ENVIRONMENTAL HEALTH AND SAFETY

Chemical Fume Hoods and Biological Safety Cabinets

OSHA Required Engineering Controls

Occupational Exposure to Hazardous Chemicals in Laboratories, 29 CFR 1910.1450

- 1910.1450 (e) (3) (viii) - Provisions for additional employee protection for work with particularly hazardous substances.
- 1910.1450(e)(3)(viii)(B) - Use of containment devices such as fume hoods or glove boxes;
  - Biological Safety Cabinets
  - Specific Ventilation i.e. local exhaust

Chemical Fume Hoods

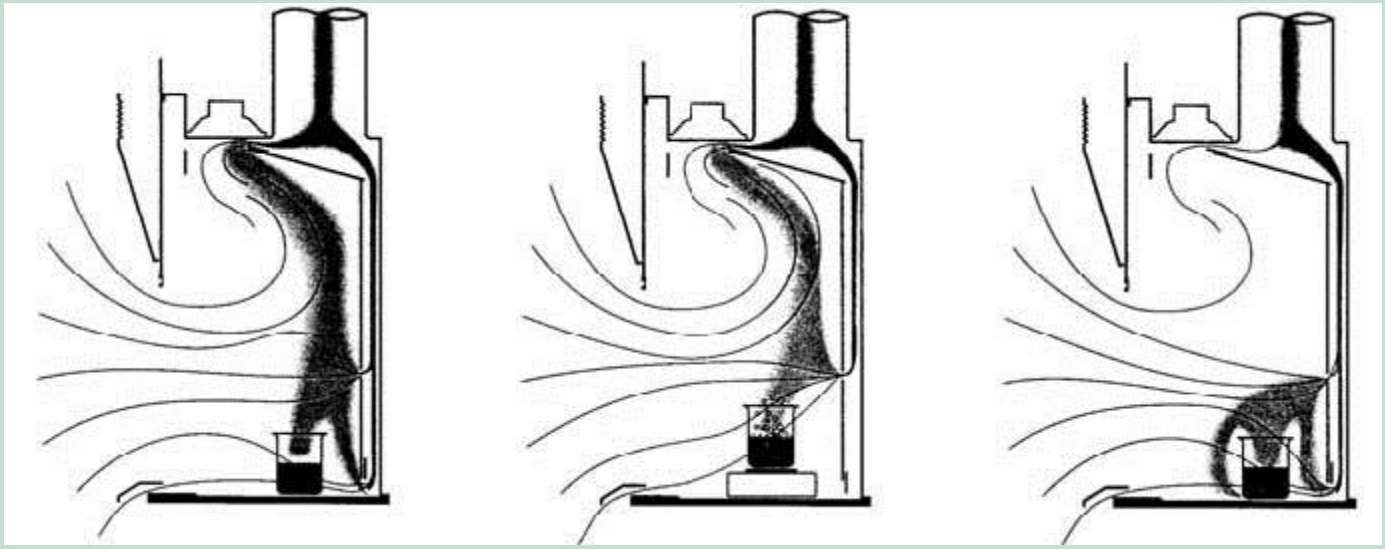
The purpose of a chemical fume hood is to contain and exhaust chemical and/or radioactive material so the user and other lab occupants are not exposed.

The most vital piece of equipment in your lab!

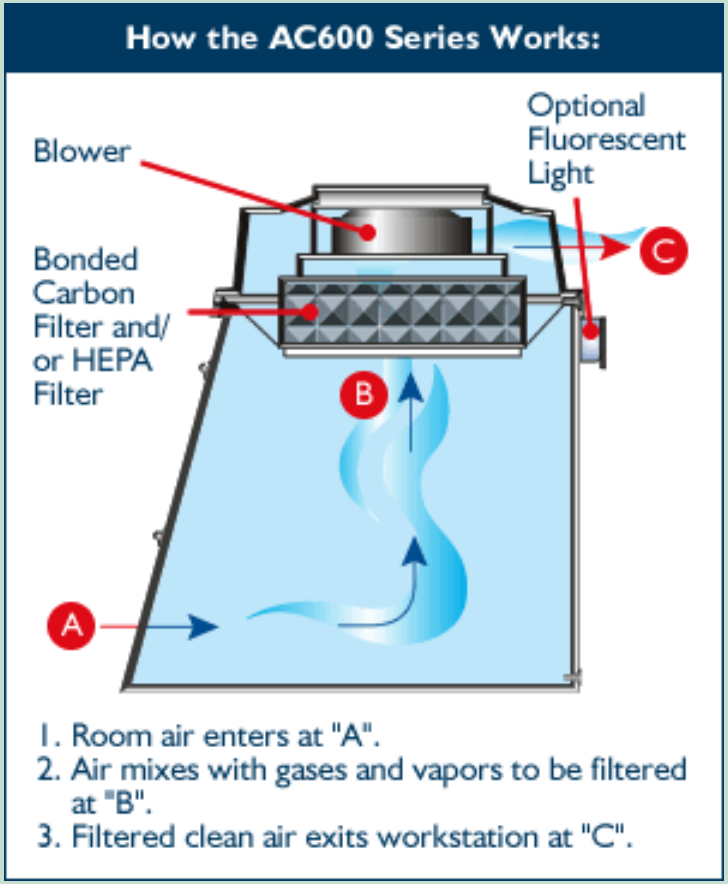
It Must Be Used Properly:

- Annual certification is required
- Verify fume hood is functioning before each use
- Keep sashes down (as low as practical)
- Don’t store flammable liquids, equipment in hood
- Limit traffic behind you

Chemical Fume Hoods (Ducted)



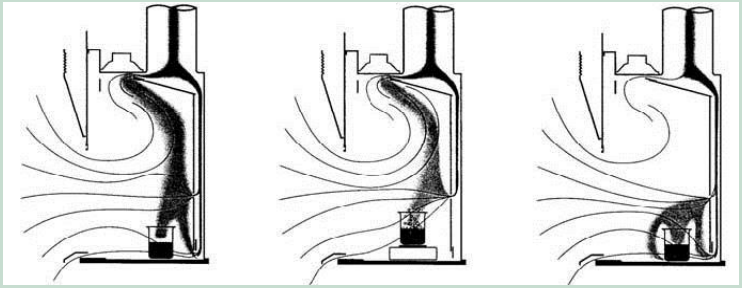
Chemical Fume Hoods (Ductless)



Verify Fume Hood is Functioning

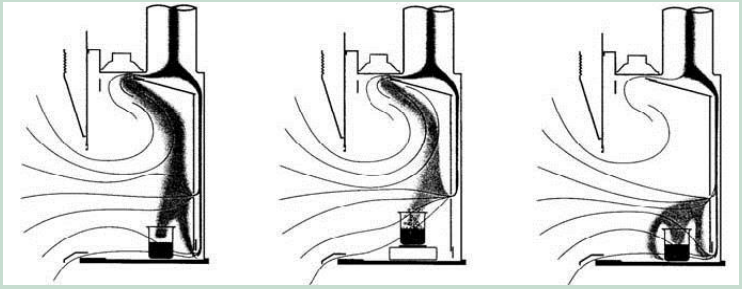
Chemical Fume Hoods

- Do not use fume hoods as storage cabinets.



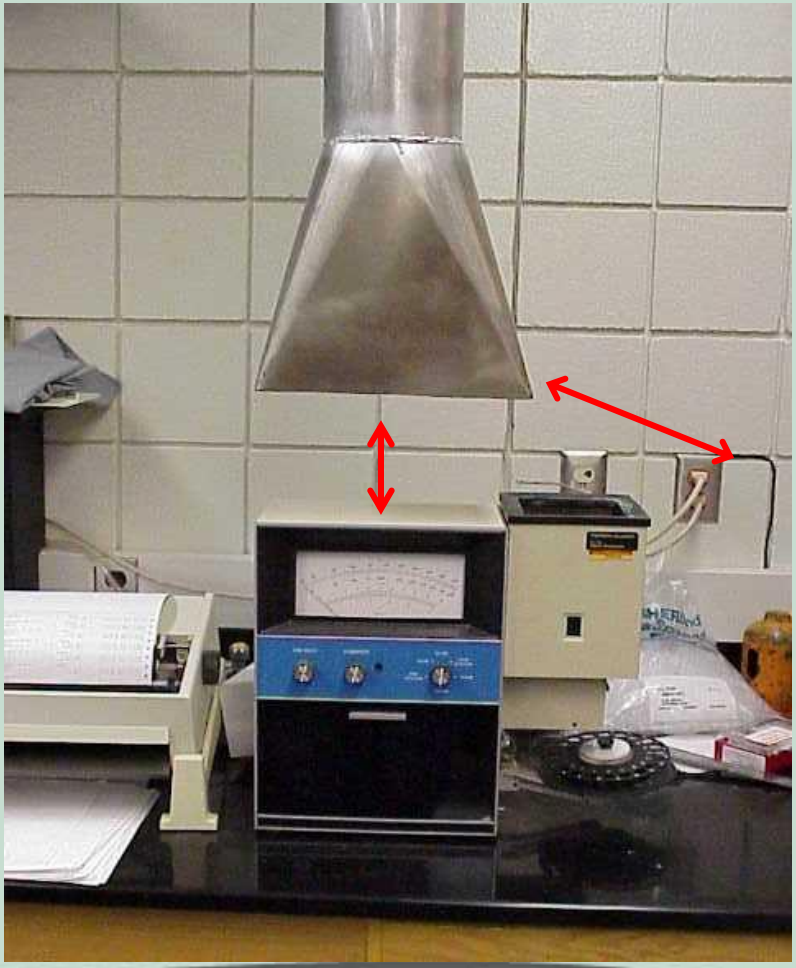
Chemical Fume Hoods

- It's important not to block fume hood air flow.
- Place large equipment on blocks or racks to allow air flow under the equipment.
- Pay attention to the height of the hood sash, ~≤ 18 in.



Specific Ventilation

- Where local exhaust ventilation is used, effective contaminant capture distance is typically one duct diameter, i.e. a six inch diameter duct should be placed no more than six inches from the source.
- Exhaust for hot processes should always be located directly above the source



Biological Safety Cabinets

Biosafety cabinets are used to provide primary containment in the laboratory when the investigator is using potentially infectious materials.

There are three types of biological safety cabinets.

Biological Safety Cabinets

Class I: The Class I biological safety cabinet is an open-front negative pressure cabinet.

The exhaust air from the cabinet is filtered by a high-efficiency particulate air (HEPA) filter.

The Class I biosafety cabinet will provide personnel and environmental protection, but not product protection.

While HEPA filters are effective for trapping particulates and infectious agents, these filters will not capture volatile chemicals or gases

Biological Safety Cabinets

Class II: The Class II vertical laminar-flow biological cabinet is an open-front, ventilated cabinet.

This cabinet provides a HEPA-filtered, recirculated mass airflow within the work space.

The exhaust air from the cabinet is also filtered by HEPA filters. Thus, the Class II biosafety cabinet will provide personnel, environment and product protection.

While HEPA filters are effective for trapping particulates and infectious agents, these filters will not capture volatile chemicals or gases

Biological Safety Cabinets

Class III: The Class III cabinet is a totally enclosed ventilated cabinet of gas-tight construction.

Operations within the Class III cabinet are conducted through attached rubber gloves.

When in use, the Class III cabinet is maintained through negative air pressure of at least 0.5 inches water gauge.

Supply air is drawn into the cabinet through HEPA filters.

The cabinet exhaust air is filtered by two HEPA filters, installed in series, before discharge outside of the facility.

Biological Safety Cabinets

- Class I and IIa exhausts air back into the room
  - It is not safe to use volatile or toxic chemicals i.e., Ether, Mercaptoethanol

- Class IIb is hard ducted to the facility exhaust system

All Biological Safety cabinets are required to be inspected and certified annually.