



ANSI C78.81-2014

*American National Standard for
Electric Lamps—Double-Capped Fluorescent Lamps—
Dimensional and Electrical Characteristics*

Secretariat:

National Electrical Manufacturers Association

Approved August 15, 2014

American National Standards Institute

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 ANSI 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 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 he has approved the standard 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 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 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.

Published by

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

© 2014 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

Foreword (This foreword is not part of American National Standard C78.81-2014.)

Suggestions for improvement of this standard should be submitted to the Secretariat, C78 Committee, National Electrical Manufacturers Association, 1300 North 17th Street, Suite 900, Rosslyn, Virginia 22209.

This revision supersedes ANSI C78.81-2013.

This standard features the following revisions:

1. 17-Watt, 24-Inch T8, Fluorescent Lamp [7881-ANSI-1001-2]
2. 25-Watt 36-Inch T8, Fluorescent Lamp [7881-ANSI-1002-2]
3. 25-Watt 48-Inch T8, Fluorescent Lamp [7881-ANSI-1028-2]
4. 32-Watt 48-Inch T8, Fluorescent Lamp [7881-ANSI-1005-3]
5. 28-Watt, 48-Inch T8, Fluorescent Lamp [7881-ANSI-1029-2]
6. 30-Watt, 48-Inch T8, Fluorescent Lamp [7881-ANSI-1030-2]
7. 40-Watt, 60-Inch T8, Fluorescent Lamp [7881-ANSI-1007-2]
8. 59-Watt, 96-Inch T8, Single Pin Instant Start Fluorescent Lamp [7881-ANSI-1505-2]

This standard features the following [new] additions:

1. 15-Watt, 18-Inch T8, Fluorescent Lamp [7881-ANSI-1031-1]
2. 15-Watt, 24-Inch T8, Fluorescent Lamp [7881-ANSI-1032-1]
3. 21-Watt, 36-Inch T8, Fluorescent Lamp [7881-ANSI-1033-1]
4. 54-Watt, 96-Inch T8, Single Pin Instant Start Fluorescent Lamp [7881-ANSI-3015-1]

CONTENTS

	Page
Foreword.....	ii
1 Scope	1
1.1 Important Patent Disclaimer	1
2 General.....	1
3 Normative References	1
4 Definitions	2
5 Lamp Abbreviations	2
6 Methods of Measurement	2
7 Reference Ballasts.....	2
8 Product Drawings	3
9 Application of Lamps on More Than One Type of Circuit	3
10 Lamp Physical and Dimensional Requirements	3
10.1 Bulb Specifications	3
10.2 Base Specifications.....	3
10.3 Lamp Dimensions	3
10.3.1 Base Alignment of Finished Lamps.....	3
10.3.2 Base Alignment of Lamps with G5 Miniature Bipin Bases.....	3
10.3.3 Base Alignment of Lamps with G13 Medium Bipin Bases	3
10.3.4 Base Alignment of Lamps with R17d Recessed Double-Contact Bases	4
10.3.5 Base Alignment of Lamps with Fa8 Single Pin Bases.....	4
10.4 Color.....	5
11 Lamp Electrical Characteristics.....	5
11.1 Lamp Operating Characteristics	5
11.2 Lamp Starting Requirements	6
12 Requirements for Ballast Design.....	6
12.1 General	6
12.2 Lamp Starting Requirements	6
12.2.1 Voltage Between Lamp Terminals.....	7
12.2.2 Voltage from Lamp Terminal to Starting Aid	7
12.2.3 Wave Shape of Rapid-Start Starting Voltage	7
12.2.4 Starting Capacitor	7
12.3 Cathode Heating	7
12.4 Lamp Operating Current	8
12.4.1 Lamp Operating Current Limits	8
12.4.2 Operating Current Waveshape.....	8
12.5 Frequency to be Used for HF Operated Lamps.....	8

12.6	Lamp End Temperature Under Abnormal Conditions.....	8
13	Requirements for Luminaire Design	9
13.1	General	9
13.2	Starting aid	9
Annex A	Guide for Establishing Fluorescent Lamp Abbreviations	11
Annex B	Guidelines for the Establishment of Nominal Wattage Values on Fluorescent Lamp Data Sheets	14
Annex C	Bibliography.....	16
Annex D	USA Deviations to Adopted IEC Sheets	17

Tables

Table 1	Values of Dimension M and T	4
Table 2	Lamp Starting Requirements.....	6
Table 3	Ground Plane Distance.....	9
Table 4	Data Sheet List	19

PART I—General Information and Requirements

1 Scope

This standard sets forth the physical and electrical characteristics of the principal types of fluorescent lamps intended for application on conventional line frequency circuits, and electronic high-frequency (HF) circuits. Some data sheets may specify more than one circuit application. Specifications for both the lamp itself and the interactive features of the lamp and ballast are given. Only double-based lamps of the regular linear shape are included. Single-based lamps, including compact, circular, square-shaped and U-shaped, are found in ANSI C78.901.

Lamps for conventional systems relying on auxiliary support from external ballasts are described. These lamps are those designed for 60 Hz and/or HF operation.

Lamp color is not specified herein.

Certain lamp types covered in this standard may be similar to those in IEC 60081. However, additional types are included that are used only in North America and are not specified in the IEC standard.

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 General

There are four parts to this standard:

- Part I** Contains requirements and general information. Detailed descriptions, references, and explanations of the terms used in the lamp data sheets are given. The principles of dimensioning lamps, both as finished lamps and for maximum outline purposes, are defined.
- Part II** Contains dimensioning principles and lamp outline drawings.
- Part III** Contains the annexes.
- Part IV** Contains the lamp data sheets for the lamp classes covered in this standard. Sheets adopted from IEC are not included, but a source reference is listed.

3 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. 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 standards indicated below.

ANSI C78.79-2014, *Nomenclature for Envelope Shapes Intended for Use with Electric Lamps*

ANSI C78.180-2003, *Specifications for Fluorescent Lamp Starters*