



## SECTION 10 74 50

### ORNAMENTAL PERFORATED METAL PANELS

Revise this Section by deleting and inserting text to meet Project-specific requirements.

Delete between [ ] if not applicable to Project. Also delete any other item or paragraph not applicable in the Section and renumber the paragraphs.

This Section uses the term "Architect/Engineer." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes: Pre-engineered, component-based, laser cut ornamental perforated metal panels.
- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- C. Related Sections

Retain Sections in subparagraphs below (or insert Sections appropriate to the Project) that contain requirements Contractor might expect to find in this Section but are specified in other Sections.

1. Section 01 33 00 - Submittal Procedures: For requirements for the submittal schedule and administrative and procedural requirements for submitting shop drawings, product data, samples and other submittals.
2. Section 03 30 00 - Cast-In-Place Concrete: Requirements for placement of anchors or sleeves in concrete.
3. Section 05 50 00 - Metal Fabrications: Miscellaneous metals.
4. Section 05 52 00 - Metal Railings: Metal panels and handrails.

##### 1.2 REFERENCES

Retain first two paragraphs below if aluminum is selected in paragraph 2.2 B.

- A. AA - Aluminum Association
- B. AAMA - American Architectural Manufacturers Association

Retain one of three subparagraphs below to coordinate with aluminum finish selected in paragraph 2.6 B.

1. 611 - Voluntary Specification for Anodized Architectural Aluminum.
1. 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
1. 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

C. ASTM - American Society for Testing and Materials

Retain one of first three subparagraphs below if steel is selected in paragraph 2.2 B; coordinate with specific steel type selected.

1. A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
1. A242/A242M - Standard Specification for High-Strength Low-Alloy Structural Steel.
1. A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

Retain subparagraph below if bituminous paint for aluminum panels is selected in paragraph 2.2 D.

2. D1187 - Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal.

D. NAAMM - National Association of Architectural Metal Manufacturers

1. MFM - Metal Finishes Manual for Architectural and Metal Products.

Retain paragraph and subparagraph below if Corafon finish is selected for metal panels.

E. SSPC - The Society for Protective Coatings

1. PA 1 - Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel.

### 1.3 SYSTEM DESCRIPTION

Retain paragraph and subparagraphs below if metal panels are using as a railing system.

A. Structural Performance: Provide handrails and railings capable of withstanding the following structural loads without exceeding allowable design working stress of materials for handrails, railings, anchors and connections:

1. Top Rail of Guards: Shall withstand the following loads:
  - a. Concentrated load of 200 lbf (0.89kN) applied at any point and in any direction.
  - b. Uniform load of 50 lbf-ft. (0.07kN-m) applied horizontally and concurrently with uniform load of 100 lbf-ft. (0.14kN-m) applied vertically downward.
  - c. Concentrated and uniform loads above need not be assumed to act concurrently.
2. Handrails Not Serving As Top Rails: Shall withstand the following loads:
  - a. Concentrated load of 200 lbf (0.89 kN) applied at any point and in any direction.
  - b. Uniform load of 50 lbf-ft. (0.07kN-m) applied in any direction.
  - c. Concentrated and uniform loads above need not be assumed to act concurrently.
3. Guard Infill Area: Shall withstand the following loads:
  - a. Concentrated horizontal load of 200 lbf (0.89 kN) applied to 1 sq. ft. at any point in system, including panels, intermediate rails, balusters, or other elements composing infill area. Loads need not be assumed to act concurrently with loads on top rails in determining stress on guard.

B. Thermal Movements: Panels shall allow for movements resulting from 120 deg F (49 deg C) changes in ambient and 180 deg F (82 deg C) surface temperatures and base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

C. Corrosion Resistance: Separate incompatible materials to prevent galvanic corrosion.

D. Structural calculations shall be prepared by a registered structural engineer licensed in the state in which Project is located.

### 1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.

3. Installation instructions and methods.
4. Description of materials, components, fabrication and finishes.
5. Structural computations and test reports provided by the manufacturer evidencing compliance with the Specifications.

Retain paragraph and subparagraph below if recycled content is required for LEED-NC, LEED-CI, or LEED-CS Credits MR 4.1 and MR 4.2.

- C. LEED Submittals:
1. Product Data for Credit MR 4.1 [and Credit MR 4.2]: For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content. Include statement indicating costs for each product having recycled content.
- D. Shop Drawings: Manufacturer's shop drawings, including plans, elevations, sections and details indicating materials, components, sizes, dimensions, tolerances, hardware, fasteners, finishes, options, accessories and installation. Show details of attaching metal panels to supports.

Retain sample requirements in first three paragraphs below as appropriate for the Project.

- E. Selection Samples: For each product specified, two (2) complete sets of finish and color chips representing manufacturer's full range of available finishes and colors.
- F. Verification Samples: For each product specified, two (2) samples, minimum size six inches (6") square, representing actual product, finish and color.
- G. Assembly Samples: Assembled samples of metal panels, fabricated from full-size components, including laser cut pattern and showing method of finishing intersections.
- H. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- I. Closeout Submittals: Manufacturer's maintenance and cleaning instructions.

## 1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of metal panel from single source from single manufacturer.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.

Retain paragraph and subparagraphs below if mockup is required for the Project.

- C. Mockup: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
1. Build mockups as indicated on the Drawings.
  2. Locate mockup on-site in the location selected by the Architect/Engineer.
  3. Notify the Architect/Engineer 1 week in advance of the dates and times when mockup will be constructed.
  4. Demonstrate the proposed range of aesthetic effects and workmanship.
  5. In presence of the Architect/Engineer, demonstrate the repair of a blemished or damaged portion of an exposed-face surface.
  6. Refinish mockup as required to produce acceptable work.
  7. Obtain the Architect/Engineer's approval of mockup before start of final unit of work.
  8. Retain and maintain mockup during construction in an undisturbed condition as a standard for judging the completed work.

Retain one of two subparagraphs below. Mockups may be installed as part of building rather than erected separately.

9. When directed, demolish and remove mockup from the Project site.
9. Approved mockup in an undisturbed condition at the time of Substantial Completion may become part of the completed work.

Retain paragraph and subparagraphs below if a pre-installation meeting is required for the Project.

- D. Pre-installation Meeting: Convene approximately two (2) weeks before start of mounting of metal panels. Require attendance of parties directly affecting work of this Section, including Contractor, Architect/Engineer, Manufacturer, and Installer. Review the following:
  - 1. Specific method of installation of components into mounting surfaces.
  - 2. Installation, adjusting, cleaning and protection of metal panels.
  - 3. Coordination with other work.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Acceptance at Site: Deliver materials to site in manufacturer's original, unopened containers, packaged for protection from transportation damage, with labels clearly identifying product name and manufacturer.
- B. Handling: Exercise care in unloading, storing and erecting metal panels to prevent bending, warping, twisting and damage to surface finish.
- C. Storage and Protection: Store metal panels in clean, dry area indoors until ready for installation. Do not store metal panels in contact with other materials that might cause staining, denting or other surface damage.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Requirements: Maintain temperature, humidity and ventilation within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Field Measurements: Verify actual locations of walls and other construction contiguous with metal panels by field measurements before fabrication and indicate measurements on shop drawings.

#### 1.8 SCHEDULING AND SEQUENCING

- A. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.
- B. Coordinate work with other operations and installation of adjacent materials to avoid damage.
- C. Coordinate installation of anchorages for metal panels. Furnish setting drawings, templates and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts and items with integral anchors, that are to be embedded in concrete or masonry.
- D. Ensure that locating templates and other information required for installation of products of this Section are furnished to affected trades in time to prevent interruption of construction progress.
- E. Schedule installation so metal panels are mounted only on completed walls or other substrates. Do not support temporarily by any means that do not satisfy structural performance requirements.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Bok Modern Inc., 1515 Vallejo Street, San Francisco, CA 94109; Phone: 415-749-6500; Email: [russ@bokmodern.com](mailto:russ@bokmodern.com); Web: [www.bokmodern.com](http://www.bokmodern.com).
- B. Substitutions: Not permitted.

#### 2.2 MATERIALS

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations or blemishes.

Retain one of four paragraphs below.

- B. Perforated Aluminum Sheet: AA5052-H32, [0.125-inch (3.17 mm)] [0.1875-inch (4.76 mm)] [Insert custom thickness] thick.
- B. Perforated Stainless Steel Sheet: ASTM A240/A240M, [Type 304] [Type 316L], [0.062-inch (1.57 mm)] [Insert custom thickness] thick.
- B. Perforated Cold-Rolled Steel Sheet: ASTM A1008/A1008M, commercial steel Type B, [0.074-inch (1.88 mm)] [Insert custom thickness] thick.
- B. Perforated Corten Steel Sheet: ASTM A242/A242M, [0.074-inch (1.88 mm)] [Insert custom thickness] thick.
  - 1. Laser Cut Pattern: [As selected by the Architect/Engineer from manufacturer's full library of designs] [Custom design].
- C. Brackets, Flanges and Anchors: Same metal and finish as supported metal panels, unless otherwise indicated.

Retain paragraph below if aluminum panels are selected.

- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187.

### 2.3 ORNAMENTAL PERFORATED METAL PANELS

- A. Pre-Engineered, Component-Based, Perforated Metal Panels
  - 1. Configuration: [Canopy] [Juliet balcony] [Wall/green screen] [Balcony guardrails] [Stair guardrails] [Fencing/gates].
  - 2. Dimensions: As indicated on the Drawings.
- B. Fasteners for Anchoring Metal Panels to Other Construction: Select fasteners of type, grade and class required to produce connections suitable for anchoring metal panels to other types of construction indicated and capable of withstanding design loads.
- C. Fasteners for Interconnecting Metal Panel Components: Use fasteners fabricated from same basic metal as fastened metal, unless otherwise indicated. Do not use metals that are corrosive or non-compatible with materials joined.

### 2.4 FABRICATION

- A. General: Fabricate metal panels to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish and anchorage, but not less than that required to support structural loads.
- B. Fabricate systems in accordance with approved shop drawings and the manufacturer's instructions. Form work true to line and level with accurate angles and surfaces.
- C. Assemble metal panels in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- D. Cut, drill and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32-inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- E. Cut, reinforce, drill and tap as indicated to receive finish hardware, screws and similar items.

- F. Use grommets, bushings and washers or methods as recommended by the manufacturer as necessary for separation of dissimilar metals.
- G. Field connections may be done using manufacturer's recommended methods.

## 2.5 FINISHES, GENERAL

- A. General: Comply with NAAMM's MFM for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.
- C. Remove die markings prior to finishing operations. Where necessary to remove die markings from any part of the work, each member shall be finished by the same process, whether or not any die markings exist. Perform this work in addition to the finish specified. Scratches, abrasions, dents and similar defects are unacceptable.

Retain article below if aluminum is selected for metal panels.

## 2.6 FINISHES FOR ALUMINUM

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

Retain one of three paragraphs below.

- B. Clear Anodic Finish: AAMA 611, **[AA-M12C22A41, Class I, 0.018 mm] [AA-M12C22A31, Class II, 0.010 mm]** or thicker.
- B. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-fluoride-phosphate conversion coating; Powder Coating: Tiger Drylac, Series 39, Polyester Powder Coating, complying with AAMA 2604), applied to an average total dry film thickness of 3 mils.
- B. Fluoropolymer PVDF 3-Coat System: Standard 3-coat, thermocured system composed of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluorocarbon topcoat complying with AAMA 2605 and AA-C12C42R1x using 70% minimum polyvinylidene fluoride resin by weight (either "Kynar 500" or "Hylar 5000" Fluorocarbon Resin by Atofina Chemical or Ausimont USA, Inc.), applied to an average total dry film thickness of 1.6 mils.

Retain subparagraph below if high-performance organic or fluoropolymer coating is selected above.

- 1. Color and Gloss: **[As selected by the Architect/Engineer from manufacturer's full range of choices] [Custom]**.

Retain article below if steel is selected for metal panels.

## 2.6 FINISHES FOR STEEL

Retain paragraph and subparagraphs below for painted steel.

- A. High-Performance Coating: Apply intermediate and finish coats to prime-coated surfaces. Comply with coating manufacturer's written instructions and with requirements in SSPC-PA 1 for shop painting. Apply at spreading rates recommended by coating manufacturer.
  - 1. Shop-Applied Primer: Epoxy coating (Corafon ADS 553/554 by PPG).
  - 2. Shop-Applied Intermediate Coat: Epoxy coating (Corafon ADS 553/554 by PPG).
  - 3. Field-Applied Finish Coat: 100% fluoropolymer coating (Corafon ADS, made from Lumiflon by PPG).

Retain paragraph and subparagraphs below for stainless steel.

- A. Stainless Steel

Retain subparagraph below unless only retaining No. 2B finish.

1. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

Retain subparagraph below for directional finishes.

2. Run grain of directional finishes with long dimension of each piece.

Retain one finish in first five subparagraphs below. Designations are sheet finish designations, which are frequently used to specify finishes applied after fabrication.

Finish in subparagraph below is a rolled finish applied to metal sheet before fabrication. Rolled finishes require care during fabrication to avoid damage. Verify suitability for intended use before retaining.

3. Bright, Cold-Rolled, Unpolished Finish: No. 2B.

Finish in subparagraph below is a 120- to 150-grit finish.

3. Directional Satin Finish: No. 4.

Finish in subparagraph below is produced from a No. 4 finish by brushing with an extremely fine abrasive to remove grit lines without producing a reflective appearance.

3. Dull Satin Finish: No. 6.

Finish in subparagraph below is produced from a No. 4 finish by buffing enough to provide a reflective surface but not enough to remove grit lines entirely. A No. 7 finish will not show scratches as readily as a No. 8 finish will.

3. Reflective, Directional Polish: No. 7.

Finish in subparagraph below is easily damaged because minor scratches will be apparent.

3. Mirror-like Reflective, Non-directional Polish: No. 8.

- B. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify field measurements are acceptable to suit assembly tolerances.
- C. Verify supports and anchors are correctly positioned.
- D. If substrate preparation is the responsibility of another installer, notify Architect/Engineer of unsatisfactory conditions before proceeding.

### 3.2 PREPARATION

- A. Supply items required to be cast into concrete or embedded in masonry with setting templates.
- B. Take field measurements after permanent end terminations are in place and prior to preparation of shop drawings and fabrication, to ensure fitting of work.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the Project conditions.

### 3.3 INSTALLATION

- A. General
  1. Install metal panels in accordance with manufacturer's written instructions.

2. Install metal panels plumb, level, square, true to line and rigid. Fit exposed connections together to form tight, hairline joints.
  3. Adjust metal panels before anchoring to ensure alignment at abutting joints.
  4. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood or dissimilar metals, with a heavy coat of bituminous paint.
  5. Use manufacturer's supplied hardware for panel-to-panel connections.
- B. Fastening to In-Place Construction
1. Attach metal panels to supports approved by the Architect/Engineer. Embedded anchor plates and supporting steel shall be provided by another trade and coordinated with the metal panel supplier.
  2. Attach metal panels securely in place using anchorage devices and fasteners, supplied or approved by the Architect/Engineer, where necessary for securing metal panels and for properly transferring loads to in-place construction.
- 3.4 ADJUSTING
- A. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by the Architect/Engineer.
  - B. Remove and replace defective or damaged components that cannot be successfully repaired as determined by the Architect/Engineer.
- 3.5 CLEANING
- A. Clean metal panels promptly after installation in accordance with manufacturer's instructions.
  - B. Do not use harsh cleaning materials or methods that will damage finish.
  - C. Do not use abrasive cleaners.
- 3.6 PROTECTION
- A. Protect installed products until completion of Project. Protect finishes of metal panels from damage during construction period with temporary protective coverings approved by metal panel manufacturer. Remove protective coverings at the time of Substantial Completion.
  - B. Replace defective or damaged components as directed by the Architect/Engineer. Restore finishes damaged during installation and construction period so no evidence remains of correction work.
  - C. Touch-up, repair or replace damaged products before Substantial Completion. Return items that cannot be refinished in field to shop; make required alterations and refinish entire unit or provide new unit.

END OF SECTION