

WVU DESIGN GUIDELINES & CONSTRUCTION STANDARDS
DIVISION 11 – EQUIPMENT

SECTION 117000 – FUME HOODS

PART 1 - GENERAL

- 1.1. Any deviance from the following instructions must be approved during design by WVU Facilities Management.
- 1.2. The WVU project manager shall be notified when fume hood acceptance testing is to start. Project manager shall contact the EH&S representative in charge of hoods for witness purposes. Copies of the testing reports shall be sent to EH&S.
- 1.3 Recommended minimum duct velocities:
 - A. Vapors, gases, smoke: 1000 – 2000 fpm
 - B. Welding fumes: 2000 – 2500 fpm
 - C. Light dust: 2500 – 3000 fpm
 - D. Dry medium dust: 3000 – 4000 fpm

PART 2 - PRODUCTS

- 2.1. WVU preferred brands: Fisher Hamilton, Kewaunee Scientific, Labconco, and TSI.
- 2.2. For general laboratory usage, a bypass hood shall be used. The following are the minimum requirements for a bypass hood:
 - A. The interior of the working chamber of the hood should be constructed of non-flammable and acid resistant material.
 - B. A back baffle system to evenly distribute the air across the face of the chamber resulting in a uniform air flow through the face of the hood.
 - C. An airfoil along the lower edge and tapered configuration on the other edges to provide the streamlined front entrance profile.
 - D. Sliding sash to minimize the size of the working aperture and to act as a safety screen.
 - E. A recessed work surface to retain spilled liquids.
- 2.3. All fume hoods shall be fitted with an audible/visual air-flow monitoring system. The hood alarm shall not use a sensor in the direct airstream such as a thermal anemometer or pitot tube. The method of detection for the alarm monitor shall be approved by WVU project manager. The AFA 1000 model from Temperature Electronics Ltd. is preferred.
- 2.4. Auxiliary air hoods are not allowed.
- 2.5. Stack discharges with adjusting nozzles are not allowed.

2.6. Perchloric acid fume hoods:

- A. Ductwork shall be 316 stainless steel with smooth-welded seams. All ductwork shall slope back to the hood at a rate not less than 8%. The ductwork shall use the steepest, straightest, and shortest route to exit the building.
- B. The interior surfaces of the entire hood, duct, fan, and stack surface must be equipped with water wash capabilities.
- C. An induction exhaust fan is preferred for this type system. This is a type of fan where the exhaust gases do not contact the motor or fan blades.
- D. All surfaces of the hood shall be materials that will not react with the acid to form flammable or explosive compounds.
- E. The exhaust system shall not be manifolded or joined to other nonperchloric acid exhaust systems.
- F. Organic materials, including gaskets, shall not be used unless it is known they will not react with perchloric acid.
- G. The hood shall be labeled "Perchloric Acid Hood".
- H. The hood shall comply with NFPA 45.

2.7. It is recommended not to ventilate flammable storage cabinets. The cap shall be used to plug and secure the opening. If the department chooses to vent flammable cabinets, they shall be piped directly to the outside as per NFPA 30.

2.8. Fume Hood Certification:

- A. Fume hoods shall be tested and certified to adhere to ASHRAE 110 by a third party firm hired by WVU personnel prior to acceptance to verify air flow of a new or re-designed fume hood.
- B. WVU PM shall contact WVU EHS, third party certifying agent, and others as required to witness and collect documentation of the testing procedure and equipment calibration certifications. .
- C. EHS shall contact WV SFM as required for fume hood certification and request for attendance.
- D. WVU PM will retain and provide documentation for the fume hood testing to EHS and the WV SFM.

PART 3 - EXECUTION

3.1. No uncoated galvanized ductwork shall be used. All ductwork joints shall be sealed.

- 3.2. Supplied air shall be sited to maximize the general dilution ventilation of the laboratory without disturbing the air flow pattern in the fume hood.
- 3.3. Face velocity shall be between 80 – 120 feet per minute but 100 fpm is preferred.
- 3.4. Laboratories air changes shall be per OSHA 29 CFR 1910.1450. Afterhours the airflow can be reduced to 4 – 6 air changes per hour.
- 3.5. Laboratory exhaust shall terminate 10 feet above the roof on the highest point of the building per NFPA 45 Section A.8.4.12.
- 3.6. Exhaust fans shall not be installed in series.
- 3.7. Laboratory air shall not be recirculated.
- 3.8. Manifold exhaust systems are preferred. These systems shall have redundant fans with VFD's.
- 3.9. Laboratory exhaust systems, fume hoods, control valves, and supply air handlers shall **not** be tied to emergency power generators.
- 3.10. WVU prefers sound levels in the laboratory to be 40 dBA or less due to individual fume hoods and room ventilation.
- 3.11. Fume hoods shall not be located adjacent to a single means of access to an exit or to a high-traffic area (NFPA 45-8.9.2).
- 3.12. Lab ventilation systems shall comply with NFPA 45 & 90A and ANSI Z9.5.
- 3.13. Laboratories shall have negative air pressure when compared to adjacent spaces.
- 3.14. Control valve on fume hood exhaust shall fail open.
- 3.15. Any ductwork passing through potentially cold air spaces shall be insulated to prevent condensation.
- 3.16. All ductwork shall slope back to hood.
- 3.17. If high acid usage is expected then a specialty coated duct is mandatory. Plain stainless steel is not acceptable.
- 3.18. Recommend corrosive and flammables cabinets be installed in base cabinet below hood.

END OF SECTION 117000