



# **Biosafety Cabinet Safety Guidelines**

2015

Safety Resources

## **Introduction**

Biosafety cabinets (BSCs) are a ventilated enclosures designed to provide primary containment for with infectious material or toxins when they are properly maintained and used in conjunction with good laboratory techniques. Class II BSCs, the most common type of cabinet used on campus, provide protection for the individual and environment, and also protection for the materials being worked within the cabinet.

The elements outlined below for the proper use of a BSC should be incorporated into the applicable standard operating procedures that are to be followed by facility personnel.



Figure 1: Biosafety cabinet.

Further detail on BSC types, installation and use may be found in the *Canadian Biosafety Standards and Guidelines*.

For further information or assistance with BSCs, please contact Safety Resources at 306-966-4675.

## **BSC Start-Up Considerations**

During the set-up of your BSC, ensure to consider the following safety tips.

- Ensure the BSC has been tested and certified in the last year. A certification sticker should be visible on the front of the cabinet.
- Ensure that the BSC sash is at the appropriate height. Adjust stool height so that underarms are level with the bottom of the sash.
- Check the pressure gauges to ensure that readings are within the acceptable range. What kind of monitors do the Health Sciences BSCs have?
- If present, test the airflow alarm and ensure it is switched to the “on” position.
- Confirm inward airflow by holding a tissue at the middle of the edge of the sash to ensure that it is drawn in.

- Disinfect the interior surfaces with a disinfectant effective against the infectious material and toxins in use in the laboratory.
- If a corrosive disinfectant must be used, the surface should be rinsed with water after disinfection.
- Assemble all materials required for manipulation and load them into the BSC.
- Care should be taken not to overcrowd or block the front or rear grilles to ensure that the appropriate airflow patterns are not compromised.
- When there is significant potential for splatter or splashes to occur during manipulations of infectious material or toxins, the work area should be lined with a plastic-backed absorbent pad.
- Place aerosol generating equipment (e.g., mixers, vortex) towards the back of the BSC, without blocking the rear grille.
- After loading material in the BSC, allow sufficient time for the airflow to stabilize before initiating work.

### **Working in the BSC**

Following are safety considerations when working in a BSC.

- Perform operations as far to the rear of the work area as possible.
- Ensure that elbows and arms do not rest on the grille or work surface.
- Avoid excessive movement of hands and arms through the front opening, which can disrupt the air curtain.
- Arms should enter/exit the BSC slowly and perpendicular to the front opening.
- Keep a bottle of an appropriate disinfectant in the BSC while work is performed to avoid having to move hands outside of the BSC.
- Segregate non-contaminated (“clean”) items from contaminated (“dirty”) items.
- Work should always flow from “clean” to “dirty” areas (see Figure 1).

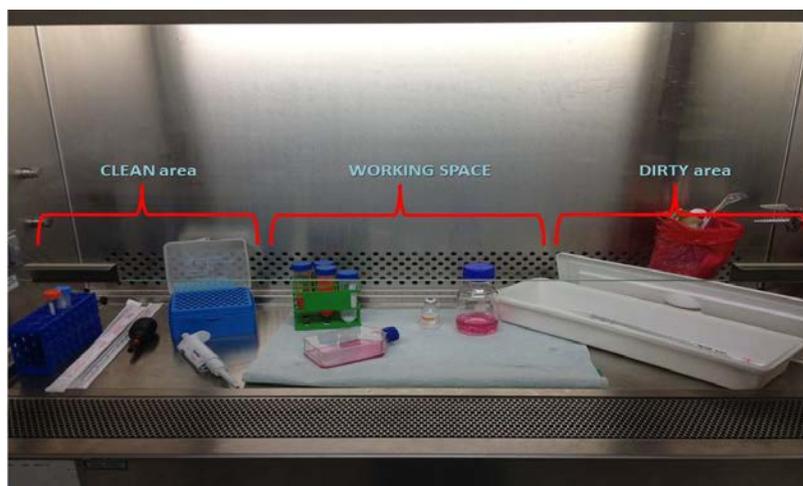


Figure 2: Proper setup when working in a BSC.

- Material should be discarded in a waste container located towards the rear of the cabinet workspace.
- **Do not** discard materials in containers **outside** of the cabinet.
- Decontaminate the surface of all objects in the BSC in the event of a spill.
- The work area should be decontaminated while the BSC is still in operation.
- Sustained open flames in the BSC are prohibited (e.g. bunsen burners, ethanol burners, etc.). On-demand open flames (e.g., touch-plate microburners) may be used as the duration of time for which the flame is produced can be controlled and limited. Non-flame alternatives (e.g. microincinerators, sterile disposable inoculation loops) should be used whenever possible.
- Natural gas and propane are prohibited from use in a BSC and any gas installed within the BSC is prohibited.
- Work in a BSC should only be conducted by one person at a time.
- Equipment creating air movement (e.g., vacuum pumps, centrifuges) may affect the integrity of the airflow and should not be used within the BSC.
- Windows that open should be kept closed when the BSC is in use.

### **Completion of Work in the BSC**

Following are safety considerations upon completion of the work in a BSC.

- Upon completion of work, allow sufficient time for the air in the BSC to pass through the filter before disrupting the air curtain by removing hands or unloading material from the BSC.
- Close/cover all containers.
- Surface decontaminate items before removing them from the BSC.
- Disinfect the interior surfaces of the BSC, including sides, back, and interior of the glass, with a disinfectant effective against the agents in use.
- If a corrosive disinfectant is used, the surface should be rinsed with water after disinfection to avoid corrosion of the stainless steel surfaces.
- Routinely remove the work surface and disinfect the tray beneath it.
- Routinely wipe the surface of the lights within the BSC with ethanol.

### **Ultraviolet Lights**

Use of UV irradiation germicidal lamps is not recommended.

Personnel wishing to use UV irradiation in BSCs should receive training on the safe work practices required and the hazards of UV radiation beforehand, including the following elements:

- UV irradiation of the work area should only be used as a secondary method of maintaining the disinfected status of a cabinet. Never rely on UV irradiation alone to disinfect a contaminated work area.

- UV irradiation is ineffective if a microorganism is protected by dust, dirt, or organic matter.
- A liquid chemical disinfectant must be the primary method of cleaning and disinfecting the interior of a BSC.
- UV irradiation does not penetrate into cracks or through the grilles of a BSC.
- UV irradiation can cause deterioration of various materials, including certain plastic and tubing.
- Never touch a UV bulb with bare hands as the natural oils from hands may leave a fingerprint and create dead space on the bulb's surface.
- UV bulbs should be cleaned frequently with an appropriate disinfectant.

The UV lamp should be routinely tested with a UV meter to ensure that the proper intensity ( $40 \mu\text{W}/\text{cm}^2$ ) is being delivered at the appropriate wavelength (254 nm) in the centre of the work area.

### **Other Resources**

*Canadian Biosafety Standards and Guidelines*, Government of Canada, 2013.