07415: ARCHITECTURAL METAL CLADDING PRODUCTS

PART 1: GENERAL

1.01 SCOPE

A. SECTION INCLUDES:

1. The extent of panel system work is indicated on the drawings and in these specifications.
2. Panel system requirements include the following components:
    a. Architectural metal panels with mounting system. Panel mounting system including anchorages, shims, furring, fasteners, sealants, related flashing, and protective film (as required) for a complete installation.
    b. Wall cladding, parapet coping, beam wraps, cornices, soffit, sills, border, and filler items indicated as integral components of the panel system or as designed.

B. RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Technical Specification Divisions 2 through 16 apply to this Section.

C. RELATED WORK SPECIFIED ELSEWHERE:

1. Section 05100: Structural Steel
2. Section 05400: Cold Formed Metal Framing
3. Section 06100: Back Up Walls
4. Section 07200: Insulation
5. Section 07270: Air Water Barriers
6. Section 07480: Exterior Sheathing
7. Section 07600: Metal flashing and Counter Flashing
8. Section 07920: Caulking and Sealants

1.02 QUALITY ASSURANCE

1. Architectural Metal Panel System Fabricator shall have a minimum of 10 years experience in the manufacturing of this product.
2. Installer: Shall have experience installing metal cladding system similar to that required for a period of not less than 10 documented years.
3. Maximum deviation from vertical and horizontal alignment of erected panels: 1/4” in 20' non-accumulative.
4. Panel fabricator/installer shall assume undivided responsibility for all components of the exterior panel system including, but not limited to attachment to sub-construction, panel to panel joinery, panel to dissimilar material joinery, and joint seal associated with the panel system.
5. Shop Drawings shall be prepared by the Fabricator of the Cladding systems.
6. Systems shall be previously tested for Performance criteria specified herein.
7. To assure a high quality wall system the appropriate air and water barrier should be installed on the substrate behind the metal wall panels.

1.03 REFERENCES

A. ALUMINUM ASSOCIATION - AA.

1. Aluminum Standards and Data.

B. AMERICAN ARCHITECTURAL MANUFACTURER’S ASSOCIATION - AAMA.

1. AAMA 2605 Voluntary Specification for High Performance Organic Coatings on Architectural Aluminum Extrusions and Panels.
2. AAMA 501.1: Dynamic water penetration test

C. AMERICAN SOCIETY FOR TESTING OF MATERIALS – ASTM – RELEVANT TESTS INCLUDE:

1. ASTM E283: Rate of Air Leakage by Uniform Static Air Pressure Difference.
2. ASTM E330: Structural performance by Uniform Static Air Pressure Difference including test to failure under negative load.
3. ASTM E331: Water Penetration by Uniform Static Air Pressure Difference.

1.04 SUBMITTALS

A. SUBMITTALS:

1. Submittals shall be in conformance with this section and with the general conditions.

B. SAMPLES:

1. Panel System Assembly: Two samples of typical assembly, 12" x 12" minimum.
2. Two samples of each color or finish selected, 3" x 4" minimum.

C. SHOP DRAWINGS:

Submit shop drawings showing project layout and elevations; fastening and anchoring methods; detail and location of joints, sealants including joints necessary to accommodate thermal movement; trim; flashing; and accessories.

D. CALCULATIONS:

Provide calculations or wind load charts prepared by a professional engineer certifying the system's compliance with design pressures for panel deflection and fastener loads.

E. SECONDARY SUPPORTS DESIGN:

Design, fabricate, and install secondary structural components of the metal cladding system (which may be required in conditions of beam or column enclosures, cornices or other three dimensional shapes) with a factor of safety not less than 1.5 (basis for design calculations shall be 1.5 times the maximum design wind pressure), such that failure of any panel component shall not occur at less than 1.5 times the maximum design wind pressure. Failure is defined as breakage, component disengagement, or permanent distortion.

1.05 WARRANTY

A. SUBMIT IN ACCORDANCE WITH DIVISION 1 – CLOSEOUT SUBMITTALS.

B. WORKMANSHIP WARRANTY:

1. Written warranty signed by manufacturer and installer warranting that portions of the work involving metal panels are of good quality, free from defects, and in conformance with the requirements of the Contract Documents. Further guarantee to repair or replace defective work during a one year period following Substantial Completion of the work.
2. Defective is defined to include failure of the system to meet structural performance requirements and/or permanent deformation resulting from pressures within the design criteria.

C. FINISH WARRANTY:

1. Written warranty signed by manufacturer warranting that the painted 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 defect in materials and workmanship. Further guarantee to repair or replace defective work during a ten year period following substantial completion of the work. Upon notification of defects within the warranty period, make necessary repairs or replacement at the convenience of the owner.

D. WARRANTY SHALL SPECIFICALLY INCLUDE THE APPLICABLE WORK OF THE FOLLOWING SECTIONS OF THE SPECIFICATIONS.

1. Section 07600 - Flashing and Sheet Metal.
2. Section 07900 - Joint Sealants.

1.06 DELIVERY, STORAGE AND HANDLING:

A. Deliver units and other components so they will not be subject to damage or deformation. Deliver panel units in crates designated for specific locations on the building as coordinated between GC and installer. Crates shall be able to withstand hoisting loads relevant to the project.

B. Storage: Stack components off the ground/floor on suitable skids in fully enclosed space. Protect against warpage, scratches, damage from moisture, exposure to direct sunlight and other surface contamination.

C. Handling: Exercise care in loading, unloading, storing, and installing units so as to preclude bending, warping, twisting, and surface damage.

PART 2: PRODUCTS

2.01 PANELS

A. ARCHITECTURAL METAL PANEL SYSTEM:

1. Fabricators offering products which may be incorporated in the work, but are not limited to, the following:

    a. Basis of Design is **Metalwërks® Arcwall 1500** by Metal Sales & Service Inc. of Kennett Square, Pa 19348 (800-321-7816 or website: www.metalwerksusa.com)

2. Arcwall 1500: Form panels to 1 ¾" depth with fully welded corners ground to a smooth finish prior to finishing. Flanges are formed for a (2) sided attachment (length of panel) typically or (4) sided where structurally required, as indicated on the contract drawings. Offset opposing flanges so depth will allow for a flush appearance. Perimeter joint width shall be 5/8" nominal or larger. Panels can be formed up to 13' optimal lengths and widths are restricted only by flat stock availability. Other lengths are available, consult Sales Dept. for size limitations. Total system depth is 2 ¼" which includes ½" nominal shim space to allow for construction tolerances.

    a. Intermediate panel stiffeners, where required by design loads applied to the panels, shall be structurally welded at ends to the panel flanges and shall be secured to the rear face of the panel with silicone of sufficient size and strength to maintain panel flatness. Stiffener material and/or finish shall be compatible with the silicone.

    b. Panel fasteners shall be stainless steel or cadmium plated for panel attachment in size and spacing as dictated by structural requirements.

    c. Panel joints will be sealed in the field with a nominal 5/8" joint sealer consisting of backer rod and caulking as recommended by the panel system supplier to meet system performance requirements.

    d. Cold formed metal framing, as required, formed to sizes indicated in a minimum #16 gage G-90 galvanized steel in a minimum depth of ¾".

2.02 MATERIALS

A. GENERAL:

1. Select materials for surface flatness, smoothness, and freedom from surface blemishes where exposed to view in the finished system.
2. Aluminum Sheet with minimum thickness of .125" with strength and durability properties specified in ASTM B 209 for 3003H-14 or 5005-H32AQ alloys.
3. Stainless Steel Sheet shall be type 304 in thicknesses of #18 gage, #16 gage, and #14 gage. Stainless steel is available in various textures and finishes, consult Sales Dept. for options.

2.03 FINISHES

A. Fluoropolymer Two or Three Coat Coating System: Manufacturer's standard two or three coat, thermo-cured system composed of specially formulated inhibitive primer, fluorocarbon color coat, and a clear fluorocarbon topcoat (applicable with three coat system). Both color coat and clear topcoat shall contain not less than 70% polyvinylidene resin by weight in compliance with AAMA 2605 for testing, performance, and application procedures.

1. Panels shall be chemically etched by an appropriate cleaner in accordance with manufacturer's written instructions.
2. Apply acid resistant primer to cleaned aluminum. Thickness range; 0.20 to 0.30 mils.
3. Apply polyvinylidene fluoride (PVF2) resinated color coat. Thickness range; 0.8 to 1.2 mils.
    a. Kynar 500. Must be applied by certified Kynar coater.
    b. Hylar 5000. Must be applied by certified Hylar coater.

4. Apply clear top coat finish as extra protection, no less then 0.8 mils thick. Comply with AAMA 2605 standards.
5. Color: Match owner's representatives' sample, or if none, from manufacturer's standard selection.
6. Properties: Meet or exceed requirements of AAMA 605.2.
7. Stainless Steel sheet shall receive a factory applied finish, #2B, #4, #6, & #8 mill polished finishes. Specialty finishes and textures available, consult Sales Dept.

2.04 DESIGN CRITERIA

A. Architectural Metal panels shall be capable of withstanding building movements and weather exposures based on the following test standards required by the Architect and/or the local building code.

a. Wind Load

Panels shall be designed to withstand the Design Wind Load specified herein as Positive ____ PSF & Negative ____ PSF at typical zones and Positive ____ PSF & Negative ____ PSF at corner zones. Wind load testing shall be conducted in accordance with ASTM E 330 to obtain the following results.

Normal to the plane of the wall between supports, deflection of the secured perimeter framing members shall not exceed L/175 or ¾" whichever is less.

Normal to the plane of the wall, the maximum panel deflection shall not exceed L/60 of the full span. No permanent deformation of the panel system will be allowed.

b. Air and Water Infiltration Tests

If system tests are not available, mock-ups shall be constructed and tests performed under the direction of an independent third party laboratory, which show compliance to the following minimum standards:

Air Infiltration - When tested in accordance with ASTM E 283, air infiltration at 1.57 lb/ft² (75 Pa) must not exceed 0.06 ft^3/min. per ft² of wall area (305 cm^3/s per m^2 of wall area).

Water Infiltration - Water infiltration is defined as uncontrolled water leakage through the exterior face of the assembly. No water infiltration shall occur in any system under a differential static pressure of 6.24 lb/ft² (300 Pa) after 15 minutes of exposure in accordance with ASTM E 331.

2.05 ACCESSORIES

1. Sealants within the panel system shall be as per manufacturer's standards to meet performance requirements.
2. Internal Flashing: sheet metal flashing which may be required at base or penetration conditions will be produced in the same material finish as the adjacent panels but will be provided in minimum .040" thickness or 24 ga 304 2B Stainless steel.
3. Coping: Wall copings will be produced with the same material as the wall panel system unless otherwise noted. Sheet Metal Flashing extensions will be acceptable in non- viewing areas in accordance with Manufacturer's recommended details.
4. Furring/Supports: Wall panels will be attached to minimum 16 ga. g-90 steel studs or furring.
5. Fasteners: Type 304 Stainless Steel or Cadmium plated as recommended for specific application.
6. Shims: High impact plastic shims will be used to maintain planar surfaces.

PART 3: EXECUTION

3.01 INSPECTION

1. Surfaces to receive panels shall be even, smooth, sound, clean, dry and free from defects detrimental to work. Notify contractor in writing of conditions detrimental to proper and timely completion of the work. Do not proceed with erection until unsatisfactory conditions have been corrected.

2. Surfaces to receive panels shall be structurally sound as designed by the project Architect/Engineer.

3.02 INSTALLATION

1. Erect panels plumb, level, and true.
2. Attachment system shall allow for the free vertical and horizontal thermal movement due to expansion and contraction for a material temperature range of -20°F to +180°F (-29°C to +82°C). Buckling of panels, opening of joints, undue stress on fasteners, failure of sealants or any other detrimental effects due to thermal movement will not be permitted.

3. Panels shall be erected in accordance with an approved set of shop drawings.
4. Anchor panels securely and in accordance with approved shop drawings to allow for necessary thermal movement and structural support.
5. Conform to panel fabricator's instructions and/or approved shop drawings for installation of concealed fasteners.
6. Do not install component parts that are observed to be defective, including warped, bowed, dented, abraded, and broken members. Contact manufacturer for replacement and/or repairs.
7. Do not cut, trim, weld, or braze component parts during erection in a manner which would damage the finish, decrease strength, or result in visual imperfection or a failure in performance. Return component parts which require alteration to shop for re-fabrication, if possible, or for replacement with new parts.
8. Separate dissimilar metals where needed to eliminate the possibility of corrosive or electrolytic action between materials.
9. Installation Tolerances: Shim and align panel units within installed tolerances of 1/4 inch in 20 feet, non-cumulative, on level/plumb/slope and location/line as indicated, and within 1/16 inch offset of adjoining faces and of alignment of matching profiles.

3.03 ADJUSTING AND CLEANING

1. Remove and replace panels damaged beyond repair as a direct result of the panel installation. After installation, panel repair and replacement shall become the responsibility of the General Contractor.
2. Repair panels with minor damage.
3. Remove protective film as soon as possible after installation.
4. Any additional protection, after installation, shall be the responsibility of the General Contractor.
5. Final cleaning shall not be part of the work of this section.