Guide Specification:
Envelope 2000® - Reveal (RV) System

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SECTION 07 42 43 - COMPOSITE WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Wall panel assembly consisting of:
a. Metal Composite Material (MCM)
b. Installation System
c. Accessories
2. The extent of the wall panel assembly as indicated in these specifications and in the drawings.

B. Related Sections:
1. Section 05 10 00 - Structural Metal Framing
2. Section 06 10 00 - Rough Carpentry
3. Section 07 20 00 - Thermal Protection
4. Section 07 60 00 - Flashing And Sheet Metal
5. Section 07 90 00 - Joint Protection
6. Section 08 80 00 - Glazing
7. Section 08 40 00 - Entrances, Storefronts, And Curtain Walls
8. Section 08 50 00 - Windows

1.2 REFERENCES

A. American Society For Testing And Materials (ASTM)

1.	ASTM B117	Standard Practice For Operating Salt Spray (Fog) Apparatus
2.	ASTM B137	Standard Test Method For Measurement Of Coating Mass Per Unit Area On Anodically Coated Aluminum
3.	ASTM B211	Standard Specification For Aluminum And Aluminum-Alloy Rolled Or Cold Finished Bar, Rod, And Wire
4.	ASTM B680	Standard Test Method For Seal Quality Of Anodic Coatings On Aluminum By Acid Dissolution
5.	ASTM C267	Standard Test Methods For Chemical Resistance Of Mortars, Grouts, And Monolithic Surfacings And Polymer Concretes
6.	ASTM C297	Standard Test Method For Flatwise Tensile Strength Of Sandwich Construction
7.	ASTM C1371	Standard Test Method For Determination Of Emittance Of Materials Near Room Temperature Using Portable Emissometers
8.	ASTM D523	Standard Test Method For Specular Gloss
9.	ASTM D635	Standard Test Method For Rate Of Burning And/Or Extent And Time Of Burning Of Plastics In A Horizontal Position

10.	ASTM D714	Standard Test Method For Evaluating Degree Of Blistering Of Paints
11.	ASTM D968	Standard Test Methods For Abrasion Resistance Of Organic Coatings By Falling Abrasive
12.	ASTM D1308	Standard Test Method For Effect Of Household Chemicals On Clear And Pigmented Organic Finishes
13.	ASTM D1781	Standard Test Method For Climbing Drum Peel For Adhesives
14.	ASTM D1929	Standard Test Method For Determining Ignition Temperature Of Plastics
15.	ASTM D2244	Standard Practice For Calculation Of Color Tolerances And Color Differences From Instrumentally Measured Color Coordinates
16.	ASTM D2247	Standard Practice For Testing Water Resistance Of Coatings In 100% Relative Humidity
17.	ASTM D2248	Standard Practice For Detergent Resistance Of Organic Finishes
18.	ASTM D2794	Standard Test Method For Resistance Of Organic Coatings To The Effects Of Rapid Deformation (Impact)
19.	ASTM D3359	Standard Test Methods For Measuring Adhesion By Tape Test
20.	ASTM D3363	Standard Test Method For Film Hardness By Pencil Test
21.	ASTM D4145	Standard Test Method For Coating Flexibility Of Prepainted Sheet
22.	ASTM D4214	Standard Test Methods For Evaluating The Degree Of Chalking Of Exterior Paint Films
23.	ASTM D5420	Standard Test Method For Impact Resistance Of Flat, Rigid Plastic Specimen By Means Of A Striker Impacted By A Falling Weight (Gardner Impact)
24.	ASTM E84	Standard Test Method For Surface Burning Characteristics Of Building Materials
25.	ASTM E283	Standard Test Method For Determining Rate Of Air Leakage Through Exterior Windows, Curtain Walls, And Doors Under Specified Pressure Differences Across The Specimen
26.	ASTM E330	Standard Test Method For Structural Performance Of Exterior Windows, Doors, Skylights And Curtain Walls By Uniform Static Air Pressure Difference
27.	ASTM E331	Standard Test Method For Water Penetration Of Exterior Windows, Skylights, Doors, And Curtain Walls By Uniform Static Air Pressure Difference
28.	ASTM E903	Standard Test Method For Solar Absorptance, Reflectance And Transmittance Of Materials Using Integrated Spheres

B. American Architectural Manufacturers Association (AAMA)

1.	AAMA 2605	Voluntary Specification, Performance Requirements And Test Procedures For Superior Performing Organic Coatings On Aluminum Extrusions And Panels

1.3 DEFINITIONS

A. Metal Composite Material (MCM):
A factory manufactured panel consisting of metal skins bonded to a plastic core, as defined by the International Building Code (IBC) Section 1402.

B. Leadership In Energy And Environmental Design (LEED):
A set of guidelines set forth by the United States Green Building Council (USGBC) to promote the building of environmentally responsible and sustainable structures.

C. ISO 9001:2008
A set of guidelines set forth by the International Organization For Standardization (ISO) to provide guidance and tools for companies and organizations who want to ensure that their products and services consistently meet customer’s requirements, and that quality is

consistently improved.

1.4 SYSTEM DESCRIPTION

A. Design Requirements:
1. Barrier System:
Wall panel assembly shall be designed in accordance with manufacturer's guidelines to be sealed at all panel joints, intersections, dissimilar material abutments, and cutouts, thus providing a weathertight barrier system.
2. Expansion And Contraction:
Wall panel assembly shall be designed with provisions for thermal expansion and contraction of the component parts to prevent buckling, failure of joint seals, undue stress on fasteners or other detrimental effects due to accumulation of dead loads and various live loads.
3. Windload:
Wall panel assembly shall be designed to withstand a positive and negative windload pressure acting inward and outward normal to the plane of the wall to meet the requirements of the latest adopted Local Building Code.

B. General Performance:
Wall panel assembly shall comply with performance requirements, as determined by the following testing performed by a qualified agency.

1.5 SUBMITTALS

A. Product Data:
1. Submit manufacturer's datasheet for specified product.
2. Submit manufacturer's installation guidelines for specified product.
3. Submit manufacturer's literature indicating pre-consumer and post-consumer percentages of recycled content in the context of LEED MR Credit 4.1 and/or MR Credit 4.2.
4. Submit manufacturer's literature indicating compliance with the American Recovery & Reinvestment Act (ARRA), Section 1605.

B. Shop Drawings:
Submit shop drawings indicating project layout and elevations, fastening and anchoring methods, dimensions of individual components and profiles, detail and location of joints, sealants and gaskets, flashing and accessories.

C. Samples:
1. Submit two (2) samples 3" x 5" of each product specified.
2. Submit two (2) samples 3" x 5" of each finish specified.

D. Test Reports:
Submit test reports indicating compliance of products with specified performance requirements from an independent testing agency.

E. Warranty:
Submit manufacturer's warranty meeting the requirements of this section.

1.6 QUALITY ASSURANCE

A. Qualifications:
1. Manufacturer:
Manufacturer shall have a minimum of ten (10) years experience in the manufacture of this product, shall be an ISO 9001:2008 Registered

Company, and shall be located within the United States of America.

2. Installer:
Installer shall be experienced in performing work of this section and in work of similar scope required by this project.

B. Pre-Installation Meeting:
Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Acceptance At Site:
Materials to be packaged to protect against transportation damage. Examine materials upon receipt to insure that no damage has occured during shipment.

B. Storage And Protection:
1. Storage:
Materials should be stored horizontally on pallets or platforms, covered with a suitable ventiliated and weathertight covering. Do not store materials where accumulation of moisture may occur or in contact with materials that might cause staining, denting, or other damage.
2. Material Handling:
Use care in unloading, storing, and erecting the materials to prevent bending, warping, and twisting. Protect finish and edges from damage. The protective film on the panel surface is to remain in place until installation and shall be removed immediately upon completion.

1.8 PROJECT CONDITIONS

A. Field Measurements:
Verify location and dimension of all elements related to the installation of the wall panel assembly. Indicate those measurements on the shop drawings.

B. Limitations:
Proceed with installation of the wall panel assembly only when existing site conditions comply with manufacturer's recommendations.

1.9 WARRANTY

A. Metal Composite Material (MCM):
1. Panel:
The integrity of the panel bond will remain intact for a minimum of ten (10) years from the Date Of Substantial Completion.

2. Finish:
a. Polyvinylidene Fluoride (PVDF):
1) The finish will not have a Fade Differential of greater than 5E units. Testing shall be in accordance with ASTM D2244.
2) The finish will not have a Chalk Rating of less than 8. Testing shall be in accordance with ASTM D4214.
3) The finish will not check, peel, lose adhesion or fracture (other than minute fractures which may develop due to fabrication and which are acceptable by industry standards on the Date Of Substantial Completion).
4) Warranty period shall be thirty (30) years from the Date Of Substantial Completion.

b. Anodized:
1) The finish will not check, peel, lose adhesion or fracture (other than minute fractures which may develop due to fabrication and which are acceptable by industry standards on the Date Of Substantial Completion).
2) Warranty period shall be twenty (20) years from the Date Of Substantial Completion.

B. Installation System:
1. Fabricator and/or installer standard form in which they agree to repair or replace components of metal-faced composite wall panel assemblies that fail in materials or workmanship within specified warranty period.
2. Weathertight warranties or other such guarantees regarding installation shall be the responsibility of the installing contractor.

C. Accessories:
Warranties or other such guarantees regarding accessories used during installation shall be the responsibility of the installing contractor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer:
Citadel Architectural Products; 6198 W Airport Blvd; Greenfield, IN 46140
ph: (800) 446-8828; fax: (800) 247-2635; www.citadelap.com; info@citadelap.com

B. Subtitutions:
1. Not permitted without approval of the architect 10 days prior to bid.
2. Items being submitted for consideration must be of the same function and meet the performance requirements set forth in this section.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
1. Product Data:
Submit product data including testing performed by a qualified agency indicating compliance with performance requirements specified in this section.
2. Samples:
Submit two (2) samples 3" x 5" of each proposed product substitution.

2.2 WALL PANEL ASSEMBLY

A. Metal Composite Material (MCM):
1. Panel:
Envelope 2000® as manufactured by Citadel Architectural Products
a. Composition:
Face: .024" (min) prefinished smooth aluminum
Core: .105" thermoset phenolic resin
Back: .010" primed smooth aluminum
b. Thickness: 4mm (nominal)
c. Weight: 1.25 lbs/ft²
d. Tolerance:
Thickness: ±1/32"
Length / Width: +0, -1/8"

Squareness: 1/64" per lineal ft

e. Performance:

1) Surface Burning Characteristics:
Panel shall have a Class A rating with a Flame Spread Index less than 25, and a Smoke Developed Index less than 450.
Testing shall be in accordance with ASTM E84.

2) Bond Integrity:
Panel shall have a minimum peel strength of 22.5 lb-in/lb.
Testing shall be in accordance with ASTM D1781.

3) Ignition Temperature:
Panel shall have a minimum self-ignition temperature of 900° F.
Testing shall be in accordance with ASTM D1929.

4) Impact Resistance:
Panel shall not have a deformation measuring larger than 0.186" in diameter or 0.007" in depth after being struck by a falling ball at 24 in-lb.
Testing shall be in accordance with ASTM D5420.

5) Rate Of Burning:
Panel shall have a CC1 Classification indicating a burning extent of 1" (25.4mm) or less when tested at a nominal thickness of .060" (1.5mm) or thickness of intended use.
Testing shall be in accordance with ASTM D635.

6) Tensile Strength:
Panel shall have a mean value of 1650 lbs.
Testing shall be in accordance with ASTM C297.

2. Finish:

a. Polyvinylidene Fluoride (PVDF):

1) Type:
Kynar 500® coating using 70% resin.
Finish shall be in conformance with AAMA 2605.

2) Color:

a) As selected by Architect from manufacturer's color guide.

b) Custom color to match Architect's standard.

3) Composition:

a) Two-Coat Colors:
0.2-mil primer coat, 0.8-mil color coat

b) Three-Coat Colors:
0.2-mil primer coat, 0.8-mil color coat, 0.7-mil clear coat

4) Performance:

a) Gloss:
Finish shall have a gloss value of 20-35 at 60°.
Testing shall be in accordance with ASTM D523.

b) Solar Reflectance:
Finish shall have a value of >25% initial, >15% after 3 years for Steep Slope and a value of >65% initial, >50% after 3 years for Low Slope.
Testing shall be in accordance with ASTM E903.

c) Emissivity:
Finish shall have a value of 0.80 (80%) min.
Testing shall be in accordance with ASTM C1371.

d) Pencil Hardness:
Finish shall have a value of F-2H.
Testing shall be in accordance with ASTM D3363.

e) Flexibility:
Finish shall have a value of 0-2 T-bend, no pick off.
Testing shall be in accordance with ASTM D4145.

f) Adhesion:
Finish shall have a value of No Adhesion Loss.
Testing shall be in accordance with ASTM D3359.

g) Reverse Impact:
Finish shall have a value of No Cracking Or Adhesion Loss.
Testing shall be in accordance with ASTM D2794.

h) Abrasion:
Finish shall have a value of 65-85 l/mil.
Testing shall be in accordance with ASTM D968.

i) Mortar Resistance:
Finish shall have a value of No Effect.
Testing shall be in accordance with ASTM C267.

j) Detergent Resistance:
Finish shall have a value of No Effect using 3% detergent @ 100 F° (72 hrs).
Testing shall be in accordance with ASTM D2248.

k) Acid Resistance:
Finish shall have a value of No Effect using 10% muriatic acid (24 hrs) and No Effect using 20% sulfuric acid (18 hrs).
Testing shall be in accordance with ASTM D1308.

l) Acid Rain:
Finish shall have a value of No Objectionable Color Change after 15 cycle min.
Testing shall be in accordance with Kesternich SO2, DIN 50018.

m) Alkalai Resistance:
Finish shall have a value of No Effect using 10%, 25% NaOH (1 hr).
Testing shall be in accordance with ASTM D1308.

n) Salt Spray Resistance:
Finish shall have a value of No Face Blistering; Max average 1/16" scribe creep, passes 4000 hrs using 5% salt fog @ 95° F.
Testing shall be in accordance with ASTM B117.

o) Humidity Resistance:
Finish shall have a value of Passes 4000 hrs, No #8 blisters using 100% relative humidity @ 95° F.
Testing shall be in accordance with ASTM D714, ASTM D2247.

p) Exterior Exposure:
Finish shall have a value of Max 5 fade and Max 8 chalk at 10 yrs @ 45°, south Florida.
Testing shall be in accordance with ASTM D2244, ASTM D4214.

b. Anodized:

1) Type:
AA-C22-A21 (clear)
AA-C22-A23 (colored)

2) Color:
As selected by Architect from manufacturer's color guide.

3) Composition:

i. Anodized (clear):
barrier, aluminum oxide, nickel/hydrate seal

ii. Anodized (colored):
barrier, aluminum oxide, colorant, nickel/hydrate seal

4) Performance:

a) Salt Spray Resistance:
Testing shall be in accordance with ASTM B117.

b) Acid Dissolution:

Testing shall be in accordance with ASTM B680.

c) Gloss:
Testing shall be in accordance with ASTM D523.

d) Coating Mass:
Testing shall be in accordance with ASTM B137.

B. Installation System:
1. Reveal (RV) System:
a. Description:
Field-assembled installation system consisting of metal composite material (MCM), trim moldings, silicone sealant, and accessories to provide a barrier system.
b. Performance:
1) Air Infiltration:
Installation system shall not allow air infiltration in excess of 0.06 cfm/ft² at 1.57 psf.
Testing shall be in accordance with ASTM E283.
2) Structural Performance:
Installation system shall have a design load of 35.0 psf applied in the positive and negative direction. There shall be no deflection in excess of L/175 of the span of any support member nor shall there be any failure of the system. At a structural test load equal to 1.5 times the specified design load, no support member shall have permanent deformation in excess of 1/1000 of its span nor shall there be any failure of the system.
Testing shall be in accordance with ASTM E330.
3) Water Penetration:
Installation system shall not have uncontrolled water penetration to the room side at a static air pressure differential of 15.0 psf.
Testing shall be in accordance with ASTM E331.
c. Trim Moldings:
1) CRAX-1 Horizontal / Vertical (Reveal)
2) CRAX-2 Perimeter J (Reveal)
3) CRAX-3 Perimeter J
4) CRAX-4 Inside Corner
5) CRAX-5 Outside Corner
6) CRAX-6 Horizontal / Vertical (3" Reveal)
7) CRAX-7 Horizontal / Vertical
8) CRAX-8 Outside Corner (Adjustable)
9) CRAX-9 Inside Corner (Adjustable)

C. Accessories:
1. Extrusions:
a. Shall conform with ASTM B211 and the manufacturer's recommendations.
b. Shall be applied in accordance with the panel manufacturer's installation guidelines.
2. Sealants:
a. Selected from the panel manufacturer's approved list of sealants.
b. Shall be applied in accordance with both the panel manufacturer's installation guidelines and the sealant manufacturer's recommendations.
3. Fasteners:
a. Selected by contractor to suit project requirements.
b. Shall be applied using the recommended fastener schedule in accordance with panel manufacturer's installation guidelines.
c. Shall be coated to prevent corrosion and/or reaction with other materials.
d. Shall be concealed except where unavoidable. Exposed fasteners shall be finished to match adjoining metal.

4. Flashing:
   a. Selected by contractor to suit project requirements.
   b. Shall be installed in such a manner to maintain the integrity of the wall system against moisture intrusion.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrate to receive the work of this section to verify that the conditions are acceptable for installation.
   1. Substrate 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.
   2. Substrate to receive panels shall be in vertical and horizontal alignment with no more deviation than 1/4" in 20'.

B. Proceed with installation only after all unsatisfactory conditions have been corrected in a manner acceptable to installer. Starting work within a particular area will be construed as installer's acceptance of surface conditions.

3.2 PREPARATION

A. Verify dimensions as required.

B. Protect adjacent work areas and finished surfaces to prevent damage that otherwise might occur during the work of this section.

3.3 INSTALLATION

A. Wall panel assembly shall be installed in accordance with the manufacturer's written installation guidelines and the approved set of shop drawings.

B. Erect wall panel assembly level and true to the intended plane.

C. Maximum deviation from vertical and horizontal alignment of erected wall panel assembly shall be no more than 1/4" in 20'-0".

D. Maximum deviation in panel flatness shall be 0.6% of the assembled units.

E. Seal all joints as required using methods and materials as recommended by the panel manufacturer.

3.4 CLEANING

A. Remove panel masking immediately after installation. Delay will result in difficulty with removal and possibly residue on the panel surface.

B. Remove temporary coverings and protection to adjacent work areas.

C. Remove and legally dispose of construction debris from project site.

END OF SECTION