ANSI/IES LM-98-24

Illuminating ENGINEERING SOCIETY

APPROVED METHOD:
MEASURING IN-SITU TEMPERATURE OF SOLID-STATE LIGHTING COMPONENTS IN LAMPS AND LUMINAIRES

AN AMERICAN NATIONAL STANDARD

Approved American National Standard ANSI

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1.1 Introduction

Solid state lighting (SSL) products have a temperature dependence that affects performance. In the past decade, the industry has been measuring in-situ temperature characteristics of its assemblies or major components installed in integrated and non-integrated lamps and luminaires. This type of measurement is performed to obtain information on how these components behave in each individual lamp or luminaire and how that product's operating temperature affects its lifetime performance, including lumen maintenance.

A consistent in-situ temperature measurement method would support the understanding of how the SSL product would behave in a real-world environment, so that the operating temperature could then be utilized in more reliable projections for the lumen maintenance and driver lifetime.

Product characteristics obtained using this procedure are measured under controlled conditions that may allow direct comparison of results gathered at different laboratories using this method.

This document is intended to provide a standalone test method for laboratories interested in measuring performance of SSL lamps and luminaires without addressing safety testing. The intention is that this method should align with safety and performance measurements such that they could be performed during the same test or with the same test setup, to allow for minimal impact to testing laboratories or minimal increased testing burden on manufacturers.

1.2 Scope

The document defines a method of measurement of the in-situ temperature of SSL components installed in integrated and non-integrated SSL lamps and luminaires. The method describes the procedures to be followed and the precautions to be observed in obtaining and reproducing in-situ temperature of SSL component measurements under standard operating conditions.

2.0 Normative References

This Approved Method is intended to be used in conjunction with the publications described in Sections 2.1 through 2.4; the latest edition of the publication shall apply.

2.1 ANSI/IES LM-80-21

Illuminating Engineering Society. Approved Method: Measuring Maintenance of Light Output Characteristics of Solid-State Light Sources. New York: IES; 2021.

2.2 ANSI/IES LS-1-22

Illuminating Engineering Society. Lighting Science: Nomenclature and Definitions for Illuminating Engineering. New York: IES; 2022. Online: www.ies.org/standards/definitions/ (Accessed 2024 Mar 29).

2.3 ASTM Standard E230/E230M-17

ASTM International. ASTM E230/E230M-17, Standard Specification and Temperature-Electromotive Force (EMF) Tables for Standardized Thermocouples. West Conshohocken, PA: ASTM International; 2017.

2.4 Conditionally Normative References

The product-type-specific standards marked "conditionally normative" are normative depending mounted roadway luminaire is being measured, then UL 1598 is normative, but UL 1993 and UL 153 are not normative.

2.4.1 UL 153. Underwriters Laboratory. UL 153, 13th ed., UL Standard for Safety – Portable Electric Luminaires. Northbrook, IL: UL; 2022 Sep 26.

2.4.2 UL 1598. Underwriters Laboratory. UL 1598, 5th ed., UL Standard for Safety – Luminaires. Northbrook, IL: UL; 2024 Jan 31.

2.4.3 UL 1993. Underwriters Laboratory. UL 1993, 6th ed., UL Standard for Safety – Self-Ballasted Lamps and Lamp Adapters. Northbrook, IL: UL; 2023 Feb 17.

2.4.4 UL 2108. Underwriters Laboratory. UL 2108, 2nd ed., UL Standard for Safety – Low Voltage Lighting Systems. Northbrook, IL: UL; 2015 Dec 7.