

SECTION 08921 - ALUMINUM CURTAIN WALL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work of this section is subject to requirements of the Contract Documents including the General Conditions and Supplementary Conditions and applicable portions of Division 1 - General Requirements.
- B. The work consists of, but is not limited to, the following items, including all work and equipment necessary and incidental to the proper execution as shown on the drawings and specified herein for aluminum curtain wall:
 - 1. Aluminum curtain wall framing.
 - 2. Aluminum trim, plates, flashing, and closures.
 - 3. Anchors, shims, reinforcement, inserts, accessories, and fasteners.
 - 4. Glass and glazing as specified herein.
 - 5. Joint sealing within curtain wall system and between curtain wall and adjacent construction.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Flashing and Sheet Metal: Section 07600.
- B. Glass and glazing, except glass and glazing specified herein: Section 08800.
- C. Building Insulation: Section 07210.
- D. Aluminum Windows: Section 08520.
- E. Finish Hardware: Section 08710.

1.03 SYSTEM DESCRIPTION

- A. Aluminum Stick-Type System: The aluminum curtain wall system shall consist of individual members erected separately. Major components consist of aluminum vertical exterior mullions, horizontal rails, and glazed insulated spandrel panels and vision glass.
 - 1. Except for spandrel panels installed during erection, the system shall be designed for glazing from the inside.

1.04 SYSTEM PERFORMANCE REQUIREMENTS

- A. General: Provide the manufacturer's stock curtain wall system, adapted to the application indicated, that complies with performance requirements specified as demonstrated by testing the manufacturers corresponding stock systems according to test methods indicated.
 - 1. Design wind velocity at the project site is 70 mph.
 - 2. Air Infiltration: Air leakage through the curtain wall system shall not exceed 0.06 cfm per square foot of wall area when tested in accordance with ASTM E 283 at a minimum static air pressure differential of 6.24 lbs per square foot.
 - 3. Water Penetration: There shall be no uncontrolled water leakage through the

curtain wall system when tested in accordance with ASTM E 331 at a minimum differential pressure of 20 percent of inward design wind load but not less than 6.24 lbs per square foot or more than 12 lbs per square foot.

4. Deflection: The deflection of any metal framing member in a direction normal to the plane of the wall shall not exceed $L/175$ of its clear span, or 3/4 inch, whichever is less, at both a positive and a negative load of 30 PSF when tested in accordance with ASTM 330.
5. Thermal Movements: The aluminum curtain wall system shall be capable of withstanding thermal movements resulting from an ambient temperature differential of 120 deg F, which may result in a metal surface temperature range of 180 deg F within the curtain wall framing without causing buckling, stresses on glass, failure of joint sealants, damaging loads on fasteners, or other detrimental effects.
6. Condensation Requirements: The aluminum curtain wall system shall be of thermal-break construction that has been tested in accordance with AAMA 1502.7 and certified by the manufacturer to provide a condensation resistance factor (CRF) of at least 45.
7. Sound Transmission: The average sound transmission loss through the aluminum curtain wall system shall be a minimum of 30 db for the standard frequency range of 125 to 4000 Hz when tested in accordance with ASTM E 90 with the glass type indicated.

1.05 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications, recommendations, and details for curtain wall, including certified test laboratory reports as necessary to show compliance with requirements.
- B. Shop Drawings: Submit shop drawings, including wall elevations at 3/4 inch scale, and full size detail sections of every typical composite member. Show anchors, hardware and other components not included in manufacturer's standard data. Include glazing details.
 1. Include setting drawings, templates, and directions for the installation of anchor bolts and other anchorages installed as a unit of work under other sections.
- C. Samples: Submit samples of each required aluminum finish, on 12 inches long sections of extruded shapes. Include 2 or more units showing extreme color variations in color.
 1. Architect reserves right to require additional samples which will show fabrication techniques, workmanship of component parts, and design of other exposed auxiliary items.
- D. Test Reports: Provide test reports from a qualified independent testing laboratory that show compliance of the manufacturer's stock aluminum curtain wall system with performance requirements indicated based on comprehensive testing of the system by the laboratory within the last 3 years current production of the system by the manufacturer.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has successfully completed installation of curtain wall systems similar in material, design, and extent to that indicated for the Project and who is acceptable to the curtain wall manufacturer.
- B. Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or referenced standards.

C. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or on one component pane of units with the appropriate certification label of inspecting and testing organization indicated below.

1. Insulating Glass Certification Council (IGCC).

D. Design Criteria: The drawings indicate size, profiles, and dimensional requirements of the curtain wall system and are based on the specific type and model indicated. Curtain wall systems by other manufacturers having equal performance characteristics may be considered provided deviations in dimensions and profiles are minor and do not change the design concept or intended performance as judged by the Architect.

1. The burden of proof for equality of the curtain wall systems is on the proposer.

E. Preinstallation Conference: Before beginning curtain wall installation, conduct a preinstallation conference at the Project site with the curtain wall system manufacturer, installer, and other interested parties to review procedures, schedules, and coordination of the curtain wall installation with other elements of the Work.

1.07 PROJECT CONDITIONS

A. Field Measurements: Take field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.

1.08 SEQUENCING AND SCHEDULING

A. Schedule installation of the glazed aluminum curtain wall system in sequence with related elements of the Work specified in other Sections to ensure that wall assemblies, including flashing, trim, and joint sealers, are protected against damage from effects of weather, age, corrosion, and other causes.

1.09 WARRANTY

A. General: Submit a written warranty signed by authorized representatives of the Contractor and installer warranting that portions of the Work involving aluminum curtain wall are of good quality, free from defects, and in conformance with the requirements of the Contract Documents and further promising to repair or replace defective Work during a 5-year period following completion of that portion of the Work.

1. Defective is defined to include the following:

- a. Glass breakage.
- b. Failure of operational parts to function normally.
- c. Deterioration or discoloration of finishes.
- d. Failure of the system to meet performance requirements.

B. The Warranty submitted under this Section shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and is in addition to and runs concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. This specification and the drawings are based on the following:

1. Kawneer Co., Inc., 1600 Wall System with 6 inch deep mullions.
- B. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include the following:
1. EFCO Corp.
 2. United States Aluminum Commercial Products Group.

2.02 MATERIALS

- A. Aluminum: Aluminum extrusions shall be of alloy and temper recommended by curtain wall manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000 psi ultimate tensile strength and not less than 0.062 inch thickness at any location for main frame members. Comply with ASTM B 221. Aluminum sheet shall be of alloy and temper best suited for application and finish shown and specified, and shall comply with requirements of ASTM B 209.
- B. Fasteners: Aluminum, non-magnetic stainless steel, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum members, trim, anchors and other components of wall units.
1. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125 inch thick, reinforce interior with aluminum or non-magnetic stainless steel to receive screw threads, or provide standard non-corrosive pressed-in splinted grommet nuts.
 2. Do not use exposed fasteners except where unavoidable. Match finish of adjoining metal.
- C. Anchors, Clips and Window Accessories: Depending on strength and corrosion-inhibiting requirements, fabricate units of aluminum, non-magnetic stainless steel, or hot-dip zinc coated steel or iron complying with ASTM A 386.
- D. Sealants and joint fillers, both for joints within the curtain wall construction and for joints at the interface of curtain wall construction and other work, shall comply with requirements specified in the "Joint Sealers" Section.
- E. Tinted Insulating Glass: Provide 2 sheets of glass as follows, and ½ inch dry air or gas filled space with -20 degree F. dew point, with Class A sealant-type edge construction to maintain a hermetic seal.
1. Exterior Glass: Gray tinted float glass, Low E Type I, Class 2, Quality q3, 1/4 inch thick.
 2. Interior Glass: Clear float glass (Type 1) Class 1, Quality Q3, 1/4 thick.
 3. Edge Construction: Twin primary seals of polyisobutylene; tubular aluminum or galvanized steel spacer-bar frame with sealed or soldered sealed corners, and filled with dessicant; and secondary seal outside of bar, bonded to both sheets of glass and bar, of polysulfide, silicone or hot-melt butyl elastomeric sealant.
 4. Warranty: Provide manufacturer's standard 10-year product warranty on maintained hermetic seal.
- F. Spandrel Insulating Glass (Type 3): Provide 2 sheets of glass as follows, and 1/2 inch dry air or gas filled space with -20 degree F. dew point, with Class A sealant-type edge construction to maintain a hermetic seal.
1. Exterior Glass: Gray tinted float glass, Type I, Class 2, Quality q3, ¼ inch thick.
 2. Interior Glass: Heat strengthened, ceramic coated (surface No. 3), Quality q3, ¼ inch thick. Color of ceramic coating shall be gray. Spandrel glass shall be manufactured by

PPG Architectural Glass, or Guardian Industries Corp., or Oldcastle Glass.

3. Edge Construction: Twin primary seals of polyisobutylene; tubular aluminum or galvanized steel spacer-bar frame with sealed or soldered sealed corners, and filled with dessicant; and secondary seal outside of bar, bonded to both sheets of glass and bar, of polysulfide, silicone or hot-melt butyl elastomeric sealant.
 4. Warranty: Provide manufacturer's standard 10-year product warranty on maintained hermetic seal.
 5. Insulating glass shall be manufactured by PPG Architectural Glass, or Guardian Industries Corp., or Oldcastle Glass.
 6. Provide insulation, where shown, in conjunction with spandrel glass. Insulation shall meet ASTM C 665, Type I, glass fiber, of thickness indicated; shall be applied as recommended by insulation manufacturer. The insulation shall be installed 1 to 2 inches behind the inside face of the spandrel glass.
- G. Glazing Sealants and Components, General: Provide color of exposed sealant compound indicated or if not otherwise indicated, as selected by Architect from manufacturer's standard colors. Comply with manufacturer's recommendations for selection of hardness, depending upon the location of each application, conditions at time of installation, and performance requirements as indicated. Select materials, and variations or modifications, carefully for compatibility with surfaces contacted in the installation.
- H. Silicone Glazing Sealant: One-part elastomeric silicone sealant complying with FS TT-S-001543, Class A, non-sag.
- I. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.
- J. Setting Blocks: Neoprene or EPDM, 70-90 durometer hardness, with proven compatibility with sealants used.
- K. Spacers: Neoprene or EPDM, 40-50 durometer hardness with proven compatibility with sealants used.
- L. Compressible Filler Rod: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, non-gassing, proven to be compatible with sealants used, flexible and resilient, with 5-10 psi compression strength for 25 percent deflection.
- M. Provide perimeter sealing for aluminum curtain wall using materials and methods as specified in Section 07900.
- N. Concealed Flashing: Dead-soft 26 gauge stainless steel concealed flashing of type selected for compatibility by the manufacturer.
- 2.03 FABRICATION
- A. General: Fabricate curtain wall system at the manufacturer's shop to the fullest extent possible and before applying finishes. Provide concealed fasteners. Make provisions to weep penetrating water and condensation to the exterior.
1. Match exposed work to produce continuity of line. Fit joints accurately and secure rigidly.
 2. Where feasible and at the Contractor's option, install glass in prefabricated frames at the manufacturer's shop.
- 2.04 FINISH
- A. General: Comply with NAAMM "Metal Finishes Manual" for recommendations relating to application and designations of finishes.

- B. Finish designations prefixed by “AA” conform to the system established by the Aluminum Association for designating aluminum finishes.
 - 1. All exposed to view aluminum curtain wall units and components shall, except as otherwise specified, be given AA-M12C22A41, clear anodized, class 1 (minimum thickness) 0.7 mils.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Furnish inserts at proper times for setting in concrete formwork, masonry, and similar work indicated to support curtain wall work.

3.02 INSTALLATION

- A. Comply with manufacturer’s instructions for protecting, handling, and installing fabricated curtain wall components, with particular care and attention to preservation of applied finishes. Discard or remove and replace damaged members.
- B. Anchor components securely in place in the manner indicated. Shim and allow for movement resulting from changes in thermal conditions. Provide separators and isolators to prevent corrosion, electrolytic deterioration, and freeze-up of moving joints.
- C. Glazing: Comply with requirements specified in “Glass and Glazing” section.
- D. Sealants and joint fillers: Comply with requirements specified in “Joint Sealers” section.
- E. Erection Tolerances: Install components plumb, level, accurately aligned, and located in reference to column lines and floor levels. Adjust work to conform to the tolerances indicated below. Tolerances indicated below are maximum and are not cumulative.
 - 1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
 - 2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
- F. Alignment: Limit offset of member alignment to 1/16 inch where surfaces are flush or less than 1/2 inch out of flush and separated by less than 2 inches by a reveal or protruding work; otherwise limit offsets to 1/8 inch.
- G. Location: 3/8-inch maximum deviation from the measured theoretical location of any member at any location.

3.03 CLEANING

- A. Clean the completed system, inside and out, promptly after erection and installation of glass and sealants, allowing for nominal curing of liquid sealants. The installer shall advise the Contractor of proper and adequate procedures for protection and cleaning during the remainder of the construction period so that the system will be without damage and deterioration at the time of acceptance.
- B. At the time of Substantial Completion, clean curtain wall system thoroughly and polish glass. Demonstrate proper cleaning methods and materials to the Owner’s maintenance personnel.

END OF SECTION 08921