PROVIDENCE
Sacred Heart
Medical Center &
Children's Hospital

Biosafety Cabinet Operation & Maintenance Procedure

Department of Microbiology

Effective date: 08/03/2007

Last Revision: 04/10/2012

Last reviewed: 03/2014

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1.0 Purpose

Various laboratory procedures generate aerosols that may spread biohazardous material in the work area and pose a risk of infection to the worker. Biological safety cabinets (BSC) are used to prevent the escape of aerosols or droplets that could expose the worker to microorganisms and to protect the specimen from airborne contamination. There are three major classes of BSC. Class I, Class II, and Class III.

- **Class I**: are enclosures similar to fume hoods, with an inward airflow through the front opening. The exhaust air from the biological safety cabinet is passed through a HEPA filter so that the equipment provides protection for the staff working in the laboratory. The product in the cabinet, however, is subject to contamination.
- **Class II**: are designed to protect the workers and the product. Class II cabinets are vertical laminar-flow cabinets with a partially open front. Airborne contaminants in the cabinet are prevented from escaping across this opening by a curtain of air formed by unfiltered air flowing from the room into the cabinet and HEPA filtered air supplied from an overhead grill down into the cabinet. A portion of the filtered air is used to maintain the air curtain, and the remainder passes down onto the work surface, and is drawn out through the grills at the back and front edges of the work surface. The HEPA filtered air from the overhead grill flows in a uniform downward movement to minimize the air turbulence. It is this air that provides and maintains a clear air work environment. A percentage of air drawn through the front and back grills of the work surface is also HEPA filtered and exhausted from the cabinet.

- **Class III**: are generally used for extremely hazardous work (e.g. BSL 4 labs at the CDC) or experiments with a high potential for aerosolization of an agent that I s transmitted by aerosolization.

2.0 Safety

Performance of this procedure will expose testing personnel to biohazardous material. All specimens must be handled as potentially infectious material as outlined in the Microbiology Biohazards and Safety document. Follow proper handling, storage, and disposal of specimens and items that come into contact with specimens. Place contaminated materials in a biohazardous waste container.

This procedure may expose you to:

- Enteric pathogens
- Bloodborne pathogens
- Airborne pathogens

To perform this procedure, you must use:

- Gloves
- Laboratory Coat
- Biological safety cabinet
- An N95 respirator must be worn when working in the Mycobacteriology and Mycology biosafety cabinets in the BSL-3 lab

Disinfectant following procedure:

- Bleach dilution sprayers or wipes can be used for on demand disinfectant.

Reference for spill/decontamination

- Microbiology Biohazards and Safety

3.0 Procedure for Operation

1. Blower should remain on 24 h a day except for maintenance.
2. Keep only essential materials in the cabinet.
3. Materials should be arranged within the cabinet for aseptic workflow. Dirty materials (waste buckets) should be on one side of the cabinet and clean materials (sterile swabs) should be on the other side of the cabinet. When working in the cabinet, do not pass dirty materials over clean area or vice versa. Sterile swabs should be covered when not in use.
4. Do not obstruct air intake or rear exhaust grills. Doing so will impede laminar airflow and create a potential safety hazard.
5. Manipulate specimens well within the cabinet, at least 6 inches from the front sash.
6. If the cabinet blower needs to be shut off, allow 3 min of operation to purge the system following any activity within the cabinet.
7. If the flow alarm is activated on one of the safety cabinets do not use the cabinet for processing specimens. Notify the Microbiology supervisor and contact Clinical Engineering (4-4707).

4.0 Maintenance and Certification

4.1 Daily Maintenance

1. At the beginning of first shift, wearing disposable gloves, wipe the back, sidewalls and work surface with 10% bleach.
2. Check the air intake and rear exhaust grills for obstructions.
3. For the class II safety cabinets in the specimen processing area, record the Magnehelic gauge reading daily. The acceptable limits for each cabinet can be found on the log or in the

LIS. If the reading does not fall within acceptable limits, do not use the cabinet, and notify the supervisor or charge tech as soon as possible.
4. Before removing any materials, allow the cabinet to run 2-3 min following manipulation of any clinical specimens.
5. Be sure dirty materials are on one side of the cabinet and clean materials are on the other side.
6. Keep only essential materials in the cabinet.

4.2 Monthly Maintenance

1. Wearing disposable gloves, wipe back, sidewalls, and work surface with 10% bleach.
2. Allow the cabinet to run 2-3 min to purge the system.
3. Turn off the blower.
4. Empty all materials from the cabinet.
5. Remove the bottom tray and clean the bottom of the cabinet with 10% bleach.
6. Replace the bottom tray and necessary materials. Arrange dirty materials on one side of the cabinet and clean materials on the other side.
7. Turn blower on.
8. Allow 3 min of operation to purge system.
9. Verify that the Magnehelic gauge reading is between 0.16 and 0.23.

5.0 General Work Practices for Biosafety Cabinets and Fume Hoods

The following are work practices that must be adhered to by all employees/students if proper hood performance is to be achieved. They should be posted in each room containing a biosafety or fume hood:

1. Know the hazard characteristics of the chemical with which you are working. If you are not sure, check the chemical's Material Safety Data Sheet (MSDS). Be sure to wear all personal protective equipment (e.g. lab coat, gloves). Biosafety and fume hoods are not intended to replace personal protective equipment.
2. Never lean into the hood as to allow your head to enter the plane of the hood face.
3. Do not allow equipment inside the biosafety hood to block airflow through the baffles.
4. Keep all materials inside the hood at least six (6) inches from the biosafety hood face.
5. Minimize movement in and out of the hood and in front of the hood, to avoid disruption of the curtain of air that protects workers from microorganisms within the hood.
6. Do not permanently store any flammable or combustible materials inside the hood; use only quantities that are necessary for performance of the day's work, and return all flammable and combustible materials to approved storage cabinets.
7. Lower the sash on the biosafety hood just to the point where the alarm is silenced. Some hoods may have an arrow along the side with which to line up the sash. This is the height that provides optimum performance as reflected in testing by a certified testing contractor.
8. Any employee or student who feels that a hood is not functioning properly should not use the hood and report the problem to Clinical Engineering (4-4707).

6.0 Document Control History

Microbiology Director Approval: Dr. Ann Robinson 08/03/2007

Medical Director Approval: Reviewed by Dr. Schappert 3/10/2010

Microbiology Supervisor Reviews: Jerry Claridge 08/03/2007, 11/2008, 10/2009, 05/2011, 03/2012, 03/2014

Revisions: 04/10/2012 Updated maintenance and operation details.