

NEMA Standards Publication TC 13-2014 (R2019)

Electrical Nonmetallic Tubing (ENT)

Published by:

National Electrical Manufacturers Association

1300 North 17th Street, Suite 900

Rosslyn, Virginia 22209

www.nema.org

© 2020 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.

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.

The National Electrical Manufacturers Association (NEMA) 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, expressed 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.

Foreword

This standard for Electrical Nonmetallic Tubing (ENT) is intended to:

- a. List dimensions and other significant requirements;
- b. Set forth some of the properties of these products and assist in selecting and obtaining the proper product for a particular need.

User needs have been considered during the development of this standard.

The Polymer Raceway Products Section (5TC) of NEMA, through its Members, has worked (and continues to work) closely with such organizations as ASTM, the Plastics Pipe Institute, appropriate government agencies, testing laboratories, and others in the periodic review and revision of these Standards for any changes necessary to remain current.

The NEMA Polymer Raceway Products Section will periodically review this standard and revise the adoptions or modifications as necessary. Proposed or recommended revisions can be submitted to:

NEMA Technical Operations Department
National Electrical Manufacturers Association
1300 North 17th Street, Suite 900
Rosslyn, Virginia 22209

NEMA TC 13-2014 (R2019) is a reaffirmation of NEMA TC 13- 2014. NEMA TC 13-2014 revised and superseded NEMA TC 13-2005.

NEMA TC 13-2014 (R2019) was approved by the NEMA Polymer Raceway Products Section. Approval does not necessarily imply that all Members of the Section voted for its approval. At the time of approval, the Section consisted of the following Members:

ABB, Inc.—www.abb.com—Memphis, TN
Anamet Electrical, Inc.—www.anacondasealtite.com—Mattoon, IL
Atkore International—www.atkore.com—Harvey, IL
Champion Fiberglass, Inc.—www.championfiberglass.com—Spring, TX
Electric-Flex Company—www.electriflex.com—Roselle, IL
FRE Composites Group—www.frecomposites.com—St. Andre-d'Argenteuil, PQ, Canada
Hubbell Incorporated—www.hubbell.com—Shelton, CT
IPEX USA, LLC. —www.ipexinc.com—Mississauga, ON, Canada
Legrand North America—www.legrand.us—West Hartford, CT
Panduit Corporation—www.panduit.com—Tinley Park, IL
Phoenix Contact—www.phoenixcontact.com—Middletown, PA
Southern Pipe, Inc.—www.southern-pipe.com—New London, NC
Southwire Company—www.southwire.com—Carrollton, GA
Underground Devices, Inc.—www.udevices.com—Northbrook, IL
United Fiberglass of America—www.unitedfiberglass.com—Springfield, OH

CONTENTS

Foreword	Error! Bookmark not defined.
Section 1 GENERAL	1
1.1 SCOPE	1
1.2 REFERENCED STANDARDS	1
Section 2 DEFINITIONS	2
Section 3 GENERAL REQUIREMENTS	3
3.1 MATERIALS	3
3.2 DIMENSIONS	3
3.3 JOINTS	3
Section 4 PERFORMANCE REQUIREMENTS	5
4.1 QUALIFICATION TESTS	5
4.1.1 Flammability	5
4.1.2 Secureness of Fittings	5
4.2 QUALITY CONTROL TESTS	5
4.2.1 Flattening	5
4.2.2 Deflection Resistance	5
4.2.3 Impact Resistance	5
4.2.4 Workmanship	5
4.2.5 Resistance to Mechanical Abuse (Bending)	5
4.2.6 Tension Test	6
Section 5 TEST METHODS	7
5.1 CONDITIONING, TEST CONDITIONS, AND SAMPLING	7
5.1.1 Conditioning Test Specimens	7
5.1.2 Test Condition	7
5.1.3 Sampling	7
5.2 DIMENSIONS—OUTSIDE DIAMETER (AVERAGE)	7
5.3 FLATTENING	7
5.4 DEFLECTION RESISTANCE	7
5.5 IMPACT RESISTANCE	7
5.6 RESISTANCE TO MECHANICAL ABUSE (BENDING)	8
5.6.1 Test Method 1	8
5.6.2 Test Method 2	8
5.7 TENSION TEST	9
5.8 FLAMMABILITY	10
5.8.1 Vertical Flame (500W Burner)	10
5.8.2 (Optional) Flame Test in Cable Trays, FT4	10
5.9 SECURENESS OF FITTINGS	10
Section 6 MARKINGS	11
Figures	
Figure 1 ENT	4
Figure 2 Tup Geometry	9
Tables	
Table 1 Size and Dimensions of Electrical Nonmetallic Tubing (ENT), In. (mm)	3

Table 2	Load for Deflection Resistance	5
Table 3	Tension Force for Tension Test.....	6
Table 4	Mandrel Sizes	8
Table 5	Sphere Sizes.....	9

< This page intentionally left blank. >

Section 1 General

1.1 Scope

This standard covers Electrical Nonmetallic Tubing (ENT) materials, dimensions, and physical properties.

NOTE—The intent of NEMA TC 13 is to harmonize with the requirements in binational standard ANSI/UL 1653-CAN/CSA C22.2 No. 227.1.