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ANSI/NEMA GR 1-2022

Ground Rod Electrodes and Ground Rod Electrode Couplings

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NOTICE AND DISCLAIMER

During the development of this standard, the persons engaged in reaching consensus could not achieve consensus about what to name specific nominal trade size designations for zinc-coated ground rods in Tables 3-1, 3-2, and 6-1. A review during an appeal determined that the inability to achieve consensus was attributable to a commercial and competitive disagreement among manufacturers. The appeals decision directed that trade size designations for zinc-coated, copper-bonded, and stainless steel ground rods be treated with consistency within the standard. When consensus could not be achieved again following the appeal, the Executive Committee of the NEMA Board of Governors resolved the disagreement by approving the nominal trade size designations shown in the "trade size" column in each of these three tables, and further directed, at the recommendation of NEMA's Codes & Standards Committee, that the foreword of this standard bring to the reader's attention the history of these changes to minimize potential confusion. Accordingly, Table 3-1a and Table 3-1b identify zinc-coated ground rods of different dimensions by their finished mean diameter and the minimum and maximum diameters for a given "trade size" of zinc-coated ground rod. Table 3-2 contains corresponding dimensions for the end point configurations for each trade size of zinc-coated ground rod. In addition to the information in the foreword and the standard, the user is encouraged to consult with the manufacturer about couplings and connectors to be used with specific grounding rods. In all other respects, 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.

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Foreword

This technical publication provides practical information concerning construction, test, performance, and manufacture of ground rod electrodes and ground rod electrode couplings. This standard is intended for use by the electrical industry to provide guidelines for the manufacture and proper application of these products and to promote the benefits of repetitive manufacture and widespread product availability.

One of the primary purposes of this technical publication is to encourage the manufacture and utilization of products, that, in themselves, function in accordance with these standards. While some sections of this publication are intended to eliminate misunderstandings between manufacturers and users, all sections, when applied properly, contribute to safety in one way or another.

The proper manufacture of ground rod electrodes and ground rod electrode couplings is, however, only one consideration in promoting the safe utilization of electricity. Other safety considerations, including environmental conditions, system design, equipment selection and application, installation, operating practices, and maintenance, involve the joint efforts of the system designer, the various equipment manufacturers, the installer, and the user. Information is provided herein to assist in proper selection and use.

This technical publication covers design and performance requirements for ground rod electrodes and ground rod electrode couplings, and provides recommendations for their selection and use under normal or certain specific conditions. These standards have been promulgated with a view of promoting safety to persons and property when products conforming to them are selected, installed, and maintained in accordance with the *National Electrical Code*® and/or the *National Electrical Safety Code*.

ANSI/NEMA GR 1-2022 revises and supersedes NEMA GR 1-2017. NEMA technical publications are periodically reviewed to meet changing conditions and technical progress, and the latest edition should be utilized. Purchasers will be notified as to when revisions take place and will be provided an opportunity to acquire these when available.

Comments from users of this technical publication are welcome. They should be sent to:

NEMA Technical and Industry Affairs Department
National Electrical Manufacturers Association
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Rosslyn, Virginia 22209

This technical publication was developed by the Electrical Connector Section of the National Electrical Manufacturers Association.

Section approval of the standard does not necessarily imply that all section members voted for its approval or participated in its development. At the time it was approved, the Electrical Connector Section was composed of the following members:

South Atlantic, LLC
Burndy LLC, A Hubbell Company
NSI Industries
ABB Installation Products Inc.
Polaris Electrical Connectors
nVent CCC LLC
nVent Erico
TE Connectivity
ASK Products Inc.
Eaton
Galvan Industries, Inc.

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Section 1
General

1.1 Scope

This technical publication applies to ground rod electrodes and ground rod electrode couplings that function in accordance with the *National Electrical Code* (NFPA 70-2020) and/or the *National Electrical Safety Code* (ANSI/IEEE C2-2023). Included are materials, construction, and performance of copper-bonded ground rod electrodes, zinc-coated ground rod electrodes, and stainless steel ground rod electrodes. This technical publication also includes information for electrode products that have been successfully used for many years but are not defined within the *National Electrical Code* or the *National Electrical Safety Code*. The items described in this technical publication are defined in Section 1.

1.2 Normative References

This NEMA technical publication represents the results of research and investigation by the members of NEMA, its sections, and its committees. It has been developed through consultation among manufacturers, users, and national engineering societies. This publication references the following standards (all referenced documents use the latest document date):

American Society for Testing and Materials
100 Barr Harbor Drive
Conshohocken, PA 19428

ASTM A123/A123M-15	*Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products*
ASTM A153/A153M-09	*Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware*
ASTM A276-13a	*Standard Specification for Stainless Bars and Shapes*
ASTM A370-21	*Standard Test Methods and Definitions for Mechanical Testing of Steel Products*
ASTM E376-19	*Standard Practice for Measuring Coating Thickness by Magnetic-Field or Eddy Current (Electromagnetic) Test Methods*

Institute of Electrical and Electronic Engineers
445 Hoes Lane
Piscataway, NJ 08854

ANSI/IEEE C2-2023	*National Electrical Safety Code*

National Fire Protection Association, Inc.
1 Batterymarch Park
Quincy, MA 02169

ANSI/NFPA 70-2020	*National Electrical Code*

Underwriters Laboratories, Inc.
333 Pfingsten Road
Northbrook, IL 60062

ANSI/UL 467	*Standard for Grounding and Bonding Equipment*