

MU IBC Ultraviolet Lamp Usage in Biological Safety Cabinets Policy

The Marshall University Institutional Biosafety Committee discourages the use of UV lamps in biological safety cabinets (BSC). The NIH, CDC, NSF/ANSI, and ABSA all concur that the use of UV is neither recommended nor necessary in BSCs. (Burgener, J. 2006 and the NIH Office of Research Services)

“Past experience has proven that good techniques in conducting experiments are highly effective in preventing contamination. The use of UV radiation does not eliminate the necessity for using good practices and procedures.” – NIH Office of Research Services <http://www.ors.od.nih.gov/sr/dohs/BioSafety/decon/Pages/decontamination.aspx>

Recommended BSC Work Practices:

1. The UV lamp should **never** be on while an operator is working in the cabinet, as exposure to UV light can cause painful eye and skin burns. If any personnel working with or around UV lights are concerned about their exposure they should contact Nathan Douglas in Environmental Health & Safety.
2. When a UV light is operated, the fan should be off and the sash must be closed as far as possible (reducing UV exposure levels to room occupants to a negligible level).
3. A liquid chemical disinfectant must always be the **primary** method of cleaning and disinfecting the interior of a BSC, as well as the surfaces of all materials and containers placed into the cabinet. Ethanol is not permitted to be the sole disinfectant as it evaporates too quickly to meet required contact times to inactivate all microorganisms of concern. Ethanol can be used following the use of an approved disinfectant. Approved disinfectants must have an EPA registration number, be labeled as effective against HIV-1 Virus, HIV-1 Virus and Hepatitis B Virus, *Mycobacterium tuberculosis* (tuberculocidal), or all three (EPA-registered product lists B, C, D, E); and must be used in accordance with the label's instructions. EPA-registered disinfectant product lists are available at: <http://www.epa.gov/oppad001/chemregindex.htm>.
4. UV irradiation of the work area should only be used as a **secondary** method of maintaining the disinfected status of a cabinet; it should never be relied on alone to disinfect a contaminated work area.
5. Germicidal UV irradiation for longer than 15 minutes is counterproductive because it produces no additional germicidal benefit and it accelerates equipment degradation. UV light can cause deterioration of some tubing. This can be dangerous if you are using a natural gas burner with tubing in a BSC. It is highly recommended that burners be replaced with a hot bead sterilizer or electric incinerator, or that sterile disposable equipment (loops, spreaders, etc.) be used. When a burner is required, all tubing must be inspected regularly and replaced if cracking is observed, and it is

recommended that gas tubing be stored away from UV exposure while the lamp is in operation.

6. All supplies (gloves, pipette tips, culture plates, flasks, and culture media) should be stored outside of the cabinet and only those materials and equipment required for the immediate work should be placed in the BSC, and only after having their exterior container surfaces disinfected. UV light does not penetrate into cracks, through the grill work of a BSC, or in the shadows cast by any materials left in the BSC. Attention must be paid to the spill area under the work surface of a BSC while performing disinfection.
7. The intensity of the UV lamp is affected by the accumulation of dust and dirt on its surface. Do not touch a UV bulb with your bare hands. The natural oils on your hand can leave a fingerprint and create dead space on the bulb's surface. UV bulbs must be cleaned frequently by turning off the UV light and wiping off the surface of the room temperature bulb with 70% alcohol.
8. UV light cannot be used as a decontaminant unless the lamp is **properly maintained**. The UV lamp should be tested every six (6) months with a UV radiometer to ensure that the proper intensity ($40 \mu\text{w}/\text{cm}^2$) is being delivered. If no meter is available, the bulb should be replaced at least annually. The bulb will produce blue light long after the germicidal effectiveness is gone.
9. Due to the mercury content of UV lamps, they must be disposed of as a hazardous waste. Contact Environmental Health & Safety at 696-3461 for disposal.
10. We recommend that investigators read published guidance on the use of UV lights including (1) Position Paper on the Use of Ultraviolet Lights in Biological Safety Cabinets. Burgener, J. Applied Biosafety 11:228-230 (2006) and (2) The NIH Office of Research Services Division of Occupation Health and Safety (Decontamination and Sterilization section) <http://www.ors.od.nih.gov/sr/dohs/BioSafety/decon/Pages/decontamination.aspx>

A significantly more effective and recommended strategy to reduce or eliminate contamination utilizes well-practiced microbiological procedures, good aseptic techniques, standard operational procedures for working in BSCs, and thorough decontamination procedures with a tested, effective disinfectant before and after BSC use.

If you have any questions regarding the use of a UV lamp, please contact the IBC Chair or Environmental Health and Safety.