SECTION 085113
ALUMINUM WINDOWS – DOUBLE HUNG TILT
SERIES 710

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Extruded aluminum windows with operable lower and upper sash.
   2. Factory glazing.
   3. Operating hardware.
   4. Insect screens.

1.02 SYSTEM DESCRIPTION

A. Design Requirements: Drawings and Specifications establish requirements for aesthetic, including dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

B. Performance Requirements: As specified in PART 2, with the following additional requirements:

C. Manufacturer's “Certificate of Compliance” must be submitted certifying product meets requirements of AAMA/WDMA/CSA 101/I.S.2/A440-11 CW40-H. **AAMA Certificate of Compliance will be required on all windows.**

D. Design and Size: Windows to withstand both positive and negative structural loads when tested in accordance with ASTM E 330, using test loads equal to 1.5 times the design test pressure (60.15 psf).

E. Deflection: Not to exceed l/175 of unsupported spans, when tested in accordance with ASTM E 330 using test loads equal to the design pressure (40.10 psf), both positive and negative, and must be without permanent deformation of any component, glass breakage, or anchorage failure.

F. Air Infiltration: Limit air infiltration through assembly to 0.5 L/s/m² (0.1 cfm/ft²) of wall area, measured at a reference differential pressure across assembly of 1.57 psf when measured in accordance with ASTM E 283.

G. Water Leakage: None, when measured in accordance with ASTM E 547 and ASTM E 331 at a water test pressure of 6.06 psf.

H. System Internal Drainage: Drain any water entering joints, condensation occurring in glazing channel, or migrating moisture occurring within system to the exterior, by means of a weep drainage network.

I. Deglazing: No disengagement of glazing surrounds members of operable panels, when tested according to ASTM E 987 at 50 lbs on vertical rails and 70 lbs on other rails.

1.03 SUBMITTALS

A. Administrative requirements for submittal procedures. Submit the following for review and approval:
   1. Product Data: Provide component dimensions, information on glass and glazing, and descriptions of hardware and accessories.
   2. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, and installation requirements.
      a. Include full-scale head, jamb, meeting stile, and sill sections.

3. Color Samples: Submit two samples of frame coating for approval, showing full range of color variations.
4. Window Samples: Submit two samples, 12 x 12 inch (300 x 300 mm) in size, illustrating typical corner construction, accessories, and finishes.
5. Submit two samples of operating hardware.
6. Submit current unexpired copies of AAMA/WDMA/CSA 101/I.S.2/A440-11 **certified** structural test reports.
7. Submit current specifications of technical compliance of factory-applied paint finish.

B. Quality Assurance/Control Submittals: Submit following for Project record. No action will be taken.
1. Calculations: Submit calculations **on the largest operable window and the smallest operable window in strict compliance with ASCE-7-02, proving compliance with the product capability within the building design pressure criteria. The submitting installation contractor shall provide the anchoring schedule with the shop drawings, indicating anchor size and spacing. This submittal must be approved by the manufacturer.**
2. Test Reports: Manufacturer's published reports and independent testing agency reports must be **AAMA Certified** and demonstrate compliance with specified requirements. Include the following:
   a. Reports of independent testing agency, approved by Owner and Architect, demonstrating compliance of proposed units with specified performance requirements. Test reports shall describe window and door systems completely.
   b. Written test procedure and drawings, including details of units and mounting in test chamber.
3. Manufacturer and Installer Qualifications: Submit lists of projects documenting not less than five years of documented, successful experience in fabrication and installation of commercial windows in similar project types.
   a. For each project: List building name and address, Owner's representative, general contractor, Architect, and appropriate subcontractors, with phone numbers and contact personnel.
4. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.

C. Contract Closeout Submittals:
1. Submit warranty. Ensure that forms have been completed in Owner's name and registered with manufacturer. Produce **original** warranties by manufacturer.
2. Maintenance Manuals: Produced by manufacturer, listing procedures and recommended frequency for inspecting, adjusting, and maintaining windows specific to this project. Address all hardware, gaskets, and sealants. Describe cleaning procedures for glass and metal surfaces.

1.04 QUALITY ASSURANCE

A. Comply with requirements of AAMA/WDMA/CSA 101/I.S.2/A440-11.
1. Maintain one copy of document on-site.

B. Manufacturer and Installer: Company specializing in fabrication of commercial aluminum windows of types required, with no fewer than five years of experience.
1. Check availability of all specified materials upon contract signing, and order promptly so work is not delayed.
2. Installer Qualifications: All mechanics on this project shall be completely familiar with these contract documents and procedures shown on installation sequence shop drawings before installing units.

C. Testing Agency Qualifications: Manufacturer's testing and/or independent testing agency, acceptable to authorities having jurisdiction, with experience and capability to conduct testing indicated, as documented according to ASTM E 548.

1.05 DELIVERY, STORAGE, AND PROTECTION

A. Delivery: Scheduled delivery to coincide with glazing schedules so that minimum handling is required.
   1. Deliver products to project site and store in manufacturer's delivered state until openings are ready for window and door installation. Do not open any concealment except as required by inspection for shipping damage.
   2. Inspect frames for damage, including finish damage, fracture of thermal breaks, or frame corner seals.

B. Storage: Store all product according to AAMA CW-10, in areas least subject to traffic or falling objects. Provide space around frames and keep storage area clean, dry, and well-ventilated to avoid condensation and other moisture-induced damage to frame finish.

C. Handling: Stack individual units on edge, leaned slightly against upright supports, with separators between each.

1.06 WARRANTY

A. Provide manufacturer's warranty against defective materials or workmanship with both submittals and Field and File records, for a period of "_____" from substantial completion. Warranty must convey ownership to the project owner.

PART 2 PRODUCTS

A. Windows shall be double hung with operable tilt lower and upper sash, aluminum frame with Thermal Break, including 7/8” double-pane glazing.
   1. Aluminum shall be of proper alloy for commercial window construction. All extruded sections shall be of 6063-T5 aluminum alloy.
   2. Main frame and sash members shall be a nominal thickness as required by ANSI/AAMA 101. Main frame shall be 3.250" in depth. Horizontal sash members shall be hollow extrusions. Main frames and sash members are to be extruded aluminum with a structural thermal barrier of high-density, low thermal conductivity polyurethane, poured and debridged.
      a. Optional framing includes: Integral 2" offset "flanged" frame.
   3. Lock shall consist of a cam latch at the interlocking meeting rail, along with an independent spring-loaded latch for the sash (upper and lower).
   4. Sash shall be balanced by field-adjustable, spirally-wound spring sash balances attached to the main frame by pivot sash shoes of nylon. Balances shall hold the sash stationary in any position along the full range of sash travel. Where weight of sash requires, double sash balances shall be used. Balances shall meet the requirements of AAMA 902.2.
   5. Weatherstripping shall be .250 polypile with mylar fins, conforming to AAMA 701.2 (Specification for Pile Weatherstrip). Weatherstripping shall be doubled at all points of contact of the sash and main frames, and at the interlocking meeting rail. A dual vinyl bulb seal shall be used at the sill.

B. All aluminum windows must be provided by sole source manufacturer capable of providing the **aluminum windows, aluminum sliding glass doors, storefront, and swinging terrace doors.**

C. All aluminum double hung windows shall be double-sash operation.

2.01 MANUFACTURERS

A. Series 710 Double Hung Window Type, as manufactured by Thermal Windows, Inc.
   1. Performance Requirements: AAMA/WDMA/CSA 101/I.S.2/A440-11 CW40-H.
   2. Construction: Thermally broken.
   3. Provide screens.
   4. Glazing: Double; clear; Low-E.

B. Windows: Tubular aluminum sections, factory-fabricated, factory-finished, thermally broken, vision glass, infill panels, related flashings, anchorage and attachment devices.

C. Approved Equals:
1. EFCO.
2. Traco.
3. Others must be approved 10 days prior to bid date.

2.02 COMPONENTS

A. Frames: Profile as indicated, thermally improved with interior portion of frame insulated from exterior portion; applied glass stops of snap-on type.
1. Attachment Accessories: Aluminum, as detailed and required for attachment to wall structure at head, jamb, and sill.

B. Insect Screen Frame: Extruded aluminum frame of rectangular sections; nominal size similar to operable glazed unit.
1. Provide for each operable exterior sash or ventilator.
2. Design windows and hardware to accommodate screens in a tight-fitting arrangement, removable from the interior, with a minimum of exposed fasteners and latches. Fit screen within window frame, allowing clear access to operating hardware without requiring removal or opening of screen or wickets.
3. Insect Screens: 14/18 mesh, aluminum strands.
4. Provide frames with manufacturer's finish to match the window assembly.

C. Operable Sash Weatherstripping: Nylon pile; permanently resilient, profiled to achieve effective weather seal.

D. Fasteners: **"Stainless Steel"** or **"Zinc Plated"**.

E. Sealant and Backing Materials: As specified in Section 079005.

F. **Muntins (Optional):**
1. **Provide muntin grids, as detailed on architectural drawings.**
2. **Finish shall match window frames.**

G. **Panning (Optional):**
1. **Provide extruded aluminum panning to receive replacement windows, as detailed on architectural drawings.**
2. **Finish shall match window frames.**

H. **Receptors/Sill Starter (Optional):**
1. **Provide extruded aluminum receptors to receive windows, as detailed on architectural drawings.**
2. **Finish shall match window frames.**

I. Provide steel internal reinforcement in mullions, as required to meet loading requirements.

2.03 MATERIALS

A. Extruded Aluminum: ASTM B 221/ASTM B 221M, 6063 alloy, T5 temper.

B. Concealed Steel Items: Profiled to suit mullion sections; galvanized in accordance with ASTM A 123/A 123M to 2.0 oz/sq ft (600 g/sq m), as required.

C. Fastener materials: All screws at joints of main frame shall be secured into integral screw ports.

D. Plastic Components: Resist QUV exposure with UV-B 313 bulbs, 4 hour CON at 50° C/4 hour UV at 40° C, in accordance with ASTM G 154 for 2,000 hours without embrittlement, cracking, or fading, and shall have a verifiable 5-year successful field track record.
   1. Recommended for exterior use by plastics manufacturer.
   2. Polyurethane for Poured and Debridged Thermal Breaks: Obtain from source providing material used successfully in poured and debridged thermal breaks for at least five years.

E. Sealants: Compatible with perimeter joint caulking. Seals with double-faced tape not allowed.
   1. Frame Corner Sealant: Butyl rubber sealant, compatible with contiguous sealants.

2.04 HARDWARE

A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, or carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock aluminum windows; sized to accommodate sash or ventilator weight and dimensions. Do not use aluminum in frictional contact with other metals.
   1. Sash lock: Meeting rail locks and auto-locks at sill.
   2. Pulls: Manufacturer's standard type.
   3. Sweep lock at meeting rails.
   4. Limit Stops: Manufacturer's standard type. **(Provide sash travel limits to 6” travel.)**
   5. Balances: Field-adjustable, spirally-wound spring balance, capable of holding sash stationary in any position along full range of sash travel.

2.05 FABRICATION

A. Fabricate components with smallest possible clearances and shim spacing around perimeter of assembly, to enable window installation and dynamic movement of perimeter seal.
   1. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
   2. Arrange fasteners and attachments to ensure concealment from view.
   3. Provide internal reinforcement in mullions as required to meet loading requirements.

B. Provide internal drainage of glazing spaces to exterior through weep holes on all operable windows.
   1. **Weep each operable sash glazing pocket and sill frame. Locate all weeps at lowest drainage point of section to drain all water from section.**

C. Assemble insect screen frames with mitered and reinforced corners. Secure wire mesh tautly in frame. Fit frame with spring-loaded steel pin retainers and/or tension springs.

D. Double weatherstrip operable units.
   1. Install weatherstripping continuously around opening and butt together tightly at corners. Discontinuities in backing retainer grooves at intersections shall not exceed 1/8 inch (3 mm).
   2. Mechanically secure weatherstripping to prevent slippage when operating sash and to prevent other displacement.
   3. Provide single line of weatherstripping along inboard face of operable sash at sill, placed approximately, 1/4 inch (6 mm) below top edge of inboard vertical leg of sill track.
   4. Weatherstripping: Replaceable without disassembly of sash or unit frame, or removal of unit frame from opening.

E. Polyurethane Poured and Debridged Thermal Breaks:
   1. Design and fabricate sash, frame, and sub-frame with continuous integral thermal barrier, permanently bonded to extrusions, providing solid, continuous, integral, non-conducting area at all frame and sash members.
   2. Cavity Profile: Symmetric and incorporate mechanical interlock.

3. Provide "Braded" thermal cavity preparation to ensure adhesion of thermal break poured in all water barrier extrusions.
4. Do not expose polyurethane to sunlight in permanent installation.
5. Shield plastic components, such as parting blocks, in unit construction from direct exterior exposure at sills, jambs, and meeting stiles using aluminum covers. Other exterior visible components shall match frame color.
6. Filled and debridged sections shall not distort or fracture due to handling, storage, fabrication, or in-service use.
7. Frame Corner Sealant: Compatible with polyurethane.
8. Do not drill or punch holes, including weep holes, through thermal break.
9. Replace damaged thermal breaks.

F. Match components to ensure continuity of line.

2.06 FINISHES

A. High Performance Organic Finish: **"AAMA 2604"** or **"AAMA 2605"**, thermally cured powder coating organic paint system.
1. Color as selected from manufacturer's (14) standard colors.

B. Anodized Finish: **"AAMA 611" (Class I** or **Class II)**, electrolytically deposited anodic oxide coating system.

C. Apply 1 coat of bituminous coating or install PVC shim separations to concealed aluminum and steel surfaces in contact with dissimilar materials.

2.07 GLASS & GLAZING INSTALLATION

A. Conform to latest edition of glazing standards of GANA Glazing Manual and GANA Sealant Manual.
1. Install glass in fixed units, in accordance with manufacturer's recommendations.
2. Allow all rubber gaskets to relax and recover several hours prior to installation. All gaskets shall be oversized, 1% to 2% in length. Install gaskets at ends and center, and then fit in remaining portions. Butt corner joints tightly and seal. Avoid contaminating surfaces to be sealed with any lubricating solutions.
3. Do not permit edges of insulated glass to contact any solvents.
4. Do not allow glass to touch framing system; replace chipped or scratched glass.
5. Keep glazing rabbet clean and dry during installation of glass.
6. Place setting blocks at quarter points of sill member without blocking any weep holes.
7. Set glass centered in opening to allow at least 1/8 inch clearance between sides of glass and anti-walk pads, and to provide at least 1/2 inch bite on glass by glazing stops.

B. Sealed Insulated Glass: Sealed insulated glass in all operable sashes shall be factory-glazed with a marine (wrap-around) reusable vinyl-glazing channel. **The insulated glass units shall be 7/8" overall thickness with two panes of .125" (1/8") double-strength glass, separated by a .625" (5/8") airspace. Exterior pane shall be .125" (1/8") Clear and the interior pane shall be .125" (1/8") Clear; 2nd surface Low-E. Glass shall be tempered where required by code.**

C. All sealed insulated glass units shall meet the requirements of ASTM E 2190-10 specification, Class "A". Sealed insulated glass units shall be warranted against seal failure for a period of "_____" from date of manufacturing.

PART 3 EXECUTION

3.01 EXAMINATION

A. Existing Conditions: Examine openings for aluminum windows to ensure that they are proper size, plumb, square, and level before installation of frames is started.
   1. Verify that adjoining air and vapor seal materials are ready to receive aluminum windows.

B. Immediately before placing into opening, inspect frames for any damage, including finish damage and fracture of thermal breaks or frame corner seals.

3.02 PREPARATION

A. Clean down masonry prior to installation of window unit assemblies.

B. Coat aluminum in direct contact with concrete, masonry, steel, or other non-compatible material with bituminous paint, zinc rich primer, or other suitable insulating material.

3.03 INSTALLATION

A. Securely install windows and doors in accordance with AAMA 101, manufacturer's instructions, and approved shop drawings.
   1. Shim frames to perimeter opening, to accommodate construction tolerances and other irregularities.
   2. Install sill shims at three points to support to sill track. Use wedge shim directly over sill flashing to offset slope of flashing. Set wedge and uniform thickness shims into bed of sealant and place over any shims below flashing. Do not damage or dent flashing during shim installation.
   3. Align windows plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
   4. Maintain relation to established lines and grades indicated on approved shop drawings.

B. Use anchorage devices to securely fasten unit assemblies to wall construction without distortion or imposed stresses.
   1. Use approved means of frame anchorage to allow for thermal expansion and contraction of frames. Fit support angles tightly against sub-frame and sill flashing without gaps and support directly on substrate without shims.
   2. Do not penetrate horizontal portion of flashing or active weep areas of unit frame with fasteners. Install frames without use of exterior exposed fasteners.

C. **Install subsill and sill end dams.**

D. Provide thermal isolation where components penetrate or disrupt building insulation.

E. Coordinate attachment and seal of perimeter air barrier and vapor retarder materials.

F. Install operating hardware not pre-installed by manufacturer.

G. Install perimeter sealant in accordance with requirements specified in Section 079005.

H. Install perimeter trim and interior closures.

I. Do not drill or punch holes, including weep holes, through thermal break.

3.04 FIELD QUALITY CONTROL

A. Either with a window unit selected from the initial delivery or a mock-up unit of each type to be used within the project, conduct a field test in strict compliance with AAMA 502-8 method A and Method B. Each opening will be tested to achieve performance of ASCE 7-05 calculated requirements (psf) for water resistance, which shall not exceed .667 % of the product's capable water based on AAMA 101/I.S.2. Allowable rates of air leakage for field testing shall be 1.5 times applicable AAMA 101/I.S.2

rate for the Product Type and Performance Class (Example: Performance test at 1.57 psf allows .30 cfm/ft²; 502B test allows .45 cfm/ft²). Both separate openings to be tested under "Contract" testing by a designated independent testing agency.

1. Schedule installation sufficiently in advance of need to allow adequate time for cure of sealants, testing and reconstruction, if needed, without delaying the project.

B. Notify Owner and Architect at least one week before testing so that they may be represented during all testing.

C. Perform tests specified in Field Quality Control Article.
   1. If window unit fails test, Contractor shall propose corrections for approval of Owner and Architect.
   2. Modify construction and perform additional tests as required to achieve specified minimum acceptable results. If corrections are not adequate, construct new mock-up at written direction of Owner and Architect. Coordinate construction of mock-up with other involved trades.
   3. Approved mock-ups may become part of completed Work if undisturbed at time of Substantial Completion.

3.04 ERECTION TOLERANCES

A. Comply with the following tolerances:
   1. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.
   2. Maximum Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 foot straight edge.

3.05 ADJUSTING AND CLEANING

A. Adjust hardware for smooth operation and secure weather-tight closure.

B. Cleaning:
   1. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.
   2. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION