SECTION 08900PR

GLAZED CURTAIN WALL

PART 1 - GENERAL

1.1 ARCHITECTURAL DESIGN REQUIREMENTS

A. Curtainwalls shall be designed by the Architect in conjunction with an acceptable curtainwall manufacturer to ensure consistency with the manufacturer’s design standards. The Architectural design must clearly define all support and attachment points, and perimeter flashings at the head, jamb, and sills. The structural design must provide adequate load support while staying within the maximum allowable deflection acceptable to the curtainwall manufacturer.

B. The Architectural drawings must clearly define sill flashings that pass completely under the base of the curtainwall and pan up on the interior. A two-piece flashing or a piece of aluminum bedded in sealant at the base is not acceptable.

C. The Architect and Structural Engineer shall review the shop drawings and calculations submitted by the Contractor for conformance to the intent of the design, and verify that the required perimeter construction and structural attachments are satisfactory.

1.2 PERFORMANCE REQUIREMENTS

A. The curtainwall manufacturer or other party retained by the Contractor shall prepare engineering calculations, stamped by a registered professional engineer, verifying that the curtainwall is capable of withstanding all required loads, structural drift, and other reasonably anticipated conditions in actual service, without impairing its performance.


C. Condensation-Resistance Factor: As a minimum, provide curtain walls tested for thermal performance and condensation resistance according to AAMA 1503. For windows used in humidified buildings, the designer shall perform a condensation study before selecting the window type, to establish required CRF based on accepted ASHRAE criteria.

D. Thermal Transmittance: Select aluminum windows with a whole-window U-value maximum indicated at 15-mph (24-km/h) exterior wind velocity and winter condition temperatures when tested according to AAMA 1503. U-Value: 0.65 Btu/sq. ft. x h x
deg F.

E. Thermal Movements: Perform an engineering calculation to determine the expected thermal movement of the curtain wall based on a temperature change range of 120 deg F (67 deg C), ambient; 180 deg F (100 deg C) material surfaces. Select a curtain wall, including anchorage, that accommodate thermal movements without buckling, distortion, opening of joints, failure of joint sealants, damaging loads and stresses on glazing and connections, and other detrimental effects.

F. Uniform Structural Load: The curtainwall must withstand a positive and negative differential pressure of 1.5 times design pressure in accordance with ASTM E330. Allow deflection less than 1/175 of the unsupported spans, when tested in accordance with ASTM E330.

G. Air Infiltration: The curtainwall system with permanent resistance to air leakage through system of not more than 0.06 cfm/sq. ft. (0.3 L/s/sq. m) of fixed wall area when tested according to ASTM E 283 at a static-air-pressure difference of 6.24 lbf/sq. ft. (299 Pa).

H. Water Penetration Resistance: The curtainwall must meet both factory and field criteria:
Select glazed aluminum curtain wall system that does not leak when tested according to ASTM E 331 at minimum differential pressure of 20 percent of inward acting wind-load design pressure as defined by ASCE 7, "Minimum Design Loads for Buildings and Other Structures," but not less than 10 lbf/sq. ft. (479 Pa).
Select glazed aluminum curtain wall system that does not evidence water leakage when tested according to AAMA 501.1 under dynamic pressure equal to 20 percent of inward acting wind-load design pressure as defined by ASCE 7, "Minimum Design Loads for Buildings and Other Structures," but not less than 10 lbf/sq. ft. (479 Pa). Water leakage is defined as according to AAMA 501.1.

Field Test: After installation, the completed curtain wall assembly (including perimeter flashings, jamb panning, and other attached elements) must pass a series of two field tests in which the perimeter elements are also exposed to pressure differentials and water spray. Perform the first field test in accordance with ASTM E1105 (Procedure A) for the same performance class as the factory test, and in no case less than 10.0 psf pressure differential, followed by a second field test in accordance with ASTM E1105 (Procedure B) consisting of four cycles of 5 minutes at 10.0 psf and 1 minute at 0 psf with continuous.

I. System drainage: select curtain wall systems that are zone drained, i.e. systems that collect water that penetrates the glazing within the glazing pocket and weep it to the exterior through weepholes in the horizontal sill frame sections. Zone drained systems have glazing pockets with sealed ends (end dams) to prevent migration of water into the vertical Mullions. Do not select curtain walls that divert water that penetrates the glazing to the vertical Mullions and drain the vertical Mullions at the base of the system.
1.3 SUBMITTALS

A. Product Data: Submittals must include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions if operable elements are included.

B. Shop Drawings by the curtain wall fabricator must include plans, elevations, sections, details, hardware, attachments to other Work, operational clearances, and the following:
   1. Frame sections
   2. Isometric drawings of joinery details, including reinforcement and stiffeners.
   4. Flashing and drainage details.
   5. Weather-stripping and thermal-break details.
   7. Window cleaning provisions.

C. Samples for verification of each type of exposed finish required in manufacturer's standard sizes. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.

D. Cutaway Sample of each vertical-to-horizontal intersection of system, made from 12 inch (300-mm) lengths of full-size components and showing details of the following:
   Joinery.
   Anchorage.
   Expansion provisions.
   Glazing.
   Flashing and drainage.

E. Require the Contractor to provide calculations by a Rhode Island licensed professional engineer showing the adequacy of the window perimeter anchors, angle supports and attachments, stiffness of the mullions and sash, and showing structural adequacy of components not verified by testing.

1.4 MOCK-UPS

A. Mockups: Prior to installing glazed aluminum curtain wall system, construct mockups for each form of construction and finish required to verify selections made under Sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for Work. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect. Notify Architect 7 days in advance of the dates and times when mockups will be constructed. Demonstrate the proposed range of aesthetic effects and workmanship. Obtain Architect's approval of mockups before start of Work. Retain and maintain mockups during construction in an
undisturbed condition as a standard for judging the completed Work. Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.

1.5 WARRANTY

A. Special Warranty: Require the manufacturer's standard warranty, in which manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:

1. Failure to meet performance requirements.
2. Structural failures including excessive deflection.
3. Water leakage, air infiltration, or condensation.
4. Faulty operation of movable sash and hardware.
5. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
6. Insulating glass failure.

B. Warranty Period: Two years from date of Substantial Completion.

C. Warranty Period for Metal Finishes: 15 years from date of Substantial Completion.

D. Warranty Period for Glass: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS’ SYSTEMS

A. Provide curtain walls systems from the following manufacturers, or approved equals
   1. EFCO 5600
   2. Kawneer 1600
   3. Wausau Superwall
   4. Vistawall 400

2.2 MATERIALS

A. Aluminum Extrusions: Alloy and temper recommended by aluminum window
manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi (150-MPa) ultimate tensile strength, not less than 16,000-psi (110-MPa) minimum yield strength, and as follows:
Main frame: not less than 0.080 inch (3.2-mm) thickness.

B. Fasteners: Aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum window members, trim, hardware, anchors, and other components.
Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125 inch (3.2-mm) thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard, noncorrosive, pressed-in, splined grommet nuts.

C. Exposed Fasteners: Unless unavoidable for applying hardware, do not use exposed fasteners. For application of hardware, use fasteners that match finish of member or hardware being fastened, as appropriate.

2.3 FABRICATION

A. Fabricate glazed aluminum curtain wall system according to Shop Drawings. Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.

C. Prepare components to receive concealed fasteners and anchor and connection devices.

D. Fabricate components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.

E. Sills and Sill Receptor Pans: Extruded aluminum, 0.125 inches thick, with mitered corners and closure plates at both ends.

F. Cope the end portion of the pressure plate screw spline at perimeter of curtain wall framing members to allow for the installation of continuous sheet membrane flashing. Miter perimeter corners of pressure plates and snap on trim to maintain continuous pressure on sheet membrane flashing.

G. Welding: Weld components to comply with referenced standard and Shop Drawings, unless otherwise indicated. Weld before finishing components. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
H. Glazing Pockets: Provide minimum clearances for thickness and type of glass indicated according to GANA's "Glazing Manual."

I. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

J. Frame Units: Factory assemble frame units according to Shop Drawings to greatest extent possible. Rigidly secure nonmovement joints. Seal joints watertight, unless otherwise indicated. Assemble components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.

K. Weep System: Each curtain wall glazing pocket and the sill frame must have at least 3 weeps, minimum 3/8 inch dimension, flush with the lowest drainage point of the section to drain all water. Require the manufacturer to coordinate the location of the weeps with setting block locations, so that all portions of the section drain freely.

2.5 GLAZING – Refer to the Division 8 section for Glazing.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Fluoropolymer Three-Coat System: Use the manufacturer's three-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.

B. Testing Services: Testing and inspecting of installed curtain wall shall take place as follows:

1. Testing Methodology: Testing of curtain wall for air infiltration and water resistance shall be performed according to AAMA 502, Test Method B, by applying same test pressures required to determine compliance with "Performance
Requirements" Article.

2. Testing Extent: As a minimum, three curtain wall areas as selected by Architect and a qualified independent testing and inspecting agency. Curtain walls shall be tested as soon after installation as practical.

3. Test Reports: Shall be prepared according to AAMA 502.

4. Where test results indicate that the curtain wall areas do not comply with specified requirements, the manufacturer shall submit a proposal for remedial action for approval by the Architect and Owner.

5. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

END OF SECTION