

**Section 08 41 00 - Aluminum Framing Systems****PART 1 - GENERAL****1.01 DESCRIPTION**

- A. Work Included:
1. Furnish and install aluminum framing systems including operable vents, glass and glazing and all other components required for a complete and proper installation.
  2. All necessary steel or aluminum members where required to support, strengthen and reinforce aluminum members.
  3. Provide compensation receptors at aluminum frames, window heads, and other location as required to accommodate deflection.
  4. Shop drawings and engineering calculations signed and sealed by an Engineer registered in Wisconsin. Erection drawings, samples and conformance testing, as required.
  5. Aluminum sill flashing.
- B. Related Work Specified Elsewhere:
1. Miscellaneous Metals - Section 05 50 00
  2. Air Barrier - Section 07 27 26
  3. Caulking and Sealants - Section 07 90 00
  4. Aluminum Flush Entrance Doors - Section 08 11 16

**1.02 QUALITY ASSURANCE**

- A. Performance Requirements - Framing System:
1. Wind loads: Provide storefront system including anchorage capable of withstanding wind load design pressures shown on structural drawings. If not shown on structural drawings, provide system designed to wind load requirements of the code having jurisdiction.
  2. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft<sup>2</sup> at a static air pressure differential of 6.24 psf.
  3. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 8 psf as defined in AAMA 501.
  4. Uniform Load: A minimum static air design load of 20 psf, unless otherwise noted or required by applicable building code, shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
  5. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than 0.60.

6. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than 56.
- B. Performance Requirements (Operable Vents):  
Windows shall have been tested for Performance Class and Grade of HC70.
1. Air Infiltration: When closed and locked, test specimen shall be tested in accordance with ASTM E283 at a minimum vent size of 5' x 3'. The air infiltration rate shall not exceed 0.10 cfm/ft of vent perimeter at a static air pressure differential of 6.24 psf.
  2. Water Resistance: When closed and locked, the test specimen shall be tested in accordance with ASTM E547 and ASTM E331 at a minimum vent size of 5' x 3', there shall be no leakage as defined in the test method at a static air pressure differential of 12 psf.
  3. Uniform Load Deflection.: A minimum static air pressure difference of 70 psf shall be applied in the positive and negative direction in accordance with ASTM E330. There shall be no deflection in excess of L/175 of the span of any framing member.
  4. Uniform Load Structural Test: A minimum static air pressure difference of 105 psf shall be applied in the positive and negative direction in accordance with ASTM E330. The unit shall be evaluated after each load.
  5. Condensation Resistance Test (CRF): When tested in accordance with AAMA 1503.1, the condensation resistance factor shall not be less than 53.
  6. Thermal Transmittance (U-Value): When tested in accordance with AAMA 1503.1, the thermal transmittance (U-Value) shall not be more than .59 BTU/hr/sf/<sup>0</sup>F.
- C. All glazing specified shall be in accord with Glazing Manual of Glazing Association of North America - latest edition.
- D. Installer Qualifications: Installer experienced (as determined by contractor) to perform work of this section, who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.
- E. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method
- F. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements

**1.03 SUBMITTALS**

- A. Prior to construction, submit shop drawings for the fabrication and installation of all work and associated components. Include the following:
1. Wall elevations at 1/4" scale, typical unit elevation at 1" scale.
  2. Show full size details of all conditions for every member, joint, anchorage, weld size, glazing system and provision for expansion and contraction and sealant application.
  3. Show sizes and locations of all embedded items required for installation of the work.
  4. Include coordination details for related and adjoining work, insert drawings and erection diagrams. Show relative layout for all adjacent walls, beams, columns and slabs, all correctly dimensioned as based upon actual field measurements, where field measurements are required.
  5. Submit for information only, structural calculations for the work, anchorage to the building structure, with all materials and all connections fully dimensioned. Show ultimate factor of safety. All drawings and calculations shall bear the seal and signature of a professional engineer licensed in Wisconsin. The Architect or its consultants will not provide said seal and signature. All calculations shall be in accordance with the current design rules of the American Architectural Metals Association (AAMA), AISC, AISI and ACI, except at otherwise provided in these specifications.
  6. Show all dimensions including, but not necessarily limited to, section thickness, frame lap over glass and edge clearance. Show tolerances for all dimensions including, but not limited to, mill and shop dimensions and glass dimensions.
  7. Shop drawings for embedded items shall be submitted separately from the balance of the framing system shop drawings and shall be submitted with reinforcing steel shop drawings.
  8. Provide key or setting shop drawings and mark legibly various parts of work prior to delivery, for properly locating in field.
  9. Samples: Contractor shall submit to Architect samples in duplicate of each and all materials and finishes specified for approval.

**1.04 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Packing, Shipping, Handling, and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Storage and Protection: Protect stored materials from exposure to harmful weather conditions. Handle framing components in a manner to avoid damage. Protect materials against damage from elements, construction activities, and other hazards before, during and after installation.

**1.05 GUARANTEE**

- A. Manufacturer shall warrant aluminum entrances and framing system to be free from defects in materials and workmanship for a period of two (2) years from date of final completion of Project.

- B. Insulating glass shall be guaranteed not to develop material obstruction of vision as a result of dust or film formation on the inner surfaces within a period of ten (10) years from the date of installation. Any unit failing to comply with terms of this guarantee shall be replaced by Contractor at no cost to Owner.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Approved Manufacturers:
- Kawneer Company, Inc., "Trifab VG 451T" and "GlassVent" Windows, and "350" Medium Stile Doors, all with windows and doors with to have the 013 Heavy Weight Mullion
  - Tubelite, "14000I/O Series" with Thermal Break and Medium Stile Doors, with heavy weight mullions
  - YKK America, "YES 45TU" and "350" Medium Stile Doors
  - Efc0, "System 433 (T) Triple Set" framing system; and "Series D300" and Medium Stile Doors with heavy weight mullions
  - Pittco Architectural Metals, Inc., "TMS 114T" and Medium Stile Doors with heavy weight mullions

### **2.02 MATERIALS**

- A. Aluminum (Framing and Components):
1. Material Standard: ASTM B 221; 6063-T6 alloy and temper
  2. Member Wall Thickness: Each framing member shall provide structural strength to meet specified performance requirements of the 013 Heavy Weight Mullion.
  3. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.
- B. Thermal Barrier: Framing System.  
1/4" separation consisting of a two part chemically curing, high density polyurethane which is mechanically and adhesively joined to aluminum storefront sections.
- C. Finishing:
1. All surfaces shall be free of scratches and other blemishes and shall receive an Architectural Class I colored anodic coating conforming to Aluminum Association Standard AA-M10C22A41 - Clear Anodized.
- D. Fasteners: Where exposed, shall be Stainless Steel.
- E. Gaskets: Glazing gaskets shall be extruded EPDM rubber.
- F. Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
- G. Glazing Materials:
1. Glazing materials shall be of material compatible with aluminum and those sealants and sealing materials used in composite structure which have direct contact with the gasket.
  2. Setting blocks and spacer shims shall be of neoprene, rubber or

other suitable material with Shore "A" hardness of 70 to 80 for setting blocks and 40 to 60 for spacer shims.

H. Glass:

1. All glass shall be stored in a safe, dry place upon delivery and shall not be unpacked until it is used.
2. Each pane shall be factory labeled and labels shall remain until final cleaning.
3. Float glass shall conform to quality standards specified in F.S. DD-G-451a.
  - a. 1/4" thick, clear float glass
4. Tempered Float Glass:
  - a. 1/4" thick, clear float glass, heat treated and cooled to provide high resistance to breakage.
5. High Performance Glass:  
1/4" clear float glass with Low E coating on #2 surface.
6. Approved Glass Manufacturers
  - PPG Industries
  - Pilkington
  - ACH Glass Operations
  - Guardian Industries Corp.
  - approved equal
7. Insulated Glass: (Dual Seal Construction, Class A Label, Insulating Glass Certification Council Silicone Secondary Seal) shall consist of two (2) sheets of clear float glass with a high performance (Low E) coating on the #2 surface and hermetically sealed argon gas filled air space. Heat strengthen insulated glazing units as required by glass fabricator to obtain ten (10) year warranty. Insulated glazing units shall meet requirements of ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
  - a. 1/4" high performance glass (exterior)  
1/2" air space  
1/4" clear float glass (interior)
  - b. 1/4" tempered high performance glass (exterior)  
1/2" air space  
1/4" tempered clear float glass (interior)
  - c. Performance Requirements:
    - Visible Light Transmittance: 74%
    - Visible Light Reflectance: 17%
    - Solar Energy Transmittance: 52%
    - Solar Energy Reflectance: 14%
    - UV Transmittance: 42%
    - Summer U-Value: 0.35
    - Winter U-Value: 0.35
    - Shading Coefficient: 0.71
    - Solar Heat Gain Coefficient: 0.62
  - d. Approved Fabricators:
    - Cardinal Glass Industries
    - ACH Glass Operations
    - Guardian Industries Corp.
    - Viracon
    - approved equal

## 2.03 FABRICATION AND MANUFACTURE

A. General:

1. Insofar as is possible, work shall be fitted and shop assembled.
2. Fabricate components with minimum clearances and shim

- spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
3. Accurately fit and secure joints and corners. Make Joints flush, hairline and weatherproof.
  4. Prepare components to receive anchor devices. Fabricate anchors.
  5. Arrange fasteners and attachments to conceal from view.
- B. Framing system: 2" x 4-1/2" nominal dimension; thermally broken with a pour and debridge process combining a mechanical and adhesive bond between the urethane and the aluminum. System shall have flush glazing stops and internal weep drainage system.
- C. Do all tapping, drilling, punching and otherwise provide holes, slots or like connections for other trades to fasten their work effectively and properly to work of this section.
- D. Provide all nuts, screws, clips, fasteners, etc. as required to complete work for this section.
- E. Framing systems shall provide a full resilient setting for glass with not less than 1/2" grip on glass.
- F. Closures: Furnish all metal closures shown on drawings and closures required for a complete and proper installation.
- G. Provide sill flashing under all aluminum framing. Sill flashing shall be .040 aluminum finished to match framing system. Provide retainer cleat.
- H. All operable (Awning) windows shown on drawings to include interior screen

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Site Verification of Conditions: Verify substrate conditions are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive framing system and sill plate is level in accordance with manufacturer's acceptable tolerances.
1. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

#### **3.02 INSTALLATION**

- A. General: Install framing system in accordance with manufacturer's instructions and AAMA storefront and entrance guide specifications manual.
- B. Dissimilar Materials: Provide separation of aluminum materials and other corrodible surfaces from sources of corrosion or electrolytic action contact points by complying with AAMA 101, Appendix, titled "Dissimilar Materials".

- C. Set all items in correct locations, level, square, plumb and in alignment with other work in accordance with manufacturer's installation instructions and approved shop drawings.
- D. Weathertight Construction: Install sill members and other members in a bed of sealant or with joint filler or gaskets, to provide weathertight construction. Coordinate installation with wall flashings and other components of construction.
- E. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- F. Provide alignment attachments and shims to permanently fasten system to building structure.
- G. Align assembly plumb and level, free of warp and twist. Maintain assembly dimensional tolerances aligning with adjacent work.

### **3.03 GLAZING**

Glazing shall comply with Glazing Manual of Glass Association of North America (GANA), latest edition.

### **3.04 ADJUSTMENTS UPON COMPLETION**

Upon substantial completion of work of this section, go over work and put in proper condition acceptable to Architect. Remove dirt, stains, etc. Clean and polish exposed work. Replace damaged work and put hardware in proper operating condition. Remove, replace or reset improperly installed glass and other materials without additional cost to Owner.

### **3.05 PROTECTION AND CLEANING**

- A. Protection: Protect finish surfaces from damage during construction. Protect aluminum framing system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.
- B. Cleaning: Repair or replace damaged Work. Clean framing systems and glass in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

### **3.06 FIELD QUALITY CONTROL**

- A. Field Tests: Architect shall select units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.
  - 1. Testing: Testing shall be performed by a qualified independent testing agency. Testing Standard per AAMA 503, including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 Water Infiltration Test.

- a. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft<sup>2</sup>, whichever is greater.
  - b. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.24 psf (300 Pa).
- B. Manufacturer's Field Services: Upon Owner's written request, provide periodic site visit by manufacturer's field service representative.

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