ANSI/IES LM-91-22

Illuminating Engineering Society

APPROVED METHOD: APPLICATION DISTANCE RADIOMETRY

AN AMERICAN NATIONAL STANDARD

Approved American National Standard ANSI

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Prepared by the IES Testing Procedures Committee.

Special Thanks

I. Ashdown

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1.0 Introduction and Scope

1.1 Introduction

Certain luminaires are often used in near-field conditions, i.e., at working distances comparable to the largest light-emitting dimension of the luminaire itself. That can cause the use of far-field IES-format photometric files (the de facto default in all lighting, hereafter referred to as "IES files") to result in substantially incorrect irradiance, illuminance, or photon-flux density values being predicted by lighting layout models constructed for near-field conditions. This problem can be overcome by using distance-specific IES file(s), generated by first collecting data at the working distance(s) of interest obtained from a single luminaire and then converting them to distance-specific IES file(s), following the protocol described in this document.

In 2000, the IES Testing Procedures Committee developed the standard IES LM-70-00, Approved Guide to Near-Field Photometry. The intent of IES LM-70-00 (now deprecated) was to develop a test method to characterize intentional uplight. Indirect lighting, as it is commonly referred to, is often seen mounted 300 to 600 mm (approx. 12 to 24 inches) away from the intended plane of illumination, such as the ceiling. This document is intended to improve and expand the methods outlined in IES LM-70-00.

Photometric data collected in the method described in ANSI/IES LM-75-19 is commonly compiled in the data format defined in ANSI/IES LM-63-19. This data format and its application, in its current iteration, remain incompatible in near-field situations such as those required in UV germicidal and horticultural growth applications, among others. ANSI/IES TM-33-18 was developed specifically to support these requirements.

The IES Testing Procedures Committee developed this Approved Method for application-distance radiometry to address the near-field application of far-field photometric data obtained using the method described in ANSI/IES LM-75-19.

For the purpose of this document, the term *near field* applies to direct measurement at the range of an application distance that is less than five or ten times the longest dimension of the device under test (DUT).

Within this document, the term *irradiance* may be replaced with *illuminance* or *photon flux density,* as applicable, and the term *radiant flux* may be replaced with *luminous flux* or *photon flux*.

1.2 Scope

This document describes:

- The method for measuring illuminance, irradiance, and/or photon flux density at multiple points on a plane at a specific application distance
- A method to generate and interpret IES files composed of equivalent intensity values and applicable only to a specific range of application distances
- The method for merging far-field characteristics with near-field characteristics at angles where points on the plane may be in the far field

This document covers the testing of lamps, light engines, and luminaires. It covers light source technologies such as LED, incandescent, fluorescent, HID, and OLED sources. This document does not cover battery-operated light sources.

This document does not define methods for interpolating between measurement points on a given measurement plane, nor does it define interpolation methods between multiple measurement planes.

2.0 Normative References

This Standard is intended to be used in conjunction with the publications described in **Sections 2.1** through **2.9**; the latest edition of the publication shall apply.

Note: The technology-specific standards marked "conditionally normative" are normative depending on the technology of the DUT. For example, if a solid-state lighting product is being measured, then ANSI/IES LM-79 is normative but ANSI/ IES LM-41 and ANSI/IES LM-46 are not normative.