



**APPROVED METHOD:**  
**MEASURING IN-SITU TEMPERATURE OF  
SOLID-STATE LIGHTING COMPONENTS  
IN LAMPS AND LUMINAIRES**  
AN AMERICAN NATIONAL STANDARD



**ANSI/IES LM-98-24**

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# CONTENTS

<b>1.0</b>	<b>Introduction and Scope</b> .....	<b>1</b>
1.1	Introduction .....	1
1.2	Scope .....	1
<b>2.0</b>	<b>Normative References</b> .....	<b>1</b>
2.1	ANSI/IES LM-80-21 .....	1
2.2	ANSI/IES LS-1-22 .....	1
2.3	ASTM Standard E230/E230M-17 .....	1
2.4	Conditionally Normative References .....	1
2.4.1	UL 153 .....	1
2.4.2	UL 1598 .....	1
2.4.3	UL 1993 .....	1
2.4.4	UL 2108 .....	1
2.4.5	UL 8800 .....	2
<b>3.0</b>	<b>Definitions</b> .....	<b>2</b>
3.1	Ambient Temperature (TA) .....	2
3.2	Device Under Test (DUT) .....	2
3.3	Drive Current .....	2
3.4	Driver Case Temperature Measurement Point (TMPC) .....	2
3.5	Driver Case TMPC Temperature (TC) .....	2
3.6	SSL COMPONENT Temperature Measurement Point (TMPS) .....	2
3.7	SSL Component TMPS Temperature (TS) .....	2
<b>4.0</b>	<b>Physical and Environmental Conditions</b> .....	<b>2</b>
4.1	General .....	2
4.2	Humidity .....	2
4.3	Ambient Temperature and Air Movement .....	2
4.4	Temperature Measurement Equipment Or System .....	2
<b>5.0</b>	<b>Electrical Conditions</b> .....	<b>2</b>
5.1	DC Voltage Regulation .....	2
5.2	AC Voltage Regulation .....	3
5.3	Monitoring of Driver Input and Output .....	3
5.4	Drive Current .....	3

<b>6.0</b>	<b>Preparation For Measurements</b>	<b>3</b>
<b>6.1</b>	<b>In-Situ Primary Application</b>	<b>3</b>
6.1.1	Portable Lamps and Luminaires (Conditionally Normative Reference: UL 153)	3
6.1.2	Lamps (Conditional Normative Reference: UL 1993)	3
6.1.3	Luminaires (Conditional Normative Reference: UL 1598 and UL 8800)	4
6.1.4	Luminaires for Low Voltage Lighting Systems (Conditionally Normative Reference: UL 2108)	4
6.1.5	Other Mounting	4
<b>6.2</b>	<b>Thermocouple Location Selection for Solid State Components</b>	<b>4</b>
<b>6.3</b>	<b>Thermocouple Location Selection for Driver</b>	<b>6</b>
<b>7.0</b>	<b>Thermal and Electrical Measurement Methods and Procedures</b>	<b>6</b>
<b>7.1</b>	<b>DUT Thermal Stability</b>	<b>6</b>
<b>7.2</b>	<b>DUT IN-SITU TEMPERATURE</b>	<b>7</b>
<b>7.3</b>	<b>Data Normalization</b>	<b>7</b>
<b>7.4</b>	<b>Elevated Ambient Temperature</b>	<b>7</b>
<b>7.5</b>	<b>Reduced Ambient Temperature</b>	<b>7</b>
<b>8.0</b>	<b>Test Report</b>	<b>7</b>
<b>8.1</b>	<b>Administrative Information</b>	<b>7</b>
<b>8.2</b>	<b>DUT Identification</b>	<b>7</b>
<b>8.3</b>	<b>Test Conditions And Measurements</b>	<b>8</b>
<b>8.4</b>	<b>Test Equipment</b>	<b>8</b>
<b>9.0</b>	<b>Measurement Uncertainty</b>	<b>8</b>
<b>Annex A</b>	<b>– Thermocouple Location and Attachment Guide</b>	<b>8</b>
<b>A.1</b>	<b>Attachment Guide</b>	<b>8</b>
<b>A.2</b>	<b>Densely Packed Arrays and Thermocouple Location: Troubleshooting TMP Location Issues</b>	<b>9</b>
<b>Annex B</b>	<b>– LED Drive Current</b>	<b>10</b>
<b>Annex C</b>	<b>– Example Guide For Using ANSI/IES LM-98</b>	<b>10</b>
<b>Informative References</b>		<b>13</b>



## 1.0 Introduction and Scope

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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

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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/](http://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.