

## **PART 1 – GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Read and be governed by conditions of the *Contract Documents*, including Sections of Division 01.

### **1.2 SECTION INCLUDES**

- .1 1.1 General Instructions
- .2 1.2 Section Includes
- .3 1.3 Summary
- .4 1.4 Submittals
- .5 1.5 Closeout Submittals
- .6 1.6 Quality Assurance
- .7 1.7 Delivery, Storage, and Handling
- .8 1.8 Field Conditions
- .9 1.9 Warranty
- .10 2.1 Manufacturer
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- .21 3.3 Glazing
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- .23 3.5 Hardware
- .24 3.6 Adjusting and Cleaning

### **1.3 SUMMARY**

- .1 Section includes:
  - .1 Aluminum entrances.
  - .2 Aluminum windows.

### **1.4 SUBMITTALS**

- .1 Submit required submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 *Product* data sheets:

- .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this Section.
- .3 *Shop Drawings*:
  - .1 Further to requirements of Section 01 33 00 – Submittal Procedures, indicate system dimensions, framed opening requirements and tolerances, adjacent construction, anticipated deflection under load, affected related work, weep drainage network, expansion and contraction joint location and details, field welding, coordination with hardware and electrical requirements.
  - .2 Identify and describe material types being supplied, wall thicknesses of extrusions, and shapes including connections and grades, dimensions and tolerances (minimum and maximum), attachments, reinforcing, anchorage and locations of fastenings, and provisions for thermal and structural movement between components of this section and adjacent materials.
  - .3 Include description of materials, metal finishing specifications, and other pertinent information.
  - .4 Design loads, typical reactions and support movement allowances, both vertical and horizontal, shall be placed on the *Shop Drawings*.
  - .5 *Shop Drawings* shall clearly indicate the specification of materials and, where applicable, indicate installation methods and coordination with other Sections.
  - .6 Submit framing member structural and physical characteristics, calculations, dimensional limitations, special installation requirements.
- .4 Samples:
  - .1 Submit samples of frame, sill and mullion sections, sill flashing and accessories, fasteners for connection of frame to opening, glazing tape, glass retainers, glazing gaskets, screening and frame, spandrel panels and each finish material and any other material, as requested.
  - .2 Samples of colour and finish prepared as specified on respective metal components for both extrusion and sheet.
  - .3 Identify samples as to treatment, thickness, alloy, framing composition, colour, manufacture, performance standard and portion of the work to which they apply.
  - .4 Fabrication shall not proceed without written acceptance of samples from the *Consultant*.
- .5 Test reports:
  - .1 Submit valid laboratory test reports, prepared by an independent laboratory, verifying that proposed system has been tested by an independent laboratory and achieved performance values that meet the specified performance criteria.

## 1.5 CLOSEOUT SUBMITTALS

- .1 Operation and maintenance data:
  - .1 Submit manufacturer's operation and maintenance instructions for incorporation into the operation and maintenance manuals in accordance with Section 01 77 00 – Contract Closeout Procedures and Submittals.

## 1.6 QUALITY ASSURANCE

### .1 Qualifications:

#### .1 Installers / applicators / erectors:

- .1 Execute work of this Section only by company who has adequate plant, equipment, and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past five years.
- .2 *Provide* at least one Foreperson who shall be thoroughly trained and experienced in skills required, be completely familiar with referenced standards and requirements of this work, and personally direct installation performed under this Section.
  - .1 Foreperson experience: Minimum 10 years' experience as glazing mechanic.
  - .2 Typical glazing mechanic experience: Minimum 3 years' experience as glazers.
- .3 Welding: Perform welding of structural components only by fabricators certified by Canadian Welding Bureau to CSA Welding qualification codes; CSA W47.1-09(2014) for welding of steel, and CSA W47.2-12 for welding of aluminum or *Equivalent* certification acceptable to the *Consultant*.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Store parts in a dry place and permit natural ventilation over their finished surfaces.
- .2 Store materials in locations protected from damage of other subcontractors.
- .3 Under conditions of high humidity or cold temperatures, *Supply* heating or forced air ventilation to prevent accumulation of surface moisture.
- .4 Mark components to show location on building and on the *Drawings*.
- .5 Protect finishes with strippable coating that will not mar, nor deface finish on removal, or a similar method designed to afford an equivalent amount of protection. Leave protected coating intact until damage risk is past or immediately prior to final cleaning.
- .6 Stacking should be done to prevent bending pressure or abrasion of finished surfaces.
- .7 Brace and protect frame units to prevent distortion and damage in shipment and handling.
- .8 *Provide* methods for lifting or hoisting units into place without causing damage.

## 1.8 FIELD CONDITIONS

- .1 Comply with requirements of *Product* manufacturers.

## 1.9 WARRANTY

- .1 The Contractor shall assume responsibility for warranties of glass and glazing included in the work of this Section, in accordance with Section 08 80 00 – Glass and Glazing.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURER

- .1 The work of this Section shall be provided by:

- .1 Alumicor,
- .2 Kawneer,
- .3 Or *Equivalent* (substitutions in accordance with Section 01 25 00 – Product Substitution Procedures).

## 2.2 PERFORMANCE/DESIGN REQUIREMENTS

- .1 Air Leakage; except entrance doors: Air leakage through the work shall not exceed 0.3 L/s/m<sup>2</sup> (0.06 cfm/ft<sup>2</sup>) of glazing area when tested in accordance with ASTM E283- 04(2012) at test pressure of 300 Pa (6.24 psf).
- .2 Water Penetration (other than entrance doors): No water penetration shall occur when the work is tested in accordance with ASTM E331-00(2009), amended to prohibit water from passing through interior glazing seals or frame joints, at a test pressure of 300 Pa (6.24 psf).
- .3 Fabricate mullions to ensure under specified loads a maximum deflection of 1/175 of mullion span or 19 mm (3/4"), whichever is less.
- .4 Design and size components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of system as calculated in accordance with Ontario Building code.
- .5 Design and size components to withstand seismic loads and sway displacement as calculated in accordance with Ontario Building code.
- .6 *Provide* system to accommodate, without damage to components or deterioration of seals:
  - .1 Movement within system,
  - .2 Movement between system and perimeter framing components,
  - .3 Dynamic loading and release of loads,
  - .4 Deflection of structural support framing,
- .7 Maintain continuous air barrier throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound, in accordance with the *Contract Documents*.
- .8 Position thermal insulation to exterior of air barrier, in accordance with the *Contract Documents*.
- .9 Ensure no vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.
- .10 *Provide* anchors sufficiently rigid to resist wind and snow loads caused by aluminum shades and brackets, without damage to wall system.

## 2.3 MATERIALS

- .1 Aluminum extrusions: Aluminum Association alloy AA6063-T5 or T6 temper for framing.
- .2 Sheet aluminum: aluminum sheet, 0.92 mm (0.04") minimum thickness.
  - .1 Aluminum alloy:
    - .1 AA3003-H14 Painting Quality.
    - .2 AA5005H14 Anodizing Quality.

- .3 Concealed sheet metal air barriers: 1 mm (0.04") (22 gauge) Z275 galvanized steel sheet.
- .4 Fasteners: aluminum or Type 304 stainless steel, finished to match adjacent material.
- .5 Isolation coating: alkali resistant bituminous paint or epoxy solution.
- .6 Glazing gaskets: fully resilient, shim type butyl glazing tape or Ethylene Propylene Diene Terpolymer (EPDM) glazing gasket.
- .7 Glass and other glazing materials: Refer to Section 08 80 00 – Glass and Glazing.
- .8 Silicone Sealant: One component, chemical curing; capable of water immersion without loss of properties: cured Shore A Durometer hardness of 15 to 25 in accordance with ASTM D2240- 05 (2010), colour as selected by the *Consultant*, where exposed, in accordance with ASTM C920-11.
- .9 Sheet metal work air barrier sealant: One component elastomeric chemical curing, in accordance with ASTM C920-11.
- .10 Air barrier membrane:
  - .1 Self-Adhesive membrane: Composite preformed modified membrane system consisting of SBS modified asphalt for low temperature flexibility and polyethylene scrim reinforcing.  
Acceptable *Products*:
    - .1 Henry 'Blueskin SA' Self-Adhesive Grade Air Barrier Membrane.
    - .2 Soprema 'Sopraseal Stick 1100'.
    - .3 W.R. Meadows 'Air Shield'.
    - .4 . Or *Equivalent*.
  - .2 Primer: as recommended by manufacturer.
  - .3 Membrane Properties:
    - .1 Thickness: 1.0 mm (40 mils).
    - .2 Application temperature: minimum +5°C.
    - .3 Service temperature: -40°C to +70°C.
    - .4 Elongation: 200% minimum in accordance with ASTM D412-06a (2013)- modified.
    - .5 Low temperature flexibility: in accordance with -30°C to CGSB 37-GP-56M-1985.
    - .6 Air leakage: 0.005 L/m2.s under a pressure differential of 75 Pa (0.01 PSI) in accordance with ASTM E283-04(2012).

## 2.4 ENTRANCE FRAMING

- .1 Exterior aluminum framing: 50.8 mm x 152.4 mm (2" x 6") frames and 152.4 mm x 152.4 mm (6" x 6") jambs, thermally broken extruded aluminum assembly with flush sight lines.
  - .1 Acceptable *Product*: Kawneer Tri Fab 601UT or *Equivalent*.
- .2 Interior aluminum framing: 45 mm x 114 mm (1-3/4" x 4-1/2") frames and 114 mm x 114 mm (4-1/2" x 4-1/2") jambs, non-thermally broken extruded aluminum assembly with flush sight lines.
  - .1 Acceptable *Product*: Kawneer Tri Fab 450 or *Equivalent*.

- .3 All section shall be designed for shear block joinery.

## 2.5 ALUMINUM ENTRANCE DOORS - EXTERIOR

- .1 Entrance glazing system shall be designed according to Section 08 41 00 - Aluminum Framed Glazing Systems requirements and the following:
- .1 Doors:
- .1 Acceptable *Product*: Kawneer '350 Medium Stile' or *Equivalent*.
- .2 Fasteners connecting and fixing the frame members shall be concealed.
- .3 Reinforce mechanically-joined corners of doors by welding, spigotting, welding and spigotting or by one piece cast aluminum angle to produce sturdy door unit.
- .4 Door stiles shall be weathered with metal backed polypropylene pile weather- stripping. *Provide* weather-stripping sweeps at door bottoms.
- .5 Door hardware: Norton 1605 closer or equivalent, 1 MS lock and 2 thumb latches (locations as scheduled or indicated), exterior threshold 115 mm (4.5"), 1 pair butt hinges, weather stripping and Classic Hardware CO-9 with stainless steel US32 polished finish, flash cap across the top of door.
- .1 *Provide* Unican locks where indicated or scheduled in the *Contract Documents*.
- .2 Barrier free door operators: in accordance with Section 08 71 13 - Automatic Door Operators.
- .6 Weathering on offset pivot or butt hung doors (single or pairs) shall be Kawneer SEALAIR elastomeric weathering of tubular shape, with a semi-rigid polymeric backing, or *Equivalent*.
- .7 Door bottom rail weathering (where required) shall be an extruded elastomeric blade sweep strip applied with concealed fasteners.
- .8 Glass: Refer to Section 08 80 00 – Glass and Glazing.

## 2.6 ALUMINUM ENTRANCE DOORS - INTERIOR

- .1 Interior entrance and interior glazing system shall be designed according to the requirements of this Section and the following:
- .1 Doors:
- .1 Acceptable *Product*: Kawneer '350 Medium Stile' or *Equivalent*.
- .2 Fasteners connecting and fixing the frame members shall be concealed.
- .3 Reinforce mechanically-joined corners of doors by welding, spigotting, welding and spigotting or by one piece cast aluminum angle to produce sturdy door unit.
- .4 Door stiles shall be weathered with metal backed polypropylene pile weather- stripping. *Provide* weather-stripping sweeps at door bottoms.
- .5 Door hardware: Norton 1605 closer or equivalent, 1 MS lock and 1 thumb latch (locations as scheduled or indicated), 1 pair butt hinges, and Classic Hardware CO-9 with stainless steel US32 polished finish, flash cap across the top of door.
- .1 Barrier free door operators: in accordance with Section 08 71 13 – Automatic Door Operators.

- .6 Weathering on offset pivot or butt hung doors (single or pairs) shall be Kawneer SEALAIR elastomeric weathering of tubular shape, with a semi-rigid polymeric backing, or *Equivalent*.
- .7 Door bottom rail weathering (where required) shall be an extruded elastomeric blade sweep strip applied with concealed fasteners.
- .8 Glass: Refer to Section 08 80 00 – Glass and Glazing.

## 2.7 ALUMINUM CURTAIN WALL

- .1 Glass Design:
  - .1 Glass shall be designed according to CAN/CGSB 12.20-M89 and Section 08 80 00 - Glass and Glazing.
  - .2 Glass subjected to guard loads shall be designed with an alternative resistance path in the event of failure of one lite or ply of glass.
  - .3 Insulating glass units in accordance with Section 08 80 00 - Glass and Glazing.
- .2 Curtain wall shall be designed according to Section 08 41 00 – Aluminum Framed Glazing Systems requirements and the following:
  - .1 Acceptable *Products*:
    - .1 Alumicor 'ThermaWall 2200 Series'.
    - .2 Or *Equivalent*.
  - .2 Thermally broken sections.
  - .3 Mechanically fasten horizontal and vertical edges of infill materials and glass units with mechanically fastened continuous pressure plates complete with caps.
  - .4 Glazing cavity shall be compartmentalized at every floor level and every 6000 mm horizontally to prevent the movement of air in accordance with standard rain screen design.
  - .5 Fasteners: concealed.
  - .6 Cap extensions shall be extruded to profiles indicated and scheduled. Break- formed cap extensions will not be accepted.

## 2.8 FINISHES

- .1 Exposed aluminum surfaces; anodized in accordance with AAMA 611-98:
  - .1 Clear anodized in accordance with AA Designation AA-M12C22A41 at exterior, AA-M12C22A31 at interior.

## 2.9 FABRICATION

- .1 Sills: extruded aluminum, finished to match window frames, 15 mm (5/8") minimum projection beyond wall surface. *Provide* preformed end caps wherever sill terminates. Butt joint sill and *Provide* preformed splice connector and sealant to prevent water penetration. Locate splice connectors (joint covers) at center line of mullions when required. Trim and detail corners neatly.
- .2 Make allowances for deflection of structure. Ensure that structural loads are not transmitted to aluminum work.
- .3 *Provide* structural steel reinforcement for strength, stiffness and connections.

- .4 Fit intersecting members to flush hairline weathertight joints and mechanically fasten together, except where indicated otherwise.
- .5 Conceal fastenings from view. Exposed fastenings where indicated in the Contract Documents.
- .6 Form cut-outs, recesses, mortising or milling for finishing hardware to templates supplied. Reinforce with aluminum or galvanized steel plates.
- .7 Field apply isolation coating to aluminum in contact with dissimilar metals and/or cementitious materials.
- .8 Fabricated assemblies shall make required clearances other assemblies and for deflection of structure.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- .1 *Install* work of this Section plumb, square, level, free from warp, twist and superimposed loads.
- .2 Secure work in required position. Do not restrict thermal movement.
- .3 *Install* hardware in accordance with templates.
- .4 Adjust operable parts for correct function.
- .5 Isolate from cementitious materials.

#### **3.2 AIR VAPOUR BARRIER CLOSURES**

- .1 It is the *Contractor's* responsibility under this section to provide and maintain the continuity of air/vapour seal to adjacent materials to which the windows and frames abut. Fit flexible seals, tapes, sealants and gaskets at locations required to achieve air/vapour/water resistant and weathertight junctions. Ensure continuity of seal at end joints between lengths of material by overlapping and cementing. Caulk junctions of system components to themselves and other work with sealant to maintain effective vapour, air and water barrier and fix in place with an aluminum flat to the air/vapour seal line at the adjacent material and to the glazing rebate.
- .2 Where deflection of structure will cause dynamic joint movement between aluminum work and dissimilar materials, install flexible seals of sufficient width to allow formation of bellows to take up any torsional and shear stresses.

#### **3.3 GLAZING**

- .1 Glaze aluminum framed windows and doors at exterior using insulating glazing units in accordance with Section 08 80 00 – Glass and Glazing.
- .2 Glaze interior windows and doors in accordance using glass types given in the glazing schedule and in accordance with section 08 80 00 – Glass and Glazing.

#### **3.4 SEALANTS**

- .1 Seal between frame members, sills and adjacent construction as a part of the work of this Section and in accordance with Section 07 92 00 – Joint Sealants.

#### **3.5 HARDWARE**

- .1 *Install* in accordance with manufacturer's installation instructions.



- .2 Accurately locate and adjust hardware to meet manufacturer's instructions. Use special tools and jigs as recommended.
- .3 Set, fit and adjust hardware according to manufacturer's directions, at heights as confirmed by the *Consultant*. Hardware shall operate freely. Protect installed hardware from damage and paint spotting.
- .4 Powered hardware:
  - .1 Power wiring will be supplied and installed by electrical work installer including conduit, boxes and other electrical appurtenances, including connections and terminations. Be responsible for ensuring that all wiring work is done in accordance with the *Suppliers* wiring diagrams and directions.
  - .2 Arrange for testing and commissioning of system by the distributor of the system. Submit a copy of reports to the *Consultant*.

### **3.6 ADJUSTING AND CLEANING**

- .1 Cleaning on completion of installation:
  - .1 Remove deposits which affect appearance or operation of units.
  - .2 Remove protective materials.
  - .3 Clean interior and exterior surfaces by washing with clear water; or with water, and soap or detergent; followed by a clear water rinse.
  - .4 Clean and restore stained metal surfaces in accordance with manufacturer's recommendations. Replace if cleaning is impossible.
  - .5 Final cleaning is specified in Section 01 77 00 – Contract Closeout Procedures and Submittals.

**END OF SECTION**