

SECTION 323117

HIGH SECURITY METAL FENCE SYSTEM

New Construction

Meets Buy American Domestic Procurement

1.0 PART 1 - GENERAL

1.1 SUMMARY

A. SCOPE OF WORK

Supply and install all materials and accoutrements required for the new construction of a high security fence system.

1.2 SYSTEM DESCRIPTION

A. The high security fence shall consist of a mesh fence fabric of a specified height made from sheet steel that is simultaneously slit and stretched into a rigid, open mesh diamond making one continuous sheet. The finished shape of the mesh openings shall be diamond. Conventional expanded metal not manufactured specifically to meet ASTM F1267 or ASTM F2548 is NOT permitted for this use.

B. The fence system shall incorporate high strength Infini-rails[®] connected to vertical posts with AMICLAMP[®].

C. The Chameleon (Round Post) and Chameleon² (Square Post) Bypass Rail Framework[™], patented US 10,221,586 B2, shall be installed providing the height of barrier required as noted on drawings. The supply of mesh fabric, framework and accoutrements for the attachment of mesh to framework, and their respective coating shall be supplied by one source to ensure the quality and required level of security.

1.3 DESIGN CRITERIA

A. Establish the barrier function.

1. New fence construction
2. Anti-Climb panels
3. Anti-Cut panels

B. System shall be engineered to meet customer required wind loads.

C. Post spacing shall be noted on drawings with documented engineering report to support post selection, the mesh style, wind load requirements, and or site conditions.

1.4 QUALIFICATIONS

- A. Manufacturer shall have a minimum of ten (10) years' experience in manufacture of expanded metal fencing.
- B. All fence components shall meet Buy American procurement.

1.5 STORAGE AND HANDLING

- A. Materials shall be stored in a clean dry location with proper ventilation to avoid damage from moisture. Materials shall be protected against damage from weather, vandalism, and theft. Any freight damage must be noted on bill of lading at time of receipt.

1.6 REFERENCES

- A. ASTM International (ASTM): (www.astm.com)
 - 1. A 121 Specification for Metallic-Coated Carbon steel Barbed Wire
 - 2. A 123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - 3. A307 Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
 - 4. A500 Standard Specification for Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
 - 5. A1011 Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon Structural High Strength Low Alloy with Improved Formability
 - 6. F900 Specification for Industrial and Commercial Swing Gates
 - 7. F1184 Specification for Industrial and Commercial Horizontal Slide Gates
 - 8. F1267 Standard Specification for Metal, Expanded, Steel
 - 9. F2200 Specification for Automated Vehicular Gate Construction
 - 10. F2548 Expanded Metal Fence Systems for Security Purposes
 - 10. F2780 Standard Guide for Design and Construction of Expanded Metal Security Fences and Barriers

1.7 SUBMITTAL

- A. Review Submittals:
 - 1. Product Data: Manufacturer's data including; test reports, product brochures, details, and specifications prior to ordering.

2.0 PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The metal fence system shall conform to the AMICO Chameleon (Round Post) and Chameleon² (Square Post) Bypass Rail Framework™ as manufactured by Alabama Metal Industries Corporation, 3245 Fayette Ave, Birmingham, AL 35208; Telephone 855-552-6426.
- B. The complete fence system shall be procured from a single source.

2.2 MATERIALS

- A. Mesh Selection [Delete as needed]

i. **AMIGUARD® 6030**

The 6030 Series Expanded Metal fence panel used shall conform to the following specification: Hot-dip zinc-coated galvanized – meet or exceed ASTM A123 and ASTM F1267 (Standard Specification for Metal, Expanded, Steel).

6030 series mesh fabric used shall meet the following:

- 1. Width of panel (SWD) – 4ft (1,219mm) through 12ft (3,658mm)
- 2. Length of panel (LWD) – 4ft (1,219mm) through 12ft (3,658mm)
Note: 1 of the 2 dimensions cannot exceed 8ft (2,438mm)
- 3. Mesh diamond – 1.850in (47.0mm) x 4.00in (101.6mm)
- 4. Mesh Open Area – 84%
- 5. Mesh strand width – 0.149in (3.78mm)
- 6. Mesh strand thickness – 0.134in (3.40mm)
- 7. Weight – 0.88 lbs/sf2 (4.29 kg/m²)
- 8. Weight (galv) – 0.99 lbs/sf2 (4.83 kg/m²)
- 9. Produced by AMICO Security

Tolerances: SWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension LWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension

ii. **AMIGUARD® 6050**

The 6050 Series Expanded Metal fence panel used shall conform to the following specification: Hot-dip zinc-coated galvanized – meet or exceed ASTM A123 and ASTM F1267 (Standard Specification for Metal, Expanded, Steel).

6050 series mesh fabric used shall meet the following:

- 1. Width of panel (SWD) – 4ft (1,219mm) through 12ft (3,658mm)
- 2. Length of panel (LWD) – 4ft (1,219mm) through 12ft (3,658mm)
Note: 1 of the 2 dimensions cannot exceed 8ft (2,438mm)
- 3. Mesh diamond – 1.330in (33.8mm) x 3.00in (76.2mm)
- 4. Mesh Open Area – 78%

5. Mesh strand width – 0.144in (3.66mm)
6. Mesh strand thickness – 0.134in (3.40mm)
7. Weight – 1.19 lbs/sf2 (5.81 kg/m²)
8. Weight (galv) – 1.31 lbs/sf2 (6.39 kg/m²)
9. Produced by AMICO Security

Tolerances: SWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension LWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension

iii. AMIGUARD® 6100

The 6100 Series Expanded Metal fence panel used shall conform to the following specification: Hot-dip zinc-coated galvanized – meet or exceed ASTM A123 and ASTM F2548 (Expanded Metal Fence Systems for Security Purposes).

6100 series mesh fabric used shall meet the following:

1. Width of panel (SWD) – 4ft (1,219mm) through 10ft (3,048mm)
2. Length of panel (LWD) – 4ft (1,219mm) through 10ft (3,048mm)
Note: 1 of the 2 dimensions cannot exceed 8ft (2,438mm)
3. Mesh diamond – 0.500in (12.7mm) x 1.200in (30.5mm)
4. Mesh Open Area – 62%
5. Mesh strand width – 0.096in (2.44mm)
6. Mesh strand thickness – 0.090in (2.29mm)
7. Weight – 1.41 lbs/sf2 (6.88 kg/m²)
8. Weight (galv) – 1.63 lbs/sf2 (7.95 kg/m²)
9. Produced by AMICO Security

Tolerances: SWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension LWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension

iv. AMIGUARD® 6200

The 6200 Series Expanded Metal fence panel used shall conform to the following specification: Hot-dip zinc-coated galvanized – meet or exceed ASTM A123 and ASTM F2548 (Expanded Metal Fence Systems for Security Purposes).

6200 series mesh fabric used shall meet the following:

1. Width of panel (SWD) – 4ft (1,219mm) through 6ft (1,829mm)
2. Length of panel (LWD) – 4ft (1,219mm) through 12ft (3,658mm)
3. Mesh diamond – 0.928in (23.6mm) x 2.100in (53.3mm)
4. Mesh Open Area – 63%
5. Mesh strand width – 0.164in (4.17mm)
6. Mesh strand thickness – 0.108in (2.74mm)
7. Weight – 1.71 lbs/sf2 (8.34 kg/m²)
8. Weight (galv) – 1.86 lbs/sf2 (9.08 kg/m²)
9. Produced by AMICO Security

Tolerances: SWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension LWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension

v. AMIGUARD® 6300

The 6300 Series Expanded Metal fence panel used shall conform to the following specification: Hot-dip zinc-coated galvanized – meet or exceed ASTM A123 and ASTM F2548 (Expanded Metal Fence Systems for Security Purposes).

6300 series mesh fabric used shall meet the following:

1. Width of panel (SWD) – 4ft (1,219mm) through 12ft (3,658mm)
2. Length of panel (LWD) – 4ft (1,219mm) through 12ft (3,658mm)
Note: 1 of the 2 dimensions cannot exceed 8ft (2,438mm)
3. Mesh diamond – 0.923in (23.44mm) x 2.000 (50.8mm)
4. Mesh Open Area – 67%
5. Mesh strand width – 0.150in (3.81mm)
6. Mesh strand thickness – 0.134in (3.40mm)
7. Weight – 1.78 lbs/sf2 (8.69 kg/m²)
8. Weight (galv) – 1.964 lbs/sf2 (9.58 kg/m²)
9. Produced by AMICO Security

Tolerances: SWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension LWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension

vi. AMIGUARD® 6800

The 6800 Series Expanded Metal fence panel used shall conform to the following specification: Hot-dip zinc-coated galvanized – meet or exceed ASTM A123 and ASTM F2548 (Expanded Metal Fence Systems for Security Purposes).

6800 series mesh fabric used shall meet the following:

1. Width of panel (SWD) – 4ft (1,219mm) through 12ft (3,658mm)
2. Length of panel (LWD) – 4ft (1,219mm) through 12ft (3,658mm)
Note: 1 of the 2 dimensions cannot exceed 8ft (2,438mm)
3. Mesh diamond – 1.330in (33.8mm) x 3.000in (76.2mm)
4. Mesh Open Area – 69%
5. Mesh strand width – 0.203in (5.16mm)
6. Mesh strand thickness – 0.198in (5.03mm)
7. Weight – 2.47 lbs/sf2 (12.05 kg/m²)
8. Weight (galv) – 2.65 lbs/sf2 (12.93 kg/m²)
9. Produced by AMICO Security

Tolerances: SWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension LWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension

vii. AMIGUARD® 7100

The 7100 Series Expanded Metal fence panel used shall conform to the following specification: Hot-dip zinc-coated galvanized – meet or exceed ASTM A123 and ASTM F2548 (Expanded Metal Fence Systems for Security Purposes).

7100 series mesh fabric used shall meet the following:

1. Width of panel (LWD) – 4ft (1,219mm) through 5ft (1,524mm)
2. Length of panel (SWD) – 4ft (1,219mm) through 12ft (3,658mm)
3. Mesh diamond – 0.500in (12.7mm) x 1.200 (30.5mm)
4. Mesh Open Area – 25%
5. Mesh strand width – 0.188in (4.78mm)
6. Mesh strand thickness – 0.090in (2.29mm)
7. Weight – 2.77 lbs/sf2 (13.52 kg/m²)
8. Weight (galv) – 3.10 lbs/sf2 (15.13 kg/m²)
9. Produced by AMICO Security

Tolerances: SWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension LWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension

viii. AMIGUARD® 7300

The 7300 Series Expanded Metal fence panel used shall conform to the following specification: Hot-dip zinc-coated galvanized – meet or exceed ASTM A123 and ASTM F2548 (Expanded Metal Fence Systems for Security Purposes).

7300 series mesh fabric used shall meet the following:

1. Width of panel (LWD) – 4ft (1,219mm) through 5ft (1,524mm)
2. Length of panel (SWD) – 4ft (1,219mm) through 12ft (3,658mm)
3. Mesh diamond – 1.280in (32.5mm) x 3.000 (76.2mm)
4. Mesh Open Area – 6%
5. Mesh strand width – 0.600in (15.2mm)
6. Mesh strand thickness – 0.075in (1.91mm)
7. Weight – 2.86 lbs/sf2 (13.96 kg/m²)
8. Weight (galv) – 3.18 lbs/sf2 (15.15 kg/m²)
9. Produced by AMICO Security

Tolerances: SWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension LWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension

ix. AMIGUARD® 7500

The 7500 Series Expanded Metal fence panel used shall conform to the following specification: Hot-dip zinc-coated galvanized – meet or exceed ASTM A123 and ASTM F2548 (Expanded Metal Fence Systems for Security Purposes).

7500 series mesh fabric used shall meet the following:

1. Width of panel (LWD) – 4ft (1,219mm) through 5ft (1,524mm)
2. Length of panel (SWD) – 4ft (1,219mm) through 12ft (3,658mm)
3. Mesh diamond – 0.925 (23.5mm) x 3.000 (76.2mm)
4. Mesh Open Area – 14%
5. Mesh strand width – 0.400in (10.1mm)
6. Mesh strand thickness – 0.090in (2.29mm)
7. Weight – 3.18 lbs/sf2 (15.523 kg/m²)
8. Weight (galv) – 3.50 lbs/sf2 (17.09 kg/m²)
9. Produced by AMICO Security

Tolerances: SWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension LWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension

x. AMIGUARD® 7700

The 7700 Series Expanded Metal fence panel used shall conform to the following specification: Hot-dip zinc-coated galvanized – meet or exceed ASTM A123 and ASTM F2548 (Expanded Metal Fence Systems for Security Purposes).

7700 series mesh fabric used shall meet the following:

1. Width of panel (SWD) – 4ft (1,219mm) through 10ft (3,048mm)
2. Length of panel (LWD) – 4ft (1,219mm) through 12ft (3,658mm)
Note: 1 of the 2 dimensions cannot exceed 8ft (2,438mm)
3. Mesh diamond – 1.000in (25.4mm) x 2.400 (61.1mm)
4. Mesh Open Area – 52%
5. Mesh strand width – 0.240in (6.10mm)
6. Mesh strand thickness – 0.179in (4.55mm)
7. Weight – 3.51 lbs/sf2 (17.123 kg/m²)
8. Weight (galv) – 3.76 lbs/sf2 (18.35 kg/m²)
9. Produced by AMICO Security

Tolerances: SWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension LWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension

xi. AMIGUARD® 7800

The 7800 Series Expanded Metal fence panel used shall conform to the following specification: Hot-dip zinc-coated galvanized – meet or exceed ASTM A123 and ASTM F2548 (Expanded Metal Fence Systems for Security Purposes).

7800 series mesh fabric used shall meet the following:

1. Width of panel (SWD) – 4ft (1,219mm) through 8ft (2438mm)
2. Length of panel (LWD) – 4ft (1,219mm) through 12ft (3,658mm)

3. Mesh diamond – 1.000in (25.4mm) x 2.250 (57.1mm)
4. Mesh Open Area – 50%
5. Mesh strand width – 0.250in (6.48mm)
6. Mesh strand thickness – 0.179in (4.55mm)
7. Weight – 3.66 lbs/sf2 (17.86 kg/m²)
8. Weight (galv) – 3.92 lbs/sf2 (19.13 kg/m²)
9. Produced by AMICO Security

Tolerances: SWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension LWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension

xii. AMIGUARD® 7900

The 7900 Series Expanded Metal fence panel used shall conform to the following specification: Hot-dip zinc-coated galvanized – meet or exceed ASTM A123 and ASTM F2548 (Expanded Metal Fence Systems for Security Purposes).

7900 series mesh fabric used shall meet the following:

1. Width of panel (SWD) – 4ft (1,219mm) through 8ft (2438mm)
2. Length of panel (LWD) – 4ft (1,219mm) through 12ft (3,658mm)
Note: 1 of the 2 dimensions cannot exceed 8ft (2,438mm)
3. Mesh diamond – 1.000in (25.4mm) x 2.250 (57.1mm)
4. Mesh Open Area – 50%
5. Mesh strand width – 0.250in (6.48mm)
6. Mesh strand thickness – 0.179in (4.55mm)
7. Weight – 3.66 lbs/sf2 (17.86 kg/m²)
8. Weight (galv) – 3.92 lbs/sf2 (19.13 kg/m²)
9. Produced by AMICO Security

Tolerances: SWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension LWD = -0 + 0.25in (6.4mm) per 12in (304.8mm) of dimension

B. Framework

1. For round posts, steel shall conform to ASTM A-653 and be cold rolled for a minimum yield strength of 35,000 psi for Schedule 40 (Std. Pipe) posts and 50,000 psi for SS40 posts. For square & rectangular posts, steel shall conform to ASTM A-653 and be cold rolled for a minimum yield strength of 50,000 psi for ASTM A500 Gr. C Steel.
2. Horizontal rails shall be a design in which rails are continuously fastened together forming a continuous rail in front of line posts. Rails shall be attached to vertical posts with AMICLAMPs®. Rails shall be pre-punched to allow 5/16-in. diameter bolts for rail to rail and mesh to rail attachment.
3. Number of AMICO Infini-Rails® rails required shall be shown on drawings.

4. Rails shall be pre-punched at regular intervals allowing the required number of attachment points.
 5. Non Infini-Rails[®] are not acceptable for this application.
- C. Finish Plates[®]
1. Pre-punched shall have a minimum thickness of 0.080-in. and extend the height of the mesh.
 2. Finish Plates[®] have pre-drilled holes for attachment to posts and Mesh.
- D. Gates
1. Gate frames shall be of a welded construction and designed to operate under the added weight of the specified high security mesh panels and wind loading. The high security mesh fabric shall fit flush on all sides of the gate frame allowing no open spaces between the fabric and the gate frame.
 2. Gates (Non-crash Rated Man Gates)
 - a. Provide AMICO swing type man gate allowing an opening of [three (3-ft), four (4-ft)] x height as noted on drawings.
 - b. Locking device shall be [padlock and chain] [double dead bolt keyed lock] with gate keeper.
 3. Gates (Non-Crash Rated Double Drive Vehicle Gates)
 - a. Provide AMICO AMIGUARD[®] 8000 Series Double Drive Swing Gate providing an opening of [eight (8-ft), [ten (10-ft)], twelve (12-ft)], sixteen (16-ft)], twenty (20-ft)], [twenty-four (24-ft)] x height as noted in drawings.
 - b. Locking devise shall be [padlock and chain] [double deadbolt keyed lock] with gate keeper.
 - c. Conduit for gate operator shall be UL approved exterior metal tubing with minimum outside diameter of 1-inch where required.
 4. Gates (Non-Crash Rated Slide Gates)
 - a. Provide AMICO AMIGUARD[®] 8000 Series Cantilever Sliding Gates allowing an opening of [ten (10-ft)], twelve (12-ft)], sixteen (16-ft)], twenty (20-ft)], [twenty-four (24-ft)] opening x required height of fence as noted in drawings.
 - b. Gate construction shall be AMICO "Fast-Trak" Aluminum Cantilever Gate mounted to 6-in x 6-in x wall thickness, length as noted in drawings.

- c. Conduit for gate operator shall be UL approved exterior metal tubing with minimum outside diameter of 1-inch where required.

E. Gate Operators

1. Slide gate operator shall be able to open and close gate(s) up to 8 feet per second with programmable speed control.
2. No moving drive components.
3. No chains, cables, gears or pinch wheels or hydraulic fluids permitted.

F. Finish

1. Finish for all materials shall be hot dip galvanized to ASTM A 123.
2. All mesh panels shall be galvanized to ensure that acidity and brightener agents remain consistent to ensure color consistency across the entire installation.

-OR-

1. Finish for all materials shall be AMICO's 4-6 mil powder coated finish.

G. Barbed Wire

1. Each post shall be provided with barbed arms as required.
2. [Three (3)], [six (6)] strands of barbed wire shall be design number 12-2-4-14R, Class 3 coating.

3.0 INSTALLATION

3.1 INSTALLTION

- A. Installation and layout of the job shall be approved by the owner prior to installation.
- B. The fence shall be completely installed according to the drawings and specifications.

3.2 PANELS, POSTS, RAILS, AND CONNECTIONS

- A. Diamond Fasteners[®] are used with each threaded fastener. Diamond Fasteners[®] are installed on the attack side of the mesh with mesh to rail attachment and behind the mesh with attachment to Finish Plates[®].
- B. Use a minimum of five (5) 5/16" x 1-1/2-in carriage bolts and nuts per rail between line posts.

- C. Fence posts' spacing and support rail spacing shall be set in accordance with the contract documents.
- D. Splice and Cover Plates in necessary shall be attached using minimum 5/16" x 1-1/2"-in carriage bolts. Bolts should be connected in all pre-punched rectangular holes in the plates.

3.3 FABRIC

- A. Fabric shall be installed so that the bottom of panels is no more than 2-in above grade. The top of panels shall be level and conforming to grade.

3.4 BARBED WIRE

- A. Barrier shall have barbed arms attached to posts allowing three strands of barbed wire that extend 12-in. above fabric height.
- B. Barbed arm to be positioned to the attack side of the barrier.

3.5 GATES

- A. Gates shall be installed so that the bottom maintains a minimum clearance of one (1) inch above the rock or concrete driveway.
- B. The gate is to swing or roll freely throughout the entire gate range of motion.
- C. Install gate operator per manufacturer's recommendations.
- D. Install UL approved conduit for gate operator electrical and control cables to meet Codes.

END OF SECTION