1.0 *GENERAL*

1.1 *Related Work and UBC Guidelines*

.1 Section 07 00 10 Building Envelope – General Requirements
.2 Section 07 25 00 Weather Barriers
.3 Section 07 40 00 Cladding
.4 Section 08 00 10 Openings – General Requirements
.5 Section 084433 Sloped Curtain Wall Glazing
.6 Section 08 80 00 Glazing
.7 Division 28 for Access and Security requirements
.8 UBC LEED Implementation Guide
.9 UBC Energy Modelling Guidelines
.10 Owner's Project Requirements
.11 UBC Resilience-Based Design Guide for Nonstructural Systems

1.2 *Related External Documents*

1. *Latest edition of the British Columbia Building Code (BCBC) including accessibility requirements.*
2. *CAN/CSA-A440.2 "Fenestration Energy Performance"*
3. *CAN/CSA-A440.4 "Window and Door Installation".*
4. *AAMA/ WDMA/ CSA 101/ I.S.2/ A440-17.*
5. *NFRC 100 "Procedure for Determining Fenestration Product U-Factors"*
6. *AAMA 501 "Methods for Tests for Exterior Walls"*
7. *ASTM E283, "Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors."*
8. *ASTM E330, "Structural Performance of Exterior Windows, Curtain walls and Doors by Uniform Static Air Pressure Difference."*
9. *ASTM E331, "Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Differential."*
10. *ASTM-E1105 "Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls and Doors by Uniform or Cyclic Static Air Pressure Difference."*

1.3 *Description*

1. *Work includes exterior aluminum curtain wall framing system complete with doors and windows within the system.*

1.4 *Coordination*

1. *The Guidelines apply to all work completed within buildings on both UBC Vancouver and UBC Okanagan campuses unless stated otherwise.*
2. *In instances where conflicts are found between these guidelines and provincial regulations or codes, please notify the UBCV Technical Review Team Architect or UBCO Facilities Management.*
3. *These guidelines are intended to be read by design consultants and their content integrated into construction drawings and specifications. Construction documents are not to reference the technical guidelines directly.*
4. *The Coordinating Registered Professional (CRP) is required to coordinate these requirements with other disciplines, including:*
    1. *Building Envelope Consultant.*
    2. *Code Consultant.*
    3. *Structural Consultant*
    4. *Energy Modeler*

1.5 *Submittals*

.1 Submit required documents to consultants in accordance with Section 013300 Submittal Procedures

.2 O&M Submittals
1. Manufacturers Safety Data sheet (MSD) for all toxic or potentially toxic materials.
2. Environmental Product Declaration (EPD)
.3 Shop drawings (including all enclosure interface details) sealed and signed by a professional Engineer registered in the Province of British Columbia.
.4 Manufacturer performance test data to confirm performance criteria.
.5 Maintenance Data
1. As-installed hardware.
2. Source for replacement parts.
3. Maintenance instructions
.6 Warranty information as per 1.6.4.

1.6 *Quality Control and Assurance*
.1 Installer Qualifications: Installer must have successfully installed the same or similar systems required for the project and other projects of similar size and scope.
.2 Quality Assurance
.1 *All structural performance requirements of this section including anchorage and fasteners to be designed and certified by a professional engineer registered in the Province of British Columbia and to provide a Letter of Assurance. Costs to be included in the contract price.*
.2 *Laboratory testing: Curtain wall manufacturer to provide as a minimum a certified copy of test report verifying compliance with the project specifications.*
.3 Quality Control
.1 *UBC will appoint and pay for an independent inspection agency to conduct field testing for water penetration.*
.2 *Initial field test at any given location shall be paid by UBC. Number of test locations to be confirmed by the project design team and UBC. Cost of re-testing to verify corrected work shall be paid by Contractor.*
.3 *Contractor is responsible to provide test chambers and ensure adequate power and water supply.*
.4 *Water testing to ASTM E.1105.*
.4 Mock-up test procedures
.1 On major new projects and renewals utilizing a customized curtain wall system curtain wall subcontractor is required to arrange for a representative performance mock-up (PMU) to be tested in an accredited lab. Test procedures to include the following:
.1 Preload, static pressure air infiltration, static pressure water infiltration, dynamic pressure water infiltration, structural service loads, inter-story drift test, inter-story vertical movement, condensation Resistance / thermal cycling, structural ultimate loads.
.5 Warranties
.1 *Manufacturer shall review, verify and provide written acceptance to verify compliance for installation and provide warranty as follows:*
.2 2-year parts and labour warranty.
.3 5-year water penetration.
.4 10-year sealed unit warranty

2.0 ***DESIGN AND PERFORMANCE REQUIREMENTS***

2.1 *Design Requirements – Vertical Curtain Wall System*
.1 Requirements are applicable to exterior aluminum curtain wall type framing system including doors and windows within the system.
.2 Self-draining curtain wall systems be selected for installation on exposed walls with no overhangs. Particular attention should be given to the storm-facing east and south-facing walls.

.3 In addition to any other applicable codes, standards and project requirements, exterior systems to meet or exceed the following minimum requirements:

.1 Environmental Separation

.1 Rating for windows to be selected based upon exposure to elements related to location on the façade and site conditions. Use the CSA A440 S1 Canadian supplement to AAMA/WDMA/CSA 101/I.S.2/ A440. Pass test at minimum 500 Pa.

.2 Glazing as part of curtain-wall system to conform to the following ratings:

.1 Water Tightness: Pass minimum 500 Pa test pressure

.2 Air Infiltration: Air infiltration/exfiltration levels to be A3 for operable products 0.5 L/sm2 and fixed 0.2 L/sm2 at 75Pa.

.2 The overall thermal transmittance of fenestration and doors shall be determined for the reference sizes listed in accordance with:

.1 CSAA440.2/A440.3,"Fenestration energy performance/User guide to CSA A440.2:19, Fenestration energy performance

.2 NFRC100,"Procedure for Determining Fenestration Product U-factors.

.3 The minimum overall thermal transmittance U-Factor shall be 1.9 W/m2K

.4 Wind Load Resistance shall meet ASTM E330.

.5 Resistance to Forced Entry shall be F20 (windows reachable from grade).

.6 Hardware to include multi-point locking with centre locking handle

.2 Engineering Design

.2 Wind Loads: Assemblies shall be reinforced where required, capable of withstanding local positive and negative wind pressures.

.3 Minimum 25 psf (1.2 kPa) inward and 25 psf (1.2 kPa) outward acting normal to the plane of the wall.

.4 Based on CAN3-S157 and allowable deflection of 1/175.

.3 Systems to utilize exterior rain screen deterrents, interior air seal barriers, and pressure-equalized cavities to minimize water infiltration into the internal areas of the system, while providing moisture control and drainage to the exterior.

.4 Curtain wall assemblies to support design loads and accommodate structural deflection, long term creep movements and drift as shown on the structural drawings without stress on glass or reduction in performance, or other detrimental effects caused by structural movement.

.5 Operable windows which are within 3.6 m (12') from grade to meet ASTM F 588 Grade 20 minimum for forced entry resistance.

.6 Fasteners:

.2 Exposed fasteners and anchors: aluminum, 300 series stainless steel, or nickel-plated brass.

.3 Concealed fasteners and anchors: aluminum, cadmium plated steel, zinc plated steel, or stainless steel.

.4 Concealed anchors: aluminum, or carbon steel painted after fabrication with zinc chromate or other primers not containing lead.

.7 At exterior locations, ensure that a peel and stick air barrier membrane (or equivalent) is installed to drain to exterior, over the entire perimeter of the opening over which the framing system is to be installed.

2.2 *Performance Requirements*

.1 Service Life Expectancy: 25-years.

.2 For security reasons from within a building, EXIT alarms may be required on certain Exit-Only doors.

3.0 *MATERIALS*

3.1 *Product Selection*

.1 Components

.1 Kawneer 1600 UT

Or equivalent as approved by consultant. Provide a variance request for review and approval if proposing an equivalent. The variance request should note all design and performance evaluations made.

.2 Door

.1 Refer to Section 08 41 13 Aluminum-Framed Entrance and Storefronts.

.3 Operable Vents

.1 Kawneer Glassvent UT

Or equivalent as approved by consultant. Provide a variance request for review and approval if proposing an equivalent. The variance request should note all design and performance evaluations made.

.4 Finishes

.1 Finishing products:

.2 Light and Neutral Colours: Thermosetting fluoropolymer two coat meeting the requirements of AAMA 2604.

.3 Dark Exterior Colours: Thermosetting enamel coating or thermosetting fluoropolymer two coat meeting the requirements of AAMA 2605.

.4 Clear anodized coating, AAMA Class II.

.5 Champagne, bronze or black coloured anodized coating to conform to AAMA Class I

******END OF SECTION******