

**SECTION 02831**

**SITWORK FENCING AND GATES**

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## SECTION 02831

### SITWORK FENCING AND GATES

#### **PART 1 – GENERAL**

##### **1.01 SUMMARY**

- A. Provide safety fence in areas indicated on the project drawings.
- B. Provide vinyl coated chain link fences and gate units controlled by single source including erection accessories, fittings, and fastenings as indicated on Drawings.

##### **1.02 RELATED SECTIONS**

- A. Construction Drawings
- B. Manufacturer's technical data and installation requirements.

##### **1.03 REFERENCES**

- A. ANSI/ASTM A123 –Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
- B. ANSI/ASTM F567 – Installation of Chain-Link Fence.
- C. ASTM A116 – Zinc-Coated (Galvanized) Steel Woven Wire Fence Fabric.
- D. ASTM A120 – Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized) Welded and seamless, for Ordinary Uses.
- E. ASTM A121 – Zinc-Coated (Galvanized) Steel Barbed Wire.
- F. ASTM A153 – Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- G. ASTM A392 – Zinc-Coated Steel Chain-Link Fence Fabric.
- H. ASTM A428 – Weight of Coating on Aluminum-Coated Iron or Steel Articles.
- I. ASTM A491 – Aluminum-Coated Steel Chain Link Fence Fabric.
- J. ASTM C569 – Steel, Carbon (0.15) Maximum Percent), Hot-Rolled Sheet and Strip Commercial Quality.
- K. ASTM C585 – Aluminum Coated Steel Barbed Wire.
- L. ASTM C94 – Ready Mixed Concrete.
- M. ASTM F573 – Residential Zinc-Coated Steel Chain Link Fence Fabric.
- N. ASTM F668 – Poly (Vinyl Chloride) (PVC) Coated Steel Chain Link Fence Fabric.
- O. Chain Link Fence Manufacturers Institute (CLFMI) – Product Manual.
- P. FS FF-F-191 – Fencing Wire and Post Metal (and Gates, Chain Link Fence Fabric, and Accessories).

##### **1.04 SUBMITTALS**

- A. Contractor shall submit catalog cut sheets of all fencing products proposed for use.

## **PART 2 – PRODUCTS**

### **2.01 ACCEPTABLE MANUFACTURERS**

- A. Subject to compliance with requirements, provide products of one of the following:
1. Allied Tube and Conduit Corporation
  2. Anchor Fence, Inc.
  3. United States Steel
  4. Acme Fence Company

### **2.02 MATERIALS**

- A. Fabric
1. No. 9 ga. (0.148"  $\pm$  0.005") finished size galvanized steel wires, 2" mesh, with both top and bottom salvages twisted and knuckled finish with a black vinyl coating.
  2. Furnish one-piece fabric widths for fencing.
- B. End, Corner, and Pull Posts: Galvanized steel, with exposed portions finished with a black vinyl coating, minimum sizes and weights as follows:
1. Up to 6'-0" Fabric Height: 2.375" OD pipe, 3.65 lbs./lin. ft., or 3.5" x 3.5" roll-formed sections, 4.85 lbs./lin. ft.
  2. Over 6'-0" Fabric Height: 2.875" OD pipe, 5.79 lbs./lin. ft., or 3.5" x 3.5" roll-formed sections, 4.85 lbs./lin. ft.
- C. Line Posts: Galvanized steel, with exposed portions finished with a black vinyl coating, minimum sizes and weights as follows:
1. Up to 6'-0" Fabric Height: 1.90" OD steel pipe, 2.70 lbs./lin. ft., or 1.875" x 1.625" C-sections, 2.28 lbs./lin. ft.
  2. 6'-0" to 8'-0" Fabric Height: 2.375" OD steel pipe, 3.65 lbs./lin. ft., or 2.25" x 1.875" H-sections 2.64 lbs./lin. ft.
  3. Over 8'-0" Fabric Height: 2.875" OD steel pipe, 5.79 lbs./lin. ft. or 2.25" x 1.875" H-sections, 3.26 lbs./lin. ft.
- D. Gate Posts: Galvanized steel, with exposed portions finished with a black vinyl coating, posts for supporting single gate leaf, or one leaf of double gate installation, for nominal gate widths as follows:
1. Up to 6'-0": 3.5" x 3.5" roll-formed section, 2.85 lbs./lin. ft., or 2.875" OD pipe, 5.79 lbs./lin. ft.
  2. Over 6'-0" to 13'-0": 4.000" OD pipe, 9.11 lbs./lin. ft.
- E. Top Rail: Rails: 1.66" OD pipe, 2.27 lbs./ft. or 1.625" x 1.25" roll-formed sections, 1.35 lbs./Ft.; galvanized steel, with exposed portions finished with a black vinyl coating, manufacturer's longest lengths.
- F. Couplings: Expansion type, approximately 6" long, for each joint.
- G. Attaching Devices: Provide means for attaching top rail securely to each gate corner, pull and end post.

- H. Sleeves: Galvanized steel with exposed portions finished with a black vinyl coating pipe not less than 6" long and with inside diameter not less than 1/2" greater than outside diameter of pipe. Provide steel plate closure welded to bottom of sleeve of width and length not less than 1" greater than outside diameter of sleeve.
- I. Tension Wire: 7 gage galvanized steel, coated coil spring wire, located at bottom of fabric.
- J. Wire Ties: 11 ga. galvanized steel.
- K. Post Brace Assembly: Manufacturer's standard adjustable brace at end and gate posts and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric. Use same material as top rail for brace, and truss to line posts with 0.375" diameter rod and adjustable tightener.
- L. Post Tops: Galvanized steel, with exposed portions finished with a black vinyl coating, weathertight closure cap for each tubular post. Furnish caps with openings to permit passage of top rail.
- M. Stretcher Bars: Galvanized steel, with exposed portions finished with a black vinyl coating, one piece lengths equal to full height of fabric, with minimum cross-section of 3/16" x 3/4". Provide one stretch bar for each gate and end post, and two for each corner and pull post.
- N. Stretch Bar Bands: Manufacturer's standard.
- O. Gate Cross-bracing: 3/8" diameter galvanized steel adjustable length truss rods.
- P. Portland Cement: ASTM C150.
- Q. Aggregates: ASTM C33.
- R. Water: Clean.
- S. Non-shrink non-Metallic Grout: Premixed, factory-packaged, noncorrosive nonstaining, nongaseous, exterior grout complying with CE CRD-C621.
- T. Swinging Gate Hardware
  - 1. Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180 degree gate opening. Provide 1-1/2" pair of hinges for each leaf over 6'-0" nominal height.
  - 2. Latch: Forked type of plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.
- U. Double Gates Hardware: Provide gate stops for double gates, consisting of mushroom type of flush plate with anchors set in concrete, to engage center drop rod or plunger bar. Include locking device and padlock eye as integral part of latch, using one padlock for locking both gate leaves.
- V. Sliding Gate Hardware: Provide manufacturer's standard heavy-duty track, ball-bearing hanger sheaves, overhead framing and support, guides, stays, bracing, and accessories as required.

### **PART 3 – EXECUTION**

#### **3.01 GATE FABRICATION**

- A. Fabricate swing gate perimeter frames of 1.90" OD pipe, galvanized steel. Provide horizontal and vertical members to ensure proper gate operation and for attachment of fabric, hardware, and accessories. Space frame members maximum of 8'-0" apart.

- B. Assemble gate frames by welding or special fittings and rivets, for rigid connections. Install same fabric as for fence with stretcher bars at vertical edges. Install diagonal cross-bracing on gates as required to ensure rigid frame without sag or twist. Bars may be used at top and bottom edges. Attach stretchers to gate frame at 15" o.c. maximum.
- C. Attach hardware to provide security against removal or breakage.

### **3.02 FINISH**

- A. Fabric Finish: Galvanized, ASTM A382, Class I, with not less than 1.2 oz. zinc/sq. ft. of surface.
- B. Framing: Galvanized steel, ASTM A120 or A123, with not less than 1.8 oz. zinc/sq. ft. of surface.
- C. Hardware and Accessories: Galvanized, ASTM A153 with zinc weights in accordance with Table I.

### **3.03 CONCRETE MIXING**

Mix materials to obtain concrete with minimum 28-day compressive strength of 2,500 psi; 1" maximum size aggregate, maximum 3" slump, and 2-4% entrained air.

### **3.04 INSTALLATION**

- A. Comply with recommended procedures and instructions of fencing manufacturer. Provide secure, aligned installation with line posts spaced at 10'-0" o.c. maximum.
- B. Grade Set Posts: Drill or hand excavate using post hole digger in firm undisturbed or compacted soil.
- C. Excavate hole for each post to minimum diameter recommended by fence manufacturer but not less than four times largest cross-section of post. Excavate hole depths approximately 3" lower than post bottom with bottom of posts set not less than 36" below finish grade surface.
- D. Center and align posts in holes 3" above bottom of excavation.
- E. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations. Extend concrete footing 2" above grade and trowel to crown to shed water.
- F. Sleeve Set Posts: Anchor posts by means of pipe sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with nonshrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.
- G. Top Rails: Run rail continuously, bending to form radius for curved runs. Provide expansion couplings as recommended by manufacturer.
- H. Center Rails: Provide center rails where indicated. Install in one piece between posts and flush with post on fabric side, using special offset fittings where necessary.
- I. Brace Assemblies: Install braces so posts are plumb when diagonal rod is under proper tension.
- J. Tension Wire: Install tension wires through post cap loops before stretching fabric and tie to each post cap with not less than 6 ga. galvanized wire. Fasten fabric to tension wire using 11 ga. galvanized steel hog rings spaced 24" o.c.
- K. Fabric: Leave approximately 2" between finish grade and bottom salvage. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.
- L. Stretcher Bars: Secure at end, corner, pull, and gate posts by threading through or clamping to fabric at 4" o.c., and secure to posts with metal bands spaced at 15" o.c.

M. Tie Wires

1. Use U-shaped wire, conforming with diameter of pipe to which attached, clasping pipe and fabric firmly when ends twisted at least two full turns. Bend ends of wire to minimize hazard to persons or clothing.
2. Tie fabric to line posts with wire ties spaced 12" o.c. Tie fabric to rails and braces with wire ties spaced 24" o.c. Tie fabric to tension wires with hog rings spaced 24" o.c.
3. Manufacturer's standard procedure will be accepted if of equal strength and durability.

N. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

O. Gates: Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubrication.

**---END OF SECTION 02831---**