

## **1 GENERAL**

### **1.1 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 – Quality Control
- .3 Section 07 92 00 – Joint Sealants.
- .4 Section 08 80 50 - Glazing.

### **1.2 REFERENCES**

- .1 American Architectural Manufacturers Association (AAMA).
  - .1 AAMA CW-DG-1-96, Aluminum Curtain Wall Design Guide Manual.
  - .2 AAMA CW-10-97, Care and Handling of Architectural Aluminum From Shop to Site.
- .2 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM E 283-04, Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  - .2 ASTM E 330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls, by Uniform Static Air Pressure Difference.
  - .3 ASTM E 331-00(2009), Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.
  - .4 AAMA 501.3 Field check of Water and Air Leakage through installed Exterior Windows, Curtain Walls and Doors by Uniform Air Pressure Difference.
  - .5 ASTM E 283, 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 E 1105, 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.

### **1.3 SYSTEM DESIGN**

- .1 The Curtain Wall System is an existing system comprised of horizontal and vertical mullions with standard pressure caps.
- .2 The existing curtain wall is a “Kawneer 7500 Wall” series curtain wall system, with a #14 clear anodized exterior finish.
- .3 The back pans are 22ga. galvanized steel with 90 mm thick “CurtainRock” semi-rigid insulation.

## **1.4 CURTAIN WALL PERFORMANCE REQUIREMENTS**

- .1 The specified modifications to the existing curtain wall system is to accommodate, without damage to the existing and new components or deterioration of the new seals:
  - .1 Movement within system.
  - .2 Movement between system and perimeter framing components.
  - .3 Dynamic loading and release of loads.
  - .4 Deflection and creep of structural support framing.
  - .5 Penetration of moisture with rain screen design for discharge and drainage.
- .2 Limit air infiltration through assembly to  $0.0002 \text{ m}^3/\text{s}/\text{m}^2$  of wall area, measured at a reference differential pressure across assembly of 75 Pa as measured in accordance with ASTM E 283.
- .3 Water leakage: none, when measured with a pressure difference of 720 Pa in accordance with ASTM E 331.
- .4 Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by the existing weep drainage rain screen network

## **1.5 SUBMITTALS**

- .1 Provide Product Data in accordance with Section 01 33 00 - Submittal Procedures. Provide written confirmation from sealant, thermal break and corner block manufacturers that the materials are chemically compatible.
- .2 Provide Samples in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Submit samples of machining of specified new weep slots in existing pressure plates.
- .4 Submit duplicate samples of all new materials specified for the rehabilitation of the existing curtain wall system. Provide duplicate samples of glazing tape, setting blocks, insulating blocking, and machined screws.
- .5 Provide schematic sketches of the drainage rain screen network.
- .6 Provide structural calculations for glass as per CAN/CGSB-12.20, structural silicone as per ASTM C1401 and secondary seal of the sealed units as per ASTM C 1249.

## **1.6 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, handle and protect materials in accordance with manufacturer's printed instructions.
- .2 Handle work of this section in accordance with AAMA CW-10.

## **1.7 MOCK-UP**

- .1 Provide one (1) completed curtainwall section including intermediate mullion, sill detail,

head detail, vision glass, and spandrel panels, illustrating the demolition work, the cleaning and preparation work, along with the reinstatement work. Assemble to illustrate component assembly including glazing materials, spandrel glazing c/w back-pan and insulation, weep drainage system, attachments, anchors, and perimeter sealant.

- .2 Allow 24 hours for inspection of mock-up by Consultant before proceeding with work.
- .3 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.
- .4 Refer to Section 01 45 00 – Quality Control for required Field Testing.

## **2 PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS**

- .1 All new materials and accessories are to be of type and size suitable for installation and appropriate performance within the existing curtain wall system

### **2.2 MATERIALS AND ACCESSORIES**

- .1 All materials in contact with silicone sealants are to be compatible with silicone sealants in accordance with this Specification, Section 07 92 00 – Joint Sealants.
- .2 Screw port corner blocks: silicone or silicone-compatible dense neoprene or EPDM, Shore A Durometer of 60 plus or minus 5, depth and width to match dimension of screw port and thermal break, length as required.
- .3 Adhesive and sealant for screw port corner blocks: silicone sealant in accordance with this Specification, Section 07 92 00 – Joint Sealants.
- .4 Replacement screws for pressure plates: series 300 stainless steel, Robertson head, diameter and length to suit new exterior gaskets, new thermal break and screw port characteristics.
- .5 Replacement exterior dry glazing gaskets: silicone or silicone-compatible dense neoprene or EPDM, Shore A Durometer of 60 plus or minus 5, profile & dimensions to match existing.
- .6 Replacement thermal break: silicone or silicone-compatible flexible PVC, Shore A durometer of 65, profile & dimensions to match existing.
- .7 Sheet Metal Screws: series 300 stainless steel, no. 8 Robertson head, self-drilling, self-tapping.
- .8 Sealant: in accordance with Section 07 92 00 – Joint Sealants.

## **2.3 WEEP SLOT/HOLE FABRICATION**

- .1 Machine additional weep slots in existing components as specified. Cut edges shall be clean, true and free of burrs and other irregularities. Multiple-hole drilling is not an acceptable means of fabricating the new slots.
- .2 Components machined in unacceptable manner are to be replaced with new to match existing. Assume responsibility for all costs associated with replacement of unacceptable components.
- .3 Position and align slots as required for proper drainage of water from bottom of glazing cavities (i.e. bottom of weep slot must align with top surface of screw port).
- .4 In similar components, positioning is to be consistent from component to component.
- .5 At both ends of every pressure plate on horizontal rails, machine additional weep slots in existing components as follows:
  - .1 One (1) slot, 8 mm high x 25 mm long
- .6 At location of original drainage holes in caps, drill out holes with 9 mm diameter bit to enlarge dimension of hole.
- .7 Provide all supports, clamps, guides and jigs as required for proper machining and positioning.

## **2.4 SNAP CAP END CLOSURES**

- .1 Provide custom-bent, aluminium closures to fill any ends of snap caps that will remain exposed by the cap installation layout.
- .2 The closures are to fit within the open end of the caps, are to be mechanically fastened to the sides of the caps, are to avoid interference with engagement of the caps on the pressure plates, and are to be sealed to the caps along the inside face of the caps.

## **2.5 FABRICATION**

- .1 Fabricate/reinstate system components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
  - .2 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof
  - .3 Prepare and install components to receive anchor devices.
  - .4 Arrange fasteners and attachments to ensure concealment from view.
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## **2.6 FINISHES**

- .1 Touch-up all existing finishes damaged due to demolition and reinstatement work to the acceptance of the Client.
- .2 All damages incurred by the work of this contract which cannot be repaired to the satisfaction of the Client shall be replaced by new components matching the existing curtain wall finishes.

## **2.7 SOURCE QUALITY CONTROL**

- .1 Perform work in accordance with AAMA CW-I-9. Maintain one copy on site.
- .2 Installer qualifications: company specializing in performing the work of this section.

## **3 EXECUTION**

### **3.1 EXAMINATION**

- .1 Prior to removal of any components, examine all conditions likely to affect the timely completion of the work of this section. Notify the Departmental Representative of conditions which prevent proper installation of work of this section.
- .2 Verify adjoining air barrier and vapour retarder materials are ready to receive work of this section.

### **3.2 REMOVALS**

- .1 Remove any components as required to undertake the work of this Section, coordinate removal work with removal work specified under other Sections of this Specification.
  - .2 Within each designated work area carefully remove all snap caps and pressure plates for later re-installation in accordance with this Specification. Install Dutchmen to temporarily retain horizontal edges of glass units. Provide number of Dutchmen as to maintain the structural integrity of the system during the work.
  - .3 From snap caps and pressure plates, remove all existing sealant, all screws, as well as all exterior gaskets.
  - .4 Remove and discard corner blocks installed across vertical mullions between ends of screw ports in horizontal rails, or between end of screw port in horizontal rail and side of screw port in vertical mullions.
  - .5 Remove and discard thermal break from horizontal rails.
  - .6 At all exposed glazing cavities in framing components, remove all sealant and other obstructions. Ensure that all components are undamaged.
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### 3.3 PREPARATION

- .1 All snap caps, pressure plates and all glazing cavities in framing components are to be cleaned with recommended solvent and wiped dry. Ensure that all surfaces are sound, dry, free from contaminants including dirt, water, frost, loose scale, sealant, oil or grease films and corrosion.
- .2 Protect all cleaned surfaces from contamination. Re-clean any contaminated surfaces.

### 3.4 INSTALLATION OF SCREW PORT CORNER BLOCKS

- .1 At junctures of horizontal rails to vertical mullions, install new corner blocks to close gaps between adjacent screw ports, so that all drainage from vertical glazing cavities is directed to the horizontal cavities. Intersections for corner blocks are as follows:
  - .1 at the ends of all horizontal rails that frame into either side of a vertical mullion supporting structural silicone glazing,
  - .2 at the ends of all horizontal rails that frame into the side of a capped vertical mullion.
  - .3 Use a minimum 6 mm edge gap for the sealed units to ensure a proper drainage at the sealed unit corner locations.
- .2 At the intersections designated above, close gaps between adjacent screw ports as follows:
  - .1 At capped vertical mullions, close the gaps between vertical screw ports and the ends of the abutting horizontal screw ports.  
and
  - .2 At intermediate vertical mullions, i.e. where there are no vertical screw ports, close the gaps between the ends of the adjacent horizontal screw ports for the full width of the vertical mullion.
- .3 At all gaps to be closed, size new corner blocks to match the depth and width of the existing adjacent screw ports as well as the thickness of the new thermal break, and to ensure proper compression by pressure plates. Size length of corner blocks to close gaps completely and ensure tight fit.
- .4 Install corner blocks to close gaps as follows:
  - .1 As adhesive, apply a coat of sealant to all contact surfaces.
  - .2 Install corner blocks square and true to adjoining surfaces, forming smooth continuation of screw port surfaces.
  - .3 Ensure that blocks fit tightly, fully closing the gaps.
- .5 Refer to Section 07 92 00 – Joint Sealants, for installation of sealant.

### 3.5 INSTALLATION OF PRESSURE PLATES

- .1 Fabricate the additional weep slots as specified and to approval of the Owner's Representative. Drill new holes along centerline of plate as required to permit installation of new fasteners at spacing specified.
- .2 Refer to Section 07 92 00 – Joint Sealants for installation of sealant.

- .3 Install new replacement exterior gaskets on pressure plates. Do not stretch gaskets during installation; overcut to ensure continuity at corners. Pre-compress horizontal gaskets to reduce creep back.
- .4 Install new thermal break in continuous length along horizontal rails. Do not stretch break during installation.
- .5 Fix pressure plates with new screws at 150 mm on centre, ensuring proper and adequate gasket compression.
- .6 Refer to this Section 07 92 00 – Joint Sealants for sealing of pressure plate intersections.

### **3.6 INSTALLATION OF SNAP CAPS**

- .1 After the new end closures have been installed, carefully reinstall snap caps over pressure plates. Tools employed are not to damage or mar the surfaces of the snap caps. Touch up scratched components with touch-up paint according to coating manufacturer's recommendations.
- .2 At both ends of all caps greater than 19 mm deep, apply a sheet metal screw to mechanically fasten cap to pressure plate. Apply cap bead over screws and along cap using sealant in accordance with Section 07 92 00 – Joint Sealants.

### **3.7 GENERAL INSTALLATION**

- .1 Provide thermal isolation where components penetrate or disrupt building insulation.
- .2 Re-install exterior sill flashings continuously at all curtain wall locations. Secure to adjacent substrate and curtain wall framing by concealed attachments.
- .3 Co-ordinate attachment and seal of perimeter air barrier and vapour retarder materials.
- .4 Apply spray foam insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- .5 Re-install glass in accordance with Section 08 80 50 - Glazing. Apply pressure plates and pressure caps as noted above.
- .6 Install perimeter sealant and backing materials in accordance with Section 07 92 00 – Joint Sealants.

### **3.8 FIELD SERVICES**

- .1 Monitor and report installation procedures and unacceptable conditions.

### **3.9 CLEANING**

- .1 Upon completion of the curtain wall system rehabilitation work, wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- .2 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

### **3.10 PROTECTION**

- .1 Protect finished Work from damage.

**END OF SECTION**

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