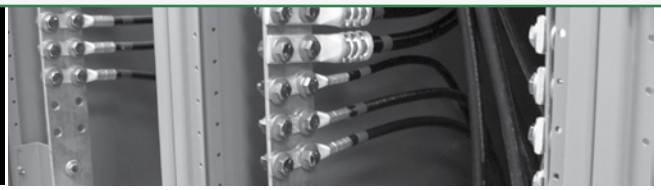
This is a preview of "NECA 331-2009". Click here to purchase the full version from the ANSI store.



NECA 331-2009

Standard for

Building and Service Entrance Grounding and Bonding

AN AMERICAN NATIONAL STANDARD

Published by
National Electrical Contractors Association

This is a preview of "NECA 331-2009". Click here to purchase the full version from the ANSI store.

NECA 331-2009

Standard for

Building and Service Entrance Grounding and Bonding

Published by
National Electrical
Contractors Association

This is a preview of "NECA 331-2009". Click here to purchase the full version from the ANSI store.

<This page intentionally left blank>

This is a preview of "NECA 331-2009". Click here to purchase the full version from the ANSI store.

Table of Contents

Foreword v

1. Scope 1
1.1 Equipment and Systems Included 1
1.2 Equipment and Systems Excluded 1
1.3 Regulatory and Other Requirements 1

2. Grounding and Bonding Overview 2
2.1 Equipment Grounding Conductor (EGC) 2
2.2 Installing Equipment Grounding Conductors 3
2.3 Grounding Electrode Conductor (GEC) 3
2.4 Grounding Electrode Conductor Protection 4
2.5 Repair or Splicing of Grounding Conductors 4

3. Service Entrance and Building Grounding 5
3.1 General Requirements 5
3.2 Metal Underground Water Piping 6
3.3 Metal Building Frame Electrodes 6
3.4 Concrete-Encased Electrodes (Ufer Grounds) 8
3.5 Ground Ring 9
3.6 Installed "Made" Electrodes 10
3.7 Ground Enhancement Materials and Chemical Rods 13
3.8 Lightning Protection Ground Terminals 13

4. Perimeter Grounding 16
4.1 Perimeter Grounding 16
4.2 Fence Grounding 18
4.3 Grounding of Other Exterior Items 20
4.4 Single Grounding Electrode System 21
4.5 Grounding Electrodesfor Separate Buildings or Structures 22

5. Building Interior Bonding and Grounding 23
5.1 Bonding 23
5.2 Equipment Grounding and Bonding 28
5.3 Grounding Bus and Grounding Terminal Bars 32

6. Bonding and Grounding of Electronic Systems 34
6.1 Performance Bonding and Grounding 34
6.2 Signal Reference Grounding Grid 34
6.3 Ground Current Interferrence with Cathode Ray Tube (CRT) Based Equipment 35
6.4 Networked Workstation Equipment 35

This is a preview of "NECA 331-2009". Click here to purchase the full version from the ANSI store.

7. Inspections 37
7.1 Final Review and Inspection Before Energizing 37
7.2 Periodic Checks and Maintenance 37

Annex A: Reference Standards 38

This is a preview of "NECA 331-2009". Click here to purchase the full version from the ANSI store.

(This foreword is not a part of the standard)

Foreword

National Electrical Installation Standards™ are intended to improve communication among specifiers, purchasers, and suppliers of electrical construction services. They define a minimum baseline of quality and workmanship for installing electrical products and systems. *NEIS*™ are intended to be referenced in contract documents for electrical construction projects. The following language is recommended:

> Grounding and bonding should be performed in accordance with NECA 331-2009, *Standard for Installing Building and Service Entrance Grounding.*

Use of *NEIS* is voluntary, and the National Electrical Contractors Association assumes no obligation or liability to users of this publication. Existence of a standard shall not preclude any member or nonmember of NECA from specifying or using alternate construction methods permitted by applicable regulations.

This publication is intended to comply with the edition of the National Electrical Code (NEC) in effect at the time of publication. Because they are quality standards, *NEIS* may in some instances go beyond the minimum requirements of the NEC. It is the responsibility of users of this publication to comply with state and local electrical codes when installing electrical products and systems.

Suggestions for revisions and improvements to this standard are welcome. They should be addressed to:

NECA Standards & Safety
3 Bethesda Metro Center, Suite 1100
Bethesda, MD 20814
(301) 215-4521 Telephone
(301) 215-4500 Fax
www.neca-neis.org
neis@necanet.org

To purchase *National Electrical Installation Standards,* contact the NECA Order Desk at (301) 215-4504 tel, (301) 215-4500 fax, or *orderdesk@necanet.org. NEIS* can also be purchased in .pdf download format from *www.neca-neis.org/store.*

Copyright © 2009, National Electrical Contractors Association. All rights reserved. Unauthorized reproduction prohibited.

National Electrical Installation Standards, NEIS, and the *NEIS* logo are trademarks of the National Electrical Contractors Association. National Electrical Code and NEC are trademarks of the National Fire Protection Association, Quincy, Massachusetts.

This is a preview of "NECA 331-2009". Click here to purchase the full version from the ANSI store.

<This page intentionally left blank>

This is a preview of "NECA 331-2009". Click here to purchase the full version from the ANSI store.

1. Scope

This standard describes installation procedures for building and service entrance grounding as well as building interior bonding and grounding. It is intended to define what is meant by installing equipment in a "neat and workmanlike manner" as required by the National Electrical Code (NEC), Section 110.12, and in accordance with "accepted good practice" as required by National Electrical Safety Code, Rule 012.C.The installations described in this standard should be performed by qualified persons. The term "qualified person" is defined in Article 100 of the NEC.

All information in this standard is intended to conform to the National Electrical Code® (ANSI/NFPA 70) and National Electrical Safety Code (ANSI/IEEE C2). Installers should always follow the NEC, NESC, applicable state and local codes, manufacturer's instructions, and project specifications when installing building grounding and bonding systems.

1.1 Equipment and Systems Included

The following are included in this publication:

- Electrical service grounding
- Building exterior grounds
- Building interior bonding
- Equipment grounding and bonding

1.2 Equipment and Systems Excluded

Lightning protection systems are specifically excluded from this publication. Interconnections between lightning protection systems and other grounding and bonding systems are necessary and briefly described in Section 3.8 of this standard.

1.3 Regulatory and Other Requirements

a) All information in this publication is intended to conform to the National Electrical Code (ANSI/NFPA 70 and National Electrical Safety Code), (ANSI/IEEE C2). Installers should always follow the NEC, NESC, applicable federal, state and local codes, manufacturer's installation instructions, and contract documents when installing building grounding and bonding systems.

b) General requirements for installing electrical products and systems are described in NECA 1, *Standard for Good Workmanship in Electrical Construction* (ANSI). Other *National Electrical Installation Standards (NEIS)* provide additional guidance for installing particular types of electrical products and systems. A complete list of *NEIS* is provided in Annex A.