



Designation: D2220 – 17

Standard Specification for Poly(Vinyl Chloride) Insulation for Wire and Cable, 75°C Operation¹

This standard is issued under the fixed designation D2220; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This specification covers a thermoplastic insulation of poly(vinyl chloride) or the copolymer of vinyl chloride and vinyl acetate.

1.2 This insulation is recommended for use in power and control circuits at temperatures not higher than 75°C. At a thickness of 15 mils (0.38 mm), application is limited to voltage ratings below 300 V, and to dry locations. At a thickness of 30 mils, the application range is widened to dry or wet applications, and to a voltage rating of 600 V.

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

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4.1 In some cases (including the title), temperatures are described in degrees Celsius only.

2. Referenced Documents

2.1 *ASTM Standards*:²

- D1711 Terminology Relating to Electrical Insulation
- D2633 Test Methods for Thermoplastic Insulations and Jackets for Wire and Cable
- D2633 Test Methods for Thermoplastic Insulations and Jackets for Wire and Cable
- G153 Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

¹ This specification is under the jurisdiction of ASTM Committee D09 on Electrical and Electronic Insulating Materials and is the direct responsibility of Subcommittee D09.07 on Electrical Insulating Materials.

Current edition approved March 1, 2017. Published March 2017. Originally approved in 1963. Last previous edition approved in 2011 as D2220 – 11. DOI: 10.1520/D2220-17.

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.

[G155 Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials](#)

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 or oil at a temperature and a time as specified in Table 1.

4. Physical Properties

4.1 The insulation shall conform to the requirements for physical properties prescribed in Table 1.

5. Electrical Requirements

5.1 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*—Test the insulated conductor at the ac withstand voltage as specified in Table 2. Unless otherwise specified, omit this test if the dc withstand voltage test described in 5.4 is performed.

5.2.1 For cables or conditions of service where mechanical stresses govern, such as in submarine cables or long vertical risers, it is possible that the minimum conductor sizes in Table 2 are not strong enough.

5.2.2 The thicknesses given in Table 2 apply to aerial cables and to single conductors installed in conduits above ground and to the individual conductors of all multiple-conductor cables having a common jacket metallic sheath or protective covering over the assembly, except as shown in 5.2.2.1.

5.2.2.1 For single-conductor cables for installation in underground ducts or direct earth burial, add 15 mils (0.38 mm) to the insulation thicknesses given in Table 2 when such cables do not have a thermoplastic jacket or metallic sheath over the assembly.

5.2.3 Where the thickness of the insulation is increased for mechanical reasons or for special service conditions, determine the test voltage in Table 2 by the size of the conductor and the rated voltage.

5.3 *Insulation Resistance*:

*A Summary of Changes section appears at the end of this standard