

## **SECTION 02810 CHAIN LINK FENCE**

### **PART 1 - GENERAL**

#### **1.01 DESCRIPTION**

- A. Section includes requirements for chain link fence and gates (personal, and swing or sliding gates), either hot-dip galvanized or polymer-coated (over hot-dip galvanizing).
- B. Polymer-coated (over hot-dip galvanizing) is installed at locations as indicated on the Contract Drawings, such as where the fence is adjacent to bike path.

#### **1.03 REFERENCE STANDARDS**

- A. American Society for Testing and Materials (ASTM International):
  - 1. A123 Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  - 2. A153 Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
  - 3. F668 Specification for PolyVinyl Chloride (PVC) - and Other Organic Polymer-Coated Steel Chain-Link Fence Fabric
  - 4. A780 Practice for Repair of Damaged or Uncoated Areas of Hot-Dip Galvanized Coatings
  - 5. F900 Specification for Industrial and Commercial Swing Gates
  - 6. F934 Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials
  - 7. F1043 Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework
  - 8. F1083 Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
- B. Federal Specification:
  - 1. RR-F-191/2C Fencing, Wire and Post, Metal (Chain Link Fence Gates) (Detail Specification)

#### **1.04 SUBMITTALS**

- A. Submit shop drawings for fencing and gates.
- B. Manufacturer's technical data and installation instructions for fencing and gates.

- C. Samples: For the polymer-coating, submit manufacturer's color chart of available colors and physical sample of color.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. Fabric: Hot-dip galvanizing conforming to ASTM A123 and A153 as applicable.
  - 1. Mesh Size and Gauge: 2 inches, 8 gauge wire
  - 2. Top and bottom salvages twisted and barbed
  - 3. Tension wire (top and bottom edges): coil spring wire, 7 gauge
  - 4. Use one piece fabric widths
- B. If polymer-coated finish is required, Polymer-coated (over galvanizing) conforming to ASTM F668, Class 1, 2, or 2b, and ASTM F1043. Wire gage specified for polymer coated fabric shall be the steel core wire, not the finish coated diameter. Color: Black in accordance with ASTM F934, unless otherwise indicated.
  - 1. Fuse and adhere a minimum 10-mil (0.254 mm) PVC coating or polyolefin coating to the zinc exterior coating of the framework.
  - 2. Polymer coated gate frames and gateposts: Match the coating type and color specified for the fence framework. Moveable parts such as hinges, latches and drop rods may be field coated in lieu of factory coated. Field Coating: Liquid polymer field touch up coating.
- C. Round Steel Pipe and Rail: Schedule 40 ASTM F1083, Grade 1A, regular standard weight. 1.8 oz/sq ft hot-dipped galvanized zinc exterior and interior per ASTM A125.
- D. Miscellaneous Hardware, Fittings and Appurtenances: Manufacture to industry standards, commercial quality, and suitable for the purpose used.
- E. Terminal Posts, Rails, Brace assembly: see Caltrain Standard Drawing or Contract Drawing for details and dimensions.
- F. Post Caps: Cast or malleable iron ball or acorn shape. Caps shall have opening for through rail where top rails are indicated.
- G. Wire Ties shall be as follows:
  - 1. For tying fabric to tension wires: 11 gauge hog rings spaced 24 inches on center
  - 2. For tying fabric to line posts: 9 gauge wire spaced 12 inches on center
  - 3. For tying fabric to rails and braces: 9 gauge wire spaced 24 inches on center.

- H. Bands: Use 14 gauge by 1 inch wide steel bands spaced 15 inches on center for securing stretcher bars to end, corner, pull and gate posts. Bands may be used in conjunction with special fittings for securing rails to end, corner and pull posts. Chamfer or ease projecting edges of bands.
- I. Sleeves for Anchoring Railing Posts in Concrete: Galvanized standard pipe sleeves with welded on bottom plates, or 24 gage galvanized sheet metal sleeves with bottoms.
- J. Galvanizing: Hot dip galvanize ferrous materials after fabrication per ASTM A125 or A153 as applicable. Repair zinc coating damaged in shop or during field erection by recoating with hot repair compound, applied per manufacturer's recommendations.
- K. Hot Repair Compound: Re Galv, Galvalloy, Galvweld alloy, or Engineer approved equal.
- L. Non-Shrink Grout (if used): Master Builders "Embeco", Sonneborn Building Products, Inc. "Ferrolith G", Halemite Manufacturing Company "Pro Rok", or Engineer approved equal.
- M. Gates shall be swing type or sliding type as indicated in the Contract Drawings, furnished complete with all hardware and accessories as required for a complete installation.
  - 1. Gate Frames: Frames shall be fabricated with materials as specified for fence framework and fabric.
  - 2. Fabrication: Conform to applicable requirements of ASTM F900, Federal Specification RR-F-191/C, and the following:
    - a. Assemble gate frames by welding or with fittings and rivets for rigid connections. Attach hardware with rivets or by other means that will provide security against removal or breakage.
    - b. Provide additional horizontal members, vertical members, and diagonal cross bracing to ensure proper gate operation, frame rigidity without sag or twist, and for attachment of fabric, hardware, and accessories.
  - 3. Gate Hardware:
    - a. Swinging Gates: Provide gate hinges, latch, stop, and keeper for each gate leaf, conforming to applicable requirements of ASTM F900 and Federal Specification RR-F-191/2C. Provide latch with provision for locking gate with a padlock.
    - b. Sliding Gates: Provide manufacturer's standard rubber-tired rollers and roller track for floor-supported sliding gates. Include intermediate rollers or casters where required to prevent gate sag or deflection. Provide locking device and padlock eyes as part of latch for locking gate with a padlock.

## 2.02 CONCRETE

- A. Concrete: Concrete shall conform to the following:
  - 1. Portland Cement: ASTM C-150, type 2 or 5 (Low alkali)
  - 2. Aggregates:
    - a. Coarse aggregates: crushed rock, max 1-1/2 inch, #200: 2% maximum
    - b. Sand: 3/8 inch maximum, #200: 2% maximum
  - 3. Compressive strength (minimum): 2,500 psi @7 days, 4,000 psi @ 28 days
  - 4. Slumps: 2 to 4.5 inches
- B. Footing hole shall be clear of roots or other organic materials. Moist hole prior to concrete pour. No water standing at bottom of hole.
- C. Consolidate concrete and remove air pockets.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Alignment and Grade: Verify horizontal alignment and grades as established by survey and plan dimensions and elevations. Securely set posts in alignment at proper depth and height, and rigid bracing where needed.
- B. Concrete Footings: Drill or dig holes for post footings in firm, undisturbed or compacted soil. Depth and post embedment as indicated in the Caltrain Standard Drawing. Trowel tops of footings and slope or dome to direct water away from posts. Slope, do not dome, in pedestrian paving.
- C. Setting Posts:
  - 1. Set in concrete footings, plumbed vertical. Post depth and spacing as indicated on the Standard Drawing or Contract Drawing. Space posts at lesser distance between centers to compensate for terrain variation such as sharp variations in incline or decline.
  - 2. Grout posts in concrete walls and curbs in sleeved holes with non-shrink grout. If built in without sleeves, set posts in vertical and top edge alignment, hold in place until concrete has set.
- D. Fit posts with post caps, line post caps, or barbed wire extension arms, as applicable. Snugly fit fittings over posts and exclude moisture.
- E. Top Rail: Pass top rails through the line post caps and form a continuous brace from end to end of each stretch of fence. Join top rail lengths with sleeves. Securely fasten top rail to terminal posts by means of rail ends and brace bands. Provide expansion couplers as recommended by the fence manufacturer.

- F. Horizontal Braces and Truss Rods: Securely fasten brace to the line post and terminal post by rail ends and brace bands. Install a truss rod, including tightening device, from the end of the brace on the line post to the terminal post just above the bottom of fence fabric using brace bands.
- G. Diagonal Braces: Install the diagonal brace with rail ends and brace bands. Fasten the brace at the locations described for a truss rod.
- H. Tension Wire: Stretch tension wire out between terminal posts and secure at the terminal posts by means of tension bands.
- I. Fence Fabric: Pull fabric taut and tie to posts, rails and tension wires. Fabric shall remain under tension after pulling force is released.
- J. Tie Wires: Use U-shaped wires, same diameter as pipe to which attached, clasping pipe and fabric firmly with ends twisted two full turns minimum. Bend ends of wires to prevent hazard to persons or apparel.
- K. Fasteners: Install nuts for tension band and hardware bolts on side of fence opposite fabric side. Peen ends of bolts to prevent removal of nuts.
- L. Gates shall be installed plumb, level, and secure for full opening without interference. Install ground-set items in concrete as recommended by the fence manufacturer. Adjust hardware for smooth operation and lubricate. Sliding gates shall operate smoothly and easily under minimum pressure.

### **3.02 REPAIR**

- A. Repair abraded or damaged galvanized surfaces with hot process field galvanizing in accordance with ASTM A780 and manufacturer's published instructions.
- B. For polymer-coated panels, prepare and recoat damaged PVC coatings, including where component has been cut, in accordance with manufacturer's instructions.

## **END OF SECTION**