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





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WC 54

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

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Foreword

This *Guide for Freqency of Sampling of Extruded Dielectric Power, Control, Instrumentation, and Portable Cables for Test* 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 or her 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 440, 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.

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Scope

This guide provides a combination of plans for the frequencies at which cable samples may be obtained for tests to determine conformance to the appropriate requirements of ICEA Standards Publications. Valid statistical sampling frequencies other than those listed herein may be acceptable if evidence of statistical control can be demonstrated. This guide applies only to extruded dielectric power, control, instrumentation, and portable cables.

This guide does not apply to those requirements to 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 five sampling plans used in this ICEA combination of plans are shown in Section 2.)

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 0.305. To convert kcmil to square millimeters, multiply by 0.507. To convert inches to millimeters, multiply by 25.4.

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 20 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 20 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 Section 3.

1.3 SAMPLE CONFORMANCE

If all of the samples pass the test specified in a standard, the quantity of cable that 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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Section 2
SAMPLING PLANS
PLAN A

Quantity of Completed Cable Used in Determining Samples (ft.)	Size of Conductors Used in Determining Samples (kcmil)	Number of Samples
Less than 2,000	Less than 250	None
Less than 1,000	250 and larger	None
2,000 to 50,000	Less than 250	1
1,000 to 25,000	250 and larger	1
Each additional 50,000	Less than 250	1
Each additional 25,000	250 and larger	1

* For metric conversion, see 1.1.5.

PLAN B

Quantity of Completed Cable Used in Determining Samples (ft.)	Number of Samples
0 to 10,000	None
10,001 to 50,000	1
Each Additional 100,000	1

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PLAN C

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

PLAN D

Three samples shall be tested per insulation extruder run. The samples shall be taken from the beginning, near the middle and the end of each insulation extruder run.

PLAN E

Type Test:

For Insulation and Polymeric Shield Materials - One sample to be tested and no other samples need be tested unless the material formula has been changed. Test report will be available upon request.

For Completed Cable Designs - One sample to be tested and no other samples need be tested unless insulation type, outer jacket, or cable design has been changed. Test report will be available upon request but not necessarily on purchaser's exact conductor size and voltage level.

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Section 3
SCHEDULE OF TESTS AND APPLICABLE SAMPLING PLANS*

Test	Conductor Stress Control Layer and Insulation	Insulation Shield and Jacket	Cable
Tensile Strength	A	A	...
Tensile Stress	A	A	...
Elongation at Rupture	A	A	...
Air Oven Aging	A	A	...
Heat Distortion	A	A	...
Oxygen Pressure Aging	A	A	...
Set	A	A	...
Air Pressure Aging	A	A	...
Oil Immersion Aging	A	A	...
Cold Bend	A	A	...
Heat Shock	A	A	...
Absorption Coefficient	A	A	...
Crack Resistance (Wrap)	A	A	...
Flame Resistance	C	...	...
Dielectric Strength Retention	A	...	...
Brittleness Temperature	E	E	...
Environmental Cracking	...	E	...
Stripping Force	...	D	...
Tear Resistance	...	A	...
Hot Creep	D	...	...
Accelerated Water Absorption, EM-60	...	...	E
Capacity and Dissipation Factor	...	...	E
Discharge Resistance	...	...	B
Ozone Resistance	...	...	B
Short-Term Dielectric Strength	...	...	C
Cold Bend/Dielectric Strength	...	...	C
Saturant	...	...	C
Moisture Resistance	...	...	C
Resistivity	...	...	C
Mineral Filler Content (Braided Cables)	...	A	C
Melting	...	A	C
Dripping	...	A	C
Bending (Braided Cables)	...	A	C
Vertical Tray Flame Test			
70,000 BTU	...	...	E
210,000 BTU	...	...	E
All Other Tests	B	B	B

*Sampling Plans A through E are described in Section 2.

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NEMA STANDARDIZATION

The purpose of NEMA Standards, their classification and status are set forth in certain clauses of the NEMA *Standardization Policies and Procedures* manual and are referenced 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 their particular needs. 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.

(Standardization Policies and Procedures, p. 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.

(Standardization Policies and Procedures, p. 2)

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.

(Standardization Policies and Procedures, p. 8)

Categories of Standards

National Electrical Manufacturers Association Standards are of three classes:

1. NEMA Standard, which relates to a product, process or procedure 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.
3. Adoptive Standard, which is adopted in whole or in part from the standards of another organization, either domestic, regional, or international.

(Standardization Policies and Procedures, pp 7 & 16)

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, which standard has been approved by at least two-thirds of the members of the Subdivision eligible to vote on the standard.

(Standardization Policies and Procedures, pp. 7 & 16)

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, and which has been approved by at least 90 percent of the members of the Subdivision eligible to vote thereon. *(Standardization Policies and Procedures, pp 7 & 16)*

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.

July 17, 1990

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