USE AND SAFE OPERATION OF CHEMICAL FUME HOODS

Policy

Environmental Health and Safety (EH&S) shall certify all horizontal/vertical chemical fume hoods and provide assistance in purchasing and system design of new hoods.

Authority and Responsibility

***Environmental Health and Safety* is responsible for:**

1. Providing information to users on guidelines and operating procedures for safe use of fume hoods;
2. Inspecting sashes, lights, service fixtures and the interior of fume hoods;
3. Conducting annual face velocity measurements;
4. Labeling fume hoods with certification stickers for those passing certification;
5. Labeling fume hoods with warning signs for those failing certification;
6. Submitting work requests to Facilities Management Department (FMD) for fume hoods failing certification requirements during annual laboratory reviews; and
7. Conducting follow-up face velocity measurements on fume hoods failing initial fume hood certification requirements.

***Principle Investigators* are responsible for:**

1. Reinforcing operating procedures and safe use information to fume hood users;
2. Conducting periodic spot checks to ensure proper fume hood operation and usage;
3. Coordinating modifications, maintenance, repair, and new equipment needs with Environmental Health and Safety and Facilities Management Department; and
4. Contacting Environmental Health and Safety to arrange for testing of fume hoods suspected of not operating properly.

***Facilities Operations* is responsible for:**

1. Performing preventive maintenance on fans, ductwork, filters, and fume hoods;
2. Performing repairs and maintenance identified by annual laboratory reviews or by users;
3. Notifying Environmental Health and Safety and coordinating with users when fume hoods must be turned off for repair, maintenance, or other operations; and
4. Notifying Environmental Health and Safety following repairs of fume hoods failing initial fume hood certification requirements for follow-up face velocity measurements.

Fume Hood Requirements

Velocity Requirements

The recommended minimum face velocity used at Central Washington University is 100 feet per minute (fpm) at a minimum sash height of 18-inches. The fan system shall be able to accommodate all fume hoods on the same fan system opened to 18-inches while still achieving 100 fpm face velocity.

Hoods shall ventilate by a dedicated exhaust fan with ducts leading directly from the hood to the roof. Horizontal ducts shall be pitched down to prevent accumulations of vapors in low spots. Duct velocities shall be maintained high enough to minimize the trapping of vapors in the exhaust system. Terminal exhaust points shall be located at least 25-feet from any possible air intake (e.g., air intake grills, doors, operable windows) and positioned at a height that allows adequate dispersion of fumes.

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General Information

A newly installed or modified hood exhausting vapors from a continuing process that is left unattended shall have an air flow switch connected to a visible and audible warning device which is tripped when the flow rate is detected outside of the programmed parameters.

Appropriate safeguards shall be provided for flammable and explosive agents vented through the hood (e.g., explosion-proof motors and control, scrubber units, biohazard filters).

Note: The use of perchloric acid is prohibited unless the hood has been designed for its specific use and manipulation.

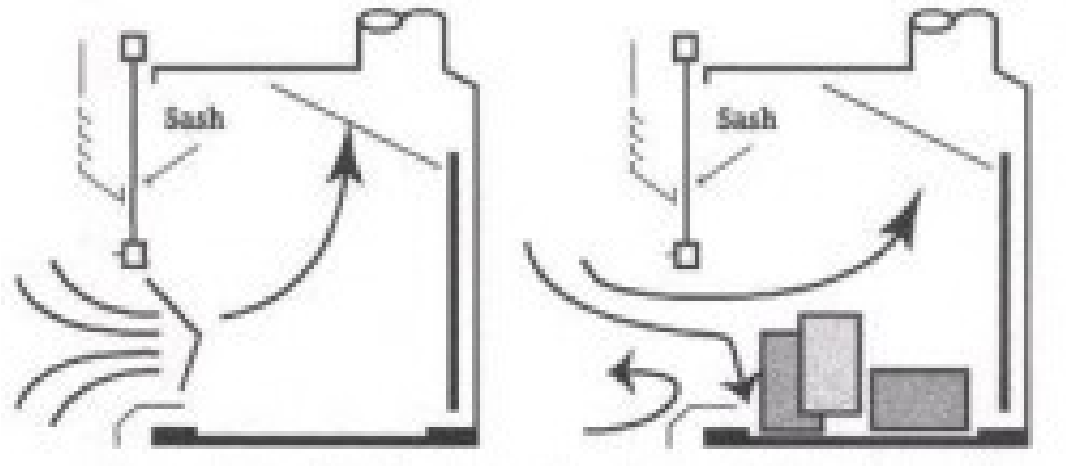
Certification

All fume hoods shall be inspected and certified annually to determine a proper face velocity of 100 fpm for regular fume hoods and 70 fpm for high-efficiency fume hoods. The airflow into and within the fume hood shall not be excessively turbulent (anything above 150 fpm). These fume hoods shall be checked by representatives from Environmental Health and Safety on an annual basis during laboratory safety reviews. All fume hoods functioning properly shall have a certification label affixed to the left of the sash opening indicating that the fume hood was certified. Any fume hood not working properly shall have a yellow sign affixed to the sash prohibiting its use until serviced. Environmental Health and Safety shall submit a work order to Facilities Management Department for fume hoods failing certification requirements during laboratory safety reviews.

Hood Usage

When using a fume hood, the following considerations shall apply:

1. Fume hoods shall not be used to store chemicals or other materials;
2. Stored materials cause disruption to airflow patterns within the hood and pose a risk to the user. See diagram of airflow patterns through empty and cluttered fume hoods;



Demonstration of airflow patterns through empty & cluttered fume hoods.

3. Avoid potential exposures by not putting any part of your body, with the exception of hands and forearms, into the fume hood;
4. During manipulation and operation within the fume hood, sashes shall be kept at the certification buffer wedge height to ensure proper air flow and protection of the user;
5. When fume hoods are not being used, fully lower the sash to offer protection from experiments inside the hood;
6. Filters shall be maintained as recommended by the manufacturer;
7. If any fume hood is suspected of not operating properly, discontinue use and contact Environmental Health and Safety at 509-963-2338 to arrange for testing;
8. Do not use fume hoods which have not been certified. To have a fume hood certified, contact Environmental Health and Safety;
9. If the fume hood is covered with materials to protect light sensitive substances, then an opening not less than that which can be considered safe for operation shall be maintained; and
10. Fume hoods equipped with automatic alarms shall be inspected by the user more frequently than once per year with the frequency of this testing based on fume hood usage.

Inspection Process

A two-step process shall be used when inspecting a fume hood to validate proper working condition.

Step 1. Inspection of Hood

A complete internal and external fume hood inspection shall be performed by the inspector evaluating the following:

1. Use of proper materials designed for that fume hood;
2. Excessive storage of any materials inside the fume hood;
3. Physical damage to the fume hood;
4. Items that should not be inside the fume hood;
5. The ability of the sash to open, close, and stay in a stationary position; and
6. Proper function of the fume hood flow indicator and alarm, if present.

Step 2. Determination of the Fume Hood's Face Velocity

The face velocity of the hood shall be determined by using a velometer or other approved device. See *Chemical Fume Hood Testing Protocol* for validation procedures. If the fume hood fails to meet the required face velocity with the sash open to a maximum of 18-inches, the sash shall be lowered and the hood re-tested. This process shall be performed until the fume hood meets the required feet per minute rating.

Note: The sash cannot be lowered to a point less than 12-inches from the base of the sash opening.

Once the inspection is completed, a certification sticker indicating the date of inspection and face velocity in feet per minute shall be placed to the left of the sash.

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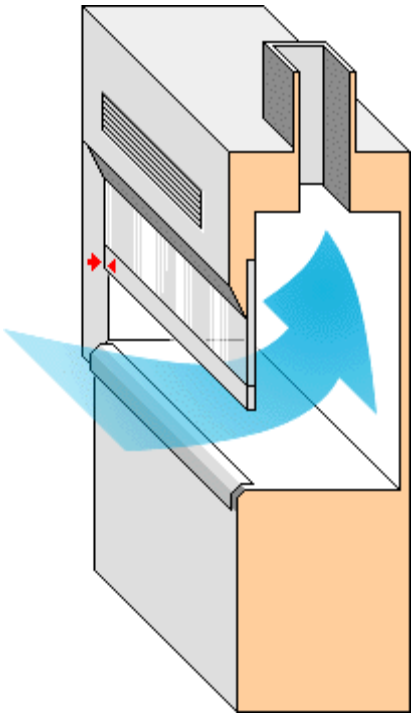
If a fume hood fails certification, a warning sign shall be placed at a prominent location on the sash of the fume hood indicating that the fume hood should not be used until it has been serviced and is working properly.

This sign shall ONLY be removed by Environmental Health and Safety once the fume hood has passed certification requirements.

Fume Hood Operating Guidelines

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 at 18-inches.* For variable air volume 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.



- *Do not block airfoil:* Some 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.
- *Place bulky equipment away from sidewalls* to allow airflow around the equipment.
- *Place any bulky equipment towards the rear of the hood* and raise it about 2-inches off the surface with blocks or bricks. This will allow airflow around and under the equipment. Equipment placed near the hood face will cause great variation in airflow. This equipment must be moved towards the rear of the hood, but do not place this equipment against the rear wall of the hood, as it will block airflow to the rear baffles. The use of riser blocks will prevent obstruction of back exhaust slots.
- *Work as far inside the hood as possible*, at least 4 to 6-inches from the front edge with the sash face between you and task at hand. All equipment should be a minimum of 9 to 12-inches away from the hood face.

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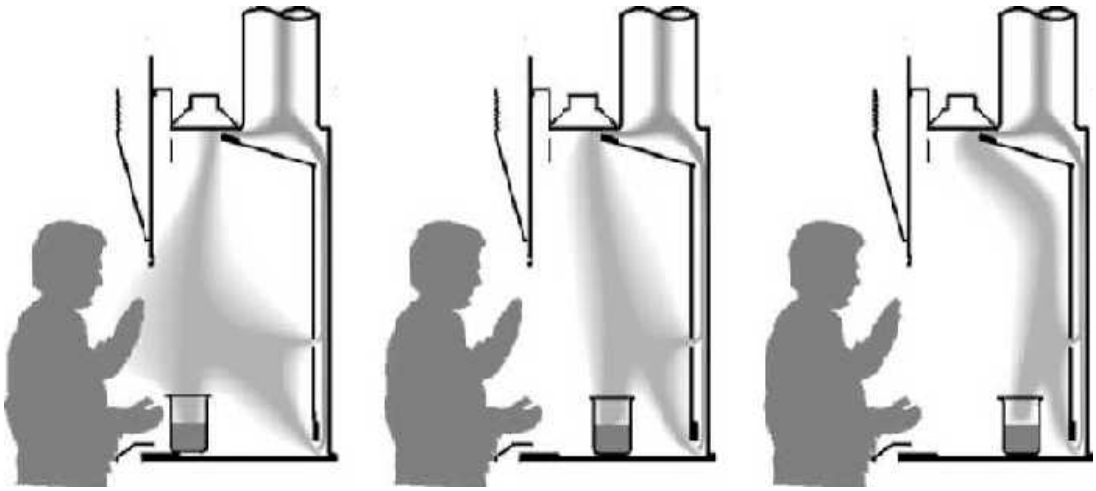

- *Keep sash face clean and clear.* To encourage use of sash as added protection against splashes, sprays, etc. keep sash face clean. If sash face must be blocked with paper for certain experiments, please take it down after the experiment is complete.
- *Do not use the hood as a storage cabinet* for chemicals or equipment. Materials stored in fume hoods should be kept to a minimum and stored in a manner that will not interfere with airflow. This can be accomplished by equipping the hood with perforated shelves on the side walls and/or allowing at least 3-inch spaces between containers or equipment so air can flow around them to the back exhaust slot.
- *Place any heat-generating equipment in the rear of the hood.* Heating devices in the hood produce convection currents that can disrupt airflow.
- *Do not use a hood for any function it was not designed for*, such as perchloric acid, radioisotopes, etc. The generation of perchloric acid vapors requires specially designed fume hoods with wash-down systems. Failure to use a wash-down system will result in the deposit of explosive perchloric acid crystals that may detonate in the hood ductwork. Hoods used for radioisotopes must be approved by Radiation Control.
- *Wear protective equipment!* Fume hoods do not prevent accidents or chemical splashes. Personnel protective equipment (safety glasses, gloves, aprons, etc.) appropriate to the conditions must always be worn.
- *Close sash when* finished with hood work or when leaving experiments or chemicals unattended! This simple procedure has contained many fires and explosions within a hood.