



SOP – BSC Standard Operating Procedures for the Safe Operation of Biological Safety Cabinets

Date: May 5, 2023

Purpose:

To detail the safe operation of biological safety cabinet (BSC) use in campus laboratories and to ensure adequate containment of biological materials. BSCs shall be used for all activities/experiments that demand a microbe-free work environment necessary for cell culture propagation and handling of any infectious organisms. All users of BSCs shall be familiar with the procedures described below.

Safety Precautions:

- All operators must receive training on the safe operation of the BSC prior to using the equipment. Training may be delegated to a qualified individual, but it remains the responsibility of the Principal Investigator (PI) to ensure their personnel are adequately trained.
- Don the required PPE, including lab coat, gloves, eye/face protection and respirator (if needed) to protect yourself as well as samples from contamination.
- Ensure work area is unobstructed. If materials must be stored in the BSC, place items adjacent to the side wall.
- Always work at least 6” (15 cm) in from the front lip of the BSC.
- Never block the front air intake grille.
- While working within a BSC, set the sash at the correct height which is generally recommended 8” to 10” depending on the manufacturer’s guidelines.
- Keep sashes fully closed when not in use.

Ultraviolet Light use:

- The Centers for Disease Control and Prevention (CDC) and the National Institutes of Health (NIH) agree that UV lamps are not recommended nor required in BSCs. Do not rely on UV light for BSC sterilization or decontamination. LSUHSC policy requires BSC sterilization/ decontamination using liquid disinfectant methods.
- If installed:
 1. Users are responsible for UV lamp repairs.
 2. Lamps must be turned off when the room is occupied to protect eyes and skin from UV exposure.
 3. Keep the BSC sash closed when the UV light is on and not in use.

Other Considerations:

- If a BSC is malfunctioning, do not attempt to use it. Alert other users and post a sign indicating the cabinet is out of service. Contact EH&S at safety@lsuhsc.edu for assessment.
- Keep BSCs clean, by cleaning up any minor spills as they occur, and periodically cleaning the inside of the cabinet.
- If an experiment is left unattended inside a BSC, alert other users and post a sign indicating an experiment is in progress, along with user contact information.
- Do not store items on top of the BSC, as it could affect the unit’s performance and, potentially, damage the HEPA filters.

Use Procedure:

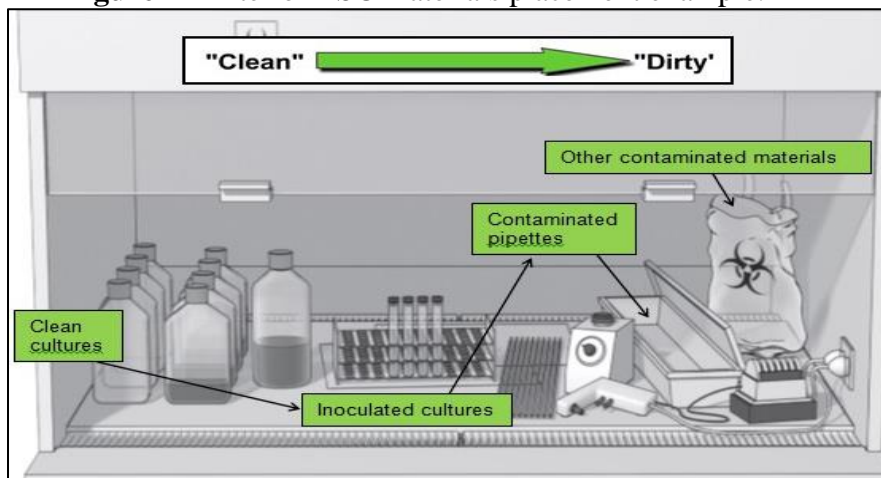
Preparation

- Only personnel trained in safe use of a BSC and on applicable laboratory hazards may perform work in a cabinet. If it is your first time working with BSCs or lab specific hazardous materials, ensure you have received supervisory training and have reviewed the applicable SDSs for chemicals and institutional / lab specific operating procedures for working with microorganisms.
- Lift the sash to the recommended height.
- Disinfect the work area before use. Wipe the inner surfaces of the BSC, including sidewall, back wall, inside of the sash, and work area with a suitable disinfectant such as 10% bleach solution followed by 70% ethanol, an iodophor, or quaternary ammonium compound.
- Prepare the work area for working from clean to contaminated areas. Set up your cabinet to reduce potential for contamination. All materials must be placed as far back in the cabinet as practical, toward the rear edge of the work surface and away from the front grille of the cabinet.
- Allow the cabinet to run for at least 4 minutes (or manufacturer's recommended time) to purge the particulates in the cabinet.
- Use a Kimwipe, or equivalent, to confirm inward air flow at the middle of the BSC. If present, record the pressure differential gauge reading and compare it to the calibration set point.
- If the cabinet is equipped with an alarm, test the alarm and switch it to the "ON" position. Do NOT work in a BSC while a warning light or alarm is signaling.
- If applicable, close the drain valve under the work surface prior to beginning work so that all contaminated materials are contained within the cabinet should a large spill occur.
- Don the required PPE, including lab coat, gloves, eye/face protection and respirator (if needed) to protect yourself as well as samples from contamination.
- Before beginning work, the operator must adjust the stool height so that his/her face is above the front opening.

Operation

- Active work should flow from clean to contaminated areas across the work surface.

Figure 1 – Interior BSC materials placement example.



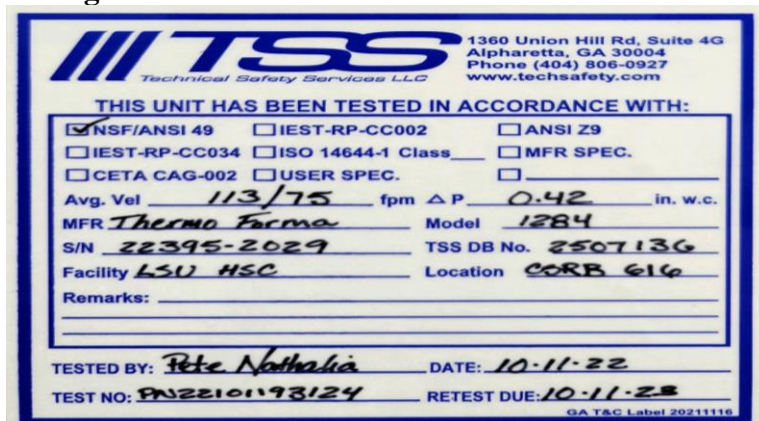


- Arms should be moved in and out slowly, perpendicular to the front opening to minimize disruption of the air curtain and laminar flow.
- All operations should be performed on the work surface at least four (4) inches from the inside edge of the front grille.
- Always use mechanical pipetting aids. Mouth pipetting is not allowed.
- Heat sources such as Bunsen burners/open flames are strictly prohibited inside the BSCs as they greatly disrupt the laminar flow of air and can cause damage to cabinet interior and HEPA filters.
- To sterilize bacteriological loops, micro-burners or electric “furnaces” may be used.
- Locate liquid waste traps inside the cabinet and use an in-line HEPA filter to protect the vacuum line. If traps must be located on the floor, place them in a secondary container (such as a durable plastic tray or box) to prevent breakage.
- When work is completed, leave the cabinet blower switch in the "on" position during the post-work cleaning procedures listed below:
 1. Clean/decontaminate the surfaces of equipment and lab materials before removing them from a BSC.
 2. Close the biohazard waste bag or container and clean the surface before removing it from a BSC.
 3. Clean the inner surfaces of the BSC, including sidewall, back wall, inside of the sash, and work area with a suitable disinfectant such as 10% bleach solution followed by 70% ethanol, an iodophor, or quaternary ammonium compound.
 4. Remove your gloves and dispose of them according to your laboratory SOP.
 5. Once these procedures have been completed, leave the blower motor on for at least 4 minutes before turning it off.
 6. Wash your hands with soap and water as appropriate.

Annual Inspections / Certification:

BSCs are inspected and certified annually by EH&S. BSC certification is indicated by labels posted on the equipment. Do not use a BSC unless within the certification retest date. Contact EH&S if an updated certification is required.

Figure 2 – NSF certification label for BSCs.





Equipment Decontamination:

Prior to BSC repairs, relocation, or disposal, BSCs in use for research involving potentially infectious agents or human-sourced material must be decontaminated by an NSF accredited professional. To schedule a BSC decontamination for these purposes, create an [on-line work request](#) or contact the Biological Safety Officer at safety@lsuhsc.edu or 504-568-6585. The cabinet must be completely cleared of any equipment, pipettes, waste, liquids, and tubing. The user must then decontaminate the surfaces with an appropriate disinfectant, such as 10% bleach solution followed by 70% ethanol solution. EH&S will coordinate with NSF accredited vendor and laboratory on scheduling equipment decontaminations. A notice of NSF decontamination will be placed on BSC once complete. Prior to use subsequent to decontamination the BSC must be recertified.

References:

1. Fundamentals of Working Safely in a Biological Safety Cabinet: <https://www.cdc.gov/labtraining/training-courses/biological-safety-cabinets.html>
2. CDC BMBL 6th Edition: <https://www.cdc.gov/labs/BMBL.html>
3. OSHA Factsheet Biosafety Cabinets: <https://www.osha.gov/sites/default/files/publications/OSHAfactsheet-laboratory-safety-biosafety-cabinets.pdf>
4. How Does a Biological Safety Cabinet Work: <https://www.labogene.com/Biological-Safety-Cabinets>