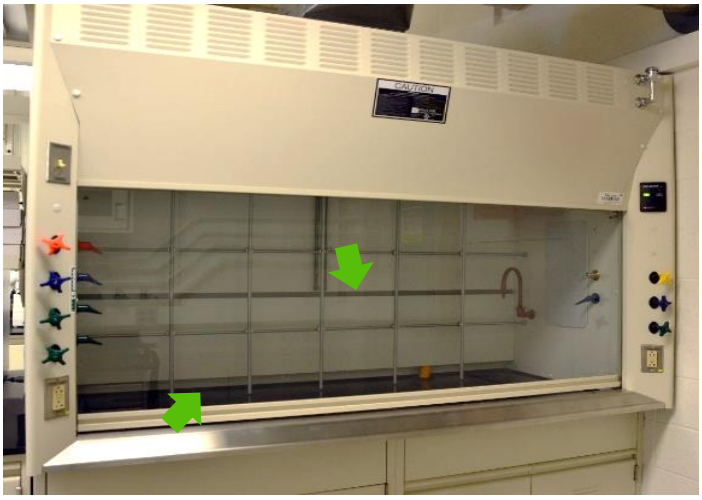
Fume Hood Operation and Safe Work Practices

Chemical Hygiene Plan

Fume hoods are the most important engineering control when working with hazardous chemicals in the laboratory. Fume hoods work by drawing air from the laboratory into the hood and exhausting the air through a slot(s) at the back of the hood and into the laboratory exhaust ductwork. The green arrows in the picture below show the slots at the back of the hood.



Fume Hood Operation

Face Velocity

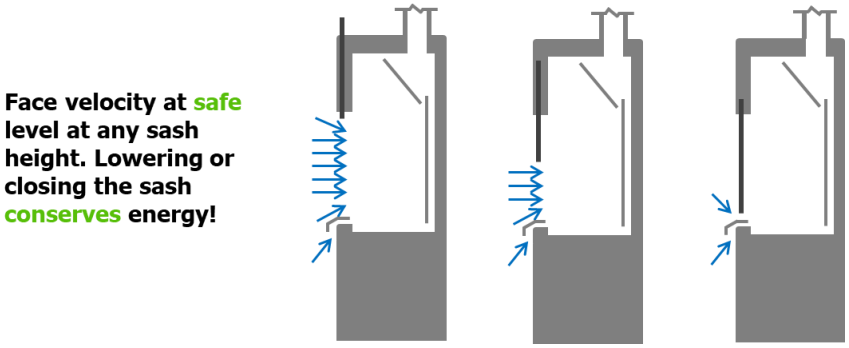
Face velocity is defined as the average velocity of air at the sash opening of the fume hood. A proper face velocity is important to ensure containment of the contaminants. Standard fume hoods are designed to operate at a face velocity of approximately 100 feet per minute (fpm). If the face velocity is too high or too low, contaminants may escape the fume hood and enter the laboratory. (Newer high efficiency low flow (HELF) fume hoods are designed to operate at a lower face velocity of approximately 60 fpm.)

Types of Fume Hoods

There are two types of fume hoods systems, constant volume and variable air volume:

Constant volume (CV) hoods exhaust the same amount of air regardless of the sash height. As the sash is raised and lowered, the face velocity changes. CV hoods have a label on the fume hood indicating the safe sash height, typically 18 inches.

Variable Air Volume (VAV) hoods vary the air flow to maintain a constant face velocity regardless of the sash height.



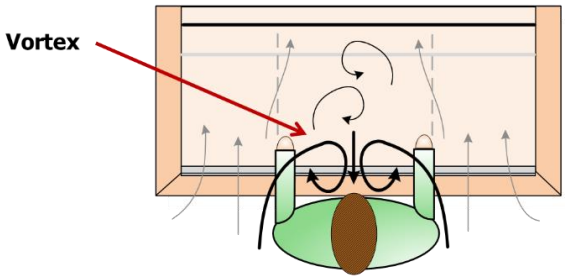
Fume Hood Monitoring Devices

Fume hoods are equipped with monitoring devices that continuously measure the air flow. The monitor has an audible and visible alarm that will activate when the air flow is too low or too high. If the fume hood alarm activates, check the sash height to make sure it is at the proper height as indicated on the label. If the alarm is still sounding, discontinue use of the hood, close the sash, post an “Out of Order” sign on the sash, and place a work order for repair. Never use a fume that is not working properly, and never permanently mute or disable the alarm.

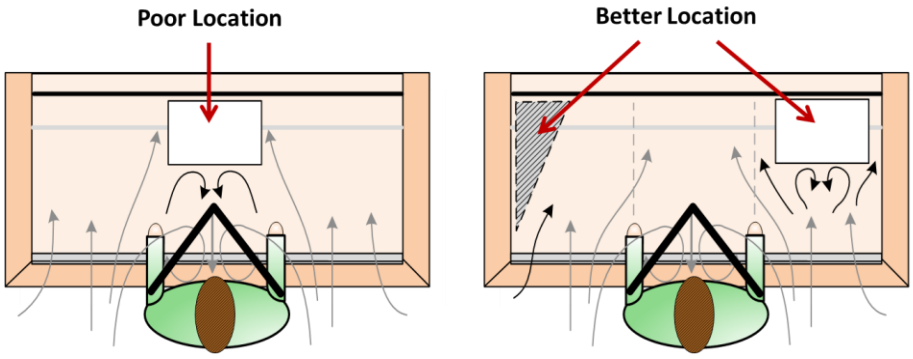
Fume Hood Safe Work Practices

Fume hoods must be properly used and maintained to provide protection. The following work practices will help ensure the maximum protection:

1. **Understand Uses and Limitations of Fume Hoods:** Use a fume hood for working with volatile hazardous chemicals and/or processes that generate aerosols or gases. **Do not** use a fume hood for:
    - Biological materials: Use a biosafety cabinet for work with infectious agents.
    - Pyrophoric or highly toxic materials: Use a glove box for working with these materials.
    - Processes that generate larger amounts of particulate: Particulate may be too heavy to get entrained in the air flow and may not be properly exhausted. Use local exhaust designed to capture particulate.
    - Perchloric acid or acid digestion:
        - Perchloric acid vapors can settle on ductwork and form explosive perchlorate crystals. Use a specialized hood with a washdown system.
        - High concentrations of acids will corrode a fume hood and ductwork. Use a specialized polypropylene hood that will not corrode for acid digestion.
2. **Verify Fume Hood Function:** Always verify that the fume hood is functioning properly before using.
    - Check to make sure the fume hood is not in alarm.
    - Check that the air if flowing into the hood. A Kimwipe may be used to verify air flow direction.
3. **Position Work Appropriately:**
    - Work as close to the center of the hood as possible and at least 6 inches back from the sash opening. A vortex forms in front of your body that can cause contaminants to flow out of the hood.



    - Large equipment can create vortexes and can block the slots used to exhaust the air, which can cause contaminants to flow out of the hood. Position large equipment to the side when possible and place equipment on blocks to prevent it from blocking the back slot.



4. **Place Sash at Proper Height:** Position the sash at the proper height indicated by the label, typically 18 inches. Close the sash when the fume hood is not being used or when there is an unattended experiment in the hood. For unattended experiments, place a notice on the sash with an emergency contact number and hazard information.
5. **Maintain Air Balance:** Keep laboratory doors closed and limit movement in front of the hood to maintain proper air balance in the room and prevent turbulence that can affect the hood's operation.
6. **Practice Good Hood Housekeeping:** Do not overload the hood or use the hood for storage. Overloading a hood can cause the back slot to be blocked and does not leave sufficient room to work safely in the hood. Always clean up spills in the hood promptly.
7. **Protect Yourself from Exposures:**
    - Wear appropriate PPE while working in a fume hood. Fume hoods do not completely contain the experiment, and incidents can occur in a fume hood that lead to skin and eye exposure.
    - Never place your head inside a fume hood while working with hazardous chemicals.
8. **Respond Properly to Fire in a Fume Hood:** If there is a fire in a fume hood, close the sash if it is safe to do so, evacuate the lab, and call 911 immediately to report the fire.