



## ENVIRONMENTAL HEALTH & SAFETY FACT SHEET: UV LIGHTS ARE NOT RECOMMENDED IN BIOSAFETY CABINETS



### Germicidal Effects of UV Light in Biological Safety Cabinets

The Centers for Disease Control (CDC) and the National Institute of Health (NIH) agree that **UV lamps are not recommended nor required in biological safety cabinets**<sup>2</sup>.

The activity of UV lights for sterilization/decontamination purposes is limited by a number of factors including<sup>4</sup>:

- Penetration** - In a dynamic air stream (e.g. biological safety cabinet): UV light is not penetrating. Microorganisms beneath dust particles or beneath the work surface are not affected by the UV irradiation. UV irradiation can cause erythema that may damage both the skin and eyes of laboratory. Eyes and skin are primarily involved because UV does not penetrate deeply into tissue. These effects are generally not permanent but can be quite painful.
- Relative Humidity** - Humidity adversely affects the effectiveness of UV. Above 70% relative humidity, the germicidal effects drops off precipitously
- Temperature and Air Movement** - Optimum temperature for output is 77-80°F. Temperatures below this optimum temperature result in reduced output of the germicidal wavelength. Moving air tends to cool the lamp below its optimum operating temperature and therefore results in reduced output.
- Cleanliness** - UV lights should be cleaned weekly with an alcohol and water mixture as dust and dirt can block the germicidal effectiveness of the ultraviolet lights.
- Age** - UV lamps should be checked periodically (approximately every six months) to ensure the appropriate intensity of UV light is being emitted for germicidal activity (UV C). The amount of germicidal wavelength light emitted from these bulbs decreases with age and bulb ratings (hours of use) may vary by manufacturer.

### Performance Standards for UV Light in Biological Safety Cabinets

The Center for Disease Control (CDC) and the National Institute of Health (NIH) agree that UV lamps are not recommended nor required in Biological Safety Cabinets (BSC)<sup>2</sup>. The National Sanitation Foundation (NSF) Standard 49<sup>3</sup>, the industry testing standard for all biohazard cabinetry, does not provide any performance criteria for UV lighting and specifically states in section 4.24.2 that “**UV lighting is not recommended in class II (laminar flow) biohazard cabinetry.**” as it is possible to produce ozone levels from UV wavelengths below 250 nm sufficient to affect rubber or other polymer made materials, low or no ozone UV light bulbs are commercially available.

### Recommendations

Due to the short time for UV overexposure to occur, it is recommended that neither laboratory nor maintenance personnel work in a room where UV lights are on<sup>1</sup>. The CDC, NIH and NSF agree that UV lamps are neither recommended nor required in Biological Safety Cabinets (BSC). **Criteria is not even available from NSF to evaluate the performance of the UV lights within a biological safety cabinet.** Numerous factors affect the activity of the germicidal effect of UV light, which require regular cleaning, maintenance and monitoring to ensure germicidal activity.

1. Ultraviolet Radiation Exposures in Biomedical Research Laboratories, Mark L. Noll. Appl. Occup. Environ. Hyg. 10(12) December, 1995, pp. 969-972.
2. Primary Containment for Biohazards: Selection, Installation and Use of Biological Safety Cabinets, U.S. Department of Health and Human Services, Public Health Services, CDC, and NIH, September 1995. US Government Printing Office Washington, 1995.
3. NSF International (NSF) Standard 49: Class II (Laminar Flow) Biohazard Cabinetry, The NSF Joint Committee on Biohazard Cabinetry, May 1992.
4. Keene, Jack; Certification and Use of Biosafety Cabinets (BSC's) © 1999 Biohaztec Associates, Inc., Midlothian, VA.

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