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Guide For Frequency of Sampling Extruded Dielectric Power, Control, Instrumentation, and Portable Cables for Test

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION ● 2101 L STREET, N.W., WASHINGTON, D.C. 20037

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Foreword

This Standard Test Methods Publication for Extruded Dielectric Power, Control, Instrumentation and Portable Cables was developed by the Insulated Cable Engineers Association, Inc. and was approved by the National Electrical Manufacturers Association.

ICEA/NEMA Standards are adopted in the public interest and are designed to eliminate misunderstandings between the manufacturers and the user and to assist the user in selecting and obtaining the proper product for his particular need. The user of this Standards Publication is cautioned to observe any health or safety regulations and rules relative to the use of the test procedures covered by this document.

Requests for interpretation of this Standard must be submitted in writing to the Insulated Cable Engineers Association, Inc., P.O. Box P, South Yarmouth, MA 02664. An official written interpretation will be provided by the Association.

Suggestions for improvement gained in the use of this publication will be welcomed by the Association.

Scope

This guide provides a combination of plans for the frequencies at which cable samples are obtained for tests to determine conformance to the appropriate requirements of ICEA Standards Publications. This guide applies only to extruded dielectric power, control, instrumentation and portable cables.

This guide does not apply to those requirements with which each production or shipping length of completed cable must comply as specified in the applicable ICEA Standards.

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GUIDE FOR FREQUENCY OF SAMPLING EXTRUDED DIELECTRIC POWER, CONTROL, INSTRUMENTATION, AND PORTABLE CABLES FOR TEST

Section 1
GUIDE FOR SAMPLING FREQUENCIES

1.1 DEFINITIONS

The following definitions apply to this guide.

1.1.1 Sample

A piece or section of cable taken from a production or shipping length or a small quantity taken from a lot of material before application to the cable.

1.1.2 Specimen

A test unit prepared from a sample.

1.1.3 Sampling Plan

A procedure for taking samples as a function of the number of production or shipping lengths or reels or quantity of cable. (The six sampling plans used in this ICEA combination of plans are shown in Table 1.)

1.1.4 Lot

A quantity of cable or material produced at the same location under the same manufacturing conditions during the same time period.

1.1.5 Metric Conversion

To convert feet to meters, multiply by 0.305. To convert kcmil to square millimeters, multiply by 0.507.

1.2 SELECTION OF SAMPLES

Each cable sample shall be taken from an accessible end of different coils or reels, selected at random. Each sample shall be traceable to the coil or reel from which it was selected.

1.2.1 Samples for Thickness Measurement

When the lot of cable to be inspected consists of two coils or reels, or less, at least one sample shall be taken from each coil or reel. When the lot consists of more than two coils or reels, and less than twenty coils or reels, at least one sample shall be taken from each of two coils or reels, selected at random. If the lot consists of twenty or more coils or reels, samples shall be taken from not less than 10 percent of the coils or reels, selected at random. At least one determination of thickness shall be made on each coil or reel selected.

1.2.2 Samples for Tests on Conducting Materials Intended for Extrusion

One sample of material for each specified test shall be molded from each lot of material intended for extrusion on cable.

1.2.3 Sample Plans for Other Tests

A sampling plan for other tests specified in an ICEA Standards Publication shall be selected in accordance with Table 2.

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1.3 SAMPLE CONFORMANCE

If all of the samples pass the test specified in a standard, the quantity of cable which they represent shall be considered as meeting the requirements of that standard.

1.4 RESAMPLING PLANS

1.4.1

If any sample fails to pass a test specified in a standard, the length of cable from which the sample was taken shall be considered as not meeting the requirements of that standard and another sample shall be taken from each of two other lengths of cable in the quantity of cable under test. If either of the second samples fail to pass the test, the quantity of cable shall be considered as not meeting the requirements of this standard. If both such second samples pass the test, the quantity of cable (except the length represented by the first sample) shall be considered as meeting the requirements of the standard.

1.4.2

Failure of any sample shall not preclude resampling and retesting the length of cable from which the original sample was taken.

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Table 1
SAMPLING PLANS*

PLAN A

Quantity of Completed Cable Ordered (ft)	Size of Conductor (kcmil)	Number of Samples	Minimum Length of Each Sample (conductor feet)
Less than 2,000	Less than 250	none	. . .
Less than 1,000	250 and larger	none	. . .
2,000–50,000	Less than 250	1	6
1,000–25,000	250 and larger	1	3
More than 25,000			
First 25,000	250 and larger	1	3
Each additional 25,000	250 and larger	1	3
More than 50,000			
First 50,000	Less than 250	1	6
Each additional 50,000	Less than 250	1	6

PLAN B

Quantity of Completed Cable Ordered (ft)	Nominal Overall Diameter of Cable (inches)	Number of Samples	Minimum Length of Each Sample (cable feet)
Less than 2,000	Less than 1.0	none	. . .
Less than 1,000	1.0 and larger	none	. . .
2,000–50,000	Less than 1.0	1	6
1,000–25,000	1.0 and larger but less than 2.0	1	3
	2.0 and larger	1	2
More than 50,000			
First 50,000	Less than 1.0	1	6
Each additional 50,000	Less than 1.0	1	6
More than 25,000			
First 25,000	1.0 and larger but less than 2.0	1	3
Each additional 25,000	1.0 and larger but less than 2.0	1	3
More than 25,000			
First 25,000	2.0 and larger	1	2
Each additional 25,000	2.0 and larger	1	2

*For metric conversions see 1.5.

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PLAN C

No sample shall be taken for 5,000 feet or less. One sample shall be taken from the first 5,001 to 20,000 feet of each cable construction and one additional sample for each additional 100,000 feet.

PLAN D

One sample shall be taken from each 25,000 feet of each cable consruction.

PLAN E

One sample shall be taken from each 50,000 feet of each cable construction.

PLAN F

For all cables with conductors larger than 500 kcmil and for all cables rated 28,000 volts or higher, one sample shall be taken for orders of between 10,000 and 40,000 feet. One additional test sample shall be taken for each additional 30,000 feet or major fraction thereof.

For all cables rated 2001-25,000 volts with conductor sizes 500 kcmil and less, one sample shall be taken for orders of between 25,000 and 100,000 feet. One additional sample shall be tested for each additional 100,000 feet or major fraction thereof.

For all cables rated 0 to 2000 volts with conductor sizes 500 kcmil and less, one sample shall be taken for orders of between 100,000 and 1,000,000 feet. One additional sample shall be tested for each additional 1,000,000 feet or major fraction thereof.

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Table 2
SCHEDULE OF TESTS AND APPLICABLE SAMPLING PLANS*

Test	Conductor Stress Control Layer and Insulation	Insulation Shield and Jacket	Cable
Tensile Strength	A	B	...
Tensile Stress	A	B	
Elongation at Rupture	A	B	...
Air Oven Aging	A	B	...
Heat Distortion	A	B	...
Oxygen Pressure Aging	A	B	...
Set	A	B	...
Air Pressure Aging	A	B	...
Oil Immersion Aging	A	B	...
Cold Bend	A	B	...
Heat Shock	A	B	...
Absorption Coefficient	A	B	...
Crack Resistance (Wrap)	A	B	...
Flame Resistance	A	...	E
Dielectric Strength Retention	A	...	...
Brittleness Temperature	A	B	...
Environmental Cracking	...	B	...
Stripping Force	...	B	...
Tear Resistance	...	B	...
Solvent Extraction	F	...	...
Accelerated Water Absorption	...	...	C
Capacity and Dissipation Factor	...	...	C
Discharge Resistance	...	...	C
Ozone Resistance	...	...	C
Short-Term Dielectric Strength	...	...	C
Cold Bend/Dielectric Strength	...	...	E
Saturant	...	...	E
Moisture Resistance	...	...	E
Resistivity	...	...	D
Mineral Filler Content (Braided Cables)	...	B	E
Melting	...	B	E
Dripping	...	B	E
Bending (Braided Cables)	...	B	E
All Other Tests	C	C	C

*Sampling Plans A through F are described in Table 1.

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NEMA STANDARDIZATION

The purpose of NEMA Standards, their classification and status are set forth in certain clauses of the NEMA Bylaws, which are quoted below:

Purpose of Standards

National Electrical Manufacturers Association Standards are adopted in the public interest and are designed to eliminate misunderstandings between the manufacturer and the purchaser and to assist the purchaser in selecting and obtaining the proper product for its particular need. Existence of a National Electrical Manufacturers Association Standard does not in any respect preclude any member or nonmember from manufacturing or selling products not conforming to the standard.

(Bylaw—Art. V, Sec. 1)

Definition of a Standard

A standard of the National Electrical Manufacturers Association defines a product, process or procedure with reference to one or more of the following: nomenclature, composition, construction, dimensions, tolerances, safety, operating characteristics, performance, rating, testing, and the service for which they are designed.

(Bylaw—Art. V, Sec. 2, Subsection A)

Dimensions

Where dimensions are given for interchangeability purposes, alternate dimensions satisfying the other provisions of the standards publication may be capable of otherwise equivalent performance.

(NEMA Policy Memorandum 84-2, dated June 7, 1984)

Classes of Standards

National Electrical Manufacturers Association Standards are of two classes:

1. NEMA Standard, which relates to a product commercially standardized and subject to repetitive manufacture, which standard has been approved by at least 90 percent of the members of the Subdivision eligible to vote thereon;
2. Suggested Standard for Future Design, which may not have been regularly applied to a commercial product, but which suggests a sound engineering approach to future development, which standard has been approved by at least two-thirds of the members of the Subdivision eligible to vote thereon.

(Bylaw—Art. V, Sec. 2, Subsection B)

Authorized Engineering Information

Authorized Engineering Information consists of explanatory data and other engineering information of an informative character not falling within the classification of NEMA Standard or Suggested Standard for Future Design.

(Bylaw—Art. V, Sec. 6, 1st Sentence)

Official Standards Proposal

An Official Standards Proposal is an official draft of a proposed standard which is formally recommended to an outside organization(s) for consideration, comment and/or approval.

(Bylaw—Art. V, Sec. 4, Subsection A)

Identification of Status

Standards in NEMA Standards Publications are identified in the foreword or following each standard as "NEMA Standard" or "Suggested Standard for Future Design." These indicate the status of the standard. These words are followed by a date which indicates when the standard was adopted in its present form by the Association.

The material identified as "Authorized Engineering Information" and "Official Standards Proposal" is designated similarly.

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