

### 3.3. Chemical Fume Hoods – Procedures for Proper and Safe Use

Chemical fume hoods are one of the most important items of safety equipment present within the laboratory. Chemical fume hoods serve to control the accumulation of toxic, flammable, and offensive vapors by preventing their escape into the laboratory atmosphere. In addition, fume hoods provide physical isolation and containment of chemicals and their reactions and thus serve as a protective barrier (with the sash closed) between laboratory personnel and the chemical or chemical process within the hood.

- A chemical fume hood must be used for any chemical procedures that have the potential of creating:
  1. Airborne chemical concentrations that might approach Permissible Exposure Limits (PELs) for an Occupational Safety and Health Administration (OSHA) regulated substance. These substances include carcinogens, mutagens, teratogens, and other toxics. PELs are found in [1910.1450, Appendix A](#). The OSHA Select Carcinogens and examples of reproductive toxins are found in Appendix B of this document.
  2. Flammable/combustible vapors approaching one tenth the lower explosive limit (LEL). The LEL is the minimum concentration (percent by volume) of the fuel (vapor) in air at which a flame is propagated when an ignition source is present.
  3. Explosion or fire hazards.
  4. Odors that are annoying to personnel within the laboratory or adjacent laboratory/office units.
- Vertical fume hood sashes can be used in three positions: 1) closed, 2) the operating height (or half open), and 3) the set-up position (or fully open).
- Hoods must be closed when unattended.
- The sash opening must be positioned no higher than the operating height (or half open) when the hood is being used with chemicals present or when chemical manipulations are performed. Place the sash in front of the face to protect the persons breathing zone near the nose and mouth from chemical contaminants released within the fume hood. When working with hazardous chemicals, the hood sash should always be positioned so that it acts as a protective barrier between laboratory personnel and the chemicals.
- The set-up position (fully open) is only used to place equipment in the hood when no chemicals are present. Do not fully open the sash when chemicals are present.
- Sliding horizontal sash panels are used with one panel placed in front of the face and arms reaching around the sides to perform manipulations. Do not slide the panels laterally exposing the face to the interior of the hood with chemicals present.
- Hood baffles or slots should be positioned properly if available. The top baffle/slot should be opened when chemicals with a vapor density of less than 1 (lighter than air) are used. The bottom baffle/slot (if available) should be opened when chemicals with vapor densities greater than 1 (heavier than air) are used.
- Chemicals and equipment (apparatus, instruments, etc.) should be placed at least 6 inches (15 cm) from the front edge of the hood.
- Equipment should be placed in the center of the working surface in the hood. Do not place materials at the front of the working surface because it will block the slot under the air foil sill at the front. Do not place materials at the back of the working surface because it will block airflow to the lower slot under the baffle in the back. Separate and elevate equipment by using blocks or lab jacks to ensure that air can flow easily around and under the equipment.
- Chemical fume hoods must be kept clean and free from unnecessary items and debris at all times. Solid material (paper, tissue, aluminum foil, etc.) must be kept from obstructing the rear baffles and from entering the exhaust ducts of the hood.

- Minimize the amount of bottles, beakers and equipment used and stored inside the hood because these items interfere with the airflow across the work surface of the hood.
- Chemicals should not be stored in a hood because they will likely become involved if there is an accidental spill, fire or explosion in the hood, thus creating a more serious problem. Fume hoods are not flammable cabinets and do not offer fire protection for materials stored inside.
- Sliding horizontal sash windows must not be removed from the hood sash.
- Laboratory personnel must not extend their head inside the hood when operations are in progress.
- The hood must not be used for waste disposal (evaporation).
- Hoods should be monitored daily by the user to ensure that air is moving into the hood. A small piece of thread, yarn, or small piece of Kimwipe® can be taped to the hood sash as a visual indicator that the hood is pulling air. Any hoods that are not working properly must be taken out of service and reported to Facility Services/Physical Plant (FS/PP) and University Environmental Health and Safety for your respective campus ([see Laboratory Safety Contacts](#)). IUEHS is responsible for evaluating chemical fume hoods annually.
- Perchloric acid digestions and other procedures using perchloric acid at elevated temperatures must not be performed in standard chemical fume hoods. Specially designed perchloric acid fume hoods must be utilized for this purpose. Call IUEHS for your respective campus for more information.