NEMA Standards Publication

ANSI C82.16-2015

American National Standard for Light-Emitting Diode Drivers—Methods of Measurement

National Electrical Manufacturers Association

ANSI C82.16-2015

American National Standard for Light-Emitting Diode Drivers—Methods of Measurement

Secretariat:

National Electrical Manufacturers Association

Approved November 10, 2015

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 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

www.nema.org

Printed in the United States of America.

FOREWORD

This foreword is not part of ANSI C82.16-2015.

This is a new standard and not a revision of a previous standard.

Suggestions for improvement on this standard will be welcome. They should be sent to the following address:

Secretary of ASC C82
National Electrical Manufacturers
1300 North 17th Street, Suite 900
Rosslyn, VA 22209

This standard was developed and approved for submittal to ANSI by the Accredited Standards Committee (ASC) on Lamp Ballasts, C82, and its working group, C82WG04. Approval of this standard is not meant to imply that all working group members voted to approve it.

Information concerning approval of this standard is based on the documents listed in the Table below.

CONTENTS

FIGURES

TABLES

Section 1
General

1.1 PURPOSE

This document complements standards and specifications that set performance limits, such as NEMA SSL 1, and provides guidance for testing methods for government specifications and other organizations.

1.2 SCOPE

This standard describes the procedures to be followed and the precautions to be taken in measuring performance of LED drivers. The scope includes, but is not limited to, LED drivers with these characteristics:

- General lighting, exterior lighting, and roadway lighting applications
- Input supply voltage up to 600 VDC or 600 VAC (50 or 60 Hz)
- Output open-circuit voltage of 600 V or less
- Constant-current or constant-voltage direct current (DC) output
- Fixed, variable (dimmable), pulse-width modulation, or programmable (tunable) output power
- External (standalone) or internal (enclosed in luminaire)

1.3 NORMATIVE REFERENCES

The following publications contain provisions that, through reference in this text, constitute provisions of this American National Standard. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the publications indicated below.

ANSI C82.11-2011	*American National Standard for Lamp Ballasts—High-Frequency Fluorescent Lamp Ballasts*
ANSI C82.77-5-2015	*American National Standard for lighting equipment—Voltage Surge Requirements*
ANSI C82.77-10-2014	*American National Standard for Lighting Equipment—Harmonic Emission Limits—Related Power Quality Requirements*
NEMA 410-2011	*Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts*
FCC Title 47	Title 47 of the Code of Federal Regulations, Part 15
NEMA SSL 1-2012	*Electronic Drivers for LED Devices, Arrays, or Systems*
UL 8750-2 (2015)	*Standard for Light-Emitting Diode (LED) Equipment for Use in Lighting Products*

1.4 DEFINITIONS

1.4.1 LED Driver Operation Points Definitions

See figures 1 and 2. The two figures are to illustrate the concepts of current control and voltage control. They are theoretical frames, rather than actual measurements.