

## **ITEM 01607.9101 M - SECURITY FENCE AND GATES**

### **DESCRIPTION**

Under this item of work, the Contractor shall furnish and erect security fencing and gates of the type and size, and at the locations shown on the plans or as directed by the Engineer. Construction of fencing and gates shall be done in accordance with the specifications and plans, and in reasonable close conformity with the lines and grades shown on the plans or established by the Engineer.

### **MATERIALS**

**Steel Framework.** All end posts, corner posts, swing gate posts and pull posts shall be 4 NPS outside diameter, 13.56 kilogram per meter Schedule 40 Pipe and all line posts shall be 3 NPS outside diameter, 9.17 kilogram per meter Schedule 40 Pipe. All posts shall be manufactured in accordance with ASTM A-120, except that the protective coating shall be as specified herein. Post tops shall be steel, wrought iron or malleable iron.

**Steel Fabric.** The fabric shall conform to the requirements of Aluminum Coated Steel Fence Fabric, Section 710-04. Selvages shall be twisted and barbed on the top side and knuckled on the bottom side.

**Swing Gate Frames.** Frames shall be Class B Steel Tubing, 2.375 NPS outside diameter, 5.43 kilogram per meter Schedule 40 Pipe. Gates shall be assembled by welding or with special steel fittings and rivets for rigid connections. Install mid-height horizontal rails on all gates over 3.0 meters high. When width of gate leaf exceeds 3.0 meters, install mid-distance vertical tubing of the same size and weight as frame members. When either horizontal or vertical bracing is not required, provide truss rods as cross bracing to prevent sag or twist.

**Gate Hardware.** All gates shall be equipped with galvanized steel hinges and latch with provisions for padlocking. Double gates and single gates with leaf width of 3.0 meters or greater shall be equipped with a drop bar and gate holdbacks.

**Barbed Wire.** The wire shall consist of two strand 12.5 gage steel wire with 14 gage 4-point steel barbs spaced 125 mm on center. Extension arms shall be constructed of pressed steel, wrought iron or malleable iron, complete with provision for anchorage to posts and attaching three rows of barbed wire to each arm. One single vertical arm shall be provided for each post.

**Security Coils.** Concertina Type: Two long razor wire concertinas (a 600 mm diameter placed inside a 750 mm diameter), and both fabricated by wrapping a barbed tape, conforming to U.S. Army MERADCOM drawing 13220E8353, except that hardness is optional, around an austenitic stainless steel core wire, 2.49 mm plus or minus 0.05 mm diameter, with a minimum tensile strength of 1565 MPa.

1. Alternative coil loops each concertina shall be attached successively at five approximately even spaced points about the circumference with stainless steel attachments to prevent the coil loops from being pulled apart at the point of attachment when a 18.1 kg load is applied. Wrapping of barbed tape about the line wire shall be accomplished with the tolerances specified in MIL-B-52489D, and shall satisfy the push test specified therein.
2. The diameter tolerance of plus or minus 13mm shall be measured at the center line of the core wire prior to extension of the concertina.

**Rails and Post Braces.** Class B Steel Tubing – 41.5 NPS OD, 2.74 kg per linear meter; SS-40 Fence Pipe as manufactured by Allied Tube and conduit Corp., Harvey IL or equal.

**Stretcher Bars.** One piece equal to full height of fabric, minimum cross-section 4.7 mm x 19 mm.

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Metal Bands (for stretcher bars). Steel, wrought iron, or malleable iron, to secure stretcher bars to end, corner, pull and gate posts.

Wire Ties. For tying fabric to line posts, rails and braces: 9 gage steel wire. For tying fabric to tension wire: 11 gage steel hog rings.

Truss Rods. 9.4 mm diameter.

Tension Wire. 7 gage coiled spring steel wire

Angle Beams. I Beams and Steel Shapes: ASTM A-36

Bolts and Nuts. ASTM A-307, Grade A

### **CONSTRUCTION DETAILS**

Section 607-3.01 of the Standard Specifications shall apply.

Space posts equidistant in the fence line with a maximum of 3.0 meter on center where feasible. In instances where 3.0 meters post separation must be increased due to the presence of underground structures and utilities, the size of the line post shall be increased and diagonal cross braces shall be installed per the manufacturers recommendation.

Earth. Excavate holes as indicated for fence and gate posts. Set posts in center of hole and fill hole with concrete. Plumb and align posts. Vibrate or tamp concrete for consolidation. Finish concrete in a dome shape above ground to shed water.

Locate corner posts at corners and at changes in direction. Use pull posts at all abrupt changes in grade and at intervals no greater than 150 meters. On runs over 50 meters, space pull posts evenly between corner or end posts. On long curves, space pull posts so that the strain of the fence will not bend the line posts

Install top rail continuously through post caps or extension arms, bending to radius for curved runs. Install expansion coupling as recommended by fencing manufacturers.

Install bottom and intermediate rails in one piece between post and flush with post on fabric side using special offset fitting where necessary.

Diagonally brace corner posts, pull posts, and terminal posts to adjacent line posts with truss rods and turnbuckles.

Maintain clearance as indicated. Thread stretcher bars through fabric using one bar for each gate and end post and two for each corner and pull post. Pull fabric tight so that the maximum deflection of fabric is 50 mm when a 13.6 kilogram pull is exerted perpendicular to the center of a panel. Maintain tension by securing stretcher bars to posts with metal bands spaced 375 mm on center. Tighten stretcher bar bands, wire ties, and other fasteners securely

Position bolts for securing metal bands and hardware so nuts are located opposite the fabric side of fence. Tighten nuts and score excess threads.

Secure post tops, extension arms, and caps with one-way cadmium plated steel screws.

Install gates plumb and level and adjust for full opening without interference. Install ground-set items in concrete for anchorage, as recommended by fence manufacturer. Adjust hardware for smooth operation and lubricate where necessary.

Tension Wire. Support bottom edge of fabric with coil spring tension wire. Fasten tension wire with hog rings

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spaced 600 mm on center. Tie tension wire to posts with 9 gage wire ties.

**METHOD OF MEASUREMENT**

The quantity to be measured for payment under this item shall be the number of linear meters of security fence satisfactorily installed, measured along the top of fencing from center to center of end posts.

**BASIS OF PAYMENT**

The unit bid price per meter for Security Fences and Gates shall include the cost of all equipment, materials and labor necessary to satisfactorily complete the work, including the cost of any fill and excavation required for the post holes.