NEMA Standards Publication




ANSI/NEMA C29.5-1984 (R2012)

# American National Standard for Wet Process Porcelain Insulators - Low and Medium Voltage Types



National Electrical Manufacturers Association

National Electrical Manufacturers Association
1300 North 17th Street, Suite 900 • Rosslyn. VA 22209
www.NEMA.org






**ANSI/NEMA C29.5-1984 (R2002, R2012)**

American National Standard

# Wet Process Porcelain Insulators—Low and Medium Voltage Types

Secretariat:

**National Electrical Manufacturers Association**

Approved: August 2012
Published: May 20, 2013

**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.

© Copyright 2013 by National Electrical Manufacturers Association

# 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 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 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 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**

© Copyright 2012 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, without the prior written permission of the publisher.

Printed in the United States of America.

© Copyright 2013 by National Electrical Manufacturers Association

# FOREWORD

(This Foreword is not part of American National Standard C29.5-1984 (R2002,R2012))

The first edition of this standard was based essentially on the EEI-NEMA (Edison Electric Institute-National Electrical Manufacturers Association) Standards for Wet-Process Porcelain Insulators (Low- and Medium-Voltage Pin Type), EEI TDJ-55, NEMA 143-1952. Subsequent revisions have been developed by the Standards Committee on Insulators for Electric Power Lines, C29.

The principal differences between this edition and the 1977 edition are: movement of the section on packing to an Appendix, the inclusion of a table for metric equivalents, and additional dimensions for Figures 1-7.

Suggestions for improvement of this standard will be welcome. They should be sent to National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1752, Rosslyn, VA 22209.

This standard was processed and approved for submittal to ANSI by Accredited Standards Committee on Insulators for Electric Power Lines, C29. Committee approval of the standard does not necessarily imply that all committee members voted for approval. At the time it approved this standard, the ASC C-29 Committee had the following members:

**Rob Christman, Chairman**
Steve Griffith, Secretary

| *Organization Represented:* | *Name of Representative:* |
|---|---|
| Edison Electric Institute | B. Freimark<br>R. Christman<br>E. Cleckley<br>M. Garrels<br>W. Avery<br>J. Varner (alt)<br>R. Kluge (alt)<br>G. Obenchain (alt) |
| Institute of Electrical and Electronic Engineers | T. Grisham<br>J. Hildreth<br>A. Jagtiani<br>J. Kuffel<br>A. Phillips<br>E. Gnandt (alt) |
| National Electrical Manufacturers Association | P. Maloney<br>A. Baker<br>R. A. Bernstorf<br>G. Powell<br>G. A. Stewart<br>E. Kress (alt)<br>Z. Lodi (alt)<br>E. Niedospial (alt)<br>A. Schwalm (alt) |
| Tennessee Valley Authority | J. Nelson |
| Western Area Power Administration | R. Clark |

© Copyright 2013 by National Electrical Manufacturers Association

# TABLE OF CONTENTS

**Page**

**FOREWORD ..... iv**
**1 SCOPE ..... 1**
**2 REFERENCED AMERICAN NATIONAL STANDARDS ..... 1**
**3 DEFINITIONS ..... 1**
**4 GENERAL ..... 1**
**5 MATERIALS ..... 1**
**6 DIMENSIONS AND CHARACTERISTICS ..... 2**
**7 MARKING ..... 3**
**8 SAMPLING, INSPECTION, AND TESTS ..... 3**
8.1 General ..... 3
8.2 Design Tests ..... 4
8.2.1 Low-Frequency Dry Flashover Test ..... 4
8.2.2 Low-Frequency Wet Flashover Test ..... 4
8.2.3 Critical Impulse Flashover Tests – Positive and Negative ..... 4
8.2.4 Radio-Influence Voltage Test ..... 4
8.2.5 Cantilever-Strength Test ..... 4
8.2.6 Thermal Shock Test ..... 4
8.3 Quality Conformance Tests ..... 4
8.3.1 Dimensional Test ..... 4
8.3.2 Visual Test ..... 4
8.3.3 Porosity Test ..... 4
8.3.4 Pinhole-Gaging Test ..... 4
8.3.5 Puncture Test ..... 5
8.4 Routine Test (Flashover Test) ..... 5

**TABLE**
**1 Neck Designations and Dimensions ..... 2**
**2 Metric Equivalents ..... 3**

**FIGURES**
**1 Pin Insulator, Class 55-1 ..... 6**
**2 Pin Insulator, Class 55-2 ..... 7**
**3 Pin Insulator, Class 55-3 ..... 8**
**4 Pin Insulator, Class 55-4 ..... 9**
**5 Pin Insulator, Class 55-5 ..... 10**
**6 Pin Insulator, Class 55-6 ..... 11**
**7 Pin Insulator, Class 55-7 ..... 12**
**8 Insulator Thread Cage ..... 13**

**APPENDIX ..... 14**

© Copyright 2013 by National Electrical Manufacturers Association

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

© Copyright 2013 by National Electrical Manufacturers Association

**AMERICAN NATIONAL STANDARD** **ANSI/NEMA C29.5-1984 (R2002, R2012)**

# Wet Process Porcelain Insulators—Low and Medium Voltage Types

## 1 SCOPE

This standard covers low- and medium-voltage-type insulators made of wet-process porcelain and used in the transmission and distribution of electric energy.

## 2 REFERENCED AMERICAN NATIONAL STANDARDS

This standard is intended for use in conjunction with the following American National Standards. When these standards are superseded by a revision approved by the American National Standards Institute, Inc., the revision shall apply.

*ANSI C29.1-1988 (R2012) Test Methods for Electrical Power Insulators*

ANSI C29.6-1996 (R2012) *Wet-Process Porcelain Insulators – High-Voltage Pin Types*

ANSI Z55.1-1967 (R1973) *Gray Finishes for Industrial Apparatus and Equipment*

## 3 DEFINITIONS

See section 2 of ANSI C29.1-1988 (R2012) for definitions of terms.

## 4 GENERAL

**4.1** Insulators shall conform in all respects to the requirements of this standard. The text and figures supplement each other and shall be considered part of this standard.

**4.2** Manufacturer's drawings, if furnished, shall show the outline of the insulators, together with all pertinent dimensions. Any variations in these dimensions due to manufacturing tolerances shall be indicated.

## 5 MATERIAL

**5.1** The insulators shall be made of good commercial-grade wet-process porcelain.

**5.2** The entire surface of the insulator, with the exception of a firing surface, shall be glazed. The entire surface shall be relatively free from imperfections. Color is not a part of this standard. If gray is required, it shall be in accordance with ANSI Z55.1-1967 (R1973), and conform to Munsell notation 5BG 7.0/0.4 with the following tolerances:

1) Hue: ± 12 (3G to 7B)
2) Value: ± 0.5
3) Chroma: -0.2 to +0.6

© Copyright 2013 by National Electrical Manufacturers Association