

A Guide to Fume Hood Codes and Standards

Sometimes it seems that almost everything in a laboratory is governed by an alphabet soup of government agencies and regulations. We are all familiar with the acronyms OSHA, EPA, NIOSH, and FDA and how they impact our labs. It's the same with fume hoods. Their installation, operation and maintenance are guided by a variety of governmental and industry organizations. Fortunately, understanding who and what determines proper fume hood operation is not as difficult as it might first seem.

Codes, Standards and Recommended Practices

The following are the primary organizations and standards regarding fume hoods:

-OSHA Part 1910.1450. OSHA stands for Occupational Safety and Health Administration. The agency regulations regarding fume hood operation are listed in the Code of Federal Regulations Volume 29 Part 1910.1450. This code addresses several aspects of laboratory design and operation. Regarding hoods it is primarily concerned with airflow at the face of the hood, monitoring, maintenance and exhaust.

-ANSI/ASHRAE 110-1995. Method of Testing Performance of Laboratory Fume Hoods. This standard is published by the American National Standards Institute and the American Society of heating, Refrigerating and Air Conditioning Engineers, Inc. It concerns itself primarily with methods of testing fume hoods to check their operation.

-ANSI/AIHA Z9.5. Titled "The American National Standard for Laboratory Ventilation" this standard is published by ANSI and the American Industrial Hygiene Association. It covers a variety of lab ventilation issues including hood monitoring, face velocities and exhaust.

-NFPA 45. This standard is prepared by the National Fire Protection Association. It recommends hood construction, location, fire protection, specialty hoods, identification, inspection, testing and maintenance and exhaust.

-SEFA 1.2-1996. SEFA is the Scientific Equipment & Furniture Association. Its publication "Laboratory Fume Hoods Recommended Practices" covers design requirements of hoods, face velocities and testing.

Special Concerns

Items of immediate interest to lab personnel that are addressed in the codes and standards include:

- A. Air flow.
- B. Monitoring/Alarms.
- C. Maintenance/Inspection.
- D. Exhaust.

A. Air Flow

Proper air flow at the face of the hood is probably the most common cause of confusion regarding fume hood operation. Here are what the codes and standards say:

1. OSHA: "General air flow should not be turbulent and should be relatively uniform throughout the laboratory, with no high velocity or static areas; air flow into and within the hood should not be excessively turbulent; hood face velocity should be adequate. (Typically 60-110 fpm.)"
2. ANSI/AIHA Z9.5: "Each hood shall maintain an average face velocity of 80-120 fpm with no face velocity measurement more than plus or minus 20% of average."
3. SEFA: "Face velocities of laboratory fume hoods may be established on the basis of the toxicity or hazard of the materials used or the operations conducted within the fume hood. Note: Governmental codes rules and regulation may require specific face velocities. A fume hood face velocity of 100 fpm is considered acceptable in standard practice. In certain situations face velocity of up to 125 fpm or as low as 75 fpm may be acceptable to meet required capture velocities of the fume hood."

B. Monitoring/Alarms

Many older labs are equipped with fume hoods that do not have air flow monitoring devices. The type of device is not specified, but according to the following codes and standards if you're putting in a hood or remodeling an older one, they are now a requirement.

1. OSHA: "...each hood should have a continuous monitoring device to allow convenient confirmation of adequate hood performance before use. If this is not possible, work with substances of unknown toxicity should be avoided or other types of local ventilation devices should be provided."
2. ANSI/AIHA Z9.5: "New and remodeled hoods shall be equipped with a flow-measuring device."
3. NFPA 45: "New and remodeled hoods shall be equipped with a flow-measuring device."

C. Maintenance/Inspection

As with all equipment, maintenance is important to proper operation.

1. OSHA: "Quality and quantity of ventilation should be evaluated on installation, regularly monitored (at least every 3 months), and re-evaluated whenever a change in local ventilation devices is made."
2. ANSI/AIHA Z9.5: "A routine performance test shall be conducted on every fume hood at least annually or whenever a significant change has been made to the operational characteristics of the system"
3. NFPA 45: "When installed or modified and at least annually thereafter, laboratory hoods, laboratory hood exhaust systems, and laboratory special exhaust systems shall be inspected and tested."
4. NFPA 45: "Special use laboratory hoods and special use local exhaust systems shall be

identified to indicate their intended use.” “A sign shall be affixed to each hood containing the following information from the last inspection: Inspection interval, Last inspection date, Average face velocity, location of fan that serves hood, Inspector’s name. Exception: In lieu of a sign, a properly maintained log of all hoods giving the above information shall be deemed acceptable.”

D. Exhaust

The old expression “out of sight, out of mind” is often apt when discussing fume hood exhaust. Lab personnel rarely crawl up onto the roof to check out their exhaust fans and stacks. Knowing what the standards, rules and codes have to say on the exhaust can come in handy if you’re experiencing odors in the lab or if you’re considering a renovation or new facility.

1. ANSI/AIHA Z9.5: “Discharged in manner and location to avoid re-entry into the laboratory building or adjacent buildings at concentrations above 20% of the allowable concentrations inside the laboratory under any wind or atmospheric conditions.” Exhaust stack: “Be in a vertical up direction at a minimum of 10 feet above the adjacent roof line as so located with respect to opening and air intakes of the laboratory or adjacent buildings to avoid re-entry.”
2. NFPA 45: “Air exhausted from laboratory hoods and other special local exhaust systems shall not be re-circulated.” “Air from laboratory units and laboratory work areas in which chemicals are present shall be continuously discharged throughout systems maintained at a negative pressure relative to the pressure of normally occupied areas of the building.”