

SECTION 07482

ARCHITECTURAL METAL WALL CLADDING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Architectural Metal Wall Cladding.
- B. Structural Framing for Architectural Metal Panel System.
- C. Associated matching sheet metal flashing and trim.

1.2 RELATED SECTIONS

- A. Section 05400 - Cold-Formed Metal Framing.
- B. Section 05500 - Metal Fabrications.
- C. Section 05735 - Ornamental Sheet Metal Enclosures.
- D. Section 07620 - Sheet Metal Flashing and Trim.
- E. Section 07900 - Joint Sealants.

1.3 REFERENCES

- A. AAMA 605.2 - Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
- B. AISC M016 - Manual of Steel Construction - Allowable Stress Design.
- C. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges.
- D. AISI SG-673 - Cold-Formed Steel Design Manual.
- E. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel.
- F. ASTM A 123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- G. ASTM A 366/A 366M - Standard Specification for Steel Sheet, Carbon, Cold-Rolled, Commercial Quality.

- H. ASTM A 653/A 653M - Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- I. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- J. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
- K. ASTM D 1730 - Standard Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting.
- L. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- M. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- N. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- O. AWS D1.1 - Structural Welding Code - Steel.
- P. AWS D1.2 - Structural Welding Code - Aluminum.
- Q. DIN 50939 - Protection Against Corrosion; Chromating of Aluminum, Directives, Symbols, and Methods of Test; Deutsches Institut fur Normung.
- R. SSPC Paint 12 - Part of Steel Structures Painting Manual, Volume 2, Systems and Specifications.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Design Data: Design calculations for architectural metal wall cladding and its connections to structure, bearing seal and signature of structural engineer.
- C. Test Data: Certified reports from independent testing agency showing compliance of a full-scale laboratory mock-up to performance requirements specified, including:

1. Air infiltration, tested in accordance with ASTM E 283.
 2. Water penetration, tested in accordance with ASTM E 331.
 3. Structural performance, tested in accordance with ASTM E 330, at 150 percent of design wind load.
- D. Product Data: Manufacturer's descriptive literature, specifications, installation instructions, and recommendations, for each component and finish.
- E. Shop Drawings: Indicate the following:
1. Layouts of cladding system, including project-specific details.
 2. Field measurements of construction over which cladding will be installed, with notation of dimensions which vary significantly from the Contract Documents.
 3. Details of edge conditions, joints, joint widths, corners, supports, anchorages, trim, flashings, closures, and perimeter conditions.
 4. Scale: 1/2 inch to 1 foot (1:20).
 5. Materials list; include component model numbers.
- F. Selection Samples: Two sets, representing manufacturer's full range of available materials, finishes, and colors.
- G. Verification Samples:
1. For each selected material, color, and finish, submit two samples, minimum size 24 inches (609 mm) square, representing actual material and finish.
 2. Two samples of each type of accessory specified.
- H. Samples of Fabricated Materials: Submit full-scale sample of panel joint showing panel edge fabrication, primary members, anchors, expansion provisions, and sealers.
- I. Test Report for Finish: Certified test reports from independent testing agency documenting conformance of coating to specified requirements.
- J. Installer's qualifications.
- K. Manufacturer's printed installation instructions for architectural metal wall cladding components; include component storage requirements.

- L. Manufacturer's written instructions for maintenance of materials and finishes.

1.5 QUALITY ASSURANCE

- A. Designer's Qualifications: Structural engineer licensed to practice in the State in which the project is located.
- B. Manufacturer Qualifications: Minimum ten years documented experience producing architectural metal wall cladding similar to those specified in this section.
 - 1. Maintaining an in-house quality assurance program.
 - 2. Having sufficient capacity to produce the required systems within project time requirements.
- C. Installer Qualifications: Minimum five years documented experience installing architectural metal wall cladding similar to those specified in this section, and approved by manufacturer.
- D. Mock-Up: Construct mock-up using materials specified in this section.
 - 1. Construct mock-up at locations indicated or directed, and as follows:
 - a. Size: __ feet by __ feet (__ mm by __ mm).
 - b. Include panels, reveals if any, indicated accessories, fasteners, and anchors.
 - 2. Obtain Architect's acceptance of mock-up before beginning construction activities of this section; accepted mock-up will be standard by which completed construction activities of this section is judged.
 - 3. Mock-up may not remain as part of work.
 - 4. Accepted mock-up may remain as part of work.
- E. Pre-Installation Meeting: Convene at job site seven calendar days prior to scheduled beginning of construction activities of this section to review requirements of this section.
 - 1. Require attendance by representatives of the following:
 - a. Installer of this section.
 - b. Other entities directly affecting, or affected by, construction activities of this section.
 - 2. Notify Architect four calendar days in advance of scheduled meeting date.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store components in manner to prevent bending, warping, twisting, and surface damage.

- B. Deliver and store components of this section in manufacturer's unopened packaging until installation.
- C. Store components off ground/floor on skids; protect against warpage, scratches, damage from moisture, exposure to direct sunlight, and other surface contamination until installation.

1.7 WARRANTY

- A. Written warranty signed by manufacturer and installer warranting that architectural metal wall cladding is free from defective materials and installation, and is in conformance with Contract Documents, and further warranting repair or replacement of defective materials or installation at no additional cost, and at the convenience of the Owner, for five year period following Substantial Completion. Defective is defined to include, but not be limited to, the following:
 - 1. Early deterioration, aging, or discoloration of finish, gaskets, or other components.
 - 2. Uncontrolled penetration of air or water.
 - 3. Failure of the system to meet performance requirements.
- B. Written warranty signed by manufacturer and installer warranting that finish will not develop excessive fading or excessive non-uniformity of color or shade, and will not crack, pit, peel, corrode, or otherwise fail as a result of defects in materials or installation, and further warranting repair or replacement of defective materials and installation at no additional cost, and at the convenience of the Owner, for a ten year period following Substantial Completion.
 - 1. Excessive fading is defined to mean a change of appearance which is perceptible and objectionable, as determined by the Owner's representative when visually compared with the original color range standard.
 - 2. Pit or corroding is defined as being discernible from a distance of 10 feet (3 m), resulting from the natural elements in the atmosphere at the project site.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Metalwerks Division, Metal Sales and Service, Inc., P.O. Box 637, Kennett Square, PA 19348. ASD. Tel: (800) 321-7816.
- B. Requests for substitution will be considered in accordance with provisions of Section 01600.
- C. Substitutions: Not permitted.
- D. Provide all components specified in this section from the same manufacturer.

2.2 ARCHITECTURAL METAL WALL CLADDING SYSTEM

- A. Wall Cladding System - Performance:
 - 1. Air infiltration: _____ cubic feet per minute per square foot (____ cu m/h per sq m) at ____ pounds per square foot (____ kPa) pressure.
 - 2. Water infiltration: _____ cubic feet per minute per square foot (____ cu m/h per sq m) at ____ pounds per square foot (____ kPa) pressure, maximum.
 - 3. Wind load resistance: Withstand 30 pounds per square foot (14 kPa), positive and negative pressure, overall, and 60 pounds per square foot (29 kPa), positive and negative pressure, at corners; without breakage, component disengagement, or permanent distortion.
 - 4. Normal-to-wall deflection: Maximum 1/240 of clear span, or 1/4 inch (6 mm), whichever is less, at full design load for each panel.
 - 5. Permanent deflection of members: Maximum 0.1 percent of clear span under 150 percent of anticipated loads, including windloads, direct loading, structural movement, structural deflection, and erection tolerances.
 - 6. Structural movement: Accommodate anticipated structural movement without loss of water infiltration integrity, air infiltration integrity, oil-canning of components, or other result which would impair appearance or performance of metal cladding system.
 - 7. Joints: Design for minimum shear forces on sealant bead and for joint sealer beads uninterrupted by anchors, shims, or other components.

- B. Wall Cladding System: Metalwerks Arc Wall System _____; factory-fabricated aluminum panel system, complete with all connections, supports, and anchors, with dimensions based on actual field measurements and coordinated with adjacent work.
1. Drainage: 1/2 inch (13 mm) deep internal drainage/furring system behind vertical and horizontal joints, with vertical gutters draining into horizontal gutters, and horizontal gutters draining to exterior of panel system at indicated locations; gutters sealed to back flange of panels with gaskets.
 2. Exposed components: Fabricated from materials selected for surface flatness, smoothness, and freedom from surface blemishes.
 3. Edges: Straight, with bending radii not less than minimum recommended by material supplier.
 4. Fasteners and anchors: Concealed; exposed fasteners not permitted except as indicated on approved shop drawings.
 5. Fabricate components as indicated on approved shop drawings.
- C. Panels: Pan-type, with formed right-angle returns and welded corners.
1. Panel depth: 1-1/2 inch (38 mm).
 2. Panel depth: 2 inches (50 mm).
 3. Welds: Fully welded, then ground to finish matching adjacent non-welded surfaces.
 4. Attachment flanges: For four-sided attachment, with opposing flanges offset for flush appearance.
 5. Attachment flanges: Shiplap-type, for overlapping, weather-shedding, horizontal joint; for panel anchorage on one flange only.
 6. Vertical and horizontal panel joints: For exposed, field-applied sealant with backer rod.
 7. Vertical panel joints: For dry gasket seals or exposed, field-applied sealant with backer rod, at manufacturer's option.
 8. Horizontal panel joints: Internally sealed with factory-applied butyl sealant or for exposed, field-applied sealant with backer rod, at manufacturer's option.
 9. Vertical panel joints: For dry gasket seals or exposed, field-applied sealant with backer rod, at manufacturer's option.

10. Horizontal panel joints: Internally sealed with factory-applied butyl sealant.
11. Integral flanges opposing attachment flanges: 2 inch by 1/2 inch (50 mm by 13 mm) channel for structural spanning capability and maximum panel rigidity.
12. Concealed hook-on cleat fastener engagement.
13. Curved panels: Accurately factory-formed to radii with no apparent seams between panel face and legs of panels or trim.
14. Fascia panels: Also provide 1/4 inch (6 mm) splice in vertical joints with backup plate.
15. Profiled panels: Where formed returns are not possible, use welded end caps, miters, and returns ground smooth prior to finishing.
16. Dimensions: As indicated, for joint width indicated, on approved shop drawings.
17. Panel dimensional tolerances:
 - a. Panel Bow: 0.2 percent of panel dimension in width and length, or 0.1875 inch (4.7 mm), whichever is greater, maximum.
 - b. Width or Length: Plus or minus 0.032 inch (0.8 mm) for width or length dimension up to 48 inches (1220 mm), plus or minus 0.064 inch (1.6 mm) for width or length dimension 48 inches (1220 mm) to 144 inches (3660 mm).
 - c. Thickness: Plus or minus 0.008 inch (0.19 mm).
 - d. Squareness: 0.1875 inch (4.7 mm) difference between diagonal measurements.
 - e. Camber: 0.032 inch (0.8 mm).
18. Finish: Fluoropolymer coating.
19. Finish: Polyester powder coating.

2.3 MATERIALS

- A. Panels: Aluminum sheet with strength and durability not less than that required for ASTM B 209/ASTM B 209M, alloy and temper 3003 H-14 or 5005 H-32AQ.
 1. Sheet thickness: Minimum 0.125 inch (3.2 mm).
- B. Fluoropolymer Coating Finish: Polyvinylidene fluoride three-coat coating system, applied by coater certified by coating manufacturer, conforming to AAMA 605.2, and as follows:
 1. Pretreatment: Chemical etch with cleaner specified by coating manufacturer.

2. Primer: Acid-resistant primer coating specified by coating manufacturer; dry film thickness range 0.2 to 0.3 mils (0.005 to 0.007 mm).
 3. Color Coat: Containing minimum 70 percent polyvinylidene resin by weight; Kynar 500(R) or Hylar 5000(R); dry film thickness of 0.8 to 1.2 mils (0.02 to 0.03 mm).
 4. Top Coat: Clear top coating containing minimum 70 percent polyvinylidene resin by weight; minimum dry film thickness of 0.8 mils (0.02 mm).
 5. Color: _____.
 6. Color: Selected from full range of coating manufacturer's standard colors.
 7. Color: Match Architect's sample.
- C. Polyester Powder Coating Finish: Manufacturer's standard electrostatically-applied or spray-applied polyester powder coating system as follows:
1. Multi-stage pretreatment process in accordance with ASTM D 1730, Type B, method 5 or 7, and DIN 50939.
 2. Finish coat: One coat commercial-grade polyester powder coating.
 3. Second finish coat: Additional coat commercial-grade polyester powder coating.
 4. Total coating thickness: 2.5 to 3.5 mils (0.06 to 0.08 mm) dry film thickness on panel face; 3.5 to 5 mils (0.08 to 0.12 mm) dry film thickness on panel edges and corners.
 5. Color: _____.
 6. Color: Selected from full range of manufacturer's standard colors.
 7. Color: Match Architect's sample.
- D. Panel Accessories: Same material, sheet thickness, and finish as adjacent panels, unless otherwise indicated; including ceiling/soffit panels, fascia panels, reveals, ceiling closures, and joint sealer recesses.
- E. Clips, Stiffeners, and Retainers: Formed or extruded stainless steel or aluminum, designed for concealed installation and specified performance criteria.
1. Screws: AISI type 305 stainless steel, self-tapping, with aluminum washers and rubber grommets; self-drilling fasteners not permitted.
 2. Bolts, nuts, and washers: AISI type 305 stainless steel.

- F. Studs, Purlins, and Sub-Girts: Channel sections roll-formed of galvanized steel sheet conforming to ASTM A 653/A 653M SQ, with hot-dip G90/Z275 zinc coating, minimum 16 gage (1.6 mm); minimum 3/4 inch (19 mm) depth; sizes as indicated and as required to allow for adjustment.
- G. Steel Angles, Plates, Bars, Rods, and Accessories: Structural steel shapes conforming to ASTM A 36/A 36M, or formed steel sheet conforming to ASTM A 366/A 366M; hot-dip galvanized after fabrication in accordance with ASTM A 123, G90 coating, or coated after fabrication with epoxy paint, minimum of 0.0785 inch (2 mm) thick.
- H. Accessory Materials: Provide concealed gaskets, fillers, insulation, and other materials as required to complete the installation.
- I. Concealed Gaskets: Vinyl or rubber.
- J. Sheet Metal Flashing and Trim Associated with Cladding System: Same material and finish as panels, and as specified in Section 07620.
- K. Joint Sealants: As specified in Section 07900, and as recommended by panel manufacturer.
- L. Thermal Insulation: As specified in Section 07210.
- M. Bituminous Paint: Cold-applied asphalt mastic, SSPC Paint 12, formulated for 15 mil (0.3 mm) dry film thickness per coat.

2.4 FABRICATION

- A. Welding:
 - 1. Use electrodes and methods recommended by manufacturer of material being welded, and in accordance with applicable AWS standards.
 - 2. Use only methods which prevent distortion and discoloration of exposed faces.
 - 3. Grind weld areas smooth, using only clean equipment and materials free of iron or iron compounds.
 - 4. Restore finish of welded areas component parts to finish matching adjacent non-welded surfaces after welding and grinding.

- B. Complete forming and welding of panels before applying specified finish.
- C. Shop Coating: If galvanizing on framing members is not compatible with alloy of component parts, apply shop coat of epoxy paint, minimum coating thickness 0.0785 inches (1.99 mm), after cutting members to size.
- D. Apply protective masking to surfaces which will be exposed in finished work; ensure that masking materials, including adhesive, will not adversely affect appearance of components.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify the following:
 - 1. Dimensions of locations to receive architectural metal wall cladding are in accordance with approved shop drawings.
 - 2. Substrates to receive architectural metal wall cladding are prepared for installation of metal wall cladding.
 - 3. Substrates are within tolerances to allow plane tolerances specified in this section.
- B. Examine areas and conditions under which work is to be performed. Do not start work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install components in accordance with approved shop drawings.
- B. Concealed Supports and Fastening Systems: Install in accordance with referenced AISC publications. Perform welding as specified for fabrication.
- C. Panels: Install to specified tolerances, with hairline joints between adjacent components.
 - 1. Field cutting of panels not permitted.
 - 2. Do not install panels that are bowed, warped, or otherwise damaged or impaired in appearance.

- D. Anchor with concealed fasteners; provide separators to prevent freeze-up of moving joints, corrosion, and electrolytic action.
- E. Protect metal surfaces from corrosion and electrolytic action by applying two coats bituminous paint on surfaces which will be in contact with concrete, masonry, or dissimilar metals; secure fastening systems to substrates using anchors specified in approved shop drawings.
- F. Accessories:
 - 1. Install to achieve weathertight assembly as construction activities progress.
 - 2. Tool sealants to concave profile, cleaning excess sealant materials from panel surfaces in the process.
- G. Installation Tolerances:
 - 1. Maximum variation from plumb, plane, level, slope, or location in plan: 1/4 inch in 20 feet (5 mm in 5 m), non-cumulative.
 - 2. Maximum variation in horizontal and vertical joint alignment: Plus or minus 1/16 inch (1.5 mm).

3.3 CLEANING

- A. After removing factory-applied masking, clean surfaces using materials and methods specified in manufacturer's instructions.

3.4 PROTECTION

- A. Protect installed components from damage to finish or function by subsequent construction activities; do not remove factory-applied masking from components until time of Substantial Completion.
- B. Repair damaged components and finishes, if any, in accordance with manufacturer's recommendations; replace components which cannot be repaired to Architect's acceptance.

END OF SECTION