

**Part 1 General**

**1.1 SUMMARY OF WORK**

- .1 This Section specifies glazed, thermally broken aluminum-framed storefronts and accessories.

**1.2 RELATED REQUIREMENTS**

- .1 Section 07 92 00 - Joint Sealing.
- .2 Section 08 80 50 – Glazing: Insulating glass units.

**1.3 REFERENCE STANDARDS**

- .1 Aluminum Association (AA)
  - .1 DAF 45 2003, Designation System for Aluminum Finishes.
- .2 American Architectural Manufacturers Association (AAMA).
  - .1 AAMA-501-2005, Methods of Test for Exterior Walls.
  - .2 AAMA-2603-2013, Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
  - .3 AAMA-2604-2013, Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
  - .4 AAMA-2605-2013, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
  - .5 AAMA CW-10-2012, Care and Handling of Architectural Aluminum From Shop to Site.
  - .6 AAMA CW-11-1985, Design Windloads for Buildings and Boundary Layer Wind Tunnel Testing.
  - .7 AAMA-TIR A1-2004, Sound Control for Fenestration Products.
- .3 ASTM International (ASTM).
  - .1 ASTM A653 / A653M – 09a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .2 ASTM B209-2010, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - .3 ASTM B221-2013, Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - .4 ASTM C612 – 2014, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

- .5 ASTM E283-2012, Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- .6 ASTM E331-2009, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.
- .7 ASTM E413 – 04, Classification for Rating Sound Insulation.
- .8 ASTM E1105 – 2008, Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.
- .9 ASTM D2240 – 2010, Standard Test Method for Rubber Property—Durometer Hardness.
- .4 Canada Green Building Council (CaGBC).
  - .1 LEED® Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations including Addendum 2007.
- .5 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-12.8-97, Insulating Glass Units.
  - .2 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.
  - .3 CAN/CGSB-19.13-M87, Sealing Compound, One-Component, Elastomeric, Chemical Curing.
- .6 CSA International (CSA)
  - .1 CAN/CSA-S157-2005, Strength Design in Aluminum.
  - .2 CAN/CSA-S136–2007, North American Specification for the Design of Cold-Formed Steel Structural Members.
  - .3 CAN/CSA W59.2-M1991(R2003), Welded Aluminum Construction.
- .7 Environmental Choice Program (ECP)
  - .1 CCD-45-1995, Sealants and Caulking Compounds.
- .8 Underwriter’s Laboratories of Canada (ULC)
  - .1 CAN/ULC-S710.1 2005, Standard for Thermal Insulation – Bead-Applied One Component Polyurethane Air Sealant Foam, Part 1: Materials Standard for Thermal Insulation - Bead - Applied One Component Polyurethane Air Sealant Foam, Part 1: Materials.

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- .1 Co-ordination: Co-ordinate work of this Section with work of other trades for proper time and sequence to avoid construction delays.
- .2 Pre-installation Meeting: Convene pre-installation meeting after Award of Contract and one week prior to commencing work of this Section to verify project requirements, substrate conditions and coordination with other building sub-trades, and to review manufacturers written installation instructions.

- .1 Comply with Section 01 and co-ordinate with other similar pre-installation meetings.
- .2 Notify attendees 2 weeks prior to meeting and ensure meeting attendees include as minimum:
  - .1 Owner;
  - .2 Consultant;
  - .3 Glazing subcontractor;
  - .4 Manufacturer's Technical Representative.
- .3 Ensure meeting agenda includes review of methods and procedures related to glazed aluminum-framed storefront installation including co-ordination with related work.
- .4 Record meeting proceedings including corrective measures and other actions required to ensure successful completion of work and distribute to each attendee within 1 week of meeting.

## **1.5 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Make submittals in accordance with Contract Conditions and Section 01 33 00 - Submittal Procedures.
- .2 Product Data: Submit product data including manufacturer's literature for glazed aluminum aluminum-framed storefront extruded members, panels, components, and accessories, indicating compliance with specified requirements and material characteristics.
  - .1 Submit list on aluminum-framed storefront manufacturer's letterhead of materials, components, and accessories to be incorporated into Work.
  - .2 Include product names, types and series numbers.
  - .3 Include contact information for manufacturer and their representative for this Project.
- .3 Shop Drawings: Submit drawings stamped and signed by Professional Engineer registered or licensed in Province of Nova Scotia, Canada. Include on shop drawings:
  - .1 Aluminum-framed storefront panel and component dimensions, framed opening requirements and tolerances, adjacent construction, anchor details anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required.
  - .2 Include details of fasteners between interior and exterior extrusions ensuring no penetration of thermal break or thermal bridging.
- .4 Samples:
  - .1 Submit duplicate 300 x 300 mm sample sections showing prefinished aluminum surface, finish, colour and texture, and including section of infill panel.
  - .2 Submit duplicate 300 x 300 mm sample sections of insulating glass unit showing glazing materials and edge and corner details.
- .3 Thermal Performance: Submit verification that Insulating Glass Units used in aluminum-framed storefront system meet RSI values specified.

- .6 Test Reports:
  - .1 Submit test reports showing compliance with specified performance characteristics and physical properties including air infiltration, water infiltration and structural performance.
- .7 Field Reports:  
Submit manufacturer's field reports within 3 days of manufacturer representatives site visit and inspection.
- .8 Installer Qualifications:
  - .1 Submit letter verifying installer's experience with work similar to work of this Section.

## **1.6 CLOSEOUT SUBMITTALS**

- .1 Operation and Maintenance Data: Supply maintenance data for aluminum-framed storefront for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Record Documentation: In accordance with Section 01 78 00 - Closeout Submittals.
  - .1 List materials used in aluminum-framed storefront work.
  - .2 Warranty: Submit warranty documents specified.

## **1.7 DELIVERY STORAGE AND HANDLING**

- .1 Delivery and Acceptance Requirements:
  - .1 Deliver material in accordance with Section 01 61 00 - Common Product Requirements.
  - .2 Deliver glazed aluminum-framed storefront materials and components in manufacturer's original packaging with identification labels intact and in sizes to suit project.
- .2 Material Handling: To AAMA CW-10.
- .3 Storage and Handling Requirements: Store materials off ground and protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
  - .1 Material storage: To AAMA CW-10.

## **1.8 WARRANTY**

- .1 Project Warranty: Refer to Contract Conditions for project warranty provisions.
- .2 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 intended to limit other rights Owner may have under Contract Conditions.
- .3 Warranty period: 2 years commencing on Date of Substantial Performance of Work.

- .1 Insulating glass units: 10 years, on Date of Substantial Performance of Work.

## **Part 2 Products**

### **2.1 MANUFACTURER AND PRODUCTS**

- .1 Manufacturers:
  - .1 Alumicor Limited,
  - .2 Other equivalent manufacturers

### **2.2 DESCRIPTION**

- .1 Thermally broken, aluminum-framed glazed storefront constructed from prefinished aluminum extrusions and including swing type doors.
- .2 Framing: As require for wind loads and uses. Flush glazed framing 114.3 mm deep x 50.8 mm wide profile.

### **2.3 DESIGN CRITERIA - ALUMINUM FRAMED STOREFRONT**

- .1 Design aluminum-framed storefront to AAMA CW-DG-1.
- .2 Design aluminum components to CAN/CSA S157.
- .3 Design and size aluminum-framed storefront to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of wall using design pressure of 0.95 kPa to ASTM E330.
  - .1 Design aluminum-framed storefront system for expansion and contraction caused by cycling temperature range of 95 degrees C over 12 hour period without causing detrimental effect to system components.
  - .2 Thermal expansion: Ensure aluminum-framed storefront system can withstand temperature differential of 85degrees C and is able to accommodate interior and exterior system expansion and contraction without damage to components or deterioration of seals.
  - .3 Design vertical expansion joints with baffled overlaps and compressed resilient air seal laid between mullion ends.
  - .4 Ensure system is designed to accommodate:
    - .1 Movement within aluminum-framed storefront assembly.
    - .2 Movement between system and perimeter framing components.
    - .3 Dynamic loading and release of loads.
    - .4 Deflection of structural support framing.
    - .5 Shortening of building concrete structural columns.
    - .6 Creep of concrete structural members.
    - .7 Vision glass areas: Insulating Glass Unit
    - .8 Power door operators and accessories.
  - .5 Limit mullion deflection to manufacturers recommended maximum with full recovery of glazing materials.
  - .6 Glass dimensions: Size glass units to CAN/CGSB-12.20.
  - .7 Flatness criteria: 6 mm maximum in 6m for each panel.

- .8 Air infiltration: 0.3 L/s/m<sup>2</sup> maximum of wall area to ASTM E283 at differential pressure across assembly of 300 Pa.
- .9 Water infiltration: None to AAMA 501, ASTM E331, ASTM E1105 at differential pressure across assembly of 720 Pa.
- .10 Ensure interior surfaces have no condensation before exposed edges of sealed units reach dew point temperatures during testing to AAMA 501.
- .11 Maintain continuous air barrier and vapour retarder throughout building envelope and aluminum-framed storefront assembly.
- .12 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.
- .13 Reinforce aluminum-framed storefront system where necessary.

## 2.4 MATERIALS

- .1 Aluminum-Framed Storefront System and Components:
  - .1 Extruded aluminum: To ASTM B221, 6063 alloy with T5 temper.
  - .2 Sheet aluminum: To ASTM B209, utility grade for unexposed surfaces.
  - .3 Fasteners, screws and bolts: Cadmium plated stainless steel 300 or 400 series to meet aluminum-framed storefront requirements and as recommended by manufacturer.
  - .4 Aluminum panels: 3 mm thick factory formed panels.
    - .1 Finish : Clear Anodized
  - .5 Thermal Break: Glass fibre reinforced polyamide porthole extrusion.
  - .6 Insulating glass units: In accordance with Section 08 80 50 – Glazing.
  - .7 Doors: Aluminum-framed swing door with glass insert suitable for inclusion in aluminum-framed storefront system, constructed and finished to match storefront.
- .1 Acceptable materials:
  - .1 Alumicor Ltd., Insuldoor, 600B INS
  - .2 Other equivalent storefront systems.
- .2 Aluminum Doors,
  - .1 Aluminum Door Components:
    - .1 Extruded aluminum: To ASTM B221, 6063 alloy with T5 temper.
    - .2 Sheet aluminum: To ASTM B209, utility grade for unexposed surfaces, anodizing quality for exposed surfaces.
    - .3 Fasteners, screws and bolts: Cadmium plated stainless steel 300 or 400 series to meet curtain wall requirements and as recommended by manufacturer.
    - .4 Vision glass for interior single glazed door: 6 mm (0.25 inches) clear tempered glass.
    - .5 Insulating glass units for exterior glazed door: In accordance with Section 08 80 00 – Glazing.
    - .6 Aluminum panels: 25.4 mm (1 inch) thick shop fabricated panels.
      - .1 Finish to match doors.
  - .2 Acceptable Material:

- .1 Alumicor Ltd., FlushGlaze BF 3400 Thermally broken Series Storefront.
- .2 Other equivalent storefront door systems.

## 2.5 FABRICATION

- .1 Aluminum-framed storefront system:
  - .1 Do aluminum welding to CAN/CSA W59.2.
  - .2 Fabricate aluminum assemblies of extruded sections to sizes and profiles indicated.
    - .1 Ensure verticals and horizontals are extrusions designed for shear block or screw spline corner construction.
  - .3 Construct units square, plumb and free from distortion, waves, twists, buckles or other defects detrimental to performance or appearance.
  - .4 Fabricate aluminum-framed storefront with minimum clearances and shim spacing around panel perimeter and ensure installation and dynamic movement of perimeter seal is enabled.
  - .5 Fabricate aluminum framed doors in accordance manufacturers recommendations.
  - .6 Accurately fit and secure joints and corners.
    - .1 Ensure joints are flush, hairline, and weatherproof.
  - .7 Prepare aluminum-framed storefront to receive anchor devices.
  - .8 Use only stainless steel or zinc plated concealed fasteners
    - .1 Ensure fasteners do not penetrate thermal break.
    - .2 Where fasteners cannot be concealed, countersunk screws finished to match adjacent material may be used upon receipt of written approval from Consultant.
  - .9 Prepare components to receive doors and openings as indicated.
  - .10 Reinforce framing members for exterior imposed loads where required.
  - .11 Visible manufacturer's labels are not permitted.
  - .12 Prepare an reinforce components for door power assisted door operator.
- .2 Aluminum Door:
  - .1 Do aluminum welding to CAN/CSA W59.2.
  - .2 Fabricate aluminum assemblies of extruded sections to sizes and profiles indicated.
    - .1 Ensure stiles and rails are tubular extrusions designed for mechanical shear block fastening in combination with SIGMA deep penetration plug welds and fillet welds at all stile/rail connections.
  - .3 Door Thickness: 51 mm (2 inches).
  - .4 Construct doors square, plumb and free from distortion, waves, twists, buckles or other defects detrimental to performance or appearance.
  - .5 Fabricate infill panels of aluminum sheet laminated to marine grade plywood.
    - .1 Aluminum sheet minimum thickness 3mm (0.125 inches).
    - .2 Marine grade plywood thickness 19mm (0.750 inches).

- .6 Accurately fit and secure joints and corners.
  - .1 Ensure joints are flush and hairline
- .7 Use only concealed or semi-concealed fasteners
  - .1 Where fasteners cannot be concealed, countersunk screws finished to match adjacent material may be used.
- .8 Install door hardware.
- .9 Locate manufacturer's labels on exterior side of door bottom rail.
- .10 Acceptable Material: Alumicor Limited, Insuldoor 600B INS
  - .1 Stile width: 146.1 mm
  - .2 Top rail: 142.9mm.
  - .3 Centre rail: 260.4mm
  - .4 Bottom rail: 177.8mm .

## **2.6 FINISHES**

- .1 Exterior exposed aluminum surfaces: To AA DAF-45-M10C2, Architectural Class I, anodized 18 µm minimum thickness coloured clear.
- .2 Interior exposed aluminum surfaces: To AA DAF-45-M10C21A31, Architectural Class II, clear anodized 10 µm minimum thickness.

## **2.7 ACCESSORIES**

- .1 Gasketing: To CCD-45 Extruded EPDM gaskets.
- .2 Setting Blocks: To CCD-45 and ASTM D2240, neoprene, 80 - 90 Shore A Durometer hardness.
- .3 Spacers: To CCD-45 and ASTM D2240, neoprene, 50 – 60 Shore A Durometer hardness.
- .4 Sealant: To AN/CGSB-19.13, Class 40, one-component, cold-applied, non-sagging silicone.
  - .1 Acceptable material: Dow Corning 795 or equivalent.
- .5 Sealant Bond Breaker: Open cell foam backer rod sized to suit project requirements.
- .6 Flashings: 3 mm (0.125 inches) thick aluminum flashing to profiles indicated and as required to close all gaps..
- .7 Liquid Foam Insulation: Single component, moisture cure, low expansion rate spray-in-place polyurethane liquid foam insulation to ULC-S710.1 and in accordance with manufacturer's written recommendations.

## **2.8 PRODUCT SUBSTITUTIONS**

- .1 Substitutions: substitutions must be approved by Owner Representative.
- 2. Ensure components come from one manufacturer.



**Part 3 Execution**

**3.1 INSTALLERS**

- .1 Use only installers with 2 years minimum experience in work similar to work of this Section or as required by manufacturer.

**3.2 EXAMINATION**

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for aluminum-framed storefront installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Consultant.
  - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

**3.3 INSTALLATION**

- .1 Install thermally broken aluminum-framed storefront in accordance with manufacturer's written recommendations.
- .2 Do aluminum welding to CAN/CSA W59.2.
- .3 Attach thermally broken aluminum-framed storefront assemblies to structure plumb and level, free from warp, and allow for sufficient adjustment to accommodate construction tolerances and other irregularities.
  - .1 Maintain dimensional tolerances and align with adjacent work.
  - .2 Use alignment attachments and shims to permanently fasten elements to building structure.
  - .3 Clean welded surfaces and apply protective primer to field welds and adjacent surfaces.
- .4 Install thermal isolation where components penetrate or disrupt building insulation.
- .5 Install sill flashings.
- .6 Install door sill.
- .7 Co-ordinate attachment and seal of perimeter air and vapour barrier in accordance with Section 072600 - Air Vapour Retarders.
- .9 Install liquid foam insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- .10 Install insulating glass units in accordance with Section 08 80 50 - Glazing and to manufacturer's written instructions.
- .11 Install perimeter sealant to method required to achieve performance criteria, backing materials, and installation criteria in accordance with Section 07 92 00 - Joint Sealants.

### **3.4 FIELD QUALITY CONTROL**

- .1 Field Inspection: Coordinate field inspection in accordance with Section 01 45 00 - Quality Control.
- .2 Site Installation Tolerances:
  - .1 Variation from plumb: 12 mm per 30 m maximum.
  - .2 Misalignment of two adjacent panels or members: 0.8 mm maximum.
  - .3 Sealant space between aluminum-framed storefront and adjacent construction: 13 mm maximum.
- .3 Manufacturer's Services:
  - .1 Coordinate manufacturer's services with Section 01 45 00 - Quality Control.
  - .2 Submit to Consultant a written agreement from the manufacturer to perform the manufacturer's services.
- .4 Submit manufacturer's written reports to Consultant describing:
  - .1 The scope of work requested.
  - .2 Date, time and location.
  - .3 Procedures performed.
    - .1 Observed or detected non-compliances or inconsistencies with manufacturers' recommended instructions.
    - .2 Limitations or disclaimers regarding the procedures performed.
    - .3 Obtain reports within seven days of review and submit immediately to Consultant.

### **3.5 CLEANING**

- .1 Progress Cleaning: Perform cleanup as work progresses.
  - .1 Leave work area clean end of each day.
- .2 Final cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment.
- .3 Waste Management:
  - .1 Co-ordinate recycling of waste materials with local regulations.
  - .2 Collect recyclable waste and dispose of or recycle field generated construction waste created during construction or final cleaning related to work of this Section.
  - .3 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.6 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by aluminum-framed storefront installation.

**END OF SECTION**