

SECTION 074213 FORMED METAL WALL PANELS

This suggested guide specification has been developed using the current edition of the Construction Specifications Institute (CSI) "Manual of Practice," including the recommendations for the CSI 3 Part Section Format and the CSI Page Format. Additionally, the development concept and organizational arrangement of the American Institute of Architects (AIA) MASTERSPEC Program has been recognized in the preparation of this guide specification. Neither CSI nor AIA endorse specific manufacturers and products. The preparation of the guide specification assumes the use of standard contract documents and forms, including the "Conditions of the Contract," published by the AIA.

Part 1 - GENERAL

1.1 Summary

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. Aluminum-faced composite panels with mounting system. Panel mounting system including anchorages, furring, fasteners, gaskets and sealants, related flashing adapters and masking for a complete installation.
 - b. Panel manufacturer recommends that system should include shop-installed aluminum stiffeners on all panels of 20 square feet or larger. Minimum stiffener recommendation is one per 20 square feet of panel area.
 - c. Parapet coping, column covers, soffits, sills, border and filler items may be indicated as integral components of the panels system or as designed.
 - d. All flashing metal required shall be provided by the panel manufacturer.
 - e. System to be fabricated and installed per local code requirements.

B. Related documents:

1. 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 Sections

1. 051200 "Structural Steel Framing"
2. 061000 "Rough Carpentry"
3. 072100 "Thermal Insulation"
4. 076200 "Sheet Metal Flashing and Trim"
5. 079200 "Joint Sealants"
6. 092000 "Plaster and Gypsum Board"

1.2 Quality Assurance

- A. Composite panel manufacturer shall have a minimum of 15 years' architectural experience in the manufacture of this product and be located within the continental USA.
- B. It is recommended that fabrication and installation of composite panels shall be from a single source. If not single source, both panel fabricator and the installer must show proof of past successful collaboration.
- C. Coordinate fabrication schedule with construction progress as directed by the contractor to avoid delay of work.
- D. Shop drawings shall show the preferred joint details providing a watertight and structurally sound wall panel system that allows no uncontrolled water penetration, on the inside face of the panel system as determined by ASTM E331.
- E. Maximum deviation from vertical and horizontal alignment of erected panels: 6 mm (1/4") in 6 m (20') non-accumulative.
- F. Panel fabricator and 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.

1.3 References

A. American Society for Testing and Materials (ASTM)

1. ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
2. 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.
3. ASTM D1781: Standard Test Method for Climbing Drum Peel Test for Adhesives.
4. ASTM E84: Standard Test Method for Surface-Burning Characteristics of Building Materials.
5. 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.
6. ASTM D3363: Standard Test Method for Film Hardness by Pencil Test.
7. ASTM D2794: Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
8. ASTM D3359: Standard Test Methods for Measuring Adhesion by Tape Test.
9. ASTM D2247: Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
10. ASTM B117: Standard Practice for Operating Salt Spray (Fog) Apparatus.
11. ASTM D822: Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
12. ASTM D1308: Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
13. ASTM D1735: Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus.
14. ASTM D1929: Standard Test Method for Determining Ignition Temperature of Plastics.
15. ASTM D635: Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in Horizontal Position.

B. Underwriters Laboratories

1. UL 1715: Room Fire Test Standard for Interior of Foam Plastic Systems. Standard for Fire Test of Interior Finish Material

C. American Architectural Manufacturers Association

1. AAMA-2605 Coil Coating Aluminum Substrates. High Performance Organic Coatings
On Coil Coated Architectural Aluminum Substrates

D. National Fire Protection Association (Excludes Face Fastened Solution System)

1. NFPA 285: Standard Method of Test for the Evaluation of Fire Propagation Characteristics of Exterior Non-Load Bearing Wall Assemblies Containing Combustible Components.
Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

1.4 Submittals

- A. Submittals shall be in conformance with section _____.

B. Samples

1. Panel assembly: Two samples of each type of assembly, 304 mm (12") x 304 mm (12") minimum.
2. Two samples of each color or finish selected, 76 mm (3") x 102 mm (4") minimum.
3. Custom-color samples will contain drawdown lines. Sizes for custom-color samples are limited.

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

- D. Fabrication Tickets: Submit fabrication drawings showing location and type of aluminum-extruded stiffeners at typical panels and at corner panels, if required.

1.5 Warranty

- A. The fabricator and installer will warrant the wall system for a period of 1 year that the fabrication and installation workmanship will be free from defects.
- B. The aluminum composite material manufacturer shall warrant for a period of 30 years against Max 5 fade based on ASTM D2244 and Max 8 chalk based on ASTM D4212 and delamination of the paint finish.

1.6 Packaging, shipping and handling

- A. Follow Manufacturer's Recommendations.
- B. Store Material in accordance with panel manufacturer's recommendations.

PART 2 - Products**2.1 Panels****A. Composite Panels**

1. Panels shall be Reynobond® Fire Resistant (FR) Aluminum Composite Materials Reynobond® (ACM) as manufactured by Arconic Architectural Products LLC (AAP), 50 Industrial Boulevard, Eastman, Georgia 31023. Contact Eastman plant at 1-800-841-7774 or 478-374-4746 or at www.reynobond.com
2. Other manufacturers are acceptable as long as they meet the same criteria as Reynobond in thickness, panel weight, bond integrity, fire rating, paint color and finish. ACM must be manufactured in the USA.

B. Fire Resistant Core (FR)

- C. Panel Thickness: RB160FR (4 mm) = 0.157" / RB240FR (6mm) = 0.236" (Editor Note: Select 4 mm or 6 mm)

- D. Panel Weight: RB160FR (4 mm) = 1.53 lbs/sft / RB240FR (6 mm) = 2.0 lbs/sft (Editor Note: Select 4 mm or 6 mm)

E. Product Performance**1. Bond integrity**

When tested for bond integrity, in accordance with ASTM D1781 (simulating resistance to panel delamination), there shall not be an adhesive failure of the bond a) between the core and the skin or b) cohesive failure of the core itself below the following values.

2. Peel Strength

100 N mm/mm (22.5 in lb./in.) As manufactured

100 N mm/mm (22.5 in lb./in.) After 21 days soaking in water at 70°F

3. Fire Performance

ASTM E84 – Passed Class A

F. Panel Finishes

Coil-coated Kynar 500® or Hylar 5000® based polyvinylidene fluoride (PVDF). AAP shall be Colorweld® 500 a fluoropolymer coating utilizing 70% Kynar 500® resins.

1. Color: To be chosen from AAP, Reynobond® standard series one, two or three colors.
2. Coating: Shall be factory applied on a continuous-process paint line. Coating shall consist of a 0.2 mil (approx.) prime coat and a 0.8 mil (approx.) finish coat containing 70% Kynar 500® resins. (If Colorweld® 500XL, coating shall consist of a 0.2 mil (approx.) barrier prime coat, a 0.80 mil (approx.) color coat, containing 70% Kynar 500® resins and a 0.5 mil (approx.) clear coat containing 70% Kynar 500® resins.) Nominal dry film thickness is 1.50 mils.
3. Gloss: ASTM D523 standard at 60° shall be 25-30.
4. Pencil hardness: ASTM D3363 shall be F-2H minimum.
5. Flexibility T-Bend: ASTM D4145 shall be 0-2T-Bend; no pick-off.
6. Adhesion: ASTM D3359 reverse impact 1/16" crosshatch shall show no cracking or adhesion loss.
7. Reverse Impact: ASTM D2794 1500 x metal thickness aluminum shall show no cracking or adhesion loss.
8. Acid Resistance: ASTM D1308, 10% muriatic acid, 24 hrs, shall show no effect. 20% sulfuric acid, 18 hrs, shall show no effect.
9. Acid Rain Test: Kesternich SO₂, DIN 500180, 10 cycles min. No objectionable color change.
10. Alkali Resistance: ASTM D1308, 10%, 25% NaOH, 1 hr., shall show no effect.
11. Salt Spray Resistance: ASTM B117, 5% salt fog at 95°F. Pass 4,000 hrs. less than 1/16" average creep from scribe; up to a few #8 blisters.
12. Humidity Resistance: ASTM D714 & ASTM D2247 100% relative humidity at 95°F, shall pass 4,000 hrs, # 8 blisters.
13. Exterior Exposure: 10 years at 45°, South Florida. ASTM D2244 shall be Max. 5 fade and ASTM D4214 shall be Max. 8 chalk.
14. Paint system shall meet the requirements of AAMA 2605 specifications.
15. (FEVE) Megaflon®, Coraflon®, Valflon® or any Lumiflon®-based paint systems are not acceptable.
16. Paint system shall have more than 20 years of architectural field use.

2.2 Panel Fabrication

A. Fire Resistant ACM is comprised of two sheets of aluminum sandwiching a solid core of extruded thermoplastic material formed in a continuous process using no glues or adhesives between dissimilar materials. The core shall be free of voids and/or air spaces and not contain foamed insulation materials. The bond between the core and the skins shall be a chemical bond. Products laminated sheet by sheet in a batch process using glues or adhesives between materials shall not be acceptable.

B. Aluminum Face Sheets

1. Thickness: 0.020"
2. Aluminum alloy shall be 3000 series or equivalent.

C. Tolerances

1. Panel Bow: Shall not exceed 0.8% of panel overall dimension in width or length.
2. Panel Dimensions: Field fabrication shall be allowed where necessary, but shall be kept to an absolute minimum. All fabrication shall be done under controlled shop conditions when possible. Panel dimensions shall be such that there will be an allowance for field adjustment and thermal movement.
3. Panel Lines: Breaks and curves shall be sharp and true, and surfaces free of warps or buckles.
4. Flatness: Panels shall be visually flat.
5. Panel Surfaces: Shall be free of scratches or marks caused during fabrication.

D. System Characteristics

1. Plans, elevations, details, characteristics and other requirements indicated are based upon standards by one manufacturer. It is intended that other manufacturers, receiving prior approval, may be acceptable, provided their details and characteristics comply with size and profile requirements, and material/performance standards.
2. System must not generally have any visible fasteners, telegraphing or fastening on the panel faces or any other compromise of a neat and flat appearance (excludes face fastened solution)
3. Fabricate panel system to dimension, size and profile indicated on the drawings based on a design temperature of 68°F (20°C).
4. Fabricate panel system to avoid compressive skin stresses. The installation detailing shall be such that the panels remain flat regardless of temperature changes and at all times remain air- and watertight.
5. The finish side of the panel shall have a removable protective film applied prior to fabrication, which shall remain on the panel during fabrication, shipping and erection to protect the surface from damage.

E. System Type (select from the following)

1. Rout-and-Return Wet System: Fabricator and installer must provide an engineered system including clips, fasteners, anchors, spacers, trim, flashings, gaskets, sealant, etc.
2. Rout-and-Return Dry System: Fabricator and installer must provide an engineered pressure relief system including extruded perimeter frame; drainage gutter; all extrusions, clips, fasteners, anchors, spacers, trim, flashings, gaskets, sealant, etc.
3. Continuous Edge Grip System: Fabricator and installer must provide an engineered pressure relief system including extruded perimeter frame; drainage gutter; all extrusions, clips, fasteners, anchors, spacers, trim, flashings, gaskets, sealant, etc.
4. Face Fastened Solution: Fabricator and installer must provide an engineered system including fasteners, anchors, spacers, trim, and flashing. Fabricator and installer can purchase necessary extrusions, braces, fasteners, and necessary tools from manufacturer.

F. System Performance

1. Composite panels shall be capable of withstanding building movements and weather exposures based on the following test standards required by the architect and/or local building codes:
 - a. Wind Load – If system tests are not available, under the direction of an independent third-party laboratory, mockups shall be constructed and tests performed to show compliance to the following minimum standards:
 - i. Panels shall be designed to withstand the design wind load based upon the local building code, but in no case less than 20 pounds per square foot (psf) and 30 psf on parapet and corner panels. Wind-load testing shall be conducted in accordance with ASTM E330 to obtain the following results.
 - ii. Normal to the plane of the wall between supports, deflection of the secured perimeter-framing members shall not exceed $L/175$ or $3/4"$, whichever is less.
 - iii. Normal to the plane of the wall, the maximum panel deflection shall not exceed $L/60$ of the full span.
 - iv. Maximum anchor deflection shall not exceed $1/16"$. At $1\ 1/2$ times design pressure, permanent deflections of framing members shall not exceed $1/100$ of span length and components shall not experience failure or gross permanent distortion. At connection points of framing members to anchors, permanent set shall not exceed $1/16"$.
 - b. Air/Water System Test – Without backup waterproof membrane. If system tests are not available, under the direction of an independent third-party laboratory, mockups shall be constructed and tests performed to show compliance to the following minimum standards:
 - i. Air Infiltration – When tested in accordance with ASTM E283, air infiltration at 1.57 psf must not exceed 0.06 cubic feet per minute per square foot of wall area.
 - ii. Water Infiltration – Water infiltration is defined as uncontrolled water leakage through the exterior face of the assembly. Systems not using a construction sealant at the panel joints (i.e., Dry Systems) shall be designed to drain any water leakage occurring at the joints. No water infiltration shall occur in any system under a differential static pressure of 6.24 psf after 15 minutes of exposure in accordance with ASTM E331.
 - c. Fire Performance: Where required by governing code, provide fire retardant MCM that has been evaluated and is in compliance with code requirements specified herein. Metal Construction Association Page www.arconicarchitecturalproducts.com
 - i. Fire Performance: Wall assemblies containing MCM System shall meet the requirements of the Intermediate Scale Multi-story test, NFPA 285, where required by code based for the design of this project.

The above tests are on panel systems that do not include a waterproof membrane behind panels

2.3 Accessories

- A. Extrusions, formed members, sheet and plate shall conform with ASTM B209 and the recommendations of the manufacturer.
- B. Panel stiffeners, if required, shall be structurally fastened or restrained at the ends and shall be secured to the rear face of the composite panel with silicone of sufficient size and strength to maintain panel flatness. Stiffener material and/or finish shall be compatible with the silicone.
- C. Sealants and gaskets within the panel system shall be as per manufacturer's standards to meet performance requirements.
- D. Fabricate flashing materials from 0.040" minimum thickness aluminum sheet provided by panel manufacturer to match the adjacent curtain wall/panel system where exposed. Post-painted spray-applied flashings are not acceptable. Provide a lap strap under the flashing at abutted conditions and seal lapped surfaces with a full bead of non-hardening sealant.
- E. Fasteners (concealed/non-corrosive): Fasteners as recommended by system fabricator and installer.
- F. Weather barriers shall provide water penetration, water vapor transmission, and air penetration resistance according to the local requirements. Seal any holes in the weather barrier with manufacturer approved materials and methods.

PART 3 - Execution

3.1 Inspection

- A. 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.
- B. Surfaces to receive panels shall be structurally sound as determined by a registered engineer.

3.2 Installation

- A. Erect panels plumb and level.
- B. 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 (-29°C) to $+180^{\circ}\text{F}$ ($+82^{\circ}\text{C}$). Buckling of panels, opening of joints, undue stress on fasteners, failure of sealants or any other detrimental effects due to thermal movement are not permitted. Fabrication, assembly and erection procedure shall account for the ambient temperature at the time of the respective operation.
- C. Panels shall be erected in accordance with an approved set of shop drawings.
- D. Anchor panels securely per engineering recommendations and in accordance with approved shop drawings to allow for necessary thermal movement and structural support.
- E. Conform to panel fabricator's instructions for installation of concealed fasteners.
- F. Do not install component parts that are observed to be defective, including warped, bowed, dented, scraped and broken members.
- G. Do not cut, trim, weld or scrape component parts during erection in a manner that would damage the finish, decrease strength or result in a visual imperfection or a failure in performance. Return component parts that require alteration to shop for refabrication, or for replacement with new parts.
- H. Separate dissimilar metals; use appropriate gaskets and fasteners to minimize corrosive or electrolytic action between metals.

3.3 Adjusting and Cleaning

- A. Remove and replace panels damaged beyond repair as a direct result of panel installation. After installation, panel repair and replacement shall become the responsibility of the general contractor.
- B. Repair panels with minor damage.
- C. Remove masking film (if used) as soon as possible after installation. Masking intentionally left in place after panel installation on an elevation shall become the responsibility of the general contractor.
- D. Any additional protection, after installation, shall be the responsibility of the general contractor to remove.
- E. Make sure weep holes and drainage channels are unobstructed and free of dirt and sealants.
- F. Final cleaning shall not be part of the work of this section.

END OF SECTION 074213

Disclaimer

Laws and building and safety codes governing the design and use of AAP's products, and specifically aluminum composite materials, vary widely. It is the responsibility of the owner, the architect, the general contractor, the installer and the fabricator/transformer, consistent with their roles, to determine the appropriate materials for a project in strict conformity to all applicable national, regional and local building codes and regulations. REYNOBOND IS COMBUSTIBLE; IT COULD CATCH FIRE AND BURN. SEE AAP WEBSITE FOR PRODUCT WARNINGS. ANY LABORATORY TESTING INFORMATION PROVIDED BY AAP APPLIES ONLY TO THE PARTICULAR PRODUCT OR ASSEMBLY TESTED AND DOES NOT NECESSARILY REPRESENT HOW PRODUCTS WILL ACTUALLY PERFORM IN USE.