



Illuminating
ENGINEERING SOCIETY

APPROVED METHOD:
MEASURING OPTICAL RADIATION
MAINTENANCE OF LED LAMPS, LIGHT
ENGINES, AND LUMINAIRES
AN AMERICAN NATIONAL STANDARD



ANSI/IES LM-84-20

**APPROVED METHOD:
MEASURING OPTICAL RADIATION
MAINTENANCE OF LED LAMPS,
LIGHT ENGINES, AND LUMINAIRES
AN AMERICAN NATIONAL STANDARD**

Publication of this report
has been approved by IES.
Suggestions for revisions
should be directed to IES.

**Prepared by:
The Testing Procedures Committee**



Copyright 2020 by the Illuminating Engineering Society.

Approved by the IES Standards Committee January 6, 2020 as a Transaction of the Illuminating Engineering Society.

Approved March 23, 2020 as an American National Standard.

All rights reserved. No part of this publication may be reproduced in any form, in any electronic retrieval system or otherwise, without prior written permission of the IES.

Published by the Illuminating Engineering Society, 120 Wall Street, New York, New York 10005.

IES Standards are developed through committee consensus and produced by the IES Office in New York. Careful attention is given to style and accuracy. If any errors are noted in this document, they should be forwarded to Brian Liebel, Director Standards, at standards@ies.org or the above address for verification and correction. The IES welcomes and urges feedback and comments.

Printed in the United States of America.

ISBN# 978-0-87995-218-1

DISCLAIMER

IES publications are developed through the consensus standards development process approved by the American National Standards Institute. This process brings together volunteers representing varied viewpoints and interests to achieve consensus on lighting recommendations. While the IES administers the process and establishes policies and procedures to promote fairness in the development of consensus, it makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

The IES disclaims liability for any injury to persons or property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on this document.

In issuing and making this document available, the IES is not undertaking to render professional or other services for or on behalf of any person or entity. Nor is the IES undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

The IES has no power, nor does it undertake, to police or enforce compliance with the contents of this document. Nor does the IES list, certify, test or inspect products, designs, or installations for compliance with this document. Any certification or statement of compliance with the requirements of this document shall not be attributable to the IES and is solely the responsibility of the certifier or maker of the statement.

AMERICAN NATIONAL STANDARD

Approval of an American National Standard requires verification by ANSI that the requirements for due process, consensus, and other criteria have been met by the standards developer.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether that person has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation to any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

CAUTION NOTICE: This American National Standard may be revised at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of approval. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Prepared by the IES Testing Procedures Committee

Becky Kuebler, *Chair*

Andrew Jackson, *Vice Chair*

David N. Randolph, *Secretary*

Jianzhong Jiao, *Treasurer*

Members

C. K. Andersen

R. P. Bergin

R. S. Bergman

E. Bretschneider

P. Elizondo

D. J. Ellis

K. C. Fletcher

M. L. Grather

Y. H. Hiebert

J. Hospodarsky

J. N. Hulett

P.-C. Hung

M. Kotrebai

J. E. Leland

S. Longo

J. P. Marella

P. McCarthy

G. McKee

C. C. Miller

E. Radkov

M. B. Sapcoe

J. E. Walker

Advisory Members

L. M. Ayers

J. Baker

C. A. Bloomfield

P.-T. Chou

M. Damle

L. Davis

J. J. Demirjian

M. E. Duffy

V. Eberhard

J. Frazer

K. J. Hemmi

S. Hua

G. John

H. Kashaninejad

T. Kawabata

R. Kelley

K. C. Lerbs

K. M. Liepmann

J. Lockner

Y. Ohno

E. Page

D. Park

E. S. Perkins

M. Piscitelli

D. Rogers

M. P. Royer

T. Schneider

A. W. Serres

G. A. Steinberg

L. Swainston

J. S. Swiernik

A. Thorseth

J. C. Vollers

Y. Zong

CONTENTS

1.0	Introduction and Scope	1
1.1	Introduction	1
1.2	Scope	1
2.0	Normative References	1
2.1	ANSI/IES LM-79-19	1
2.2	ANSI/IES LS-1-20	1
2.3	ANSI/IES TM-27-20	1
2.4	ANSI/IES TM-28-20	2
2.5	ANSI/IES TM-33-18	2
2.6	ISO/IEC Guide 98-4: 2012	2
3.0	Definitions	2
3.1	device under test (DUT)	2
3.2	DUT failure	2
3.3	luminous flux maintenance	2
3.4	photon flux maintenance	2
3.5	radiant flux maintenance	2
3.6	tolerance interval	2
4.0	Physical and Environmental Conditions during Operation and Handling	2
4.1	General	2
4.2	Mounting DUTs	3
4.3	Vibration	3
4.4	Ambient Temperature during Operation of DUTs	3
4.5	Humidity	3
4.6	Air Movement	3
4.7	Operating Orientation	3
5.0	Electrical Conditions	3
5.1	Input Voltage	3
5.2	AC Line Voltage Wave Shape	3
5.3	Line Impedance	3
5.4	Line Voltage Regulation	3
5.5	DC Voltage Regulation	3
5.6	DC Current Regulation	3
5.7	Wiring	3

6.0	Optical Radiation and Thermal Measurement Procedure	4
6.1	Optical Radiation Measurement	4
6.2	LED or OLED Source In-Situ Case Temperature Measurement	4
7.0	Testing Procedures	4
7.1	Seasoning or Aging	4
7.2	Handling	4
7.3	DUT	4
7.3.1	DUT Sample Selection	4
7.3.2	DUT Tracking	4
7.4	Operating Cycle	4
7.5	Timekeeping	4
7.6	Operating Duration and Measurement Intervals	5
7.7	Operation of Dimmable or Controllable DUTs	5
7.8	Reporting DUT Failures	5
8.0	Test Report	5
8.1	Administrative Information	5
8.2	DUT Identification	5
8.3	Physical and Ambient Conditions	5
8.4	Measurement Intervals	6
8.5	Operating Duration	6
8.6	Non-operational DUTs	6
8.7	Other Items	6
8.8	Deviations	6
8.9	Results	6
	Annex A – Recommendations for Measurement of In-Situ LED Case Temperature, T_s	6
	Additional Reading	8
	Informative References	8