Basic Laboratory Equipment Safety:
Fume Hoods at UTIA

What is a chemical fume hood?

A chemical fume hood is a type of local ventilation device that is designed to limit exposure to hazardous or toxic fumes, vapors, or dust. A fume hood is typically a large piece of equipment enclosing five sides of a work area, the bottom of which is most commonly located at a standing work height.

What is the purpose of a fume hood?

Chemical fume hoods, when used properly, are one of the most reliable engineering controls in the laboratory. They protect personnel by:

- Containing vapors, dusts, gases, and fumes generated within the hood, and removing them as air flows into the hood and then out via the laboratory exhaust system
- Contributing to laboratory ventilation as air flows through the hood
- Shielding the worker with a clear sliding window, called a sash, that contains aerosols and prevents injury from splashes, fires, or minor explosions that may occur inside the hood

What are the different types of fumes hoods at UTIA?

There are two kinds of fume hoods in use at UTIA:

- **Constant air volume hoods:** The constant air volume (CAV) fume hood exhausts the same amount of air all the time, regardless of sash position. As the sash is lowered and raised, the velocity at the face of the hood changes. EH&S tests all hoods regularly and marks the opening that gives the correct face velocity (see image at left) on constant air volume hoods.
- **Variable air volume hoods:** Some newer models, called variable air volume (VAV) hoods, modulate air flow based on sash height and maintain 100 feet per minute face velocity at all sash heights. The UTIA Safety Office tests VAV hoods, but does not mark the sash height since it's always 100 feet per minute.

  VAV fume hoods are equipped with flow sensors that activate an audible alarm when malfunctions occur.

What are the basic measures to take prior to using a fume hood at UTIA?

Before beginning work in a chemical fume hood do the following:

- Confirm the fume hood has been certified by the UTIA Safety Office within the last 12 months. If the date on the certification sticker is more than 12 months, contact the UTIA Safety Office
- Confirm the fume hood monitor is functioning properly - both visual and audio components indicate normal operation. If either the visual or audio component appears to be in alarm mode, contact the UTIA Safety Office and Facilities Services. Stop all work in the hood until the problem is corrected.
- Confirm air is flowing into the hood before use. Air flow can be checked by simply taping a strip of tissue (Kim-wipe) onto the sash. The tissue will serve as a visual indicator of air flow.

What are the standard work practices for using a fume hood at UTIA?

The determination that a hood is necessary for a particular process should be based on a hazard analysis (discussed in the PPE Module) of the process under consideration. Such an analysis would include a review of the physical characteristics, quantity, and toxicity of the materials to be used, the volatility of the materials present during the procedure, the probability of their release, and the number and sophistication of manipulations, etc. More subjective factors such as the skill and expertise of the individual performing the work should also be considered.

The protection afforded by a fume hood is only as good as the work practices of the hood user. The following are general guidelines to be followed when working in the hood:

1. Know the toxic properties of the chemicals with which you work. Be able to identify signs and symptoms of overexposure. Refer to the Chemical Hazard Communication module for more information on chemical hazards.
2. Mark a line with tape 6 inches behind the sash and keep all chemicals and equipment behind that line during procedure. This will help to keep vapors from escaping the hood when air currents from people walking past the hood, etc. interfere with air flow at the face of the hood.
3. Keep the sash completely lowered anytime "hands-on" experiments are not in progress or whenever the hood is on and unattended.

4. Never utilize the hood unless there is some indication that the hood is operating. A tissue taped to the sash or inside the hood provides a good indicator of air flow.
5. Check the electronic gauge reading (if equipped) and compare it with the reading documented on the hood inspection sticker. If the reading differs significantly from that on the sticker, the hood may not be operating sufficiently.
6. The hood is not a substitute for personal protective equipment. Wear gloves, safety glasses, etc., as appropriate.
7. Visually inspect the baffles (openings at the top and rear of the hood) to be sure the slots are open and unobstructed.
8. Do not block baffles. If large equipment is in the hood, put it on blocks to raise it approximately two inches so that air may pass beneath it.
9. Do not use the hood as a storage cabinet. Keep only the materials necessary for the procedure inside the hood.
10. Keep the sash clean and clear.
11. Clean all chemical residues and spills from the hood chamber after each use.
12. All electrical devices should be connected outside the hood to avoid sparks which may ignite a flammable or explosive chemical.
13. DO NOT USE A HOOD FOR ANY FUNCTION FOR WHICH IT WAS NOT INTENDED. Certain chemicals or reactions require specially constructed hoods. Examples are perchloric acid or high pressure reactions. Most special use hoods are labeled as to the uses for which they are designed. If you have any questions about the capabilities of a particular hood, contact the UTIA Safety Office.
14. Lab personnel should not place their upper body in the fume hood except during initial setup of equipment inside the hood, before any hazardous materials have been placed inside the hood.
15. The hood sash or panels should be lowered to the lowest (comfortable) working height, usually 18”. Fully opening the sash may lower the face velocity to the point of ineffectiveness.
16. Keep the air foil along the front bottom edge of the fume hood in place at all times. Removing the air foil or altering its position can seriously impact the proper air flow of your fume hood. *Do not block airfoil:* Many labs place absorbent paper on the floor of the hood and over the airfoil to catch spills. The airfoil provides airflow across the floor of the hood, especially when the sash is closed. If you use absorbent paper in the hood, please do not block the airfoil.
17. Avoid allowing electrical cords or hoses to impede the proper functioning of the bottom air foil or sash.
18. Avoid creating cross-drafts or air currents near the hood. They'll pull contaminated air out of the hood and into the breathing zone. Air currents can be caused by:

    - Air ventilation in the room

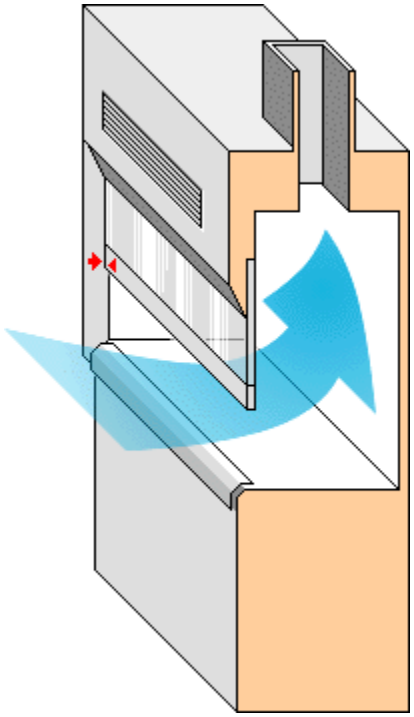
- Open doors or windows
- People walking by the hood
- Rapid arm or body movement

19. Keep the sash closed as much as practical for increased safety and for energy conservation.
20. Do not use the hood to evaporate unwanted solvents or spills.

What are the basic operating guidelines for using a fume hood at UTIA?

To maximize hood effectiveness and minimize personal exposure to toxic vapors or gases, use fume hoods in accordance with these operational guidelines:

Operate the hood at the proper sash height, as indicted on the UTIA Safety Office certification sticker located on the front of the hood. For variable air volume or bypass hoods sash heights will not be posted. These hoods should maintain the velocity (indicated on the label) at any sash height, but sashes should be lowered to a position where they can provide additional protection from splashes, sprays, and fires.



Minimize release of contaminants into the work area by reducing pedestrian traffic in front of hoods, particularly during hazardous experiments. Also minimize nearby disturbances, such as doors opening or closing, people walking by, and any quick motion in order to prevent cross drafts.
Do not position fans or air conditioners so as to direct airflow across the face of the hood. This can interfere with airflow and containment of hazardous chemicals.