

MATRIX ALPHA COATED® | CONSTRUCTION SPECIFICATION 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 galvanized steel perimeter enclosure grid 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 steel perimeter enclosure grid framing system of the Matrix Alpha Coated® design, (specify mesh filler, Table 1) style. The system shall include all components (i.e., mesh filler, mesh retainer channels, rails, posts, 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 A123/A123M** - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- **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 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 D6695** - Standard Practice for Xenon-Arc Exposures of Paint and Related Coatings
- **ASTM B221** - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes
- **ASTM F2548** - Expanded Metal Fence Systems for Security Purposes

- **ASTM F2453/F2453M** - Welded Wire Mesh Fence Fabric
- **IEEE P80/D10** - Draft Guide for Safety in AC Substation Grounding
- **IEEE 142-1991** - IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems
- **IEEE 81-2012** - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials for a Ground System
- **ASTM F2781** - Testing Forced Entry, Ballistic and Low Impact Resistance of Security Fence Systems.

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 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.

1.08 PRODUCT WARRANTY

Powder coated surface on all mesh and framework (i.e. rails and posts) is guaranteed under normal and proper usage, against cracking, peeling, chipping or corroding for a period of ten (10) years from the original purchase date. Matrix Alpha Coated is also guaranteed for the same period of time against defects in workmanship or materials. See product specific warranty for additional details.

1.09 PRODUCT TESTING & COMPLIANCE

Fence system shall be tested by third party professional engineer to IEEE P80/D10, IEEE 142-1991 and IEEE 81-2012. Fence system shall be tested to ASTM standard F2781 for forced entry by third party certified testing organization.

Test summary documentation shall be made available upon request.

PART 2 - MATERIALS

2.01 MANUFACTURER

The fence system shall conform to perimeter enclosure grid framing system of the Ameristar Matrix Alpha Coated design, (specify mesh filler, Table 1) style, manufactured by Ameristar Perimeter Security USA Inc. in Tulsa, Oklahoma.

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2.02 MATERIAL

A. Steel material for perimeter enclosure grid framework (i.e. rails and posts), shall have a minimum yield strength of 45,000 psi (310 MPa).

B. Steel material for bury posts 3" x 6" x .083 shall be hot-dip galvanized to meet the requirements of ASTM A653/A653M with a minimum zinc coating weight of 1 oz/ft², Coating Designation G100.

C. Steel material for bury posts 3" x 6" x 3/16" wall shall be hot-dip galvanized to meet the requirements of ASTM A653/A653M with a minimum zinc coating weight of 1.85 oz/ft², Coating Designation G185.

D. Steel material for plated posts 3" x 6" x .083 shall be hot-dip galvanized to meet the requirements of ASTM A123/A123M with a minimum zinc coating weight of 1 oz/ft², Coating Thickness Grade 45.

E. Steel material for plated & bury posts 3" x 6" x 3/16" wall., 6" x 6" x 3/16" wall., shall be hot-dip galvanized to meet the requirements of ASTM A123/A123M with a minimum zinc coating weight of 1.7 oz/ft², Coating Thickness Grade 75.

F. Steel material for rails 2" x 2" x 16GA. shall be hot-dip galvanized to meet the requirements of ASTM A653/A653M with a minimum zinc coating weight of 1 oz/ft², Coating Designation G100.

G. Rails shall be a minimum 2" SQ. x 16GA. and shall run continuous along front face of Matrix Alpha Coated fence system. Rail changes in grade and direction shall be accomplished by Matrix Alpha Coated hinged bracket. Hinged bracket shall fully engage each end of rail. Rail sections shall be joined by internal rail splice and secured using fastener. Rail to post attachment brackets shall be a minimum .875" wide x 14GA.

H. Fence post shall meet the minimum system requirements. Post options include 3" x 6" x .083, 3" x 6" x 3/16" or 6" SQ. x 3/16". Post size shall be based upon system design requirements.

I. The cross-sectional shape of the T-track shall conform to the manufacturer's mesh trim design with outside cross-section nominal dimensions of 3.5" x .5" minimum. Aluminum material for T-track shall conform to the requirements of ASTM B221, alloy designation 6063-T5.

J. Matrix Alpha Coated mesh filler material shall comply with one of the options listed in Table 1.

2.03 FABRICATION

A. Posts shall be pre-cut to specified lengths. Rails shall be pre-cut to manageable length and adjoined using splice coupling and fastener.

B. T-track cover shall be pre-cut to specified lengths and pre-drilled for mesh attachment. T-track shall be affixed vertically to mesh to accommodate the joining of specified filler material.

C. Mesh filler panels shall be pre-cut to match fence height. Each mesh panel shall be affixed to top rail using a minimum of 2 infill hanger brackets. Mesh infill shall be affixed at each remaining rail, minimum of 3 connection points per mesh panel at middle and bottom rails.

D. Integrated technology post shall be pre-manufactured with access ports strategically located and have predrilled holes for attachment. Technology post base shall be a minimum 6" x 6" SQ., and either 18' or 20' above grade.

E. The manufactured galvanized framework shall be subjected to the PermaCoat® thermal stratification coating process (*high-temperature, in-line, multi-stage, multi-layer*) including, as a minimum, a six-stage pretreatment/wash, 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 (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**.

F. Pedestrian swing gates shall match fence system. Gate shall be pre-drilled to accept appropriate hardware set. Infill frames shall be fabricated as a single unit. Frame shall be of welded construction inset with mesh filler, attachment to gate frame by means of security fasteners. Gate jamb frame shall be fully welded consisting of 3" x 12GA. square tubing for main jamb, 1" SQ. gate stop, and strike mounting block, with gate stop bumpers. Jamb to include an electrical access point with conduit point of connection. Electrical connection to gate by means of Power Transfer connection mounted in jamb and

SEE REFERENCED TABLES ON THE FOLLOWING PAGE

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gate. Gate shall be pre-assembled. Gate threshold to be mounted with fasteners allowing for placement below grade or removal after gate installation. Gate hardware to consist of exterior rated devices. Gate and hardware to be pre-assembled prior to shipping. Gate opening shall be designed to accommodate a 48" clear opening.

G. Sliding cantilever gates shall match fence system. Slide gate shall be a component design using tracks, up-rights, mesh filler, hardware, fittings, and fasteners. Gate installation shall comply with latest ASTM F2200 standards for automated gates.

H. Optional – Animal mitigation shield shall be securely mounted to top portion of fence and gate system. Animal shield shall provide positive deterrent from nuisance animals intruding into protected areas. System shall be installed along the upper most portion of the fence and gate system and throughout the entire perimeter including all corners and/or changes in fence direction. Animal mitigation system shall be evaluated and recommended by an accredited herpetologist for mitigating intrusion of nuisance animal's i.e. snakes, raccoons, squirrels, iguanas, rodents of unusual size, possums, cat species & nutria.

I. Optional – Barbed wire deterrent shall be installed at top of fence and gate system. Barbed wire deterrent shall have a minimum of 3 strands and be affixed to barb arms. Barb arms shall be securely attached to each line and terminal posts.

J. Optional – Spike Deterrent Strips shall be securely attached to the top of fence and gate system. Spike Deterrent strips shall be 12GA. (.075") galvanized steel, spike sets shall alternate between two heights every 2", spike set heights shall be 2.75" and 3.5". Spike deterrent strips shall affix atop fence and gate system not exceeding a distance between each strip section of 2".

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 to meet system requirements. Fence posts shall not exceed 12' on center. Fence framework and mesh filler shall be attached to system posts with fasteners supplied by the manufacturer. Posts shall

be installed per system drawings (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 steel and aluminum system components, adhere to the following steps to seal exposed surfaces; 1) Remove all metal shavings from cut area. 2) Apply fence system manufacturer provided zinc-rich paint to thoroughly cover cut edge and/or drilled hole; let dry. Failure to seal exposed surfaces per these steps above will negate warranty. Use of non-Ameristar parts or components will negate the manufactures' 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 INSTALLATION TESTING

Completed installation shall be tested for compliance to applicable IEEE Grounding Standards by qualified third party.

3.06 CLEANING

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

SEE REFERENCED TABLES ON THE FOLLOWING PAGE 

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Table 1 - Matrix Alpha Coated Filler Options		
Trade Name	Product	Description
X-Span Ultra™	Expanded Metal Mesh	.5" x #13R - (43% screening) ASTM F2548
X-Span Modified™	Expanded Metal Mesh	.5" x #13R (.188 strand width) - (75% screening) ASTM F2548
WireWorks™	Welded Wire Mesh	.5" x 3" x 8GA. (36% screening) / ASTM F2453/F2453M

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 kit 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" 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).

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