READ THIS FIRST

The Engineer shall verify that the latest version of the Federal Aviation Administration Advisory Circular AC 150/5370-10, “Standards for Specifying Construction Of Airports” and that the latest version of the Federal Aviation Administration, Northwest Mountain Region Revision to AC 150/5370-10, “Standards for Specifying Construction Of Airports” are incorporated into this specification.

This Project Spec Document may need additional modifications to suit your project. It is recommended that you proofread each section, paying attention to any “Notes” boxes such as this one--you should remove these “Notes” sections as you go. Also, do a search for all bracket characters “ [ ] “ as they are used to show you areas containing options or project specific details (you can use Microsoft Word’s Find feature {Ctrl-F} to jump to an open bracket “ [ “ character quickly). Again, these bracket characters should be removed.

It is important that every paragraph be numbered to allow for easy referencing. If you use the document’s built in styles and formatting your outline should be fine (turn on the formatting toolbar by going to View > Toolbars > Formatting). Most paragraphs will use the style “Numbered Material” and can be promoted (Shift) or demoted (Shift-Tab).

You should not have to manually enter extra spaces, carriage returns or outline characters such as A, B, C, or 1.01, 1.02; the formatting will do this for you. The entire document is 11 pt. Arial. If you paste items in, you may need to reapply the “Numbered Material” format.

1. GENERAL
   1. SUMMARY OF WORK
      1. The extent and location of “Chain Link Fence (FAA)” Work is shown in the Contract Documents. Chain link fencing, including gates, shall be provided in accordance with the provisions of FAA Item F-162, Chain-Link Fence, attached hereto.
   2. GOVERNING CODES, STANDARDS, AND REFERENCES
      1. TBD
   3. SUBMITTALS
      1. Submit materials data in accordance with Section 01 33 00 - Submittals. Furnish manufacturers’ technical literature, standard details, product specifications, and installation instructions for all products.
      2. Submittals shall include the following:
2. NOT USED
3. NOT USED
4. NOT USED

End of Section

Revision History:

05/01/2014 Conversion to 2004 CSI Numbering System

10/15/2014 Added Sole Source and Salient Characteristics Note to Part 2 and revisions

# ITEM F-162 CHAIN-LINK FENCE

## DESCRIPTION

162-1.1 This item shall consist of furnishing and erecting a chain-link fence in accordance with these specifications and the details shown on the plans and in conformity with the lines and grades shown on the plans or established by the Engineer.

## MATERIALS

A. If only one product is acceptable (single or sole source product), obtain an approved Competition Waiver and submit to the CPO Construction, Contract Administrator. The language shall read as: “Manufacturer Name, Product # XXXXX, No Equal.” Refer to CPO-6 Competition Waiver Policy for more information.

B. If a Competition Waiver is not approved or more than one product is acceptable, this section must list a minimum of 2 products plus the language “Or Approved Equal,” along with salient characteristics. Refer to CPO Construction’s Salient Characteristics Guidelines for more information.

162-2.1 FABRIC. [The fabric shall be woven with a 9-gauge [galvanized steel wire] [polyvinyl chloride (PVC)-coated steel] [aluminum alloy] [zinc-5% aluminum mischmetal] wire in a 2 in (50 mm) mesh and shall meet the requirements of [ ].] [The fabric shall be woven from a [ ] gauge aluminum-coated steel wire in a 2 in (50 mm) mesh and shall conform to the requirements of ASTM A 491.]

Galvanized steel fabric shall conform to the requirements of ASTM A 392, Class 2.

Polyvinyl chloride-coated steel shall conform to the requirements of ASTM F 668, Class 2b.

Aluminum alloy fabric shall conform to the requirements of ASTM F 1183.

Zinc-5% aluminum mischmetal alloy coated steel shall conform to the requirements of ASTM F 1345, Class 2.

The Engineer shall specify 9 or 10 gauge aluminum-coated wire.

Metallic-coated fabric shall have a clear acrylic coating applied to the selvage area after weaving.

162-2.2 BARBED WIRE. Barbed wire shall be 2-strand 12-1/2 gauge [zinc-coated] [aluminum-coated] wire with 4-point barbs and shall conform to the requirements of [ ].

Zinc-coated barbed wire shall conform to the requirements of ASTM A 121, Class 3, Chain Link Fence Grade.

Aluminum-coated barbed wire shall conform to the requirements of ASTM A 121, Class II.

162-2.3 POSTS, RAILS AND BRACES. Line posts, rails, and braces shall conform to the requirements of ASTM F-1043 or ASTM F 1083 as follows.

Galvanized tubular steel pipe shall conform to the requirements of Group IA, (Schedule 40) coatings conforming to Type A, or Group IC (High Strength Pipe), External coating Type B, and internal coating Type B or D.

Roll Formed Steel Shapes (C-Sections) shall conform to the requirements of Group IIA, and be galvanized in accordance with the requirements of F 1043, Type A.

Hot-Rolled Shapes (H Beams) shall meet the requirements of Group III, and be galvanized in accordance with the requirements of F 1043, Type A.

Aluminum Pipe shall conform to the requirements of Group IB.

Aluminum Shapes shall conform to the requirements of Group IIB.

Vinyl or polyester coated steel shall conform to the requirements of ASTM F 1043, Paragraph 7.3 Optional Supplemental Color Coating.

Composite posts shall conform to the strength requirements of ASTM F 1043 or ASTM F 1083. The strength loss of composite posts shall not exceed 10 percent when subjected to 3,600 hours of exposure to light and water in accordance with ASTM G 23, ASTM G 26, and ASTM G-53.

Posts, rails, and braces furnished for use in conjunction with aluminum alloy fabric shall be aluminum alloy or composite.

Posts, rails, and braces, with the exception of galvanized steel conforming to F 1043 or ASTM F 1083, Group 1A, Type A, or aluminum alloy, shall demonstrate the ability to withstand testing in salt spray in accordance with ASTM B 117 as follows:

External: 1,000 hours with a maximum of 5% red rust.

Internal: 650 hours with a maximum of 5% red rust.

The dimensions of the posts, rails, and braces shall be in accordance with Tables I through VI of Fed. Spec. RR-F-191/3.

162-2.4 GATES. Gate frames shall consist of [galvanized steel pipe] [polymer-coated steel pipe] [aluminum alloy pipe] [composite posts] and shall conform to the specifications for the same material under paragraph 162-2.3. The fabric shall be of the same type material as used in the fence.

162-2.5 WIRE TIES AND TENSION WIRES. Wire ties for use in conjunction with a given type of fabric shall be of the same material and coating weight identified with the fabric type. Tension wire shall be 7-gauge marcelled steel wire with the same coating as the fabric type and shall conform to ASTM A 824.

All material shall conform to Fed. Spec. RR-F-191/4.

162-6 MISCELLANEOUS FITTINGS AND HARDWARE. Miscellaneous steel fittings and hardware for use with [zinc-coated] [aluminum-coated] [zinc-5% aluminum-mischmetal alloy-coated] steel fabric shall be of commercial grade steel or better quality, wrought or cast as appropriate to the article, and sufficient in strength to provide a balanced design when used in conjunction with fabric posts, and wires of the quality specified herein. [All steel fittings and hardware shall be protected with a zinc coating applied in conformance with ASTM A 153.] [Miscellaneous aluminum fittings for use with aluminum alloy fabric shall be wrought or cast aluminum alloy.] Barbed wire support arms shall withstand a load of 250 pounds (113 kg) applied vertically to the outermost end of the arm.

162-2.7 CONCRETE. Concrete shall be of a commercial grade with a minimum 28-day compressive strength of 2500 psi (17 240 kPa).

162-2.8 MARKING. Each roll of fabric shall carry a tag showing the kind of base metal (steel, aluminum, or aluminum alloy number), kind of coating, the gauge of the wire, the length of fencing in the roll, and the name of the manufacturer. Posts, wire, and other fittings shall be identified as to manufacturer, kind of base metal (steel, aluminum, or aluminum alloy number), and kind of coating.

## CONSTRUCTION METHODS

162-3.1 CLEARING FENCE LINE. All trees, brush, stumps, logs, and other debris which would interfere with the proper construction of the fence in the required location shall be removed a minimum width of 2 ft (61 cm) on each side of the fence centerline before starting fencing operations. The cost of removing and disposing of the material shall not constitute a pay item and shall be considered incidental to fence construction.

162-3.2 INSTALLING POSTS. All posts shall be set in concrete at the required dimension and depth and at the spacing shown on the plans.

Posts should be spaced not more than 10 ft (3 m) apart and should be set a minimum of 36 in (90 cm) in concrete footings. If the frost depth is greater than 36 in (90 cm), the posts should be set accordingly. The posts holes shall be in proper alignment so that there is a minimum of 3 in (75 mm) of concrete on all sides of the posts.

The concrete shall be thoroughly compacted around the posts by tamping or vibrating and shall have a smooth finish slightly higher than the ground and sloped to drain away from the posts. All posts shall be set plumb and to the required grade and alignment. No materials shall be installed on the posts, nor shall the posts be disturbed in any manner within 7 days after the individual post footing is completed.

Should rock be encountered at a depth less than the planned footing depth, a hole 2 in (50 mm) larger than the greatest dimension of the posts shall be drilled to a depth of 12 in (300 mm). After the posts are set, the remainder of the drilled hole shall be filled with grout, composed of one part Portland cement and two parts mortar sand. Any remaining space above the rock shall be filled with concrete in the manner described above.

In lieu of drilling, the rock may be excavated to the required footing depth. No extra compensation shall be made for rock excavation.

162-3.3 INSTALLING TOP RAILS. The top rail shall be continuous and shall pass through the post tops. The coupling used to join the top rail lengths shall allow for expansion.

162-3.4 INSTALLING BRACES. Horizontal brace rails, with diagonal truss rods and turnbuckles, shall be installed at all terminal posts.

162-3.5 INSTALLING FABRIC. The wire fabric shall be firmly attached to the posts and braced in the manner shown on the plans. All wire shall be stretched taut and shall be installed to the required elevations. The fence shall generally follow the contour of the ground, with the bottom of the fence fabric no less than 1 in (25 mm) or more than 4 in (100 mm) from the ground surface. Grading shall be performed where necessary to provide a neat appearance.

At locations of small natural swales or drainage ditches and where it is not practical to have the fence conform to the general contour of the ground surface, longer posts may be used and multiple strands of barbed wire stretched thereon to span the opening below the fence. The vertical clearance between strands of barbed wire shall be 6 in (150 mm) or less.

Openings below the fence may also be spanned with barbed wire fastened to stakes.

The Engineer shall specify if tension wire is to be installed.

162-3.6 ELECTRICAL GROUNDS. Electrical grounds shall be constructed [where a power line passes over the fence] [at 500 ft (150 m) intervals]. [The ground shall be installed directly below the point of crossing.] The ground shall be accomplished with a copper clad rod 8 ft (240 cm) long and a minimum of 5/8 in (15 mm) in diameter driven vertically until the top is 6 in (150 mm) below the ground surface. A No. 6 solid copper conductor shall be clamped to the rod and to the fence in such a manner that each element of the fence is grounded. Installation of ground rods shall not constitute a pay item and shall be considered incidental to fence construction.

The Engineer shall indicate the location of all electrical grounds on the plans. Grounding may not be necessary with the use of composite posts.

## METHOD OF MEASUREMENT

162-4.1 Chain-link fence will be measured for payment by the linear foot (meter). Measurement will be along the top of the fence from center to center of end posts, excluding the length occupied by gate openings.

Gates will be measured as complete units.

## BASIS OF PAYMENT

162-5.1 Payment for chain-link fence will be made at the contract unit price per linear foot (meter).

Payment for driveway or walkway gates will be made at the contract unit price for each gate.

The price shall be full compensation for furnishing all materials, and for all preparation, erection, and installation of these materials, and for all labor equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item F-162-5.1 Chain-Link Fence-per linear foot (meter)

Item F-162-5.2 Driveway Gates-per each

Item F-162-5.3 Walkway Gates-per each

## MATERIAL REQUIREMENTS

|  |  |
| --- | --- |
| ASTM A 121 | Zinc-Coated (Galvanized) Steel Barbed Wire |
| ASTM A 123 | Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products |
| ASTM A 153 | Zinc Coating (Hot-Dip) on Iron and Steel Hardware |
| ASTM A 392 | Zinc-Coated Steel Chain-Link Fence Fabric |
| ASTM A 491 | Aluminum-Coated Steel Chain-Link Fence Fabric |
| ASTM A 572 | High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Steel Quality |
| ASTM A 653 | Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process |
| ASTM A 824 | Metallic-Coated Steel Marcelled Tension Wire for Use With Chain Link Fence |
| ASTM A 1011 | Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability |
| ASTM B 117 | Standard Practice for Operating Salt Spray (Fog) Apparatus |
| ASTM B 221 | Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire Shapes and Tubes |
| ASTM B 429 | Aluminum-Alloy Extruded Structural Pipe and Tube |
| ASTM F 668 | Poly(vinyl Chloride)(PVC) and other Organic Polymer-Coated Steel Chain-Link Fence Fabric |
| ASTM F 1043 | Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework |
| ASTM F 1083 | Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures |
| ASTM F 1183 | Aluminum Alloy Chain Link Fence Fabric |
| ASTM F 1345 | Zinc-5% Aluminum-Mischmetal Alloy-Coated Steel Chain Link Fence Fabric |
| ASTM G 152 | Operating Open Flame (Carbon-Arc) Light Apparatus for Exposure of Nonmetallic Materials |
| ASTM G 153 | Operating Enclosed Carbon-Arc Light Apparatus for Exposure of Nonmetallic Materials |
| ASTM G 154 | Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials |
| ASTM G 155 | Operating (Xenon-Arc) Light Apparatus for Exposure of Nonmetallic Materials |
| FED SPEC RR-F-191/3 | Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces) |
| FED SPEC RR-F-191/4 | Fencing, Wire and Post, Metal (Chain-Link Fence Accessories) |

End of Item F-162

## REFERENCES

1. ASTM A 121 Zinc-coated barbed wire
2. ASTM A 123 roll-formed sections galvanized
3. ASTM A 153 miscellaneous steel fittings and hardware zinc coating
4. ASTM A 392 Galvanized steel fabric
5. ASTM A 446 zinc-polymer-coated steel pipe
6. ASTM A 491 fabric
7. ASTM A 491 Aluminum-coated steel fabric
8. ASTM A 570 roll-formed sections
9. ASTM A 572 steel used in all structural shapes
10. ASTM A 569 zinc-polymer-coated steel pipe
11. ASTM A 585 Aluminum-coated barbed wire
12. ASTM B 221 aluminum alloy for extruded bar, shape and tube
13. ASTM B 429 aluminum alloy schedule 40 for extruded pipe and tube
14. ASTM F 668 Polyvinyl chloride-coated steel
15. ASTM F 1083 Galvanized steel pipe
16. ASTM F 1183 Aluminum alloy fabric
17. ASTM F 1234 roll-formed sections coated with zinc-5% aluminum mischmetal alloy
18. ASTM F 1234 structural shapes galvanized
19. ASTM F 1234 zinc-polymer-coated steel pipe exterior coating
20. ASTM F 1234 zinc-polymer-coated steel pipe interior coating
21. ASTM F 1345 Zinc-5% mischmetal alloy coated steel
22. FAA Item F-162 Chain Link Fences
23. Fed. Spec. RR-F-191/3 dimensions of the posts, rails and braces
24. Fed. Spec. RR-F-191/3 vinyl-coated steel
25. Fed. Spec. RR-F-191/4 wire fabric ties, wire ties and tension wires

End of Item