

1 General

1.1 **SECTION INCLUDES**

- .1 Design, labour, Products, tool, equipment and services necessary for Aluminum work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 AAMA 501, Methods of Test for Exterior Walls.
- .2 AAMA 2605, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels - Series: Components, Coatings and Finishes.
- .3 AAMA CW-10, Care and Handling of Architectural Aluminum from Shop to Site.
- .4 AAMA CW-DG-1, Aluminum Curtain Wall Design Guide Manual.
- .5 AAMA/WDMA/CSA 101/I.S.2/A440, Standard Specification for Windows, Doors, and Unit Skylights.
- .6 ANSI H35.1M, Alloy and Temper Designation Systems for Aluminum (Metric).
- .7 ASTM A167, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
- .8 ASTM B209M, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .9 ASTM B221M, Specification for Aluminum-Alloy Extruded Bars, Rods, Wires, Profiles and Tubes.
- .10 ASTM C920, Specification for Elastomeric Joint Sealants.
- .11 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.
- .12 ASTM E330, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .13 ASTM E331, Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
- .14 ASTM F738M, Specification for Stainless Steel Metric Bolts, Screws, and Studs.
- .15 CAN/CGSB 1.108-M, Bituminous Solvent Type Paint.
- .16 CAN/CGSB-82.1-M, Sliding Doors.

- .17 CAN/ULC S702, Thermal Insulation, Mineral Fibre, for Buildings.
- .18 CAN/ULC S705.1, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Material Third Edition.
- .19 NFRC 100, Procedure for Determining Fenestration Product U-factors.
- .20 NFRC 200, Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.

1.3 **DEFINITION(S)**

- .1 Aluminum work: Shall mean aluminum curtainwall, entrances, vestibules, doors, screens and framing mentioned in Part 2 of this Specification Section.

1.4 **DESIGN REQUIREMENTS**

- .1 Design Aluminum work to meet requirements of AAMA/WDMA/CSA 101/I.S.2/A440, AAMA CW-DG-1, ASTM E283, ASTM E330, ASTM E331, NFRC 100, NFRC 200 and to meet performance and energy requirements specified herein and as required by authorities having jurisdiction.
- .2 Design Aluminum work in accordance with following Climatic Design Data for Toronto contained in the Ontario Building Code:
 - .1 Design temperature: January 1%, July 2 1/2% .
 - .2 Hourly wind pressures: 1 in 50 year occurrence.
 - .3 Seismic design: Class "C".
- .3 Design complete aluminum window systems, including glazing, to meet the following performance criteria:
 - .1 U-factor: To Follow.
 - .2 SHGC: To Follow.
- .4 Design complete aluminum entrance door systems, including glazing, to meet the following performance criteria:
 - .1 U-factor: To Follow.
 - .2 SHGC: To Follow.
- .5 Design Aluminum work to accommodate following without producing detrimental effect:
 - .1 Cyclic 40°C daily thermal swing of components.
 - .2 Cyclic, dynamic loading and release of loads such as wind loads.
 - .3 13 mm vertical deflection in supporting structure and movement of supporting structure due to live, dead load, and creep or deflections, seismic load, sway displacement and similar items.

- .6 Design to prevent accumulation of condensate on interior side of Aluminum work framing under the following service conditions:
 - .1 Interior summer temperature: 21 °C.
 - .2 Interior winter temperature: 21 °C.
 - .3 Exterior temperature: -20 °C.
 - .4 Interior RH: 35%.
- .7 Design windows in accordance to AAMA/WDMA/CSA -101/I.S.2/ A440, to the following performance levels:
 - .1 Performance class: CW.
 - .2 Minimum performance grade (PG): 30.
 - .3 Minimum positive design pressure: 1440 Pa.
 - .4 Minimum negative design pressure: - 1440 Pa.
 - .5 Minimum water penetration test pressure: 220 Pa.
 - .6 Minimum air infiltration/exfiltration: A2.
 - .7 Condensation resistance: I57
- .8 Restrict air infiltration/exfiltration, through Aluminum work in accordance with ASTM E283 at pressure differential as indicated:
 - .1 Curtainwalls and entrance assemblies: 0.0003 m³/s m² at differential of 300 Pa.
 - .2 Doors (per door): 2.78 m³/h m per linear metre of crack at differential of 75 Pa.
- .9 Design and detail controlled drainage path to actively discharge water, which enters into or forms within Aluminum work, to exterior; prevent accumulation or storage of water within Aluminum work. Prevent water from entering interior when tested in accordance with ASTM E331 at a pressure differential of 700 Pa.
- .10 Design and detail air barrier, vapour retarder, and rainscreen products and assemblies into continuous and integrated Aluminum work envelope. Optimize Aluminum work design to align envelope layers and to minimize thermal bridges.
- .11 Prevent deflection and permanent or progressive glazing displacement. Restrict horizontal and vertical mullion deflection to less than L/175 and 19 mm maximum for heights under 4115 mm and L/240 and 25 mm maximum for heights over 4115 mm.
- .12 When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span in accordance with ASTM E330.
- .13 Design anchorage inserts for installation as part of other Sections of work. Design anchorage assemblies to accommodate construction and installation tolerances.
- .14 Provide all reinforcing within aluminum members as required by design and OBC to provide structurally sound assembly. In any case, mullion size shall not be increased due to provision of reinforcing.

- .15 Design Aluminum work and connections to substrate where the bottom of the Aluminum work extends to a point below 1070 mm above finished floor level and separates a floor level from an adjacent interconnected space to withstand the required guard and handrail loads in accordance with the OBC and applicable local regulations. When requested by Consultant, provide a letter signed and sealed by a Professional Engineer certifying that the Aluminum work conforms to the OBC requirements.

1.5 SUBMITTALS

- .1 Shop drawings:
 - .1 Submit shop drawings for mock-ups and Aluminum Work in accordance with Section 01 33 00 indicating:
 - .1 Plans, sections, details, type of extrusions, profiles, finishes, panels, spandrels, operating components, doors, related flashings, closures, fillers, and end caps, and sealants.
 - .2 Products and glazing types.
 - .3 Calculations or modelling confirming Aluminum work conforms to specified performance and energy requirements.
 - .4 Structural integrity of Aluminum work, anchorage inserts, and system installation tolerances.
 - .5 Section and hardware reinforcement, anchorage, assembly fixings.
 - .6 Detailing, locations, and allowances for movement, expansion, contraction
 - .7 Air barrier and vapour retarder continuity and path of cavity drainage and air pressure equalization.
- .2 Samples:
 - .1 Submit two samples of following in accordance with Section 01 33 00;
 - .1 250 mm long samples of each type of extrusion and finish.
 - .2 250 x 200 mm samples of insulating glass unit.
 - .3 One complete corner detail of door frame, glazing, wood slats within curtain wall and finish for each door type.
 - .4 Each door hardware item for Consultant's approval.
 - .5 250 x 200 mm sample of aluminum panel.
 - .6 200 x 200 mm sample of insect screen for operable windows for Consultant's approval of fibreglass mesh.
- .3 Reports:
 - .1 Submit substantiating engineering data, and independent test results of pre-tested, Aluminum work to substantiate compliance with the design criteria including air leakage and water penetration conforming to ASTM E283 and ASTM E331.
 - .2 Engineering data demonstrating compliance with test procedures outlined in AAMA 501 including as a minimum air leakage resistance, static pressure water penetration resistance, dynamic pressure water penetration resistance, wind load resistance, vertical live load deflection movement and lateral (horizontal) movement, and condensation resistance.

- .3 Submit documentation to substantiate ten years of experience in Aluminum work manufacture and installation of similar size and nature.
- .4 Close-out submittals: Submit Aluminum work data for incorporation into the Operations and Maintenance Manual as part of Section 01 78 00.
- .5 Extended warranties: Submit extended warranty signed and registered by the manufacturer providing the warranty in the name of the Owner for the timeframe and coverage specified in this Section.

1.6 **QUALITY ASSURANCE**

- .1 Retain a Professional Engineer, licensed in Province of Ontario, with experience in Aluminum work of comparable complexity and scope to perform the following services as part of the work of this Section:
 - .1 Design of Aluminum work.
 - .2 Review, stamp, and sign shop drawings.
 - .3 Conduct on-Site inspections and prepare and submit inspection reports. Number and frequency of inspection to be sufficient to satisfy Engineer that Work is being fabricated and installed in accordance with reviewed shop drawings and design intent.
- .2 Shop mock-up:
 - .1 Provide one, full scale mock-up in shop of Aluminum work for shop testing, including air leakage, water penetration, and deflection in accordance with AAMA/WDMA/CSA 101/I.S.2/A440, AAMA 501, ASTM E283, ASTM E330, and ASTM E331. If a test fails, additional testing may be required by Consultant to ensure performance of Aluminum Work at no additional cost to Owner.
 - .2 Demonstrate conformance to specified design requirements.
 - .3 Mock-up shall show full range of Products, finishes, textures, quality of fabrication, and workmanship including, but not limited to, framing members, glazing units, anchorage, opening units, doors and transitions to adjoining assemblies and materials.
- .3 Pre-installation meetings:
 - .1 Mock-ups: Prior to installation of mock-ups, arrange meeting at the shop and on Site to be attended by Consultant, Contractor, and Engineer and site superintendent to inspect substrates, and to review installation procedures 48 hours in advance of installation.
 - .2 Site: Prior to installation of curtain wall, arrange meeting at the Site to be attended by Consultant, Contractor, and Engineer and site superintendent to inspect substrates, and to review installation procedures 2 weeks in advance of installation.

1.7 **DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle Aluminum Work in accordance with AAMA CW-10 and manufacturer's written recommendations.

- .2 Protect aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather. Do not remove before final cleaning of building.

1.8 EXTENDED WARRANTY

- .1 Aluminum work: Submit an extended warranty for Aluminum work in accordance with General Conditions, except that warranty period is extended to 5 years.
 - .1 Warrant against failure to meet the design criteria and requirements such as interior leakage, and frame condensation.
 - .2 Coverage: Labour and materials to repair or replace Aluminum Work as required to correct deficient work and meet specified requirements including affected adjacent work.
- .2 Glazing:
 - .1 Provide a 10 year warranty, commencing from date of Substantial Performance, against defects in the insulating glass units and warrant them to be free from material obstruction of vision as a result of dust or film formation on the internal glass surfaces by any cause, under normal design conditions. Warrant the following:
 - .1 The insulating glass units shall be free from condensation, fogging material obstruction of vision as a result of dust or film formation on the internal glass surfaces by any cause under design conditions.
 - .2 The insulating glass units shall not change their mechanical design properties and shall not in any way deteriorate, degrade, delaminate or change their visual appearance.
 - .3 The glass units will not break due to thermal shock and temperature differential due to inherent glass faults, other than extrinsic glass breakage.
 - .4 Internal fogging shall be deemed to occur when light transmission of the glass is reduced by 5% in any 50 mm x 50 mm area.
 - .5 Failure will be deemed to occur when the internal dew point exceeds -40oC in a 21oC ambient temperature (when tested in accordance with ASTM E576).
 - .2 Warrant that glazing work is water and weather tight and free from distortion; that glazing materials will not deteriorate from exposure to the atmosphere and weather, will not be displaced, and will be free from permanent deformation under load; and that glass and insulating glass units will not be broken, cracked or scratched by causes resulting from defects in material, workmanship or design of glazing installation.
 - .3 Cracked or scratched glass, shrinking, cracking, staining, hardening, sagging of glazing materials; loosening or rattling of glass; and leaking of glazed joints will be considered defective work.
 - .4 Warranty shall provide for the removal of defective Products, replacement with new Products conforming to the specifications, and restoration of work damaged by removal and replacement including labour and installation costs.

3. Manufacturer's finish Warranty: Provide manufacturer's written warranty naming Owner as beneficiary and covering finish degradation or failure of factory-applied exterior fluoropolymer finish on Aluminum work within the warranty period; warrant finish per AAMA 2605 for colour fade less than 5 units, maximum chalk rating of 8, and greater than 30% gloss retention. Warranty period for finish: 5 years from date Work is certified as substantially performed.

2 Products

2.1 **ACCEPTABLE MANUFACTURER(S) AND SYSTEM(S)**

- .1 All Aluminum work systems and components are to be provided by a single manufacturer to ensure a single source of responsibility for the Work of this Section.
- .2 Curtain Wall: 'ThermaWall 2600 Series' by Alumicor Limited, '1600UT Curtain Wall' by Kawneer, or approved alternative by Toro Aluminum or Oldcastle Building Envelope. Provide unique instance of 207 mm extended cap for CW32.
- .3 Aluminum windows: 'RainBlade 2970 ShadowLine' with mitred fabrication and closed back perimeter by Alumicor Limited, or approved alternative by Kawneer or Oldcastle Building Envelope.
- .4 Operable Windows (vents): 'Phantom Vent 5000' by Alumicor Limited, or approved alternative by Kawneer or Oldcastle Building Envelope.
- .5 Aluminum entrance/storefront framing (exterior): '3400 Series' by Alumicor Limited, or '451T Storefront' by Kawneer or Oldcastle Building Envelope.
- .6 Interior framing: '1800 Series' by Alumicor Limited, '450 Storefront' by Kawneer or approved alternative by Toro Aluminum or Oldcastle Building Envelope.
- .7 Aluminum doors:
 - .1 Interior: ~~'400A Canadiana'~~ **'400A Canadiana'** by Alumicor Limited, '400 Series' by CRL / U.S. Aluminum, or approved alternative by Oldcastle Building Envelope.
 - .2 Exterior: ~~'400A Insuldoor'~~ **'ThermaPorte 7700'** by Alumicor Limited, '400T Series' by CRL / U.S. Aluminum, or approved alternative by Oldcastle Building Envelope.
- .8 Aluminum sliding doors: Conforming to CAN/CGSB-82.1-M and AAMA/WDMA/CSA 101/I.S.2/A440:
 - .1 Thermally broken frame and insulated glazing units.
 - .2 Locking Device: Latch-lock device, with locking function operable only from inside. **Key locking function operable on from exterior.**
 - .3 Door panels to be double operating.

2.2 MATERIALS

- .1 All materials under work of this Section, including but not limited to, sealants are to have low VOC content limits.
- .2 Aluminum extrusions and channels: ASTM B221 and ANSI H35.1 AA6063 alloy, T6 temper.
 - .1 Profile and dimensions: Refer to Contract Drawings.
 - .2 Thermal breaks in frame members: Vertically aligned with glazing.
- .3 Aluminum sheet: ASTM B209 and ANSI H35.1 AA1100 aluminum alloy, H14 temper, minimum 1.29 mm for sheets less than 610 mm wide and minimum 2.05 mm for sheets of a greater dimension.
- .4 Reinforcements and anchors: ASTM A167, Type 304 to AISI No. 2B finish. Size as shown.
- .5 Glass and glazing materials: As specified in Section 08 80 00.
- .6 Spandrel panel and shadow box airseal backpan: ASTM A653/A653M; 0.9 mm thick, Z275 galvanized steel sheet.
- .7 Airseal and Aluminum work sealant: ASTM C920, Type S, Grade NS, Class 100/50; One-part, low-modulus, moisture-curing, silicone. 'Dowsil 790' by Dow Consumer Solutions ; 'Spectrem 1' by Tremco. Verify compatibility with insulating glass unit manufacturer's secondary sealant. Colour as selected by Consultant. Primer as recommended by manufacturer.
- .8 Frame sealant: Type as recommended by the Aluminum work manufacturer.
- .9 Joint backing: Closed cell foam polyethylene rod, outsized minimum 30-50% larger than joint width and compatible with joint sealant. Product as recommended by sealant manufacturer.
- .10 Airseal transition membrane: 'Soprasedal Stick 1100' by Soprema Inc., 'Exoair 110' by Tremco or 'Air-Shield' by W.R. Meadows. Membrane to come complete with applicable primer.
- .11 Anchors, clips, and angles: Extruded aluminum or stainless steel.
- .12 Shims and blocking for frame: Rigid plastic, wood is not permitted.
- .13 Flashings, closures and trim: 1.0 mm minimum aluminum sheet, finish to match Aluminum Work extrusion finish.
- .14 Screws, bolts and other fasteners: ASTM F738M; Stainless Steel Type 304.
- .15 Isolation coating: CAN/CGSB-1.108-M; Bitumastic coating, acid and alkali resistant material.

- .16 Spandrel panel insulation: CAN/ULC S702; minimum 56 kg/m³, unfaced, semi-rigid mineral wool.
 - .1 'Thermafiber FireSpan' by Owens-Corning.
 - .2 'CurtainRock' by Rockwool Inc.
 - .3 Thickness: As required to fill void.
 - .4 Insulation fasteners: Stik-Clip with retaining washer.
- .17 Spray Foam Insulation: CAN/ULC S705.1, CFC free, polyurethane foam in place, closed cell, low expansion, one component air sealant, minimum density 15 kg/m³.
- .18 Window hardware: Manufacturer's standard heavy duty corrosion resistant hardware.
- .19 Door hardware: Supplied by finish hardware supplier under Section 08 70 00 for installation by door manufacturer.
- .20 Insect screen (windows): Extruded aluminum frames containing heavy duty, fine fibreglass mesh in accordance with AAMA/WDMA/CSA 101/I.S.2/A440. Screen to be retained in place with turn clip type fixings. Provide samples for the Consultant's approval.
- .21 Weatherstripping: Manufacturer's standard weatherstripping, durable, non-absorbing material resistant to deterioration by aging and weathering.

2.3 **FABRICATION**

- .1 Fabricate sections true to detail, free from defects impairing appearance, strength and durability. Fabricate extrusions with sharp, well defined corners.
- .2 Fabricate Aluminum work in accordance with reviewed shop drawings and manufacturer's written instructions.
- .3 Fabricate, fit, and secure framing joints and corners accurately, with flush surfaces, and hairline joints. Apply frame sealant at joints to provide continuity of water and air barrier.
- .4 Conceal anchors, reinforcement and attachments from view. Fabricate reinforcement in accordance with design requirements.
- .5 Do not expose manufacturer's identification labels on aluminum assemblies.
- .6 Fabricate continuous sill flashings with intermediate anchor clips, and joint reinforcing, form to profile shown. Fabricate filler and closure pieces as necessary for a complete and weather tight installation.
- .7 Fabricate doors and frames complete with internal reinforcements, cut-outs, and recesses to accommodate finish hardware. Reinforce cut-outs to assure adequate strength.

- .8 Fabricate Aluminum work closures and trim from aluminum sheet. Form to profile shown. Make weathertight.
- .9 Fabricate extruded and formed alum sills in finish to match extrusions.
- .10 Double weatherstrip doors. Install weatherstripping in specially extruded ports and secure to prevent shrinkage or movement.
- .11 Fabricate glazing recess with drainage to exterior.

2.4 **ALUMINUM DOORS**

- .1 Fabricate doors of welded construction.
- .2 Glazing stop: Aluminum, square, snap-on type, designed for glazing system.

2.5 **SPANDREL PANELS, AND SHADOW BOXES**

- .1 Fabricate spandrel panel and shadow box inner facing of galvanized sheet to form an airseal backpan. Wrap edges with galvanized sheet, enabling installation and minor movement of perimeter seal.
- .2 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- .3 Provide integral reinforcing and stiffeners as required to reinforce panel against deflection caused by wind and suction loads.
- .4 Place continuous layer of insulation to airseal backpan with adhesive and impale clips and fasteners. Ensure there are not gaps between the insulation and airseal backpan. Provide aluminum sheet over exterior face of insulation in shadow box as indicated.
- .5 Provide spacers as necessary to separate dissimilar metals.
- .6 Ventilate and pressure equalize the air space outside the exterior surface of the insulation, to the exterior.
- .7 Arrange fasteners and attachments to ensure concealment from view.
- .8 Glass panels (SGL): Consists of 6 mm thick spandrel glass to the exterior with insulated backpan to the inside. Insulation shall be in thickness as indicated on Contract Drawings, retained with stick clips. Seal all joints in shop with specified sealant, including perimeter seal at backpan. Colour to later selection by Consultant.
- .9 Shadow boxes (SB, GL-1): Consists of insulated glass unit to the exterior with insulated backpan to the inside complete with prefinished aluminum sheet in colour as selected by Consultant on exterior face of insulation. Seal all joints in shop with high grade butyl sealant, including perimeter seal at backpan.

- .10 Metal panels: Consists of an exterior prefinished flush aluminum panel with panel stiffeners as required, to match colour of framing, with insulation core in thickness as indicated on Contract Drawings and galvanized sheet back-pan.

2.6 **FINISH**

- .1 Extrusion finish: 'Duranar XL' by PPG in accordance with AAMA 2605. Colour: to be selected by Consultant. Colour: Refer to Material Legend as indicated on Drawings.
- .2 Spandrel Extrusion finish: 'Duranar XL' by PPG in accordance with AAMA 2605.. Colour: Refer to Material Legend as indicated on Drawings.
- .3 Doors: 'Duranar XL' by PPG in accordance with AAMA 2605. Colour: to be selected by Consultant
- .4 Panel and sheet finish: As indicated on drawings to match adjacent extrusion finish.

3 Execution

3.1 **EXAMINATION**

- .1 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 **INSTALLATION**

- .1 Install Aluminum work in accordance with reviewed shop drawings, manufacturer's instructions, AAMA/WDMA/CSA 101/I.S.2/A440 and to meet requirements of authorities having jurisdiction.
- .2 Install work of this Section securely, in correct location, level, square, plumb, at proper elevations, free of warp or twist.
- .3 Apply isolation coating at 0.8 mm dry film thickness to prevent corrosive or electrolytic action between dissimilar materials such as aluminum to concrete, masonry, galvanized steel and similar conditions.
- .4 Install flashings, closures, and trim pieces.
- .5 Fill voids between aluminum framing and adjacent construction with foam insulation.
- .6 Install sills in maximum lengths possible. For sills over 1200 mm in length, maintain 3 mm to 6 mm space at each end.
- .7 Refer to Contract Drawings for glazing type locations. Install glazing in accordance with Section 08 80 00.

- .8 Spandrel panels and shadow boxes:
 - .1 Set back pans to framing in sealant and apply sealant to cover screw heads to maintain air tight seal between back pans and framing.
 - .2 Adhere stick clips to metal back pans at 300 mm o.c. both ways. Apply insulation adhesive over entire surface of barrier and around clips held with adhesive.
 - .3 Cut insulation slightly over-size and press insulation boards firmly to barrier impaling them on clips without bending clips. Butt insulation boards tightly. install retainers to clips.
 - .4 Wrap aluminum sheet over exterior face of insulation in shadow box.
- .9 Automatic door operators to be supplied and installed by Section 08 70 00. Install doors and hardware to manufacturers' written instructions. Clean and adjust hardware for correct performance.
- .10 Install aluminum door manufacturer's standard weatherstripping at door frame perimeter. Install weatherstripping throughout entire length and width of doors at jambs and heads.
- .11 Install doors and hardware to manufacturers' written instructions. Clean and adjust hardware for correct performance.
- .12 Adjust operable parts for correct function.
- .13 Remove damaged or unacceptable Products and assemblies from Site and replace to Consultant's acceptance.
- .14 Install glass presence markers, in two cross stripes extending from diagonal corners. Maintain markers until final clean-up.

3.3 **ERECTION TOLERANCES**

- .1 Tolerances: Non-cumulative.
 - .1 Maximum variation from plumb: 1.5 mm/3 m non-cumulative or 12 mm/30 m, whichever is less.
 - .2 Maximum misalignment of two adjoining members abutting in plane: 0.8 mm.
 - .3 Vertical and horizontal positions: +/- 3 mm.
 - .4 Racking of face: 6 mm, nil in elevation.
 - .5 Operable components: Consistent with smooth operation and weatherproof performance.
 - .6 Maximum perimeter sealant joint between Aluminum work and adjacent construction: 13 mm.

3.4 **GLAZING PERIMETER AIRSEAL**

- .1 Install glazing perimeter airseal at entire perimeter of each insulating glass unit to achieve an airseal from insulating glass unit to curtain wall frame. Do not obstruct path of cavity drainage and air pressure equalization.

- .2 Perform sealant work in accordance with manufacturer's written requirements.

3.5 **AIRSEAL TRANSITION MEMBRANE**

- .1 Install primer and airseal transition membrane in accordance with manufacturer's instructions and reviewed shop drawings.
- .2 Overlap airseal transition membrane 75 mm minimum and lap in direction of waterflow. Hand roll membrane to ensure 100% contact and adhesion to substrates.
- .3 Coordinate airseal transition to adjacent parts of Work. Continuity of weather and air seal to be maintained throughout curtain wall and at interface with adjacent components or systems.
- .4 Provide terminations fabricated from same material as airseal transition membrane or material recommended by membrane manufacturer at sills, lintels, openings, and where horizontal surfaces intersect with vertical surfaces to ensure moisture is shed to exterior.

3.6 **JOINT BACKING AND ALUMINUM WORK SEALANT**

- .1 Prepare substrate surface and mask as recommended by sealant manufacturer.
- .2 Install joint backing and sealant at Aluminum work and perimeter joints for weather tight installation in accordance with sealant manufacturer's instructions. Tool sealant. Remove excess sealant.

3.7 **FIELD QUALITY CONTROL**

- .1 Test sliding doors in accordance with ASTM E1105 for water penetration.
 - .1 Procedure A: test sliding door at 700 Pa, for uniform static air pressure difference for 15 minutes by applying water at a minimum rate of 3.4 L/m² minute.
 - .2 Procedure B: test sliding door at 700 Pa, for static air pressure difference for 4 cycles of 5 minutes each by applying water at a minimum rate of 3.4 L/m² minute.
 - .3 Failure criteria as per ASTM E1105.

3.8 **CLEANING**

- .1 Maintain Aluminum work, inside and outside, in clean condition throughout construction period.
- .2 Remove labels, protective material, and glass presence markers from prefinished surfaces.
- .3 Remove certification labelling when directed by Consultant, in writing.

- .4 Wash Aluminum work with solution of mild detergent in warm water, with particular attention to recesses and corners. Wipe surfaces clean and dry.

END OF SECTION