



GREGORY
FENCE

**SUPER – C EXPANDED METAL
FENCE PANEL SYSTEM**

**HIGH SECURITY PERIMETERS
SECURITY FENCE SPECIFICATIONS**



GREGORY
FENCE

4100 13th St SW, Canton, OH 44710 330-477-4800

gregoryfence.com



**SECTION 32 31 00 / 02825
EXPANDED METAL SECURITY FENCING**

PART 1 GENERAL

1.1 SCOPE OF WORK

The contractor shall provide all labor, materials and appurtenances necessary for installation of Gregory Industries expanded metal security fence system outline herein.

1.2 SYSTEM DESCRIPTION

As distributed by Gregory Industries, the system will include high security expanded metal mesh panels and fittings. The framework will be Super-C High Security Fencing.

1.3 QUALITY ASSURANCE

1. Manufacturer Qualifications: Minimum of 10 years' experience in the manufacture of expanded metal fencing.
2. Contractor Qualifications: Contractor shall provide installers experienced with the installation of expanded metal security fencing.

1.4 RELATED SECTIONS

1. _____ - Earthwork
2. _____ - Concrete

1.5 REFERENCES

1. ASTM A 121 - Standard Specification for Metallic-Coated Carbon Steel Barbed Wire.
2. ASTM A 123 - Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
4. ASTM F 626-96a - Standard Specification for Fence Fittings.
5. ASTM F 900 - Specification for Industrial and Commercial Swing Gates.
6. ASTM F 1043-06 - Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Framework.
7. ASTM F 1083-06 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
8. ASTM F 1184 - Standard Specification for Industrial and Commercial Horizontal Slide Gates.
9. ASTM F 1267 - Standard Specification for Metal, Expanded Steel.
10. ASTM F 1910-98(2003) - Standard Specification for Long Barbed Tape Obstacles.
11. ASTM F 1911-05 - Standard Practice for Installation of Barbed Tape.
12. ASTM F 2548-06 - Standard Specification for Expanded Metal Fence Systems for Security Purposes.
13. ASTM F 2780 - Standard Specification Guide for Design and Construction of Expanded Metal Security Fences and Barriers.

1.6 SUBMITTALS

1. Product Data: Manufacturer's product data sheets on each product to be used, including details and drawings.
2. LEED Requirements:
 1. MR Credits 2.1 and 2.2 - Construction Waste Management
 2. MR Credits 4.1 and 4.2 - Recycled Content
 3. MR Credits 5.1 and 5.2 - Regional Materials
3. Shop Drawings: Provide plan, post spacing and sizing, location of gates and material finish as necessary to depict actual products specified, proper design considerations, and installation procedures. Coordinate fencing locations with the Contract Drawings.

1.7 DELIVERY, STORAGE, AND HANDLING

1. 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 PRODUCTS

2.1 MANUFACTURERS

1. The high security expanded metal fence system shall conform to the expanded metal system as distributed by Gregory Industries 4100 13th Street SW; Canton, OH 44710: (330) 477-4800; www.gregorycorp.com.

2.2 EXPANDED METAL SECURITY MESH

1. Mesh Panels: Expanded Steel.
 1. Type: ½ inch #13R.
 - a. Strand Width: 0.096 inches (2.4mm).
 - b. Strand Thickness: 0.090 inches (2.3mm).
 - c. SWD: 0.50 inches (12.7mm)
 - d. LWD: 1.2 inches (30.5mm)
 - e. Percent Open Area: 57.
 - f. Galvanized weight per sq. foot: 1.74 lbs. (0.79 Kg.)
 2. Type: ½ inch #13R (.188)
 - a. Strand Width: 0.188 inches (4.8mm)
 - b. Strand Thickness: 0.090 inches (2.3mm)
 - c. SWD: 0.50 inches (12.7mm)
 - d. LWD: 1.2 inches (30.5mm)
 - e. Percent Open Area: 25
 - f. Galvanized weight per sq. foot: 3.1 lbs. (1.41 Kg.)
 3. Type: ¾ inch #9R.
 - a. Strand Width: 0.150 inches (3.8mm).
 - b. Strand Thickness: 0.134 inches (3.4mm).

- c. SWD: 0.923 inches (23.4mm)
 - d. LWD: 2.0 inches (51mm).
 - e. Percent Open Area: 68.
 - f. Galvanized weight per sq. foot: 1.98 lbs. (0.9 kg.).
4. Type: 1 inch #7R (.240)
- a. Strand Width: 0.240 inches (6.1mm)
 - b. Strand Thickness: 0.170 inches (4.3mm).
 - c. SWD: 1.0 inches (25mm).
 - d. LWD: 2.4 inches (61mm).
 - e. Percent Open Area: 52.
 - f. Galvanized Weight per sq. foot: 3.7 lbs. (1.68 kg.).
5. Type: 1 inch #7R (.225)
- a. Strand Width: 0.240 inches (6.1mm).
 - b. Strand Thickness: 0.170 inches (4.3mm).
 - c. SWD: 1.0 inches (25mm).
 - d. LWD: 2.25 inches (57.15mm).
 - e. Percent Open Area: 56.
 - f. Galvanized weight per sq. foot: 3.65 lbs. (1.65 kg.).
6. Type: 1 inch #7R (.300)
- a. Strand Width: 0.275 inches (7mm).
 - b. Strand Thickness: 0.183 inches (4.6mm).
 - c. SWD: .875 inches (22mm).
 - d. LWD: 2.20 inches (56mm).
 - e. Percent Open Area: 39-41.
 - f. Galvanized weight per sq. foot: 4.79 lbs. (kg.).
7. Type: 1 ½ inch #9R.
- a. Strand Width: 0.144 inches (3.7mm).
 - b. Strand Thickness: 0.134 inches (3.4mm).
 - c. SWD: 1.3 inches (33mm).
 - d. LWD: 3 inches (76mm).
 - e. Percent Open Area: 76.
 - f. Galvanized weight per sq. foot: 1.31 lbs. (0.54 kg.).
8. Type: 1 ½ inch #6R.
- a. Strand Width: 0.203 inches (5.2mm).
 - b. Strand Thickness: 0.194 inches (4.9mm).
 - c. SWD: 1.3 inches (33mm).
 - d. LWD: 3 inches (76mm).
 - e. Percent Open Area: 69.
 - f. Galvanized weight per sq. foot: 2.75 lbs. (1.25 Kg.).

9. Type: 2 inch #9R.
 - a. Strand Width: 0.149 inches (3.8mm).
 - b. Strand Thickness: 0.134 inches (3.4mm).
 - c. SWD: 1.85 inches (47mm).
 - d. LWD: 4 inches (102mm).
 - e. Percent Open Area: 84.
 - f. Galvanized weight per sq. foot: 0.99 lbs. (0.45 Kg.).

2.3 EXPANDED METAL SUPER-C SECURITY FENCING

1. Frame: 8 Foot (2438 mm) Super C Fence Framework:
 1. Line Post Type: 3.25 inch (82.5mm) x 2.50 inches (63.5mm) roll formed C post.
 2. Terminal Post Type: 4 inch (102mm) O.D. Schedule 40 galvanized pipe.
 3. Maximum Span: 93 inches (2362mm).
 4. Panel Size: 48 inches wide by 96 inches tall (1219mm x 2438mm).
 5. Horizontal Rails: (3) - 1.625 inch (41.3mm) x 1.25 inch (31.8mm) roll formed C Rail.

2.4 FENCE ATTACHMENT FITTINGS AND HARDWARE:

Expanded metal fence panels shall be installed using hot dip galvanized steel fittings and sized to framework specific to the project. Use Fittings to install expanded metal fence fabric.

1. Expanded Metal Mesh Fittings:
 1. Bands are 11ga x 1 inch steel and shall be sized to match outside diameter of terminal, corner and gate posts. Retro bands shall be used to attach expanded metal mesh to posts. Typical use is one band less than the height of the fence.
 2. C-Clamps are 11ga x 1 inch steel and shall be sized to match outside diameter of line posts and rails. C-Clamps shall be used to attach expanded metal mesh to line posts and rails. Typical placement of clamps is every 12-15 inches on line posts and rails.
 3. Bar Clamps are 11ga x 1 inch steel bars and shall be used in pairs to join mesh vertically between rails. Typical use is 2 less than the height of the fence per join.
 4. Bands are 10ga x 2 inch steel and shall be sized to match outside diameter of terminal, corner and gate posts. Heavy bands shall be used to attach expanded metal mesh to posts. Typical use is one band less than the height of the fence.
 5. C-Clamps are 10ga x 2 inch steel and shall be sized to match outside diameter of line posts and rails. C-Clamps shall be used to attach expanded metal mesh to line posts and rails. Typical placement of clamps is every 12-15 inches on line posts and rails.
 6. Clamps are 10ga x 2 inch steel bars and shall be used in pairs to join mesh vertically between rails. Typical use is 2 less than the height of the fence per join.
 7. Super C Steel Cover Strap is a 3/16 inch x 2 inches (4.8mm x 51mm) steel cover strap with pre drilled slots 12 inches (305mm) on center. The cover strap shall be used to attach expanded metal panels at line posts
 8. Nuts and Bolts shall be stainless steel carriage bolts with nuts to maximize security. Bolt size is contingent on mesh and fittings.

2. Fence Framework Fittings:

1. Super C Boulevard Clamps are used to secure rails to posts when middle or bottom rail is required.
2. Super C Offset Cups are used in conjunction with bands to connect horizontal rails to terminal, corner, or gate posts.

2.5 SECURITY APPURTENANCES:

1. Expanded Metal Mesh Fittings:

1. Steel barbed wire of 80 rods each, Coating Class 3 to ASTM Specification A121.
2. Barbed wire shall meet the material requirements and installation per A121-99(2004) Standard Specification for Metallic-Coated Carbon Steel Barbed Wire.
3. Barbed wire shall be installed using manufacturers' approved method of attachment.

2. Barbed Tape:

1. Barbed Tape shall be 18-in single coil helical with stainless steel barb and Class III galvanized steel.
2. Barbed Tape shall meet ASTM F 1911 Standard Practice for Installation of Barbed Tape and will have 33 coil loops per 50 linear foot coil.
3. Barbed Tape shall be installed using manufacturers' approved method of attachment.

3. Security Ground Guard Panels shall be attached to the bottom rail of the fence and buried in a trench in line with the fence above grade.

1. Type: ½ inch #6R.

- a. Strand Width: 0.203 inches (5.2mm).
- b. Strand Thickness: 0.194 inches (4.9mm).
- c. SWD: 1.3 inches (33mm).
- d. LWD: 3 inches (76mm).
- e. Percent Open Area: 69.
- f. Galvanized weight per sq. foot: 2.75 lbs. (1.25 Kg.).

2. Type ½ inch #13R.

- a. Strand Width: 0.096 inches (2.4mm).
- b. Strand Thickness: 0.090 inches (2.3mm).
- c. SWD: 0.50 inches (12.7mm).
- d. LWD: 1.2 inches (30.5mm).
- e. Percent Open Area: 57.
- f. Galvanized weight per sq. foot: 1.74 lbs. (0.79 Kg.).

4. Security U-Edging shall be used to minimize, where necessary, sharp edges and secure expanded metal for safety railing applications.

- a. 18 gauge x 7/8 inch (22mm) x_____.

2.6 GATES AND GATE HARDWARE

1. Single Swing Pedestrian Gate:

1. Single Swing Gates shall be of a welded construction and designed to operate under the added weight of the expanded metal security mesh panels and the affects of additional wind loading
2. Swing gates shall be designed per ASTM F900 Specification for Industrial and Commercial Swing Gates.
3. Swing gates shall be covered with mesh fabric and shall fit flush on all sides of the gate frame allowing no open spaces between the fabric and the gate frame.
4. Bands shall secure the mesh to the gate frame. Use 1 less band than the height of the vertical gate member and one less than the width of the gate leaf per horizontal gate member.
5. Use C-Clamps for bracing. Clamps shall be spaced no more than 16 inches apart on gate braces. Any required mesh to mesh joints shall be secured using Clamps evenly spaced over the joint.
6. Expanded Metal panels shall overlap a minimum of one diamond. Typically, use 2 less clamps than the height of the gate leaf.
7. Gate hinges shall be structurally capable of supporting the gate leaf and allow the gate to open and close without binding. The installed gate latch shall be capable of retaining the gate in a closed position.
8. Alternatively, expanded metal mesh can be welded directly to the gate frame.

A. Gate Frame: Round.

1. 1.90 inch (48mm) round pipe fully welded.
2. Mesh to attach to outside of frame with fittings.
3. Standard industrial hinges to match hinge post size.
4. Standard industrial fork latch to match latch post size.
5. Fittings and accessories: Truss rod and tighteners, post caps, and brackets will be malleable iron or steel hot dipped galvanized in accordance with ASTM F 626.

B. Gate Frame: Square.

1. 2 inch by 2 inch (51mm x 51mm) 14ga. square tubing, fully welded.
2. Expanded Metal Mesh in-fill welded to frame center.
3. Standard industrial hinges to match hinge post size.
4. Standard industrial fork latch to match latch post size.
5. Horizontal Support Rails: 1.
6. Horizontal Support Rails: 2.

C. Post Types

1. Post Type: 2.875 inch (73mm) Schedule 40/SS40 pipe.
2. Post Type: 4 inch (102mm) Schedule 40/SS40 pipe.

2. Single Swing Pre-Hung Pedestrian Gate:

1. Single Swing Gates shall be of a welded construction and designed to operate under the added weight of the expanded metal security mesh panels and the affects of additional wind loading.
2. Swing gates shall be designed per ASTM F900 Specification for Industrial and Commercial Swing Gates.
3. Pre-hung single swing security gates shall have expanded metal fabric welded directly to the frame allowing for no open space.

4. Gate hinges shall be structurally capable of supporting the gate leaf and allow the gate to open and close without binding. The installed gate latch shall be capable of retaining the gate in a closed position.

A. Gate Frame: Square.

1. 2 inch by 2 inch (51mm x 51mm) 14ga. square tubing, fully welded.
2. Standard opening size 38 inches wide by 84 inches high (965mm x 2134mm).
3. Expanded Metal Mesh in-fill welded to frame center.
4. Standard industrial hinges to match hinge post size.
5. Standard industrial fork latch to match latch post size.
6. Egress hardware
 - a. Standard crash bar.
 - b. Electromagnetic crash bar with keypad entry.
 - c. Mechanical code lock.
 - d. Custom - refer to drawings.
7. Horizontal Support Rails: 1.

B. Post Types

1. Post Type: 3 inch x 3 inch (76mm x 76mm) square.

3. Double Drive Swing Pedestrian Gate:

1. Double Drive Swing Gates shall be of a welded construction and designed to operate under the added weight of the expanded metal security mesh panels and the affects of additional wind loading.
2. Swing gates shall be designed per ASTM F900 Specification for Industrial and Commercial Swing Gates.
3. Swing gates shall be covered with expanded metal fabric and shall fit flush on all sides of the gate frame allowing no open spaces between the fabric and the gate frame.
4. Bands shall secure the mesh to the gate frame. Use 1 less band than the height of the vertical gate member and one less than the width of the gate leaf per horizontal gate member.
5. Use C-Clamps for bracing. Clamps shall be spaced no more than 16 inches apart of gate braces. Any required mesh to mesh joints shall be secured using Clamps evenly spaced over the joint.
6. Expanded metal panels shall overlap a minimum of one diamond. Typically, use 2 less clamps than the height of the gate leaf.
7. Gate hinges shall be structurally capable of supporting the gate leaf and allow the gate to open and close without binding. The installed gate latch shall be capable of retaining the gate in a closed position.
8. Alternatively, expanded metal mesh can be welded directly to the gate frame.

A. Gate Frame: Round

1. 1.90 inch (48mm) round pipe fully welded.
2. Mesh to attach to outside of frame with fittings.
3. Standard industrial hinges to match hinge post size.
4. Standard industrial fork latch to match latch post size.
5. Fittings and accessories: Truss rod and tighteners, post caps, and brackets will be malleable iron or steel hot dipped galvanized in accordance with ASTM F 626.

B. Gate Frame: Square.

1. inch by 2 inch (51mm x 51mm) 14ga. square tubing, fully welded.
2. Expanded Metal Mesh in-fill welded to frame center.
3. Standard industrial hinges to match hinge post size.
4. Standard industrial fork latch to match latch post size.
5. Horizontal Support Rails: 1.
6. Horizontal Support Rails: 2.

C. Post Types

1. Post Type: 2.875 inch (73mm) Schedule 40/SS40 pipe.
2. Post Type: 4 inch (102mm) Schedule 40/SS40 pipe.

4. Horizontal and Cantilever Swing Gates:

1. Horizontal and Cantilever Slide Gates shall be of a welded construction and designed to operate under the added weight of the expanded metal security mesh panels and the affects of additional wind loading.
2. Slide gates shall be designed per ASTM F 1184 Specification for Industrial and Commercial Horizontal Slide Gates.
3. Slide gates shall be covered with expanded metal fabric and shall fit flush on all sides of the gate frame allowing no open spaces between the fabric and the gate frame.
4. Bands shall secure the mesh to the gate frame. Use 1 less band than the height of the vertical gate member and one less than the width of the gate leaf per horizontal gate member.
5. Use C-Clamps for bracing. Clamps shall be spaced no more than 16 inches apart on gate braces. Any required mesh to mesh joints shall be secured using Clamps evenly spaced over the joint.
6. Expanded Metal panels shall overlap a minimum of one diamond. Typically, use 2 less clamps than the height of the gate leaf.
7. Alternatively, expanded metal mesh can be welded directly to the gate frame.

A. Gate Frame: Round.

1. 1.90 inch (48mm) round pipe fully welded.
2. Mesh to attach to outside of frame with fittings.
3. Standard industrial hinges to match hinge post size.
4. Standard industrial fork latch to match latch post size.
5. Fittings and accessories: Truss rod and tighteners, post caps, and brackets will be malleable iron or steel hot dipped galvanized in accordance with ASTM F 626.

B. Gate Frame: Square.

1. 2 inch by 2 inch (51mm x 51mm) 14ga. square tubing, fully welded.
2. Expanded Metal Mesh in-fill welded to frame center.
3. Standard industrial hinges to match hinge post size.
4. Standard industrial fork latch to match latch post size.
5. Horizontal Support Rails: 1.
6. Horizontal Support Rails: 2.

C. Post Types

1. Post Type: 2.875 inch (73mm) Schedule 40/SS40 pipe.
2. Post Type: 4 inch (102mm) Schedule 40/SS40 pipe.

D. Types of Slide Gates:

1. Type 1 - Overhead Slide - Any horizontal slide gate supported from above.
 - a. Top track and Rail: Enclosed combination one piece aluminum extrusion.
 - b. Top track and Rail: Dual track (2) enclosed combination one piece aluminum extrusions welded together.
 - c. Bottom rail: 2 inch by 4 inch (51mm x 102mm) rectangular aluminum (1.71 lb./lf) in accordance with ASTM B221 alloy and temper 6061-T6.
 - d. Vertical members: interior vertical members shall be the same material as gate frame with corresponding alloy and temper 6061-T6.
 - e. Truck Assembly - Zinc die cast swivel type with sealed lubricant ball bearing rollers to ensure proper truck alignment in track.
 - f. Bottom guide wheels: Each assembly shall consist of two 3 inch (76mm) diameter rubber wheels straddling bottom horizontal gate rail.
2. Type II - Cantilever Slide - Any horizontal slide gate spanning an opening and lacking a top or bottom support within that opening. Type II gates shall be supplied in one or two classes:
 - a. Class 1-Steel frame gates and aluminum frame gates using external rollers.
 - b. Class 2-Steel frame gates and aluminum frame gates using internal rollers.

2.7 FENCE SYSTEM FINISHES

1. Galvanized Finish:

1. Hot dip galvanized expanded metal mesh, fittings and framework meeting ASTM A123.

2. Color Coated Finish:

1. All color coated expanded metal mesh material shall be coated using 8-12 mil finish.

Panels will be electro deposition E-coat, color coated and top coated with a TGIC polyester powder.

2. Fence Framework shall be PVC coated black to meet ASTM 1043.
3. All nuts and bolts shall be painted after installation.

2.8 RELATED PRODUCTS

1. Concrete: Ready mixed concrete in accordance with Section 03300; site delivered and placed in accordance with requirements found in Part 3 of this section.
2. Concrete: Site mixed concrete in accordance with ASTM C 387 and Section 03300; placed in accordance with requirements found in Part 3 of this section.

PART 3 EXECUTION

3.1 EXAMINATION

1. Do not begin installation until site has been properly prepared to finish grading requirements.
2. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

1. All new installation shall be laid out by contractor in accordance with construction plans.
2. Prepare all work areas and components. Clean all debris from work area prior to installation.

3.3 EXCAVATION

1. Excavate for fence posts to a depth as required by local building code. At no time may the post depth be less than the following:
 1. 8 foot (2438mm) Fences: minimum of 30 inches (762mm).
 2. Post Spacing:
 1. On flat and gradual gradient, locate posts every 93 inches (2362mm) on center.
 2. On flat and gradual gradient, locate posts every ___ inches (___ mm) on center.
 3. On steep gradient, decrease post centers to 48 inches (1219mm) on center.

3.4 INSTALLATION - GENERAL CONDITIONS

1. Installation and layout of the job shall be approved by the owner or general contractor prior to installation.
2. Install posts plumb and set on center per manufacturer's drawings.
3. Install all line rails level. The bottom rail shall be installed 3 to 6 inches above the bottom of the expanded metal panel. Top rail shall be installed 3-6 inches from the top of the expanded metal panel.
4. Expanded metal panels shall be installed flush to grade.
5. Expanded metal panels shall overlap three diamonds or 3 inches with diamonds orientated in the same direction.
6. Expanded metal mesh panels shall fit flush to all corner posts, end posts, gate posts and gate frames.
7. Clamp mesh to line posts and rails using clamps spaced per manufacturer's drawings.

3.5 PROTECTION

1. Protect installed products until completion of project.
2. Tighten all nuts and if not using breakaway bolts peen, scarf or weld the threads of the carriage bolts.
3. Touch-up, repair or replace damaged products before substantial completion.