



**ANSI C137.3-2017**

*American National Standard for Lighting Systems—  
Minimum Requirements for Installation of Energy Efficient Power  
over Ethernet (PoE) Lighting Systems*

Secretariat:

**National Electrical Manufacturers Association**

Approved: May 25, 2017

**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.

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 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, expressed 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 particular 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 The American National Standards Institute, Inc. (ANSI) that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer. An American National Standard implies a consensus of those substantially concerned with its scope and provisions. 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 existence of an American National Standard does not in any respect preclude anyone, whether s/he has approved the standard or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards. It is intended as a guide to aid the manufacturer, the consumer, and the general public.

The American National Standards Institute, Inc., does not develop standards and will in 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, Inc. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on this title page.

**CAUTION NOTICE:** This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute, Inc. 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, Inc.

Published by

**National Electrical Manufacturers Association  
1300 North 17th Street, Suite 900  
Rosslyn, VA 22209**

© 2017 National Electrical Manufacturers Association

All rights, 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, 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	References .....	2
	2.1 Normative References.....	2
	2.2 Informative References .....	2
3	Definitions .....	3
4	Installation Requirements.....	3
	Annex A.....	5

## Foreword

Utilizing Power over Ethernet (PoE) technology to provide power and communication to a lighting system can provide benefits including high energy efficiency, simplified installation, and high bandwidth data transmission. However, resistive line losses within PoE lighting distribution systems utilizing CAT5/6 cabling can exceed 15% depending on the gauge of PoE cable selected, resulting in an overall system efficacy that can be significantly lower than traditional AC-powered 120–480 V lighting systems. Utilizing a cable with an appropriate wire gauge can limit these losses and help ensure a PoE lighting system that can match or exceed the efficacy of a traditional 120–480 V AC lighting system.

This standard establishes the minimum gauge of wire to limit resistive line losses and support an energy efficient PoE lighting system. This standard was developed by a committee including lighting manufacturers, PoE equipment manufacturers, electric utilities, and energy efficiency performance rating organizations. The commercially available gauge sizes specified by the standard have been chosen to result in average resistive line losses of less than 5% of total power delivered across typical installations assuming an average cable length of 50 m.

At the time this standard was approved the ANSI C137 committee was composed of the following members:

Acuity Brands  
ALA  
Atlas  
Cree  
CSA  
Digital Lumens  
DimOnOff Inc.  
Duke Energy  
Duke Energy Progress  
Eaton Lighting Solutions  
Energy Focus  
EYE Lighting  
Florida Power & Light  
GE Lighting  
Georgia Power  
Gulf Power  
Hubbell Lighting  
IALD  
IES  
Intertek  
Lambda 530 Consulting  
LED Roadway Lighting  
Legrand  
Leidos  
Leviton  
Lighting Science Group  
Lumispec Consulting  
Lutron  
MAXLITE  
NEEP/DLC  
OSRAM SYLVANIA  
Philips Lighting  
PNNL

RAB Lighting  
Schneider Electric  
Silver Spring Networks  
SMUD  
Sunrise Technologies  
TE Connectivity  
Telematics Wireless  
Telensa  
UL  
Universal Lighting Technologies

**<This page intentionally left blank.>**



## **1 Scope**

- 1.1** This standard specifies the minimum requirements for installation of Power over Ethernet (PoE) lighting systems to ensure minimal energy losses. A typical PoE lighting system uses standardized ethernet twisted pair cable (e.g. category 5e cable) to connect powered devices (PDs), such as luminaires, to DC power source equipment (PSE) (e.g., network switch) without the need for AC line voltage power to the luminaires. The ethernet cable also carries data for control and monitoring of the luminaire.
- 1.2** The energy efficiency of a PoE lighting system depends on three elements: PSE efficiency, PD efficiency, and cable energy losses. This standard specifies cable and installation practices to limit the electrical energy losses of the cable between the PSE and the PD.
- 1.3** Applications include, but are not limited to, commercial, residential, and industrial lighting applications.