

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 05 12 23 Structural Steel
- .2 Section 05 41 00 Structural Metal Stud Framing
- .3 Section 05 50 00 Metal Fabrications
- .4 Section 06 10 00 Rough Carpentry
- .5 Section 07 05 43 Thermal Clips
- .6 Section 07 21 13 Building Insulation
- .7 Section 07 27 00 Vapour Permeable Air Barriers
- .8 Section 07 27 13 Modified Bituminous Sheet Air Barriers
- .9 Section 07 62 00 Sheet Metal Flashing and Trim
- .10 Section 07 92 00 Joint Sealants
- .11 Section 08 11 00 Metal Doors and Frames
- .12 Section 09 21 16 Gypsum Board

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM B117-19 Standard Practice for Operating Salt Spray (Fog) Apparatus
 - .3 ASTM B209/B209M-21a Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
 - .4 ASTM B211/B211M-23 Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire
 - .5 ASTM B221-21 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
 - .6 ASTM C297/C297M-16 Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions
 - .7 ASTM C1166-21 Standard Test Method for Flame Propagation of Dense and Cellular Elastomeric Gaskets and Accessories
 - .8 ASTM D395-18 Standard Test Methods for Rubber Property—Compression Set
 - .9 ASTM D412-16(2021) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
 - .10 ASTM D624-00(2020) Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
 - .11 ASTM D746-20 Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact
 - .12 ASTM D1037-12(2020) Standard Test Methods for Evaluating Properties of Wood Base Fiber and Particle Panel Materials
 - .13 ASTM D1149-18 Standard Test Methods for Rubber Deterioration—Cracking in an Ozone Controlled Environment
 - .14 ASTM D1761-20 Standard Test Methods for Mechanical Fasteners in Wood
 - .15 ASTM D1929-23 Standard Test Method for Determining Ignition Temperature of Plastics
 - .16 ASTM D2240-15(2021) Standard Test Method for Rubber Property—Durometer Hardness

- .17 ASTM D2247-15(2020) Standard Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity
- .18 ASTM E84-24 Standard Test Method for Surface Burning Characteristics of Building Materials
- .19 ASTM E119-22 Standard Test Methods for Fire Tests of Burning Construction and Materials
- .20 ASTM E330/E330M-14(2021) Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
- .21 ASTM G155-21 Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 102-18 Surface Burning Characteristics of Building Materials and Assemblies
 - .2 ULC 114-18 Standard Method of Test for Determination of Non-combustibility in Building Materials
 - .3 ULC 134-13 Standard Method of Fire Test of Exterior Wall Assemblies
 - .4 ULC 135-16 Standard Test Method for the Determination of Combustibility Parameters of Building Materials Using an Oxygen Consumption Calorimeter (Cone Calorimeter)
- .3 International Organization for Standardization (ISO):
 - .1 ISO 105:2013 Textiles - Tests for Colour Fastness
 - .2 ISO 178:2010 Plastics - Determination of Flexural Properties
 - .3 ISO 527-1:2012 Plastics - Determination of Tensile Properties - Part 1: General Principles
- .4 American Architectural Manufacturers Association (AAMA):
 - .1 AAMA 509-09 Voluntary Test and Classification Method for Drained and Back Ventilated Rain Screen Wall Cladding Systems
- .5 Canadian Construction Materials Centre (CCMC)
 - .1 CCMC 13549-R Technical Guide 07 193 Sheathing Membrane - Breather Type

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit manufacturer's data sheets covering the care and recommended maintenance procedures for incorporation into maintenance manuals.
- .3 Shop Drawings: Submit shop drawings of panel systems, components, façade material, panel layout and accessories to the Consultant for review.
- .4 Samples:
 - .1 Submit for approval 100mm x 150mm sample of proposed colour and texture for Consultant's approval.
 - .2 Submit full size samples of accessories as requested by Consultant.
- .5 Delegated Design Submittals: Furnish complete design calculations and details, fabrication and erection shop drawings and site review for solid phenolic wall panels, bearing the seal of a Professional Engineer registered in the province of Ontario, in accordance with applicable Building Code and Contract Documents.
- .6 Provide maintenance data for Solid Phenolic Wall Panels for incorporation into Operating and Maintenance Manuals specified in Section 01 78 00.

1.5 Quality Assurance

- .1 Qualifications: Provide proof of qualifications when requested by Consultant:

- .1 Manufacturer / Supplier: Obtain materials from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties.
 - .2 Installers: Execute Work of this Section using qualified personnel skilled in installation of work of this Section, having a minimum of five years proven experience of installations similar in material, design, and extent to that indicated for this Project.
 - .2 Pre-Construction Conference: Arrange a site meeting attended by the Contractor, the Subcontractor, the Consultant, materials suppliers, and other relevant personal before commencement of work for this Section.
 - .1 Review methods and procedures related to installation, including manufacturer's written instructions;
 - .2 Examine substrate conditions for compliance with manufacturers installation requirements;
 - .3 Review temporary protection measures required during and after installation.
 - .3 Coordination: Coordinate the Work of this Section with the installation of gypsum sheathing board and air barrier; Sequence work so that installation of solid phenolic panels and support framing coincides with installation of substrate preparation without causing delay to the Work.
 - .4 Mock-ups: Construct mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution in accordance with Section 01 45 00-Quality Control and as follows:
 - .1 Build mock-up of typical wall section, incorporating the panel and finish, support framing and anchoring, breathable membrane, substrate materials, and adjacent materials including flashing, doors, windows and trim.
 - .1 Notify Consultant a minimum seven days prior to mock-up construction.
 - .2 Review and acceptance of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless Consultant specifically notes such deviations in writing.
 - .3 Once reviewed by Consultant, acceptable mock-up can form a permanent part of the Work and will form the basis for acceptance for the remainder of the project.
 - .5 Remove and replace materials found not acceptable at no cost to Owner or Consultant.
- 1.6 Shipping, Handling and Storage
- .1 Refer to Section 01 61 00 – Common Product Requirements.
 - .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
 - .3 Delivery: At the time of delivery, visually inspect all materials for damage. Remove damaged materials from the site immediately.
- 1.7 Project Conditions
- .1 Site Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings where materials outlined in this Section are indicated to fit walls and other construction.
 - .2 Establish dimensions and proceed with materials outlined in this Section where field measurements cannot be made without delaying the work; allow for site trimming and fitting.

- .3 Ambient Conditions: Install materials outlined in this Section after completion of work by other Sections is complete, and all penetrations are watertight; to provide adequate dry, clean, level, and plumb surfaces for installation and adhesion.

1.8 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.9 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.
- .2 Provide manufacturer's ten year warranty from date of production to maintain the mechanical qualities, water tightness and frost resistance, providing the panels are correctly installed on a ventilated construction according to the installation procedures of the manufacturer.
- .3 Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

PART 2 PRODUCTS

2.1 Manufacturers

- .1 Basis-of-Design: Materials specified in this Section are based on MEG | Material Exterior Grade" as supplied by ABET USA Inc; N48W37031 E. Wisconsin Ave PO Box 88 Oconomowoc, WI 53066; Tel: 1-800-223-2238; web: <https://abetlaminati.com>

2.2 Performance Requirements

- .1 General Performance: Solid phenolic engineered façade wall panel assemblies shall comply with performance requirements without failure due to defects in manufacture, fabrication, installation, or other defects in construction.
- .2 Delegated Design: Design solid phenolic engineered façade wall panel assembly, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- .3 Performance classified based on AAMA 509 test and classification method for drained and back ventilated rain screen wall cladding systems. This method determines the degree of wetting of the water resistive barrier and the available ventilation / drying of a drained and back ventilated cavity.
- .4 Structural Performance: Provide solid phenolic engineered façade 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 E330:
 - .1 Wind Loads: To be based on local building code.
 - .2 Deflection Limits: Solid phenolic wall panel assemblies shall withstand wind loads with horizontal deflections no greater than 1/60 of the span.

- .5 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - .1 Temperature Change (Range): Minus 29 °C to plus 82 °C ambient; 82 °C material surfaces.
- .6 Design to accommodate, by means of control joints, movement in wall system and between wall system and building structure, caused by structural movements, without permanent distortion, damage to in fills or racking of joints.

2.3 Materials

- .1 Solid Phenolic Engineered Facade Panels:
 - .1 Solid phenolic engineered exterior façade panel: rigid homogenous flat panel manufactured utilizing thermosetting resins reinforced with cellulose fibers, produced under high temperature and pressure and with integral properties and fire resistive qualities for use as an exterior façade material. A decorative surface of cellulose fibre integrated on both sides as part of the phenolic process.
 - .2 Panel Core: Brown core.
 - .3 Mounting Configuration: Prepare panels for exposed rivet installation.
 - .4 Application:
 - .1 Exterior and Interior Facades
 - .5 Thickness:
 - .1 8mm
 - .6 Dimensions:
 - .1 3050mm x 1300mm
 - .7 Surface Burning Characteristics:
 - .1 Meets CAN/ULC S134.
 - .2 Flame Spread: Class A, ASTM E84.
 - .3 Smoke Development: Less than 450, ASTM E84.
 - .4 Ignition Temperature: Greater than 350 degree C above ambient, ASTM D1929.
 - .5 Meets local building code for Potential Heat of Building Materials, NFPA 259.
 - .6 Meets local building codes for Fire Resistant Assemblies, ASTM E119.
 - .7 Meets local building codes for NFPA 268.
 - .8 Physical Characteristics:
 - .1 Modulus of Elasticity: 9000 MPa minimum, ISO 178.
 - .2 Tensile Strength: 60 Mpa minimum, ISO 527-2.
 - .3 Flexural Strength: 80 Mpa minimum, ISO 178.
 - .4 Thermal Conductivity (K value):
 - .1 8mm – 1.666 btu-in/hr-ft² – F
 - .2 10mm – 1.566 btu-in/hr-ft² – F
 - .5 Solid phenolic engineered façade wall panels shall be capable of meeting conditions of acceptance within limits and under conditions indicated, based on testing according to:
 - .1 ASTM G155 - Accelerated Weathering
 - .2 ASTM E330 - Structural Performance
 - .3 ASTM C297 - Bond Strength
 - .4 ASTM D1037 - Flexural Strength
 - .5 ASTM B117 - Salt Spray
 - .6 ASTM D2247 - Water Resistance
 - .7 ASTM D1761 - Fastener Pull-through
 - .8 ASTM 518 - Thermal Transmission

- .9 Finish:
 - .1 Colour Stability: The decorative surface shall comply with classification, 3- 5 measured with the grey scale according to ISO 105:A02.
 - .2 Panels with integrated colour one side, complete with UV-protective film applied.
 - .3 Finish: Matte
 - .4 Colour:
 - .1 Colour Type 1: 871 Grigio Scuro
 - .2 Colour Type 2: 1824 Blu Amorgos
- .10 Basis of Design Product:
 - .1 Products: Abet USA Inc. EF (exposed) system components made in the USA. Includes J channels, Hat channels and colour matched SFS D12 fasteners
- .2 Substructure:
 - .1 Vertical Girts:
 - .1 Vertical girts supporting panels shall be minimum 1.2 mm thick, galvanized zinc-coated steel to ASTM A653 with Grade A coating Z275. Painted black.
 - .1 Shop Primers: Provide primers that are compatible with paint systems specified in Section 09 91 13.
 - .2 Preformed galvanized metal sheet, 1.2 mm thick, minimum base steel nominal thickness, notched or perforated for drainage.
 - .3 Girt locations as determined and approved by structural engineer, to align with modular panel fasteners spaced based on manufacturer's panel load data.
 - .4 Front fastened systems:
 - .1 Girts behind panels to be vertical to allow vertical ventilation.
 - .2 Preformed black galvanized steel girts to be used at inside and outside corners to ensure corners are straight and closed visually and used at intermediary panel locations and where panels come together.
 - .5 Cavity behind panel: Minimum 25mm of unrestricted space.
 - .6 gap between panels: Minimum of 8mm to allow for expansion and contraction.
 - .7 EPDM Rubber Separation Strip: Designed and supplied by Engineered Assemblies to be installed between the panel and the vertical girt to allow movement between panel and support system, meeting the following:
 - .1 Shore "A" Hardness: ASTM D2240.
 - .2 Compression Set, 22h at 100°C: ASTM D395.
 - .3 Ozone Resistance, 100 mPa 100h @ 40°C 20%
 - .4 Elongation: ASTM D1149.
 - .5 Tensile Strength: ASTM D412.
 - .6 Elongation at Rupture: ASTM D412.
 - .7 Tear Strength: ASTM D624.
 - .8 Brittleness Temperature at -40°C: ASTM D746.
 - .9 Flame Propagation, Option II; ASTM C1166.
 - .10 Substructure to account for control joints of building to ensure a girt is not connected across the control joint.
 - .11 Install panels across one set of vertical girts to ensure that expansion and contraction of the substrate is controlled within framing members.
 - .2 Thermal Clips: as specified in Section 07 05 43
 - .1 Clip Depth: As indicated on Contract Drawings.
 - .3 Vertical Clip Spacing:
 - .1 As required by Engineered Design.
- .3 Fasteners:

- .1 Colour matched stainless steel rivets, as per Engineered Assemblies recommendations. No dissimilar materials allowed, in selection of fasteners.
- .2 All holes are pre-drilled at same diameter.
- .3 Fixed holes include a stainless steel grommet on the rivet stem.
- .4 Floating holes have rivet only.

- .4 Bird and Vent Screen: Continuous bird and vent screen located at top and bottom of panel system, where opening is minimum 25 mm wide, with minimum 50% free air flow, manufactured by Engineered Assemblies from perforated aluminum, painted black.

- .5 Flashings: Prefinished steel as specified in Section 07 62 00.
 - .1 Flashings at edges, top and bottom of panel system as per Contract Drawings.

- .6 Vapour Permeable Air Barrier Membrane: As specified in Section 07 27 00.

- .7 Insulation: As specified in Section 07 21 13.

- .8 Sheathing Board: As specified in Section 06 16 43.

PART 3 EXECUTION

3.1 Examination

- .1 Verification of Conditions:
 - .1 Examine substrates to receive work and surrounding adjacent surfaces for conditions affecting installation. Coordinate with related sections to ensure proper dimensions are maintained.
 - .2 Verify site dimensions by accurate field measurements so that work will be accurately designed, fabricated and fitted to the structure.
 - .3 All penetrations through the façade for the work of other trades shall be fitted with a watertight sleeve. Verify flashings are in place, sealed with waterproof membrane and covered with building membranes.
 - .4 Maintain sheathing membrane integrity.

- .2 Notify Contractor in writing of any conditions that are not acceptable.

- .3 Proceed with installation after verification and correction of surface conditions acceptable to manufacturer.

3.2 Installation

- .1 Erect panel system in accordance with manufacturer's instructions and reviewed shop drawings.

- .2 Erect panels in straight lines, true, level and plumb. Maintain dimensions required by manufacturer for minimum distances from edge for holes and penetrations.

- .3 Space at top and bottom of each wall minimum 25 mm, as per manufacturer's details.

- .4 Installation to allow for thermal expansion of the panel. Provide a minimum of 10 mm space between each panel on all four sides, allowing for expansion.

- .5 Holes are pre-drilled as per manufacturer's written instructions, in locations recommended by panel manufacturer. Provide pre-drilled holes a minimum distance between 20 mm and 38 mm from all edges of panel.
- .6 Size of rivets as per manufacturer's written instructions. No other types of fasteners are approved. All exposed rivets shall be coated to match panel finish, as provided by the panel manufacturer.
- .7 Install panels with joints centered over framing. Install all rivets straight to the panel and in a consistent manner.
- .8 Do not install using damaged, warped or misaligned material.
- .9 Where panels fit into accessories, allow room for expansion.
- .10 Finished installation shall be properly secured, free of rattles, distortions, waviness, and protrusions, damaged or chipped components.
- .11 Cut and flash wall penetrations with metal flashing.
- .12 Install breathable sheathing membrane in accordance to manufacturer's instructions. No penetrations are to be left in installed membrane.

3.3 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Progress Cleaning: Leave work area clean at the end of each workday, ensuring safe movement of passing pedestrians.
- .3 Final Cleaning: At completion of installation, clean all surfaces so they are free of foreign matter using cleaners recommended by material manufacturer.
- .4 Restore panels and accessory components damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by the Consultant, remove and replace damaged panels with new at no additional cost to the Owner.
- .5 Waste Management: Co-ordinate recycling of waste materials and packaging at appropriate facility, diverting waste from landfill. Certified installer shall be responsible for ensuring waste management efforts are practiced.

End of Section