



NECA/NEMA 605-2018



Standard for Installing

# Underground Nonmetallic Utility Duct

Jointly Published by  
National Electrical  
Contractors Association



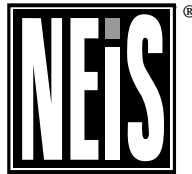
National Electrical  
Manufacturers Association



# NECA/NEMA 605-2018

Standard for

## Installing Underground Nonmetallic Utility Duct



Published by  
National Electrical  
Contractors Association



Jointly developed with  
National Electrical  
Manufacturers Association



## **NOTICE OF COPYRIGHT**

***This document is copyrighted by NECA***

ISBN: 978-1-944148-24-9

©2016. 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) 215-4549, 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

# Table of Contents

- Foreword.....v**
- NEMA Notice and Disclaimer.....vi**
- 1. Scope ..... 1**
  - 1.1 Included .....1
  - 1.2 Excluded.....1
  - 1.3 Regulatory and Other Requirements .....1
- 2. Nomenclature ..... 2**
- 3. Selection of Conduit and Duct ..... 3**
  - 3.1 Types of Raceway.....3
  - 3.2 Pipe Stiffness.....3
- 4. Handling and Storage of Conduit and Duct..... 4**
  - 4.1 Handling .....4
  - 4.2 Storage.....4
  - 4.3 Handling on the Jobsite .....5
- 5. Installation of Conduit and Duct ..... 6**
  - 5.1 Proper Installation.....6
  - 5.2 Trench Excavation .....6
  - 5.3 Conduit and Duct Separation .....7
  - 5.4 Joining of Raceway .....8
  - 5.5 Encased Burial (EB) of Rigid Nonmetallic Conduit (RNC) .....8
  - 5.6 Direct Burial (DB) of Rigid Nonmetallic Conduit (RNC).....10
  - 5.7 Expansion Fittings.....11
  - 5.8 Field Bending.....11
  - 5.9 Short-Radius Elbows.....12
  - 5.10 Conduit and Duct Repairs.....12
  - 5.11 Connections to Conduit Systems of Other Materials .....13
  - 5.12 Conduit Rodding (Fishing) .....13
  - 5.13 Mandrelling .....13
- 6. Field Bending Procedures for PVC Conduit ..... 15**
  - 6.1 Proper Installation.....15
  - 6.1 Joining.....15
  - 6.2 Trench Excavation .....16
  - 6.3 Procedures for Installation of Conduits for Field Bends .....16
- 7. Conduit-in-Casing Construction ..... 18**
  - 7.1 Conduit-in-Casing Construction .....19
  - 7.2 Using Conduit-in-Casing Construction .....19

7.3	Casing Types and Sizes.....	19
7.4	Conduit Normally Used.....	19
7.5	Supporting the Conduits .....	19
7.6	Typical Bore Spacer Examples .....	20
7.7	Grout and Reasons to Grout.....	22
7.8	“No Grout” and “Blown Sand” Applications.....	23
7.11	Other Methods and Practices .....	25
<b>8.</b>	<b>Solvent-Cementing Joints for PVC Rigid Nonmetallic Conduit, Duct, and Fittings.....</b>	<b>26</b>
8.1	To Prime or Not to Prime.....	26
8.2	Selection of Solvent Cement.....	26
8.3	Cutting Conduit Or Duct .....	26
8.4	Cleaning.....	27
8.5	Application Procedure .....	27
8.6	Assembly Precautions.....	27
8.7	Atmospheric Considerations .....	27
<b>9.</b>	<b>Joining of RTRC .....</b>	<b>29</b>
9.1	General Recommended Joining Procedures.....	29
9.2	Specific Joining Types and Procedures .....	29
9.3	Joint Cleaning and Adhesive Instructions .....	31
9.4	RTRC Coupling Joints .....	33
<b>10.</b>	<b>Joining Procedures for HDPE Raceway .....</b>	<b>34</b>
10.1	Introduction .....	34
10.2	General Provisions .....	34
10.3	Mechanical Fittings .....	34
10.4	Barbed Mechanical Fittings .....	35
10.5	Threaded Mechanical Fittings .....	35
10.6	Compression Fittings.....	35
10.7	Expansion Joints.....	35
10.8	Heat Fusion.....	35
10.9	Butt Fusion Joining .....	35
10.10	Socket Fusion Joining.....	36
10.11	Electrofusion Joining.....	36
10.12	Repair Operations .....	36
<b>Annex A:</b>	<b>NECA and NEMA Information.....</b>	<b>37</b>
<b>Annex B:</b>	<b>Reference Standards .....</b>	<b>38</b>

(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:

Underground Nonmetallic Utility Duct should be performed in accordance with NECA/NEMA 605-2018, *Standard for Installing Underground Nonmetallic Utility Duct*.

NECA/NEMA 605 is an adoption of NEMA TCB 2-2012, *NEMA Guidelines for the Selection of Underground Nonmetallic Duct*. NEMA's TCB 2-2012 guideline is intended to provide assistance as a guide to obtain the most appropriate and satisfactory installation of rigid nonmetallic conduit (RNC) or raceway systems. This guideline is in no way intended to assume or replace any responsibilities of engineers, customer representatives, owners, or other persons in establishing engineering design practices and procedures best suited to individual job conditions. The complete text of NEMA's publication is reproduced here, in this *National Electrical Installation Standard*.

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 non-member 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](http://www.neca-neis.org)  
[neis@necanet.org](mailto: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](mailto:orderdesk@necanet.org). *NEIS* can also be purchased in .pdf download format from [www.neca-neis.org/store](http://www.neca-neis.org/store).

Copyright © 2017, 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.

*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.

Cover photo courtesy Jay Hintze/Quality Electric Inc., Boise, ID

*(This notice is not a part of the standard)*

# NEMA Notice and Disclaimer

The information in this publication was considered technically sound by a consensus among persons engaged in its development at the time it was approved. Consensus does not necessarily mean there was unanimous agreement among every person participating in the development process.

The National Electrical Manufacturers Association (NEMA) standards and guideline publications, of which the document herein is one, are developed through a voluntary 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. Although NEMA administers the process and establishes rules to promote fairness in the development of consensus, it does not write the documents, nor does it 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, 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 particular purpose(s) or need(s). NEMA does not undertake to guarantee the performance of any individual manufacturer's 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 circumstance. 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.

# 1. Scope

## 1.1 Included

This guideline covers recommendations for the selection, handling and installation of underground single bore rigid nonmetallic conduit (RNC) or raceway for power, lighting, signaling, and communications applications. For the purposes of this guideline, rigid nonmetallic conduit (RNC) or raceway refers to HDPE, PE, PVC or RTRC conduit and duct.

## 1.2 Excluded

Corrugated coilable utility duct is not covered in this guideline; details on storage, handling, and installation are covered in NEMA TCB-3. Although not specifically mentioned in this standard, variations of the products discussed may occasionally be specified. Users should follow installation recommendations of the manufacturer.

## 1.3 Regulatory and Other Requirements

All information in this publication is intended to conform to the National Electrical Code® (NFPA Standard 70). Installers shall always follow the NEC®, applicable state and local codes, and manufacturer's instructions when installing electrical equipment and systems.

Only qualified persons as defined in the NEC familiar with the construction and installation of electrical power distribution and control systems and equipment shall perform the technical work described in this publication. Administrative functions and other tasks can be performed under the supervision of a qualified person. All work shall be performed in accordance with NFPA 70E, *Standard for Electrical Safety in the Workplace*.

General requirements for installing electrical products and systems are described in NECA 1-2015, *Standard for Good Workmanship in Electrical Construction* (ANSI). Other *National Electrical Installation Standards* provide additional guidance for installing particular types of electrical products and systems. A complete list of *NEIS* is provided in Annex B.