Part 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One, General Requirements, is part of this Section and shall apply as if repeated here.

1.2 QUALIFICATIONS

1. The Specification and drawings are based on aluminum windows as manufactured by Kawneer Limited. Alumicor with similar profiles, material and finishes that meet the standards established by the Specification is acceptable as a substitution. The manufacturer will be responsible for the supply, installation and guarantee of this Division.

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2. Only those manufacturers listed above shall be used, unless approved by the Architect in writing 7 days prior to tender closing. All proposed equivalent products shall comply fully with the product performance requirements / finishes / all options specified and detailed on the drawings.

3. It is the responsibility of the approved manufacturers to meet or exceed and submit OBC SB-10 Energy Efficiency Compatibility Results.

   Note: The above mentioned submittal is to incorporate the specified sealed glazing unit and each opening component as a whole before the shop drawings are accepted or before any shop drawings are reviewed.

1.3 SHOP DRAWINGS

1. Submit shop drawings in accordance with GC 3.11 of CCDC Document 2-2020 and following requirements of 01 33 00 Submittals.

2. Submit shop drawings for the fabrication and installation of associated components of the work. Indicate anchors, joint system, thermal breaks, expansion provisions, hardware, and other components not included in manufacturer's standard data. Include glazing details where required.

3. Before shop drawings and fabrication are started, take critical measurements at the site to facilitate installation and fitting of work.

4. Note that shop drawings for translucent glazing units to be part of this section.

5. Submit with shop drawings certification that window design and construction will meet the specified requirements. Certification shall be in the form of test reports on similar units performed by an independent testing laboratory, and shall meet approval of Architect before fabrication commences.

6. Shop drawings are to be in the same units as the tendered drawings with critical on center mullion dimensions (dimension string from datum level to top of opening noting center of mullions) noted along with all other regular shop drawing

dimensions, no exceptions. Both units (metric and imperial) are allowed. Openings are to be identified with the corresponding tags on the tendered drawings.

1.4 SUBMITTALS

1. Submit samples of curtain wall, panel sections, glazing, fasteners, caulking and finishes / colours for Architect's approval before fabrication.

2. Furnish templates, diagrams, and other data to fabricators and installers of related work, as needed for coordination installation.

3. Coordinate with Division 16, Section 08700 Finish Hardware and security subcontractor for any electrical provisions required.

1.5 WARRANTY

1. The work and materials of this Section shall be under Warranty in accordance with GC 12.3 of CCDC Document 2 - 2020 but for a period of five (5) years from the date of Architect's Certificate of Substantial Completion. Hermetically sealed glazing units shall be guaranteed for a period of ten (10) years.

2. Warranty shall include: Warranty against excessive colour changes or surface deterioration of aluminum finishes; complete weather tightness of the curtain wall and aluminum panel system against unreasonable intensity and frequency, or both, of sound by the curtain wall and aluminum panel system installation or its anchorage system or loosening or deforming of any members of the installation.

1.6 PROTECTION

1. Mark each light with a large cross to indicate presence of glass (colour that stands out to the visible eye). Use material that will leave no residue after removal.

2. Replace under the work of this section defective, damaged or broken glass due to fault setting, handling or storage.

1.7 OPERATION AND MAINTENANCE DATA

1. Upon completion of installation, supply standard parts service kit and service manual. Arrange with, and demonstrate to building maintenance staff window operation, sash removal, cleaning, re-glazing, and general maintenance procedures.

1.8 DESIGN

1. Aluminum Curtain Wall shall be designed to safely withstand a wind load normal to the plane of the wall of twenty (20) pounds per square foot (0.95 kPa.) and shall meet the standards of the latest Ontario Building Code as currently amended in regard to increased design pressure due to height and negative pressures. All

components shall be able to withstand the loads with maximum deflection of L/200 of the span. Aluminum curtain wall shall be designed to accommodate thermal movement over an ambient temperature range of -40 F. to +120 F.

Copies of any and all structural calculations made in connection with the supplementary design and/or detailing of the work of this Section shall be promptly furnished to the Architect if requested.

Supply all connections, brackets, angles and fasteners to tie curtain wall to main structure, floors, columns and beams

2. The entire exterior skin execution shall be based on the "Rain Screen" principle and the system shall provide:

    1. Such gaskets, baffles, overlaps and seals as required to provide a "Rain Screen" barrier to effectively deter rain water entry into the cavities of the system.

    2. The necessary "air seals" to minimize air passage from the system cavities into the building and vice-versa to assure adequate pressure equalization of the system cavities with the outside.

    3. The "air and vapour seals" required to minimize air borne vapour exfiltration from the building into the system cavities.

    4. Openings between these cavities and the outside of sufficient cross-section to provide pressure equalization. All openings must be effectively baffled or otherwise guarded to minimize direct water entry.

    5. Thermally, the grid members shall have a resistance to heat transfer equal to or better than that of the area along the bottom of the 1" (25 mm) sealed glass units.

3. Performance:

    1. Air in-or-Exfiltration performance shall exceed industry standards of .06 c.f.m./ft2 (.0003 m3/s-m2) when tested in accordance with ASTM E283 at a 6.24 p.s.f. (300 Pa) pressure difference.

    2. There shall be no water infiltration into the building when tested in accordance with ASTM E331 with a pressure differential of 15.0p.s.f. (720Pa) whichever is higher.

    3. No condensation shall form on any interior surfaces of the aluminum members before any of the exposed area of the 1" (25 mm) sealed units reaches the dew point temperature.

    4. Thermal expansion allowance at aluminum panel system: The system has to take a temperature difference of 185 degrees F. (85 degrees C) without putting stress into any member of sealant.

5. Erected aluminum panel system shall have flatness criteria not to exceed 1/4" (6mm) in 20'-0" (6000mm). Units have rippling, waving, or oil canning exceeding the above criteria shall be subject to replacement if the condition cannot be satisfactorily repaired and corrected in the field.

1.9 STANDARDS

1. Kawneer 1620 SSG Thermally Broken Curtain Wall System with fiberglass perimeter pressure plates - 7 ½" (190.5mm) or 6" (152.4mm) deep frames (manufacturer to approve in writing with tender submission prior to start of construction in regard to loading on the system(s) with 2" (50.8 mm) sightline tubular mullion with 3/4" deep cap or 100mm sloped cap with drip edge and cap-Less (combination of horizontal and vertical) as indicated on drawings and/or as recommended otherwise by manufacturer.

2. TGP Fireframes Curtainwall Series and SG Curtainwall Series fire Resistive Framing and door systems to be installed at all fire rated locations. To be installed as per manufacturer's instructions, including glazing required.

3. Provide GlassVent UT (Ultra Thermal), top pivoting awning / side pivoting casement projecting out window operation with operator assembly and complete with removable insect screens. Operator to work from the interior without removing insect screen.
   NOTE:
   Maximum operable opening not to exceed 4" (100mm) on any floor level from above ground (Main, Level 1) floor and up.

4. Provide Versoleil SunShade – Outrigger System as shown on elevations.

5. Provide Versoleil SunShade – Single Blade System as shown on elevations.

6. Provide Air barrier in the form of a sealed insulated metal back pan for all spandrel glazing locations, at aluminium panel locations and plywood infill locations. Install air/vapour barrier transition membrane over plywood infill locations, both to be sealed in curtain wall framing. Provide finished aluminium cover inside on the surface of the sealed metal back between and flush with interior face of mullions.

7. Fabricate and install Curtain Wall in accordance with NAAMM Standard SW-1-68T published by the National Association of Metal Manufacturers. Only those provisions of the Standard applicable to the Curtain Wall shown on drawings and as specified herein shall govern.

8. Comply to CAN3-S157 as currently amended.

9. Aluminum doors at exterior and interior curtain wall locations shall be doors as per Section 08400 - Aluminum Entrance Framing and Doors.

1.10 DESCRIPTION

1. ALUMINUM CURTAIN WALL

1. Work included: furnish labour, material and other services to complete the fabrication and installation of the framing, including material and fitments required for the operation of any entrance units included, in the manner, direction and performance shown on the shop drawings and specified herein.

2. Work included: furnish all labour material to provide and install the following items:

    1. Aluminum uninsulated panels.

    2. Aluminum flashings, trim pieces, fascia and closer members.

    3. Formed subjects.

    4. All necessary clips, fastening devices, required accessories needed to attach the composite aluminum pieces indicated on the drawing into position.

    5. Aluminum metal weeping channels.

    6. All necessary caulking conforming to 19-GP-24M and all necessary gaskets, etc. to weather seal all joints.

    7. All necessary flanges, supports, and mullion steel reinforcement, as required to keep panels rigid and stable to conform with design as indicated on the drawings.

    8. Intermediate galvanized steel stud panel and girt supports.

    9. All aluminum framing including "Z" girts, channels, clips, angles or blocking to secure aluminum composite panels.

    10. Cutting, reinforcing, closing, trimming of openings.

    11. All glass, spandrels and glazing.

    12. All caulking and sealants.

    13. Aluminum panels, aluminum and galvanized steel air barrier liners and insulation.

    14. 1/8" (3mm) aluminum or 1/4" (6mm) aluminum composite panels at wall, canopy, roof parapet, and soffit locations.

    15. Aluminum Operators as indicated on drawings.

3. Curtain wall supplier engineer to verify all required curtain wall systems, spans, loads etc. prior to tender closing.

Part 2 PRODUCTS

2.1 MATERIALS

1. Aluminum: Extruded aluminum alloy members 6063 T5 alloy, minimum 1.6 mm (0.62") thick. Sheet which is not to be exposed shall be Utility Grade.

2. Aluminum Flashing: Supply 0.125" (3.2 mm) thick aluminum to profiles as indicated on drawings.

3. Aluminum Sills: Sills are to be extruded aluminum and shall be complete with required anchors, joint covers, end caps or returns, chairs, anchors, anchoring devices and jamb drip deflectors. Extruded sills are to be the profile shown with minimum ⅛" (3mm) thickness with safety / drip edges. Sills shall be in longest possible lengths, joints only at mullions; all joints are to be sealed with slip joint.

   NOTE: Aluminum sills to be provided at bottom of all windows and curtain wall locations as detailed.

4. Cavity insulation in Metal Air-barrier Liner / Back Pan: See 07213 Section Mineral Fibre Insulation

5. Metal Air-barrier Liner / Metal Back Pan: 3.2mm clear anodized aluminum with all corners of panels sealed where exposed to interior areas. All other locations shall be 20 gauge thick steel air/barrier liner with 1.25 oz./sq. ft. (458 g/m^2) galvanizing with corners of panel sealed. Panels to be flat; stiffen as required.

6. Vision Glass: as per 08800 Glass and Glazing Section.

   NOTE: All vision glazing lower than 1070mm a/f/f (main floor levels, stair landings, etc) that is not protected by some type of interior guard, to be designed to withstand the loading on guards as per obc sb-13; where the difference in elev. between the adjacent ground or flr. level is more than 600mm typical.

7. Operating Vents: Black anodized colour, hinged awning / casement limited opening to max. 4" (100mm). 1 pair heavy duty Anderburg or Senator Friction Arms with polished US-4 cam handle and keeper for 500mm wide and less and 2 for all windows greater than 500mm wide. (or operation handle that the screen does not have to be taken out in order to open the operable window)

8. Insect Screens: Size to match operable window vent as per manufacturer, glass fibre mesh in clear anodized aluminum frame with extruded elastomer removable splines.

9. Smart Glass Inner Lite: as per 08800 Glass and Glazing Section.

10. Spandrel Glass Panels: as per 08800 Glass and Glazing Section.

11. Glazing Tape: Tremco Visionstrip co-extruded EPDM gasket with integral glazing tape on the exterior and a black, closed cell elastomeric glazing gaskets appropriate to the function on the interior. Colour of glazing selected by Architect.

12. Spacer Shims: 1/4" (6 mm) x ½" (12.7 mm) Norton tape. Shims for frame are to be oil resistant rubber or plastic acceptable to glass manufacturer, channel shaped and each approximately 4" (100 mm) long.

13. Thermal Break: Soft PVC, compressed to seal between main sections and pressure plates.

14. Isolating Coating: Black alkali resistant bitumastic enamel.

15. Sealant Bond Breaker: Open cell foam backer rod sized to suit.

16. Silicone Sealant: Dow Corning #795 or as per manufacturer's recommendations exceeding CAN2-19.13-M87 Class 40 requirements. Min 2 colours as selected by Architect.

17. Sealant at Perimeter Masonry Openings: 3 part Tremco Dymeric 240 sealant in accordance with Caulking - Section 07900 (Type A sealant). Minimum 2 colours as selected by Architect.

18. Sprayed-on Urethane Insulation: Supply and installation by this section as specified under Section 07215.

19. Fasteners, Screws and Bolts: Stainless steel 300 Series or stainless steel 400 Series cadmium plated of sufficient size and quality to perform their intended function.

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2.2 FABRICATION

1. General

1. Construct aluminum assemblies of extruded sections to size and profile shown on drawings.

2. Build units square, true, accurate to size, free from distortion, waves, twists, buckles or other defects detrimental to performance or appearance.

3. Units too large for handling or shipping shall be prefabricated in factory, disassembled and marked for shipping and field assembly.

4. Use concealed fastenings. No exposed screws shall show in the finished work where finished product is exposed to view, unless approved by the Architect. Such screws shall be countersunk and finished to match surfaces in which they occur.

5. Joints shall be accurately cut and fitted to result in a tightly closed joint.

6. Provide additional reinforcing at location of handrail brackets and at stair and landing areas to withstand O.B.C. horizontal loading designs.

7. Vertical and horizontal members shall be tubular extrusions designed for shear block corner construction.

8. All joints shall be accurately machined, assembled and sealed to provide neat weathertight joints. Shielded drainage and pressure equalization vents shall be provided where required. All horizontal members shall be sealed to vertical members to provide individual compartments within the system in accordance with the rain screen principle

2. Assembly

1. Assembly shall be Kawneer 1620 SSG Thermally Broken Curtain Wall System or approved equal. See item 1.9.

2. Mullion Depth Sizes exclusive of cap: See Item 1.9

3. Cap Depth Sizes and Locations:

    1. Exterior horizontal caps 3/4" (19 mm) at perimeter.

    2. All exterior vertical caps 3/4" (19 mm) at perimeter.

    3. Do not provide vertical or horizontal caps where narrow double lines are indicated on drawings, these are capless.

4. Aluminum caps for mullion assembly to be without gap.

5. All horizontal members must form individually pressure equalized and sealed gutter members.

6. Vertical expansion and construction joints shall be provided and designed for baffled overlaps with a compressed resilient air seal laid in between the mullion ends.

7. At aluminum and spandrel panel locations provide 20 gauge thick steel air/barrier liner with 1.25 oz./sq. ft. (458 g/m2) galvanizing with corners of panel sealed at all concealed locations. Provide 16 ga. clear anodized air/barrier liner panels at all interior exposed locations. Panels to be stiffened as required to maintain a flat surface.

8. Insulation shall be fitted into the air-barrier liners / metal back pans and secured by being impaled onto welded pains and retained by integral discs. Insulation to always extend out to thermal break in framing members. All void spaces to have spray in place insulation installed, this includes where indentations have been created by integral disc compression (where insulation does not fluff up to original shape, thickness), and from thermal break in curtain wall framing sealed to batt insulation, all perimeters of back pan.

9. Structural anchors shall have three-way adjustment and be welded after curtain wall alignment. Field paint touch-up shall follow the welding operation.

10. Provide thermally broken door frame adaptors for all doors in aluminum curtain wall framing.

11. Provide 10" (254 mm) height side light bases with sill flashing by doors where indicated on drawings.

3. Closures, Flashings and Miscellaneous Covers

1. Provide .125" (3 mm) thick aluminum closures, caps and flashings where indicated

4. Aluminum Finish

1. The aluminum finish to be PPG Duranar XL (UC70178XL) Champagne Metallic.

5. Aluminum Composite Panels

1. Install panels at all locations indicated and as detailed on drawings.

2. Spacing of Aluminum Panel Girt System: aluminum girt anchor or clip system designed to meet performance requirements specified. Design system to minimize direct heat transfer; avoid direct metal to metal contact.

3. Flashings, Trim, Closures: fabricated to profiles indicated and as required to meet design and performance requirements. Use preformed corner pieces only. Use same material as exterior skin where exposed.

6. Aluminum Sills

1. Provide continuous extruded aluminum sills at bottom of curtain wall set in bed of caulking; to be manufactured from curtain wall supplier.

7. Aluminum Door Adapters

1. Provide 19mm perimeter door adapters to suit door installation in curtain walls wherever aluminum doors are indicated on drawings.

8. Aluminum Panel Joints

1. Aluminum panel joints to be aligned with centre line of curtain wall mullions or other panel joints (to be verified at site) and to be coordinated with Architectural drawings prior to manufacturing; also coordinate with drawings for joint detailing, if not on drawings, contractor to ask for detail during shop drawing submission

Part 3 EXECUTION

1. INSTALLATION

1. Install curtain wall in accordance with manufacturer's recommendations and with standards specified herein.

2. Isolate all aluminum coming in contact with other metals, masonry or concrete with heavy shop coating of black alkali resistant bituminous paint to prevent electrolytic or chemical action.

3. Fill voids between aluminum extrusions and masonry or concrete surfaces with sprayed-on urethane insulation where necessary to prevent movement or infiltration of air. Drill and fill aluminum extrusions with sprayed-on urethane insulation where indicated on drawings.

4. Installation of aluminum panel system:

1. Erection shall be by skilled personnel only as directed by Panel Manufacturer. Joints shall be thoroughly sealed against entrance of weather to interior of assembly.

2. Install work, plumb, straight, even and true to required lines, levels and slopes. Reject and replace bent, scratched, dented mismatched, loose, or out-of-true work.

3. Provide custom structural supports and aluminum shims.

4. Fasten panels by system of support and fasteners according to manufacturer's recommendation to provide true surface free from undulations.

5. Install adequate expansion joints to accommodate thermal movement wall.

6. Install copings, closures, drips, and flashings unless specified otherwise. Finish shall match exterior panels.

7. Tape or backpaint contact surfaces where galvanized and aluminum metal and concrete come in contact to prevent corrosion

8. Replace all panels with mars, scratches, and cut edges with new panel etc.

9. Install aluminum doors as per Section 08400 - Aluminum Entrance Framing and Doors.

2. CAULKING

1. Glazing and aluminum caulking to be under this section as per manufacturer's instructions and as per details on drawings in accordance with procedures specified under Section 07900.

2. Caulking around perimeter of curtain wall between curtain wall and masonry to be done by this section as per Section 07900 using Tremco Dymeric 240 (Type 'A') sealant.

3. Caulking to be done between panels including air-barrier liners / metal back pans under this Section using silicone sealant and installed as per Section 07900. All caulking of panels to surrounding masonry, concrete, etc. shall be by Section 07900.

3. GLAZING

1. Glazing shall be in strict conformance with manufacturer's instructions and shop drawings.

2. Units shall be manufactured by an I.G.M.A.C. certified facility.

3. Mark each light with a large white cross to indicate the presence of glass.

4. Replace under this Section defective, damaged or broken glass due to faulty setting, handling, storage or cleaning.

5. Glass supplied and installed under this section in accordance to Section 08800 – Glass and Glazing.

4. PROTECTION AND CLEANING

1. Aluminum shall be isolated from concrete, mortar, plaster and dissimilar metals with bituminous paint.

2. Framing shall be protected from other building materials during and after installation until acceptance by the Architect.

3. General Contractor to maintain protection and provide final cleaning.

4. Upon completion of erection all aluminum panel surfaces shall be cleaned to the satisfaction of the Architect.

5. Promptly as the work proceeds and on completion, clean up and remove from the premises all rubbish and surplus materials resulting from the foregoing work.

End of Section 08 44 26