SECTION 323119 - DECORATIVE METAL FENCES AND GATES

ALL LIBRARIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Decorative aluminum fences.
2. Swing gates.

B. Related Sections:

1. Section 033000 "Cast-in-Place Concrete" for concrete.
2. Section 312000 "Earth Moving" for site excavation, fill, and backfill where decorative metal fences and gates are located.

1.3 SYSTEM DESCRIPTION

A. The manufacturer shall supply a total fence system. The ornamental fence system shall be 4’-0” in height from grade.

B. The system shall include all components (i.e., pickets, posts, rails, gates and hardware) required.

1.4 PERFORMANCE REQUIREMENTS

A. Lightning-Protection System: Maximum grounding-resistance value of 25 ohms under normal dry conditions.

1.5 REFERENCES

A. ASTM B117 – Practice for Operating Salt-Spray (Fog) Apparatus.

B. ASTM B221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.

C. ASTM D523 – Test Method for Specular Gloss.

D. ASTM D822 – Practice for Conducting Tests on Paint and Related or Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.

E. ASTM D1654 – Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

F. ASTM D2244 – Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.

G. ASTM D2794 – Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

H. ASTM D3359 – Test Method for Measuring Adhesion by Tape Test.

I. AAMA 2603 – Voluntary Specification, Performance Requirements & Test Procedures for Pigmented organic Coatings on Aluminum Extrusions and Panels.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show locations of fence, posts, rails, details of extended post and accessories. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, sections, details of post anchorage, attachment, bracing and other required installation and operational clearances. Include plans, elevations, sections, details, and attachments to other work.

C. Product Certificates: For each type of fence, from manufacturer.

D. Warranty: Sample of special warranty.

E. Samples: For each fence material and for each color specified.

1. Provide Samples 12 inches (300 mm) in length for linear materials.

1.7 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Product Test Reports: 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 and other specified requirements.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: Installer shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Include 10-foot (3-m) length of fence complying with requirements.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Preinstallation Conference: Conduct conference at Project site.

1.9 PRODUCT HANDLING AND STORAGE

A. Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping and handling.

B. Materials shall be stored in such manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

1.10 PRODUCT WARRANTY

A. All structural fence components (i.e. rails, pickets, and posts) shall be warranted within specified limitations, by the manufacturer for a period of twenty (20) years from date of original purchase. Warranty shall cover any defects in material finish, including cracking, peeling, chipping, blistering or corroding.

B. Reimbursement for labor necessary to restore and replace components that have been found to be defective under the terms of manufacturer's warranty shall be guaranteed for five (5) years from date of original purchase,

PART 2 - PRODUCTS

2.1 ALUMINUM

A. Aluminum, General: Provide alloys and tempers with not less than the strength and durability properties of alloy and temper designated in paragraphs below for each aluminum form required.

B. Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T5.

C. Tubing: ASTM B 429, Alloy 6063-T6.

D. Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.

E. Die and Hand Forgings: ASTM B 247 (ASTM B 247M), Alloy 6061-T6.

F. Castings: ASTM B 26/B 26M, Alloy A356.0-T6.

G. Aluminum material for fence framework (i.e., tubular pickets, rails, and posts) shall conform to the requirements of ASTM B221. The aluminum extrusions for posts and rails shall be Alloy and Temper Designation 6005-T5. The aluminum extrusions for pickets shall be Alloy and Temper Designation 6063-T6.

H. Pickets shall be 5/8” square by .050” thick. Horizontal rails shall be 1” by 1-1/8” Forerunner channel with .055” thick top & internal web wall, and .072” thick side walls and shall be punched to allow picket to pass through the top of the rail. The Forerunner rail shall be constructed with an internal web insert providing a raceway for the pickets to be retained with a 1/8” retaining rod. Fence posts and gate posts shall meet the minimum size requirements of listed latter in this specification.

2.2 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

1. For aluminum, provide type and alloy as recommended by producer of metal to be welded and as required for strength and compatibility in fabricated items.

B. Concrete: Normal-weight, air-entrained, ready-mix concrete complying with requirements in Section 033000 "Cast-in-Place Concrete" with a minimum 28-day compressive strength of 3000 psi (20 MPa), 3-inch (75-mm) slump, and 1-inch (25-mm) maximum aggregate size or dry, packaged, normal-weight concrete mix complying with ASTM C 387 mixed with potable water according to manufacturer's written instructions.

2.3 GROUNDING MATERIALS

A. 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: 5/8 by 96 inches (16 by 2440 mm).

2.4 DECORATIVE ALUMINUM FENCES

A. Decorative Aluminum Fences: Fences made from aluminum extrusions.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings, Echelon Majestic ornamental aluminum fencing system by Ameristar Fence Products, or comparable product by one of the following:

a. Alumi-Guard, Inc.
b. Ameristar Fence Products.
c. Elegant Aluminum Products, Inc.
d. Royal Aluminum and Steel, Inc.

B. Posts: Square extruded tubes.

1. Line Posts: 2 by 2 inches (50 by 50 mm) with 0.062-inch (1.57-mm) wall thickness.
2. End and Corner Posts: 2 by 2 inches (50 by 50 mm) with 0.062-inch (1.57-mm) wall thickness.
3. Swing Gate Posts: 2 by 2 inches (50 by 50 mm) with 0.125-inch (3.18-mm) wall thickness.

C. Post Caps: Aluminum castings that cover entire top of posts.

D. Rails: Extruded-aluminum channels, 1 by 1-1/8 inches (25 by 29 mm), with 0.072-inch- (1.80-mm-) thick sidewalls and 0.055-inch- (1.40-mm-) thick top.

E. Pickets: Extruded-aluminum tubes, 5/8 inch (16 mm) square, with 0.050-inch (1.27-mm) wall thickness.

1. Terminate tops of pickets at top rail for flush top appearance.
2. Picket Spacing: 4 inches (101.6 mm) clear, maximum.

F. Fasteners: Manufacturer's standard concealed fastening system.

G. Fasteners: Manufacturer's standard tamperproof, corrosion-resistant, color-coated fasteners matching fence components with resilient polymer washers.

H. Fabrication: Assemble fences into sections by fastening pickets to rails.

1. Fabricate sections with clips welded to rails for fastening to posts in field.
2. Drill clips for fasteners before finishing.

I. Accessories: Aluminum castings shall be used for all post caps, scrolls, finials, and other miscellaneous hardware. Hinges and latches shall be fabricated from aluminum, stainless steel or composite materials.

2.5 SWING GATES

A. Gate Configuration: Single leaf, as indicated.

B. Gate Frame Height: 48 inches (1218 mm), as indicated.

C. Gate Opening Width: 36 inches (914 mm), as indicated.

D. Aluminum Frames and Bracing: Fabricate members from square extruded-aluminum tubes 2 by 2 inches (50 by 50 mm) with 0.125-inch (3.18-mm) wall thickness.

E. Frame Corner Construction: Assembled with corner fittings.

F. Additional Rails: Provide as indicated, complying with requirements for fence rails.

G. Infill: Comply with requirements for adjacent fence.

H. Picket Size, Configuration, and Spacing: Comply with requirements for adjacent fence.

I. Hardware: Latches permitting operation from both sides of gate, hinges, and keepers for each gate.

J. Spring Hinges: BHMA A156.17, Grade 1, suitable for exterior use.

1. Function: 320 - Gate spring pivot hinge. Adjustable tension.

K. Latching: Positive latching that can be opened from either side of the gate.

L. Aluminum Finish: Powder coating.

2.6 ALUMINUM FINISHES

A. The manufactured framework shall be subjected to the Ameristar thermal stratification coating process (high-temperature, inline, multi-stage, and multi-layer) including, as a minimum, a six-stage pretreatment/wash and an electrostatic spray application of a polyester finish. The topcoat shall be a "no-mar" TGIC polyester powder coat finish with a minimum thickness of 2 mils (0.0508 mm). The stratification-coated framework shall be capable of meeting the performance requirements for each quality characteristic shown below.

1. Adhesion:

a. ASTM Test Method: D3359 – Method B.
b. Performance Requirements: Adhesion (Retention of Coating) over 90% of test area (tape and knife test).

2. Corrosion Resistance:

a. ASTM Test Method: B117 & D1654.
b. Performance Requirements: Corrosion Resistance over 1,000 hours (Scribed per D1654; failure mode is accumulation of 1/8" coating loss from scribe or medium #8 blisters).

3. Impact Resistance:

a. ASTM Test Method: D2794.
b. Performance Requirements: Impact Resistance over 60 inch lb. (Forward impact using 0.625" ball).

4. Weathering Resistance:

a. ASTM Test Method: D822, D2244, D523 (60 degree Method).
b. Performance Requirements: Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).

5. Color and Gloss: Black

2.7 FABRICATION

A. Pickets, rails and posts shall be pre-cut to specified lengths. ForeRunner rails shall be pre-punched to accept pickets. Grommets shall be inserted into the pre-punched holes in the rail and pickets shall be inserted through the grommets so that pre-drilled picket holes align with the internal upper raceway of the ForeRunner rail (Note: This can best be accomplished by using an alignment template). Retaining rods shall be inserted into each ForeRunner rail so that they pass through the pre-drilled holes in each picket, thus completing the panel assembly. Panels to be preassembled by manufacturer.

B. Swing gates shall be fabricated using Echelon Forerunner rail material, 1.25” sq. by 1025” gate ends, and 5/8” sq. by .050” pickets. All rail and upright intersections shall be joined by welding. All picket and rail intersections shall be joined by welding.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, construction layout, and other conditions affecting performance of the Work.

B. Do not begin installation before final grading is completed unless otherwise permitted by Architect.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet (152.5 m) or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 DECORATIVE FENCE INSTALLATION

A. Install fences according to manufacturer's written instructions.

B. Install fences by setting posts as indicated and fastening rails to posts.

C. Post Excavation: Drill or hand-excavate holes for posts in firm, undisturbed soil. Excavate holes to a diameter of not less than 4 times post size and a depth of not less than 24 inches (600 mm) plus 3 inches (75 mm) for each foot (300 mm) or fraction of a foot (300 mm) that fence height exceeds 4 feet (1200 mm).

D. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.

2. Concrete Fill: Place concrete around posts and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

    a. Concealed Concrete: Top 2 inches (50 mm) below grade as indicated on Drawings to allow covering with surface material. Slope top surface of concrete to drain water away from post.

3. Posts Set in Concrete: Extend post to within 6 inches (150 mm) of specified excavation depth, but not closer than 3 inches (75 mm) to bottom of concrete.
4. Space posts uniformly at 6 feet (1.83 m) o.c.

E. Fence panels rails shall be inserted into punched posts and affixed with fasteners.

3.4 FENCE INSTALLATION MAINTENANCE

A. When cutting/drilling rails or posts adhere to the following steps to seal the exposed surfaces; 1) Remove all metal shavings from cut area. 2) Apply custom finish paint matching fence color. Failure to seal exposed surfaces per steps 1 & 2 will negate warranty. Ameristar spray cans or paint pens shall be used to finish exposed surfaces; it is recommended that paint pens be used to prevent overspray. Use of non-Ameristar parts or components will negate the manufactures' warranty.

3.5 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. Adjust hardware for smooth operation and lubricate where necessary.

3.6 GROUNDING AND BONDING

A. Fence Grounding: Install at maximum intervals of 1500 feet (450 m) except as follows:

1. Fences within 100 Feet (30 m) of Buildings, Structures, Walkways, and Roadways: Ground at maximum intervals of 750 feet (225 m).

    a. Gates and Other Fence Openings: Ground fence on each side of opening.

        1) Bond metal gates to gate posts.

B. Grounding Method: At each grounding location, drive a grounding rod vertically until the top is 6 inches (150 mm) below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at the grounding location.

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.

E. Bonding to Lightning-Protection System: If fence terminates at lightning-protected building or structure, ground the fence and bond the fence grounding conductor to lightning-protection down conductor or lightning-protection grounding conductor, complying with NFPA 780.

3.7 FIELD QUALITY CONTROL

A. Grounding-Resistance Testing: Engage 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.

3.8 ADJUSTING

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

B. Lubricate hardware and other moving parts.

3.9 CLEANING

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

END OF SECTION 323119