Biosafety Cabinet Guidelines

What is a Biosafety Cabinet?

A biosafety cabinet (BSC) is not chemical fume hood. Fume hoods are designed to remove chemical fumes and aerosols away from the work area. BSCs are designed to provide both a clean work environment and protection for employees who work with biological hazards. BSCs use vertical laminar airflow to create a barrier to airborne particles, such as microorganisms. They use High Efficiency Particulate Air (HEPA) filters to clean air going into the work area and out to the environment. The air in most BSCs is re-circulated over the work area through the HEPA filter. The HEPA filter removes airborne particles from the air, but does not remove chemical fumes. A single exception is a specific special model of Class II Type B2 BSC that is UL classified as a fume hood.

What is a Laminar Flow Clean Bench?

A laminar flow clean bench provides a space to work with a product or specimen where it will be protected from contamination by particulates such as microorganisms. This is accomplished by the laminar flow of clean air from a HEPA filter, which is blown across the workspace and out toward the user and the lab. Thus the basic laminar flow clean bench provides no protection for the user from chemically hazardous or infectious materials, including particulate or volatile hazards, and aerosols.

When Should I Use a Biosafety Cabinet?

Use a BSC for manipulations of human pathogens or antineoplastics that are likely to create aerosols (such as vortexing open tubes, pipetting, opening caps after centrifuging, sonicating, aspirating with a syringe, etc.). Use for all manipulation of airborne transmitted pathogens (such as Brucella abortus, Mycobacterium tuberculosis, etc.).

Open Flames in a Biosafety Cabinet

Using open flames, such as Bunsen burners, in a BSC disrupts the air flow, compromising protection of both the worker and the work. In addition, if the flame of the burner is too large, or ignites a wash bottle of ethanol (often found in a BSC), the excessive heat may melt the adhesive holding the HEPA filter together or burn holes in the filter media. Alternative methods such as electric incinerators or disposable inoculating loops are recommended.
Ultraviolet Lights in a Biosafety Cabinet

Remember that the ultraviolet (UV) light in your BSC is only useful as an extra precaution in keeping the work area decontaminated between uses, because UV light has very little power to penetrate, even through a dust particle. Always clean and decontaminate the work area thoroughly using a chemical disinfectant after each use. If installed, UV lamps should be cleaned weekly to remove any dust or dirt which may block the germicidal effectiveness of the UV light. UV lamps must be turned off when the room is occupied to protect laboratory occupants’ skin and eyes from UV exposure. Exposure to UV light can cause burns to the corneas and skin cancer. Never work in a laboratory with a UV light on and always turn off UV lights when working in the BSC.

Annual Certification Testing

Improper airflow or filter leaks in a BSC (and laminar hoods) could expose laboratory personnel to biohazardous materials. To ensure that BSCs on campus are providing necessary protection to workers and the environment, it is essential that the BSCs be routinely inspected. EHS contracts with a qualified service company to annually service all BSCs and laminar hoods on campus that are used to contain biological hazards. You will be notified when annual testing will be performed. Testing is done according to the nationally accepted standards of NSF International. Your BSC should have a label on it stating the date it was last tested.

Moving or Repairs

In addition to annual testing, BSCs must also be re-tested whenever they are moved or have filters changed. This must be done by a qualified servicing company. Call EHS at 7233 to schedule testing other than annual.

Purchasing a New Biosafety Cabinet

If you plan to purchase a new BSC, notify EHS at x7233 for assistance in choosing the appropriate BSC for your needs and to get the BSC on the schedule for annual certification testing. Use the following guidelines when purchasing a BSC:

1. The BSC should be certified by according to NSF Standard 49. Work with any infectious agents or recombinant DNA classified as requiring Biosafety Level 2 or higher containment will not be permitted in a BSC that does not pass certification testing for containment.

2. Verify with the Biosafety Officer that the BSC type (Class II Type A, Class II Type B2, etc.) is appropriate for the type of work that it will be used for (type of biological agents to be contained and any chemicals to be used.)

3. If the BSC is a Class II Type B3, the connection to the exhaust preferably should be a thimble connection and not a gas tight connection.
4. Installation of BSCs must allow access to both supply and exhaust filters for annual certification testing and filter changes:
   a. Top of cabinet must be far enough below the ceiling (at least 18") to allow field testing of exhaust flow according to NSF Standard 49.
   b. Any connections to exhaust ductwork must allow access for field testing of exhaust flow according to NSF Standard 49.

5. Any outlets inside the work area of the BSC should be ground fault circuit interrupter (GFCI) outlets.