

ANSI/IESNA RP-27.3-07



Recommended Practice
for
Photobiological
Safety
for
Lamps— Risk Group
Classification and
Labeling

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Recommended Practice for Photobiological Safety for Lamps and Lamp Systems - Risk Group Classification and Labeling

Prepared by
The IESNA Photobiology Committee



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Prepared by the IESNA Photobiology Committee

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Photobiological Safety for Lamps- Risk Group Classification and Labeling

1.0 INTRODUCTION

This standard is the third in a series of standards relating to the photobiological safety of lamps and lamp systems and is devoted to lamp safety. Lamps were developed and produced in large quantities and became commonplace in an era when industry-wide safety standards were not common. The evaluation and control of lamp hazards is a far more complicated subject than similar tasks for a single-wavelength laser system. The required radiometric measurements are quite involved, for they do not deal with the simple optics of a point source, but rather with an extended source which may or may not be altered by diffusers or projection optics. Also, the wavelength distribution of the lamp may be altered by ancillary elements, diffusers, lenses, and the like, as well as by variations in operating voltage.

To evaluate a broad-band optical source, such as an arc lamp, an incandescent lamp, a fluorescent lamp, or an array of lamps, it is necessary to determine the spectral distribution of optical radiation emitted from the source at the point or points of nearest human access. This accessible emission spectral distribution of interest for a lamp system may differ from that actually being emitted by the lamp alone due to the filtration by any optical elements (e.g., projection optics) in the light path. Secondly, the size, or projected size, of the source must be characterized in the retinal hazard spectral region. Thirdly, it may be necessary to determine the variation of irradiance and projected radiance (see **glossary**) with distance. The performance of the necessary measurements is normally not an easy task without sophisticated instruments. Users must normally rely on the expertise of the manufacturers for information on lamps and lamp systems. General safety requirements and reference measurement techniques for lamp and specific lamp systems are provided in other standards of this series.

Finally, there are well known optical radiation hazards associated with some lamps and lamp systems. The purpose of the RP-27 series of standards is to inform the public and original equipment manufacturers (OEM) about potential radiation hazards that may be associated with various lamps and lamp systems. It is also the purpose of these standards to provide guidance, advice, and standard methods for evaluating and informing the user, both the public and the OEM, about the potential optical radiation hazards that may be associated with these products.

The purpose of this standard (RP-27.3) is to provide guidance for the proper categorization, classification, and informational requirements of lamps so that such sources may be properly applied in the design of lamp systems, recognizing that lamps commonly are used in a system or device of some type.

2.0 SCOPE

This standard covers the classification, labeling and informational requirements for lamps that emit optical radiation in the wavelength range from 200 nm to 3000 nm except for light emitting diodes used in optical fiber communication systems and for lasers which are covered in a separate series of ANSI standards (Series Z136). Federal mandatory requirements for lamps subject to specific Federal Regulations take precedence over requirements included in this consensus standard.

Note 1: Units of wavelength in this document are exclusively in nanometers (nm).

Note 2: Subtended angles are denoted by the full included angle, not the half angle.

3.0 DEFINITIONS

For standard nomenclature and definitions, radiometric and photometric quantities, and illuminating engineering terminology, refer to ANSI/IESNA RP-16-2005, *Nomenclature and Definitions for Illuminating Engineering*. Certain frequently used terms are defined in the **glossary**.

3.1 Blue Light Hazard

Potential for a photochemically induced retinal injury resulting from radiation exposure at wavelengths primarily between 400 nm and 500 nm. This damage mechanism dominates over thermal for times exceeding 10 s.

3.2 Continuous Wave (CW) Lamp

A lamp that is operated with a continuous output for a 0.25 s period of time or greater, i.e., a non pulsed lamp (see **Section 3.15**). In this standard, General Lighting Source (GLS) lamps (see **Section 3.7**) are defined to be Continuous Wave Lamps.

3.3 Emission Limit

A limit defined for each Risk Group, based upon reasonably foreseeable conditions of exposure. It

