure of feet per minute.

7. Why is 100 fpm the target face velocity?
As you work at the hood, air is drawn in a laminar (even) flow through the face of the hood. The air velocity is one of the factors determining how well vapors and particles are captured and carried out of the lab. Containment is also affected by air foils, hood shape, configuration, equipment inside the hood, and cross drafts (foot traffic, proximity to doors and room vents).

Optimum face velocity has been found to be 80-120 linear feet per minute. At lower velocities, the fume hood may not capture and remove vapors at a sufficient rate. At higher velocities, air flow may become turbulent, producing eddies and backflows that slow the rate of removal or cause vapors to escape. A glycerol smoke test is one helpful way to visualize and verify adequate vapor containment.

8. Is it safe to use flammable chemicals in the hood if there are lights inside?
The lights installed inside fume hoods are designed to keep flammable vapors away. Newer fume hoods are designed with a high level of fire-safety in mind. Electrical equipment and other heating apparatus will increase the risk of fire. All equipment must be inspected and kept in good condition to minimize the risk of fire. Care must be exercised with all heating devices and flammable solvents, do not use open flames and carefully monitor the temperature of heating elements.

9. Can I use a stand-alone or "ductless" fume hood that does not vent to the outside?
Probably not. Fume hoods that do not vent solvents outside of the building rely on filters inside the cabinet to remove vapors and toxins from the air inside the hood before discharging into the lab. Some vapors are not completely captured by the filters and they end up in the lab. Also, contaminants build up on the filters which can become a hazard. A maintenance schedule for removing filters must be set up; this is usually done with a contractor. And of course, the filters must be disposed of as hazardous waste. EHS recommends only vented fume hoods to be used at the University of Idaho.

10. Can I use flammable or toxic chemicals in a Biological Safety cabinet?
Biosafety cabinets (BSC) are used to remove infectious agents such as microbes and spores. Air passes through a HEPA filter and back into the room. The filter removes small particles but not vapors and gases, so a BSC should not be used with chemicals (a small amount ethanol or isopropanol for decontamination is OK).

11. How are Radiation hoods different?
Use of radioactive materials requires prior approval and licensing by EHS Radiation Safety Officer. Conventional fume hoods may be used for low level radioisotope applications. Some materials such as radioactive iodine require special filters, maintenance and scheduled filter replacement.

12. Will the glass in the sash protect me from explosions?
The sash will protect you from some explosions and fires, for that reason you should keep it as low as possible. But if you are working with reactive substances or with pressurized equipment, you should keep your work behind a portable blast shield.

13. Why is the fan on the roof and not on top of the hood or inside the building?
With a fan on the roof, air is pulled through the duct inside the building resulting in lower air pressure inside the duct relative to the rest of the building. Any leaks in the duct system draw air into the duct and carry it outdoors. If the fan was on top of the fume hood or anywhere else inside the building, it would produce positive pressure inside the duct relative to the building; any leaks in the ducts would push contaminants out of the duct and into the building.

14. How can I reduce eddy currents or otherwise improve containment efficiency?
Keep lab doors and windows closed (most lab windows are sealed shut). These extra sources of inlet air can affect the performance of the hood, cause turbulent air currents in the room or cause the room to lose its negative pressure. Limit foot-traffic near hoods when in use. Pedestrian traffic or fast movement in front of hoods can cause turbulence and negatively affect the containment of the fume hood. Work at least 6 inches into the hood from the plane of the sash. This will reduce the risk of eddy currents blowing vapors back at you and will maximize fume hood containment. If hoses or cords must be inserted through the face of the hood, run them underneath the airfoil so the sash can close completely – some hoods have openings designed for the at the left or right side.

15. What should I do if the power goes out while I am working in the hood?
Lower the sash to within an inch or two so the chimney effect will keep some air flowing into the hood and contain any vapors. If there is a power outage in the building, evacuate the building immediately.

16. What should I do if I need to add exhaust ventilation to other equipment in the lab?
If you do your own ventilation work, you will compromise the efficiency of your existing system. Exhaust (HVAC) systems are balanced to maintain negative pressure inside the lab and to optimize efficiency. ALWAYS contact Facilities Management and/or EHS if your ventilation needs change. Other than changing the sash height and baffle adjustment, never make modifications to the hood without consulting with EHS.

17. How should I store gas cylinders? In the fume hood?
Toxic and flammable gases such as fluorine, arsine, phosphine, silane, phosgene, hydrogen selenide and nickel carbonyl should be used in an approved gas storage cabinet. Other gases such as

hydrogen chloride and ammonia should be used only in a fume hood. Check with EHS for help installing the right specialty cabinet.

18. What should I do if the fume hood alarm keeps going off?

- Stop all experiments
- Close hood sash completely.
- Call Facilities Management to let them know that the hood alarm is going into "Alarm" mode. Make sure to tell them the building, room number and the hood number.
- Call EHS at 208-885-6524 to let them know as well.

19. Is it OK to have a sink in the hood?

Small sinks (called cup sinks) can be in a hood, but this adds to the risk of chemicals going down the drain. You will probably be working with open chemical containers next to a drain that needs to be protected from chemical releases. To help keep your chemicals out of the environment, all cup sinks must have a raised edge lip that is at least 3/8" high.

20. Is it OK to remove the service panels located on each side of the hood's interior in order to run hoses, electrical cords, etc. into the fume hood?

No. If the service panels are removed, the hoods capture efficiency is greatly compromised because the hood exhaust can now move through the service panel opening and out into the lab.

21. Who certifies fume hoods at the university? And who maintains them?

EHS personnel certify every fume hood at the university annually using calibrated equipment. EHS personnel will install a new re-certification label on the fume hoods, usually located near the 17- or 18-inch-high sash stopper (if present). Facilities' HVAC Shop repairs all fume hoods on Moscow campus. All other extension centers should hire a local service provider to maintain and repair their hoods.

22. Who cleans my fume hood?

Lab users, not custodial services, are responsible for cleaning their fume hood. Water and a mild detergent is recommended for cleaning general dust, dirt, rust and other non-hazardous debris from surfaces within the fume hood.

23. Why is it important to evacuate a building when the fume hood ventilation system is not working? What are the hazards?

Chemical fume hoods function as the primary engineering control within a chemical hygiene program by capturing and exhausting hazardous airborne contaminants from laboratories. As an R1 research institution, the University works with chemicals that may be toxic, carcinogenic, flammable, explosive, combustible, reactive, or otherwise hazardous. If a fume hood ventilation system fails, these hazards can no longer be effectively contained.

- **Loss of Containment:** Without negative pressure and airflow into the hood, toxic, flammable, or corrosive vapors can escape from the hood and enter the laboratory environment.

- **Chemical Exposure:** Laboratory personnel may be exposed to harmful airborne contaminants through inhalation, potentially resulting in acute health effects, chronic illness, or exposure to carcinogens.
- **Backdrafts:** Changes in building pressure can create backdrafts through inactive exhaust ductwork, allowing contaminated air, chemical residues, or outside pollutants to be pushed back into occupied spaces.
- **Fire and Explosion Hazards:** Flammable vapors may accumulate in the laboratory when exhaust ventilation is lost. Increasing vapor concentrations can create an ignitable atmosphere, significantly increasing the risk of fire or explosion from ignition sources such as electrical equipment, static discharge, or open flames.
- **Unknown Air Quality Conditions:** During a ventilation failure, it is often impossible to determine the concentration and distribution of airborne contaminants without specialized monitoring equipment. Evacuation minimizes the risk of exposure until the ventilation system has been evaluated and restored to safe operation.