



# Standard Specification for Steel Chain-Link Fencing Materials Used for High Security Applications<sup>1</sup>

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## 1. Scope

1.1 This specification covers chain-link fencing material applications for high security applications.

1.2 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.

## 2. Referenced Documents

2.1 *ASTM Standards*:<sup>2</sup>

- A121 Specification for Metallic-Coated Carbon Steel Barbed Wire
- A392 Specification for Zinc-Coated Steel Chain-Link Fence Fabric
- A491 Specification for Aluminum-Coated Steel Chain-Link Fence Fabric
- A824 Specification for Metallic-Coated Steel Marcellled Tension Wire for Use With Chain Link Fence
- F567 Practice for Installation of Chain-Link Fence
- F626 Specification for Fence Fittings
- F668 Specification for Polyvinyl Chloride (PVC), Polyolefin and Other Polymer-Coated Steel Chain Link Fence Fabric
- F900 Specification for Industrial and Commercial Steel Swing Gates
- F934 Specification for Colors for Polymer-Coated Chain Link Fence Materials
- F1043 Specification for Strength and Protective Coatings on Steel Industrial Fence Framework
- F1184 Specification for Industrial and Commercial Horizontal Slide Gates
- F1345 Specification for Zinc-5 % Aluminum-Mischmetal Alloy-Coated Steel Chain-Link Fence Fabric

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

F1379 Terminology Relating to Barbed Tape

F1664 Specification for Poly(Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used with Chain-Link Fence

F1665 Specification for Poly(Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Barbed Wire Used With Chain-Link Fence

F1910 Specification for Long Barbed Tape Obstacles

F1911 Practice for Installation of Barbed Tape

F2200 Specification for Automated Vehicular Gate Construction

2.2 *UL Standard*:

UL 325 Door, Drapery, Gate, Louver, and Window Operators and Systems<sup>3</sup>

2.3 *Chain Link Fence Manufacturers Institute*:

WLG 2445 Chain Link Fence Wind Load Guide for the Selection of Line Post and Line Post Spacing<sup>4</sup>

## 3. Significance and Use

3.1 Typical end users of this specification require higher than normal security.

## 4. Materials and Manufacture

4.1 *Framework*—Shall meet the size and strength requirements in Specification F1043, Table 3, for heavy industrial fence framework. Where icing conditions and high wind loads are prevalent, fences using small security mesh, or fences higher than 12 ft (3.7 m), determine the post size and spacing using WLG 2445. Horizontal top, mid or bottom rails if specified shall be 1.660-in. (42-mm) O.D., or roll-formed section 1¼ by 1⅝ in. (32 by 41 mm). Framework may be polymer-coated and color shall be one of the choices listed in Specification F934. Framework coatings shall be in accordance with Specification F1043.

4.2 *Fabric*—Chain link fabric shall conform to Specifications A392, A491, F668, or F1345. Mesh larger than 1 in. (25 mm) shall be 6-gauge, 0.192 in. (4.88 mm) or 9-gauge, 0.148

<sup>3</sup> Available from Underwriters Laboratories (UL), 2600 N.W. Lake Rd., Camas, WA 98607-8542, <http://www.ul.com>.

<sup>4</sup> Available from Chain Link Fence Manufacturers Institute, 10015 Old Columbia Road, Suite B-215, Columbia, MD 21046, <http://www.chainlinkinfo.org>.

in. (3.76 mm), 1-in. mesh shall be 9-gauge mesh smaller than 1 in. shall be 11-gauge, 0.120 in. (3.05 mm) or 9-gauge, 0.148 in. (3.76 mm).

**NOTE 1**—The various chain link fabric specifications list fabric heights up to and including 12-ft (3.7-m) height. Some fabrics are available up to 20 ft (6.1 m). Reference Specification **F567** for fabric installation especially where two fabric heights are spliced horizontally. Chain link fabric shall be installed on the secure side of the fence.

4.3 *Fittings*, shall be galvanized pressed steel or malleable castings conforming to Specification **F626**.

4.3.1 Fittings may be polymer-coated after galvanizing.

4.3.2 Tie wires shall be 9-gauge, 0.148 in. (3.76 mm), metallic-coated steel or polymer-coated over 9-gauge, 0.148 in. (3.76 mm), galvanized steel core wire in accordance with Specification **F626**. The finish coating shall match the finish coating of the fabric.

4.4 *Barbed Tape Obstacles*—Barbed tape, when specified, shall conform for Specification **F1910**. Barbed tape shall be installed in conformance with Practice **F1911**. When specifying barbed tape, use descriptions as listed in Terminology **F1379**.

4.5 *Barbed Wire*—Metallic-coated barbed wire shall conform to Specification **A121**, 12½-gauge, 0.099-in. (2.51-mm) diameter strand wire, 14-gauge, 0.030-in. (2.02-mm) barbs.

4.5.1 Aluminum-coated, coating Type A, Coating Class 40, Design Number 12-4-3-14R or 12-4-5-14R.

4.5.2 Zinc-coated (galvanized), Coating Type Z, Coating Class 3, Design Number 12-4-5-14R.

4.5.3 5 % Aluminum-mischmetal, Coating Type ZA, Coating Class 60, Design Number 12-4-5-14R.

4.5.4 Polymer-coated barbed wire shall conform to Specification **F1665**.

4.6 *Tension Wire*—Metallic tension wire shall conform to Specification **A824**.

4.6.1 Type I Aluminum-coated.

4.6.2 Type II Zinc-coated.

4.6.3 Type III Zinc-5 % Aluminum Mischmetal.

4.6.4 Polymer-coated tension wire shall conform to Specification **F1664**.

4.7 If a polymer-coated fence system is selected, the color selection shall be in accordance with Specification **F934**.

4.8 *Gates*—The gates shall be in accordance with Specification **F900** swing gates or Specification **F1184** slide gates. All bolts used with gates shall be peened to prevent removal of nut.

4.8.1 Pedestrian gates shall be a galvanized steel material 1.900-in. (48-mm) outside diameter tubular or 2-in. (51-mm) square. Typical gate size shall be 4-ft (1.2-m) wide by 7-ft (2.1-m) high complete with transom if fence is higher than 7 ft (2.1 m). Manual or electric security locks shall be installed in swing gate frames using a lock box and weatherproof enclosure.

4.8.2 *Vehicular Gates*—Vehicular gates such as those used for sally ports shall be single leaf or double leaf overhead slide gates in accordance with Specification **F1184**. Consult security

gate specialists for motor type, controls, locking capabilities and related security issues. Automated gates shall comply with **F2200** and UL 325.

4.9 *Accessories*—If accessories such as electronic sensors, gate operators, etc., are to be employed, the designer is encouraged to contact various producers of these products for product information and performance criteria.

## 5. Fabric Attachments

5.1 *Line Post*—Fabric shall be attached with 9-gauge 0.148 in. (3.76 mm) tie wires or other appropriate fasteners in accordance with Specification **F626**. (Recommended security spacing, 12 in. (305 mm) on center.)

5.2 *Rails*—Fabric shall be attached with 9-gauge 0.148 in. (3.76 mm) tie wires or other appropriate fasteners in accordance with Specification **F626**. (Recommended security spacing, 12 in. (305 mm) on center.)

### 5.3 Terminal Post:

5.3.1 *Fabric*, shall be attached to the terminal post with ¼ by ¾ in. (6.35 by 19.05 mm) galvanized steel tension bars and ⅛ by 1 in. (3.18 by 25 mm) tension bands in accordance with Specification **F626**. (Recommended security spacing, 12 in. (305 mm) on center.) The smaller opening security mesh shall be secured using galvanized steel minimum ½ by 1½ in. (13 by 38 mm) vertical straps that sandwich the security mesh between the strap and post by means of through bolting using ⅜ in. (10 mm) carriage bolts. (Recommended spacing of bolts, minimum 15 in. (381 mm) on center.)

## 6. Rails

6.1 Top, intermediate, and bottom rails may be specified at the discretion of the designer.

## 7. Barbed Wire

7.1 Barbed wire shall be installed, in accordance with Specification **F567**, with one or more strands, depending on the degree of security required, or in conjunction with the use of barbed tape obstacles.

7.2 Supporting arms for barbed wire, when supplied, shall meet the requirements of Specification **F626**.

## 8. Tension Wire

8.1 Fabric shall be secured to tension wire as directed in Specification **F567**, using 9-gauge 0.148 (3.76 mm) steel hog rings, in accordance with Specification **F626**.

8.2 Tension wire shall be stretched independently from the fabric and not interwoven with the fabric, in accordance with Specification **F567**. (Recommended security spacing, 12 in. (305 mm) on center.)

## 9. Keywords

9.1 barbed tape obstacles; barbed wire; chain-link fence fabric; chain-link fence framework; high security; wire coating; wire gauge

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