

SECTION 032300

ORNAMENTAL STEEL FENCING

******* OGi Architectural Metal Solutions manufactures several basic construction materials including steel, stainless steel and aluminum bar gratings, safety gratings, stair treads, and fiberglass gratings. OGi Architectural Metal Solutions also manufactures several types of ornamental metal fencing.**

This guide can be used to specify various steel bar gratings. These can be used for platforms, stairs treads and handrails, trench covers, sunscreens, fences and many other applications. Steel bar gratings can be specified as a separate section or as part of another building element. For the later, paragraphs from this guide would be inserted into the section specifying the element constructed with steel gratings. *****

The specifier will need to edit this product specification to reflect the options and applications being used. Most editing can be accomplished by deleting unnecessary requirements.

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Ornamental welded steel fencing panels fabricated with galvanized flat bars pressure locked into, modular, open grille fencing panels including steel fence posts and gates.
- B. Related sections:

******* List other specification sections dealing with work directly related to this section such as the following. *******

1. Section 03 30 00 - Cast-in-Place Concrete: Concrete footings for support of fence posts.
2. Section 32 31 30 - Gate Operator: Electric operator for ornamental steel gates.

1.2 REFERENCES

****** List by number and full title reference standards referred to in remainder of specification section. Delete non-applicable references. *******

- A. American Society for Testing and Materials (ASTM) Publications:
 1. ASTM A1011/A-04, A572, A578 Standard Specification for Steel Sheet and Strip
 2. ASTM A36 - Structural Steel.
 3. ASTM A121 - Zinc-Coated (Galvanized) Steel Barbed Wire.
 4. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

5. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
6. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
7. ASTM D822 - Tests on Paint and Related Coatings Using Filtered Open-Flame Carbon-Arc Exposure Apparatus.
8. ASTM D1794 - Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
9. ASTM D3363 - Test Method for Film Hardness by Pencil Test.

1.3 SUBMITTALS

- A. Provide in accordance with Section 01 33 00 - Submittal Procedures:
 1. Product data for components and accessories.
 2. Shop drawings showing layout, dimensions, spacing of components, [interface with electric gate operator,] and anchorage and installation details.
 3. Sample: 8 by 10 inches minimum size sample of fence panel illustrating design, fabrication workmanship, and selected color coating.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. OGi Architectural Metal Solutions (800.321.9800) custom fabrication of required components, or equal as approved by architect.
- B. Manufacturers of equivalent products submitted and approved in accordance with Section 01 63 00 - Product Substitution Procedures.

2.2 MATERIALS

- A. Steel bar stock: ASTM A1011
- B. Steel bar stock: ASTM A36.
- C. Steel tubing: ASTM A500, Grade B.
- D. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, and water reducing and plasticizing additives.

2.3 FENCE SYSTEM

- A. Type: Ornamental steel PressLock fencing system consisting of modular open grille fencing panels fabricated by pressure locking flat steel bars, supported by steel posts and gates and gate hardware; OGi PressLock Steel Fence System as manufactured by OGi Architectural Metal Solutions.

***** OGi Architectural Metal Solutions provides 8 open grille fence panels. Refer to OGi product literature for illustrations of various patterns.

- B. Fence panels: Fabricated from galvanized steel flat bars pressure locked to form an open grille pattern; [\[Urban\]](#) [\[Guardian\]](#) [\[Perimeter\]](#) [\[Palladium\]](#) [\[Screen\]](#) [\[SafeGuard\]](#) [\[Modular\]](#) [\[Tuscan\]](#) as manufactured by OGi Architectural Metal Solutions.

***** Fence panels are provided in standard heights and widths. Available sizes vary with fence pattern. Refer to OGi product literature for available sizes. Custom sizes can also be obtained as a special order. *****

***** Include the following paragraph for PressLock URBAN fence panel. *****

1. Vertical main bars: 1 inches by 12 gauge (0.1046 inches) flat bars spaced at 2-3/16 inches.
2. Horizontal cross bars: 3/8 inches by 16 gauge (0.059 inches) flat bars spaced at 5-1/4 inches.
3. Top and bottom perimeter bars: 1 by 1/8 inch flat bars.
4. Panel height: [\[36\]](#) [\[48\]](#) [\[60\]](#) [\[72\]](#) [\[84\]](#) [\[96\]](#) inches.
5. Panel width: Up to 72 inches.

***** Include the following paragraph for PressLock GUARDIAN fence panel. *****

1. Vertical main bars: 1 inches by 12 gauge (0.1046 inches) flat bars spaced at 2-3/16 inches.
2. Horizontal cross bars: 3/8 inches by 16 gauge (0.059 inches) flat bars spaced at 2-5/8 inches.
3. Top and bottom perimeter bars: 1 by 1/8 inch flat bars.
4. Panel height: [\[36\]](#) [\[48\]](#) [\[60\]](#) [\[72\]](#) [\[84\]](#) [\[96\]](#) inches.
5. Panel width: Up to 72 inches.

***** Include the following paragraph for PressLock PERIMETER fence panel. *****

1. Vertical main bars: 1 inches by 14 gauge (0.0747 inches) flat bars spaced at 1-3/4 inches.
2. Horizontal cross bars: 3/8 inches by 16 gauge (0.059 inches) flat bars spaced at 1-3/4 inches.
3. Top and bottom perimeter bars: 1 by 1/8 inch flat bars.
4. Panel height: [\[36\]](#) [\[48\]](#) [\[60\]](#) [\[72\]](#) [\[84\]](#) [\[96\]](#) inches.
5. Panel width: Up to 72 inches.

***** Include the following paragraph for PressLock PALLADIUM fence panel. *****

1. Vertical main bars: 1 inches by 14 gauge (0.0747 inches) flat bars spaced at 1-3/4 inches.
2. Horizontal cross bars: 3/8 inches by 16 gauge (0.059 inches) flat bars spaced at 5-1/4 inches.

3. Top and bottom perimeter bars: 1 by 1/8 inch flat bars.
4. Panel height: [36] [48] [60] [72] [84] [96] inches.
5. Panel width: Up to 72 inches.

***** Include the following paragraph for **PressLock SCREEN** panel. *****

1. Vertical main bars: 1 inches by 12 gauge (0.1046 inches) flat bars spaced at 7/8 inches.
2. Horizontal cross bars: 3/8 inches by 16 gauge (0.059 inches) flat bars spaced at 7/8 inches.
3. Top and bottom perimeter bars: 1 by 1/8 inch flat bars.
4. Panel height: [36] [48] [60] [72] [84] [96] inches.
5. Panel width: Up to 72 inches.

***** Include the following paragraph for **PressLock SAFEGUARD** panel. *****

1. Vertical main bars: 1-1/2 inches by 12 gauge (0.1046 inches) flat bars spaced at 2-3/16 inches.
2. Horizontal cross bars: 3/8 inches by 16 gauge (0.059 inches) flat bars spaced at 5-1/4 inches.
3. Top and bottom perimeter bars: 1 by 1/8 inch flat bars.
4. Panel height: [36] [48] [60] [72] [84] [96] inches.
5. Panel width: Up to 72 inches.

***** Include the following paragraph for **PressLock MODULAR** fence panel. *****

1. Vertical main bars: 1 inches by 12 gauge (0.1046 inches) flat bars spaced at 3-15/16 inches.
2. Horizontal cross bars: 3/8 inches by 16 gauge (0.059 inches) flat bars spaced at 3-15/16 inches.
3. Top and bottom perimeter bars: 1 by 1/8 inch flat bars.
4. Panel height: [36] [48] [60] [72] [84] [96] inches.
5. Panel width: Up to 72 inches.

***** Include the following paragraph for **PressLock TUSCAN** fence panel. *****

1. Vertical main bars: 1 inches by 12 gauge (0.1046 inches) flat bars spaced at 4-13/16 inches.
2. Horizontal cross bars: 3/8 inches by 16 gauge (0.059 inches) flat bars spaced at 5-1/4 inches.
3. Top and bottom perimeter bars: 1 by 1/8 inch flat bars.

4. Panel height: [36] [48] [60] [72] [84] [96] inches.
5. Panel width: Up to 72 inches.

******* Fence posts for OGi PressLock Steel Fence System can be either flat steel bars or square steel tubing. Refer to OGi product literature for required sizes for heights, widths, and types of fence panel. *******

- C. Posts: Galvanized [flat steel bars] [square steel tubes].
 1. Size: [2-1/2 by 1/2] [3-1/2 by 1/2] [2 by 2] [4 by 4] inches.
 2. Length: [_____].
 3. Weld flat steel bar top caps to tubular posts.

2.4 GATES

- A. Provide gates of type and size indicated on Drawings. Equip gates with manufacturer's standard hardware as required for complete functional operation.

******* OGi Architectural Metal Solutions provides single and double hinged swinging gates for ornamental steel fences. Gates can be operated with various types of electric operators specified in other sections. Refer to OGi product literature for available sizes and types of gates. *******

******* Include the following paragraphs if hinged swinging gates are required. *******

- B. Type: Hinged swinging [single] [double] gate.

******* Size of steel tubing used to fabricate swinging gate frames will depend on gate size. Refer to OGi product literature for recommended sizes. *******

1. Construction: Welded frame fabricated from [_____] by [_____] inches steel tubing with open grille steel panels to match fencing material.
2. Nominal size: [_____] wide by [_____] high.
3. Hardware:
 - a. Hinges: Size and type as determined by manufacturer. Provide 2 hinges for each leaf up to 6 feet high and 1 additional hinge for each additional 24 inches in height or fraction thereof.
 - b. Latch: 3/4 inch diameter slide bolt to accommodate padlock.
 - c. For double gates provide padlockable, 5/8 inch diameter center cane bolt assembly and strike.

******* Include the following paragraph if gates are to be operated with electric gate operator. *******

- C. Coordinate provision of gate with electric operator specified in Section 32 31 30 - Gate Operator to ensure size, weight, and design of gate is compatible with operator.

2.5 ACCESSORIES

***** **PressLock Fencing Urban, Guardian, Perimeter, Palladium, Screen, SafeGuard, Modular, and Tuscan fences can be fabricated with top, bottom, or top and bottom pickets. If pickets are required, include the following paragraph.**

- A. Fence pickets: Equip fence panels with [top] [and] [bottom] pickets by providing steel tube welded to back of vertical main bars in lieu of flat perimeter bars. Extend pickets [] inches above tube.

***** **As an anti-intruder device, ornamental steel fences can be provided with extension arm posts to carry 3 strands of barbed wire or electrified wires. Include the following paragraph if extension arms are required.** *****

- B. Extension arm posts: Provide posts with steel flat bar extensions, 11-3/4 by 2-3/8 by 5/16 inches projecting 45 degrees, with 3 holes for attachment of barbed or electrified wires.
- C. Barbed wire: Two twisted strands of ASTM A121 galvanized 12.5 gauge wire with 14 gauge four point round barbs at 5 inches.

***** **As an anti-intruder device, a steel fence panel extending at an angle from top of fence and bolted to vertical fence panel, can be provided. Include the following paragraph if canted fence panel extensions are required.**

- D. Canted fence panel extension: Provide [] high fence panels bolted to vertical fence panels and extending at 45 degrees angle. Panels shall match open grille design of adjacent fence panels.
- E. Fasteners: Stainless steel bolts of type, size, and spacing as recommended by fence manufacturer for specific condition.

***** **Include the following paragraph if ornamental steel fencing is erected in high-security area and anti-intruder bolts are required.** *****

- F. For exposed locations, provide anti-intruder bolts consisting of cup head bolt and nut with clamping hexagon such that tightening shears hexagon and render bolt impossible to release.

2.6 FACTORY FINISH

- A. Steel fence panels and posts shall be hot-dip galvanized to 1.25 ounces per square foot minimum zinc coating in accordance with ASTM A123. Standard size components shall receive polyester powder coating. Large gate panels shall be coated with 2-part polyurethane coating.
- B. Polyester powder coating: Electrostatically applied colored polyester powder coating heat cured to chemically bond finish to metal substrate.
1. Minimum hardness measured in accordance with ASTM D3363: 2H.
 2. Direct impact resistance tested in accordance with ASTM D2794: Withstand 160 inch-pounds.
 3. Salt spray resistance tested in accordance with ASTM B117: No undercutting, rusting, or blistering after 500 hours in 5 percent salt spray at 95 degrees F and 95 percent relative humidity and after 1000 hours less than 3/16 inch undercutting.
 4. Weatherability tested in accordance with ASTM D822: No film failure and 88 percent gloss retention after 1 year exposure in South Florida with test panels tilted at 45 degrees.

C. Polyurethane coating: 1.0 mil dry film thickness of coating of steel test panel cured 30 minutes at 180 degree F and aged 14 days shall resist the following test conditions without failure:

1. 5 percent salt spray for 500 hours.
2. 100 percent relative humidity for 1000 hours.
3. Water immersion for 100 hours.
4. 20 double rubs with cloth saturated with either lacquer thinner, acetone, MEK, gasoline, xylene.
5. Exposure to lubricating oils, hydraulic fluids, and cutting oils.
6. 16 cycles of 24 hours at 100 percent humidity, 24 hours at 10 degrees F, and 24 hours at 77 degrees F.
7. Hardness: H to 2H.
8. Flexibility: 1/8 inch conical mandrel.

******* OGi Architectural Metal Solutions provides 10 standard colors. Custom colors are available for minimum size orders. Contact OGi for information on custom colors. *******

D. Color:

*** *Note:* Color to be selected from the following standard colors. Select required color below – delete all color listing information not selected. (Specific color match or other colors are extra cost options) ***

Color Selection Indicated Below:

MESA TAN	9810-1049
SAFETY YELLOW	9810-1268
RUBY RED	9810-3042
OCEAN BLUE	9910-5054
IVY GREEN	9810-6046
SONNY ORANGE II	9810-2113
ELECTRIC GRAY	9810-7042
JET BLACK	9900-9000
SKY WHITE II	9910-9897
DARK SIENNA	9910-8036

Selected by Architect from manufacturer's standard color range

Custom color as selected by Architect

PART 3 - EXECUTION

3.1 PREPARATION

A. Prior to fabrication, field verify required dimensions.

******* Include the following paragraph if electric gate operators are required. *******

- B. Coordinate fence and gate installation with provision of gate operator specified in Section 32 31 30 - Gate Operator to ensure proper power supply and that conduit and wiring are concealed.

******* Size of concrete fence footings will depend on fence height, post spacing, and other project conditions. Footing dimensions may be indicated on Drawings or in this section but not both locations in order to eliminate potential conflicts. Edit the following paragraphs to reflect specific project conditions. *******

- C. Cast concrete footings in accordance with Section 03 30 00 - Cast-in-Place Concrete as detailed on Drawings and approved shop drawings.
 - 1. Minimum footing diameter:
 - a. Terminal and gate posts: 12 inches.
 - b. Intermediate line posts: 10 inches.
 - 2. Allow [8 inches] [_____] minimum embedment of posts.
 - 3. Allow [6 inches] [_____] minimum concrete beneath post bottom.
- D. [Provide setting holes for embedment of fence posts.] [Core drill existing concrete footings for embedment of fence posts.] Hole shall be 2 inches minimum greater than post width.

3.2 INSTALLATION

- A. Install fencing in accordance with manufacturer's installation instructions and approved shop drawings.
- B. Install fence posts plumb and level [by setting post in hole] [cast] [drilled] in concrete and grouting solid] [by embedding post directly in concrete footing.] Temporarily brace fence posts with 2 by 4 wood supports until [concrete] [grout] is set.
- C. Do not install bent, bowed, or otherwise damaged panels. Remove damaged components from site and replace.
- D. Secure fence panels with [standard stainless steel bolts] [stainless steel anti-intruder bolts] to fence posts [prior to setting posts in footings.] [after posts have been set in footings.]

******* Include the following paragraph if extension arm posts are installed. *******

- E. Extension arm posts: Erect arms sloped [inward] [outward] and attach 3 strands of barbed wire. Tension wire and secure to arms.

******* Include the following paragraph if canted fence panel extensions are required. *******

- F. Canted fence panel extension: Slope panels [inward] [outward] at 45 degrees angle and rigidly bolt to vertical fence panels.
- G. Gates:
 - 1. Install gates and adjust hardware for smooth operation.
 - 2. [Provide concrete center foundation depth and drop rod retainers at center of double swinging gate openings.]

3. [Provide concrete surface for length of operation of V-wheeled rolling gate. Anchor track to concrete with countersunk fasteners.]
 4. After installation, test gate [and operator]. Open and close a minimum of five times. Correct deficiencies and adjust.
- H. Touch-up damaged finish with paint supplied by manufacturer and matching original coating.

END OF SECTION