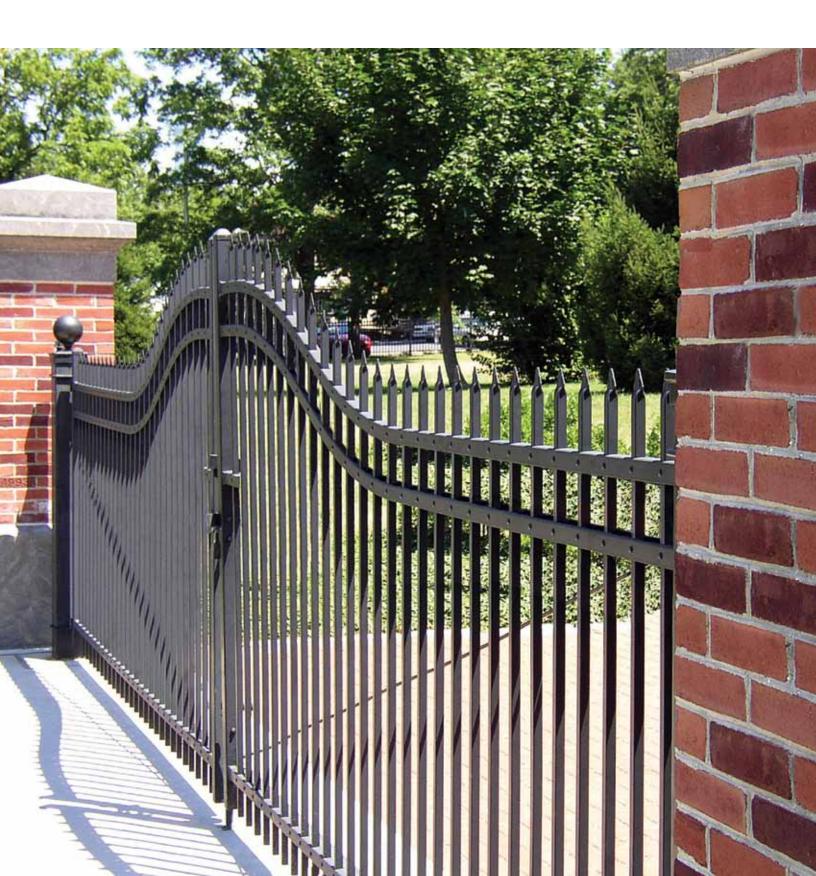


## **Monumental Iron Works**<sup>®</sup>



# Monumental Iron Works<sup>®</sup>

### The Finest Ornamental Iron

Ornamental iron fences and gates have been the architectural choice for attractive security worldwide for hundreds of years. Combining today's technology with traditional elegance and craftsmanship, Master Halco is able to offer a unique, ornamental solution with the look of fencing forged by the hands of master blacksmiths.

Monumental Iron Works<sup>®</sup> fences and gates bring a combination of aesthetic elegance and security to residential, commercial, industrial, and institutional properties. Monumental Iron Works is sure to satisfy your architectural goals with a wide variety of options, designs, and styles crafted for outstanding value. Quality materials manufactured to our exacting specifications allows us to provide a durable, cost-effective fence system that will last for many years.

### Crafted Elegance, Customized Construction

Monumental Iron Works is a modular system, consisting of component parts designed to support each other. When completely assembled, these parts create one of the strongest ornamental fence systems on the market. Using industrial rivets, the constructed panels have the solid look and feel of authentic ornamental iron.

With a riveted panel system, you can be sure the factory applied coating will offer years of maintenance and rust free elegance. Monumental Iron Works utilizes a multiple layer coating process that ensures corrosion protection, durability and a great appearance for years to come. Monumental Iron Works system will complement any architectural design while providing elegance, security, and long lasting value.





A Tradition of Fencing Solutions



### Top 3 Reasons to Buy Monumental Iron Works®

#### **1.** Made In America

 Monumental Iron Works is made in America and can be ordered through your local Master Halco distributor location.



### 2. Labor & Time Savings

- Pre-assembled panels for faster installations.
- Patented Pro-Arc<sup>™</sup> brackets adjusts up/down/left/right for easy field installation tolerances.

### 3. Maintenance Free

- UV and weather resistant powder coating applied to individual pieces BEFORE assembly to resist cracking, flaking and peeling.
- Constructed with industrial drive rivets to eliminate potential red rust problems associated with welded systems.



### Partial List of MIW<sup>®</sup> Installation Sites

#### **Colleges and Universities:** Yale University Harvard University Stanford University **Drexel University** Johns Hopkins University West Point Air Force Academy Georgia Tech University of Alabama University of Maryland University of Pennsylvania University of Toledo **Old Dominion University** William & Mary College Holyoke College

#### **Municipal and Government Projects:**

**FBI Headquarters** Social Security Administration U.S. Post Office Library of Congress National Arboretum World Trade Center, Baltimore Federal Hill Park Chicago Parks Oriole Park at Camden Yards V.A. Cemeteries Philadelphia Naval Yards Aberdeen Proving Grounds **HUD Housing Projects** JFK Airport Philadelphia Airport **Newark Airport** Tampa Airport

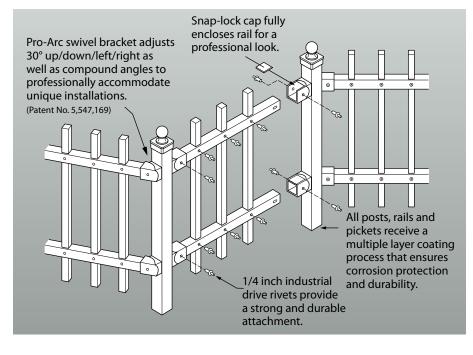
Estate Properties: Custom Built Homes Executive Homes Residential Homes

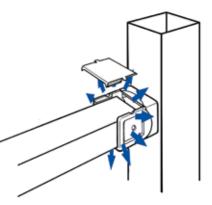
#### **Other Institutions:**

The Church of Jesus Christ of Latter Day Saints Cleveland Plain Dealer Baltimore Sun News Papers Glaxo Eli Lilly Ameriflora Max and Erma's Restaurants Marion Merrel Dow

## Monumental Iron Works<sup>®</sup>

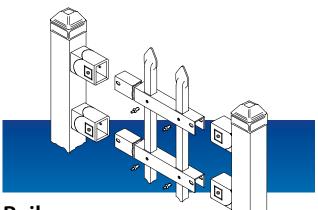
#### **Superior Construction & Strength**





### **Pro-Arc™ Brackets**

The patented bracket fastens panels to the posts using a bolt-thru design for added strength and security. By swiveling 30° in any direction it allows for grade and layout changes. The fully enclosed bracket is very user-friendly



### Rails

Our exceptionally strong

rails are polyester coated 11 gauge 1-1/2 inch x 1-3/8 inch galvanized steel "U" rail that will hold up in high traffic areas. The self-draining "U" design prevents moisture from collecting, offering maximum protection against rust. Pre-punched slotted rail holes allow for fast alignment and easy rivet attachment of the rail to the Pro-Arc bracket.

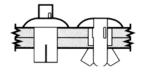


A Tradition of Fencing Solutions

MasterHalco.com | 888-MH-Fence

allowing for field installation tolerances while providing a finished look from unsightly rail cuts, short sections, and biased panels.

#### Industrial Drive Rivets To increase panel



strength, industrial drive rivets with 1,100 lbs. of holding power and 1,500 lbs. of sheer strength fasten each picket to the rails giving the system the solid look and feel of traditional ornamental iron. Fastening each picket to the rails creates an integral structure that provides fixed-point loading and spreads any vertical or horizontal force over the entire section. Since the drive rivets are installed after all components are coated, the possibility of rust points is eliminated..

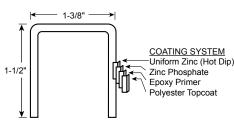
### Installation

All posts and rails are pre-drilled for fast, userfriendly assembly and installation. This also reduces the chance of errors that result from drilling holes during field installation.

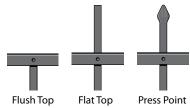
### Monumental Iron Works

### Coating

The coating applied to Monumental Iron Works® is a multi-layered system that



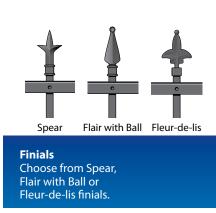
ensures unequaled service life and unmatched weather resistance. The quality of materials used in construction, plus the protective coating applied to Monumental Iron Works<sup>™</sup> is backed by our 10 year warranty.

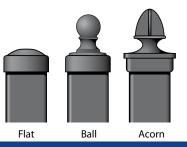


**Picket Tops** Choose from Flush Top, Flat Top or Press Point pickets.

#### Pickets

Each steel picket is riveted to the rail for maximum strength. Options include 3/4 inch square or 1 inch square with 16 or 14 gauge wall thickness. Solid bar 3/4 inch square pickets are also available. When selecting Estate style F or G panels, choose from three picket tops to customize your fence and create a style all your own.





**Post Caps** Choose from Flat, Ball or Acorn.

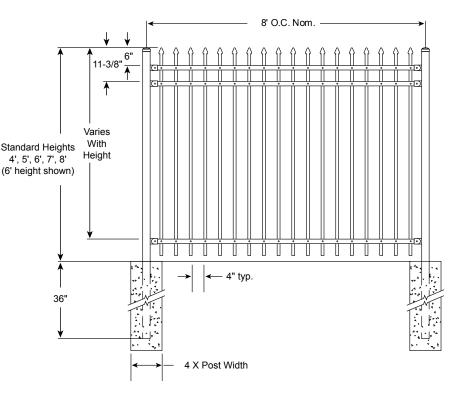
#### **Posts and Caps**

Factory pre-drilled mounting holes permit fast field installation while maintaining the integrity of the powder-coated finish. Steel posts are available in the following sizes:

- 2-1/2" square X 16 ga, up to and including 6'
- 2-1/2" square X 14 ga, over 6', up to and including 8'
- 3" square X 12 ga available

Posts can be flange-mounted on walls and concrete pads, or set into sleeves.





Refer to construction specifications for recommended installation dimensions.

### **Imperial Style Panels**

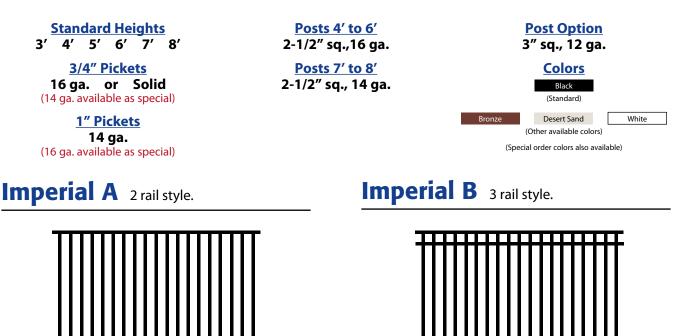
#### Flush Top

The design of our Imperial style is based on traditional iron picket fences dating back to 1892. Long accepted as an outstanding value because of their quality construction, durability, numerous options and affordable pricing, Imperial fences and gates by Monumental Iron Works<sup>®</sup> provide an exceptional ornamental picket fence system where elegant simplicity is desired. The Imperial style is an ideal choice where a combination of strength and classic appearance is desired.



Shown: Imperial D-Modified style with ball post caps

### **Options for Imperial Panels**



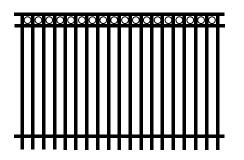
A Tradition of Fencing Solutions

MASTER HALCO

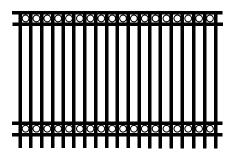
MasterHalco.com | 888-MH-Fence



### **Imperial D**-Modified 3 rail style with rings.



### **Imperial E** 4 rail style with 2 rows of rings.





### **Imperial Style Gates**

Monumental Iron Works<sup>®</sup> Imperial gates add that perfect touch to any Imperial style fence system. Our selection of gate configurations makes it easy to select a distinctive entryway for each project. Contact Master Halco today for more information.





### **Options for Imperial Gates**

<u>Standard Heights</u> 3' 4' 5' 6' 7' 8'

3/4" Pickets 16 ga. or Solid (14 ga. available as special)

1" Pickets 14 ga. (16 ga. available as special) Posts 4' to 6' 2-1/2" sq.,16 ga.

Posts 7' to 8' 2-1/2" sq., 14 ga.



(Special order colors also available)

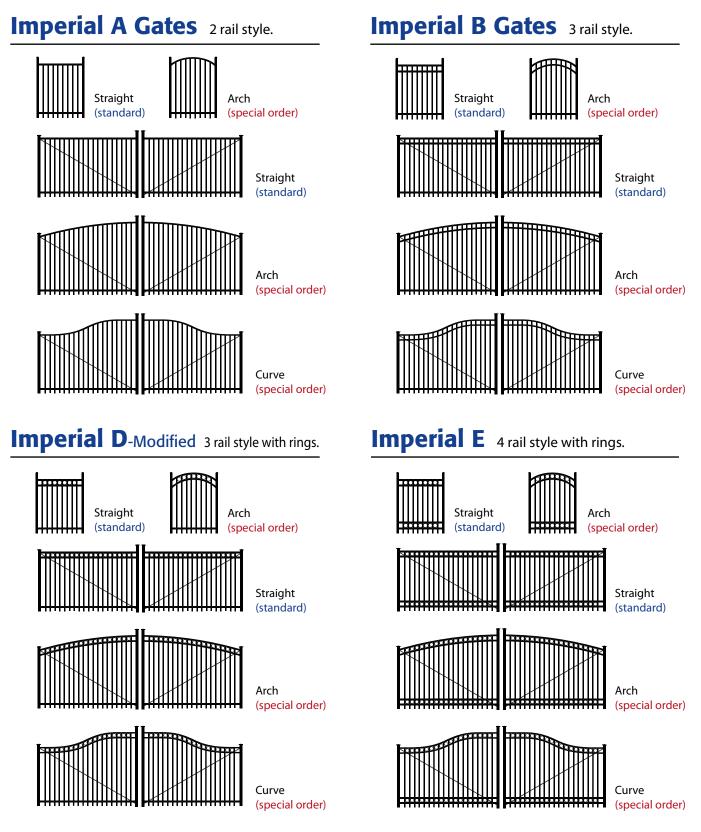




A Tradition of Fencing Solutions

MasterHalco.com | 888-MH-Fence

### **Imperial Gate Configurations**



(standard): available in Steel

(special order): available in Alum. (no rivets)or Steel

Cantilever gates available upon request

### **Estate Style Panels**

#### Picket Top

Monumental Iron Works® Estate style with a variety of top picket treatments are reminiscent of very early English and European ironwork. Good looking and long lasting, these styles will enhance the

beauty and value of any property. Every Monumental Iron Works® fence provides lasting beauty and performance. All components are engineered for strength, security and maintenance free ownership.



Shown: Estate F style with triad finials

### **Options for Estate Panels**

**Standard Heights** 3′ 5' 6' 7′ 8′

3/4" Pickets 16 ga. or Solid (14 ga. available as special)

1" Pickets 14 ga. (16 ga. available as special)

Posts 4' to 6' 2-1/2" sq.,16 ga.

Posts 7' to 8'

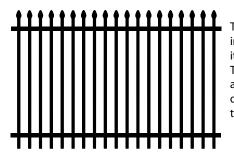


**Post Option** 

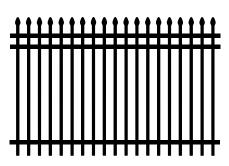
**Estate A** 2 rail, press point style.

2-1/2" sq., 14 ga.

## Estate B 3 rail, press point style.

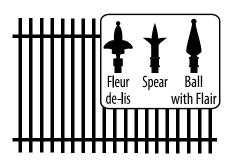


The style is contemporary in design and noted for its spear like appearance. The spear top pickets add attractive security and distinction to any architectural design.



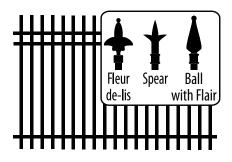


#### Estate F 2 rail, finial-ready style.



Estate style with finial top options is one of the more ornate styles offered by Monumental Iron Works. The three distinctively ornate finials, Fleur-de-lis, Spear, and Ball with Flair add old world charm and dignity to any property. Finials are sold separately.

#### Estate G 3 rail, finial-ready style.

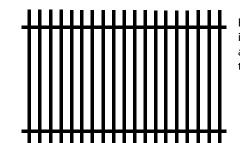




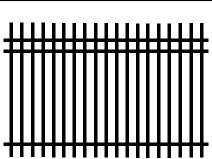
### Estate K 2 rail, flat top style.



#### Estate L 3 rail, flat top style.



Estate style with flat top is the most contemporary and classic look offered in the Estate series.







### **Estate Style Gates**

#### Picket Top

Every Monumental Iron Works<sup>®</sup> Estate style fence has multiple gate selections to choose from. The top picket design is carried through to straight and arch gate configurations. Enhancing the beauty, maintenance free ownership, and value of any property has never been easier.





Shown: Estate B curved double gate with rings added

### **Options for Estate Panels**

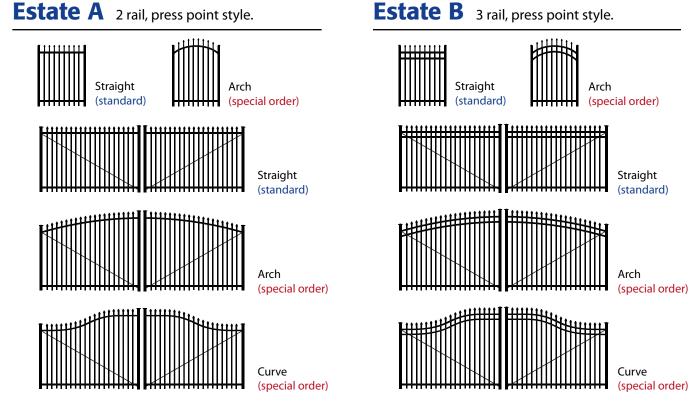
<u>Standard Heights</u> 3' 4' 5' 6' 7' 8' <u>3/4" Pickets</u> 16 ga. or Solid

<u>1" Pickets</u> 14 ga. Posts 4' to 6' 2-1/2" sq.,16 ga. Posts 7' to 8' 2-1/2" sq., 14 ga.



(Special order colors also available)

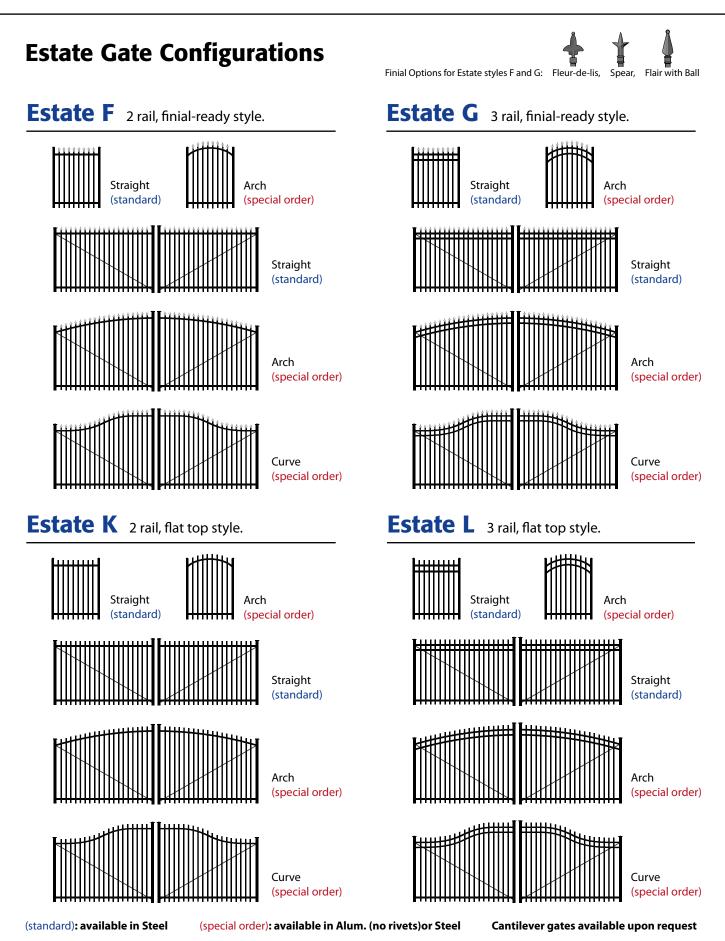
Bronze



(standard): available in Steel

(special order): available in Alum. (no rivets)or Steel

Cantilever gates available upon request

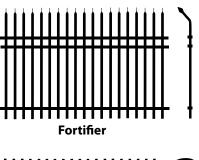


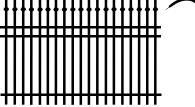
### **Fortifier B**

#### Security Top

When security is your main concern, the Fortifier style of Monumental Iron Works<sup>®</sup> is the best choice. With top pickets angled to prevent intrusion, Fortifier discourages entry, yet maintains the classic ironwork appearance.

Fortifier is available with popular rail and picket configurations found in the Imperial or Estate styles of Monumental Iron Works.<sup>®</sup> Contact Master Halco today for complete information.





Fortifier Plus



Fortifier fences under 7' are not recommended because of consumer safety.





### **Basic Specifications**

#### Master Halco Monumental Iron Works: Riveted Steel Ornamental Fence System Construction Specification – SECTION 32-31-00

#### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

The contractor shall provide all labor, materials and appurtenances necessary for installation of the industrial ornamental steel fence system defined herein at (specify project site).

#### **1.02 RELATED WORK**

Section \_\_\_\_\_ - Earthwork Section \_\_\_\_\_ - Concrete

#### **1.03 SYSTEM DESCRIPTION**

The manufacturer shall supply a total Riveted Steel Ornamental Fence system of the Master Halco Monumental Iron Works, (specify Imperial, Estate Spear, Estate Flat Top or Fortifier) design. The system shall include all components (i.e., pickets, rails, posts, brackets, gates and hardware) required.

#### **1.04 QUALITY ASSURANCE**

The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

#### **1.05 REFERENCES**

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

#### 1.06 SUBMITTAL

The manufacturer's submittal package shall be provided prior to installation.

#### 1.07 PRODUCT HANDLING AND STORAGE

Upon receipt at the job site, all materials shall be checked to ensure that no damages occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

#### PART 2 - MATERIALS

2.01 MANUFACTURER The fence system shall conform

The fence system shall conform to Monumental Iron Works, (specify Imperial, Estate Spear, Estate Flat Top or Fortifier) design, and (specify 2-Rail, 3-Rail, 3-Rail with Rings, 4-rail, 4-Rail with Rings) style sold by Master Halco, Inc, Irving Texas. The manufacturer shall supply this total Riveted Ornamental Steel Fence system in compliance with the requirements of ASTM F2408.

#### 2.02 MATERIAL

**A.** Steel material for fence framework (i.e. 3/4" tubular pickets, rails and posts), shall be galvanized prior to forming in accordance with the requirements of ASTM A653/A653M, with minimum yield strength of 45,000 psi (310 MPa). The steel shall be hot-dip galvanized to meet the requirements of ASTM A653/A653M with a minimum zinc coating weight of 0.90 oz/ft2, Coating Designation G-90 for rails; 0.60 oz/ft2, Coating Designation G-60 for pickets and posts.

**B.** Material for pickets shall be a minimum of ¾" x 16ga tubing. The cross-sectional shape of the rails shall conform to the manufacturer's U-channel design with outside cross-section dimensions of 1.375" x 1.5" and a minimum thickness of 11 Ga. Picket holes in the U-channel rail shall be spaced 4.687" on center. Picket to channel connection shall be ¼" diameter aluminum drive rivet. Fence posts and gate posts shall meet the minimum size requirements of Table 1. Construction Specification - SECTION 32 31 00

Monumental Iron Works - Riveted Steel Ornamental Fence System

#### 2.03 FABRICATION

**A.** Pickets, rails and posts shall be precut to specified lengths. U-channel rails shall be pre-punched to accept pickets. Pickets shall be pre-drilled to accept rivets.

**B.** Industrial drive rivets of sufficient length shall attach pickets to rails in a secure fashion to minimize picket movement. Rivet shall have a minimum of 1100 lbs. holding power and a shear strength of 1500 lbs.

**C.** Pro-Arc Rail End Brackets: Brackets shall be die cast zinc (ZAMAK #3 alloy) per ASTM B86-83Z 33521. Ball and socket design capable of 30° swivel (up/down-left/right). Bracket to fully encapsulate rail end with snap fit top cap for complete security. Bracket shall be secured to the rail by a #4 Drive Rivet.

**D.** The manufactured galvanized framework shall be subjected to the PermaCoat<sup>®</sup> thermal stratification coating process (high-temperature, in-line, multi-stage, multi-layer) including, as a minimum, a six-stage pretreatment/wash (with zinc phosphate), an electrostatic spray application of an epoxy base, and a separate electrostatic spray application of a nepoxy base, and a separate electrostatic spray application of a no-mar"TGIC polyester powder coating (gray in color) with a minimum thickness of 2 mils (0.0508mm). The topcoat shall be a "no-mar"TGIC polyester powder coating finish with a minimum thickness of 2 mils (0.0508mm). The color shall be (specify Black, Bronze, White, or Desert Sand). The stratification-coated framework shall be capable of meeting the performance requirements for each quality characteristic shown in Table 2.

**E.** Swing gates shall be fabricated using channel rail, gate ends, gussets and pickets. Gates that exceed 6' in width will have intermediate upright(s) and cable trussing with turnbuckle. Gate leaves from 6'-1" through 12' will have 1-1/2" sq. rail stiffeners. Gate leaves from 12'-1" through 16' will have 2" sq. top and bottom rails. Gate leaves from 16'-1" through 24' will have 2" sq. top and bottom rails and 2" sq. rail stiffeners. All rail and upright intersections shall be joined by welding. All picket and rail intersections shall also be joined by welding.

#### PART 3 - EXECUTION 3.01 PREPARATION

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

#### 3.02 FENCE INSTALLATION

Fence post shall be spaced according to Table 3, plus or minus 5/16". 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 SEALING EXPOSED SURFACES

To seal the exposed steel surfaces when cutting/drilling rails or posts, the following steps shall be performed: 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. Ameristar spray cans or paint pens shall be used to prime and finish exposed surfaces; it is recommended that paint pens be used to prevent overspray. Use of non-Master Halco parts or components will negate the manufacturers' 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 manufacture 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. (Note: See following page for Tables 1, 2, 3, & 4)

#### Monumental Iron Works: Riveted Steel Ornamental Fence System (Cont'd) Construction Specification – SECTION 32-31-00

#### TABLE 1 – MINIMUM SIZES FOR MONUMENTAL IRON WORKS

FENCE POST RECOMMENDATION CHART		
FENCE POSTS PANEL HEIGHT		
2-1/2" X 16 GA.	UP TO & INCLUDING 6' HEIGHT	
2-1/2" X 14 GA.	OVER 6' UP TO & INCLUDING 8' HEIGHT	

GATE POST RECOMMENDATION CHART				
GATE	GATE HEIGHT			
LEAF	UP TO INCLUDING 6'	OVER 6' UP TO AND INCLUDING 8'		
UP TO 4'	2-1/2" X 12 GA.	3″X 12 GA.		
4' 1" TO 6'	3″ X 12 GA.	3″X 12 GA.		
6' 1"TO 12'	4′ X 11 GA.	6″ X 3/16″		
12' 1"TO 16'	6"X 3/16"	6″ X 3/16″		
16' 1" TO 18'	8″ x 1/4″	8″x 1/4″		
18′ 1″ to 24′	8″ x 1/4″	8″x 1/4″		

#### TABLE 2 – COATING PERFORMANCE REQUIREMENTS

QUALITY CHARACTERISTICS	ASTM TEST METHOD	PERFORMANCE REQUIREMENTS	
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 1,000 hours (Scribed per D1654; failure mode is accumu- lation 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

POST SIZE	2-1/2″	3″	2-1/2″	3″
BRACKET TYPE	FLAT MOUNT (BB314)		PRO-ARC BRACKET	PRO-ARC BRACKET
POST SETTINGS ± 5/16" O.C. 8' NOMINAL SPAN (90.740" RAIL)	95″	95-1/2″	95″	95-1/2″

#### TABLE 4 – WIND LOADING

HEIGHT	PANEL LENGTH	POST SIZE	WIND LOAD CAPACITY (PSF)	WIND LOAD CAPACITY (MPH)
4'	8′	2-1/2" X 16 GA.	66.0	179
5′	8'	2-1/2" X 16 GA.	45.7	149
6'	8'	2-1/2" X 16 GA.	32.0	125
7'	8'	2-1/2" X 14 GA.	30.0	121
8′	8′	2-1/2" X 14 GA.	24.0	107

Note: "Note: Mph values shown are provided for information only. They are calculated according to ANSI/ASCE 7-05, "American Society for Civil Engineers Minimum Design Loads for Buildings and Other Structures", Exposure Category C (open terrain with scattered obstructions having lengths, generally less than 30 feet), based on post setting in 36" deep concrete footer in soil assumed to be fmid-range strength and compaction. Since specified project conditions such as jurisdictional building codes, elevation of installation, post base/footer design, soil strength, etc., may change from project, a structural engineering evaluation, unique to applicable requirements and conditions, should be performed. Consult with your Master Halco Service Representative for an estimate on Engineering Analysis and PE. Certification."



**A Tradition of Fencing Solutions** 

#### MasterHalco.com | 888-MH-Fence

Distribution service centers are located throughout North America.



Available from:

