



NEW ICEA STANDARDS AND AEIC SPECIFICATION FOR MEDIUM-VOLTAGE POWER CABLES

Lauri J. Hiivala
Nexans Energy

Outline

- **Existing NEMA/ICEA standards**
- **Changes to ICEA standards**
- **New ANSI/ICEA and
ANSI/NEMA/ICEA standards**
- **AEIC specifications**
- **Availability of standards and
specifications**

Changes to ICEA Standards

- **Four major standards were based on insulation material**
- **All new standards are application oriented**

Withdrawn Standards

- **NEMA WC 7-1988/ICEA S-66-524
Crosslinked Polyethylene Insulated
Wire & Cable**
- **NEMA WC 8-1988/ICEA S-68-516
Ethylene Propylene Rubber Insulated
Wire & Cable**

New Standards

- **Combined TR-XLPE/XLPE (ICEA S-66-524) and EPR (ICEA S-68-516)**
- **ANSI/ICEA S-94-649-2000 Concentric Neutral Cables Rated 5 –46 kV**
- **ANSI/ICEA S-97-682-2000 Utility Shielded Cables Rated 5 – 46 kV**

Other Standards

- **ANSI/NEMA WC 53/ICEA T-27-581-2000 Test Methods for Extruded Dielectric Cables**
- **ANSI/NEMA WC 54/ICEA T-26-465-465-2000 Guide for Frequency of Sampling Extruded Dielectric Cables**

Significant Changes

- **Added utility user requirements to ICEA standards**
- **Previously insulation thicknesses were minimum average and minimum point**
- **Deleted requirement for minimum average wall thickness.**

Significant Changes

- **Raised the minimum point wall thickness**
- **Added maximum point thickness**
- **Insulation shield stripping tension requirement: 3 - 24 lbs for all discharge-free cable designs**

Manufacturer's Perspective

- **ICEA diameters differ from AEIC**
- **ICEA minimum diameters based on minimum point thickness and lower than AEIC CS8 minimum diameters**
- **ICEA maximum diameters compared to AEIC CS8:**
 - **most are the same**
 - **some are 5-15 mils less**
 - **a few are 5 mils**

Point Thickness Requirements for Insulation Wall

Old ICEA and AEIC

	<u>Min</u>	<u>Max</u>
15 kV	158	none
	198	none
25 kV	234	none
28 kV	252	none
35 kV	311	none

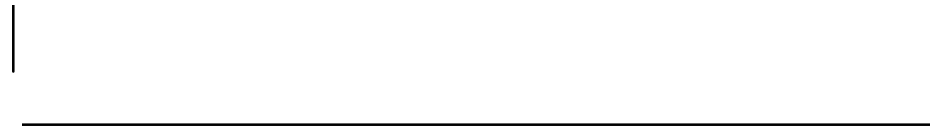
New ICEA and AEIC

	<u>Min</u>	<u>Max</u>
15 kV	165	205
	210	250
25 kV	245	290
28 kV	265	310
35 kV	330	375

15 kV 175-mil Wall Old AEIC Requirements

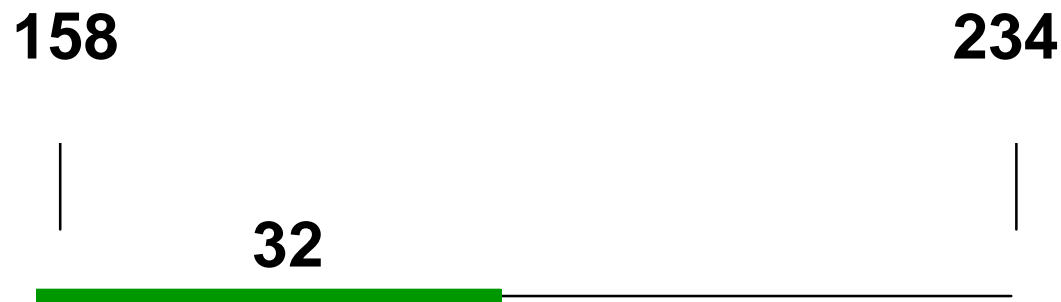
158

234



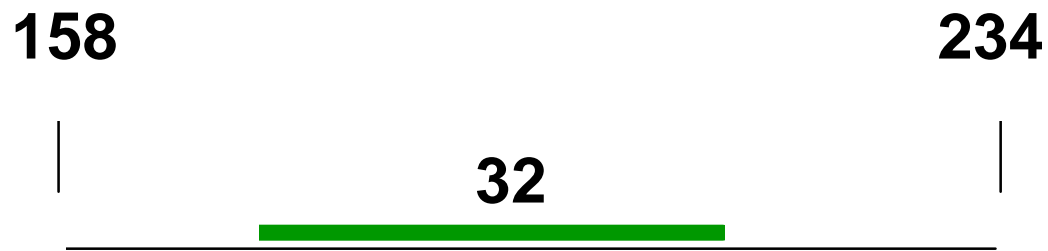
**AEIC allowed insulation wall thickness to vary
between these limits.**

15 kV 175-mil Wall Old AEIC Requirements



Although AEIC limited the variation between min and max point thickness, that could vary over a wide range.

15 kV 175-mil Wall Old AEIC Requirements



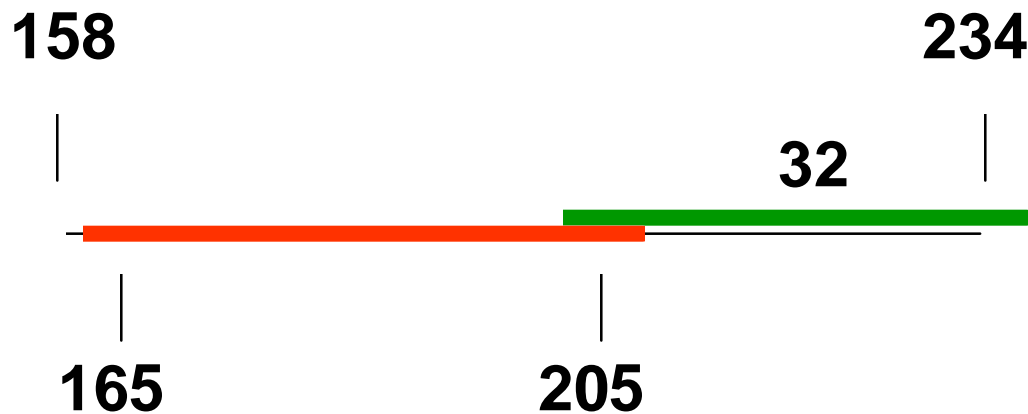
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15 kV 175-mil Wall Old AEIC Requirements



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15 kV 175-mil Wall Old AEIC Requirements



The new ICEA/AEIC requirements limit the wall thickness within a specific minimum and maximum point thickness.

Effect of New Dimensional Changes

- **Manufacturers will supply a more consistent insulation wall thickness.**
- **New ICEA diameters will result in lower material usage.**
- **Consult accessory manufacturer for proper selection**

Old AEIC Specifications

- **Were supplements to ICEA standards**
 - **CS5-94 (TR-XLPE/XLPE) was supplement to NEMA WC 7-1988/ICEA S-66-524**
 - **CS6-96 (EPR) was supplement to NEMA WC 8-1988/ICEA S-68-516**

New AEIC Specification

- **CS8 combined CS5 (TR-XLPE/XLPE) and CS6 (EPR)**
- **Supplement to S-94-649 and S-97-682**
- **Shielded 5 kV through 46 kV**

Sections Kept in CS8

- **Only six sections from CS5 and CS6 were kept in CS8**
- **A. Preface**
- **G. Internal Irregularity Test (Hot Oil)**
- **H. General**
 - **Procedures, CTRs, Testing Frequency and Repairs**

Sections Kept in CS8

- **J. Shipment and Reels**
- **K. Guarantee**
- **M. Qualification Tests**
 - **Tree count**
 - **Reduced number of wafers to count for each test**
 - **Added tree counts for 180 and 360 days**

Sections Kept in CS8

- Part of Thermomechanical Qualification Test**
- Dissipation Factor Classification in the CV Extrusion Qualification (Periodic Qualification Test)**
- All other sections were either deleted or a sentence was added referring to the ANSI/ICEA standard**

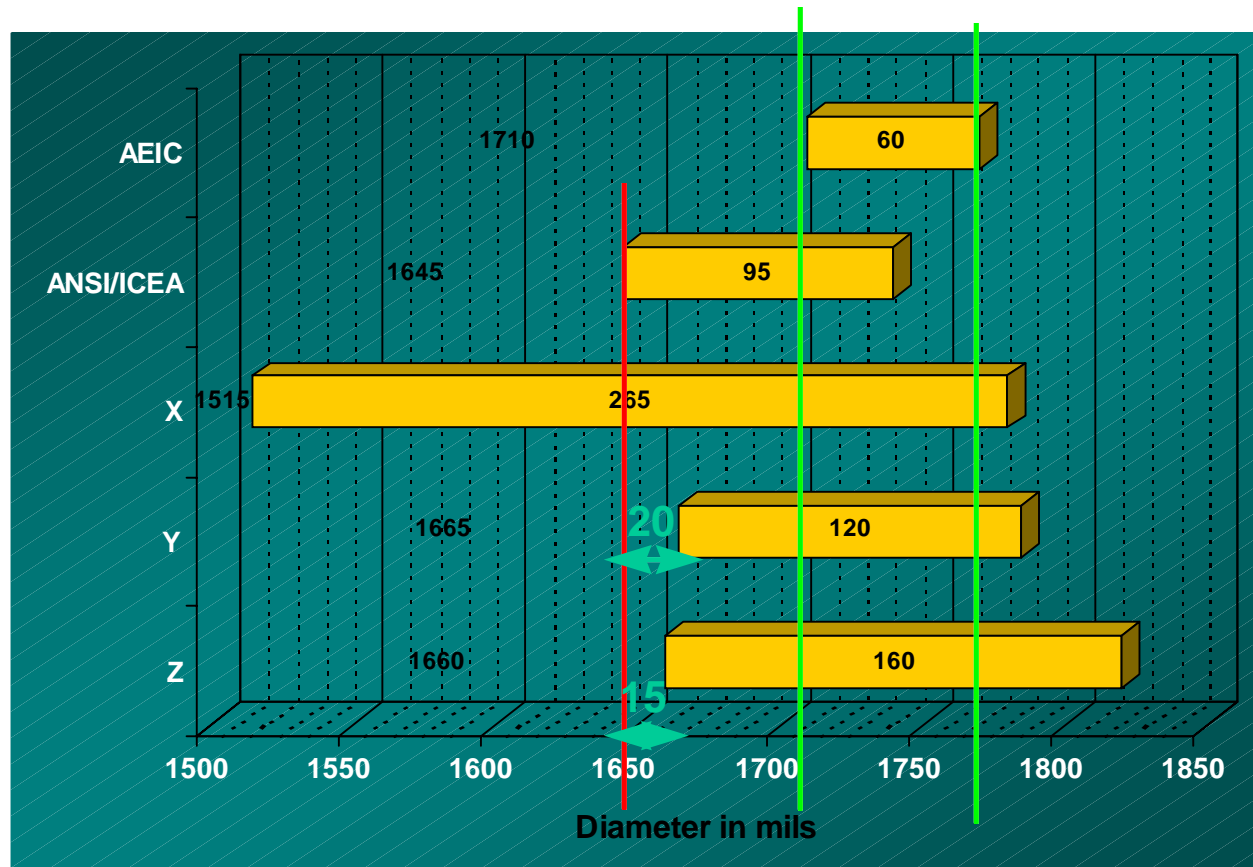
Other Changes to CS8

- **Insulation Shield Field Strippability Test performed once per cable core extruder run at two temperatures**
- **Appendixes - Same diameter tables as previously in CS5 and CS6**

User's Perspective

- AEIC maintained these diameters for compatibility with cable accessories**
- Common usage of these tables by cable accessory manufacturers**

Range of 1000 kcmil 25 kV Cable and Splices



User's Perspective

- **Accessory manufacturers will have splices that meet the ANSI/ICEA standards**
- **After that, AEIC intends to drop tables and use ANSI/ICEA tables**
- **Utilities must examine the new diameters with respect to their present accessories.**

Conclusions

- **ANSI/ICEA utility cable standards are now nationally accredited**
- **AEIC CS8 still supplements the ANSI/ICEA utility cable standards**
- **ANSI/ICEA standards have provided a way to greatly simplify the AEIC specifications**
- **Cable engineers must ensure cable specs are designed for accessories.**

Availability of ICEA Standards

Global Engineering Documents

15 Inverness Way East

Englewood, CO 80112, USA

Tel:(800) 854-7179 or (303) 397-7956,

Fax: (303) 397-2740

E Mail: global@ihs.com

Web Site: <http://global.ihs.com>

Availability of AEIC Specifications

**Association of Edison Illuminating
Companies**

600 North 18th Street

P.O. Box 2641

Birmingham, AL 35291-0992

Phone: 205.257.3839

<http://www.aeic.org>