Designation: ~~D1047 – 16~~ D1047 – 21

Standard Specification for Poly(Vinyl Chloride) Jacket for Wire and Cable[1]

This standard is issued under the fixed designation D1047; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This specification covers a durable general-purpose thermoplastic jacket made from poly(vinyl chloride) or the copolymer of vinyl chloride and vinyl acetate suitable for a minimum installing temperature of ~~–10°C.~~ –10 °C.

1.2 The values stated in inch-pound units are ~~the standard, except in cases where SI units are more appropriate. The values~~ to be regarded as standard. The values given in parentheses are ~~for information only.~~mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1711 Terminology Relating to Electrical Insulation
D2565 Practice for Xenon-Arc Exposure of Plastics Intended for Outdoor Applications
D2633 Test Methods for Thermoplastic Insulations and Jackets for Wire and Cable
D4329 Practice for Fluorescent Ultraviolet (UV) Lamp Apparatus Exposure of Plastics
D6360 Practice for Enclosed Carbon-Arc Exposures of Plastics
~~G151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources~~
G153 Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
G154 Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials
G155 Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions pertinent to this specification, see Terminology D1711.

4. Test Applicable for Sunlight and Weather Resistant Materials

4.1 The jacket shall retain a minimum of 80 % of its unexposed tensile strength and elongation after 720 h of exposure in a dual

[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, 2016~~March 1, 2021. Published ~~March 2016~~May 2021. Originally approved in 1949. Last previous edition approved in ~~2011~~2016 as ~~D1047 – 11.~~D1047 – 16. DOI: ~~10.1520/D1047-16.~~10.1520/D1047-21.

[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~~standard's Document Summary page on the ASTM website.

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

carbon-arc ~~apparatus or a Xenon arc light~~ apparatus, a xenon arc light apparatus, or a fluorescent lamp apparatus. Prepare the specimens in accordance with Test Methods D2633 for physical tests of insulations and jackets. Do not buff the surface that is exposed to the light source. Perform the test in accordance with Practice D2565 for a ~~Xenon Arc~~xenon arc apparatus, using Cycle 1 in Table X3.1 of Practice G155, or Practice D6360~~,~~ for an enclosed ~~Carbon Arc~~carbon arc apparatus, using Cycle 1 of Table X1.1 of Practice G153, or Practice D4329 for a fluorescent lamp apparatus using Cycle 1 of Appendix X2 of Practice G154, depending on which type of these three apparatus is specified.

5. Physical Properties

5.1 The jacket shall conform to the requirements for physical properties prescribed in Table 1.

5.2 When used on single-conductor nonshielded cable rated 2001 to 5000 V phase to phase, the jacket shall also conform to the requirements for surface resistivity and U-bend discharge in Table 2.

6. Sampling

6.1 Sample the jacket in accordance with Methods D2633 unless otherwise specified.

7. Test Methods

7.1 Unless otherwise specified, test the jacket in accordance with Methods D2633.

8. Keywords

8.1 jacket for wire and cable; ~~poly (vinyl~~ poly(vinyl chloride) jacket; thermoplastic jacket

TABLE 1 Physical Properties for Poly(Vinyl Chloride) Jacket[A]

Unexposed (Unaged) Requirements:	
~~Tensile strength, min, psi (MPa)~~	~~1500 (10.3)~~
Tensile strength, min, psi (MPa)	1500 (10.3)
~~Elongation at rupture, min, %~~	~~100~~
Elongation at rupture, min, %	100
Exposed (Aged) Requirements:	
~~After Air Oven Aging Test at 100 ± 1°C for 5 days:~~	
After Air Oven Aging Test at 100 ± 1 °C for 5 days:	
~~Tensile strength, min, % of unexposed (unaged) value~~	~~85~~
Tensile strength, min, % of unexposed (unaged) value	85
~~Elongation at rupture, min, % of unexposed (unaged) value~~	~~60~~
Elongation at rupture, min, % of unexposed (unaged) value	60
~~After Oil Immersion Test at 70 ± 1°C for 4 h:~~	
After Oil Immersion Test at 70 ± 1 °C for 4 h:	
~~Tensile strength, min, % of unexposed (unaged) value~~	~~80~~
Tensile strength, min, % of unexposed (unaged) value	80
~~Elongation at rupture, min, % of unexposed (unaged) value~~	~~60~~
Elongation at rupture, min, % of unexposed (unaged) value	60
~~Heat distortion, 121 ± 1°C, max, %~~	~~50~~
Heat deformation, 121 ± 1 °C, max, %	50
~~Heat shock, 121 ± 1°C~~	~~no cracks~~
Heat shock, 121 ± 1 °C	no cracks
~~Cold bend, −35 ± 1°C~~	~~no cracks~~
Cold bend, −35 ± 1 °C	no cracks

[A] The values specified are applicable only to jacket having a nominal wall thickness of 0.030 in. (0.76 mm) or greater.