

2.04 - SAFETY EQUIPMENT

PART 1 – GENERAL

PART 2 -- PRODUCTS

Biological safety cabinets (BSCs) are required in BL2/3 laboratories for manipulations of infectious agents that have the potential of creating aerosols. As a general rule, BSCs in a BL2 laboratory are recirculating units, although they can be vented by design. BSCs in a BL3 are exhausted through a separate BL3 exhaust fan system in the building. Please consult the EHS (2-6816) for more information.

1. Biological safety cabinets, whether purchased through the UW Purchasing Department contract or as part of a building contract, shall meet all EHS requirements (see reference, Appendix B).

Directive: EHS

Justification: Extensive testing has shown that purchase of BSCs without generic specification requirements results in unsatisfactory units that are very expensive to maintain and may jeopardize research projects during servicing.

2. The type of cabinet to be used shall be determined during the design process by research applicability and because it may be part of the laboratory exhaust system.

Guideline: CDCINNIH BMBL, Appendix A

Directive: EHS

Justification: Not all BSCs are appropriate for a specific intended use. The EHS must be consulted before procurement.

3. BSCs shall be located away from the laboratory door and other high traffic areas.

Guideline: CDCINNIH BMBL, Appendix A

Standard: NSF 49

Justification: The effectiveness of BSCs is compromised by outside air currents and the movement of laboratory personnel.

4. Two BSCs shall not be installed closer than 48 inches (front to front).

Standard: NSF 49

Justification: Laminar air flow is interrupted by concurrent operation of two cabinets within 48 inches of each other. The potential for air turbulence increases when two cabinet operators are working at the same time in the immediate vicinity.

5. All cabinets shall be NSF listed, UL approved and installed according to manufacturer and university requirements.

Guideline: CDCINNIH BMBL, Appendix A

Directive: EHS

Justification: The cabinet manufacturer has designed BSCs that, when used and installed properly, will provide product, environmental and personnel protection. However, if a cabinet is not installed properly (e.g., if a Class II, B2 cabinet is not ducted or if a cabinet is located near supply air outlets or heat

registers), it may not be serviceable. Furthermore, to install a cabinet and deviate from the listed NSF requirements will void the NSF 49 approved listing and jeopardize field certification.

6. A biosafety cabinet shall not be installed directly opposite an autoclave.

Guideline: CDCINNIH BMBL, Appendix A

Directive: EHS

Justification: The exhaust from an autoclave contains heat and moisture, that may interfere with the air barrier of the BSC. This could cause air turbulence in the BSC and adversely affect the unit's performance. There is also an increase of potential contamination within the cabinet if the autoclave is not functioning properly, since the steam may contain spores or aerosols. Furthermore, operator usage of an autoclave will create traffic in the vicinity of the cabinet air barrier, further deteriorating performance.

7. All BL2 & 3 experiments performed concurrently with minute quantities of toxic chemicals or trace amounts of radionuclides shall be done in a Class II, Type 131, B2 or 133 cabinet.

Guideline: CDCINNIH BMBL, Appendix A

Directive: EHS

Justification: A Class II, type A cabinet recirculates 70% of its air within the room, and HEPA filters do not provide protection from chemical vapors, gases or volatile radionuclides. Therefore, activities involving these materials shall be performed in a Class II, type B cabinet that has been properly vented and field-certified or in an approved Class II Type A that has been "thimble" connected to the exhaust duct work and field certified.

8. All BSCs shall be field certified when first installed in the laboratory and at least annually thereafter. They must also be recertified after relocation, filter replacement or service within a contaminated cabinet plenum.

Guideline: CDCINNIH BMBL, Appendix A

Standard: NSF 49

Directive: EHS

Justification: HEPA filters and gaskets inside a BSC can shift during transport and deteriorate over time, potentially allowing hazardous materials to leak from the cabinet and into the laboratory. The BSC must be tested annually to guarantee containment, as well as product and environmental protection.

9. Uncombusted natural gas shall not be introduced into a BSC atmosphere.

Directive: EHS

Justification: Introduction of natural gas into a BSC atmosphere violates the prohibition against use of flammable material within a cabinet. However, natural gas may be used within a BSC to support controlled combustion, provided the following conditions are met. Gas burners must be OBS-authorized, small-flame sterilizers such as "Touch-o-Matic" burners. The cabinet must be hard-plumbed with an exterior, accessible gas shut-off valve, union and recommended stainless steel flex connection (such as manufactured by Swaglock). This assembly shall be connected to a side wall bulkhead connector and natural gas petcock as provided by the cabinet manufacturer. Since natural gas used solely to support small, controlled combustion is not directly released into the cabinet atmosphere, it is not considered a flammable substrate and therefore does not conflict with the prohibition against use of flammable material within cabinets.

DESIGN STANDARDS

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Use of unauthorized burners or natural gas introduced by soft plumbing through the working face or any other portal is a fire hazard and is prohibited. Such use will be reported to the laboratory supervisor and unauthorized burners or plumbing shall be removed.

B. Centrifuges in BL2/3 laboratories shall be equipped with sealed rotor heads or used with covered safety containers. Continuous flow centrifuges or other equipment that may produce aerosols should be contained within devices that exhaust air through certified HEPA filters.

Guideline: CDCINNIH BMBL, Section C.1.B, page 23
Directive: EHS

Justification: The use of centrifuges can produce bioaerosols, and accidents involving centrifuges may result in a breach of containment and/or in laboratory-acquired infections. Therefore, standard operating practices and engineering controls must be adhered to in BL2/3 laboratories.

C. Vacuum lines shall be protected with liquid disinfectant traps and, for some applications, in-line HEPA filters.

Directive: EHS

Justification: These features protect laboratorians and university personnel who service ancillary support equipment.

D. Compressed gas cylinders shall be secured.

Standards: NFPA 45 and NFPA 99

Justification: Prevents explosion hazards.

PART 3 – EXECUTION

END OF SECTION