



ALUMICORE
ELEGANT FAÇADE INC.
ALUMINUM COMPOSITE PANEL SYSTEM

SECTION 07 42 43

METAL-FACED COMPOSITE WALL PANELS (RAIN SCREEN)

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Division 01 - General Requirements, and other applicable specification sections in the Project Manual apply to the work specified in this Section.

1.2 SUMMARY

- A. Scope: Provide design and engineering, labor, material, equipment, related services, and supervision required, including, but not limited to, manufacturing, fabrication, erection, and installation for metal-faced composite wall panels and soffits (Dry joint system) as required for the complete performance of the work, and as shown on the Drawings and as herein specified.
- B. Section Includes: The work specified in this Section includes, but shall not be limited to, fabricated composite panels, including, but not limited to, supports, anchors, fasteners, and sealants required for rain screen type panel system according to custom design indicated on the Drawings.
- C. Related Sections
 1. Structural Metal Framing Section 05100
 2. Cold Formed Metal Framing Section 05400
 3. Building Insulation Section 07210
 4. Air/Vapour Barriers Section 07200
 5. Metal Flashing and Trims Section 07620
 6. Sealants, Caulking and Seals Section 07900
 7. Windows Section 08500

1.3 REFERENCES

- A. General: The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only. The edition/revision of the referenced publications shall be the latest date as of the date of the Contract Documents, unless otherwise specified.
- B. American Architectural Manufacturers Association (AAMA):
 1. AAMA 501.1, "Methods of Test for Exterior Walls - Standard Test Method for Exterior Windows, Curtain Walls, and Doors for Water Penetration Using Dynamic Pressure.
 2. AAMA 508, "Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems."
 3. AAMA 2605, "Voluntary Specification, Performance Requirements, and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels."
 4. ANSI B18.6.4: Screws inch series.
- C. ASTM (ASTM):
 1. ASTM B 209/B 209M, "Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate."
 2. ASTM B 221/B 221M, "Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
 3. ASTM D 1781, "Standard Test Method for Climbing Drum Peel for Adhesives."
 4. ASTM E 84, "Standard Test Method for Surface Burning Characteristics of Building Materials."

5. ASTM E 283, "Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Difference Across the Specimen."
6. ASTM E 330, "Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference."
7. ASTM E 331, "Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference."

D. National Association of Architectural Metal Manufacturers (NAAMM):

1. NAAMM MFM, "Metal Finishes Manual."

1.4 DEFINITION

- A. Metal-Faced Composite Wall Panel Assembly: Metal-faced composite wall panels, attachment system components, miscellaneous metal framing, and accessories necessary for a complete rain screen type wall system.

1.5 PERFORMANCE REQUIREMENTS

- A. General Performance: Metal-faced composite wall panel assemblies shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Structural Performance: Provide metal-faced composite wall panel assemblies capable of withstanding the effects of the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 330:
1. Wind Loads: Determine loads based on the following minimum design wind pressures:
 - a. Uniform pressure of 30 psf (1436 Pa), acting inward or outward.
 2. Deflection Limits: Metal-faced composite wall panel assemblies shall withstand wind loads with horizontal deflections no greater than 1/175 of the span at the perimeter and 1/60 of the span anywhere in the panel.
- C. Air Infiltration: When tested in accordance with ASTM E 283, air infiltration at 6.24 psf (299 Pa) shall not exceed 0.060 cfm (0.00003 m³/s) per square foot (0.09 m²) of wall area.
- D. Water Infiltration: Water infiltration is defined as uncontrolled water leakage through the exterior face of the assembly. 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 15.00 psf (718 Pa) after 15 minutes of exposure in accordance with ASTM E 331.
- E. Water Penetration at Dynamic Pressure: AAMA 501.1 at the same test pressure difference specified for the static pressure test.
- F. Thermal Movements: Allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures in engineering, fabricating, and installing exterior metal fabrications to prevent buckling, opening of joints, overstressing of components and connections, and other detrimental effects. Base engineering calculation on actual surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.
1. Temperature Change (Range): 120 °F or 67 °C ambient, 180 °F or 100 °C material surfaces.
- G. Pressure Equalization of Horizontal Joinery: Shall pass the criteria for a pressure equalized horizontal joint in accordance with AAMA 508.

1.6 SUBMITTALS

- A. General: See Section 01 33 00 - Submittal Procedures.
- B. Product Data: Submit product data showing material proposed. Submit sufficient information to determine compliance with the Drawings and Specifications. Product data shall include, but shall not be limited to, construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal-faced composite wall panel and accessory.
- C. Shop Drawings: Submit shop drawings for each product and accessory required. Include information not fully detailed in manufacturer's standard product data, including, but not limited to, fabrication and installation layouts of metal-faced composite wall panels; details of edge conditions, joints, panel profiles, corners,

anchorage, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish among factory-assembled, shop-assembled, and field-assembled work.

1. Submit shop drawings which have been signed and sealed by a professional engineer licensed to practice in the State in which the Project is located.

D. Samples:

1. Submit samples for initial color selection. Submit samples for each type of metal-faced composite wall panel indicated with factory-applied color finishes. Submit samples in form of manufacturer's color charts showing full range of colors and finishes available. Where finishes involve normal color variations, include samples showing the full, range of variations expected.
 - a. Include similar samples of panel, trim, and accessories involving color selection.
 - b. Include manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each sealant exposed to view.
2. Submit Mock Up sample for verification purposes. Submit (1200 mm) by (1800 mm) of selected color coating to show design, fabrication techniques, and workmanship. Include fasteners, closures, and other metal-faced composite wall panel accessories.
 - a. Composite Panels: Include four-way joint.

E. Quality Control Submittals:

1. Design Data: For installed products indicated to comply with certain design loadings, include structural analysis data signed and sealed by the professional engineer who was responsible for their preparation. Only the loading on the structure at the connections will be reviewed.
2. Qualification Data: Submit qualification data for firms and persons specified in Quality Assurance Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names of architects and owners, and other information specified.
3. Test Reports:
 - a. Compatibility and Adhesion Test Reports: Submit compatibility and adhesion test reports from sealant manufacturer, indicating the following:
 - 1) Materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2) Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
 - b. Product Test Reports: Submit certified product test reports based on tests performed by an accredited inspecting and testing laboratory clearly describing in written form, and in shop drawing form, compliance of the composite metal wall panel assembly with requirements indicated based on comprehensive testing.

F. LEED Submittals: Submittals that are required to comply with requirements for LEED certification include, but shall not be limited to, the following:

1. Recycled Content Materials: Provide product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
2. Low-Emitting Materials: Submit certification by the manufacturer confirming that products (i.e., adhesives, sealants, paints, coatings, etc.) meet or exceed the volatile organic compound (VOC) limits set by specific agencies or other requirements as outlined in the LEED Green Building Rating System. VOC limits shall be clearly stated in the submittal.

1.7 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer Qualifications: Manufacturer shall be a firm engaged in the manufacture of metal-faced composite wall panels of types and sizes required, and whose products have been in satisfactory use in similar service for ten years.
2. Installer Qualifications: Installer shall be a firm that shall have 10 years of successful installation experience with projects utilizing metal-faced composite wall panels similar in type and scope to that required for this Project.
 - a. Installer shall assume undivided responsibility for all components of the composite 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 composite panel system.

3. **Engineer Qualifications:** The engineer shall be a professional engineer registered in Province of Ontario experienced in providing engineering services of the kind indicated that have resulted in the installation of products similar to this Project in material, design, and extent, and that have a record of successful in-service performance.
- B. **Regulatory Requirements:** Comply with applicable requirements of the laws, codes, ordinances, and regulations of Province of Ontario.
- C. **Pre-Installation Conference:** Conduct pre-installation conference in accordance with Section 01 31 19 - Project Meetings. Prior to commencing the installation, meet at the Project site to review the material selections, installation procedures, and coordination with other trades. Pre-installation conference shall include, but shall not be limited to, the Contractor, the Installer, and any trade that requires coordination with the work. Date and time of the pre-installation conference shall be acceptable to the Owner and the Architect.
- D. **Single Source Responsibility:** Obtain each type of metal-faced composite wall panel from a single source with resources to produce products of consistent quality in appearance and physical properties without delaying the work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the Project site in supplier's or manufacturer's original wrappings and containers, labeled with supplier's or manufacturer's name, material or product brand name, and lot number, if any.
 1. Deliver components, sheets, metal-faced composite wall panels, and other manufactured items so as not to be damaged or deformed. Package metal-faced composite wall panels for protection during transportation and handling.
- B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
 1. Unload, store, and erect metal-faced composite wall panels in a manner to prevent bending, warping, twisting, and surface damage.
 2. Retain strippable protective covering on metal-faced composite wall panel for period of panel installation.

1.9 WARRANTY

- A. **General:** Warranty for composite panel Work comply with General Conditions, Except that warranty period is extended to 3 years for the following:
 1. Leaking, warping, twisting, joint, and finish failure.
 2. Coverage: Complete replacement including affected adjacent parts.
- B. **Special Warranty:** The work of this Section to be in accordance with the Contract Documents and free from faults and defects in materials and workmanship for a period indicated below. This special warranty shall extend the one year period of limitations contained in the General Conditions. The special warranty shall be countersigned by the manufacturer and the Installer.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 2. Warranty period shall be two years from date of Substantial Completion.
- C. **PVDF Finish Warranty:** Warranty covers failure of the factory-applied exterior finish within the specified warranty period and agreeing to repair finish or replace work that shows evidence of finish deterioration. Deterioration of finish includes, but shall not be limited to, color fade, chalking, cracking, peeling, and loss of film integrity.
 1. **Warranty Period for PVDF Finish:** Warranty period shall be 20 years from date of Substantial Completion.
- D. **Additional Owner Rights:** The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties required of the Contract Documents.

PART 2 - PRODUCTS

2.1 ACCEPTABLE PRODUCTS

- A. Basis of Design: Items specified are to establish a standard of quality for design, function, materials, and appearance.
- B. Aluminum Composite Panel: Alucore by Elegant Façade Inc.
115 Woodvalley Dr. – Brampton ON L7A 2E1
Phone: 905 495 0238 Fax: 905 495 2492 Email address: info.ecs@rogers.com

2.2 MATERIALS AND ACCESSORIES

- A. Aluminum:
 - 1. Aluminum Extrusions: Alloy 6063-T6 or Alloy 6061-T6.
 - 2. Aluminum Sheet and Plate: Alloy 3003 or Alloy 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- B. Stiffeners: Panel stiffeners 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. Concealed Stainless Steel Fasteners: Self tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads.
- D. Z Girts & C channels: minimum of 1.2mm thick, Z275 galvanized in accordance to CAN/CSA S136-M. Depth according to the drawings.
- E. Sealants: ASTM C920, Type M within Panel System by Tremco Ltd or according to project documents.
- F. Flashings, closure pieces, trim shall be the same material and colour of panels.
- G. Touch Up paint: Matching same colour recommended by the manufacturer.

2.3 COMPOSITE METAL PANELS

- A. General: Metal-faced composite wall panels fabricated from two metal facings bonded, using no glues or adhesives, to solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment system components and accessories required for weathertight system.
 - 1. Aluminum Face Sheets:
 - a. Thickness: 0.020 inch (0.51 mm).
 - b. Aluminum Alloy: 3000 Series or equivalent.
 - 2. Polyethylene (PE) Core: Flame spread of 15 and a smoke developed rating of 120 with a center panel joint; flame spread of 0 and a smoke developed of 0 with no joint; tested in accordance with ASTM E 84, Class A building material rating.
 - 3. Fire Resistant (FR) Core: Flame spread rating of 15 and a smoke developed rating of 30 with a center panel joint; flame spread of 0 and a smoke developed of 0 with no joint; tested in accordance with ASTM E 84, Class A building material rating.
 - 4. Panel Thickness: 0.118 inch (3 mm).
 - 5. Panel Thickness: 0.157 inch (4 mm).
 - 6. Panel Thickness: 0.236 inch (6 mm).
 - 7. Bond Integrity: When tested for bond integrity, in accordance with ASTM D 1781 (simulating resistance to panel delamination), there shall not be an adhesive failure of the bond between the core and the skin, or cohesive failure of the core itself below the following values:
 - 8. Tolerances:
 - a. Width: ± 0.08 inch (2.03 mm).
 - b. Length: ± 0.16 inch (4.06 mm).
 - c. Panel Bow: Maximum 0.8 percent of any 72 inch (1829 mm) panel dimension.
 - d. Squareness: Maximum 0.20 inch (5.08 mm).
 - e. Flatness: Maximum deviation from panel flatness shall be 1/8 inch (3 mm) in 5 feet (1524 mm) on panel in any direction for assembled units (non-accumulative, no oil-canning).

2.4 FABRICATION

- A. General: Fabricate and finish metal-faced composite wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
1. Fabricate metal-faced composite wall panels in a manner that shall eliminate condensation on interior side of panel and with joints between panels designed to form rain screen type seals.
- B. Metal-Faced Composite Wall Panels: Factory form panels in a continuous process with no glues or adhesives or batch process by laminating each sheet using glues or adhesives between dissimilar materials. Trim and square edges of sheets with no displacement of face sheets or protrusion of core material.
1. Form panel lines, breaks, and angles to be sharp and true, with surfaces free from warp and buckle.
 2. Fabricate panels with sharply cut edges, with no displacement of face sheets or protrusion of core material.
 3. Fabricate panels with panel stiffeners, as required to comply with deflection limits, attached to back of panels with structural silicone sealant / bond tape.

2.5 FINISHES

- A. Comply with NAAMM MFM for architectural metal products for recommendations for applying and designating finishes.
1. Aluminum Finishes: Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
 - a. Class I Clear Anodized Finish: AA-M12-C22-A41 (Mechanical Finish: as fabricated, non-specular; Chemical Finish: etched, medium matte; Anodic Coating: Class I Architectural, clear film thicker than 0.7 mil [0.018 mm]) complying with AAMA 611.
 - b. Class I Color Anodized Finish: AA-M21-C22-A42/A44 (Mechanical Finish: as fabricated, non-specular; Chemical Finish: etched, medium matte; Anodic Coating: Class I Architectural, film thicker than 0.7 mil [0.018 mm] with integral color or electrolytically deposited color) complying with AAMA 611. Provide color to match the Architect's sample, or, if no sample, as selected by the Architect from within full range of industry colors and color density range.
 - c. High Performance Organic Coating: AA-C12-C42-R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: chemical conversion coating, acid chromate-fluoride-phosphate pretreatment; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions.
 - 1) Standard Two-Coat Polyvinylidene Fluoride (PVDF) Finish Coating: Manufacturer's standard thermocured system, complying with AAMA 2605, composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight, as produced by Arkema, Inc. ("Kynar 500") or by Solvay Solexis, Inc. ("Hylar 5000"). Provide minimum 1.2 mil (0.030 mm) total dry film thickness. Provide color to match the Architect's sample, or, if no sample, as selected by the Architect from manufacturer's standard choices for color and gloss.
 - 2) Special Three-Coat Polyvinylidene Fluoride (PVDF) Finish Coating: Manufacturer's standard three-coat thermocured system, complying with AAMA 2605, composed of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent PVDF resin by weight, as produced by Arkema, Inc. ("Kynar 500") or by Solvay Solexis, Inc. ("Hylar 5000"). Provide color to match the Architect's sample, or, if no sample, as selected by the Architect from manufacturer's standard choices for color and gloss.
 - d. FEVE Finish Coating: Prepare, pretreat, and apply coating to exposed metal surfaces in shop to comply with coating and resin manufacturer's instructions. Provide manufacturer's standard thermoset system, complying with AAMA 2605, containing the fluorinated ethylene vinyl ether (FEVE) resin. Provide minimum total dry film thickness of 1.0 mil (0.025 mm). Provide color to match the Architect's sample, or, if no sample, as selected by the Architect from manufacturer's standard choices for color and gloss.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine areas and conditions under which the work is to be installed, and notify the Contractor in writing, with a copy to the Owner and the Architect, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

1. Examine substrates, areas, and conditions, with the Installer present, for compliance with requirements for installation tolerances, metal-faced composite wall panel supports, and other conditions affecting performance of the work.
2. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal-faced composite wall panel manufacturer.
3. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal-faced composite wall panel manufacturer.
4. Verify that weather-resistant sheathing paper has been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
5. Examine roughing-in for components and systems penetrating metal-faced composite wall panels to verify actual locations of penetrations relative to seam locations of panels before panel installation.
6. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Installer.

3.2 PREPARATION

- A. Coordination: Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to the Project Site.
- B. Miscellaneous Framing: Install subgirts, base angles, sills, furring, and other miscellaneous wall panel support members and anchorage according to manufacturer's instructions.

3.3 COMPOSITE WALL PANEL INSTALLATION

- A. General: Install metal-faced composite wall panels according to manufacturer's instructions in orientation, sizes, and locations indicated on the Drawings. Install panels perpendicular to girts and subgirts unless otherwise indicated. Anchor panels and other components of the work securely in place, with provisions for thermal and structural movement.
 1. Shim or otherwise plumb substrates receiving metal-faced composite wall panels.
 2. Install square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
 3. Anchor panels securely per engineering recommendations and in accordance with final shop drawings to allow for necessary thermal movement and structural support.
 4. Where panels are designed for field-applied sealant joints, seal joints completely with specified sealant.
 5. Conform to panel fabricator's instructions for installation of concealed fasteners.
 6. Do not install component parts that are observed to be defective, including, but not limited to, warped, bowed, dented, scraped, and broken members.
 7. Do not cut, trim, weld, or braze component parts during erection in manner which would damage finish, decrease strength, or result in visual imperfection or failure in performance. Return component parts, which require alteration to shop for re-fabrication, if possible, or for replacement with new parts.
 8. At flashing butt joints, provide a lap strap under flashing and seal lapped surfaces with a full bed of non-hardening sealant.
 9. Separate dissimilar metals and use gasketed fasteners, isolation shim, or isolation tape where needed to eliminate possibility of corrosive or electrolytic action between metals.
- B. Erection Tolerances:
 1. Maximum variation from plane or location shown on shop drawings shall be 1/2 inch (13 mm) in 30 feet (9.14 m) of length and up to 3/4 inch (19 mm) in 300 feet (91.44 m).
 2. Maximum deviation for vertical member shall be 0.10 inch (2.54 mm) in 25 feet (7.62 m) run.
 3. Maximum deviation for a horizontal member shall be 0.10 inch (2.54 mm) in 25 feet (7.62 m) run.
 4. Maximum offset from true alignment between two adjacent members abutting end to end, in line shall be 0.03 inch (0.76 mm).

3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as metal-faced composite wall panels are installed unless otherwise indicated in manufacturer's installation instructions. On completion of metal-faced composite wall panel installation, clean finished surfaces as recommended by panel manufacturer. Maintain in a clean condition during construction. Masking intentionally left in place after panel installation on an elevation shall become the responsibility of the General Contractor.

- B. After metal-faced composite wall panel installation, clear weepholes and drainage channels of obstructions, dirt, and sealant.
 - C. Replace metal-faced composite wall panels that have been damaged or have deteriorated beyond successful repair by finish touch-up or similar minor repair procedures.
 - D. Any additional protection, after installation, shall be the responsibility of the general contractor to remove.
- 3.5 PROTECTION
- A. Provide final protection and maintain conditions in a manner acceptable to the Installer that shall ensure that the metal-faced composite wall panels shall be without damage at time of Substantial Completion.

END OF SECTION