Part 1 General

1.01 SUMMARY

 Provide all labor, material, and equipment necessary to furnish and install aluminum windows as shown on drawings and specifications herein. Window shapes and accessories as specified and detailed shall establish the type of units and materials to be used to provide the functional performance and aesthetic requirements desired. Details indicate the required depth and profile.

1.02 RELATED REQUIREMENTS

Section 01600 – Product Requirements

Section 07900 – Joint Sealers

Section 08800 – Glass and Glazing

1.03 REFERENCE STANDARDS.

1. AAMA-WDMA/CSA 101/I.S.2/A440-17 “North American Fenestration Standard/Specification for Windows, Doors and Skylights”
2. AAMA 501.5-07 “Test Method for Thermal Cycling of Exterior Walls”
3. AAMA 502 "Voluntary Specification for Field Testing of Newly Installed Fenestration Products"
4. AAMA 611-98 "Voluntary Specification for Anodized Architectural Aluminum"
5. AAMA 701/702 "Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals”
6. AAMA 910-10 “Voluntary ‘Life Cycle’ Specification and Test Methods for AW Class Architectural Windows and Doors”
7. AAMA 1503-09 “Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections”
8. AAMA 2603 “Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels”
9. AAMA 2604 “Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels”
10. AAMA 2605 “Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels”
11. ANSI Z97.1-2004 “Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test”
12. ASTM B221-14 “Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes”
13. ASTM E90-09 “Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements”
14. ASTM E283-12 "Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen"
15. ASTM E330M-14 "Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference"
16. ASTM E331-09 “Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen”
17. ASTM E413-10 “Classification for Rating Sound Insulation”
18. ASTM E547-09 "Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference"
19. ASTM E966-10e1 “Standard Guide for Field Measurements of Airborne Sound Insulation of Building Facades and Facade Elements”
20. ASTM E987-09 “Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference”
21. ASTM E987-09 “Test Method for Deglazing Force of Fenestration Products”
22. ASTM E1332-10a “Standard Classification for Rating Outdoor-Indoor Sound Attenuation”
23. ASTM E2235-04 (2012) “Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods”
24. ASTM F588-14 “Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact”
25. NFRC 100-2014 “Procedure for Determining Fenestration Product U-Factors”
26. NFRC 200-2014 “Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence”
27. NFRC 303-2014 “Procedure for Constructing a Laminate in Optics”
28. NFRC 500-2014 “Procedure for Determining Fenestration Product Condensation Resistance Values”

1.04 PERFORMANCE REQUIREMENTS

1. All fixed windows will consist of glass fixed into the frame unit.
2. Except as otherwise indicated, provide window units complying with requirements of AAMA Classification "AW" Performance Grade windows. Windows for this project will be rated at a minimum of AW100 for full size test units per AAMA/WDMA/CSA 101/I.S.2/A440-17 to withstand a design pressure of 100 ­­­­psf minimum.
3. Uniform Load Deflection Test
4. With the frame in a fixed position, test in accordance with ASTM E330M-14 with a static air pressure difference of 100 pounds per square foot, pressure to be applied both positively and negatively.
5. Static air pressure difference shall be 1.5 times the design pressure used in 1.03 A (1.5 is the factor used to provide a margin of safety in aluminum windows and is the minimum recommended by the AAMA).
6. The window shall be evaluated for deflection during each load, for permanent damage after each load and for any effects on the normal operation of the window. No member of the frame shall exceed L/175 deflection of its span.

 D. Uniform Load Structural Test

1. With the frame in a fixed position, test in accordance with ASTM E330M-14 with a static air pressure difference of 150 pounds per square foot, pressure to be applied both positively and negatively.
2. Static air pressure difference shall be 1.5 times the design pressure used in 1.03 A (1.5 is the factor used to provide a margin of safety in aluminum windows and is the minimum recommended by the AAMA).
3. At conclusion of test, there shall be no glass breakage; permanent damage to fasteners, hardware parts, nor shall permanent set exceed .2%\*L of the span between anchors.
4. Air Infiltration
5. With the frame/glazing in the fixed position, window shall be tested in accordance with ASTM E283-12 and shall meet the following performance requirements.
6. Air infiltration shall not exceed 0.100 cfm/ft² at 6.27 psf.
7. Water Resistance
8. With the frame/glazing in the fixed position, water shall be applied at a rate not less than 5 gallons/ft²/hour. Window shall be subjected to a pressure drop of 15 psf minimum. Tests shall be conducted in accordance with ASTM E547-09 and ASTM E331-09.
9. Thermal Performance
10. When tested in accordance with NFRC 100-2014 the thermal transmittance due to conduction (Uc) shall not exceed 0.33 on the entire specimen.
11. When tested in accordance with NFRC 500-2014 the Condensation Resistance enumerator (CR) shall not be less than 48 on the entire specimen.
12. When tested in accordance with AAMA 1503-09 the Condensation Resistance Factor enumerator (CRF) shall not be less than 61 on the entire specimen.
13. Forced Entry Resistance
14. When tested in accordance with ASTM F588-14, window shall perform to a minimum Performance Level Grade 10, Assembly Type: D
15. Sound Transmission
16. Windows shall be fully assembled and glazed prior to testing. Acoustic performance based on glass performance alone or theoretical calculations will not be accepted.
17. Testing shall be performed in a NVLAP, IAS, or ILAC Certified Test Laboratory
18. Sound Transmission Class (STC). Window shall be tested in accordance with ASTM E90-09 and perform to a minimum STC 33.
19. Outdoor Indoor Transmission Class (OITC). Window shall be tested in accordance with ASTM E1332-10a and perform to a minimum of OITC 24.
20. See Window and Door schedules for specific acoustic performance requirements.

1.05 QUALITY ASSURANCE

1. All testing shall be performed by an independent architectural testing laboratory accredited by the American Architectural Manufacturers Association (AAMA), the National Voluntary Laboratory Accreditation Program (NVLAP) and the International Conference of Building Officials (ICBO) and such other accreditation as may be required by state of local building regulations.
2. The manufacturer shall provide the architect and owner a notarized affidavit of compliance certifying that the windows furnished for this project are identical in every aspect of design, component parts (including sealants and the application thereof, reinforcing members, etc.) and fabrication techniques as the windows tested in the laboratory for which test reports have been furnished.

1.06 SUBMITTALS

1. Window manufacturer shall supply product data for each type of window required, including:
2. Construction details and fabrication methods.
3. Data on hardware and accessories.
4. Recommendations for maintenance and cleaning of exterior surfaces.
5. Before proceeding with the manufacturer of windows, the window contractor shall submit complete shop drawings with installation details for the Architect’s approval. These drawings shall also show window elevations, details of all window sections, bill of materials, details of anchorage, and associated hardware.
6. Window manufacturer shall submit three [3] samples of finish.
7. Window manufacturer shall submit a copy of the product warranty to be applied to this project.

1.07 WARRANTY

1. The manufacturer shall warrant the product against material defects or defects in manufacturing. If a defect is discovered and brought to the attention of the Manufacturer, the defect will be corrected at no cost to the owner. Warranty shall not be pro-rated. Warranties requiring the owner to return windows to the factory for repair or replacement shall not be accepted.
2. Windows: warrant for Ten [10] years against defects in material or workmanship under normal use.
3. Insulating glass units: warrant seal for Ten [10] years against visual obstruction from film formation or moisture collection between internal glass surfaces, excluding that caused by glass breakage or abuse.
4. Finish: warranty supplied by finish manufacturer. (Select warranty to match finish selection in §2.04, then delete others including this note)

 Organic finish conforming to AAMA 2605-05: warrant for Ten [10] years against chipping, peeling, cracking, chalking, or fading.

 Organic finish conforming to AAMA 2604-05: warrant for Five [5] years against chipping, peeling, cracking, chalking, or fading.

 Organic finish conforming to AAMA 2603-02: warrant for One [1] years against chipping, peeling, or cracking.

Part 2 Products

2.01 MANUFACTURER

1. Basis of Design: SCW3060 – Narrow Fixed Window as manufactured by St. Cloud Window, Inc. 390 Industrial Blvd**.**, Sauk Rapids, MN 56379, Phone: 800-383-9311, Fax: 320-255-1513, www.stcloudwindow.com
2. No substitutions without prior approval will be accepted.
3. Terminology used herein may include reference to that manufacturer’s proprietary products. Such references shall be construed only for the purpose of establishing the quality of materials and workmanship to be applied under this section and shall not be construed as limiting competition.
4. Requests for substitutions of products or manufacturers other than the Base Bid must be submitted to the Architect Ten [10] business days prior to the bid date. Requests for substitutions must demonstrate that the product seeking approval meets or exceeds the design and performance specifications of the Base Bid. Products not pre-approved by the Architect in writing via addendum will not be accepted. Substitutions must comply with the requirements of section 01600 – Product Requirements.

2.02 MATERIALS

1. Aluminum Extrusions for all framing and sash members
2. Shall be extruded aluminum alloy 6063-T6 per ASTM B221-14.
3. All primary frame members shall have a nominal extrusion wall thickness of minimum 0.08’’.
4. Sill frame shall consist of thermally broken, extruded aluminum, including a metal hooded weep cover with mylar flap.
5. Thermal Barrier
6. Provide continuous extruded high-performance nylon 6/6 polyamide with multi- directional 25% glass fiber reinforcing as manufactured by Technoform or equal. All polyamide material must be from a minimum of 90% virgin components, with a maximum 10% pre-consumer regrind. Aluminum components shall be mechanically crimped into cross knurled cavities and obtain a minimum composite shear value of 800 pounds for a 4” section. Roll-in PVC, slide-in thermal breaks and pour and de-bridge urethane thermal breaks will not be acceptable.
7. Glazing
8. All glazing shall comply with the performance requirements outlined in Section 08800 – Glass and Glazing, referenced in 1.02.
9. All windows to be fully factory glazed with ½’’ - 1⅞’’ overall insulated glass.
10. All glass shall be glazed with removable stops and shall be replaceable without dismantling the frame members.
11. A continuous EPDM gasket will be used on the exterior glazing stop and a continuous silicone toe-bead around the glass edge to prevent moisture from intruding into the window system. A continuous EPDM rubberized wedge is to be used on the interior glazing stops.
12. Nominal glass thickness and type shall be:
13. Exterior Glass Lite
14. Thickness: 1/4" (5/16’’) (3/8’’) (7/16’’) (1/2’’)

1. Tint: clear (bronze) (gray) (green) (blue)
2. Type: annealed (tempered) (laminated)
3. Coating: low E on #2 surface (none)
4. Air Space
5. 1/2” (9/16”) (5/8”) (11/16”) (3/4”) (13/16”) Air Filled (90% Argon Filled)
6. Interior Glass Lite
7. Thickness: 1/4" (5/16’’) (3/8’’) (7/16’’) (1/2’’)
8. Tint: clear (bronze) (gray) (green) (blue)
9. Type: annealed (tempered) (laminated)
10. Coating: low E on (#3 surface) (#4 surface) (none)
11. Glazing for access/acoustic panel for enhanced performance
12. Thickness: 1/4" (5/16’’) (3/8’’) (7/16’’) (1/2’’)

1. Tint: clear (bronze) (gray) (green) (blue)
2. Type: annealed (tempered) (laminated)

2.03 FABRICATION

1. Window shall consist of glass installed in one frame. All joints of the frame shall be securely joined by structural corner keys, threaded screws installed into the aluminum extruded screw ports, and sealed with Dow 100% Silicone. All sharp corners of the frame shall be deburred. Window unit is to be constructed in a manner that will facilitate the replacement of worn or damaged parts, hardware, or weather-strip.

2.04 FINISH

1. Interior: *(Choose only one of the following and delete all remaining verbiage including this note)*

Anodized Finish: Class II (etched and anodized to 0.4 mil), conforming to AAMA 611-98

Color to be: Clear

Anodized Finish: Class I (etched and anodized to 0.7 mil), conforming to AAMA 611-98

Color to be: Clear, Black, Dark Bronze, Med. Bronze, Lt. Bronze, Champagne

PVDF Organic Coatings: Finish shall be 70% fluoropolymer (PVDF) organic coating in a color selected by Architect. Applied coatings shall meet or exceed AAMA 2605-05, including 10 years Florida exposure and 4000 hours humidity tests.

Color to be:

PVDF Organic Coatings: Finish shall be 50% fluoropolymer (PVDF) organic coating in a color selected by Architect. Applied coatings shall meet or exceed AAMA 2604 -05, including 5 years Florida exposure and 3000 hours humidity tests.

Color to be:

Pigmented Organic Coatings: Finish shall be Baked Enamel organic coating in a color selected by Architect. Applied coatings shall meet or exceed AAMA 2603 -02, including 1 year Florida exposure and 1500 hours humidity tests.

 Color to be:

1. Exterior:*(Choose only one of the following and delete all remaining verbiage including this note)*

Anodized Finish: Class II (etched and anodized to 0.4 mil), conforming to AAMA 611-98

Color to be: Clear

Anodized Finish: Class I (etched and anodized to 0.7 mil), conforming to AAMA 611-98

Color to be: Clear, Black, Dark Bronze, Med. Bronze, Lt. Bronze, Champagne

PVDF Organic Coatings: Finish shall be 70% fluoropolymer (PVDF) organic coating in a color selected by Architect. Applied coatings shall meet or exceed AAMA 2605-05, including 10 years Florida exposure and 4000 hours humidity tests.

Color to be:

Fluoride PVDF Organic Coatings: Finish shall be 50% fluoropolymer (PVDF) organic coating in a color selected by Architect. Applied coatings shall meet or exceed AAMA 2604 -05, including 5 years Florida exposure and 3000 hours humidity tests.

Color to be:

Pigmented Organic Coatings: Finish shall be Baked Enamel organic coating in a color selected by Architect. Applied coatings shall meet or exceed AAMA 2603 -02, including 1 year Florida exposure and 1500 hours humidity tests.

 Color to be:

Part 3 Erection

3.01 INSTALLATION

1. All window and related window components shall be installed in accordance with local or international building codes, requirements of the owner, and the approved shop drawings of the manufacturer. Installation shall be by a contractor who is experienced and who shall document at least one or more projects of similar nature and scope for which the window products were successfully installed.
2. All materials shall be erected plumb, level, and true, relative to the building structure. The maximum variation from plumb and level shall not exceed 1/8” (plus or minus) over ten feet.
3. Approved low expansion spray foam shall be installed in the frame cavity between the window frame and the substrate. The window installer shall use caution in the insulation process to avoid overfilling the window cavity causing distortion to the window frame, excess foam contacting exposed surfaces, and underfilling leaving voids causing convection issues.

3.02 CAULKING

1. A grade “A” type neutral cure, liquid Dow or equal or compatible approved sealant compound as approved by the Architect, shall be applied per the installation drawings and details at all points where the aluminum master frame and/or panning intersects the masonry or other exterior wall finish. The caulking shall be applied in a manner which ensures a continuous air and water-tight perimeter seal. Color to match the color of the aluminum windows unless specified otherwise by the Architect.

3.03 FIELD TESTING

1. Air and Water
2. On-site testing shall be conducted at owner’s discretion and expense. Up to three test specimens shall be selected by owner or architect.
3. On-site testing shall be conducted for Air Infiltration and Water Leakage as specified in section 1.04 – D and E, by an AAMA-certified architectural testing company in accordance with AAMA 502, Method A or B.

3. If a test specimen shall fail any aspect of the field test a forensic analysis shall be performed in accordance with AAMA 511. At architect’s discretion up to three (3) additional windows may be tested. If subsequent repairs are necessary due to a systemic defect, the window manufacturer/contractor shall bear expenses to repair all windows.

1. Acoustic
2. On-site testing shall be conducted at owner’s discretion and expense. An isolated window unit shall be selected by the owner or architect.
3. On-site testing shall be conducted for Field Measurements of Airborne Sound Attenuation of Building Facades and Façade Elements as specified in section 1.04 – H-3 and H4, by an AAMA-certified acoustic testing company in accordance with ASTME966-18a.

3.04 ADJUSTMENTS, PROTECTION, AND CLEANING

1. After installation, the erector shall remove all excess sealants, caulking, spray foam and other misplaced materials from all surfaces, including adjacent work. The window frame and glass shall be cleaned thoroughly with materials and methods recommended by the window and glass manufacturers and shall not cause any defacement of the work.
2. Installer shall make any and all adjustments to window, installation, and/or seals to function properly and in accordance with the manufacturer’s standards.
3. Protection of glass and window materials: Protect from contact with contaminating substances resulting from construction operations. After installation and cleaning of windows by window contractor, the general contractor shall be responsible for maintaining the cleanliness and protection of the window from damage from other trades.

1. The general contractor shall be responsible for the protection of the work from damage by other trades.