

**SECTION 32 31 19**  
**DECORATIVE FENCES AND GATES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This work consists of all labor, materials, and equipment necessary for furnishing and installing decorative fences, gates and accessories in conformance with the lines, grades, and details as shown.

**1.2 RELATED WORK**

A. Temporary Construction Fence: Section 01 00 00, GENERAL REQUIREMENTS.

**1.3 MANUFACTURER'S QUALIFICATIONS**

A. Fence, gates, and accessories shall be products of manufacturers regularly engaged in manufacturing items of type specified.

**1.4 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For gates. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each fence material and for each color specified.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for decorative metallic-coated tubular picket fences, including finish, indicating compliance with referenced standard.

**PART 2 - PRODUCTS**

**2.1 STEEL AND IRON**

- A. Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Bars (Pickets): Hot-rolled, carbon steel complying with ASTM A 29/A 29M, Grade 1010.
- C. Tubing: ASTM A 500, cold formed steel tubing.
- D. Bar Grating: NAAMM MBG 531.
  - 1. Bars: Hot-rolled steel strip, ASTM A 1011/A 1011M, Commercial Steel, Type B.
  - 2. Wire Rods: ASTM A 510.

- E. Uncoated Steel Sheet: Hot-rolled steel sheet, ASTM A 1011/A 1011M, Structural Steel, Grade 45
- F. Galvanized-Steel Sheet: ASTM A 653/A 653M, structural quality, Grade 50, with G90 coating.
- G. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, structural quality, Grade 50, with AZ60 coating.

## 2.2 COATING MATERIALS

- A. Epoxy Zinc-Rich Primer for Steel: Complying with MPI #20 and compatible with coating specified to be applied over it.
- B. Epoxy Primer for Galvanized Steel: Complying with MPI #101 and compatible with coating specified to be applied over it.
- C. Epoxy Intermediate Coat: Complying with MPI #77 and compatible with primer and topcoat.
- D. Polyurethane Topcoat: Complying with MPI #72 and compatible with undercoat.

## 2.3 MISCELLANEOUS MATERIALS

- A. Concrete: Normal-weight concrete complying with requirements in Division 03 Section "Cast-in-Place Concrete" with a minimum 28-day compressive strength of 3000 psi, 3-inch slump, and 1-inch maximum aggregate size.
- B. Nonshrink Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107 and specifically recommended by manufacturer for exterior applications.

## 2.4 DECORATIVE METALLIC-COATED STEEL TUBULAR PICKET FENCES

- A. F 2408, for light industrial (commercial) application (class) unless otherwise indicated.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Merchants Metals (division of MMI Products, Inc.) Guardsman Fence, Kent 3-rail style with one row of rings or comparable product by one of the following:
    - a. Ameristar Fence Products: Montage Commercial, Style-Genesis.
    - b. Master Halco, Monumental Iron Works Estate, Style "L".
- B. Metallic-Coated Steel Sheet: Galvanized-steel sheet or aluminum-zinc alloy-coated steel sheet.

- C. Post Caps: Formed from steel sheet and hot-dip galvanized after forming or aluminum castings.
- D. Pickets: Square tubes.
  - 1. Extend pickets beyond top rail as indicated and terminate with galvanized-steel caps.
  - 2. Picket Spacing: 4 inches clear, maximum.
- E. Finish: Powder coating.

## 2.5 SWING GATES

- A. Gate Frame: Ornamental picket swing gate frames to be fabricated of galvanized steel tubing. ASTM A-924/A-924M, of structural steel having a 45,000 psi (310 MPa) tensile strength and a G90 zinc coating. Members welded with stainless steel rods, forming a rigid one piece unit. Vertical upright members 2" sq., 14 ga. metal thickness.
- B. Gate Horizontal Rails: "U" channels, formed of hot rolled, structural steel 1-3/8" (35 mm) wide by 1-1/2" (38 mm) high, 11 gauge metal thickness. Rails must be punched to receive pickets and rivets. Rails stainless steel welded inside vertical members. Pickets are galvanized steel 1" (25 mm) to match fence sections. Pickets attached to "U" channels using 1/4" industrial drive rivets.
- C. Mortise Locks: BHMA A 156.13, Grade 1, suitable for exterior use. Keyed one side-interior to property.
  - 1. Function: F17 - Dead lock.
  - 2. Material: Brass or bronze.
  - 3. Levers: Case, forged, or extruded brass or bronze.
  - 4. Mounting Box: Configuration necessary to enclose locks. Fabricate from 1/8-inch thick, steel plate.
- D. Hydraulic Gate Closer: Sentinel #SN55 SL.
- E. Gate Posts: Square gate posts (ASTM A-924/A-924M) 45,000 psi tensile strength with G90 galvanized coating.
- F. Galvanizing: For items that are indicated to be galvanized, hot-dip galvanize to comply with ASTM A 123/A 123M unless otherwise indicated.
- G. Finish: Powder coating. Gates to be coated after all welding is completed.

## 2.6 ALUMINUM FINISHES

- A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 2 mils.

1. Color: Black, Matte finish.

## 2.7 GROUNDING MATERIALS

- A. Grounding Conductors: Bare, solid wire for No. 6 AWG and smaller; stranded wire for No. 4 AWG and larger.
  1. Material above Finished Grade: Copper.
  2. Material on or below Finished Grade: Copper.
  3. Bonding Jumpers: Braided copper tape, 1 inch wide, woven of No. 30 AWG bare copper wire, terminated with copper ferrules.
- B. Grounding Connectors and Grounding Rods: Comply with UL 467.
  1. Connectors for Below-Grade Use: Exothermic-welded type.
  2. Grounding Rods: Copper-clad steel.
    - a. Size:  $\frac{3}{4}$ " diameter by 10 feet.

## 2.8 METALLIC-COATED STEEL FINISHES

- A. Galvanized Finish: Clean welds, mechanical connections, and abraded areas and repair galvanizing to comply with ASTM A 780.
- B. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a zinc-phosphate conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas and repair galvanizing to comply with ASTM A 780.
- C. Powder Coating: 2-coat finish consisting of zinc-rich epoxy prime coat and TGIC polyester topcoat, with a minimum dry film thickness of 2 mils for topcoat and a minimum total dry film thickness of 4 mils.
  1. Color Black, Matte finish.

## PART 2 - EXECUTION

### 2.1 DECORATIVE FENCE INSTALLATION

- A. Install fences according to manufacturer's written instructions.
- B. Install fences by setting posts as indicated and fastening rails and pre-assembled panel to posts.
- C. Set posts in concrete curb to depth indicated on the drawings. Core poles for posts, set plumb and true to line and anchor with quick-setting, nonshrink grout. After grout is hardened, seal top of post hole with waterproof sealant finished to direct water away from posts.

2.2 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage.
- B. Adjust hardware for smooth operation and lubricate where necessary. Confirm that latches and locks engage accurately and securely without forcing or binding.

2.3 GROUNDING AND BONDING

- A. Fence Grounding: Install at maximum intervals of 1000 feet except as follows:
  - 1. Fences within 50 Feet of Buildings, Structures, Walkways, and Roadways: Ground at maximum intervals of 500 feet.
    - a. Gates and Other Fence Openings: Ground fence on each side of opening.
      - 1) Bond metal gates to gate posts.
      - 2) Bond across openings, with and without gates, except openings indicated as intentional fence discontinuities. Use No. 2 AWG wire and bury it at least 18 inches below finished grade.
- B. Protection at Crossings of Overhead Electrical Power Lines: Ground fence at location of crossing and at a maximum distance of 150 feet on each side of crossing.
- C. Bonding Method for Gates: Connect bonding jumper between gate post and gate frame.
- D. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
  - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
  - 2. Make connections with clean, bare metal at points of contact.
  - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
  - 4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
  - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

2.4 FIELD QUALITY CONTROL

- A. Grounding-Resistance Testing: Provide a qualified testing agency to perform tests and inspections.
1. Grounding-Resistance Tests: Subject completed grounding system to a megger test at each grounding location. Measure grounding resistance not less than two full days after last trace of precipitation, without soil having been moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural grounding resistance. Perform tests by two-point method according to IEEE 81.
  2. Excessive Grounding Resistance: If resistance to grounding exceeds specified value, notify Architect promptly. Include recommendations for reducing grounding resistance and a proposal to accomplish recommended work.
  3. Report: Prepare test reports certified by a testing agency of grounding resistance at each test location. Include observations of weather and other phenomena that may affect test results.

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