



Designation: F1664 – 08 (Reapproved 2022)

Standard Specification for Poly(Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used with Chain-Link Fence¹

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1. Scope

1.1 This specification covers PVC and other conforming organic polymer-coated steel tension wire for use with chain link fence. PVC and other organic polymer coatings hereinafter will be designated as polymer coating.

1.2 Tension wire, produced from three classes of wire coatings, is covered as follows:

1.2.1 *Class 1*, consisting of a polymer coating extruded over zinc-coated or aluminum-coated or zinc-5 % aluminum-mischmetal alloy-coated steel wire;

1.2.2 *Class 2a*, consisting of a polymer coating extruded and adhered to zinc-coated or aluminum-coated or zinc-5 % aluminum-mischmetal alloy-coated steel wire; and

1.2.3 *Class 2b*, consisting of a polymer coating fused and adhered to zinc-coated or aluminum-coated or zinc-5 % aluminum-mischmetal alloy-coated steel wire.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *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.*

¹ This specification is under the jurisdiction of ASTM Committee F14 on Fences and is the direct responsibility of Subcommittee F14.40 on Chain Link Fence and Wire Accessories.

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2. Referenced Documents

2.1 ASTM Standards:²

[A90/A90M Test Method for Weight \[Mass\] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings](#)
[A370 Test Methods and Definitions for Mechanical Testing of Steel Products](#)

[A428/A428M Test Method for Weight \[Mass\] of Coating on Aluminum-Coated Iron or Steel Articles](#)

[D1499 Practice for Filtered Open-Flame Carbon-Arc Exposures of Plastics](#)

[F552 Terminology Relating to Chain Link Fencing](#)

[F934 Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials](#)

[G152 Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials](#)

[G153 Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials](#)

3. Terminology

3.1 *Definitions*—For definitions of terms such as fabric (chain-link fence), tension wire, PVC, and polymer coating, see Terminology [F552](#).

4. Ordering Information

4.1 Orders for tension wire purchased in accordance with this specification shall include the following information:

4.1.1 Quantity (expressed in number of coils);

4.1.2 Class of coating to be applied to metallic-coated steel wire;

4.1.3 Color of coating;

4.1.4 Selection of type of metallic coating on the steel wire substrate, which shall be the choice of the producer unless otherwise specified;

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.

4.1.5 Core diameter of wire or minimum wire breaking strength, or both;

4.1.6 Packaging requirements; and

4.1.7 Certification, if required.

4.2 Any tests required other than those covered specifically in this specification must be stipulated by the purchaser in the order or contract.

NOTE 1—A typical ordering description is as follows: 20 coils polymer-coated steel tension wire, Class 2b coating, olive green color, 7-gage (0.177-in. (4.50 mm)) core wire, in 1000-ft (305-m) coils, certified to this specification.

5. Materials

5.1 *Base Metal*—The base metal shall be steel of such quality and purity that, when drawn to the size of wire specified and coated with an organic polymer, the finished wire shall be of uniform quality and have properties and characteristics as prescribed in this specification.

5.2 Wire used for the manufacture of tension wire shall meet the requirements of this specification. The polymer coating shall be formulated and produced properly to conform to the requirements of this specification.

6. Manufacture

6.1 Class 1 polymer-coated wire shall have the coating extruded onto wire that conforms to the requirements as given in Table 1.

6.2 Class 2a polymer-coated wire shall have the coating extruded and adhered to wire that conforms to the requirements as given in Table 1.

6.3 Class 2b polymer-coated wire shall have the coating fused and adhered to wire that conforms to the requirements as given in Table 1.

7. Size of Wire

7.1 The permissible variation from the specified diameter of the core wire, 0.177 in. (4.50 mm) 7 gage or 0.148 in. (3.76 mm) 9 gage, shall be ±0.005 in. (0.13 mm).

8. Breaking Strength

8.1 Tension wire shall meet the minimum breaking strength indicated in Table 2 when tested in accordance with Test Methods and Definitions A370.

8.2 Specimens to establish conformance with this requirement shall comprise individual pieces from a coil of the tension wire. The specimens shall be of sufficient length so as to be gripped firmly in the testing machine. The polymer coating may be removed from the sample by chemical or mechanical means before testing.

TABLE 1 Breaking Strength of Metallic-Coated Core Wire

Specified Diameter of Core Wire, in. (mm)	Minimum Breaking Strength, lbf (N)
0.177 (4.50)	1950 (8670)
0.148 (3.76)	1290 (5740)

TABLE 2 Weight of Metallic Coatings

Specified Diameter of Core Wire, in. (mm)	Minimum Weight of Zinc Coating, oz/ft ² (g/m ²)	Minimum Weight of Aluminum Coating, oz/ft ² (g/m ²)	Minimum Weight of Zinc-5 % Aluminum-Mischmetal Coating, oz/ft ² (g/m ²)
0.177 (4.50)	0.40 (122)	0.20 (61)	0.40 (122)
0.148 (3.76)	0.30 (92)	0.20 (61)	0.30 (92)

9. Weight of Metallic Coatings

9.1 The weight of the metallic coating shall conform to Table 1.

9.2 The weight of the coating shall be determined on an individual piece of wire over 12 in. (305 mm).

9.3 The weight of the zinc or zinc-5 % aluminum mischmetal alloy coating shall be determined by the method contained in Test Method A90/A90M after stripping the polymer coating as outlined in Section 10.

9.4 The weight of the aluminum coating shall be determined by the method contained in Test Method A428/A428M after stripping the polymer coating as outlined in Section 10.

10. Thickness of PVC Coating

10.1 The thickness of the coating shall be in accordance with Table 3.

10.2 The thickness of the coating shall be determined on an individual piece of wire. This specimen may be any length of wire over 12 in. (305 mm).

10.3 For Class 1 and Class 2a material, strip the coating mechanically from the wire and measure the minimum and maximum thickness of the coating with a suitable micrometer.

10.4 For Class 2b material, strip the coating by chemical means and determine the diameter of the bare wire. Scrape the coating from one side of the wire and measure the reduced diameter with a micrometer. The thickness of the coating at this point is the difference between the measurement thus obtained and the measured diameter of the bare wire. In a similar manner, determine the thickness of the coating at right angles to the first determination.

10.5 Take care not to remove any of the metallic surface when removing polymer coating by scraping.

11. Properties of Polymer-Coated Tension Wire

11.1 The polymer-coated tension wire shall have a demonstrated ability to conform to the following requirements:

11.2 *Adhesion Tests:*

11.2.1 Class 2a must conform to the requirements of 11.2.2. Class 2b must conform to the requirements of 11.2.3.

TABLE 3 Thickness of Polymer Coating

	Class 1 and Class 2a, in. (mm)	Class 2b, in. (mm)
Minimum thickness at any point	0.015 (0.38)	0.006 (0.15)
Maximum thickness at any point	0.025 (0.64)	0.012 (0.30)