



ANSI C78.53-2019 (R2023)

*American National Standard for Electric Lamps—
Performance Specifications for
Direct Replacement LED (Light Emitting Diode) Lamps*

Secretariat:

National Electrical Manufacturers Association

Approved: August 24, 2023

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 warranty 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, Virginia 22209**

© 2023 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 prior written permission of the publisher.

Printed in the United States of America

Foreword (This foreword is not part of ANSI C78.53-2019 (R2023))

This is not a new standard. It is a reaffirmation of a previous standard (ANSI C78.53-2019).

Suggestions for improvement of this standard will be welcome. They should be sent to the National Electrical Manufacturers Association, 1300 North 17th Street, Suite 900, Rosslyn, VA 22209.

This standard was developed and approved for submittal to ANSI by the C78 Committee. Approval of this standard is not meant to imply that all Committee Members voted to approve it.

CONTENTS

1	SCOPE	1
1.1	IMPORTANT PATENT DISCLAIMER	1
2	NORMATIVE REFERENCES	1
3	INFORMATIVE REFERENCES	2
4	DEFINITION	2
5	PERFORMANCE SPECIFICATIONS	2
5.1	General	2
5.1.1	Marking	2
5.1.2	Lamp Designation	2
5.1.3	Lamp Bases	2
5.2	Application Requirements	3
5.2.1	Temporal Light Artifacts (TLA)	3
5.3	Starting Characteristics	3
5.4	Electrical Characteristics	3
5.4.1	Power Quality	3
5.5	Photometric Characteristics	3
5.5.1	Luminous Flux	3
5.5.2	Color Characteristics	3
5.6	Tubular LED (TLED) Specific Specifications	4
5.6.1	TLED Background	4
5.6.2	Dimensions	4
5.6.3	Thermal	4
5.6.4	Electrical Characteristics	5
5.6.5	Photometric characteristics	5
5.7	HID Specific Specifications	7
5.7.1	Introduction	7
5.7.2	General	7
5.7.3	Electrical Characteristics	7
5.7.4	Photometric Characteristics	8
5.7.5	Compatibility Criteria	8

< Page left blank intentionally.>

1 Scope

This standard describes the electrical, mechanical, and photometric characteristics of LED lamps that are direct replacements for existing ANSI standardized non-LED lamps. Lamps covered in this standard contain LED-based light sources. Direct replacement is defined as LED lamps that shall not require modification of existing equipment. This standard addresses general illumination products.

1.1 Important Patent Disclaimer

At the time of publication, it is possible that some of the elements of this document may be the subject of patent rights. When this standard was approved for publication, the National Electrical Manufacturers Association (NEMA) did not know of any patent applications, patents pending, or existing patents. NEMA shall not be held responsible for identifying any or all such patent rights.

2 Normative References

ANSI C78.377	<i>American National Standard for Electric Lamps—Specifications for the Chromaticity of Solid State Lighting (SSL) Products</i>
ANSI C78.380	<i>American National Standard for Electric Lamps—High-Intensity Discharge (HID)—Method of Designation</i>
ANSI C78.40	<i>American National Standard for Electric Lamps—Specifications for Mercury Lamps</i>
ANSI C78.41	<i>American National Standard for Electric Lamps—Guidelines for Low-Pressure Sodium (LPS) Lamps</i>
ANSI C78.42	<i>American National Standard for Electric Lamps—High-Pressure Sodium (HPS) Lamps</i>
ANSI C78.43	<i>American National Standard for Electric Lamps—Single-Ended Metal Halide Lamps</i>
ANSI C78.44	<i>American National Standard for Electric Lamps—Double-Ended Metal Halide Lamps</i>
ANSI C78.52	<i>American National Standard for Electric Lamps—LED (Light Emitting Diode) Direct Replacement Lamps— Method of Designation</i>
ANSI C78.62612	<i>American National Standard for Electric Lamps--Self-ballasted LED Lamps – Performance Specifications</i>
ANSI C78.81	<i>American National Standard for Electric Lamps—Double-Capped Fluorescent Lamps—Dimensional and Electrical Characteristics</i>
ANSI C81.61	<i>American National Standard for Electrical Lamp Bases—Specifications for Bases (Caps) for Electric Lamps</i>
ANSI C82.2	<i>American National Standard for Lamp Ballasts—Method of Measurement of Fluorescent Lamp Ballasts</i>
ANSI C82.5	<i>American National Standard for Reference Ballasts—High-Intensity-Discharge and Low-Pressure Sodium Lamps</i>
ANSI C82.6	<i>American National Standard for Lamp Ballasts—Ballasts for High-Intensity Discharge (HID) Lamps—Methods of Measurement</i>
ANSI C82.11	<i>American National Standard for Lamp Ballasts—High Frequency Fluorescent Lamp Ballasts</i>