

## SECTION 2831

### ITEM F-162 CHAIN-LINK FENCES

#### **PART 1 - GENERAL**

##### **1.1 DESCRIPTION.**

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.

#### **PART 2 - MATERIALS**

##### **2.1 FABRIC.**

The fabric shall be woven with a 9-gauge galvanized steel wire in a 2-inch mesh and shall meet the requirements of ASTM A 392, Class 2. Fabric shall be seven feet high.

##### **2.2 BARBED WIRE.**

Barbed wire shall be 2-strand 12-1/2 gauge zinc-coated wire with 4-point barbs and shall conform to the requirements of ASTM A 121, Class 3, chain link fence grade.

##### **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 ASTM F 1043, Type A.

Line posts shall all be of the same type.

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

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

Interior: 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.

## **2.4 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.

## **2.5 MISCELLANEOUS FITTINGS AND HARDWARE.**

Miscellaneous steel fittings and hardware for use with zinc-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. Barbed wire support arms shall withstand a load of 250 pounds applied vertically to the outermost end of the arm.

## **2.6 CONCRETE.**

Concrete shall be of a commercial grade with a minimum 28-day compressive strength of 2500 psi.

## **2.7 SIGNS.**

Signs bearing the legend: "AIRPORT OPERATIONS AREA, NO UNAUTHORIZED PERSONS BEYOND THIS POINT" shall be posted on the chain link fabric. Signs shall be aluminum and have pre-stamped holes. The surface of the signs shall be finished with a durable, clear coating. Galvanized bolts and hardware shall be used to attach the signs.

## **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.

## **PART 3 - EXECUTION**

### **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 feet 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.

### **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 feet apart and should be set a minimum of 36 inches in concrete footings. If the frost depth is greater than 36 inches, the posts should be set accordingly. The posts holes shall be in proper alignment so that there is a minimum of 3 inches 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 inches larger than the greatest dimension of the posts shall be drilled to a depth of 12 inches. 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.

### **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.

### **3.4 INSTALLING BRACES.**

Horizontal brace rails, with diagonal truss rods and turnbuckles, shall be installed at all terminal posts.

### **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 inch or more than 4 inches 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 inches or less.

### **3.6 ELECTRICAL GROUNDS.**

Electrical grounds shall be constructed where a power line passes over the fence at 500-foot intervals. The ground shall be installed directly below the point of crossing. The ground shall be accomplished with a copper clad rod 8 feet long and a minimum of 5/8 inch in diameter driven vertically until the top is 6 inches 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.

### **3.7 POSTING SIGNS.**

Signs shall be posted at 300-foot intervals. The bottom of the signs shall be placed approximately 5 foot from ground level so that they are at eye level. Signs shall be bolted to the fence using galvanized bolts and hardware.

### **3.8 REMOVAL OF EXISTING FENCE.**

Existing fence to be removed is designated on the project plans. The Contractor shall remove all fencing material including wire and posts. Posts shall be removed to their full depth. It will not be acceptable to cut posts off at or below ground level. The Contractor shall dispose of posts, wire, and other fencing material off-site.

## **PART 4 - METHOD OF MEASUREMENT**

### **4.1 CHAIN LINK FENCE.**

Chain-link fence will be measured for payment by the linear foot. Measurement will be along the top of the fence from center to center of end posts.

### **4.2 FENCE REMOVED.**

Fence removed will be measured for payment by the linear foot. Measurement will be along the top of the fence from center to center of end posts, including the length occupied by gate openings.

## **PART 5 - BASIS OF PAYMENT**

### **5.1 CHAIN LINK FENCE.**

Payment for chain-link fence will be made at the contract unit price per linear foot. The price shall be full compensation for furnishing all materials, and for all preparation, erection, and installation of these materials, including no trespassing signs, and for all labor equipment, tools, and incidentals necessary to complete this item.

### **5.2 FENCE REMOVED.**

Payment for fence removed and salvaged to the Owner will be made at the contract unit price per linear foot. The price shall be full compensation for furnishing all labor equipment, tools, and incidentals necessary to complete this item.

## **PART 6 - MATERIAL REQUIREMENTS**

|            |   |
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| ASTM A 121 | Zinc-Coated (Galvanized) Steel Barbed Wire  |
| ASTM A 123 | Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, pressed, and Forged Steel Shapes, Plates, Bars and Strip |

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| ASTM A 153            | Zinc Coating (Hot-Dip) on Iron and Steel Hardware  |
| ASTM A 392            | Zinc-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 Marcellled 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 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  |
| 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)   |