SECTION 08521 - ALUMINUM WINDOWS

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes Aluminum-Framed Fixed Windows.

B. Related Sections include the following:

1. Division-08, Section 08411-"Aluminum-Framed Entrances and Storefronts."
2. Division-08, Section 08800-"Glazing".

1.3 DEFINITIONS

A. Performance grade number, included as part of AAMA/NWWDA product designation code, is actual design pressure in pounds-force-per-square-foot (pascals) used to determine structural test pressure and water test pressure.

B. Structural test pressure, for uniform load structural test, is equivalent to 150 percent of design pressure.

C. Minimum test size is smallest size permitted for performance class (gateway test size). Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of aluminum window indicated.

1. Submit copy of current Miami-Dade County Department of Product Approval – "Notice of Acceptance".

B. Product Data and Manufacturer's Published Installation Instructions, data on finishes, hardware, accessories, recommendations for maintenance and cleaning of exterior surfaces and re-glazing instructions.

1. Submit copy of current Miami-Dade County Product Approval "Notice-of-Acceptance".

C. Shop Drawings: Submit Shop Drawings showing floor plans, elevations, sections, full-size details with dimensions and sizes of all framing members. Details to include, but are not limited to, construction of adjacent Work, air and vapor seal with adjacent construction, component anchorage and locations, anchor methods, shim methods and materials, hardware, and installation details. Shop Drawings shall be signed and sealed by a Florida-Licensed Professional Engineer. All dimensions shall be field-verified prior to fabrication of Window Units.

D. Structural Calculations: Shall be prepared by a Florida-Licensed Professional Engineer and shall include:

1. Conformance with ASCE 7-95 or wind-load analysis.
2. Section properties of framing members.
3. Analysis for framing members.
4. Fastener and Anchor Analysis.
5. Analysis of glass thickness.
6. Analysis of stress in structural silicone.

E. Samples for Verification: For Aluminum Window components required submit Manufacturer's standard to illustrate window construction, glass, glazing, and color. Architect reserves right to require additional samples which show fabrication techniques, workmanship, and design of hardware and accessories.

E. Qualification Data: For Installer and Testing Agency.

F. Field Quality-Control Test Reports: From a qualified testing and inspecting agency engaged by Contractor.

G. Product Test Reports: Based on evaluation of comprehensive tests performed within last four years by a qualified testing agency, for each type, grade, and size of aluminum window. Test results based on use of down-sized test units will not be accepted.

H. Submit Product Approval "Notice of Acceptance" (NOA) prepared by Miami-Dade County Building Code Compliance Office (BCCO), Product Control Division.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An installer acceptable to Aluminum Window Manufacturer for installation of units required for this Project.

B. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, with experience and capability to conduct testing indicated.

C. Product Compliance: Window Units must be in compliance with Florida Building Code, 2001 Edition, Emergency Egress Requirements, State of Florida DEP requirements, and Miami-Dade County Building Code Compliance Protocols PA 201, 202, and 203. All exterior glazing shall be Impact Resistant in compliance with Building Code and shall be designed to withstand design wind loads indicated in Wind Load Study approved for use for this Project as prepared by Florida-Licensed Professional Engineer.

D. Fabricate and install Windows and Frames in accordance with the following:
   1. AAMA 101.
   2. AAMA / NWWDA 101-97 – Voluntary Specifications for Aluminum Windows and Sliding Glass Doors.
   3. AAMA 2605-98 – Voluntary Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum.
   4. ASTM C 1036-01 – Standard Specification for Flat Glass.
   5. ASTM C 1048-04 Standard Specification for Heat-Treated Flat Glass.

E. Source Limitations: Obtain aluminum windows through one source from a single manufacturer.

F. Product Options: Information on Drawings and in Specifications establishes requirements for aluminum windows' aesthetic effects and performance characteristics. 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. Performance characteristics are indicated by criteria subject to verification by one or more methods including pre-construction testing, field testing, and in-service performance.

G. Window Description: Drawings indicate size, profiles, and dimensional requirements of Aluminum Windows and are based on specific system indicated. Refer to Division 1 Section "Product Requirements."

H. Compliance with Wind and Load Requirements: Window members shall be designed and sized to withstand dead loads caused by pressure and suction of wind and shall comply with structural performance, air infiltration, and water penetration requirements per Florida Building Code, 2001 Edition, and Miami-Dade County Product Approval requirements.

I. Fenestration Standard: Comply with AAMA/NWWDA 101/I.S.2, "Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors," for minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

J. Glazing Publications: Comply with published recommendations of glass manufacturers and GANA's "Glazing Manual" unless more stringent requirements are indicated.

K. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.

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

1.6 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of Contract Documents, and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents, including, but not limited to, requirements of State of Florida Statute Article 718-203.

B. Submit written agreement for Aluminum Windows on Manufacturer's Standard Form, signed by Manufacturer, Installer, and Contractor, agreeing to repair or replace defective parts and components that do not comply with referenced Quality Standards.

1. Warranty Period: To be determined under Contract in accordance with State of Florida Statute Article 718-203 from Date of Substantial Completion.

C. Warranty Period: Three (3) years from Date of Substantial Completion.

D. Warranty Period for Metal Finishes: Five (5) years from Date of Substantial Completion.

E. Warranty Period for Glass: Five (5) years from Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into Work include, but are not limited to, the following:

1. Fixed Windows

a.	Arch Armalite	(800) 432-8132	www.archarmalite.com.
b.	CGI Windows	(800) 442-9042	www.cgiwindows.com.
c.	Kawneer.	(770) 449-5555	www.kawneer.com.
d.	RC Aluminum Industries, Inc.	(305) 592-1515	www.rcalum.com.
e.	Sun Metals Systems	(212) 584-9706	www.sunmetalssystems.com.
f.	TRACO	(800) 637-7002	www.traco.com.

B. Substitutions:

1. One (1) substitute Manufacturer may be submitted on completed "Substitution Request Form" (see Section 01600) for each Product specified in this Section.
2. Architect will consider Substitutions for Brand Name Products Specified provided Products proposed are in compliance with the Requirements of Specifications and are equal to or better than approved Product.
3. Architect reserves right to reject any Product which, in his opinion, will not produce quality of Work specified herein.

2.2 FRAME AND WINDOW UNIT MATERIALS, GENERAL

A. Extruded Aluminum: Shall comply with ASTM B221-02 and shall be Aluminum 6063 alloy, T-5 temper.

B. Extruded Aluminum Sills: Shall be sloped for positive wash, shall be one-piece-full-width of opening, shall have jamb angles to terminate sill length, and shall have underside of sill coated with bituminous paint.

C. Weather-Stripping: Shall be double weather-stripping of water-resistant polypropylene pile and virgin PVC vinyl in strict accordance with Miami-Dade County Product Approval.

D. Sealant and Backing Materials: Shall be as specified in Section 07920.

E. Bituminous Paint: Shall be cold-applied asphalt-mastic complying with SSPC-Paint 12 (containing no asbestos fibers) or cold-applied asphalt-emulsion complying with ASTM D 1187-97(02). Approved Paint, **"Karnak 118 Black Asphaltum"** as manufactured by Karnak Corp. (800) 526-4236; www.karnak.com, or approved equal.

F. Fasteners: Shall be stainless-steel, AISI Type 302 (18-8), with annealed tensile strength of 80,000 psi minimum. Plated or coated materials shall not be permitted.

1. Anchorage of Frames at Jambs, Heads, Sills, and Mullions: Shall comply with local building department requirements and shall have Drawings prepared by a Florida-Licensed Professional Engineer.

G. Anchors, Clips, and Accessories: Provide anchors, clips, and Aluminum-Framed Window accessories of nonmagnetic stainless-steel, AISI Type 302, of strength to withstand design pressure indicated.

H. Shims: Shall be metal or plastic only.

2.3 GLASS AND GLAZING MATERIALS

A. Glass: Glass shall be as specified in Section 08800–"Glazing" and shall comply with applicable requirements of ASTM C 1036-01 and ASTM C 1048-04 and having maximum transmissivity allowed by Miami-Dade County Ordinances. Glass shall be set in continuous black flexible-vinyl channels to permit glazing without the need for bedding-compound when assembled by Contractor and to facilitate field-replacement when necessary.

B. Laminated 9/16-Inch-Thick Impact Glass: Shall be installed per 2001 Florida Building Code, Section 1626.2 and Section 1626.3, as follows:

1. Large Missile Impact (LMI): Shall be installed to up-to and including 30-feet in height .
2. Small Missile Impact (SMI): Shall be installed above 30-feet in height.

2.4 FABRICATION

A. General: Fabricate aluminum windows, in sizes indicated, that comply with AAMA/NWWDA 101/I.S.2 for performance class and performance grade indicated. Include a complete system for assembling components and anchoring windows.

B. Fabricate Aluminum Window frames and mullions with reinforced corners and joints. Frame shall have internal reinforcement as required for structural rigidity. Members shall be designed and sized to withstand dead-loads caused by pressure and suction of wind.

C. Internal drainage weep-holes and channels shall be designed to migrate moisture to exterior of Window Unit and Sill.

D. Window Flange: Shall be minimum-3/4-inch-thick.

E. Bituminous Paint: Shall be applied to all concealed metal surfaces which are in contact with cementitious surfaces or with dissimilar metals.

2.5 FINISHES

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

B. Finish designations prefixed by AA comply with system established by Aluminum Association for designating aluminum finishes.

C. Exterior and Interior Aluminum Finish: Electrostatically applied thermoplastic flouropolymer polyvinylidene fluoride (PVDF) resin-containing powder-coating with inhibitive-flash-primer over chromate-conversion-coating. Resin for resin-based powder or liquid Coating shall be **"Kynar 500"** resin as manufactured by Arkema or **"Hylar 5000"** as manufactured by Solvay Solexis. Finish shall meet or exceed AAMA 2605-98 Standards. (Reference: See Section 05080 –"Factory-Applied Metal Coatings").

1. Fluoropolymer (PVDF) Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive-primer and fluoropolymer-color-topcoat containing not less than seventy-percent (70%) polyvinylidene fluoride (PVDF) resin- by-weight, complying with AAMA 2605.
2. Color: Shall be as selected by Architect/Owner from color-samples submitted for approval by Coating Manufacturer.
3. Selected color shall be tested and Certified by Sliding Glass Door Manufacturer to comply with AAMA 2605-98.

D. Finish Samples: Shall be supplied to Sealant Contractor for required adhesion testing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances; rough opening dimensions; levelness of sill plate; coordination with wall flashings, vapor retarders, and other built-in components; operational clearances; and other conditions affecting performance of work.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
2. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.

B. Verify that rough openings are correctly sized and located. Openings, substrates, structural support, anchorage, and conditions with Installer present shall be examined for compliance with requirements for installation tolerances, rough-opening dimensions, levelness of sill-plate,

coordination with wall flashings, vapor retarders and other built-in components, operational clearances, and other conditions affecting performance of Work.

1. Should conditions require, Contractor shall submit a written report to Architect/Owner detailing conditions which may adversely affect Installation

C. Prepare opening to permit correct installation of frame and achievement of continuity of air and vapor-barrier seal.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Comply with Manufacturer's Written Instructions for installing windows, hardware, accessories, and other components, Drawings, Shop Drawings, Install in compliance with ASTM E 2112-01 (Standard Practice for Installation of Exterior Windows, Doors, and Skylights), and as specified.

B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

C. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.

D. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to exterior.

E. Metal Protection: Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified in "Dissimilar Materials" Paragraph in Appendix B in AAMA/NWWDA 101/I.S.2.

F. Install glass in accordance with Section 08810.

G. Install perimeter type sealant, backing materials, and installation requirement in accordance with Section 07920.

H. Coat bottom of Window Sills with paint-compatible-sealant specified in Section 07920.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner shall 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 windows shall take place as follows:

1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 502, Test Method A, by applying same test pressures required to determine compliance with AAMA/NWWDA 101/I.S.2 in Part 1 "Performance Requirements" Article.

2. Testing Extent: Three (3) windows as selected by Architect and a qualified Independent Testing and Inspecting Agency. Windows shall be tested immediately after installation.
3. Test Reports: Shall be prepared according to AAMA 502.

C. Architect shall select locations to be tested for conformance with specified water-resistance requirements in accordance with ASTM E 1105-00. Tests shall be conducted at an air pressure differential of fifteen-percent (15%) of highest possible design pressure. There shall be no water leakage. Cost for initial test shall be paid for by Owner. All unsuccessful tests, both original and retests, shall be paid for by Contractor. Testing shall continue at Contractor's expense until three (3) consecutive tests have been performed and approved.

D. Remove and replace windows where test results indicate that windows do not comply with specified requirements.

3.4 ADJUSTING

A. Clean aluminum surfaces promptly after installing windows. Avoid damaging protective coatings and finishes. Remove excess glazing and sealing compounds, dirt, and other substances.

B. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged during construction period including natural causes, accidents, and/or vandalism.

3.5 PROTECTION AND CLEANING

A. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to Manufacturer's Written Recommendations.

B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

C. Clean factory-glazed glass immediately after installing windows. Comply with Manufacturer's Written Recommendations for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.

D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

E. Institute and maintain protective measures and other precautions required through remainder of construction period to ensure that, except for normal weathering, windows will be without damage or deterioration at the time of Substantial Completion.

END OF SECTION 08521