Anti-Ram Barrier | PU50/P2 Engineered Cable System Integrated With Ornamental Fence

PART 1 – GENERAL

1.01 WORK INCLUDED

The contractor shall provide all labor, materials and appurtenances necessary for installation of the anti-ram barrier 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 anti-ram cable barrier system PU50/P2 Engineered design. The system shall include all components (i.e., cables, supports, panels, posts, 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 F2656 – Standard Test Method for Vehicle Crash Testing of Perimeter Barriers
- Federal Specification RR-W-410E / Wire Rope and Strand.
- ASTM F2408 – Ornamental Fences Employing Galvanized Steel Tubular Pickets.

1.06 SUBMITTAL

The manufacturer's literature shall be submitted prior to installation.

1.07 PRODUCT HANDLING AND STORAGE

Upon receipt at the job site, all materials shall be checked to ensure that no damage 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

A. The anti-ram cable barrier system shall be PU50/P2 Engineered based on test results of similar design. Engineering analysis shall be based upon ASTM F2656, Impact Condition Designation PU50, Penetration Rating P2, with capability of stopping a 5,070 lb vehicle traveling at speeds up to 50 mph.

C. The entire anti-ram barrier system, and all associated panels, gates, accessories, fittings, and fasteners shall be obtained from a single source.

2.02 MATERIAL

A. Steel material for cable-supporting framework (i.e., corrugated pales, rails and posts) shall be galvanized prior to forming and shall conform to the requirements of ASTM A653/A653M, with a 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/ft^2 (276 g/m^2), Coating Designation G-90.

B. Material for pickets shall be 1" square x 16 Ga. tubing. The rails shall be steel channel, 1.75 x 1.75 x 12 Ga. Picket holes in the rail shall be spaced 4.72" o.c. Fence posts and gate posts shall meet the minimum size requirements of Table 1.

C. Pickets shall be inserted into the 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 by fusion welding process, thus completing the rigid panel assembly (Note: The process produces a virtually seamless, spatter-free good-neighbor appearance, equally attractive from either side of the panel).

D. The manufactured panels shall be subjected to an inline electrode position coating (E-Coat) process consisting of a multi-stage pretreatment/wash (with zinc phosphate), followed by a duplex application of an epoxy primer and an acrylic topcoat. The minimum cumulative coating thickness of epoxy and acrylic shall be 2 mils (0.058 mm). The color shall be Black. The coated panels and posts shall be capable of meeting the performance requirements for each quality characteristic shown in Table 2 (Note: The requirements in Table 1 meet or exceed the coating performance criteria of ASTM F2408).

E. The cable material shall be Independent Wire-Rope Core (IWRC) wire rope conforming to Federal Specification RR-W-410E, 6 x 36 Warrington Seale, preformed, right regular lay, medium lubrication, Extra Improved Plow Steel (EIPS), with a breaking strength of 103,400 pounds (51.7 tons). Cable diameter shall be 1 inch.

2.03 FABRICATION

A. Rails and posts shall be pre-cut to specified lengths. Rails shall be pre-punched to accept tamperproof security fasteners. Post flange shall be pre-punched to accept rail to post attachment. Post web shall be punched providing a clear opening for interior of rails to align throughout the entire system for affixing conduit, video cabling, IDS wiring, and other components for a complete systems integration. Rails shall be attached to post flange providing a bracket-less design at each intermediate post.

B. The manufactured galvanized framework shall be subjected to a 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 polyester finish. The base coat shall be a thermosetting epoxy powder coating (gray in color) with a minimum thickness of 2 mils (0.0508mm). The topcoat shall be a "no-mar" TGIC polyester powder coat finish with a minimum thickness of 2 mils (0.0508mm). The color shall be black. The stratification-coated framework shall be capable of meeting the performance requirements for each quality characteristic shown in Table 1.

Table 1 – 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 3,500 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).

PART 3 - EXECUTION

3.01 PREPARATION

A. The purchaser shall indicate the location of barrier line with suitable stakes. Stake intervals shall not exceed 500 ft or line of sight.

B. The purchaser shall indicate all underground utility locations, USC&G benchmarks, property monuments, and other underground structures.

C. Before installing the Anti-Ram Cable System, all necessary site clearing and grading shall be performed by the purchaser. An adequate clearance on both sides of the cable barrier line is required.

3.02 INSTALLATION

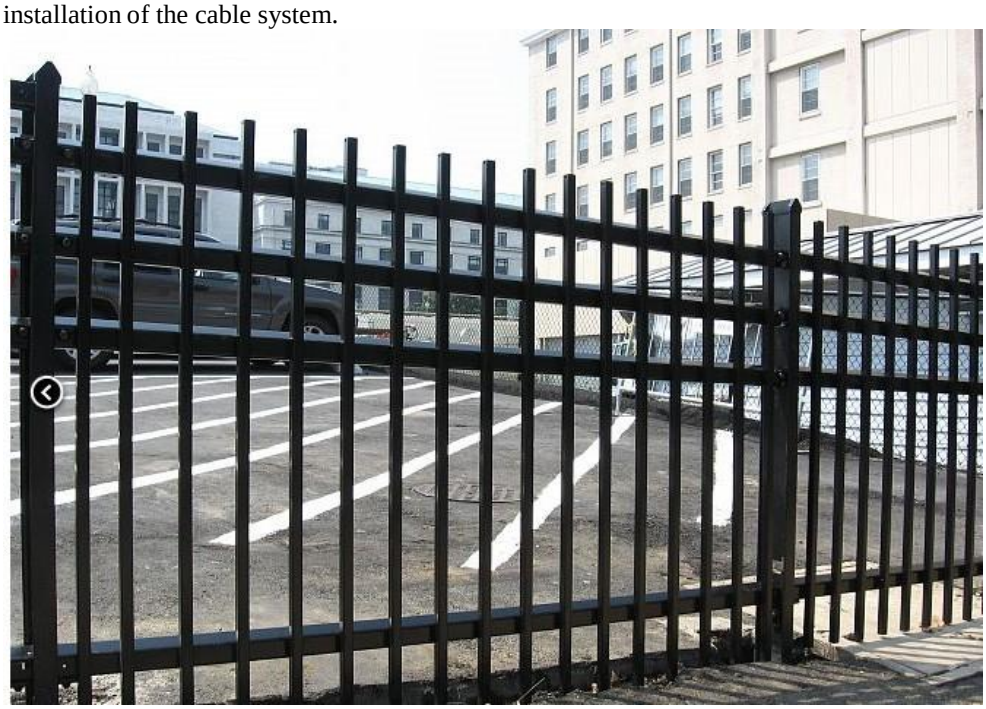
A. The barrier shall be installed per manufacturer's recommendation. Fence panels, brackets, cabling, and fasteners shall be installed according to installation instructions and drawings. Posts and bollards shall be installed per product drawings and installation instructions. The "Earthwork" and "Concrete" sections of this specification shall govern material requirements for the concrete footer unless otherwise specified by the product drawings or installation instructions.

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. Manufacturer's 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-Manufacturer's parts or components will negate the manufactures' warranty.

3.04 CLEANING

The contractor shall clean the jobsite thoroughly to ensure it is left neat and free of any debris caused by the installation of the cable system.



TAB 3 to Fort Lauderdale Fence Project, Scope of Work