Fume hoods

If used and maintained properly, fume hoods are an effective engineering control in place to protect laboratory personnel against exposure to hazardous materials.

In order to ensure adequate fume hood operation, the University of Guelph ensures that fume hoods and their performance are inspected regularly.

Fume Hood Face Velocity - A Significant Factor in Performance

While acceptable performance of a fume hood is a function of a number of factors, including but not limited to: the design of the hood itself, the exhaust system, user work practices, equipment size and arrangement in the hood, fume hood location and make-up air to the fume hood, it is also significantly influenced by “face velocity” (the average velocity of air entering a fume hood perpendicular to the face (sash) opening).

For satisfactory fume hood performance with respect to “face velocity”, the following shall be applied:

For a By-Pass Fume Hood (constant volume):

Air flow through the hood shall provide an average face velocity of 0.4 m/sec (80 ft/min) - 0.65m/sec (130ft/min) at a working sash height of 18 inches. The low end of the face velocity range provides for adequate capture of contaminants generated within the hood while the high end of the range produces an air flow into and within the hood that is not excessively turbulent and therefore not likely to degrade hood performance.

For a Variable Air Volume (VAV) Fume Hood (constant velocity):

Air flow through the hood shall provide an average face velocity of 0.5 m/sec (100 ft/min) - 0.65m/sec (130ft/min) regardless of sash height.

For a Low Flow Fume Hood:

The appropriate air flow through a low flow hood will be determined upon commissioning of the hood based on containment testing and assessed annually.

Fume Hood Sash Positioning (Vertical Sliding Sash)

The sash should be used to minimize the size of the working aperture and to act as a safety screen (note: one should use an appropriate blast shield if there is a chance of an explosion). Based on safety and comfort considerations, the normal working sash height for fume hoods should be about 18?; larger openings may degrade hood performance and also, in the event of a chemical splash/spill/small explosion, provide little or no protection to the face and upper body, while with smaller openings, some users may experience difficulty in physically trying to conduct some of their fume hood activities. In exceptional circumstances, because of fume hood activities, larger sash openings may be required (note however that a fume hood with a fully-open sash must be used with caution since the sash cannot act then as a safety screen); face velocities must be adjusted to acceptable values.

When fume hood users are not working at the fume hood (making adjustments to equipment and carrying out manipulations in the hood), the sash should be kept closed.

Fume Hood Performance Summary

During annual inspections your fume hood will receive one of the following performance ratings as indicated on a corresponding label left on the fume hood itself. A description of these ratings is included below.

Satisfactory

- no modifications to the fume hood system(s) are required.
- fume hood users should conduct activities at the normal working sash height of 18?.

Adequate with Sash Height Adjustment to 12?

- fume hood face velocity is too low at the normal working height of 18? to adequately capture contaminants generated within the hood.
- as an interim measure fume hood users must conduct activities at a working sash height of 12?.
- Building Mechanics/Controls, Maintenance and Energy Services will receive notification (through the Validation/Audit Report) of the fume hood performance and will develop an action plan to improve fume hood performance.

Adequate with Sash Height Adjustment to Fully Open

- fume hood face velocity is too high at the normal working height of 18?, resulting in air flow into and within the hood that may be excessively turbulent and therefore likely to degrade hood performance.
- as an interim measure fume hood users must conduct activities with the sash fully open; note however that a fume hood with a fully-open sash must be used with caution since the sash cannot act then as a safety screen.
- Building Mechanics/Controls, Maintenance and Energy Services will receive notification (through the Validation/Audit Report) of the fume hood performance and will develop an action plan to improve fume hood performance.

Any fume hood receiving a satisfactory or adequate rating will receive a green label indicating such.

Unsatisfactory (unacceptably low face velocities)

- the fume hood must not be used in its present state; face velocities are too low at all sash settings to adequately capture contaminants generated within the hood.
- Building Mechanics/Controls, Maintenance and Energy Service will be notified immediately (through the Work Order desk in Physical Resources) of the unacceptable fume hood performance. Building Mechanics/Controls, Maintenance and Energy Services) will develop a suitable plan of action to return the fume hood to service.

Unsatisfactory (unacceptably high face velocities)

- the fume hood must not be used in its present state; face velocities are too high at all sash settings, resulting in air flow into and within the hood that may be excessively turbulent and therefore likely to degrade hood performance.
- Building Mechanics/Controls, Maintenance and Energy Services will be notified immediately (through the Work Order desk in Physical Resources) of the unacceptable fume hood performance. Controls (Maintenance and Energy Services, Physical Resources) will develop a suitable plan of action to return the fume hood to service.

Fume hoods with an unsatisfactory rating will receive a red label with the statement "DO NOT USE FUME HOOD" until such time as the fume hood is returned to service i.e. has received a satisfactory/adequate performance rating.

Alarm Systems

Fume hood alarm systems continuously monitor the operating efficiency of exhaust systems confirming adequate performance or warning the operator when a partial or complete failure of the exhaust system occurs by emitting both audible and visual warning signals. Fume hood alarms at the University of Guelph include both manufacturer built-in and after-market alarm systems (e.g. Ventalert).

Features pertinent to laboratory personnel may include:

- audible & visual alarm
- test switch
- independent power source
- low-charge battery indicator
- electrical interconnect for special applications

Reasons for activation of alarm include:

- local power failure
- remote shut off by service personnel without hood operator notification
- slipping or broken drive belts
- slipping drive pulleys
- defective drive motor running at reduced r.p.m. or motor failure
- broken fan blades
- obstructed/severely corroded duct (between sensing port and fan unit)
- closing fire dampers
- duct access doors not in place
- activating “test” switch

Each fume hood will receive a blue label indicating the proper procedure if the fume hood alarm activates.

Ventalert Air-System Alarm

The exhaust system in an operating fume hood produces a low static pressure which causes air to be drawn through the hood and ducts. “Ventalert” monitors the negative, operating static pressure in the duct just above the fume hood and alarms when the pressure deviates from the preset limit.

“Ventalert” is mounted on the exterior of the fume hood (with a small sensing tube penetrating the duct above the hood) in a location that is readily visible to the user during use of the fume hood. Many of the fume hoods at the University of Guelph utilize the Ventalert Air-System alarms.

Special Note: “Ventalert” meets all criteria as set by the Canadian Standards Association (CSA)

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