Section 07 42 13 – Aluminum Wall Panels

Part 1 General

1.1 SUMMARY

.1 Work of this section includes provision of the following:
- .1 Aluminum Wall Panel System.
- .2 Fastening system.
- .3 Sub-girt system.
- .4 Engineering by Sub-Contractor.

1.2 RELATED REQUIREMENTS

.1 Section 05 41 00 - Structural Metal Stud Framing

.2 Section 06 16 43 - Gypsum Sheathing

.3 Section 07 05 42 - Thermally Improved Cladding Support Systems

.4 Section 07 14 16 - Cold Fluid-Applied Waterproofing

.5 Section 07 21 13 - Board Insulation

.6 Section 07 27 13 - Modified Bituminous Air and Vapour Barrier

.7 Section 07 62 00 - Sheet Metal Flashing and Trim

.8 Section 07 92 00 – Sealants

1.3 REFERENCES

.1 Aluminum Association, Inc. (AA)
- .1 AA 3003 - Non-Heat Treatable Aluminum Manganese Copper Alloy; 2009.
- .2 AA 5005 - Non-Heat Treatable Aluminum Magnesium Alloy; 2010
- .3 AA 6061 - Heat Treatable Aluminum Silicon Alloy; 2009
- .4 AA 6063 - Heat Treatable Aluminum Magnesium Silicon Alloy; 2009.

.2 American Aluminum Manufacturers Association (AAMA)
- .1 AAMA 508 - Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems; 2014.
- .2 AAMA 620 - Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Aluminum Substrates; 2002.
- .3 AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

.3 American Society for Testing and Materials International (ASTM)

.1 ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018

.4 Canada Green Building Council (CaGBC)
.1 LEED Canada Reference Guide for Green Building Design and Construction 2009

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Convene pre-installation meeting prior to beginning work of this Section and on-site installation, with Contractor, Consultant, Panel Fabricator, Panel Installer, and Panel Manufacturer to:
.1 Verify project requirements.
.2 Review installation and substrate conditions.
.3 Co-ordination with other building sub-trades.
.4 Review installation method and warranty requirements.
.5 Review field quality control procedures.

.2 Panel Fabricator's representative shall also provide frequent inspection visits during the course of work of this Section to assure quality and competence of panel installation.

1.5 SUBMITTALS

.1 Provide submittals in accordance with Division 01 Requirements

.2 LEED Submittals: in accordance with requirements of Section 01 35 21 - LEED Requirements; submit product information and supporting documentation for verification related to following Credits:
.1 MR Credit 4 Recycled Content.

.3 Product Data
.1 Submit Panel Manufacturer's printed product literature, specifications and datasheet.
.2 Submit WHMIS MSDS - Material Safety Data Sheets acceptable to Labour Canada, and Health and Welfare Canada.

.4 Shop drawings
.1 Submit shop drawings, signed and sealed by the Panel Fabricator's Engineer.
.2 Indicate layout, profiles and product components including anchorage, accessories, finish colours and textures.
.3 Include details showing thickness and dimensions of the various system parts, fastening and anchoring methods, locations of joints and gaskets and location and configuration of movement joints.

.5 Samples
.1 Submit standard sized samples of aluminum panel in specified thickness, and selected colours. Allow for review at panel fabrication facility of clips, anchors, supports, fasteners, closures, and other panel accessories for assembly approval.

.6 Panel Fabricator's Instructions
.1 Submit installation instructions
.2 Submit special handling criteria and cleaning procedures.

.7 Shop drawing submittals shall bear the seal of a professional engineer registered in the Province of the Work.

.8 Submit delegated design professional engineer's design notes and calculations upon request of the Consultant.

.9 Schedules from Panel Fabricator's Engineer:
.1 Provide Schedules S-B and S-C to Consultant (CRP - Coordinating Registered Professional).

.10 Field Review Reports
.1 Schedules S-B and S-C provided by professional engineer

.11 Quality assurance submittals
.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

1.6 QUALITY ASSURANCE

.1 Panel Fabricator
.1 Company specializing in designing, engineering, and fabricating wall panels of this Section.
.2 Able to document minimum 10 years experience. Submit project contact information. Owner, General Contractor, Architect names and phone numbers including project addresses.
.3 Approved Panel Fabricator
.1 Keith Panel Systems Co. Ltd., www.keithpanel.com

.2 Panel Installer
.1 Company specializing in installing work of this Section.
.2 Able to document minimum 5 years experience. Submit project contact information. Owner, General Contractor, Architect names and phone numbers including project addresses.
.3 Trained and authorized by Panel Fabricator as qualified to perform work of this Section.
.4 Approved Panel Installers
.1 Keith Panel Systems Co. Ltd., www.keithpanel.com
.2 Parker Johnston Industries Ltd., www.parkerjohnstonroofing.com
.3 Sobotec Ltd., www.sobotec.com

.4 Retain a professional engineer, registered in the province of the Work, to design fabrication and erection of the Work of this Section in accordance with applicable

.5 Building Code and Contract Document requirements including, but not limited to, the following:
- .1 Seal and signature to shop drawings and design submittals requiring structural engineering.
- .2 Field review of installed components.

1.7 MOCK-UPS

.1 Construct mock-ups if necessary in accordance with Division 01 Requirements

.2 Cost of mock-up(s) are separate from Sub-trade Contract Price and are to be submitted to Contractor for review and approval by Owner

.3 Construct mock-ups in locations as directed by Consultant:
- .1 Provide mock-up for evaluation of surface finishes and workmanship.
- .2 Construct mock-up indicating relationship between wall panels, air spaces, air/vapour retarder membrane, windows, and doors.
- .3 Remove and replace units which are not accepted.
- .4 Do not proceed with remaining work until workmanship, colour, and finish are reviewed by Consultant.
- .5 Refinish mock-up area as required to produce acceptable work.
- .6 When accepted, mock-up will demonstrate minimum standard of quality required for this work.
  - .1 Approved mock-up may remain as part of finished work.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver components, aluminum panels, and other manufactured items so as not to be damaged or deformed. Package aluminum composite material panels for protection during transportation and handling.

.2 Unload, store, and erect aluminum panels in a manner to prevent bending, warping, twisting, and surface damage.

.3 Stack aluminum panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store aluminum panels to ensure dryness, with positive slope for drainage of water. Do not store aluminum panels in contact with other materials that might cause staining, denting, or other surface damage.

.4 Retain strippable protective covering on aluminum panels during installation.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling and disposal in accordance with Division 01 Requirements.

1.10 WARRANTY

.1 Workmanship Warranty
- .1 Installer agrees to repair or replace components of the panel system that fail in workmanship within specified warranty period. Failures include all items in relation to the following:
  - .1 Structural failures.
  - .2 Rainscreen performance failures.
- .2 Warranty Period: Two years from date of Substantial Completion.

.2 Aluminum Panel Material Warranty
- .1 Manufacturer's standard warranty in which Manufacturer agrees to repair finish or replace the aluminum material that show evidence of deterioration. Deterioration of finish includes, but is not limited to, colour fade, chalking, cracking, peeling of factory-applied finishes within specified warranty period under the following criteria:
  - .1 Color fading more than 5 Hunter units when tested according to ASTM D 2244.
  - .2 Chalking in excess of a No.8 rating when tested according to ASTM D 4214.
  - .3 Cracking, checking, peeling, or failure of paint to adhere to bare metal.
- .2 Finish Warranty Period: 20 years from date of Substantial Completion.

Part 2 Products

2.1 SYSTEM DESCRIPTION

.1 Factory-formed and assembled, site installed, aluminum wall panels fabricated from solid aluminum single skin material; formed into profile for installation method indicated.

.2 Attachment components including perimeter frame, tracks and clips to be extruded aluminum

.3 Panel perimeter frame shall consist of factory-installed hidden dry rubber gaskets that reduces moisture entry into the Rainscreen cavity and minimizes noise from movement.

.4 System shall be of pressure-equalized Rainscreen design as tested per AAMA 508. Lag time between the cavity and cyclic wind pressure (5 PSF to 25 PSF) shall not exceed 0.08 seconds. The maximum differential between the cavity pressure and the external wind pressure shall not exceed 8%

.5 Wall panel system shall be designed for positive drainage of water leakage and condensation to exterior of wall panel system, including gutter system and hidden flashing at each horizontal joint.

2.2 PERFORMANCE/DESIGN CRITERIA

.1 Structural Performance: Provide aluminum panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 330:
  .1 Wind Loads: As indicated on Drawings.
  .2 Other Design Loads: As indicated on Drawings.
  .3 Deflection Limits: For wind loads, no greater than 1/100 for frame elements and 1/60 for panel materials.

.2 Seismic Performance
  .1 Aluminum wall panels shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

.3 Air Infiltration
  .1 When tested according to ASTM E 283, air leakage of not more than 0.02 cfm/sq. ft. (0.1 L/s per sq. m) at a test-pressure difference of 6.24 lbs/sq. ft. (300 Pa).

.4 Water Penetration under Static Pressure
  .1 When tested according to ASTM E 331, no water penetration under static pressure differential of 20% of inward acting design load at a test-pressure difference of 12 lbs/sq. ft. (600 Pa).

.5 Water Penetration under Dynamic Pressure
  .1 Tested according to AAMA 501.1:
    .1 No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 12 lbs/sq. ft. (600 Pa).
    .2 Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.

.6 Pressure Equalized Rainscreen
  .1 Tested to AAMA 508-07
    .1 The panel Fabricator must provide an official test report from an independent testing agency that graphs the performance of the panel system when subject to the AAMA 508-07 test criteria
    .2 Lag time between the cavity and cyclic wind pressure (5 PSF to 25 PSF) shall not exceed 0.08 seconds. The maximum differential between the cavity pressure and the external wind pressure shall not exceed 8%. For example, at 25 PSF External Wind Pressure, the cavity pressure should not fall below 23 PSF.

.7 Thermal Movements
  .1 Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, 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): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

.8 Fire Performance
.1 Solid metal panel industry accepted as Non-Combustible

2.3 ALUMINUM PANEL SYSTEM MATERIALS

.1 Non-composite single skin aluminum sheets as follows:
.1 Minimum 1.2mm skin material thickness
.2 Basis of Design
.1 Custom colour by Pure+FreeForm

.2 Panel System:
.1 Basis of Design
.1 KPS System A by Keith Panel Systems
.2 Attachment assembly components
.1 Perimeter frame, tracks and clips to be formed of aluminum extrusions
.1 Alloy AA 6063
.2 Colour:
.1 Exposed: match panel colour
.2 Unexposed: mill finish

2.4 SYSTEM BACK-UP MATERIALS

.1 Fasteners: corrosion resistant; standard Leland

.2 Thermally broken façade substructure (if required by jurisdiction):
.1 Attributes:
.1 Non-combustible
.2 Meet requirements of ASHRAE 90.1 for project location
.3 Adjustable to permit façade alignment to meet installation tolerances.
.4 Suitable for rear ventilated rain screen façade design.

.3 Acceptable product:
.1 KPS ThermaSmart Clip 2.0 by Keith Panel Systems Co. Ltd.

.4 Girts and sub-girts as detailed: custom manufactured z-girts, Galvalume steel to ASTM A792/A792M, 18 Ga. (1.2 mm) thickness, profiles as indicated, AZM 150 coating.

.5 Isolation Tape: ACM Manufacturers standard material for separating dissimilar metals from direct contact.

2.5 ACCESSORIES

.1 System Sealants: Panel system to be dry-joint Rainscreen with no reliance on surface applied sealants.

.2 Gaskets: Santoprene or EPDM as recommended by Panel Fabricator.

.3 Flashings: Fabricate flashing from 1.02mm (0.040") minimum thickness aluminum sheet. Where exposed to view, finish to match adjacent panels. Provide lap strip under flashing at abutted conditions; with lapped surfaces sealed with a full-bed of non-hardening sealant.

2.6 FINISH

.1 Prefinished sheet with factory applied coating to AAMA 2604, Polyvinylidene Fluoride (PVDF) or Fluoroethylene Vinyl Ether (FEVE), or equal.
- .1 Colour: to be selected by Consultant from ACM Manufacturer's full colour range.
- .2 Custom colour(s): [to be noted here; Consultant understands that custom colours may be associated with additional set-up fees]
- .3 Coating thickness: two coat system not less than 30 micrometres (1.2 mils).

2.7 FABRICATION

.1 Panels and components shall comply with details as indicated on drawings and as indicated in reviewed shop drawings.

.2 Panel system shall be shop fabricated – field fabrication or assembly not acceptable.

.3 Components shall match quality and installation of accepted mock-up specified above.

.4 Drill 6.35 mm (0.25 inch) drainage weep holes every 406 mm (16 inches) on centre along length of horizontally oriented bottom end frames located at base of panelized wall areas.

.5 Tolerances:
- .1 Panel dimensions shall allow for field adjustment and thermal movement.
- .2 Panel perimeter lines shall be sharp, smooth and free of warps or buckles.
- .3 Panel surfaces shall be free of scratches or marks caused during fabrication.

2.8 INSULATION

.1 Insulation: as specified in Section 07 21 13 - Board Insulation.

Part 3 Execution

3.1 PREPARATION

.1 Obtain dimensions from job site.

.2 Ensure all structural support is aligned and condition is acceptable.

.3 Building surfaces shall be smooth, clean and dry, and free from defects detrimental to the installation of the system. Notify Contractor of conditions not acceptable for installation of system.

.4 Inspect wall system and components before installation and verify that there is no shipping damage.

.5 Do not install damaged panels; repair or replace as required for smooth and consistent finished appearance.

3.2 INSTALLATION

.1 Install aluminum panels in accordance with panel fabricator's written instructions and shop drawings.

.2 Ensure continuity of building envelope air barrier and vapour retarder systems.

.3 Erect panels plumb, level and true.

.4 Do not install component parts that are observed to be defective, including warped, bowed, dented, scraped and broken members.

.5 Adjust assembly to secure panels safely to wall while allowing for expansion and contraction of components.

.6 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.

.7 Return component parts which require alteration to shop for fabrication, if possible, or for replacement with new parts.

.8 Ensure panels aligned vertically and horizontally.

.9 Separate dissimilar metals; use appropriate gaskets and tapes to minimize corrosive or electrolytic action between metals.

.10 Install flashings to divert all moisture and condensation to exterior. Trim and flash around doors, louvers, and windows. Use only membrane flashing supported by insulation per architectural details.

.11 Site Tolerances:

- .1 Variation from plane or location shown on shop drawings: 10 mm over 10 m (0.4 inches over 33-foot) length to maximum of 20 mm over 100 m (0.79 inches over 328 feet).
- .2 Deviation of vertical and horizontal members: 3 mm maximum over 8.5 m (0.12 inches over 28-feet) run.
- .3 Offset between two adjacent members abutted end-to-end, in line: maximum 0.75 mm (0.03 inch) from true alignment

.12 Touch-Up Painting: Inspect completed wall system and apply matching touch-up paint as needed to correct minor paint flaws.

3.4 FIELD QUALITY CONTROL

.1 Panel Fabricator's Field Services:
  .1 Panel Fabricator to provide field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with Panel Fabricator's installation instructions.

3.5 CLEANING

.1 Clean in accordance with paint system manufacturer's instructions.

.2 Remove and replace panels damaged beyond repair as direct result of panel installation.

.3 Repair panels with minor damage.

.4 Remove protective film from finish panels immediately once installation is complete or as otherwise directed by Consultant.

.5 Provide additional protection required after installation to protect assembly and finishes during construction.

.6 Weep holes and drainage channels shall be unobstructed and free of dirt and sealants.

.7 Upon final acceptance of installation, remove surplus and protective materials, excess materials, rubbish, tools and equipment from site.

.8 General Contractor to leave panels clean and free of debris and residue. Where required, clean exposed panel surfaces using non-abrasive detergent and clean water in accordance with paint manufacturer's instructions.

End of Section__