



ANSI C136.50-2021

*American National Standard
for Roadway and Area Lighting Equipment—
Energy Measurement for a Network Lighting Control (NLC)
Device with a Locking-Type Receptacle*

Secretariat:

National Electrical Manufacturers Association

Approved: July 20, 2021

American National Standards Institute, Inc.

NOTICE AND DISCLAIMER

The information in this publication was considered technically sound by the consensus of persons engaged in the development and approval of the document at the time it was developed. Consensus does not necessarily mean that there is unanimous agreement among every person participating in the development of this document.

American National Standards Institute (ANSI) standards and guideline publications, of which the document contained herein is one, are developed through a voluntary consensus standards development process. This process brings together volunteers and/or seeks out the views of persons who have an interest in the topic covered by this publication. While NEMA administers the process and establishes rules to promote fairness in the development of consensus, it does not write the document and it does not independently test, evaluate, or verify the accuracy or completeness of any information or the soundness of any judgments contained in its standards and guideline publications.

NEMA disclaims liability for any personal injury, property, or other damages of any nature whatsoever, whether special, indirect, consequential, or compensatory, directly or indirectly resulting from the publication, use of, application, or reliance on this document. NEMA disclaims and makes no guaranty or warranty, express or implied, as to the accuracy or completeness of any information published herein and disclaims and makes no warranty that the information in this document will fulfill any of your purposes or needs. NEMA does not undertake to guarantee the performance of any individual manufacturer or seller's products or services by virtue of this standard or guide.

In publishing and making this document available, NEMA is not undertaking to render professional or other services for or on behalf of any person or entity, nor is NEMA 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. Information and other standards on the topic covered by this publication may be available from other sources, which the user may wish to consult for additional views or information not covered by this publication.

NEMA has no power, nor does it undertake to police or enforce compliance with the contents of this document. NEMA does not certify, test, or inspect products, designs, or installations for safety or health purposes. Any certification or other statement of compliance with any health or safety-related information in this document shall not be attributable to NEMA 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. ANSI states that the requirements for due process, consensus, and other criteria for approval 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 significantly more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and 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 they have 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 under no circumstances give an interpretation of 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 or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this standard. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Published by

National Electrical Manufacturers Association
1300 North 17th Street, Rosslyn, VA 22209

© 2021 by National Electrical Manufacturers Association

All rights reserved including translation into other languages, reserved under the Universal Copyright Convention, the Berne Convention for the Protection of Literary and Artistic Works, and the International and Pan American Copyright Conventions.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, and without the prior written permission of the publisher.

Printed in the United States of America.

< This page intentionally left blank. >

Contents

1	Scope	1
2	Normative References	1
3	Informative References	1
4	Definitions	1
5	General Requirements	2
5.1	Energy Data Reporting - Frequency and Data Retention.....	3
5.2	Optical Test Output Port (OTOP)	3
6	Test Samples, Method, And Reporting	3
6.1	Accuracy Class	3
6.2	Test Samples	3
6.3	Test Method.....	3
6.4	Test Report.....	5
7	Accuracy Tests	5
7.1	Test Conditions and Current Classification	5
7.2	Basic Accuracy Requirement	7
7.3	Test #1: No Load	7
7.4	Test #2: Load Performance	7
7.5	Test #3: Effect of Variation of Power Factor.....	8
7.6	Test #4: Effect of Variation of Voltage	9
7.7	Test #5: Effect of Variation of Frequency	10
7.8	Test #6: Effect of Variation of Ambient Temperature	10
8	External Disturbances Performance Verifications	13
8.1	Test #7: Voltage Interruptions	13
8.2	Test #8: Effect of High-Voltage Line Surges, Electrical Fast Transients (EFT)	13
8.3	Test #9: Effect of Electrostatic Discharge (ESD).....	13
8.4	Test #10: Effect of Operating Temperature	14
8.5	Test #11: Effect of Relative Humidity	14

Figures

Figure 1	Test Results Examples	4
----------	-----------------------------	---

Tables

Table 1	Accuracy Tests	4
Table 2	Current Classifications and Related Test Conditions for Example NLC Devices	6
Table 3	Basic Accuracy Requirement	7
Table 4	Load Performance Tests	8
Table 5	Effect of Variation of Power Factor.....	9
Table 6	Effect of Variation of Voltage	9
Table 7	Effects of Variation of Frequency	10
Table 8	Effects of Variation of Ambient Temperature	12
Table 9	External Disturbance Accuracy Test	13

Foreword

At the time this Standard was approved the ANSI C136 committee was composed of the following members:

Acuity Brands	Kauffman Consulting, LLC
Alabama Power Company	LED Roadway Lighting
American Electric Power	Legrand, North America
Amphenol Canada Corp.	Leotek Electronics, USA Corp
Atlas Lighting Products, Inc.	Light Smart
Caltrans	Littlefuse, Inc.
CIMCON Lighting	Lumispec Consulting
City of Kansas City, Missouri	Mississippi Power
City of Los Angeles, Bureau of Street Lighting	National Grid
Comptek Technologies	OSRAM SYLVANIA Inc.
Cree Lighting	Pacific Northwest National Laboratory
DimOnOff Inc.	Phoenix Lighting
Dominion Energy	PSEG Power
Duke Energy	RealTerm Energy
Duke Energy Progress	Rebecca Rainer
EPRI	Ripley Lighting Controls LLC
Excellence Opto, Inc.	SELC Ireland Limited
EYE Lighting International	Signify North America Corporation
Florida Power & Light Company	Solais Lighting, Inc.
Fonroche Lighting America	South Carolina Electric & Gas
Gateway International 360	StressCrete/King Luminaire
GE Current, a Daintree Company	Sunrise Technologies, Inc.
Georgia Power Company	Tampa Electric Company
GooTroo Consulting	TE Connectivity
Graeme Lister Consulting	Telematics Wireless
GreenStar Products, Inc.	Telensa
Greg Mercier Consulting	TESCO—The Eastern Specialty Company
Hancock Consulting	Ubicquia
Hapco Aluminum Pole Products	Utility Metals Division of Fabricated Metals, LLC
Howard Lighting	Valmont Composite Structures
Hubbell Lighting, Inc.	Valmont Industries, Inc
Intermatic Incorporated	Vandal Shields
Intertek USA	Watthour Engineering Company, Inc
Itron, Inc.	Westire Technology Limited
JEA	Xcel Energy

1 Scope

This Standard describes methods and requirements for the measurement of energy consumption and the reporting of the consumption for a network lighting control (NLC) device in an outdoor lighting application to meet metering accuracy requirements using a locking-type receptacle in a two-wire power supply installation. This Standard does not address the communication of the data captured from the point of measurement. This Standard only addresses power delivered; it does not address two-way (bidirectional) metering.