

117000 FUME HOODS

Part 1 – GENERAL

1.1 Description

A. This section details the guidelines and expectations for the design and installation of fume hood systems on Johns Hopkins University Homewood Campus. Project conditions and requirements vary, thus precluding the absolute adherence to the items identified herein in all cases. However, unless there is adequate written justification and approval from the JHFRE Engineering and Energy Department, it is expected that these guidelines will govern the design and specifications.

B. Fume hoods, new or existing, shall be tied into the BAS whenever available and the Fire Alarm Control Unit if suppression equipment is present.

C. Before renovating or installing any fume hoods, consult the JHU Green Lab Standards for the latest updates.

1.2 Submittals

N/A

1.3 Quality Assurance

A. Recommended minimum duct velocities:

1. Vapors, gases, smoke: 1000 – 2000 fpm
2. Welding fumes: 2000 – 2500 fpm
3. Light dust: 2500 – 3000 fpm
4. Dry medium dust: 3000 – 4000 fpm

B. Laboratory exhaust shall terminate 10 feet above the roof on the highest point of the building. Discharge must be directed vertically upward and shall have a velocity of at least 3,000 fpm.

C. For general laboratory usage, a bypass hood shall be used. The following are the minimum requirements for a bypass hood:

1. The interior of the working chamber of the hood should be constructed of nonflammable and acid resistant material.
2. 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.
3. An airfoil along the lower edge and tapered configuration on the other edges to provide the streamlined front entrance profile.
4. Sliding sash to minimize the size of the working aperture and to act as a safety screen.

5. A recessed work surface to retain spilled liquids.

D. 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 JHU project manager.

E. Lab fume hoods are not to be ducted into any system that contains a recovery wheel.

F. Auxiliary air hoods are not allowed.

G. Stack discharges with adjusting nozzles are not allowed.

1.4 Delivery and storage

A. Material deliveries and storage areas to be approved by Owner.

B. Material storage to comply with manufacturer's recommendations.

PART 2 – PRODUCTS

2.1 JHU preferred manufacturers: Fisher Hamilton, Kewaunee Scientific, Labconco, and TSI.

2.2 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 acid to form flammable or explosive compounds.

E. The exhaust system shall not be manifolded or joined to other non-perchloric 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.

2.3 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.

2.4 Fume Hood Certification:

A. Fume hoods shall be tested and certified to adhere to ASHRAE 110 by a third-party firm hired by JHFRE prior to acceptance to verify air flow of a new or re-designed fume hood.

B. The JHU project manager shall be notified when fume hood acceptance testing is to start. PM shall contact JHU Health, Safety & Environment department, third party certifying agent, and others as required to witness and collect documentation of the testing procedure and equipment calibration certifications.

PART 3 – EXECUTION

3.1 Fume hoods shall not be located adjacent to a single means of access to an exit or to a high-traffic area.

3.2 Supplied air shall be sized and located to maximize the general dilution ventilation of the laboratory without disturbing the air flow pattern in the fume hood.

3.3 Laboratories shall have negative air pressure when compared to adjacent spaces.

3.4 JHU prefers sound levels in the laboratory to be 40 dBA or less due to individual fume hoods and room ventilation.

3.5 Fume hoods pricing shall be provided to connect to the BAS with sensors for runtime, CFM & duct velocity.

3.6 Lab ventilation systems shall comply with NFPA 45 & 90A and ANSI Z9.5.

3.7 Laboratories air changes shall be designed per the most recent publication of OSHA 29 CFR 1910.1450.

3.8 Laboratory air shall not be recirculated by any means. This includes the previously noted use of recovery wheels being prohibited.

3.10 Exhaust fans shall not be installed in series.

3.11 Manifold exhaust systems are preferred. These systems shall have redundant fans with VFD's.

3.12 Control valve on fume hood exhaust shall fail open.

3.13 All ductwork shall slope back to hood.

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

3.15 Any ductwork passing through potentially cold air spaces shall be insulated to prevent condensation.

3.16 If high acid usage is expected then a specialty coated duct is mandatory. Plain stainless steel is not acceptable.