ThermTek™ Specifications

SECTION 089000:
GLAZED ALUMINUM STICK BUILT AND UNITIZED CURTAIN WALLS

This suggested guide specification has been developed using the current edition of the Construction Specifications Institute (CSI) "Manual of Practice," including the recommendations for the CSI three-part Section Format and the CSI Page Format. Additionally, the development concept and organizational arrangement of the American Institute of Architects (AIA) MasterSpec® Program has been recognized in the preparation of this guide specification. The preparation of the guide specification assumes the use of standard contract documents and forms, including the "Conditions of the Contract," published by the AIA.

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section covers ThermTek™ Stick Built and Unitized Curtainwall Systems, including perimeter trims, accessories, shims and anchors, and perimeter sealing of curtain wall framing.

B. Types of ThermTek™ Aluminum Curtainwall Systems include:

1. ThermTek 25D Double Glazed Captured Curtainwall Systems:
   a. Sightline: 3″
   b. Outside glazed
   c. System depth: 9 $\frac{3}{4}$″ and 7 $\frac{1}{2}$″

2. ThermTek 25T Triple Glazed Captured Curtainwall Systems:
   a. Sightline: 3″
   b. Outside glazed
   c. System depth: 10 $\frac{1}{2}$″ and 8 $\frac{1}{4}$″

3. ThermTek 25D Double Glazed SSG Curtainwall Systems:
   a. Sightline: 3″
   b. Outside glazed
   c. System depth: 8 $\frac{5}{8}$″ and 6 $\frac{3}{8}$″

4. ThermTek 25T Triple Glazed SSG Curtainwall Systems:
   a. Sightline: 3″
   b. Outside glazed
   c. System depth: 9 $\frac{3}{8}$″ and 7 $\frac{1}{8}$″

C. Related Sections:
   1. 072700: Air Barriers
   2. 079010: Joint Sealants
   3. 084100: Aluminum-Framed Entrances and Storefronts
   4. 089100: Aluminum Windows
   5. 088000: Glazing
   6. 089100: Exterior Sun Control Devices
   7. 089000: Louvers
   8. 074200: Metal Wall Panels

1.3 DEFINITIONS

A. For fenestration industry standard terminology and definitions, refer to the Fenestration & Glazing Industry Alliance (FGIA) Glossary (AAMA AG-13) Glossary (AAMA AG-13)

1.4 PERFORMANCE REQUIREMENTS

A. General Performance:

   1. Product to comply with the specified performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction, as determined by testing of glazed aluminum curtain walls representing those indicated for this project.
   2. Glazed aluminum curtain walls shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
   3. Failure includes any of these events:
      a. Thermal stresses transferring to building structure
      b. Glass breakage
      c. Loosening or weakening of fasteners, attachments, and other components
      d. Failure of operating units

B. Delegated Design:
   1. Design glazed aluminum curtain walls, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Wind Loads:
   1. The curtain wall system shall include anchorage that is capable of withstanding the following wind load design pressures:
      a. Inward: (_____) psf or (_____) Pa
      b. Outward: (_____) psf or (_____) Pa

   2. The design pressures are based on the (_____) Building Code, (_____) Edition.

D. Air Leakage:
   1. The test specimen shall be tested in accordance with ASTM E 283.
   2. Air infiltration rate shall not exceed 0.06 cfm/ft² at a static air pressure differential of 6.24 psf.

E. Water Resistance:
   1. Static:
      a. The test specimen shall be tested in accordance with ASTM E 331.
      b. There shall be no leakage at a minimum static air pressure differential of 15 psf.

   2. Dynamic:
      a. The test specimen shall be tested in accordance with AAMA 501.1.
      b. There shall be no leakage at an air pressure differential of 15 psf.

F. Uniform Load:
   1. A static air design load of (_____) psf shall be applied in the positive and negative direction in accordance with ASTM E 330.
   2. There shall be no deflection in excess of L/175 of the span of any framing member at design load.
   3. 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.

G. Seismic:
   1. When tested to AAMA 501.4, system must meet design displacement.

H. Thermal Transmittance (U-factor), Physical Test:
   1. Thermal transmittance in accordance with ANSI/NFRC 100 Thermal Simulations.
   2. Thermal transmittance in accordance with NFRC 102 Thermal Physical Validation Testing.

I. Solar Heat Gain Coefficient (SHGC):
   1. Solar Heat Gain Coefficient in accordance with ANSI / NFRC 200 Thermal Simulations.

J. Condensation Resistance (CR):
   1. Condensation Resistance in accordance with NFRC 500 Thermal Simulations.

1.5 SUBMITTALS

A. Product Data:
   1. For each type of product indicated, include:
      a. Construction details
      b. Material descriptions
      c. Dimensions of individual components and profiles
      d. Finishes

   2. Recycled Content:
      a. Provide documentation that aluminum has a minimum of 50% mixed pre- and post-consumer recycled content; and rest of the primary aluminum must be from hydroelectric smelter.
      b. Provide a sample document illustrating project-specific information that will be provided after product shipment.

c. After product has shipped, provide project-specific recycled content information:
    1) Indicate recycled content, including the percentage of pre- and post-consumer recycled content per unit of product.

B. Shop Drawings:
1. Plans
2. Elevations
3. Sections
4. Full-size details
5. Attachments to other work

C. Samples for Initial Selection:
1. Provide samples for units with factory-applied color finishes.

D. Samples for Verification:
1. Provide a verification sample for each type of exposed finish required, in manufacturer's standard sizes.

E. Product Test Reports:
1. Provide test reports for glazed aluminum curtain walls.
2. Test reports must be based on evaluation of comprehensive tests performed by a qualified preconstruction testing agency.
3. Test reports must indicate compliance with performance requirements.

F. Fabrication Sample:
1. Provide a fabrication sample of each vertical-to-horizontal intersection of aluminum-framed curtain wall systems, made from 12" (304.8 mm) lengths of full-size components and showing details of the following:
    a. Joinery
    b. Glazing

1.6 QUALITY ASSURANCE

A. Installer Qualifications:
1. Installer must have successfully installed the same or similar systems required for the project and other projects of similar size and scope.

B. Manufacturer Qualifications:
1. Manufacturer must be capable of fabricating glazed aluminum curtain walls that meet or exceed the stated performance requirements.

C. Product Options:
1. Information on drawings and in specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
2. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

D. Mockups:
   1. Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   2. Build mockups for the type(s) of curtain wall elevation(s) indicated, in location(s) shown on drawings.

E. Pre-installation Conference:
   1. Conduct conference at project site to comply with requirements in Project Management and Coordination Section.

1.7 PROJECT CONDITIONS

A. Field Measurements (If Required):
   1. Verify actual locations of structural supports for glazed aluminum curtain walls by field measurements before fabrication.
   2. Indicate measurements on shop drawings.

1.8 WARRANTY

A. Submit manufacturer's standard warranty for owner's acceptance.

B. Warranty Period:(_____) Years.
   1. From Date of Substantial Completion of the project provided however that in no event shall the Limited Warranty begin later than six months from date of shipment by manufacturer.
   2. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product:
   1. ThermTek™ Stick Built and Unitized Curtainwall Systems.

      a. ThermTek 25D Double Glazed Captured Curtainwall Systems:
         1) Sightline: 3″
         2) Outside glazed
         3) System depth: 9 $\frac{3}{4}$″ and 7 $\frac{1}{2}$″

      b. ThermTek 25T Triple Glazed Captured Curtainwall Systems:
         1) Sightline: 3″
         2) Outside glazed
         3) System depth: 10 $\frac{1}{2}$″ and 8 $\frac{1}{4}$″

c. ThermTek 25D Double Glazed SSG Curtainwall Systems:
   1) Sightline: 3”
   2) Outside glazed
   3) System depth: 8 $\frac{5}{8}$” and 6 $\frac{3}{8}$”

d. ThermTek 25T Triple Glazed SSG Curtainwall Systems:
   1) Sightline: 3”
   2) Outside glazed
   3) System depth: 9 $\frac{3}{8}$” and 7 $\frac{1}{8}$”

B. Substitution Acceptance:
   1. Acceptance will be in written form, either as an addendum or modification.
   2. Acceptance will be documented by a formal change order signed by the owner and contractor.

2.2 MATERIALS

A. Aluminum Extrusions:
   1. Alloy and temper recommended by glazed aluminum curtain wall manufacturer for strength corrosion resistance, and application of required finish.
   2. Not less than .060” wall thickness at any location for the main frame.
   3. Complying with ASTM B221: 6063-T6 alloy and temper
   4. Recycled Content:
      a. Shall have a minimum of 50% mixed pre- and post-consumer recycled content.
      b. Indicate recycled content, including the percentage of pre- and post-consumer recycled content per unit of product.

B. Fasteners:
   1. Nonmagnetic stainless steel or other materials must be non-corrosive and compatible with aluminum members, trim hardware, anchors, and other components.

C. Anchors, Clips and Accessories:
   1. Aluminum, nonmagnetic stainless steel, or shop primed steel or iron.
   2. Anchors, clips and accessories shall provide sufficient strength to withstand the design pressure indicated.

D. Reinforcing Members:
   1. Reinforcing members must provide sufficient strength to withstand the design pressure indicated.

E. Sealant:
   1. For sealants required within fabricated curtainwall system, provide silicone type recommended by sealant manufacturer for joint size and movement.

F. Thermal Barrier:
   1. Thermal separator shall be extruded of polyamide separation and shall be tested in accordance with AAMA.

G. Tolerances:
   1. References to tolerances for wall thickness and other cross-sectional dimensions of glazed curtain wall members.

2.3 CURTAIN WALL FRAMING

A. Framing Members:
   1. Manufacturer's standard extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
   2. Glazing System: Four-sided captured, vertical structural silicone glazed (SSG).
   3. Glazing Plane: Front

B. Glass:
   1. Insulating glass options:

      a. Double Glazed 1" to 1 $\frac{5}{16}$"

      b. Triple Glazed 1 $\frac{3}{4}$" to 2 $\frac{1}{16}$"

C. Brackets and Reinforcements:
   1. Manufacturer's standard high-strength aluminum or plastic shims for aligning system components.

D. Framing Sealants:
   1. Shall be suitable for glazed aluminum curtain wall as recommended by sealant manufacturer.

E. Fasteners and Accessories:
   1. Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories must be compatible with adjacent materials.

F. Perimeter Anchors:
   1. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

G. Packing, Shipping, Handling, and Unloading:
   1. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

H. Storage and Protection:
   1. Store materials so that they are protected from exposure to harmful weather conditions.
   2. Handle material and components to avoid damage.
   3. Protect material against damage from elements, construction activities, and other hazards before, during, and after installation.

2.4 GLAZING

A. Glazing to meet requirements in Division 08 Glazing Section.

B. Available Glazing Options:
   1. Outside glazed captured and SSG:
      a. Double Glazed 1″ to 1 $\frac{5}{16}$″
      b. Triple Glazed 1 $\frac{3}{4}$″ to 2 $\frac{1}{16}$″

C. Glazing Gaskets:
   1. Gaskets to meet requirements of ASTM C864.

D. Setting Blocks:
   1. Manufacturer's Standard Silicone.

E. Bond-Breaker Tape:
   1. Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

F. Glazing Sealants:
   1. As recommended by manufacturer for joint type.

2.5 OPERABLE UNITS

A. Doors comply with Division 08 Aluminum-Framed Entrances and Storefronts Section.

B. Windows comply with Division 08 Aluminum Windows Section.

2.6 ACCESSORY MATERIALS

A. Bituminous Paint:
   1. Cold-applied asphalt-mastic paint

2.7 FABRICATION

A. Extrude or form aluminum shapes before finishing.

B. Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations
   2. Accurately fitted joints
   3. Physical and thermal isolation of glazing from framing members
   4. Accommodations for thermal and mechanical movements of glazing and framing that maintain required glazing edge clearances
   5. Provisions for field replacement of glazing from exterior
   6. Fasteners, anchors, and connection devices that are concealed from view to the greatest extent possible

7. Internal weeping system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.

C. Curtain Wall Framing:
   1. Fabricate components for assembly using screw spline system following manufacturer's standard installation instructions.

D. After fabrication, clearly mark components to identify their locations in project according to shop drawings.

2.8 ALUMINUM FINISHES

A. Finish designations that are prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Factory Finishing:
   1. Permanodic® AA-M10C21A44, AAMA 611, Architectural Class I Color Anodic Coating (Color_____)
   2. Permanodic® AA-M10C21A41, AAMA 611, Architectural Class I Clear Anodic Coating (Color#14 Clear) (Optional)
   3. Permanodic® AA-M10C21A31, AAMA 611, Architectural Class II Clear Anodic Coating (Color#17 Clear) (Standard)
   4. Permafluor™ (70% PVDF), AAMA 2605, Fluoropolymer Coating (Color_____)

PART 3 EXECUTION

3.1 EXAMINATION

A. With installer present, examine areas for compliance with requirements for installation tolerances and other conditions affecting performance of the work.

B. Proceed with installation only after correcting unsatisfactory conditions.

3.2 INSTALLATION

A. Curtain Wall System Installation:
   1. Install curtain wall systems plumb, level, and true to line, without warp or rack of frames, within manufacturer's prescribed tolerances, and complying with installation instructions.
   2. Provide support and anchor in place.
   3. Dissimilar Materials:
      a. Provide separation of aluminum materials from sources of corrosion or electrolytic action contact points.

4. Glazing:
    a. Glass shall be outside glazed.
    b. Glass shall be held in place with pressure plates anchored to the mullion.
    c. Glass shall be held in place by structural silicone.

B. Related Products Installation:
1. Sealants (Perimeter):
    a. Refer to Joint Treatment (Sealants) Section.
2. Glass:
    a. Refer to Glass and Glazing Section.
    b. Reference: ANSI Z97.1, CPSC 16 CFR 1201, and GANA Glazing Manual.

3.3 FIELD QUALITY CONTROL

A. Field Tests:
1. Architect shall select curtain wall units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter-caulked, and cured.
2. Conduct tests for air infiltration and water penetration with manufacturer's representative present.
3. Tests that do not meet the specified performance requirements and units that have deficiencies shall be corrected.
4. Testing shall be performed per AAMA 503 by a qualified independent testing agency. Refer to Testing Section.
5. Air Infiltration Tests:
    a. Conduct tests in accordance with ASTM E 783.
    b. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft², whichever is greater.
6. Water Infiltration Tests:
    a. Conduct tests in accordance with ASTM E 1105.
    b. 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 8 psf (383 Pa).

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Adjusting: Not Applicable.

B. Protection:
1. Protect installed product's finish surfaces from damage during construction.
2. Protect aluminum curtain wall system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.

C. Cleaning:
   1. Repair or replace damaged installed products.
   2. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.
   3. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during the construction period.
   4. Remove construction debris from project site and legally dispose of debris.

END OF SECTION 089000