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SUPERSEDING
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FEDERAL SPECIFICATION SHEET

# FENCING, WIRE AND POST, METAL (CHAIN-LINK FENCE ACCESSORIES)

The General Services Administration has authorized the use of this Federal Specification Sheet by all Federal agencies.

(This specification forms a part of the latest issue of Federal specification RR-F-19l/GEN).

## 1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers general requirements for chain-link fence accessories.

1.2 Classification. Chain-link fence accessories.

| | | |
|---|---|---|
| Item | 1 | Caps. |
| Item | 2 | Rail and brace ends. |
| Item | 3 | Rail sleeves. |
| Item | 4 | Wire ties and clips. |
| Item | 5 | Brace bands. |
| Item | 6 | Tension wire. |
| Item | 7 | Tension bars. |
| Item | 8 | Tension wire. |
| Item | 9 | Truss rods. |
| Item | 10 | Barbed wire. |
| Item | 11 | Barbed wire support arms. |
| Item | 12 | Miscellaneous accessories. |

## 2. APPLICABLE DOCUMENTS

2.1 Non-Government documents. The following other non-Government documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS STANDARD (ASTM)

ASTM A90/A90M – Standard Test Method for Weight Mass of Coating on Iron Steel Articles with Zinc or Zinc-Alloy Coatings
ASTM A428/A428M – Standard Test Method for Weight (Mass) of Coating on Aluminum-Coated Iron or Steel Articles
ASTM A817 - Standard Specification for Metallic-Coated Steel Wire for Chain-Link Fence Fabric and Marcelled Tension Wire
ASTM A824 - Standard Specification for Metallic-Coated Steel Marcelled Tension Wire for Use with Chain Link Fence
ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Bars, Rod, and Wire
ASTM B487 - Standard Test Method for Measurement of Metal and Oxide Coating Thicknesses by Microscopical Examination of a Cross Section
ASTM B750 - Standard Specification for GALFAN (Zinc-5% Aluminum-Mischmetal) Alloy in Ingot Form for Hot-Dip Coatings

Comments, suggestions, or questions on this document should be addressed to Defense Supply Center Philadelphia (DSCP), ATTN: DSCP-NASA, 700 Robbins Avenue, Philadelphia, PA 19111-5096 or e-mail to dscpg&inspecomments@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at http://assist.daps.dla.mil.

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AMERICAN SOCIETY FOR TESTING AND MATERIALS STANDARD (ASTM) (contd)

| | |
|---|---|
| ASTM E376 | - Standard Practice for Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Examination Methods |
| ASTM F626 | - Standard Specification for Fence Fittings. |
| ASTM F1664 | - Standard Specification for Poly (Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used with Chain-Link Fence |
| ASTM F1665 | - Standard Specification for Poly (Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Barbed Wire Use with Chain-Link Fence |

(Application for copies should be addressed to the ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or www.astm.org).

3. REQUIREMENTS

3.1 Materials. Materials shall be as specified herein and in applicable specifications and standards, and other referenced documents. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification. Materials shall be free of defects which adversely affect performance or serviceability of the finished product.

3.2 Zinc-coating. Unless otherwise specified (see 6.1), all ferrous accessories shall be hot-dip zinc-coated with an average weight of not less than 1.2 ounces of zinc per square foot of coated surface area.

3.3 Color coating and material. When color coating is required the color shall be as specified (see 6.1), and shall match the color specified for chain-link fabric as cited in RR-F-191/1. Ferrous accessories shall be zinc-coated in accordance with 3.2, prior to application of color coating. Unless otherwise specified (see 6.1), color coating material shall be at the option of the manufacturer.

3.4 Items.

3.4.1 Item 1, caps. All exposed ends of tubular posts shall be fitted with caps. The cap shall fit snugly over the posts and exclude moisture such as rain. When top rail is provided the caps shall have a ring or hole suitable for the through passage of the top rail. Caps shall be pressed steel, malleable casting, or aluminum alloy in accordance with ASTM F626.

3.4.2 Item 2, top rail, and brace ends. Ends for top rail and braces shall be provided when top rail or braces are required. Top rail and brace ends shall be press steel, malleable casting, or aluminum alloy in accordance with ASTM F626.

3.4.3 Item 3, top rail sleeves, Top rail sleeves shall allow for expansion and contraction of the top rail. Top rail sleeves shall have a minimum length of 6 inches, and be of the same material as the top rail. Top rails provided with 3-inch swage ends are acceptable in lieu of top rail sleeves.

3.4.4 Item 4, wire ties and clips. Wire ties or clips shall be provided for attaching fabric to line posts, top rail, or tension wire. Wire ties and clips shall be at intervals not greater than 15-inches when attaching fabric or line posts, and the space interval shall not exceed 24-inches when attaching fabric to top rails or tension wire. Unless otherwise specified (see 6.1), wire ties and clips, and wire coatings shall be as specified in ASTM F626. Wire ties and clips shall not fracture when tested in accordance with 4.4.1.

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3.4.5 Items 5 and 6, brace and tension bands. Brace bands shall be used to secure top rail and brace ends to terminal posts. When tension bars are used, tension bands shall be used for securing chain-link fabric at each terminal post (see 3.4.6). Spacing of tension bands on posts shall be at 15-inch intervals or less. Brace and tension bands shall be steel and shall be 3/4-inch wide by 1/10-inch thick nominal.

3.4.6 Item 7, tension bars. Tension bars for 1-3/4 and 2-inch mesh shall be no less than 3/16 by 3/4-inch or equivalent cross-sectional area. Tension bars for 1-inch mesh shall be no less than 3/8 by 3/16-inch or equivalent cross-sectional area. A tension bar shall be provided where chain-link fabric meets terminal posts. Tension bar shall be steel, of a continuous length compatible with the height of the fence and shall be threaded through the fabric and attached to the post by tension bands (see 3.4.5). Roll formed posts with integral loops for weaving fabric to posts are acceptable in lieu of tension bars.

3.4.7 Item 8, tension wire. Tension wire shall be furnished when top rail is not required. Tension wire shall be used at the bottom of the fence when fabric is not otherwise secured. Tension wire shall be zinc coated steel, aluminum coated steel in accordance with ASTM A824 or polyvinyl chloride (PVC) over zinc-coated steel, or aluminum alloy in accordance with ASTM F1664 as specified (see 6.1). Unless otherwise specified (see 6.1), all tension wire shall be manufactured with 7 gage steel wire size.

3.4.7.1 Steel tension wire. Steel tension wire shall be marcelled or crimped coil spring hard tempered carbon steel wire. The tension wire shall have a minimum tensile strength of 75,000 pounds per square inch. Zinc coated steel shall not have less than 1.2 ounces of zinc per square foot of coated surface area unless otherwise specified (see 6.1). Zinc – 5% aluminum-mischmetal (Zn-5Al-MM) coated steel shall not have less than 0.60 ounces per square foot unless otherwise specified (see 6.1). Aluminum coated steel shall not have less than 0.40 ounces of aluminum per square foot of coated surface area. Unless otherwise specified (see 6.1), PVC coated wire shall have minimum coating thickness of 0.007-inches. The coatings shall match the fence fabric.

3.4.7.2 Aluminum alloy tension wire. Aluminum alloy tension wire shall conform to the chemical composition of ASTM B211, Alloy 6061-T94.

3.4.8 Item 9, truss rods. Truss rods shall be steel and have a minimum diameter of 5/16-inch.

3.4.9 Item 10, barbed wire. Unless otherwise specified, barbed wire shall consist of two 12-1/2-gage 0.099-inch twisted line wires with 14-gage 0.080-inch round barbs as listed in ASTM A121, Design Number 12-4-5-14R. Barbed wire shall be zinc-coated steel, Zn-5Al-MM coated steel, aluminum coated steel, or PVC over zinc-coated steel per ASTM F1665 as specified (see 6.1). All barbs shall consist of four points and spacing of barbs shall be at 5-inch (+1-inch) centers.

3.4.9.1 Zinc-coated steel barbed wire. Zinc-coated steel barbed wire shall have a zinc coating of at least 0.80 ounces per square foot of coated surface area (see 4.4.2.1).

3.4.9.2 Aluminum-coated steel barbed wire. Aluminum-coated steel barbed wire shall have an aluminum coating of at least 0.30 ounces per square foot of coated surface area (see 4.4.2.1). Solid aluminum barbs are acceptable.

3.4.9.3 PVC coated steel barbed wire. PVC coated steel barbed wire shall have a PVC coating of at least 0.007-inch thickness. Wire shall be coated *with* a minimum of 0.3 ounces of zinc per square foot of coated surface area or meet the requirements of 3.4.9.2 before application of the PVC coating.

3.4.9.4 Aluminum alloy barbed wire. Aluminum alloy barbed wire shall conform to the chemical composition of ASTM B211, Alloy 6061-T94.

3.4.9.5 Zn–5AL-MM coated steel barbed wire. Zn-5Al-MM coated steel barbed wire shall have a coating weight of at least 0.40 ounces per square foot of coated surface area (see 4.4.2.1).

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3.5 Item 11, barbed wire support arms. Barbed wire support arms shall be of the following types as specified (see 6.1).

(a) Single-arm, for three barbed wire strands.
(b) V-arms, for six barbed wire strands.
(c) A-arms, for five barbed wire strands.

When installed, the barbed wire support arms shall project at an angle of 45 ± 5 degrees from the plane of the fence line and the outer strand of barbed wire shall be positioned 12 ± 2-inches horizontally from the fence line. Intermediate strands of barbed wire shall be uniformly spaced between the strand on the end of the support arm and the fabric. All support arms shall be fitted with clips or slots for attaching the barbed wire to the support arm. Support arms shall be capable of withstanding a load of 250 pounds (lbs) when tested in accordance with 4.4.3.

3.6 Item 12, miscellaneous accessories. Unless otherwise specified (see 6.1) miscellaneous items, such as bolts, nuts, and washers shall be galvanized steel or aluminum alloy at the manufacturer's option.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. (See RR-F-191/GEN)

4.2 Sampling. (See section 6 of RR-F-191/GEN)

4.3 Examination: Examine accessories for defects listed in table I.

TABLE I. Classification of defects, posts, rails, and braces.

| Defects | Major | Minor |
|---|---|---|
| Item not as specified. | X | |
| Tension wire not as specified. | X | |
| Color not as specified. | X | |
| Dimensions not within tolerance where applicable. | X | |
| Barbed wire not as specified. | X | |
| Barbed wire support arms not as specified. | X | |
| Damage or defects affecting function or serviceability. | X | |
| Damage or defects not affecting function or serviceability. | | X |

4.3.1 Thickness of bands and diameter wire. Determine the thickness using a suitable micrometer. Measure diameter of wire by taking the average of two dimensions at right angles to each other.

4.4 Test methods.

4.4.1 Wire ties and clips. Bend wire from which ties and clips are formed through an angle of 180 degrees (°) on a mandrel having the same diameter as the wire under test to determine conformance to requirements of 3.4.4.

4.4.2 Weight and thickness of metallic coatings.

4.4.2.1 Weight of zinc and Zn-5Al-MM coating. Determine weight of zinc coating in accordance with ASTM A90 (see 3.4.7.1 and 3.4.9.2).

4.4.2.2 Weight of aluminum coating. Determine weight of aluminum coating in accordance with ASTM A428 (see 3.4.7.1 and 3.4.9.2).

4.4.2.3 Thickness of aluminum coating. Determine thickness of aluminum by any one of the following methods (see 3.4.7.1 and 3.4.9.2).

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4.4.2.3.1 Measurements. Determine the thickness by taking half of the difference between the diameter of the aluminum-coated wire and the diameter of the wire after stripping the aluminum, or determined microscopically in accordance with ASTM B487. Use the mean of two measurements at right angles to each other when determining the diameter of the coated or the stripped wire, or use the mean of the coating thickness taken at right angles to each other when determined microscopically.

4.4.2.3.2 Magnetic. Determine thickness of aluminum coating magnetically in accordance with ASTM E376.

4.4.3 Barbed wire support arms. Clamp the base of the arm securely. Apply a vertical 250-lb load where the outer strand of barbed wire connects to the arm, permanent deflection of the arm is cause for rejection (see 3.5).

5. PREPARATION FOR DELIVERY (See RR-F-191/GEN).

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Ordering Data. Purchasers should select the preferred options permitted herein and include the following information in acquisition documents:

a. Title, number, and date of this specification.
b. Item required (see 1.2).
c. Material for accessories if other than specified (see 3.1).
d. Zinc or Zn-5Al-MM coating if other than specified (see 3.2).
e. Color coating material if other than specified and color required (see 3.3).
f. Type of tension wire required (see 3.4.7).
g. When wire ties and clips are to be other than required (see 3.4.4).
h. When tension wire is to be other than 7 gage and gage required (see 3.4.7).
i. Zinc coating for steel tension wire if other than specified (see 3.4.7.1).
j. Type of barbed wire required (see 3.4.9).
k. Type of barbed wire support arms required (see 3.5).
l. When miscellaneous accessories are not the manufacturer’s option and the accessories specified (see 3.6).

6.2 Accessories. Consult manufacturers or suppliers when ordering accessories since some accessories are furnished with all chain-link fencing.

6.3 Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes (additions, modifications, and corrections) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

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