

## C-16. LABORATORY EQUIPMENT

### I. PURPOSE

To facilitate the decontamination, certification, and proper function of laboratory equipment.

### II. DEFINITIONS

**Biological Safety Cabinet (BSC)** - Is a type of engineering control used for the containment of potentially biohazardous aerosols generated by many microbiological laboratory procedures. Three types of BSCs (Class I, II, III) are used in microbiological laboratories. Open-fronted Class I and Class II biological safety cabinets are primary barriers which offer significant levels of protection to laboratory personnel and to the environment when used with good microbiological techniques. The Class II also provides product protection within the cabinet. The gas-tight Class III biological safety cabinet provides the highest attainable level of protection to personnel and the environment.

**Decontamination** - Is the use of physical or chemical processes to remove, inactivate, or destroy living organisms to some lower level (not necessarily zero).

**Disinfection** - is the selective elimination of certain undesirable microorganisms to prevent their transmission

**Disinfectant** – A chemical agent that eliminates a defined scope of pathogenic organisms, but not necessarily all microbial forms.

**Engineering Controls** - Mechanisms to physically isolate or remove the agent from the workplace.

**Primary Barriers** - Safety equipment (including enclosed containers and other engineering controls) designed to remove or minimize exposures to hazardous biological materials.

**Secondary Barriers** - Features incorporated into the design of the facility to protect persons working inside and outside of the laboratory. The recommended secondary barrier design is based on the risk level and mode of transmission of specific agents.

**Sterilization** - The use of a physical or chemical process to destroy all microbial life, including extremely nonlabile bacterial endospores. The operational

definition of sterilization is a carefully monitored process that will assure that the probability of an item being contaminated by a microbe to be equal to or less than one in a million.

**Work Authorization Tag** - Form used to document the need for and proper conduct of effective biological, chemical, and/or radiological decontamination.

### III. **RESPONSIBILITIES**

- A. EHS is responsible for assisting in and actual decontamination of certain laboratory equipment in accordance with the current Standard Operating Procedures.
- B. EHS is responsible for providing appropriate training to individuals approved to sign work authorization tags.
- C. Laboratory Supervisors and Building Managers are responsible to ensure that equipment is properly identified and decontaminated before movement or work on the equipment is initiated.

### IV. **PROCEDURES**

- A. Biological Safety Cabinets (BSC)
  - 1. EHS personnel will decontaminate BSCs using an appropriate method prior to annual certification or internal repair work. FME personnel will perform annual certification of all BSCs and necessary repair work.
  - 2. The identified laboratory contact will be contacted by EHS to schedule decontamination and certification of each BSC in their respective work area.
  - 3. Laboratory personnel are responsible for removing from the BSC all supplies and equipment prior to decontamination.
- B. Work Authorization Tags
  - 1. EHS conducts training for both biological and chemical decontaminations in conjunction with work authorization tag procedures. This is often referenced as "Decon Qualified" training. Once an individual completes this one-time training, they are authorized to perform the applicable responsibilities. This training is

documented in the OHM training database.

2. Specific guidelines for operation and decontamination of laboratory equipment are contained in Section 4 of the NCI-Frederick Safety and Environmental Compliance Manual. These guidelines ensure the proper decontamination of equipment for safety clearance.
3. Authorized laboratory personnel will decontaminate the equipment and sign the portion of the tag marked "decontaminated by" and the supervisor initials the tag to verify decontamination.
4. In order to initiate the actual repair/calibration/replacement of the equipment, the requestor will notify the appropriate department (i.e., Trouble Desk, Property, or the Scientific Equipment Repair Coordinator) as appropriate.
5. The requestor will submit a completed work authorization tag to EHS (Tags can be obtained by contacting EHS at x1451).
6. Once a work authorization tag is received, EHS will verify that the equipment does not pose a hazard from biological, chemical, and radiological contamination, according to the potential contaminant of concern as indicated on the "work authorization tag".
7. Laboratory personnel are responsible for following these instructions for tag initiation and proper decontamination of laboratory equipment prior to work authorization by individuals authorized by EHS to sign work authorization tags.

C. Engineering Controls

1. Engineering controls include primary (protective equipment) and secondary barriers (facility design).
2. The requestor submits a purchase request (PR) through the appropriate channels to Purchasing which will in-turn ensure that EHS reviews the PR for proper selection of equipment.

D. Autoclave Monitoring

1. EHS provides laboratory personnel bi-annual autoclave monitoring services to determine efficiency and adequacy of microbiological kill.
2. EHS will send *B. sterothermophilis* ampules to a designated contact person for each autoclave bi-annually for monitoring/validation purposes (Refer to NCI-Frederick Safety and Health Manual, Section 4).
3. The identified contact is sent an ampule for each autoclave in their area. Instructions are provided for the placement of an ampule within the autoclave during the run. The contact is to return the ampule to Biological Safety for incubation to determine if autoclave has provided a proper microbiological kill. Results will be sent to the contact for their information and records. The user should maintain these results as long as the autoclave is in service. Autoclave owners are encouraged to institute a routine monitoring program which includes keeping a log and utilizing biological indicators on a regular basis. For more information on developing an autoclave-monitoring program contact EHS at x1451.

E. Space Decontaminations

1. Gas or vapor phase decontaminations of animal areas are performed to provide a pathogen-free environment for specific animal research projects.
2. Decontamination using an appropriate chemical disinfectant may be used on environmental surfaces.
3. Laboratory personnel or building managers shall contact EHS for space decontamination in their area.
4. EHS will coordinate with the requestor to determine the appropriate decontamination method to be used.
5. EHS will coordinate the date of decontamination and provide instructions to laboratory personnel (if applicable) prior to setting up decontamination.

V. **REFERENCES**

NSF 49 - Class II (Laminar Flow) Biohazard Cabinetry  
29 CFR 1910.1030 - Occupational Exposure to Bloodborne Pathogens  
Containment Equipment: Certification of BSCs when moved and at least  
annually, appropriate personal protection, and physical containment devices.  
29 CFR 1910.1048 - June 1994 Occupational Exposure to Formaldehyde  
CDC/NIH Guidelines- Biosafety in Microbiological and Biomedical Laboratories  
NCI-Frederick Exposure Control Plan