



## **ANSI E1.9 – 2007 (R2012)**

Reporting Photometric Performance Data for  
Luminaires Used in Entertainment Lighting

Photo/2005-5010a

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Document number Photo/2005-5010a

This edition of ANSI E1.9 was accepted as an American National Standard by the American National Standards Institute on 15 October 2012.

This standard was originally published when the Entertainment Services and Technology Association was operating under the name of PLASA North America. ESTA has reverted to its original name, and this document has been rebranded with the current corporate name and logo. No changes have been made to the contents of the standard.

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The ESTA Technical Standards Program was created to serve the ESTA membership and the entertainment industry in technical standards related matters. The goal of the Program is to take a leading role regarding technology within the entertainment industry by creating recommended practices and standards, monitoring standards issues around the world on behalf of our members, and improving communications and safety within the industry. ESTA works closely with the technical standards efforts of other organizations within our industry, including USITT and VPLT, as well as representing the interests of ESTA members to ANSI, UL, and the NFPA. The Technical Standards Program is accredited by the American National Standards Institute.

The Technical Standards Council (TSC) was established to oversee and coordinate the Technical Standards Program. Made up of individuals experienced in standards-making work from throughout our industry, the Council approves all projects undertaken and assigns them to the appropriate working group. The Technical Standards Council employs a Technical Standards Manager to coordinate the work of the Council and its working groups as well as maintain a "Standards Watch" on behalf of members. Working groups include: Control Protocols, Electrical Power, Event Safety, Floors, Fog and Smoke, Followspot Position, Photometrics, Rigging, and Stage Lifts.

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The Photometrics Working Group, which authored this Standard, consists of a cross section of entertainment industry professionals representing a diversity of interests. ESTA is committed to developing consensus-based standards and recommended practices in an open setting.

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**Interest category codes:**

CP = custom-market producer	DE = designer
DR = dealer rental company	G = general interest
MP = mass-market producer	U = user

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## Foreword

(This foreword is not part of the standard and contains no requirements.)

The purpose of this standard is to describe a method of reporting the photometric performance of luminaires being sold for or offered for use in entertainment lighting that is both detailed and easy to understand for people in this entertainment lighting market. The document is not intended to describe the data that is required for automated lighting design and calculation software, although the reported data may be used for such purposes, nor is it intended to describe a machine-readable data reporting format.

## 1 Scope

This standard is intended to be used for the presentation of photometric data for luminaires used in the entertainment and performance industries. This standard defines the minimum photometric data to be presented on documents purporting to accurately describe the photometric performance of these luminaires. It does not prohibit the presentation of information in addition to that required by this standard.

## 2 Definitions

For the purposes of this standard the following terms shall be defined as:

**2.1 cutoff field area:** The area on a plane illuminated by a luminaire in which the level of illumination is 3% of the maximum or above.

**2.2 cutoff illuminance angle:** The angle on a plane perpendicular to an illuminated surface with the center of a luminaire's exit aperture at the apex, and the rays of the angle passing through the iso-illuminance line where the illumination is 3% of the maximum illuminance. The plane is defined by the center of the luminaire's exit aperture and a line on the illuminated surface passing through the center of the illuminated area.

**2.3 exit aperture:** The luminous opening of a luminaire through which the light beam is emitted. With multiple lamp or multiple compartment luminaires, the exit aperture shall be taken as the entire array of lamps or compartments.

**2.4 far-field luminaire:** A luminaire whose intended operating distance from the subject is greater or equal to the distance at which the inverse-square law can be used to predict an illumination level.

**2.5 half-peak illuminance angle:** The angle on a plane perpendicular to an illuminated surface with the center of a luminaire's exit aperture at the apex, and the rays of the angle passing through the iso-illuminance line where the illumination is 50% of the maximum illuminance. The plane is defined by the center of the luminaire's exit aperture and a line on the illuminated surface passing through the center of the illuminated area.

**2.6 half-peak lumens:** The lumens falling within the area of an iso-illuminance diagram in which the level of illumination is 50% of the peak illuminance level or more.

**2.7 hard focus:** A focus position that achieves the most clearly defined edge to the illuminated area.

**2.8 illuminance:** The areal density of the luminous flux incident at a point on a surface.