



Proper Use of a Chemical Fume Hood

Standard Operating Procedure

1. Purpose

This Standard Operating Procedure (SOP) defines proper work practices when using a chemical fume hood. When used correctly, a chemical fume hood can help prevent exposure to hazardous chemicals; when it is not used within its manufacturer specifications and parameters, it may not provide adequate protection against exposure. If you have any questions concerning the applicability of any item listed in this procedure, contact your Approval Holder (AH), Approval Safety Coordinator (ASC) or facility coordinator, or the Research Laboratory & Safety Services (RLSS).

2. Scope

Ideally, chemical fume hoods should be used when working with any hazardous chemicals in the laboratory. A chemical fume hood must, however, be used whenever particularly hazardous chemicals (i.e. select carcinogens, developmental and reproductive toxins and chemicals with a high degree of acute toxicity) are being manipulated or when hazardous vapors, mists, aerosols or gases are being used or created during a procedure. A chemical fume hood may also be used for the storage of lecture bottle-sized cylinders of hazardous gases (e.g. gases with a National Fire Protection Agency [NFPA] health rating of 3 or 4).

3. Chemical Fume Hood Requirements

Chemical fume hoods must be used according to manufacturer specifications. Some hazardous chemicals may require the use of a specialized or modified chemical fume hood (e.g. perchloric acid). Do not modify the chemical fume hood from its manufactured settings (i.e. drilling holes into the cabinet, resetting blast gates, etc.) unless your specific modification has been assessed and approved by the RLSS. Though manufacturer specifications may change slightly from hood to hood, some basic principles are the same and must be used in University laboratories.

- The fume hood must be certified annually by UA Facilities Management (FM) or a contracted vendor (i.e. for some satellite locations). A certification label must be present on the front of the fume hood, including the date of the last certification.
- The majority of chemical fume hoods should be functioning at a minimum of 100 linear feet per minute (fpm), though some high performance low-flow fume hoods also exist. Often, the certification label will include a mark for the fume hood sash height at which this minimum face velocity is reached. If you are unsure if a fume hood is functioning at an adequate face velocity, contact the RLSS to perform face velocity measurements.
- When a highly toxic or corrosive gas is being stored in the chemical fume hood, the face velocity should be maintained at 200 fpm.
- The fume hood light, alarm and sash should be fully functional at all times.
- Chemical fume hoods should not be plumbed into publically owned treatment works; those with sinks should be disconnected from the drain or guarded against accidental spills.
- There are two main types of chemical fume hoods: those with a vertical sliding sash and those with a horizontal sliding sash, as illustrated in Figure 1. Different certification and use procedures are necessary for each type of fume hood.

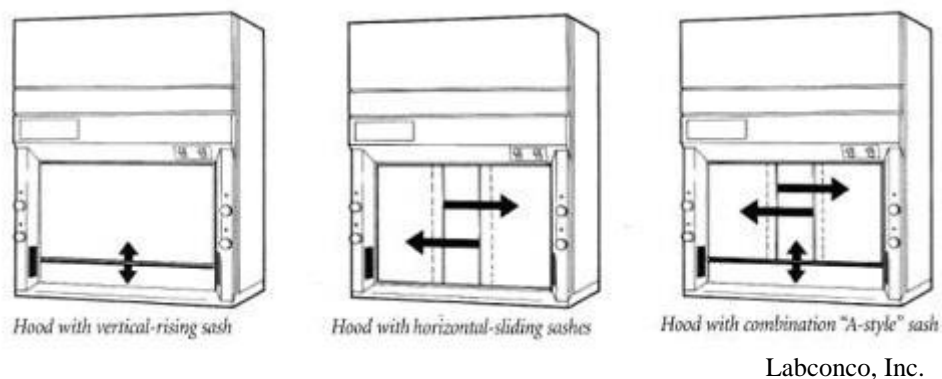


Figure 1: Illustration of the types of chemical fume hood sashes.

4. Proper Fume Hood Practices

Work must be performed with the sash at or below the mark at which the fume hood was certified. This level is typically identified by an arrow on the certification label or a line drawn in permanent marker. When working with a chemical fume hood with a vertical sliding sash, you should work with the sash at its lowest possible position, while still allowing for comfortable working conditions. When working with chemical fume hoods with horizontal sliding sashes, workers should work with their arms around a panel of the horizontal sash. If this is not possible or causes difficulties in performing experimental actions, modifications may be made by the manufacturer (e.g. narrowing the width of each horizontal sash panel) or other shielding methods may be used to allow for adequate protection. Contact the RLSS for further information.

To allow adequate airflow and protection against hazardous fumes, mists, vapors, dusts, etc., all work must be performed at least 6 inches inside of the hood. Some chemical fume hoods have a stainless steel bar installed on the outside of the fume hood, which forces workers to stand 6 inches from the hazardous chemical work. Contact the RLSS to obtain prior written approval for the removal of this bar if it prevents practical/safe work practices. The importance of working six inches within a chemical fume hood is illustrated in Figure 2.

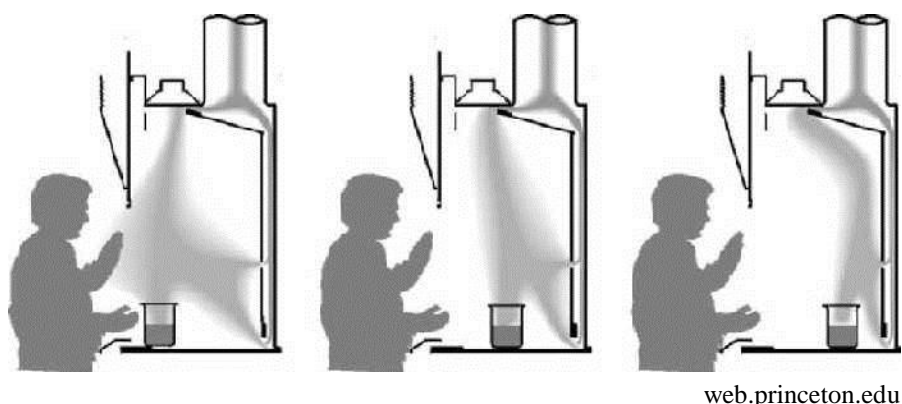
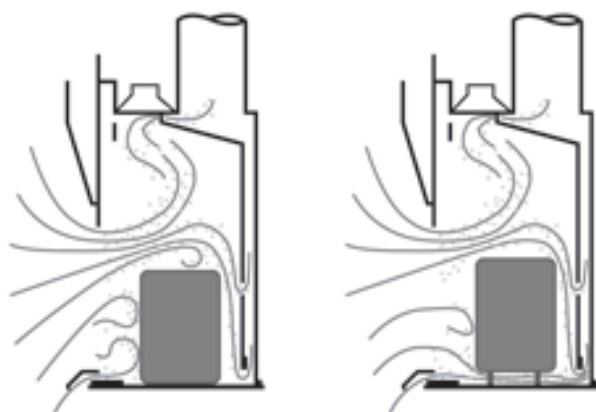


Figure 2: Containment of vapors in a chemical fume hood as a function of working distance.

The fume hood sash should be lowered completely when it is not in use, especially during unattended reactions.

Do not store hazardous chemicals or other items inside of a chemical fume hood, unless they require ventilated storage. The more objects present in a chemical fume hood, the less effective the air flow is in protecting workers against hazardous chemicals. If items, such as hot plates, shaker tables or other equipment required for the reaction, must be placed in a chemical fume hood, place them on a stand to allow airflow underneath, as shown in Figure 3. Contact the RLSS to verify the fume hood's performance after adding large objects or shielding into a hood, or if a degradation of normal airflow is suspected.



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Figure 3: Obstruction of air flow by objects in a chemical fume hood.

5. Malfunctioning/Uncertified Chemical Fume Hood

If the chemical fume hood alarm sounds, immediately discontinue work, close the fume hood sash and reset the alarm. Verify the alarm settings; if the fume hood alarm system is functioning properly (e.g. it is not set to a low face velocity such as 10 fpm), contact the Facilities Management HVAC group at 520-621-3000 to inform them of the alarm if you are on the main campus. If the fume hood is at a UA satellite location, inform your facility coordinator and facility ventilation contractor of the fume hood alarm.

If the chemical fume hood is not functioning properly (e.g. lighting malfunction, strange noises coming from the fume hood, face velocity is below 100 fpm, the sash will not move properly, etc.) or is overdue for recertification, contact the FM HVAC group (main campus) or your facility coordinator and facility ventilation contractor (satellite locations) to schedule maintenance of the chemical fume hood.