

CITY OF POMONA CONSTRUCTION STANDARD
DECORATIVE METAL FENCES AND SWING GATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Decorative wrought iron picket fences and swing gate.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
1. ASTM International (ASTM):
 - a. A47, Ferritic Malleable Iron Castings.
 - b. A48, Gray Iron Castings.
 - c. A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - d. A242, High-Strength Low-Alloy Structural Steel.
 - e. A500, Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - f. A510, General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel.
 - g. A588, High-Strength Low-Alloy Structural Steel with 50 ksi Minimum Yield Point to 4-in. Thick.
 - h. A1011, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
 - i. F626, Standard Specification for Fence Fittings.
 - j. F900, Standard Specification for Industrial and Commercial Swing Gates.
 - k. F2589 – Ornamental Fences Employing Steel Tubular Pickets.
 - l. F2814 – Standard Guide for Design and Construction of Ornamental Steel Picket Fence Systems for Security Purposes.
 2. American Welding Society (AWS).
 - a. D1.1, Structural Welding Code – Steel.
 3. Building Hardware Manufacturer’s Association
 - a. A156.1, American National Standard for Butts and Hinges.
 4. Institute of Electrical and Electronics Engineers
 - a. C2, National Electrical Safety Code.
 - b. 81, Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Potentials of a Ground System.
 5. National Association of Architectural Metal Manufacturers
 - a. MBG 531, Metal Bar Grating Manual.
 6. National Fire Protection Association (NFPA)
 - a. 70, National Electrical Code (NEC).
 7. National Ornamental and Miscellaneous Metals Association
 8. Underwriters Laboratories, Inc. (UL).
 - a. 325, Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems
 - b. 467, Grounding and Bonding Equipment.
- B. Qualifications:
1. Installer shall have a minimum three (3) years experience installing similar fencing.
 2. Installer shall be fabricator of products.
 3. Utilize only AWS certified welders.
 - a. Qualify procedures and personnel according to AWS D1.1/D1.1M, “Structural Welding Code – Steel.”

1.3 DEFINITIONS

- A. NPS: Nominal pipe size, in inches.

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- B. Installer or Applicator:
 - 1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
 - 2. Installer and applicator are synonymous.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. Product technical data including:
 - a. Acknowledgement that products submitted meets requirements of standards referenced.
 - b. Two (2) copies of Manufacturer's installation instructions.
 - 2. Scaled plan layout showing spacing of components, accessories, fittings, and post anchorage.
 - 3. Scaled shop drawings for gates include plans, elevations, sections, details, and attachments to other work.
 - a. Showing connections to adjacent construction, range of travel, and mechanical connections to fence.
 - b. Show size and location of concrete mounting pad.
 - 4. Mill certificates.
 - 5. Product Test Reports:
 - a. Based on evaluation of comprehensive tests performed by a qualified testing agency, for decorative metallic-coated steel tubular picket fences, including finish, indicating compliance with referenced standard.
 - 6. Welding certificates.
 - 7. Source quality control test results.
- B. Operation and Maintenance Manuals:
 - 1. Furnish manufacturer's installation, operation and maintenance manuals, bulletins, and spare parts lists.
 - 2. Furnish a complete Operation and Maintenance Support and Service plan which documents service for the equipment.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials and products in labeled packages. Store and handle in strict accordance with manufacturer's instructions.
- B. Upon receipt at jobsite, check materials to ensure no damage occurred during shipping or handling.
- C. Store materials in a manner to protect against damage due to construction operations.

1.6 PROJECT CONDITIONS

- A. Field verify all dimensions prior to fabrication of fence system; panels and gates.
- B. Warranty
 - 1. Provide warranty against defects in material and workmanship for a period of one (1) year after end of correction period defined in the current General Conditions.
 - 2. Any equipment found to be defective within the first 12 months of service shall be replaced by the manufacturer with new equipment at no cost to the City.

PART 2 -PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. The following manufacturers are acceptable:
 - 1. Ameristar Fence Products.
 - 2. Iron Eagle Industries, Inc.
 - 3. Master Halco.

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4. Merchants Metal; a division of MMI Products, Inc.
5. Payne Fence Products; a division of Payne Metal Works, Inc.
6. Xcel Fence.
7. Or equal.

2.2 COMPONENTS

A. Steel and Iron

1. Plates, Shapes, and Bars: ASTM A588/A242.
2. Bars (Pickets): Hot-rolled, carbon steel complying with ASTM A588/A242.
3. Tubing: ASTM A500, cold formed steel tubing.
4. Bar Grating: NAAMM MBG 531.
 - a. Bars: Hot-rolled steel strip, ASTM A1011/A1011M, Commercial Steel, Type B.
 - b. Wire Rods: ASTM A510 (ASTM A510M).
5. Castings:
 - a. Either gray or malleable iron unless otherwise indicated. Gray Iron per ASTM A48/A48M, Class 30. Malleable Iron per ASTM A47/A47M.
6. Painting and Protective Coatings:
 - a. Powder Coating.
 - b. Color to be selected by City. Contractor shall coordinate color selection with City.

B. Decorative Tubular Picket Fences

1. Design:
 - a. Pressed point (spear shape) security fence, curved outward.
2. Nominal Height: 96 inches (96"), 8 feet (8').
 - a. Straight-run height: 72 inches (72"), 6 feet (6').
 - b. Curved section of picket height: 24 inches (24"), 2 feet (2').
3. Comply with ASTM F2589 and A588/A242, for industrial application (class) unless otherwise indicated.
4. Interior surface of tubes formed from uncoated steel sheet shall be hot dip zinc coated.
5. Posts:
 - a. End and Corner Posts:
Square tubes, 3 by 3 inches (76 by 76 mm) formed from 0.105-inch (2.66 mm) nominal-thickness, 12 GA, sheet.
 - b. Swing Gate Posts:
Square tubing, 4 by 4 inches (101.6 by 101.6 mm) formed from 0.105-inch (2.66 mm) nominal-thickness, 12 GA, sheet.
6. Post Caps:
 - a. Pre-fabricated per manufacturer.
7. Pickets:
 - a. Square tubes.
 - b. Size:
 1. 1 inch by 1 inch (0.25 by 0.25-mm).
 2. Minimum wall thickness: 12 GA tubing.
 3. Extend pickets beyond top rail as indicated and curved outward for security. Press flat and trim to produce spear point shape (Apache style).
 - c. Picket Spacing: 5 inches (127 mm).
8. Fasteners: Manufacturer's standard tamperproof, corrosion-resistant, color-coated fasteners matching fence components with resilient polymer washers.

C. Swing Gate:

1. Gate Configuration: Single leaf.
2. Gate Frame Height: As indicated by the detail drawing.
3. Gate Opening Width: Two 96"x120" Swinging Gates.
4. Frames and Bracing: Fabricate members from square tubing 2 by 2 inches (51 by 51 mm) with 1/8-inch (3.2mm) wall thickness.
5. Frame Corner Construction: Welded.
6. Additional Rails: Provide as indicated, complying with requirements for fence rails.
7. Picket Size, Configuration, and Spacing: Comply with requirements for adjacent fence.
8. Hardware:

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- a. General: Utilize items that suit the shape and size of gate / post framing members.
- b. Locking Mechanism: Install 3/8" diameter, 24" long, cold rolled steel drop rod round stock in ground for each gate.
- c. Hinges: BHMA A156.1, Grade 1, suitable for exterior use. 1)
 - 1. Function: 39 -Full surface, triple weight, antifriction bearing.
 - 2. Material: Wrought steel, forged steel, cast steel, or malleable iron.
- 9. Finish exposed welds to comply with NOMMA Guideline 1, Finish #4 -good-quality, uniform undressed weld with minimal splatter.
- 10. Support Posts: Type I pipe; minimum 4 inch OD.
- 11. Finish exposed welds to comply with NOMMA Guideline 1, Finish #4 -good-quality, uniform undressed weld with minimal splatter.

2.3 FABRICATION

- A. Pickets, rails, and posts shall be precut to specified lengths.
 - 1. Rails shall be pre-punched to accept pickets.
- B. Completed sub-assemblies (i.e., panel sections) shall be capable of supporting a 600 LBS load applied at mid-span without permanent deformation.
 - 1. Panels shall be bias able to a 25% change in grade.
- C. Gates shall be fabricated using same materials and gate ends having the same outside cross-section dimensions as the fence rail.
 - 1. Each upright and rail intersection shall be joined by welding.
 - 2. Each picket and rail intersection shall be joined by welding.

| Post Size (O.D.) | Line Posts | Corner & Terminal Posts Gate Posts Gates Width < 4 FT Gates Width > 4 FT but less than 8 FT, |
|----------------------|--------------------------------------|--|
| 2-1/2", 3", 4", > 4" | 10", 12", 16" all 4x Post O.D. | 12", 15", 18", 5x Post O.D. 20", 24" 6x Post O.D. |

2.4 SOURCE QUALITY CONTROL

- A. Test related fence construction materials to meet the following standards:
 - 1. Posts and rails: ASTM F1043, Heavy Industrial.

PART 3 –EXECUTION

3.1 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts.
 - 1. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.2 INSTALLATION

- A. Install in accordance with the Manufacturer's instructions. Lines and grades shown on detail drawing with posts plumb and vertical.
- B. Do not start fence installation before final grading is complete and finish elevations are established.
- C. Concrete Footings:
 - 1. Drill holes in firm, undisturbed or compacted soil, not less than three inches (3") deeper than bottom of posts.
 - 2. Set posts in concrete footings with crowned, steel-troweled tops. Top of crown shall be one inch (1") above finished grade. Posts shall be wrapped with two inch (2") wide 20 mil thick vinyl tape. Tape post from one inch (1") above grade to bottom of post in an overlapping vertical pattern.

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3. Minimum Footing Sizes: Utilize applicable criteria from the following table.

| Footing Depth | | |
|----------------------|-------------------------------|------------|
| Nominal Fence Height | Minimum Depth | |
| | Line, Corner & Terminal Posts | Gate Posts |
| 4 FT | 24 IN | 39 IN |
| 5 FT | | |
| 6 FT | 30 IN | 42 IN |
| 7 FT | | |
| 8 FT | 36 IN | 48 IN |
| 9 FT | | |
| 10 FT | 42 IN | 48 IN |

- D. Attach rails to posts by welding.
- a. Align rails in a consistent manner.
 - b. Place fence such that bottom of rails are two inches (2") above finished grade.
- E. Space line posts at equal intervals not exceeding 8 feet OC.
- F. Install post cap top at each post.
- G. Gates:
1. Install gates according to Manufacturer's written instructions, level, plumb, and secure for full opening without interference.
 2. Attach hardware using tamper-resistant or concealed means.
 3. Install ground-set items in concrete for anchorage
 4. Adjust hardware for smooth operation and lubricate where necessary.
 5. Provide rigid, weatherproof joints.
 6. Assure correctly aligned level and plumb.
 7. Fully conceal anchor bolts in finished installation.

3.3 FIELD QUALITY CONTROL

- A. Field Tolerances:
1. Post to post spacing: +/-1/2"
 2. Plumbness of Posts: +/-1/8"
 3. Visual Alignment of Posts and rails: Fencing which is visibly misaligned will not be accepted, and shall be corrected.
 4. Consistency of picket alignment: +/-1/8"

3.4 ADJUSTING

- A. Gates:
1. Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range.
 2. Confirm that latches and locks engage accurately and securely without forcing or binding.

END OF SECTION

