

This is a preview of "NECA 202-2006". [Click here to purchase the full version from the ANSI store.](#)



Standard for
Installing and Maintaining
Industrial Heat Tracing Systems

NEIS



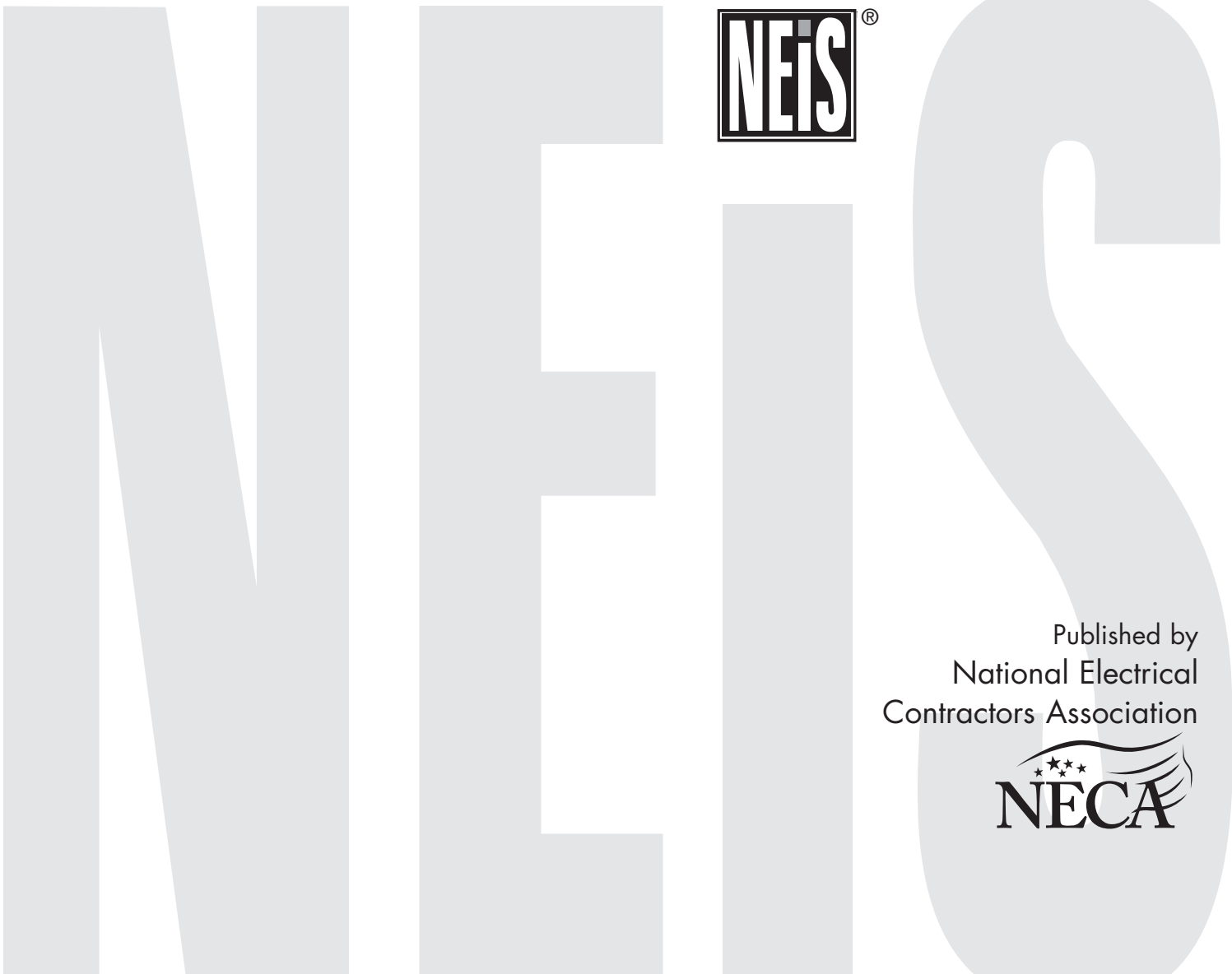
Published by
National Electrical
Contractors Association



NECA 202-2006

Standard for
Installing and Maintaining
Industrial Heat Tracing Systems

**An American
National Standard**



Published by
National Electrical
Contractors Association



NOTICE OF COPYRIGHT

This document is copyrighted by NECA

Reproduction of these documents either in hard copy or soft (including posting on the web) is prohibited without copyright permission. For copyright permission to reproduce portions of this document, please contact NECA Standards & Safety at (301) 657-3110 ext. 546, or send a fax to (301) 215-4500.

OR

National Electrical Contractors Association
3 Bethesda Metro Center, Suite 1100
Bethesda, Maryland 20814
(301) 657-3110

Organizations may obtain permission to reproduce a limited number of copies by entering into a license agreement. For information, contact:

IHS
15 Iverness Way East
Englewood, CO 80112-5704 or call
1-800-854-7179 (USA and Canada)
(303) 397-7956 (International)

Table of Contents

Forewordiii
1. Scope	1
1.1 Electrical Heat Tracing of Pipes, Vessels and Associated Equipment Included	1
1.2 Electrical Heating Systems Excluded	1
1.3 Related Construction Materials	1
1.4 Code Requirements and Manufacturer's Recommendations	1
2. Definitions	3
3. Pre-Installation Checks	4
3.1 Check the Pipe to be Heat Traced	4
3.2 Plan the Installation	4
3.3 Mark Location of Terminations	4
4. General Installation Practices	5
4.1 Receiving, Storing, Protecting, and Delivering	5
4.2 Site Preparation	6
4.3 Unpacking and Handling Material	6
4.4 Proper Type and Application	7
4.5 Coordination with Other Trades	7
4.6 Securing Components in Place	7
4.7 Wiring Connections	7
5. Heating Cable Installation	9
5.1 Paying Out the Cable	9
5.2 Attaching the Heating Cable	10
5.3 Securing the Heating Cable	12
5.4 Wrapping Heat Sinks	13
5.5 Special Cautions	14
6. Heating Cable Connections	16
7. Thermostat Controls	18
7.1 General	18
7.2 Ambient-Sensing Thermostats	18
7.3 Line-Sensing Thermostats	18

NECA 202 Standard for Installing and Maintaining Industrial Heat Tracing Systems

8. Thermal Insulation	19
8.1 Pre-Insulation Inspection	19
8.2 Insulation Installation	19
8.3 Testing After Insulation Installation	20
9. Power Supply and Electrical Protection	21
9.1 Voltage Rating	21
9.2 Electrical Loading	21
9.3 Ground-Fault Protection for Equipment (GFPE)	21
10. Commissioning	22
10.1 Pre-Commissioning	22
10.2 Ambient-Sensing Controlled Systems	22
10.3 Line-Sensing Controlled Systems	22
10.4 Backup (Redundant) Systems	22
11. Preventive Maintenance	23
11.1 Maintenance Procedures	23
11.2 Maintenance Records	23
11.3 Repairs	23
11.4 Maintenance of Piping and Associated Equipment	23
11.5 Special Cautions	23
12. Heating Cable Testing	24
12.1 Insulation Resistance Testing	25
13. Typical Troubleshooting Guide for Parallel Circuit Heaters	26
13.1 Troubleshooting Flowchart	26
13.2 Questions, Steps, and Corrective Actions	26
Annex A: Recordkeeping	34
Annex B: Reference Standards	37

(This foreword is not a part of the standard)

Foreword

National Electrical Installation Standards[™] (*NEIS*[®]) are designed 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:

Industrial heat tracing systems shall be installed in accordance with NECA 202-2006, *Standard for Installing and Maintaining Industrial Heat Tracing Systems* (ANSI).

Use of *NEIS* is voluntary, and the National Electrical Contractors Association (NECA) assumes no obligation or liability to users of this publication. Existence of a standard shall not preclude any member or non member of either organization 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 safety 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) 657-3110
(301) 215 4500 fax
www.neca-neis.org
neis@necanet.org

To purchase *NEIS*, 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 at www.neca-neis.org/standards.

Copyright ©2006, 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 registered trademarks of the National Fire Protection Association.

Cover illustration courtesy of Tyco Thermal Controls

This is a preview of "NECA 202-2006". [Click here to purchase the full version from the ANSI store.](#)

NECA 202 Standard for Installing and Maintaining Industrial Heat Tracing Systems

Revision History		
NECA 202-2001	07/2001	First publication
NECA 202-2006	09/2006	Reaffirmation

1. Scope

1.1 Products and Applications Included

This standard describes procedures for the installation, testing, and documentation of electrical freeze protection and process heat tracing systems. Heat tracing cable types covered by this publication include: self-regulating heating cables, and mineral insulated (MI) heating cables (see Figures 1.1(a)-1.1(e) on the following page).

System components used with these types of heat tracing cables included power transformers, control panels, temperature sensors, temperature controllers, contactors, circuit breakers, enclosures, conduit, wire, and all necessary auxiliary equipment and controls.

1.2 Products and Applications Excluded

The following types of heat tracing systems are specifically excluded from this publication:

1. Skin effect heating systems
2. Impedance heating systems
3. Inductance heating systems

1.3 Related Construction Materials

In addition to the electrical heat tracing components described in 1.1, this publication includes related construction materials including labels, adhesive tapes, attachment wire and components, and thermal insulation and cladding.

1.4 Regulatory and Other Requirements

a) All information in this publication is intended to conform to the National Electrical Code (ANSI/NFPA 70), and, in general, the typical recommendations of electrical heat tracing manufacturers. It is

recommended that all work be performed in accordance with NFPA 70E, *Standard for Electrical Safety in the Workplace*. Installers should always follow the NEC, applicable state and local codes, manufacturer's instructions when installing electrical heat tracing. Articles 427 (ordinary areas) and 500 (Classified areas) of the NEC govern the installation of electrical heat tracing systems. IEEE 515 and 515.1 are accepted industry standards that also contain useful information about installing electrical heat tracing systems.

b) Only qualified persons familiar with the construction and installation of electrical heat tracing systems should perform the work described in this publication.

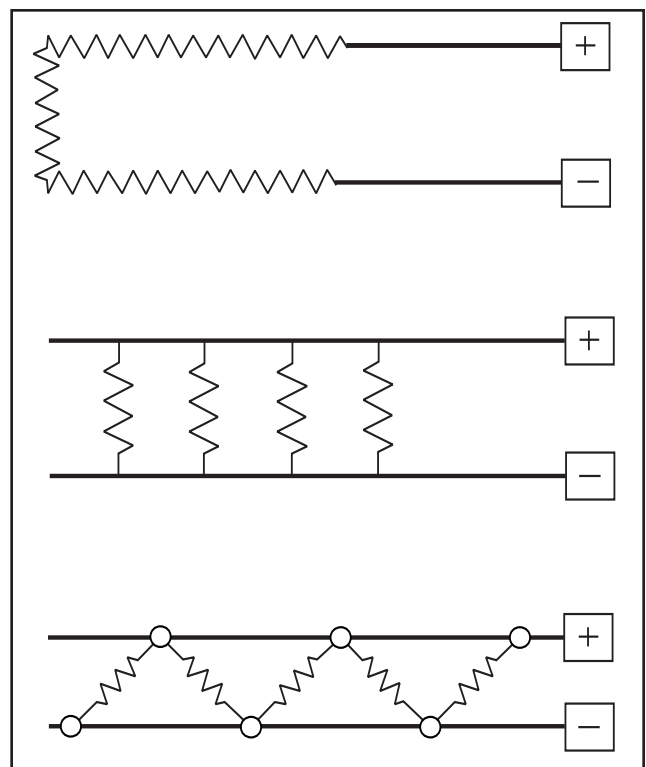


Figure 1.1(a)—Types of electrical heating