

# Clean Air Device

## Primary Containment Device

### Formaldehyde Decontamination

The formaldehyde decontamination process decontaminates the BSCs inner walls, plenums and filters. This process prevents contaminated air from being released into the workplace when the unit is disassembled, moved or repaired. The formaldehyde decontamination policy protects the welfare of people in the facility, as well as those who handle, move or repair BSCs. All BSCs shall be professionally formaldehyde decontaminated before a unit is relocated, placed in storage, serviced (interior) or discarded. The formaldehyde decontamination (decon) process takes two days.

On the first day, the certifier will prepare the BSC, then generate formaldehyde gas in the sealed BSC. This may take up to three hours. The gas will then be slowly neutralized from the BSC overnight after the decontamination of internal surfaces. The certifier may request the room be vacated due to the small potential for formaldehyde gas to leak from the BSC.

On day two, the certifier will return to remove the decon equipment from the BSC and place an approval sticker on the view-screen or some other conspicuous area. The approval sticker indicates that the unit is safe to be moved or repaired.

### Decon for relocation

Once the approval sticker is on the BSC the utilities (gas, vacuum) may be disconnected and the BSC moved. The lab must make arrangements with physical plant to have the utilities disconnected from the BSC. After the BSC is relocated and connected to the utilities call Occupational Health and Safety at 785-3550 to have the unit re-certified. The unit must be re-certified before use.

### Decon for Repairs

The repairs will be started on day two. Once repairs are completed and the unit is recertified, the certifier will remove the approval sticker.

### Re-certification after Relocation or Major Repair Work

Re-certification assures the integrity of the unit has not been compromised. Moving a unit may damage internal parts such as filters, motors, or plenums.

### Clean Air Device Users Petition (Form P)

The Clean Air Device Users Petition (Form P) was designed to prevent the inappropriate use of equipment and save laboratories money. This petition must be completed and submitted to the Office of Environmental Health & Safety when a Biological Safety Cabinet (BSC) or Laminar Flow Bench (LFB) will be:

- ◆ purchased
- ◆ newly installed
- ◆ reactivated from storage
- ◆ relocated
- ◆ transferred to a new owner
- ◆ placed into storage
- ◆ discarded

The Clean Air Device Users Petition is available from the Office of Environmental Health & Safety (737-2121).

### Requesting Service or Repair

Call the Office of Environmental Health & Safety at 785-3550 when your BSC or LFB needs service or repair. When calling include the following information: □ Make □ Model □ Serial # □ Location of the unit □ Contact person and telephone #

This information expedites the response time and lessens the down time of your unit and, therefore, your work.

### Purchasing a BSC or LFB

Mail or facsimile (785-7588) a Clean Air Device Users Petition (Form P) to the Office of Environmental Health & Safety. The petition will be reviewed and returned to you with either an approved or denied response. If the unit is approved, attach the petition to the Purchase Order. The Purchasing Department will not accept purchase orders for BSCs or LFBs without the petition or approval from the Office of Environmental Health & Safety. If the Petition is denied, the unit cannot be used or purchased.

Note: In the case of LFBs, it is extremely important to describe the intended use, and why the use of a BSC is not feasible or possible. The justification must include a description of the types of activities to be performed in the LFB.



The CAD Program monitors the performance of **Biological Safety Cabinets (BSCs), Horizontal Laminar Flow Benches and Vertical Laminar Flow Benches (LFBs)**. Each unit is monitored and adjusted to assure it meets standards of the National Sanitation Foundation (NSF 49), the manufacturer or the Institute for Environmental Sciences Recommended Practice for Laminar Flow Clean Air Devices (IES-RP-CC-002-86).

BSCs and LFBs used properly provide a "clean" work environment for your research or patient care activities. BSCs have the added advantage of providing personnel and environmental protection. The efficacy of BSCs and LFBs depends upon the behavior of the operator and the unit's orientation in the facility.

All BSCs and LFBs in use shall be placed on the **Certification Service Contract** and certified at least annually. Any BSC or LFB not under the Certification Service Contract shall be formaldehyde decontaminated, placed in storage status and disabled.

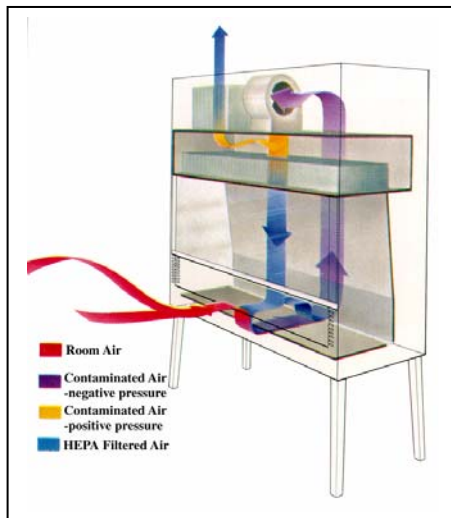
The Office of Environmental Health & Safety (OEHS) shall be notified whenever BSCs or LFBs need service or repair (e.g. replacing fluorescent lamps, switches, etc.).

Yale has a long standing policy to actively discourage the purchase and use of LFBs. The Biological Safety Committee and OEHS recognize LFBs do not provide personnel or environmental protection from infectious or potentially infectious agents, allergens, chemicals or radioactive materials. In the past, unauthorized LFBs were returned to the manufacturer, causing delays in research and additional costs.

Notify the Office of Environmental Health & Safety in advance when you plan to have BSCs or LFBs moved, placed into storage, ownership transferred, discarded, removed from Yale or received from another institution or manufacturer.

BSCs and LFBs shall be certified after installation and before use, after relocation and on an annual basis.

BSCs shall be professionally formaldehyde decontaminated before a unit is relocated, placed in storage, serviced (interior) or discarded.



### Biological Safety Cabinet (BSC)

A Biological Safety Cabinet offers personnel, product, and environmental protection. The BSC provides primary containment for infectious materials.

Biohazards are isolated by confining the infectious contaminant within the BSC. The BSC removes contaminants from the air through High Efficiency Particulate Air (HEPA) filters. The intake air is filtered through a HEPA filter before flowing into the BSC work area. The exhaust air is also filtered by a HEPA filter. Aerosols generated within the cabinet work area are contained within the BSC.

### Laminar Flow Bench (LFB) or Clean Bench

The HLFB offers only product protection. Air entering the unit is filtered through a HEPA filter before it blows across the work space toward the operator into the room. A LFB is not appropriate for use with biohazardous materials since standing or sitting in the air path results in contaminated air blowing in the direction of the operator.

Objects in the LFB interrupt the airflow and may enable contaminated particulates to enter the work area. The term "backwash" refers to the entry of organisms shed by the operator or unfiltered room air into the work zone. Backwash may be induced by microscopes or other equipment in the LFB.

### Germicidal Ultraviolet Lamps

Many BSCs are equipped with germicidal ultraviolet (UV) lamps. The germicidal effect of the UV lamp is affected by time of exposure, distance, presence of dust or debris and the UV lamp intensity. Even though a UV lamp maintains a blue-violet visible glow, this does not mean it still has a germicidal effect. UV lamps require periodic maintenance. The UV lamp intensity must be monitored and the UV lamp must be cleaned periodically to remove dust and debris. Microorganisms covered by materials or not in the direct path of the UV light will not be destroyed. Relying on the germicidal effectiveness of UV lamps can lead to a false sense of security.

Presently there is no written policy concerning the use of ultraviolet (UV) lamps. The Office of Environmental Health and Safety has recommended the practice of routine surface decontamination instead of using UV lamps in BSCs. Routine surface decontamination of the BSC is more effective than the use of UV lamps.

Prolonged exposure to UV light may cause burns, reddening of the skin, or eye irritation. UV lamps must be turned off when occupying the room or working in the BSC since UV light is reflected from the stainless steel surfaces of the BSC. Even though there is no direct exposure to the UV lamp, it is still capable of causing eye injury

