



Standard Specification for Crosslinked Polyethylene Insulation for Wire and Cable Rated 0 to 2000 V¹

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1. Scope

1.1 This specification covers a crosslinked polyethylene insulation for electrical wires and cables in conductor sizes 14 AWG [2.08 mm²] and larger. The base polymer of this insulation consists substantially of polyethylene or a polyethylene copolymer.

1.2 This type of insulation is suitable for continuous use on power cables in wet and dry locations, for voltage ratings not exceeding 2000 V and at conductor temperatures not exceeding 90 °C for normal operation. For copper conductors, the insulation may be applied over the uncoated metal.

1.3 Materials covered by this specification are not sunlight and weather resistant unless they are carbon black pigmented or contain an additive system designed for this protection.

1.4 In many instances the insulation cannot be tested unless it has been formed around a conductor. Therefore, tests are done on insulated wire in this standard solely to determine the relevant property of the insulation and not to test the conductor or completed cable.

1.5 Whenever two sets of values are presented, in different units, the values in the first set are the standard, while those in parentheses are for information only.

2. Referenced Documents

2.1 ASTM Standards:²

D470 Test Methods for Crosslinked Insulations and Jackets for Wire and Cable

D1248 Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable

D1711 Terminology Relating to Electrical Insulation

D2765 Test Methods for Determination of Gel Content and Swell Ratio of Crosslinked Ethylene Plastics

2.2 ICEA Standard:

ICEA T-28-562 Test Method for Measurement of Hot Creep of Polymeric Insulations³

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this specification refer to Terminology **D1711**.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *aging (act of), n*—exposure of materials to air at 121 °C for 168 h.

4. Physical Properties

4.1 The requirements for the insulation are listed in **Table 1**.

5. Electrical Requirements

5.1 *Order of Testing*—Perform the ac voltage, insulation resistance, and dc voltage tests in that order when any of these tests are required. The sequence for other testing is not specified.

5.2 *AC Voltage Test*—Subject wires and cables to an ac test voltage for a period of 5 min. Unless otherwise specified, omit this test if the dc voltage test described in **5.4** is to be performed. Test at a voltage of 100 V/mil [4 kV/mm] based on the specified nominal thickness of insulation for the rated circuit voltage, phase to phase. Conduct the tests in accordance with Test Methods **D470**.

5.3 *Insulation Resistance*—The insulated conductor shall have an insulation resistance equal to or greater than that corresponding to a constant of 10 000 at 60 °F [15.6 °C]. When the temperature of the water in which the insulation is tested differs from 60 °F, apply a correction factor. **Table 2** of Test Methods **D470** contains the correction factors. Each insulation manufacturer can furnish the 1 °F coefficient for the insulation material by using the procedure given in Test Methods **D470**. Multiply the measured value by the correction factor to obtain the insulation-resistance value corrected to 60 °F.

5.3.1 Where a nonconducting separator is applied between the conductor and insulation or where an insulated conductor is

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from Insulated Cable Engineers Association, P. O. Box 440, South Yarmouth, MA 02664 or Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112.