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Standard Specification for Welded Wire Mesh Fence Fabric (Metallic-Coated or Polymer Coated) for Meshes of 6 in.² [3871 mm²] or Less, in Panels or Rolls, with Uniform Meshes¹

This standard is issued under the fixed designation F2453/F2453M; 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.

^{ε1} NOTE—Reapproved and editorially revised throughout in February 2011.

1. Scope

1.1 This specification covers welded wire mesh fence fabric produced from steel wire or metallic-coated steel wire. The metallic-coated fabric may be polymer coated after fabrication.

1.2 Welded wire mesh fence fabric is produced in four types, based on the kind of coating, as described in Section 4.

1.3 This specification is applicable to orders in either inch-pound units or SI units. Values stated in either inch-pound or SI units are to be regarded separately as the standard. Within the text, the SI units are shown in brackets. The values in the two systems are not exact equivalents; therefore, each system shall be used independent of the other, without combining values in any way.

1.4 This specification references notes and footnotes, which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of this specification.

1.5 The following safety hazards caveat pertains only to the test methods portion, Section 13, of this specification: *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 and health practices and determine the applicability of regulatory limitations proper to use.*

2. Referenced Documents

2.1 ASTM Standards:²

A82/A82M Specification for Steel Wire, Plain, for Concrete Reinforcement (Withdrawn 2013)³

A90/A90M Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings

A123/A123M Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products [e/astm-f2453-f2453m-14](#)

A185/A185M Specification for Steel Welded Wire Reinforcement, Plain, for Concrete (Withdrawn 2013)³

A641/A641M Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

A853 Specification for Steel Wire, Carbon, for General Use

A856/A856M Specification for Zinc-5 % Aluminum-Mischmetal Alloy-Coated Carbon Steel Wire

A902 Terminology Relating to Metallic Coated Steel Products

B117 Practice for Operating Salt Spray (Fog) Apparatus

D1499 Practice for Filtered Open-Flame Carbon-Arc Exposures of Plastics

F934 Specification for Colors for Polymer-Coated Chain Link Fence Materials

2.2 ISO Standard:⁴

ISO 2178 Non-Magnetic Coatings on Magnetic Substrates—Measurement of Coating Thickness—Magnetic Method

¹ This specification is under the jurisdiction of ASTM Committee F14 on Fences and is the direct responsibility of Subcommittee F14.35 on Architectural Metal Fence Systems.

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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 The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

3. Terminology

3.1 *Definitions*—Refer to Terminology **A902** for general terminology relating to metallic-coated steel products.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *welded wire mesh fence fabric*—material composed of a series of longitudinal and transverse steel wires arranged substantially at right angles to each other, and welded together at the points of intersection by electrical resistance welding to form fabricated sheets or rolls. See **Tables 1 and 2** for list of standard mesh sizes.

4. Classification

4.1 Welded wire mesh fence fabric is classified in accordance with coating as follows:

4.1.1 *Type 1*, consists of welded wire fabric made from wire which is zinc-coated, as per Specification **A641/A641M** Class 3 minimum, before being welded into fabric, known as galvanized before welding.

4.1.2 *Type 2*, consists of welded wire fabric which is made from uncoated wire and the fabric is subsequently zinc-coated after fabrication, in accordance with Specification **A123/A123M**, Coating Grade 35, known as galvanized after welding.

4.1.3 *Type 3*, consists of welded wire fabric made from wire which is coated with zinc-5 % aluminum-mischmetal alloy (Zn-5Al-MM), in accordance with Specification **A856/A856M**, Class A, before being welded into fabric, known as zinc 5 % aluminum mischmetal alloy-coated steel before welding.

4.1.4 *Type 4*, consists of welded wire fabric made from wire which is zinc-coated, in accordance with Specification **A641/A641M**, Class 1 minimum, before being welded into fabric, known as galvanized before welding, and subsequently polymer coated.

4.1.5 In agreement between buyer and supplier Type 1, 2 or 3 can be used to produce polymer coated welded wire fabric.

5. Ordering Information

5.1 Orders for material purchased under this specification shall include the following information:

5.1.1 Quantity (number of units of rolls or panels)

5.1.2 Mesh description: wire spacing and size (gage)

5.1.3 Panel (height by length) or Roll (height by length)

5.1.4 Type of coating (Section 4), including the specific type to be furnished.

5.1.5 ASTM designation and year of issue.

5.1.6 Any special requirements (see Section 8).

5.1.7 Certification, if required (see 15.1)

NOTE 1—A typical ordering description, when same mesh and gage, is as follows: 500 panels—0.5 in. by 3 in. by 8.5 gage/120 in. by 99 in. Type 2,

ASTM F2453/F2453M-14

TABLE 1 Panel Sizes^A

| Panels | Vertical Mesh Spacing (in.) | Horizontal Mesh Spacing (in.) | Wire Diameter | | Panel Width for Post Spacings 6, 7, 8, and 10 ft (in.) | Panel Length (Height) (ft) |
|--------|-----------------------------|-------------------------------|---------------|------------|--|----------------------------|
| | | | Gage | in. [mm] | | |
| | 0.5 | 2.0 | 11 | 0.120 3.06 | 74, 86, 98, 122 | 6 - 21 |
| | 0.5 | 3.0 | 8.5 | 0.155 3.93 | 75, 87, 99, 123 | 6 - 21 |
| | 0.5 | 3.0 | 11 | 0.120 3.06 | 75, 87, 99, 123 | 6 - 21 |
| | 2.0 | 2.0 | 11 | 0.120 3.06 | 74, 86, 98, 122 | 6 - 21 |
| | 2.0 | 2.0 | 8.5 | 0.155 3.93 | 74, 86, 98, 122 | 6 - 21 |
| | 2.0 | 2.0 | 6.5 | 0.185 4.70 | 74, 86, 98, 122 | 6 - 21 |

TABLE 1 Panel Sizes^A

| Vertical Mesh Spacing (in.) | Horizontal Mesh Spacing (in.) | Wire Diameter | | Panel Width for Post Spacings 6, 7, 8, and 10 ft (in.) | Panel Length (Height) (ft) |
|-----------------------------|-------------------------------|---------------|------------|--|----------------------------|
| | | Gauge | in. [mm] | | |
| 2.0 | 2.0 | 11 | 0.120 3.06 | 74, 86, 98, 122 | 6 - 21 |
| 2.0 | 2.0 | 8.5 | 0.155 3.93 | 74, 86, 98, 122 | 6 - 21 |
| 2.0 | 2.0 | 6 | 0.192 4.88 | 74, 86, 98, 122 | 6 - 21 |
| 2.0 | 2.0 | 6.5 | 0.185 4.70 | 74, 86, 98, 122 | 6 - 21 |
| 0.5 | 2.0 | 10.5 | 0.128 3.25 | 74, 86, 98, 122 | 6 - 21 |
| 0.5 | 2.0 | 11 | 0.120 3.06 | 74, 86, 98, 122 | 6 - 21 |
| 0.5 | 3.0 | 11 | 0.120 3.06 | 75, 87, 99, 123 | 6 - 21 |
| 0.5 | 3.0 | 10.5 | 0.128 3.25 | 75, 87, 99, 123 | 6 - 21 |
| 0.5 | 3.0 | 9 | 0.148 3.77 | 75, 87, 99, 123 | 6 - 21 |
| 0.5 | 3.0 | 8.5 | 0.155 3.94 | 75, 87, 99, 123 | 6 - 21 |
| 0.5 | 3.0 | 8 | 0.162 4.12 | 75, 87, 99, 123 | 6 - 21 |
| 0.5 | 3.0 | 6 | 0.192 4.88 | 75, 87, 99, 123 | 6 - 21 |
| 0.75 | 3.0 | 4 | 0.225 5.72 | 75, 87, 99, 123 | 6 - 21 |

^APanels available up to 10 ft 6 in. in width (not all meshes) and 21 ft in length. The vertical mesh spacing is the distance measured from the top to the bottom. The horizontal mesh opening is the distance measured from left to right.

TABLE 2 Roll Sizes^A

| Mesh Size as Produced in Rolls | | | | | | | |
|--------------------------------|------|-------------------------|------|---------------|------|------|---------------------|
| Vertical Mesh Spacing | | Horizontal Mesh Spacing | | Wire Diameter | | | Roll Height (Width) |
| in. | [mm] | in. | [mm] | Gage | in. | [mm] | ft |
| 1.0 | 25 | 1.0 | 25 | 12.5 | 0.99 | 2.51 | 3 - 10.5 |
| 1.0 | 25 | 1.0 | 25 | 11 | .120 | 3.06 | 3 - 10.5 |
| 1.5 | 38 | 1.5 | 38 | 12.5 | .099 | 2.51 | 3 - 10.5 |
| 1.5 | 38 | 1.5 | 38 | 11 | .120 | 3.06 | 3 - 10.5 |
| 2.0 | 50 | 2.0 | 50 | 11 | .120 | 3.06 | 3 - 10.5 |
| 2.0 | 50 | 2.0 | 50 | 10 | .135 | 3.43 | 3 - 10.5 |
| 2.0 | 50 | 2.0 | 50 | 8.5 | .155 | 3.93 | 3 - 10.5 |
| 2.0 | 50 | 2.0 | 50 | 6.5 | .185 | 4.70 | 3 - 10.5 |
| 2.4 | 60 | 2.4 | 60 | 10 | .135 | 3.43 | 3 - 10.5 |
| 2.4 | 60 | 2.4 | 60 | 8.5 | .155 | 3.93 | 3 - 10.5 |
| 2.0 | 50 | 0.5 | 13 | 11 | .120 | 3.06 | 3 - 10.5 |
| 2.0 | 50 | 1.0 | 25 | 11 | .120 | 3.06 | 3 - 10.5 |
| 2.0 | 50 | 1.0 | 25 | 10 | .135 | 3.43 | 3 - 10.5 |
| 3.0 | 75 | 1.0 | 25 | 12.5 | .099 | 2.51 | 3 - 10.5 |
| 3.0 | 75 | 1.0 | 25 | 11 | .120 | 3.06 | 3 - 10.5 |

^ARolls available up to 10 ft 6 in. in width (not all meshes) in foot increments up to 100 ft in length. The vertical mesh spacing is the distance measured from the top to the bottom. The horizontal mesh opening is the distance measured from left to right.

conforming to Specification F2453 or 100 rolls of 2 in. by 2 in. 8.5 gage/96 in. by 100 ft, Type 1, conforming to Specification F2453. The vertical mesh opening (height measured from top to bottom) is designated first followed by the horizontal mesh opening (width measured from left to right).

6. Material and Manufacture

6.1 The wire used in the manufacture of welded wire mesh fence fabric shall conform to the specifications in 6.1.1 as appropriate for the type ordered, except the tensile strength shall conform to 7.1. The wire may be produced from any grade of steel listed in Specification A82/A82M or Specification A853.

6.1.1 Type 1 welded wire fabric shall be manufactured from zinc-coated steel wire conforming to Specification A641/A641M Class 3 coating (minimum). Type 2 welded wire fabric shall be manufactured from uncoated steel wire conforming to Specification A82/A82M or Specification A853, and the fabric subsequently zinc-coated by the hot-dip process, conforming to Specification A123/A123M, Coating Grade 35 (minimum). Type 3 welded wire fabric shall be manufactured from zinc-5 % aluminum-mischmetal coated steel wire conforming to Specification A856/A856M, Class A coating (minimum). Type 4 welded wire fabric shall be manufactured from zinc-coated steel wire conforming to Specification A641/A641M—Class 1 coating.

6.2 Wire for welded wire mesh fence fabric shall be assembled by automatic machines or other suitable mechanical means that will ensure accurate spacing and alignment of all members of the finished fabric. Longitudinal and transverse members of the welded wire fabric shall be connected at every intersection in accordance with the requirements of 13.4 by the process of electric resistance welding, which employs the principle of fusion combined with pressure.

6.3 The polymer coating used in the manufacture of polymer-coated welded wire mesh fence fabric shall conform to the properties in 8.2 and 8.3.

6.3.1 The polymer-coated welded wire mesh fence fabric shall have the polymer coating fused and adhered onto the metallic-coated welded wire fabric after fabrication of mesh.

7. Mechanical Properties

Tensile Strength

7.1 *Tensile Strength*—The tensile strength of the wire used for the welded wire mesh fence fabric shall be soft, medium or hard in accordance with the requirements of Specifications A641/A641M (Type 1 and 4), A856/A856M (Type 3) and hard drawn in accordance with Specification A82/A82M or Specification A853 (Type 2). The cross-sectional area of the test specimen shall be based on the diameter of the metallic coated wire. (See Table 3.)

8. Physical Properties

8.1 *Metallic Coating*—The minimum metallic coating weight shall conform to the requirements of Specification A641/A641M, Class 3 coating for Type 1 and Type 2 and Specification A856/A856M Class A coating for Type 3.

8.2 *Polymer Coated*—The minimum coating weight of the metallic coated wire shall conform to the requirements of Specification A641/A641M Class 1 for Type 4.

8.3 *Polymer Coating on Wire*—The initial properties of the polymer coating on the wire and welded wire fabric shall have a demonstrated ability to conform to the following requirements:

8.3.1 *Salt Spray Exposure and Ultraviolet Light Exposure:*

8.3.1.1 The polymer coating shall show no effect after 1000 h of salt spray exposure in accordance with Practice B117.

TABLE 3 Breaking Strength of Core Wire

| Specified Diameter of Wire (Metallic Coated) | | | Minimum Breaking Strength | |
|--|-------|------|---------------------------|------|
| Gage | in. | [mm] | lb | [N] |
| 12.5 | 0.099 | 2.51 | 400 | 1775 |
| 11 | 0.120 | 3.06 | 590 | 2620 |
| 10 | 0.135 | 3.43 | 750 | 3335 |
| 8.5 | 0.155 | 3.93 | 990 | 4400 |
| 6.5 | 0.185 | 4.70 | 1410 | 6270 |

TABLE 3 Breaking Strength of Core Wire

| Specified Diameter of Wire (Metallic Coated) | | | Minimum Breaking Strength | |
|--|-------|------|---------------------------|------|
| Gauge | in. | [mm] | lb | [N] |
| 4 | 0.225 | 5.72 | 1392 | 6192 |
| 6.5 | 0.185 | 4.70 | 1410 | 6270 |
| 6 | 0.192 | 4.88 | 1013 | 4506 |
| 8 | 0.162 | 4.12 | 721 | 3207 |
| 8.5 | 0.155 | 3.94 | 990 | 4400 |
| 9 | 0.148 | 3.77 | 602 | 2678 |
| 10.5 | 0.128 | 3.25 | 500 | 2224 |
| 11 | 0.120 | 3.06 | 590 | 2620 |

8.3.1.2 The polymer coating shall show no effect of exposure to ultraviolet light with test exposure of 1000 h using apparatus Type E and 63°C, when tested in accordance with Practice D1499.

8.3.1.3 *Evaluation of Coating after Salt Spray and Ultraviolet Exposure Test*—After 1000 h salt spray test and exposure to ultraviolet light as specified in 8.3.1.1 and 8.3.1.2, the polymer coating shall not show cracks, blisters or splits. The change in color, measured in terms of ΔE, shall not be more than ten.

8.3.2 *Adhesion*—The polymer coating shall adhere to the wire such that the coating breaks rather than separates from the wire when tested in accordance with 13.3.

8.3.3 *Mandrel Bend*—The polymer-coated wire when subjected to a single 360° bend at -0°F [-18°C] around a mandrel ten times the diameter of the wire, shall not exhibit breaks or cracks in the polymer coating.

8.3.4 *Color*—Unless otherwise agreed upon between buyer and supplier, the color of the polymer-coated wire shall conform to Specification F934.

9. Dimensions and Tolerances

- 9.1 The diameter of metallic-coated wire shall conform to Table 3.
- 9.2 The minimum thickness of the polymer coating, not to be considered the finished gage, shall be as shown in Table 4.
- 9.3 Welded wire mesh fence fabric shall have mesh openings as designated in Tables 1 and 2. Mesh opening shall be considered to be center-to-center distance between two consecutive longitudinal or transverse wires as designated in Fig. 1. The permissible tolerance is ± 1/8 in. [3.2 mm] on meshes 2 in. and above and 1/16 in. [1.6 mm] on meshes under 2 inches.
- 9.4 In panel or roll length, the permissible tolerance shall not exceed ± 1/4 in. [6.3 mm] when measured over a 6 ft direction. In all cases, the mesh count must be correct.
- 9.5 The width and height of the mesh openings for welded wire mesh fence fabric as installed on fence posts shall be as shown in Fig. 2.
- 9.6 The flatness of panels shall conform to the following: when a panel is laid on a flat surface, such that any lift is in the middle of the panel, the maximum lift shall not exceed 2 in. [50.8 mm].

10. Workmanship

10.1 Wire of proper grade and quality, when fabricated in the manner herein required, shall result in a strong, serviceable mesh-type product having substantially square or rectangular openings. It shall be fabricated and finished in a workmanlike manner, as determined by visual inspection, and shall conform to this specification.

TABLE 4 Thickness of Polymer Coating

| Minimum Thickness at Any Point | |
|--------------------------------|-------|
| in. | mm |
| .004 | [.10] |