ASSESSMENT OF OPTICAL RADIATION HAZARDS OF LEDS

Patrick von Nandelstadh

Finnish Institute of Occupational Health, New Technologies and Risks, Helsinki, Finland

High power LEDs are used in a variety of new luminaries and are likely to replace many of today's traditional light sources. The high radiance of some LED sources may cause a photobiological hazard to the retina of the eye. Also, the high luminance may cause discomfort glare increasing accident risks at specific work tasks, for instance during mounting or service of LED equipment. At present, however, it is unclear which safety standards and guidelines are the most appropriate for the safe exposure determinations of LEDs.

In this study, the spectral irradiance and radiance of white and blue LEDs for different viewing conditions were determined. The measurement results were compared with various well-known international exposure limit values, i.e. the CIE safety standards for lamp and lamp systems, the laser safety standard IEC 60825-1, and the European Directive for occupational exposure to artificial optical radiation (2006/25/EC). In addition, the luminance and the amount of glare were evaluated for different viewing geometries. Based on the before-mentioned evaluations, the need for eye protection and the transmittance properties of suitable filters for specific work situations are discussed in this paper.