

Biosafety Cabinet SOP

CBS-SOP-012-18
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Purpose

This document provides general instructions on the use of biological safety cabinets (BSC) for the handling of biohazardous materials.

Scope

Biosafety cabinets are an engineering control strategy to limit exposure to potentially hazardous biological materials (i.e. Containment Level 2 biohazardous materials) when performing activities that may generate aerosols. All users of BSC should be familiar with the procedures outlined below.

Definitions/Acronyms

PSDS – Pathogen Safety Data Sheets are technical documents posted on the Public Health Agency of Canada (PHAC) website and used by individuals working with pathogens in the laboratory.

Requirements/Policies/Regulations

- Human Pathogens & Toxins Act S.C. 2009, c. 24
- Occupational Health and Safety Act R.S.O. 1990, c. O.1
- University of Guelph [Biosafety Policy](#)
- University of Guelph Safety Policy [851.11.01](#) Biosafety Program (Feb 2016)

Training

Training and competency:

WHMIS, Lab Safety and Biosafety training

All operators must receive training on the safe use of the BSC prior to using the equipment. Training may be delegated to a qualified individual, but it remains the responsibility of the supervisor to ensure their personnel are adequately trained.

Certification:

The Biological Safety Officer shall coordinate and maintain records of the annual certification of biological safety cabinets.

Postings:

Certification tag shall be posted on the BSC.

Maintenance

Ensure the hood certification is up to date. If hood certification has expired, do not use the hood, and call EHS (x53282) to request recertification.

Safety Precautions

- ⚠ Do not use biosafety cabinets when handling toxic, volatile or flammable materials.
- ⚠ Do not use open flames inside cabinet at any time. Open flames are not required in the near microbe-free environment of a biosafety cabinet. On an open bench, flaming the neck of a culture vessel will create an upward air current that prevents microorganisms from falling into the tube or flask. An open flame in a biosafety cabinet, however, creates turbulence that disrupts the pattern of air supplied to the work surface and can damage the HEPA filter.
- ⚠ The UV light must be turned off when the cabinet is in use.

Description of the Task

Preparation:

- Plan your experiment so you have all required items with you when you start.
- Ensure the hood certification is up to date.
- Turn off the UV light. Turn on fan (if switch-operated) and work light, and verify airflow using display or a kimwipe.
- Allow 5 minutes for airflow to stabilize and remove particulates.
- Don required personal protective equipment (lab coat, gloves, and eye protection).
- Use 70% ethanol or another suitable chemical disinfectant to disinfect the interior surfaces of the cabinet.
- Retrieve required materials from storage locations. Use a cart or tray when retrieving multiple items.
- Ensure you have the supplies needed for collecting waste; containers or bags available within the hood for temporary waste storage, and for handling spills;

paper towel, chemical disinfectant, forceps and autoclavable bags in case you have a spill inside the cabinet. This prevents in-and-out movements from the cabinet that disrupt the airflow protecting the user.

- Place surface disinfected items inside the hood separated based on 'clean' and 'dirty'. The general workflow should be from clean to contaminated (dirty) and limit the movement of dirty items over clean ones.

Procedure:

- Arrange your items as near to the back of the hood as you can without obstructing the air vents at the rear.
- Work cautiously to avoid generation of aerosols and minimize disruptions of airflow. Avoid moving your arms or items in and out of the hood as much as possible.
- Avoid moving your hands, pipettes, or other items over open containers or plates to avoid cross-contamination.
- Monitor airflow throughout your work – if unusual variations appear, close all open containers and lower the sash.
- When finished, close all containers (culture dishes, flasks, etc.).
- All containers and equipment should be surface decontaminated with 70% ethanol or another suitable chemical disinfectant and removed from the cabinet when work is completed.
- Disinfect the interior of the hood with a suitable chemical disinfectant.
- Remove/change gloves, and wash hands thoroughly.
- Allow fan to operate an additional 5 minutes to clear cabinet of contaminants.
- Turn off work light and fan (if switch operated) and turn on UV light for an automated cycle of at least 20 min. U.V. lights can accumulate dust and dirt that will block the germicidal effectiveness of the light. Clean U.V. lamps regularly to remove such build-up.

Contingency Plan and Reporting

Power Outage:

In the event of a power outage the sash on the cabinet must be closed. There may not be sufficient airflow to ventilate the BSC and provide operator protection.

Equipment Malfunction:

If a fan stops working:

- Immediately stop all work and close all open containers within the cabinet.
- Close the sash fully.

- Remove lab coat and gloves, and thoroughly wash hands.
- Wait 30 minutes for aerosols to settle.
- Use a suitable chemical disinfectant, and cautiously wipe down the exterior of all items before removing from cabinet.
- Affix a warning sign (e.g. "OUT OF ORDER. DO NOT USE") to the cabinet.
- Do not attempt to reuse the biosafety cabinet until the problem is fully resolved.

Incident Response:

Complete the [Incident Report Form](#) to report the spill to your supervisor and EHS.

Spill Cleanup:

If a spill occurs within the biosafety cabinet:

- Refer to CBS-SOP-010-18 Biohazard Spills
- Keep the fan operating and cover the spill with absorbent material.
- Soak the area with a suitable chemical disinfectant and leave undisturbed for 20 minutes.
- Place the saturated absorbent materials in a clean biohazard waste bag.
- Use a paper towel soaked in chemical disinfectant to clean the interior of the hood, including the tray under the work surface.
- Allow cabinet to run for an additional 10 minutes.

Waste Management and Environmental Responsibility

- Place segregated waste in closed, labelled, and leak-proof containers that have been surface decontaminated (wiped down with 70% ethanol or another suitable chemical disinfectant) prior to removal from the BSC.
- Available options for treatment and disposal of solid waste (e.g., paper towels, gloves, media plates, bench cover) are:
 1. Autoclave (i.e. steam sterilize in an instrument performance verified with biological indicators)
 2. Contact Lab Safety Officer to be on a designated weekly/on call list for an external vendor "Biohazard" pick-up (Offsite Treatment). Maximum storage time in the lab is 7 days.
- Available options for treatment and disposal of liquid waste (e.g., microorganism or virus cultures or infectious liquid media or broth waste) are:
 1. Treat with bleach (9:1) for 30 minutes and pour it down the lab sink
 2. Autoclave (i.e. steam sterilize in an instrument performance verified with biological indicators) & then pour it down the sink

3. Contact Lab Safety Officer to be on a designated weekly/on call list for offsite biohazard treatment by an external vendor.
- Discard sharps in a CSA-approved sharps collector (leak-proof, rigid, puncture resistant, and fitted with a lid). Do not bend, break or remove needles from the syringes or overflow sharps container. Once the container is $\frac{3}{4}$ full, surface decontaminate container and remove from cabinet. Autoclaved sharps container, complete the “Surplus Chemical and Sharps Disposal Request” and tag with University of Guelph’s hazardous chemical waste yellow tags.

References/Material/Resources

- Canadian Biosafety Standards 2nd edition (2015) sections 3.7, 4.6, and 5.1
- Canadian Biosafety Handbook 2nd edition (2016) – Chapter 11 BSC
- Canadian Biosafety Guideline - Containment Level 1: Physical Design and Operational Practices
- Safety Data Sheets (SDS), Pathogen Safety Data Sheets (PSDS)
- Animal disease fact sheets - Canadian Food Inspection Agency
- Carlton University EHS Safety Sheet #3
- EHS Biosafety Manual (Jan 2017)
- BSC manual from manufacturers
- UoG-CBS-SOP-010-18 Biohazard Spills

Distribution of Copies

Document accessible on [CBS website](#)

SOP History

Biosafety Cabinet SOP v 15-Jan-2008 prepared by A. Doane

Reason for Changes:

- Inclusion of waste management and environmental responsibility
- Update and expansion of references
- Reformatting to meet AODA compliance

Review Frequency:

All CBS SOP’s are to be reviewed every two years or as changes in legislation or procedures necessitate.