

THE ABCs OF BSCs

WHICH CABINET DO I NEED?

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LEARNING OBJECTIVES

After attending this session, attendees should be able to:

1. Understand the process needed to select the correct biological safety cabinet for the application
2. Be able to identify common design and installation pitfalls and understand how to avoid them.
3. Explain why an exhausted Class II Type A2 cabinet is not inherently safer than a recirculated cabinet.
4. Understand when an exhausted biological safety cabinet is needed and how much exhaust is required.

Presentation Description – Navigating the world of biological safety cabinets (BSCs) can be bewildering. Selecting the correct cabinet is critical to ensure users are protected and energy consumption is minimized. This session will discuss best practices to identify lab user needs and match them with the right cabinet to provide a functional, sustainable result. Case studies will be used to illustrate the BSC selection process and to offer guidance on common pitfalls and how to avoid field "surprises" or unsafe installations.



PRESENTER



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AGENDA

- 1. WHEN AND HOW BIOSAFETY CABINETS ARE USED**
- 2. RELEVANT GUIDES AND STANDARDS**
- 3. COMMONLY USED BIOLOGICAL SAFETY CABINETS**
- 4. TIDBITS ABOUT BIOSAFETY CABINETS**
- 5. KEY TAKEAWAYS**

WHEN AND HOW BIOSAFETY CABINETS ARE USED



BIOLOGICAL SAFETY CABINETS

- Biosafety cabinets or “BSCs”
- Primary containment for work with biological hazards
- Most often used to protect user from exposure and protect a sample from contamination
- Institution must conduct a risk assessment
- This presentation will focus on Class II Type A2 and Class II Type B2 cabinets



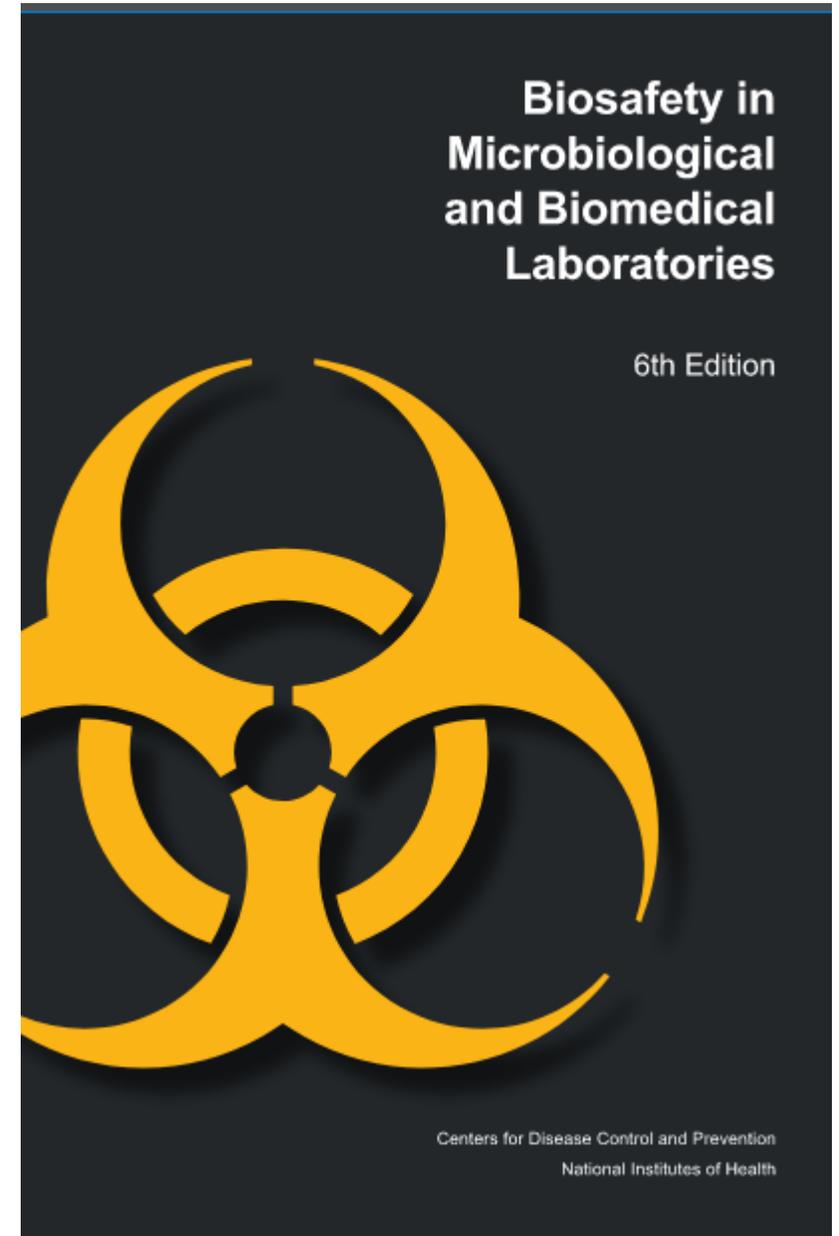
RELEVANT GUIDES AND STANDARDS





THE BMBL

- **CDC/NIH Document**
- **Appendix A covers Selection, Installation, and Use of Biological Safety Cabinets**





NSF/ANSI STANDARD 49

- **Design, Construction, Performance, and Field Certification of Biosafety Cabinets**
 - **Airflow Velocity**
 - **HEPA Filtration**
 - **Construction Materials**
 - **Noise and Vibration**
 - **Illumination**
 - **Performance Testing Protocols**



COMMONLY USED BIOSAFETY CABINETS



CLASS II TYPE A2

- Most often used BSC
- Provides product and personnel protection
- Commonly used for Cell Culture
- Can be recirculated or exhausted



CLASS II TYPE B2

- More rare than A2
- Provides product and personnel protection
- Fully exhausted
- May need bubble tight damper for decontamination



TIDBITS ABOUT BIOSAFETY CABINETS



COMPRESSED GASES

- Compressed gases should never be hard piped to a biosafety cabinet
- Vacuum is OK



CABINET LOCATION

- **Away from main doors and main walkways**
- **Locate supply diffusers away from cabinets**
 - **Consider using a low velocity style diffuser**
- **Cross drafts from doors, foot traffic, and supply air can pull air out of the cabinet**



SHOULD AN A2 CABINET BE EXHAUSTED?

- Yes, if it's been working hard, it might be exhausted 😊
- Most work can be conducted safely in a recirculated cabinet
- Cabinets have HEPA filters that capture biological pathogens
- Exhausting an A2 cabinet does not make it “safer” for the user



SHOULD AN A2 CABINET BE EXHAUSTED?

- Per the BMBL, an A2 cabinet should be exhausted:
 - If small amounts of volatile toxic chemicals are used
 - If small amounts of radionuclides are used
 - Requires that the institution conduct a risk assessment
- If a process produces objectionable odors
 - Processing stool samples, for example



HOW DOES AN A2 CABINET GET EXHAUSTED?

- By installing a canopy
 - Provided by the BSC manufacturer
 - Canopies have small openings that pull in room air along with the air from the BSC
 - Canopy makes an “indirect connection”
- Size the exhaust system for the cabinet exhaust plus the room exhaust pulled in through the canopy
- Never connect an A2 cabinet directly to building exhaust (NSF/ANSI Standard 49)
- Be sure the ceiling is high enough to accommodate the canopy



THINGS TO KNOW ABOUT B2 CABINETS

- B2 cabinets are fully exhausted
- Highly sensitive to pressure changes in the exhaust system
 - BMBL recommends using a dedicated, independent exhaust system
- Locate the fan on the roof to avoid positively pressurized ductwork
- Install a flow monitor and interlock it to shut off the BSC internal supply fan in the event of an exhaust failure
- If volatile chemicals are used, check compatibility with filter and gasket materials
 - Carbon filters may be needed. HEPA filters do not capture volatile chemicals



KEY TAKEAWAYS





KEY TAKEAWAYS

- **Choose the right cabinet for the application**
- **Perform a risk assessment (institution, not consultants need to do this)**
- **An exhausted A2 cabinet is not inherently safer than a recirculated cabinet**
- **Use a dedicated, independent exhaust system for B2 cabinets**



Q & A

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