Guidance on the Use of Fume Hoods at Tufts University

Fume hoods are also called laboratory hoods. However, biological safety cabinets are often mistakenly called “hoods” or “tissue culture hoods,” they are cabinets.

Containment, Decontamination and Ventilation

There are three primary differences: containment, decontamination and ventilation. Containment is defined as a room designed to prevent the spread or release of hazardous airborne materials outside the room by special walls, floors, ceilings and doors under normal and emergency conditions such as fire. Decontamination is the ability to remove hazardous materials from the surfaces of the room, supplies and equipment including chairs and desks. Ventilation is the planned supply and removal of air from a space or room. Laboratory ventilation accomplishes four objectives:

1. The laboratory operates such that air flows into the laboratory from adjoining areas such as the hallway. More air is removed from the room than is supplied.

2. All the air that enters the laboratory is exhausted and is not recycled or allowed to reenter the building. This is referred to as 100% exhaust.

3. The amount of air exhausted can result in 4 to 12 complete room air changes per hour that dilute air contaminants produced during experiments on the open bench or from equipment and other operations outside the fume hood.

4. Much, if not all the air is exhausted through fume hoods that are designed to contain hazardous air contaminants under normal and emergency conditions.

Determining Fume Hood Use

The simple answer is that any procedure that results in the production of air contaminants that are toxic, flammable, corrosive, irritating or have nauseating odors should be conducted in a fume hood. In addition:

Use a fume hood when handling any amount of powders, liquids or gases with a Threshold Limit Value (TLV), Recommended Exposure Limit (REL) or Permissible Exposure Limit (PEL) of less than 5 ppm or 0.2mg/M3 or if the chemical has an Oral Lethal Dose of 50% (oral LD50) in rodents of 50 mg/kg or less (this would be a toxin/poison).

Note: This information is in Section 8 and 11 of the Safety Data Sheet.

Use a fume hood when handling more than 500 mL of any liquid or gas with a TLV or PEL between 5 and 50 ppm or powders between 0.2 and 2 mg/M3. A chemical will evaporate or become airborne if it has a vapor pressure of 25 mmHg at room temperature (20C) or if it is heated or sprayed as a mist.

Note: This information is in Section 8 and 11 of the Safety Data Sheet.

Use a fume hood when using all other high hazard chemicals as outlined in the Tufts Chemical Hygiene Plan.

General Fume Hood Procedures

In addition to the above, the following general rules should also be followed when using fume hoods:

1. Review the Safety Data Sheet for the chemical you plan to use so that you understand the hazards and have confirmed the fume hood is an adequate control measure.

2. Review how to properly use a fume hood with your Supervisor beforehand to make sure you understand how it functions. Reference the fume hood manufacturers' instructions.

3. Do not store large volumes of chemicals, waste, supplies or other material in a fume hood unless they are actively being used. Move chemicals in and out as they are used or designate a specific hood for only chemical or chemical waste storage.

4. Do not store equipment in a fume hood. The larger the equipment, the more air turbulence is created thus a chance for eddy currents to be formed allowing air to be circulated outside the sash into the breathing zone of the user and the laboratory. If equipment is needed, using sturdy blocks, raise at least 1-inch above the work area of the fume hood to allow airflow under the equipment.

5. Do not alter the construction of a fume hood such as installing shelving. If ventilated chemical storage is needed, use a ventilated storage cabinet.

6. Check to make sure the fume hood has been tested within 12 months.

7. Perform operations at least 6-inches from the sash inside the fume hood. A piece of tape will remind the user of the 6-inches line. Note: Some fume hoods have built-in secondary containment defining the 6-inches.

8. Minimize air currents at the face of the fume hood by reducing foot traffic, door closures, fans and fast side movements of the arms.

9. Work with the sash at a safe height by not exceeding the approved sash height/placement. Note: there is a sticker on the frame of the sash noting the correct sash height/placement.

10. Check the flow indicator at various times to ensure that air is being drawn into the fume hood. This could be mechanical, electrical or a simple piece of Kimwipe (thin paper) hanging from the sash indicating air flow operation and direction. The user should understand the alarm system operation that notifies the user of improper airflow in the hood and to stop all work if this alarm is not working.

11. Perform operations while viewing through the glass sash. This provides secondary eye and face protection to supplement safety glasses or goggles and maintains correct airflow

through the opening. Note: Protective eyewear, gloves and coats should be worn when using a fume hood.

12. Never place your head into the fume hood.

13. Prevent liquid spills into the cup sink in the fume hood by sealing the drain with a temporary cap to prevent the release of chemicals into the drain system.

14. Close the sash when the fume hood is not in use.

Note: Additional rules for the use of radioactive materials are in the Tufts Radiation Safety Manual.