

SECTION 32 31 16

ORNAMENTAL FENCES AND GATES

PART 1 GENERAL

1.1 DESCRIPTION

- A. Contractor shall provide all labor, materials and appurtenances necessary for installation of the industrial ornamental steel fencing system and accessories defined herein and as shown on the drawings. The manufacturer shall supply and the contractor shall install a total industrial ornamental steel fence system as indicated on plans and details including all components including but not limited to pickets, rails, posts, gates, post caps, gates and all hardware required.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Site Concrete: Section 03 30 20
- B. Misc. Landscape Metalwork: Section 05 52 13

1.3 QUALITY ASSURANCE

- B. Do not scale drawings for dimensions. Use only the written dimensions indicated on the Drawings, unless such be found in error. Contractor shall verify and be responsible for dimensions and conditions shown by the Drawings, and shall visit the site to inspect and verify field conditions prior to fabrication and installation. The Owner's Representative shall be notified, in writing, of discrepancies on Drawings, in field dimensions or conditions, and of changes required in construction details.
- C. Provide each type of gate as a complete unit produced by a single manufacturer, including required mounting accessories, fittings and fastenings.
- D. Details shown in the Drawings shall be followed for exterior appearance. Minor changes in interior construction will be accepted in order to conform to Contractor's shop practices or engineering requirements when, in the Owner's Representative's sole judgment, such changes do not detract materially from design concept or intent. Contractor shall circle such changes on the shop drawings.
- E. Completed work shall be structurally sound, and free from distortions, chips, breaks, holes, splits or other disfigurements considered as imperfections for the specific material.
- F. Comply with the latest publications for materials and operations of the following:
  - 1. "Code of Arc and Gas Welding in Building Construction" of American Welding Society, WS D1.0, latest edition with current supplements and addenda, is hereby made a part of this Section and Miscellaneous Metalwork shall conform to the applicable requirements therein, except as otherwise specified herein or shown on the drawings. Nothing contained herein shall be construed as

- permitting work that is contrary to code requirements or governing rules and regulations.
- 2. All work shall conform to the American Institute of Steel Construction specifications for design, erection and fabrication, and acceptable standards of good practice. Finished members shall be true to line and free from twists and bends.
- 3. Conform to ASTM Standard F2048– Guide for Fencing/ Barriers for Playgrounds.
- 4. SSPC "Steel Structures Painting Manual, Volume 2, Systems and Specifications".
- 5. Industrial Fasteners Institute "Fastener Standards Book".

#### 1.4 STRUCTURAL DESIGN AND ENGINEERING

- A. Details in the Drawings indicate a general design approach for the fencing and gates but do not necessarily include the specific fabrication details required for the complete structural integrity of the gates, nor do they necessarily consider preferred shop practices of individual contractors. Such specific fabrication details shall be provided by the Contractor, who shall ensure that fencing and gates withstand any static, dynamic and erection loads that act upon them, including such loads associated with handling and servicing.
- B. Contractor shall furnish a complete structural design for fencing and gate, incorporating reasonable safety factors necessary to protect the Owner and Contractor against public liability including ADA /Title 24 Accessibility requirements.
- C. Contractor shall be responsible for the engineering and internal construction of gate, and shall submit shop drawings and details for review by the Owner's Representative
  - 1. Structural design shall meet applicable local, state, and national codes, as well as testing laboratory listings, where required.

#### 1.5 SUBMITTALS per 01 33 00

- A. Product Data: Manufacturer's catalogue cuts indicating material compliance and specified options.
- B. Shop Drawings:
  - 1. Shop drawings shall be neat, well organized and clearly legible. Elevations and plan views from the Drawings may be reproduced for the sake of expedience where appropriate.
  - 2. Shop drawings shall be drawn to scale and not subsequently reduced to fit a drawing format.
  - 3. Submit elevations and plan views for gate types, including graphic layouts, complete dimensions, materials, locations of fasteners and finishes. Determine the total quantity for each gate type and note it in the shop drawings.
  - 4. Submit comprehensive section drawings for gate types where applicable, including sections of typical members. Show fabrication and installation details, including details for securing members to one another, to structures, and/or to site work. Show interior construction, reinforcements, anchorages, components

and finishes. Reproduction of section drawings shown in the Drawings shall not be acceptable.

5. Site Condition Verification: Where required by the Owner's Representative for specific items, Contractor shall inspect site to confirm installation conditions, then submit shop drawings and/or written documentation for approval indicating proposed mounting devices.

C. Samples:

6. Color and Finish:

- a. Owner to supply RAL # for Powder Coating. Submit 3 each samples of finish and colors. Prior to submittal, Contractor shall verify that colors submitted as samples match accurately any samples or specifications provided by Owner's Representative.
- b. Contractor to submit verification of powder coating and paint used for fabrication and installation.

PART 2 MATERIALS

2.01 MANUFACTURER

A. Ornamental Picket Fence:

Style: Allguard Style 2 Rail Industrial Fence System  
Finish: Powder Coated Factory finish w/ Field Painting of Welds

Approved Supplier: Capitol Steel  
Rep: John McCarthy  
Phone: (916) 383-3368  
[JMcCarthy@scsfence.com](mailto:JMcCarthy@scsfence.com)

a. 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 (310 MPa) and a minimum zinc (hot-dip galvanized) coating weight of 0.90 oz/ft<sup>2</sup> (276 g/m<sup>2</sup>), Coating Designation G-90.

b. Material for pickets shall be 1" square 16 Ga. tubing. The rails shall be steel channel, 2" square 14 GA. Pickets welded to rails and fence panels welded to posts. Fence posts shall be 6" square and gate posts shall meet the minimum size requirements of Table 1.

## 2.3 SETTING MATERIAL

- A. Concrete: Minimum 28 day compressive strength of 3000 psi (20 MPa).

## PART 3 EXECUTION

- 3.1 CONDITION OF SURFACES: Inspect all surfaces to receive site metalwork and report all defects which would interfere with this installation. Starting work implies acceptance of surfaces as satisfactory.

## 3.2 WORKMANSHIP

- A. Verify all measurements at job. Coordinate all metalwork with adjoining work for details of attachments, fittings, etc. Do all cutting, shearing, drilling, punching, threading, tapping, etc., required for site metalwork or for attachment of adjacent work. Drill or punch holes; do not use cutting torch. Shearing and punching shall leave true lines and surfaces.
- B. Conceal all fastenings where practicable. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Form joints exposed to weather to exclude water.
- C. Make all permanent connections in ferrous metal surfaces using welds where possible; do not use bolts or screws where they can be avoided.
- D. Provide all lugs, clips, anchors, and miscellaneous fastenings necessary for complete assembly and installation.
- E. Set all work plumb, true, rigid and neatly trimmed out. Miter corners and angles of exposed mouldings and frames unless otherwise noted.
- F. Set all railings and similar items shown or required to be set in sleeves or cans with molten lead or quick-setting, non-shrink anchor cement. Unless otherwise noted, size sleeves for approximately 1/4" clearance all around.
- G. Where items must be incorporated or built into adjacent work, deliver to trade responsible for such work in sufficient quantity that progress of work is not delayed. Be responsible for proper location of such items.

- 3.3 WELDING: Perform all welding in accordance with AWS Code D1.0. Welds shall be made only by operators experienced in performing the type of work indicated. Welds normally exposed to view in the finished work shall be uniformly made and shall be ground smooth. Where welding is done in proximity to glass or finished surfaces, such surfaces shall be protected from damage due to weld sparks, spatter or tramp metal.

- 3.4 BOLTED, SCREWED AND RIVETED CONNECTIONS: In general, use bolts for field connections only, and then only as detailed. Provide washers under all heads and nuts bearing on wood. Draw all nuts tight and nick threads of permanent connections to prevent loosening. Use beveled washers where bearing is on sloped surface.

3.5 PREPARATION: All new installation shall be laid out by the contractor in accordance with the construction plans.

3.6 FENCE INSTALLATION: Fence post shall be spaced according to Table 3, plus or minus ½". For installations that must be raked to follow sloping grades, the post spacing dimension must be measured along the grade. Fence panels shall be attached to posts with brackets supplied by the manufacturer. Posts shall be set in concrete footers having a minimum depth of 36" (Note: In some cases, local restrictions of freezing weather conditions may require a greater depth). The "Earthwork" and "Concrete" sections of this specification shall govern material requirements for the concrete footer. Posts setting by other methods such as plated posts or grouted core-drilled footers are permissible only if shown by engineering analysis to be sufficient in strength for the intended application.

3.03 FENCE INSTALLATION MAINTENANCE: When cutting/drilling rails or posts adhere to the following steps to seal the exposed steel surfaces; 1) Remove all metal shavings from cut area. 2) Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry. 3) Apply 2 coats of custom finish paint matching fence color. Failure to seal exposed surfaces per steps 1-3 above will negate warranty.

3.04 GATE INSTALLATION: Gate posts shall be spaced according to the manufacturers' gate drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected. Type and quantity of gate hinges shall be based on the application; weight, height, and number of gate cycles. The manufacturers' gate drawings shall identify the necessary gate hardware required for the application. Gate hardware shall be provided by the manufacturer of the gate and shall be installed per manufacturer's recommendations.

3.05 CLEANING: The contractor shall clean the jobsite of excess materials; post-hole excavations shall be scattered uniformly away from posts.

Table 1 – Minimum Sizes for Posts			
Fence Posts	Panel Height		
6" x 12 Ga.	Up to & Including 6' Height		
Gate Leaf	6' Gate Height		
Up to 4'	6" x 12 Ga.		
4'1" to 6'	6" x 11 Ga.		
6'1" to 8'	6" x 11 Ga.		
8'1" to 10'	6" x 3/16"		
10'1" to 12'	6" x 3/16"		
12'1" to 14'	6" x 3/16"		
14'1" to 16'	6" x 3/16"		

Table 2 – Coating Performance Requirements			
<u>Quality Characteristics</u>	<u>ASTM Test Method</u>	<u>Performance Requirements</u>	
Adhesion	D3359 – Method B	Adhesion (Retention of Coating) over 90% of test area (Tape and knife test).	
Corrosion Resistance	B117, D714 & D1654	Corrosion Resistance over 1,500 hours (Scribed per D1654; failure mode is accumulation of 1/8" coating loss from scribe or medium #8 blisters).	
Impact Resistance	D2794	Impact Resistance over 60 inch lb. (Forward impact using 0.625" ball).	
Weathering Resistance	D822 D2244, D523 (60° Method)	Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).	

Table 3 – Post Spacing By Bracket Type										
Span	8' Nominal (91-1/2" Rail)				8' Nominal (92-5/8" Rail)					
Post Size	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"
Bracket Type	Industrial Flat Mount (BB301)*		Industrial Line 2-1/2" (BB319) 3" (BB320)		Industrial Universal 2.5" (BB302) 3" (BB303)		Industrial Flat Mount (BB301)		Industrial Swivel (BB304)*	
Post Settings ± 1/2" O.C.	94-1/2"	95"	94-1/2"	95"	96"	96-1/2"	96"	96-1/2"	*96"	*96-1/2"
*Note: When using BB304 swivel brackets on either or both ends of a panel installation, care must be taken to ensure the spacing between post and adjoining pickets meets applicable codes. This will require trimming one or both ends of the panel. When using the BB301 flat mount bracket for Invincible style, rail may need to be drilled to accommodate rail to bracket attachment										

END OF SECTION