

**SECTION 02826**  
**WELDED STEEL PICKET FENCE**

**PART 1 - GENERAL**

**1.1 SUMMARY**

**A. Section includes:**

1. Fusion welded and rackable ornamental steel picket fence system.

**B. Related sections:**

1. Section 03310 "Concrete Work" for post support.
2. Section 09960 "High Performance Coatings" for finish of all steel surfaces.

**C. References:**

1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM B117 - Practice for Operating Salt-Spray (Fog) Apparatus.
3. ASTM D523 - Test Method for Specular Gloss.
4. ASTM D714 - Test Method for Evaluating Degree of Blistering in Paint.
5. ASTM D822 - Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
6. ASTM D1654 - Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.
7. ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
8. ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
9. ASTM D3359 - Test Method for Measuring Adhesion by Tape Test.
10. ASTM F2408 – Ornamental Fences Employing Galvanized Steel Tubular Pickets.

**1.2 SUBMITTALS**

- A. Shop drawings: Layout of fences with dimensions, details, and finishes of components, and accessories.
- B. Product data: Manufacturer's catalog cuts indicating material compliance and specified options.
- C. Samples for verification:
  1. Sample of steel finish with color selected on the Plans.

2. Sample of welds showing quality of workmanship.

### 1.3 QUALITY ASSURANCE

- A. Fabricator qualifications: A firm experienced in producing welded steel fencing similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required quantities.
- B. Installer qualifications: Fabricator of products.
- C. Welding qualifications: Qualify procedures and personnel according to the following:
  1. AWS D1.1/D1.1M, "Structural Welding Code – Steel."
- D. Mockups: Build mockups to verify selections made under sample submittals and to set quality standards for fabrication and installation.
  1. Include 8-foot length of fence complying with requirements (2 posts and one full fence panel).
  2. Approved mockup may become part of the completed Work if undisturbed at time of Final Acceptance.
- E. Pre-installation conference: Conduct conference at Project site.

### 1.4 PROJECT CONDITIONS

- A. Field measurements: Verify actual locations for fencing and locations of adjacent hardscape items by taking field measurements before fabrication and indicate measurements on Shop Drawings.

### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inspect materials upon arrival at the project site for damage that may have occurred during shipping or handling.
- B. Store materials in a way that ensures proper ventilation and drainage, and protects against damage, weather, vandalism, and theft.

### 1.6 WARRANTY

- A. Provide Manufacturer's standard limited warranty for all structural fence components (i.e. rails, pickets, and posts) to cover any defects in material finish, including cracking, peeling, chipping, blistering, or corroding for a period of 20 years following the date of Final Acceptance. See Manufacturer's Warranty for full details.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURER

- A. Products from qualified manufacturers having a minimum of five years of experience manufacturing welded steel picket fencing will be acceptable by the Engineer as equal, if approved in writing, ten days prior to bidding, and if they meet the following specifications for design, size gauge of metal parts and fabrication.
- B. Obtain all fence components from a single source.
- C. Acceptable product: Must be approved by Engineer.

### 2.2 MATERIALS

#### A. General:

- 1. Metal surfaces: Use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, roller trade names, and roughness for fabrication of fencing work exposed to view. Remove such blemishes by grinding or by welding and grinding prior to cleaning, treating, and application of surface finishes including zinc coatings.
- 2. Provide materials free from defects impairing strength, durability, or appearance.

#### B. Fencing Materials:

- 1. Steel material for fence panels and posts shall conform to the requirements of ASTM A653/A653M, with a minimum yield strength of 45,000 psi (310MPa) and a minimum zinc (hot-dip galvanized) coating weight of 0.60 oz/ft<sup>2</sup> (184 g/m<sup>2</sup>), Coating Designation G-60.
- 2. Material for the vertical pickets shall be 3/4" square x 18 Ga. tubing.
- 3. Material for the three horizontal rails shall be steel channel, 1.25" x 0.92" x 14 Ga. Picket holes in the rails shall be spaced 4.675" apart (on center). Pickets shall not pass through top rail.
- 4. Material for fence posts shall be 2-1/2" x 16 Ga. tubing.
- 5. Pickets, rails, and posts shall be pre-cut to specified lengths. Rails shall be pre-punched to accept pickets.
- 6. Pickets shall be inserted into pre-punched holes in the rails and shall be aligned to standard spacing using a specially calibrated alignment fixture. The aligned pickets and rails shall be joined at each picket-to-rail intersection with the fusion welding process, thus completing the rigid panel assembly.
- 7. The manufactured fence system shall be capable of meeting the vertical load, horizontal load, and infill performance requirements for Residential weight fences under ASTM F2408.
- 8. Fence height: 42 inches

#### C. Miscellaneous materials:

1. Welding rods and bare electrodes: Select according to AWS specifications for metal alloy welded.
2. Etching cleaner for Galvanized Metal: Complying with MPI#25.
3. Galvanized Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible paints specified to be used over it.
4. Shop Primers: Provide primers that comply with Section 09960, "High- Performance Coatings", of this Technical Special Provision.
5. Intermediate Coats and Topcoats for Steel: Provide products that comply with Section 09960, "High- Performance Coatings", of this Technical Special Provision.

## 2.3 FABRICATION

- A. General: Fabricate fencing to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Verify dimensions on site prior to shop fabrication.
- C. Fabricate all work per approved shop drawings.
- D. Assemble fencing in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble unit only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- E. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inches unless otherwise indicated. Remove sharp edges or rough areas on exposed surfaces.
- F. Form work true to line and level with accurate angles and surfaces.
- G. Fabricate connections that will be exposed to weather in a manner to exclude water.
- H. Connections: Fabricate fencing with welded connections unless otherwise indicated.
- I. Welded Connections: Cope components at connections to provide close fit. Weld all around connections.
  1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  2. Obtain fusion without undercut or overlap.
  3. Remove flux immediately.
  4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

## 2.4 FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Steel Finishes:

1. Galvanizing:
  - a. Hot-dip galvanize exterior steel products made from rolled, pressed, and forged steel shapes, castings, plates, bars, and strips indicated to be galvanized to comply with ASTN A 123A/A 123M.
  - b. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
  - c. Fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
2. Preparing Galvanized Items for Shop Priming: After galvanizing, thoroughly clean decorative metal of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
3. Primer Application: Apply shop primer to prepared surfaces of items unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No.1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry
  - a. Shop prime uncoated ferrous-metal surfaces with primers specified in Section 09960, "High- Performance Coatings", of this Technical Special Provision.
4. Shop-Painted Finish: Comply with Section 09960, "High- Performance Coatings", of this Technical Special Provision.
5. Finish color: See "Materials Schedule" on the Plans.

## 2.5 WARRANTY

- A. Manufacturer's standard limited warranty that its fence is free from color coat flaking and peeling and other defects in materials and workmanship
  1. Warranty period: 20 years following the date of Final Acceptance

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify areas to receive fencing are completed to final grades and elevations.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Ensure property lines and legal boundaries of work are clearly established.

### 3.2 PREPARATION

- A. All new installation shall be laid out by the contractor in accordance with the Plans.

### 3.3 INSTALLATION

- A. Perform cutting, drilling, and fitting required for installing fencing. Set products accurately in location, alignment, and elevation, measured from established lines and levels.
- B. Fit exposed connections accurately together to form hair-line joints. Where cutting, welding, and grinding are required for proper fitting and jointing of fencing, restore finishes to eliminate evidence of such work.
- C. Where field adjustments are required, all workmanship shall be equal to shop fabrication.
- D. Setting in concrete:
  - 1. Position posts in concrete footings leaving a minimum of one inch clearance around post on all sides.
  - 2. Fill space around post with non-shrink, non-metallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.
  - 3. Set posts plumb within a tolerance of 3/16 inches in 3 feet.
  - 4. Secure fencing while grout sets to prevent movement.

### 3.4 FENCE INSTALLATION MAINTENANCE

- A. When cutting/drilling rails, pickets, or posts, adhere to the following steps to seal the exposed surfaces to ensure the manufacturer's warranty is not negated:
  - 1. Remove all metal shavings from the cut area.
  - 2. Apply custom finish paint matching fence color.

### 3.5 CLEANING

- A. Clean up debris and unused material, and remove from the site.

### 3.6 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by fencing manufacturer. Remove protective coverings at time of Final Acceptance or as directed by the Engineer.
- B. If damage occurs during construction period, restore finish properly so that no evidence of corrective work remains.

END OF SECTION 02826