

# FEDERAL SPECIFICATION

Fencing, Wire & Post  
Metal (and Gates,  
Chainlink Fabric, and  
Accessories)

RR-F-191K/Gen

14 May 1990

Superseding

RR-F-191J/Gen

July 22, 1981

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14 May 1990  
SUPERSEDING  
RR-F-191J/GEN  
July 22, 1981

FEDERAL SPECIFICATION

FENCING, WIRE AND POST METAL (AND GATES, CHAIN-LINK  
FENCE FABRIC, AND ACCESSORIES)  
(GENERAL SPECIFICATION)

This Federal specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

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

1.2 Classification. Classification for the various parts of chain-link fencing are included in the detail specifications.

- RR-F-191/1 - Fencing, Wire and Post, Metal (Chain-Link Fence Fabric).
- RR-F-191/2 - Fencing, Wire and Post, Metal (Chain-Link Fence Gates).
- RR-F-191/3 - Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails, and Braces).
- RR-F-191/4 - Fencing, Wire and Post, Metal (Chain-Link Fence Accessories).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specification and standards. The following specification and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer (Code 156), Naval Construction Battalion Center, Port Hueneme, CA 93043-5000, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 5660

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

SPECIFICATIONS

Federal Specification

PPP-B-601 - Boxes, Wood, Cleated-Plywood.

Federal Standards

FED-STD-151 - Metals, Test Methods.

FED-STD-123 - Marking for shipment (Civil Agencies).

Military Standard

MIL-STD-105 - Sampling Procedures and Tables for Inspection  
by Attributes.

(Unless otherwise indicated, copies of federal and military specifications and standards are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19120-5094.)

2.1.2 Other 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.

ASTM

ASTM D 3951 - Commercial Packaging.

ASTM D 3953 - Strapping, Flat Steel and Seals.

ASTM F 552 - Standard Definitions of Terms Relating to Chain Link Fencing.

(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

3. REQUIREMENTS

3.1 Materials. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this specification are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. Unless otherwise specified, none of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this specification.

3.2 Dimensional tolerances. Unless otherwise specified dimensional tolerances shall be  $\pm 1$  percent. Minimum dimensions specified are the minimum dimensions allowed and the  $\pm 1$  percent tolerances does not apply.

3.3 Workmanship. All fence components shall be free from pits, excessive roughness, blisters, loose rust and mill scale, cracks, and seams to an extent that would be detrimental to the intended end use. Coated surfaces shall be free from uncoated areas except ends of wires on selvage. Polyvinyl-chloride coated components shall be free from cuts or cracks that permit access of water to the base metal. All fencing components, except barbed wire and barb selvage of fabric, shall be free from sharp edges.

3.4 Definitions. Definitions of fencing components not specified herein shall be in accordance with ASTM F 552.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the documents where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.2 Inspection lot. All fence components of the same type, size and class, offered for delivery at the same time shall be considered a lot for the purposes of inspection.

4.3 Sampling . (See 6.4)

4.4 Examination of preparation for delivery. An examination shall be made to determine compliance with the requirements of section 5. The sample unit shall be one shipping container fully prepared for delivery.

4.5 Test methods.

4.5.1 Frequency of tests. Unless otherwise specified (see 6.2), tests for chemical composition shall be performed on the initial inspection, and thereafter only when changes are made in the material.

4.5.2 Chemical analysis. Chemical analysis shall be in accordance with Methods 111.2 or 112.2 of FED-STD-151. In case of dispute, referee analysis shall be by the wet method in Method 112.2.

#### 5. PREPARATION FOR DELIVERY

5.1 Packing. Packing shall be level A, B or commercial as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Fabric. Each length of fabric shall be rolled in a tight roll. The ends of the roll shall be secured with a minimum of four ties, evenly spaced, of soft annealed wire in a manner to prevent unrolling or loosening during shipment and storage.

5.1.1.2 Gates. Gates shall be strapped to a skid-type base. Strapping shall conform to ASTM D 3953, grade optional, with a protective finish.

5.1.1.3 Rails, posts and braces. Rails, posts and braces shall be bundled. Strapping shall conform to ASTM D 3953, grade optional, with a protective finish.

5.1.1.4 Accessories Accessories shall be packed in boxes conforming to PP-B-601, overseas type. The contents shall be blocked, braced, and cushioned to prevent movement within the boxes.

5.1.2 Level B. The items shall be packed as specified in 5.1.1, except that where boxes are required they shall comply with PPP-B-601, domestic type, and where strapping is required, the protective finish shall not be required.

5.1.3 Commercial. The items shall be packed in accordance with ASTM D 3951.

5.2 Marking.

5.2.1 Military agencies. Marking shall be in accordance with FED-STD-123.

5.2.2 Civil agencies. Marking shall be in accordance with the requirements of ASTM D 3951.

## 6. NOTES

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

6.1 Intended use. Fencing fabric, with proper posts, gates, and accessories, for complete fencing is intended for domestic, commercial, and industrial use.

6.2 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. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1).
- c. Frequency of tests (see 4.5.1).
- d. Selection of applicable level of packing required (see 5.1).

6.3 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

6.4 Sampling. A random sample of like fence components shall be selected from each lot in accordance with MIL-STD-105.

6.4.1 Sampling for examination and tests. A random sample for examination and tests shall be selected in accordance with MIL-STD-105 based on examination level II, and test level S-2. The Acceptable Quality Level (AQL) shall be 2.5 percent defective for major defects and 4.0 percent defective for minor defects.

RR-F-191K/GEN

MILITARY CUSTODIANS:

Army - ME  
Navy - YD  
Air Force - 99

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA - FSS  
HHS - FEC  
INTERIOR - BLM  
USDA - AFS

Review Activities

Air Force - 84  
DLA - GS

PREPARING ACTIVITY:

Navy - YD

User Activity

Army - CE

(Project 5660-0087)

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Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein.

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14 May 1990

Superseding

RR-F-191/1C

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RR-F-191/1D  
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SUPERSEDING  
RR-F-191/1C  
July 22, 1981

FEDERAL SPECIFICATION SHEET

FENCING, WIRE AND POST METAL (CHAIN-LINK FENCE FABRIC)  
(DETAIL SPECIFICATION)

This Federal specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

(This specification forms a part of the latest issue of Federal specification RR-F-191K/GEN).

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers requirements for chain-link fabric.

1.2 Classification. Chain-link fabric will be of the following types, mesh sizes, wire gage size, and fabric height as specified (see 6.1):

- Type I - Zinc-coated steel.
- Type II - Aluminum-coated steel.
- Type III - Aluminum alloy.
- Type IV - Polyvinyl chloride (PVC) coated over zinc or aluminum coated steel.

Mesh size in inches:

- 1 inch (9 and 11 wire gage size only).
- 1-3/4 inch (all wire gage sizes).
- 2 inch (all wire gage sizes).
- 2-1/8 inch (all wire gage sizes).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer (Code 156), Naval Construction Battalion Center, Port Hueneme, CA 93043-5000, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 5660

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Wire gage size = outside diameter of metal core wire in inches:

- 11 gage = 0.120 inches
- 9 gage = 0.148 inches
- 6 gage = 0.192 inches

Fabric height in inches:

- 36 inches
- 42 inches
- 48 inches
- 60 inches
- 72 inches
- 84 inches
- 96 inches
- 120 inches
- 144 inches

## 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.

### ASTM

- ASTM A 90 - Test for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
- ASTM A 370 - Mechanical Testing of Steel Products.
- ASTM A 428 - Tests for Weight of Coating on Aluminum-Coated Iron or Steel Articles.
- ASTM B 211 - Aluminum-Alloy Bars, Rods, and Wires.
- ASTM D 1499 - Operating Light-and-Water-Exposure Apparatus (Carbon-Arc Type) for Exposure of Plastics.
- ASTM D 1535 - Specifying Color by the Munsell System.
- ASTM D 1729 - Visual Evaluation of Color Differences of Opaque Materials.
- ASTM G 23 - Operating Light and Water-Exposure Apparatus (Carbon-Arc Type) for Exposure of Nonmetallic Materials.
- ASTM G 26 - Operating Light and Water-Exposure Apparatus (Xenon-Arc Type) for Exposure of Nonmetallic Materials.

(Application for copies should be addressed to the ASTM, 1916 Race Street, Philadelphia, PA 19103.)

## 3. REQUIREMENTS

3.1 Fabric. The chain-link fence fabric shall be helically woven into a diamond mesh. Fabric shall be woven from the type of wire, mesh size and wire gage size, and to the height selected (see 1.2 and 6.1).

3.2 Steel wire. Unless otherwise specified (see 6.1) the steel wire for the fabric shall be of such quality and purity that, when drawn to the wire gage size specified, the wire shall have a minimum tensile strength of 75,000 pounds per square inch when tested in accordance with 4.4.3. The breakload for steel is: 11 gage - 850 pounds; 9 gage - 1290 pounds; and 6 gage - 2170 pounds. The breakload for aluminum alloy is 9 gage - 925 pounds; 6 gage - 1560 pounds.

3.3 Wire gage size. Wire for fabric shall be of the wire gage size selected (see 1.2 and 6.1). The outside diameter cited in 1.2 is the metal wire diameter allowable for that wire gage size and includes the metallic coating. When type IV wire is required, the wire gage size shall be that of the core wire only, the PVC coating shall not be considered when determining wire size. Tolerance for wire size  $\pm 0.005$  inches.

3.4 Type I, zinc-coated steel wire. Unless otherwise specified (see 6.1), the minimum weight of coating on the wire shall be 1.2 ounces of zinc per square foot of coated surface area when determined in accordance with 4.4.2.1.

3.5 Type II, aluminum-coated steel wire. The minimum weight of aluminum coating for 6- and 9-gage wire shall be 0.4 ounces per square foot. The minimum weight of aluminum coating for 11-gage wire shall be 0.35 ounces per square foot. Weight of aluminum shall be determined in accordance with 4.4.2.2.

3.6 Type III, aluminum alloy wire. The aluminum wire shall conform to the requirements of ASTM B 211, alloy 6061-T94.

3.7 Type IV, PVC coated over zinc or aluminum coated steel wire. The PVC coating shall meet the requirements of 3.7.1 thru 3.7.4. Minimum thickness of the PVC coating shall be 0.007 inches as determined in 4.4.4.1. Unless otherwise specified (see 6.1), the method of applying the PVC coating (see 6.4) shall be the manufacturer's option. Minimum weight of zinc coating on the steel wire shall be 0.4 ounces per square foot for 6 gage and 0.3 ounces per square foot for 9 and 11 gage. Aluminum coated steel wire shall meet the requirements of 3.5.

3.7.1 Color of PVC-coated wire. The color of PVC-coated wire shall be one of the standard colors cited in table I as specified (see 6.1). When colors not cited in table I are required, the color shall be as specified (see 6.1).

TABLE I. Color of PVC coated fabric wire.

Munsell Units (ASTM D 1535 and D 1729)			
	<u>Medium green</u>	<u>Dark green</u>	<u>Black</u>
Hue	8.8G	2.0G	1.8PB
Value	2.63	3.02	1.26
Chroma	5.8	2.35	0.5

3.7.2 Weaveability to PVC coated wire. PVC coated wire shall be capable of being woven in to fabric without the PVC coating cracking, crazing, or peeling.

3.7.3 Accelerated ageing of PVC coatings. PVC coatings shall not shrink more than 1/16 inch per foot of length, demonstrate a significant visual change in color or gloss, or exhibit breaks, cracks, crazing, crumbling, or other visual forms of failure when tested in accordance with 4.4.4.2.

3.7.4 Flexibility of PVC coating. PVC coating shall demonstrate flexibility by exhibiting no breaks, cracks, crazing, crumbling, or other visual forms of failure of the coating when tested in accordance with the mandrel bend test of 4.4.4.3.

3.8 Mesh size. The mesh size for fabric shall be one of the sizes selected (see 1.2). The mesh size shall be the inside measurement of the diamond shape of the tensioned fabric as determined in 4.3.2. Tolerance for mesh size is  $\pm 1/8$  of an inch.

3.9 Diamond count. Unless otherwise specified (see 6.1), the diamond count shall be the manufacturer's standard. All diamond counts shall be consistent within a lot.

3.10 Selvage. Unless otherwise specified (see 6.1), the fabric will be furnished with standard selvages as follows:

- (a) Fabric up to and including 60 inches high with 2-inch mesh shall be knuckled at the top and bottom selvages.
- (b) Fabric over 60 inches high with 2-inch mesh shall be twisted and barbed on the top selvage and knuckled on the bottom selvage.
- (c) Fabric of all heights with 1-inch or 1-3/4 inch mesh shall be knuckled at the top and bottom selvages.

When specified (see 6.1), fabric shall be provided with one of the following selvage types:

- (a) Knuckled at both selvages.
- (b) Knuckled at one selvage and twisted and barbed at the other.
- (c) Twisted and barbed at both selvages, except on fabric with 1-inch mesh.

3.10.1 Knuckled. Loops of knuckled selvage shall be closed or nearly closed with a space not exceeding the diameter of the wire.

3.10.2 Twisted and barbed. Wire shall be twisted in a closed helix of 1-1/2 machine turns equivalent to three full twists, and cut at an angle to provide sharp barbs. The wire ends beyond the twist shall be at least 1/4-inch long (see 4.3.3).

3.11 Fabric height. Fabric height shall be of the selected  $\pm 1$  inch (see 1.2 and 6.1), as determined by 4.3.4. Tolerance for fabric height is  $\pm 1$  inch.

3.12 Fabric length. Unless otherwise specified (see 6.1), the standard length of fabric roll shall be 50 linear feet  $\pm 1$  percent as determined by 4.3.5. Each roll of fabric shall be a one-piece length.

4. QUALITY ASSURANCE PROVISIONS

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

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

4.3 Sampling. (See 6.4)

4.4 Examination. Examine fabric for defects listed in table II.

TABLE II. Classification of defects.

Defects	Major	Minor
Height of fabric not as specified.	X	
Diamond count not as specified.	X	
Length of wire not as specified.	X	
Size of wire not as specified.	X	
Size of wire not as specified.	X	
Type of wire not as specified.	X	
Selvage not as specified.	X	
Color not as specified.	X	
Barbs on twisted and barbed selvage not sharp.		X
Frozen joints on zinc-coated fabric.	X	
Coating cut, scratched, or abraded exposing bare wire.	X	
Plastic coating cracked, crazed, or peeling.	X	

4.3.1 Wire gage. Determine the diameter of types I, II, and III wire by averaging two diameter measurements of the wire taken at right angles to each other (see 1.2 and 3.3.) The diameter of type IV wire shall be determined as above after removal of the PVC coating.

4.3.2 Size of mesh. Measure the clear distance in either direction between the wires forming the parallel sides of the mesh taking the mean of two dimensions at right angles to each other (see 1.2 and 3.8).

4.3.3 Length of barbs. Measure the wire ends along the inside of the twist from the last twist to the tip of barbs in twisted and barbed selvage (see 3.10.2).

4.3.4 Height of fabric. Measure the height with tension applied, between outer extremities of the fabric, including the overall dimension from ends of barbs or knuckles (see 3.11).

4.3.5 Length of fabric. When in rolls, measure the length by unrolling the rolls on a flat surface and apply tension to remove slack. Tension applied shall not reduce the actual height of the fabric by more than 1/16 inch per foot of height or by more than 1/2 inch in overall height, whichever is less (see 3.12).

#### 4.4 Test methods.

4.4.1 Specimens. At least two specimens for each test shall be obtained from one linear foot of fabric cut from one of the rolls selected in accordance with 4.2.

#### 4.4.2 Weight and thickness of metallic coatings.

4.4.2.1 Zinc coat. Determine weight of zinc in accordance with ASTM A 90 (see 3.4 and 3.7).

4.4.2.2 Weight of aluminum coat. Determine weight of aluminum coating in accordance with ASTM A 428 (see 3.5).

4.4.3 Tensile test of steel wire. The steel wire shall be tested for tensile strength in accordance with ASTM A 370 (see 3.2).

#### 4.4.4 PVC coating tests.

4.4.4.1 PVC coating thickness. Determine thickness of PVC coating by stripping the coating and measuring the diameter of the wire as in 4.3.1. One-half the difference between this measurement and the outside diameter of the coated wire will be used to determine the thickness of the coating for conformance to 3.7.

4.4.4.2 Accelerated aging of a PVC coated wire. A sample of PVC coated wire from which the fabric is woven shall be subjected to accelerated aging by exposure for 1,000 hours at a black panel temperature of  $145\frac{1}{2} \pm 9\frac{1}{2}$  Fahrenheit (F) ( $63\frac{1}{2} \pm 5\frac{1}{2}$  Celsius (C)) in accordance with ASTM D 1499. The apparatus used to perform this test shall be either ASTM G 23, Type D, E, F, or HH or ASTM G 26, type BH. After completion of this aging, the coated wire shall be examined to determine compliance with 3.7.3. Shrinkage of the coating of more than 1/16 inch per foot of length, significant visual change in color or gloss, or breaks, cracks, crazing, crumbling, or other visual forms of failure shall be cause for rejection. In addition, samples of the coated wire which have completed this aging process must meet the requirements of the mandrel bend test of 4.4.4.3.

4.4.4.2.1 Frequency of test. Unless otherwise specified (see 6.1), the test for accelerated aging shall be performed on the initial inspection, and thereafter only when changes are made in the PVC coating.

4.4.4.3 Mandrel bend test. After the sample has been subjected to the accelerated aging of 4.4.4.2, it shall be tested as follows: A 12-inch length of PVC coated wire removed from the fabric, including bends and straight sections, but not including twists or knuckles, shall be used as the sample. This sample shall be cold soaked at  $-20\frac{1}{2}$ F ( $-29\frac{1}{2}$ C) for 1 hour. The sample shall be removed from the cold source and within 30 seconds wrapped around a mandrel one complete turn ( $360\frac{1}{2}$ ). The mandrel shall have a maximum diameter of 10 times the outside diameter of the wire being tested. The coating on the wire shall exhibit no breaks, cracks, crazing, crumbling or other visual forms of failure after completion of this test (see 3.7.4).

## 5. PREPARATION FOR DELIVERY (See RR-F-191K/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. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1).
- c. Size required (see 1.2).
- d. When first article is required for inspection and approval (see 3.1).
- e. Type, mesh size, wire gage size, and fabric height required (see 1.2, 3.3, 3.8, and 3.11).
- f. When the steel wire is other than specified (see 3.2).
- g. When weight of zinc coating is other than specified (see 3.4).
- h. When method of applying the PVC coating is not manufacturers option and method specified (see 3.7 and 6.4).
- i. Color of PVC coated wire is other than cited and color required (3.7.1).
- j. When color of PVC coated wire is other than cited and color required (see 3.7.1).
- k. When diamond counts are not as specified and diamond count required (see 3.9).
- l. Type of selvage if other than standard (see 3.10).
- m. Length of fabric if other than standard (see 3.10).
- n. Frequency of test for accelerated aging of PVC coated wire (see 4.4.4.2.1).

6.2 Zinc-coated fabric. The surface of zinc coatings, particularly those produced by hot-dip galvanizing, are not always smooth and devoid of irregularities. Such irregularities ordinarily do not warrant rejection of zinc-coated fabric. Thickness of the zinc coat can be determined, using 1.2 ounces of zinc per square foot equivalent to a coating thickness of 2.0 mils (0.0020 inch) (see 3.4).

6.3 Aluminum-coated fabric. Discoloration of the wire and rust formations on the cut ends are inherent characteristics of this material and does not warrant rejection of aluminum-coated fabric. Thickness of the aluminum coat can be determined using 1 ounce of aluminum per square foot of surface equivalent to a coating thickness of 4.35 mils (0.00435 inch) (see 3.5).

6.4 PVC coated fabric. There are different PVC coated fabrics on the market. Some of the ways in which they may vary are: The methods of applying the PVC coating, wall thickness of the PVC coating, adhesion of the PVC coating to the wire, and cost. These factors should be taken into consideration when selecting a fence fabric for different environmental applications.

MILITARY INTERESTS:

Custodians

Army - ME  
Navy - YD  
Air Force - 99

Review Activity

Air Force - 84  
DLA - CS

User Activities

Army - CE  
Navy - MC, CG

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA - FSS  
HHS - FEC  
INTERIOR - BLM  
USDA - AFS

PREPARING ACTIVITY:

Navy - YD  
(Project 5660-0088)

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14 May 1990

Superseding

RR-F-191/2C

July 22, 1981

RR-F-191/2D  
14 May 1990  
SUPERSEDING  
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July 22, 1981

FEDERAL SPECIFICATION SHEET

FENCING, WIRE AND POST, METAL (CHAIN-LINK FENCE GATES)  
(DETAIL SPECIFICATION)

This Federal specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

(This specification forms a part of the latest issue of Federal specification RR-F-191K/GEN).

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers detail requirements for chain-link fence gates, and accessories.

1.2 Classification. Chain-link fence gates will be of the following types, as specified (see 6.1):

- Type I - Single swing.
- Type II - Double swing.
- Type III - Single cantilever sliding, wheel sliding gate.
- Type IV - Double cantilever sliding.
- Type V - Single overhead sliding.
- Type VI - Double overhead sliding.
- Type VII - Vertical lift.
- Type VIII - Special.

2. APPLICABLE DOCUMENTS (Not applicable).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer (Code 156), Naval Construction Battalion Center, Port Hueneme, CA 93043-5000, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 5660

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

### 3. REQUIREMENTS

3.1 Design. Detailed construction requirements for all gates shall be as specified (see 6.1), and shall meet the applicable requirements of this specification. Gate frames shall be of welded construction or shall be assembled using fittings. When fittings are used as the construction method for gate frames, the frames shall be fitted with 5/16-inch minimum diameter truss rods. All gates shall be constructed so that they may be operated by one person.

3.1.1 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-191/1D. Steel frames shall be zinc-coated prior to application of color coating. Unless otherwise specified (see 6.1), color coating material shall be at the option of the manufacturer.

3.2 Frames. Gate frames shall be constructed from applicable class, size, and grade members selected from RR-F-191/3D as specified (see 6.1).

3.2.1 Welded zinc-coated frames. When specified (see 6.1), the frames shall be zinc-coated by the hot dip or metal spray method after fabrication. When frames are not zinc coated after fabrication the welds shall be coated with a zinc rich paint or cold zinc spray.

3.2.2 Color coated frames. When color coated frames are required and the frames are of welded construction, all weld areas shall be finished with a suitable rust preventative coating and a matching color final coating.

3.3 Fabric. Gate fabric shall be selected from RR-F-191/1D and shall be of the type, size of mesh, gage size of wire, color, and selvage as specified (see 6.1).

3.4 Barbed wire top. When barbed wire top is specified (see 6.1), the end members of gate frames shall extend 1 foot above the top horizontal section of the gate frame. Three strands of barbed wire, uniformly spaced, shall be attached by bands, clips or eyebolts.

3.5 Latches, hinges, stops, and keepers. Latches, hinges, stops and keepers shall be zinc-coated steel or color coated over zinc-coated steel, or aluminum coated steel as specified (see 6.1). When zinc coating is required, the weight of zinc coating shall be 1.2 ounces per square foot unless otherwise specified (see 6.1). When aluminum coating is required, the weight of aluminum coating shall be not less than 0.4 ounce per square foot.

3.5.1 Single gate latches. Single gate latches shall be fork type, gravity drop bar type with positive locking features, or plunger bar type of full gate height as specified (see 6.1).

3.5.2 Double gate latches. Latches for double gates shall be fork type latch with center drop rod, or plunger bar type of full gate height arranged to engage the gate stop, or a positive locking gravity device as specified (see 6.1). Locking devices shall be constructed so that the center drop rod or plunger bar cannot be raised when locked.

3.5.3 Stops. Center gate stop shall be provided for all double gates and shall be suitable for setting in concrete or with anchors for the center drop rod or plunger.

3.5.4 Keepers. Keepers shall be provided for each gate leaf over 5 feet wide. Gate keepers shall consist of a mechanical device for securing the free end of the gate when in full open position.

3.5.5 Gate hinges. Gate hinges shall be of adequate strength for the gate, and shall have large bearing surfaces for clamping or bolting in position. Hinge action shall be such that gates may be easily opened and closed by one person. Hinges shall provide for full 180 degrees (°) swing of gate leaf.

3.6 Rollers. Rollers shall be equipped with bearings. Non-sealed type bearings shall be provided with a grease fitting for periodic maintenance. Rollers shall be secured to the gate post or gate frame without welding. Unless otherwise specified (see 6.1), rollers shall be enclosed.

4. QUALITY ASSURANCE PROVISIONS

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

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

4.4 Examination. Examine gates for defects listed in table I.

TABLE I. Classification of defects gates.

Defects	Major	Minor
Type of gate not as specified.	X	
Materials not as specified.	X	
Color not as specified.	X	
Truss rods missing or less than 5/16-inch diameter.	X	
Dimensions not within tolerance.	X	
Welds not painted or protected against corrosion		X
Gate construction not as specified.	X	
Damage or defects affecting function or serviceability.	X	
Damage or defects not affecting function or serviceability.		X

5. PREPARATION FOR DELIVERY (See RR-F-191K/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. Type of gate required (see 1.2).
- c. Design and construction of gate required (see 3.1).
- d. When color coating is required and color (see 3.1.1).
- e. When color coating material is other than specified (see 3.1.1).
- f. Class, grade, and size of wire, color, and selvage for fabric required (see 3.3).
- g. When barbed wire top on gate is required (see 3.4).
- h. Coating required on latches, hinges, stops, and keepers, and weights of coatings if other than that specified (see 3.5).
- i. Type latch required (see 3.5.1 and 3.5.2).
- j. When rollers are other than specified (see 3.6).

**MILITARY CUSTODIANS:**

Army - ME  
Navy - YD  
Air Force - 99

Review Activities

Air Force - 84  
DLA - CS

User Activities

Army - CE  
Navy - MC, CG

**CIVIL AGENCY COORDINATING ACTIVITIES:**

GSA - FSS  
HHS - FEC  
INTERIOR - BLM  
USDA - AFS

**PREPARING ACTIVITY:**

Navy - YD

(Project 5660-0089)

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Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein.

RR-F-191/3D

14 May 1990

Superseding

RR-F-191/3C

July 22, 1981

RR-F-191/3D  
14 May 1990  
SUPERSEDING  
RR-F-191/3C  
July 22, 1981

FEDERAL SPECIFICATION SHEET

FENCING, WIRE AND POST, METAL (CHAIN-LINK  
FENCE POSTS, TOP RAILS AND BRACES)  
(DETAIL SPECIFICATION)

This Federal specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for use of all Federal agencies.

(This specification forms a part of the latest issue of Federal specification RR-F-191K/GEN)

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers general requirements for chain-link fence posts, top rails, and braces.

1.2 Classification. Chain-link fence posts, top rails, and braces will be of the applicable class, size, and grade as specified (see 6.1).

Class 1 - Steel pipe.

Grade A - Hot-dip zinc-coated after fabrication with 1.8 ounces of zinc per square foot of coated surface area.

Grade B - Hot-dip zinc-coated with 0.9 ounces of zinc per square foot of external coated surface area. The interior surface shall be hot-dip zinc-coated or zinc rich painted to a minimum thickness of three mils.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer (Code 156), Naval Construction Battalion Center, Port Hueneme, CA 93043-5000, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 5660

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Size - Outside diameter multiplied by (x) minimum wall thickness in inches:

SP1 1.660 OD x 0.111  
 SP2 1.90 OD x 0.120  
 SP3 2.375 OD x 0.130  
 SP4 2.875 OD x 0.160  
 SP5 4.00 OD x 0.226  
 SP6 6.625 OD x 0.280  
 SP7 8.625 OD x 0.322

Class 2 - Aluminum Pipe.

Size - Outside diameter in inches x weight per foot of length (lb/ft):

AP1 1.629 OD x 0.786 lb/ft  
 AP2 1.869 OD x 0.940 lb/ft  
 AP3 2.351 OD x 1.264 lb/ft  
 AP4 2.846 OD x 2.004 lb/ft  
 AP5 3.960 OD x 3.151 lb/ft  
 AP6 6.559 OD x 6.564 lb/ft  
 AP7 8.625 OD x 9.878 lb/ft

Class 3 - Formed steel sections.

Size - Outside dimensions in inches x weight per foot of length (lb/ft):

FS1 1.625 by 1.25 x 1.35 lb/ft  
 FS2 1.875 by 1.625 x 2.40 lb/ft  
 FS3 2.250 by 1.70 x 2.78 lb/ft  
 FS3 3.50 by 3.50 x 5.10 lb/ft

Class 4 - Steel H-sections.

Size - Outside dimensions in inches x weight per foot of length (lb/ft):

SH1 2.25 by 1.70 x 3.43 lb/ft

Class 5 - Aluminum H-sections.

Size - Outside dimensions in inches x weight per foot of length (lb/ft):

AH1 1.875 by 1.565 x 0.91 lb/ft  
 AH2 2.250 by 2.00 x 1.22 lb/ft

## Class 6 - Steel square sections.

Size - Outside dimensions in inches x weight  
per foot of length (lb/ft):

SS1 2.00 by 2.00 x 2.60 lb/ft  
SS2 2.50 by 2.50 x 5.10 lb/ft

## Class 7 - Aluminum square sections.

Size - Outside dimensions in inches x weight  
per foot of length (lb/ft):

AS1 2.50 by 2.50 x 1.25 lb/ft  
AS2 3.00 by 3.00 x 1.40 lb/ft  
AS3 3.00 by 3.00 x 2.45 lb/ft

## 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.

ASTM

ASTM A 90	- Test for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
ASTM A 570	- Hot Rolled Sheet and Strip, Structural Quality.
ASTM A 572/A 572M	- High-Strength Low-Alloy Columbium-Vanadium Steel of Structural Quality.
ASTM B 221	- Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
ASTM B 429	- Aluminum Alloy Extruded Structural Pipe and Tube.
ASTM E 8	- Tension Testing of Metallic Materials.
ASTM F 1083	- Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded for Fence Structures.

(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

## 3. REQUIREMENTS

3.1 Zinc-coating. Unless otherwise specified herein, all steel material shall be hot-dip zinc-coated on all surfaces with an average weight of not less than 1.8 ounces of zinc per square foot of coated surface area. When the weight of the zinc coating shall be other than 1.8 ounces or other than specified herein (see 6.1).

3.2 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. Steel posts, rails, and braces shall be zinc-coated in accordance with 3.1, prior to application of color coating.

Unless otherwise specified (see 6.1), color coating material shall be at the option of the manufacturer. shall be zinc-coated in accordance with 3.1, prior to application of color coating. Unless otherwise specified (see 6.1), color coating material shall be at the option of the manufacturer.

3.3 Dimensions and tolerances. Tolerances for weight per foot requirements are minus 5 percent with no limit on plus. The tolerance for the dimensions for posts is minus 2 percent and plus 5 percent.

3.4 Description.

3.4.1 Class 1 steel pipe grades A and B. Pipe conforming to ASTM F 1083 (schedule 40 standard weight) meets or exceeds the requirements for grades A and B. Steel pipe other than ASTM F 1083 (schedule 40 standard weight) shall meet the outside dimensions and minimum wall thickness required and shall have minimum yield strength of 50,000 psi. Grade A pipe shall be hot-dipped zinc coated inside and out with an average weight of not less than 1.8 ounces of zinc per square foot of coated surface area. Unless otherwise specified (see 6.1), grade B pipe shall be hot-dipped zinc-coated with an average weight of not less than 0.9 ounces of zinc per square foot of exterior surface and shall be over coated with a clear acrylic or polyester. The internal surface of grade B pipe shall have a protective coating of hot dipped zinc or zinc rich paint with a minimum thickness of three mils.

3.4.2 Class 2 - aluminum pipe. Class 2 aluminum pipe material shall conform to ASTM B 429, alloy 6063, temper T6.

3.4.3 Class 3 - formed steel section. Formed steel section material shall be formed from sheet steel conforming to ASTM A 570, grade 35 for FS1 and FS4, and ASTM A 570, grade 45 for FS2 and FS3.

3.4.4 Class 4 - steel H-section. Steel H sections shall be produced from steel conforming to ASTM A 572, grade 45.

3.4.5 Class 5 - aluminum H-section. Aluminum H-section material shall conform ASTM B 221, alloy 6063, temper T6.

3.4.6 Class 6 - steel square section. Steel square sections shall be produced from steel having a minimum yield strength of 40,000 pounds per square inch.

3.4.7 Class 7 - aluminum square section. Aluminum square section material shall conform to ASTM B 221, alloy 6063, temper T6.

3.5 Posts. Unless otherwise specified (see 6.1), posts shall conform to tables I thru VII. Length of posts shall be compatible with the specified fence height, or shall be as specified (see 6.1). The term "Terminal posts" shall apply to end, corner, and pull posts. The term "Line posts" is defined as the vertical posts installed between terminal posts. The term "Gate posts" shall apply to the post supporting the weight of the gate.

TABLE I. Posts of class 1 steel pipe, grades A and B.

Post Type	Fabric Heights	Size
Terminal	up to 6 ft	SP3
	over 6 ft	SP4
Line	up to 6 ft	SP2
	up to 8 ft	SP3
	over 8 ft	SP4
<u>Gate Leaf Widths</u>		
Gate	up to 6 ft	SP4
	up to 13 ft	SP5
	up to 18 ft	SP6
	up to 23 ft	SP7

TABLE II. Posts of class 2 aluminum pipe.

Post Type	Fabric Heights	Size
Terminal	up to 6 ft	AP3
Line	up to 6 ft	AP2
	up to 8 ft	AP3
<u>Gate Leaf Widths</u>		
Gate	up to 13 ft	AP5
	up to 18 ft	AP6
	up to 23 ft	AP7

TABLE III. Posts of class 3 formed steel section.

Post Type	Fabric Heights	Size
Line	up to 8 ft	FS2
	over 8 ft	FS3
Terminal	All heights	FS4

TABLE IV. Posts of class 4 steel H-section.

Post Type	Fabric Heights	Size
Line	All heights	SH1

TABLE V. Posts of class 5 aluminum H-section.

Post Type	Fabric Heights	Size
Line	All heights	AH2

TABLE VI. Posts of class 6 steel square section.

Post Type	Fabric Heights	Size
Terminal	up to 6 ft	SS1
	over 6 ft	SS2
<u>Gate Leaf Widths</u>		
Gate	up to 6 ft	SS2

TABLE VIII. Posts of class 7 aluminum square section.

Post Type	Fabric Heights	Size
Terminal	up to 6 ft	AS1
	over 6 ft	AS3
<u>Gate Leaf Widths</u>		
Gate	up to 6 ft	AS2

3.6 Top rails and braces. Top rails and braces, when required, shall be of the class, grade, and size as specified (see 6.1).

3.6.1 Rail connectors. Top rail lengths shall be fitted with 6-inch connectors of the same material as the rail or shall have a 3-inch long swage on one end for connecting into a continuous run. Suitable fittings shall be provided for securing top rail to each gate, corner, and end posts.

3.6.2 Braces. Braces shall be provided for gate posts and each terminal post when a top rail is not used. When fabric height is 6 feet (ft) or greater, braces shall be furnished with or without top rail. Braces extending to line post shall be connected back to the base of the braced post by a 5/16 inch minimum outside diameter truss rod and tightener. Double braces shall be furnished when fabric height is over 9 ft.

#### 4. QUALITY ASSURANCE PROVISIONS

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

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

4.3 Examination. Examine posts, top rails, and braces for defects listed in table VIII.

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

Defects	Major	Minor
Class, size, and grade not as specified.	x	
Material not as specified.	x	
Dimensions and weights not within tolerance.	x	
Color not as specified.	x	
Weight of zinc coating not as specified.	x	
Coating cut, scratched, or abraded exposing bare metal.	x	
Damage or defects affecting function or serviceability.	x	
Damage or defects not affecting function or serviceability.		x

#### 4.5 Test methods.

4.4.1 Yield strength. Prepared a specimen obtained from the material and determine yield strength in accordance with ASTM E 8 (see 3.4.6).

4.4.2 Zinc-coat on steel posts, top rails, and braces. Determine weight of zinc in accordance with ASTM A 90 (see 3.1).

#### 5. PREPARATION FOR DELIVERY (See RR-F-191K/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. Class, size, and grade required (see 1.2).
- c. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1).
- d. When weight of zinc coating is to be other than specified (see 3.1).
- e. Color coating required and color required (see 3.2).
- f. When color coating material is other than specified and material required (see 3.2).
- g. When grade B coatings are other than specified (see 3.4.1).
- h. When posts are other than specified (see 3.5).
- i. When length of posts is specified and length required (see 3.5).
- j. Class, grade and size of top rails specified (see 3.6).
- k. Class, grade and size of braces specified (see 3.6).

**MILITARY CUSTODIANS:**

Army - ME  
Navy - YD  
Air Force - 99

Review Activities

Air Force - 84  
DLA - GS

User Activities

Army - CE  
Navy - MC, CG

**CIVIL AGENCY COORDINATING ACTIVITIES:**

GSA - FSS  
HHS - FEC  
INTERIOR - BLM  
USDA - AFS

**PREPARING ACTIVITY:**

Navy - YD

(Project 5660-0090)

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Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein.

RR-F-191/4D

14 May 1990

Superseding

RR-F-191/4C

July 22, 1981

RR-F-191/4D  
14 May 1990  
SUPERSEDING  
RR-F-191/4C  
July 22, 1981

FEDERAL SPECIFICATION SHEET

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

This Federal specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for use of all Federal agencies.

(This specification forms a part of the latest issue of Federal specification RR-F-191K/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.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer (Code 156), Naval Construction Battalion Center, Port Hueneme, CA 93043-5000, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 5660

DISTRIBUTION STATEMENT A. Approved for public release; distribution is

unlimited.

## 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.

### ASTM

- ASTM A 90 - Test for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
- ASTM A 428 - Tests for Weight of Coating on Aluminum-Coated Iron or Steel Articles.
- ASTM B 211 - Aluminum-Alloy Bars, Rods, and Wire.
- ASTM B 487 - Measuring Metal and Oxide Coating Thicknesses by Microscopical Examination of a Cross Section.
- ASTM E 376 - Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic).

(Application for copies should be addressed to the ASTM, 1916 Race Street, Philadelphia, PA 19103.)

## 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-191/1D. 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 formed steel, malleable or cast iron, or aluminum alloy.

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 formed steel, malleable or cast iron, or aluminum alloy.

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 shall be not less than the fabric wire gage size and of the same coatings. The minimum weight for zinc coated wire ties and clips is 0.8 ounces of zinc per foot of coated surface area. Wire ties and clips shall not fracture when tested in accordance with 4.4.1.

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, polyvinyl chloride (PVC) over zinc-coated steel, or aluminum alloy as specified (see 6.1). Unless otherwise specified (see 6.1), all tension wire shall be 7 gage wire size with an outside diameter of 0.177-inch (+0.005-inch).

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). 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 B 211, 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. Barbed wire shall consist of two 12-1/2-gage 0.099-inch (+0.005-inch) twisted line wires with 14-gage 0.080-inch (+0.005-inch) round barbs. Barbed wire shall be zinc-coated steel, aluminum coated steel, aluminum alloy, or PVC over zinc-coated steel 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 B 211, Alloy 6061-T94.

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  $45 \pm 5$  degrees from the plane of the fence line and the outer strand of barbed wire shall be positioned  $12 \pm 2$ -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-191K/GEN)

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

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

TABLE VIII. 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 ( $^{\circ}$ ) 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 coating. Determine weight of zinc coating in accordance with ASTM A 90 (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 A 428 (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).

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 B 487. 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 E 376.

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-191K/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. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1).
- c. Item required (see 1.2).
- d. Material for accessories if other than specified (see 3.1).
- e. Zinc coating if other than specified (see 3.2).
- f. Color coating material if other than specified and color required (see 3.3).
- g. Type of tension wire required (see 3.4.7).
- h. When wire ties and clips are to be other than required (see 3.4.4).
- i. When tension wire is to be other than 7 gage and gage required (see 3.4.7).
- j. Zinc coating for steel tension wire if other than specified (see 3.4.7.1).
- k. Type of barbed wire required (see 3.4.9).
- l. Type of barbed wire support arms required (see 3.5).
- m. 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.

MILITARY CUSTODIANS:

Army - ME  
Navy - YD  
Air Force - 99

Review Activity

DLA - CS

User Activities

Army - CE  
Navy - MC, CG

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA - FSS  
HHS - FEC  
INTERIOR - BLM  
USDA - AFS

PREPARING ACTIVITY:

Navy - YD

(Project 5660-0091)

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Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein.