

Guidelines for Exposure to Ultraviolet Light

American Conference of Governmental Hygienists Guidelines for Exposure to Ultraviolet Light Related to Typical Conditions of Exposure ^[1]

THRESHOLD LIMIT VALUES FOR ULTRAVIOLET RADIATION EXPOSURE

Threshold Limit Values (TLV's) for ultraviolet radiation are recommended by the American Conference of Governmental Industrial Hygienists and represent conditions under which it is believed that nearly all workers may be repeatedly exposed without adverse effect.

These values for exposure of the eyes or skin apply to UV radiation from arcs, gas and vapor discharges, fluorescent and incandescent sources, and solar radiation, but do not apply to UV lasers. They do not apply to UV exposure of photosensitive individuals or of individuals concomitantly exposed to photosensitizing agents.

The recommended TLV for the near UV spectral region (320 to 400 nanometers) is that total irradiance incident upon the unprotected skin or eye should not exceed an intensity of 1 mW/cm² for periods greater than 17 minutes and should not exceed 1 Joule/cm² for exposure times less than 17 minutes.

To put this into perspective, 1 mW/cm² is the intensity level one would expect to read on a cloudless, spring day in New England if the radiometer sensor/probe were aimed directly at the sun. In subtropical latitudes on sunny days, a reading of 3 mW/cm² would be typical.

UV light sources produce moderate to high levels of intensity at close range in a flooded field of specific dimensions or in a focused beam or spot. Intensity of UV light is inversely proportional to the square of its distance from the light source. Thus, intensity diminishes quickly the further away from the source it is measured. For example, in an experiment performed at Dymax Corporation, an unshielded Dymax 2000-EC UV flood lamp was mounted on its stand and aimed down at a standard matte black, wooden work surface. The lamp was 6" above the work surface, where an intensity of 45 mW/cm² was read. The lamp sat on a counter which was 36" above the floor. A reading taken at the eyes of a 5'-9" technician who was standing directly adjacent to the counter registered 0 mW/cm². The technician's eyes were 27" from the work surface.

In another example, with a 2000-EC lamp mounted 7" away from the work surface and a reading of 16 mW/cm² on the surface, readings were taken at the edge of the work surface and at 1 inch intervals away in a horizontal plane. Readings at the edge of the unshielded work surface (1" away) were 5 mW/cm², at 2"-4 mW/cm², at 3" were 3 mW/cm², at 4 inches were 2 mW/cm², and at 5 inches, 1 mW/cm².

All Dymax lamps are sold with shielding which blocks 100% of UV light.

Dymax recommends that personnel working with ultraviolet equipment wear 100% UV-blocking eyewear and cover skin areas which may be intermittently exposed to UV light. These steps are a simple, common sense approach to UV safety and prevent exposure of skin or eyes to UV light from any source.

If more information is required in regard to this subject, please contact Equipment or Applications Engineering at Dymax Corporation.

[1] *Threshold Limit Values and Biological Exposure Indices for 1986-1987*, American Conference of Industrial Hygienists, Second Printing, pp. 104-106.

© 1999-2010 Dymax Corporation. All rights reserved. All trademarks in this guide, except where noted, are the property of, or used under license by Dymax Corporation, U.S.A.

The data contained in this bulletin is of a general nature and is based on laboratory test conditions. Dymax does not warrant the data contained in this bulletin. Any warranty applicable to the product, its application and use is strictly limited to that contained in Dymax's standard Conditions of Sale. Dymax does not assume responsibility for test or performance results obtained by users. It is the user's responsibility to determine the suitability for the product application and purposes and the suitability for use in the user's intended manufacturing apparatus and methods. The user should adopt such precautions and use guidelines as may be reasonably advisable or necessary for the protection of property and persons. Nothing in this bulletin shall act as a representation that the product use or application will not infringe a patent owned by someone other than Dymax or act as a grant of license under any Dymax Corporation Patent. Dymax recommends that each user adequately test its proposed use and application before actual repetitive use, using the data contained in this bulletin as a general guide.

LIT023 10/13/2010