

SECTION 057310**ORNAMENTAL STEEL RAILING**

******* OGi Architectural Metal Solutions manufactures several types of ornamental metal railing. This guide specification section can be used to specify ornamental steel railings fabricated from galvanized flat bars into several open grille designs. OGi Architectural Metal Solutions also manufactures several types of ornamental metal fencing which can be specified in SECTION 32 31 20 - ORNAMENTAL STEEL FENCING, AND SECTION 32 31 21 - ALUMINUM 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 and round rods welded 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 05 51 10 - Steel Stairs: Construction of steel stairs and landings to receive metal railings.

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 A121 - Zinc-Coated (Galvanized) Steel Barbed Wire.
 3. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

4. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
5. ASTM A1264 - Safety Requirements for Workplace Floor and Wall Openings, Stairs, and Railing Systems.
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.
10. ASTM E894 - Anchorage of Permanent Metal Railing Systems and Rails for Buildings.
11. ASTM E935 - Permanent Metal Railing Systems and Rails for Buildings.

1.3 DESIGN REQUIREMENTS

- A. Railing assemblies and attachments shall be designed, fabricated, and installed in accordance with ASTM A1264, ASTM E894, ASTM E935 to support:
 1. 200 pounds concentrated loading applied at any point in any direction.
 2. 50 pounds per linear foot uniform load applied horizontally to top of rail.

1.4 SUBMITTALS

- B. Provide in accordance with Section 01 33 00 - Submittal Procedures:
 3. Product data for components and accessories.
 4. Shop drawings showing layout, dimensions, spacing of components, [interface with electric gate operator,] and anchorage and installation details.
 5. 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 A36.
- B. Steel tubing: ASTM A500, Grade B.
- C. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, and water reducing and plasticizing additives.

2.3 RAILING SYSTEM

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

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

- B. Rail 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.

***** Handrail 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 handrail 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: [\[36\]](#) [\[40\]](#) [\[42\]](#) [\[48\]](#) inches.
5. Panel width: Up to 96 inches.

***** Include the following paragraph for PressLock GUARDIAN handrail 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: [\[36\]](#) [\[40\]](#) [\[42\]](#) [\[48\]](#) inches.
5. Panel width: Up to 96 inches.

***** Include the following paragraph for PressLock PERIMETER handrail 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] [40] [42] [48] inches.
5. Panel width: Up to 96 inches.

***** Include the following paragraph for **PressLock PALLADIUM** handrail 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] [40] [42] [48] inches.
5. Panel width: Up to 96 inches.

***** Include the following paragraph for **PressLock SCREEN** handrail 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] [40] [42] [48] inches.
5. Panel width: Up to 96 inches.

***** Include the following paragraph for **PressLock SAFEGUARD** handrail 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] [40] [42] [48] inches.
5. Panel width: Up to 96 inches.

***** Include the following paragraph for **PressLock MODULAR** handrail 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] [40] [42] [48] inches.

5. Panel width: Up to 96 inches.

***** Include the following paragraph for **PressLock TUSCAN** handrail 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] [40] [42] [48] inches.
5. Panel width: Up to 96 inches.

- C. Panel configuration: Provide railing panels as detailed on Drawings and approved shop drawings.

***** Typical panel configuration is flat rectangular shape. Standard panel height is 40 inches. *****

1. Rectangular: [[_____] high by [_____] wide.] [As indicated on Drawings.]

***** Include the following paragraph if trapezoidal and other special shaped railings are required for stairs and ramps. *****

2. Irregular: Provide custom cut trapezoidal and other irregular shaped panels as required for stair and ramp railings. Fabricate with vertical main bars and horizontal cross rods with perimeter edges cut diagonally.

***** Curved panels can be provided for railings with 9 inches minimum radius. *****

3. Curved: Bend steel railing panels and other horizontal components to [_____] radius [as indicated on Drawings and approved shop drawings].

***** Rail posts for **OGi PressLock Steel Rail 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. *****

- D. Posts: Galvanized [flat steel bars] [square steel tubes].

4. Size: [2-1/2 by 1/2] [3-1/2 by 1/2] [2 by 2] [2-1/2 by 2-1/2] inches.

5. Length: [_____] .

6. Mounting: Fabricate posts to be mounted [in sleeves or core drilled holes] [with base plates and expansion anchors] [with wall brackets and expansion anchors].

4. Weld flat steel bar top caps to tubular posts.

***** OGi Architectural Metal Solutions manufactures various types of top rail which can be finished to match railing. Select required type in the following paragraph. *****

- D. Top rail: Contoured, tubular steel railing 2-3/4 inches wide by 1-1/4 inches deep. [[_____] by [_____] steel tubing.] [[_____] by [_____] channel.] Fabricate top rail for concealed attachment to railing panels and to adjacent walls where railing terminates.

***** Tubular steel bottom rails as well as complete perimeter frames for railing panels can be provided. Include the following paragraph for bottom rails. *****

- E. Bottom rail: [_____] by [_____] steel [flat bar] [tubing] for attachment to bottom of railing panels with concealed fasteners.

***** Include the following paragraph for perimeter frames. *****

- F. Perimeter railing frame: Welded frame fabricated from [_____] by [_____] steel [flat bar] [tubing].
- G. Fasteners: Stainless steel bolts of type, size, and spacing as recommended by fence manufacturer for specific condition.

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: 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.

2.5 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.
4. Minimum hardness measured in accordance with ASTM D3363: 2H.
 5. Direct impact resistance tested in accordance with ASTM D2794: Withstand 160 inch-pounds.

6. 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.
 7. 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:
- | | |
|-----------------|-----------|
| 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.

***** Size of concrete fence footings will depend on rail 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. *****

- B. 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.
- C. [Provide setting holes for embedment of rail posts.] [Core drill existing concrete footings for embedment of rail posts.] Hole shall be 2 inches minimum greater than post width.

3.2 INSTALLATION

- A. Install railing in accordance with manufacturer's installation instructions and approved shop drawings.
- B. Install rail 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 rail 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 rail panels with [standard stainless steel bolts] [stainless steel anti-intruder bolts] to rail posts [prior to setting posts in footings.] [after posts have been set in footings.]
- E. 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.]
- F. Touch-up damaged finish with paint supplied by manufacturer and matching original coating.

END OF SECTION