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 E547-00(2016) "Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Differential"
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 E2068-08 “Test Method for Determination of Operating Force of Sliding Windows and Doors”
24. ASTM E2235-04 (2012) “Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods”
25. ASTM F588-14 “Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact”
26. NFRC 100-2014 “Procedure for Determining Fenestration Product U-Factors”
27. NFRC 200-2014 “Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence”
28. NFRC 303-2014 “Procedure for Constructing a Laminate in Optics”
29. NFRC 500-2014 “Procedure for Determining Fenestration Product Condensation Resistance Values”

1.04 PERFORMANCE REQUIREMENTS

1. All horizontal sliding windows will operate by single / double sash slide with half or full frame screens. The sash shall be loaded head first into the frame. The sightlines and profiles of the fixed sash and operable sash shall match.
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 AW40 for full size test units per AAMA/WDMA/CSA 101/I.S.2/A440-17 to withstand a design pressure of 40 ­­­­psf minimum.
3. Uniform Load Deflection Test
4. With the sash in a closed position test in accordance with ASTM E330M-14 with a static air pressure difference of 40 pounds per square foot, pressure to be applied both positively and negatively.
5. Uniform Load Structural Test
6. With the sash in a closed position test in accordance with ASTM E330M-14 with a static air pressure difference of 60 pounds per square foot, pressure to be applied both positively and negatively.
7. 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).
8. At conclusion of test, there shall be no glass breakage; permanent damage to fasteners, hardware parts, support arms, or actuating mechanisms, nor any other damage which would cause the window to be inoperable. Permanent deformation of any frame, sash, or ventilator member shall not exceed L/175 of its span.
9. Air Infiltration
10. With the sash in a closed and locked position, window shall be tested in accordance with ASTM E283-12 and shall meet the following performance requirements.
11. Air infiltration shall not exceed 0.3 cfm/ft² at 6.24 psf.
12. Water Resistance
13. With the sash in the closed and locked position, the window shall be subjected to a pressure drop of 8 psf minimum 12 psf maximum. All tests shall be performed with and without the screen. Tests shall be conducted in accordance with ASTM E547-00 (2016).
14. Thermal Performance
15. When tested in accordance with NFRC 100-2014 the thermal transmittance due to conduction (Uc) shall not exceed 0.60 on the entire specimen.
16. When tested in accordance with NFRC 500-2014 the Condensation Resistance enumerator (CR) shall not be less than 44 on the entire specimen.
17. When tested in accordance with AAMA 1503-09 the Condensation Resistance Factor enumerator (CRF) shall not be less than 59 on the entire specimen.
18. Forced Entry Resistance
19. When tested in accordance with ASTM F588-14, window shall perform to a minimum Performance Level 10.
20. Sound Transmission
21. Sound Transmission Class (STC). When tested in accordance with ASTM E90-09, window shall perform to a minimum STC-32 and a maximum STC-41. Testing shall be performed in a NVLAP Certified Test Laboratory.
22. Outdoor Indoor Transmission Class (OITC). When tested in accordance with ASTM E1332-10a, door shall perform to a minimum of OITC-25 and a maximum of OITC-35. Testing shall be performed in a NVLAP Certified Test Laboratory.

1.05 QUALITY ASSURANCE

1. All testing shall be performed by an independent architectural testing laboratory accredited by the American Architectural Manufactures 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.

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 manufacture 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: SCW4040 – Horizontal Sliding 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
2. Shall be extruded aluminum alloy 6063-T6 per ASTM B221-14.
3. All primary sash and frame members shall have a nominal extrusion wall thickness of minimum 0.10’’.
4. Sill frame shall consist of thermally-broken, extruded aluminum, including a baffled weep system to drain precipitation with an aluminum weep cover and flap.
5. Insect Screen
6. All screen frames to be tubular extruded aluminum, finished with screen mesh, securely held in place by means of reusable foam spline. Roll-formed screen frames shall not be accepted.
7. Provide screens on operating vents as indicated on the architectural plans.
8. Mesh to be: Fiberglass (Aluminum) (Stainless Steel) (Copper)
9. Thermal Barrier
10. 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 600 pounds for a 4” section. Rolled in PVC, single directional glass fiber reinforced polyamide and pour and de-bridge Urethane thermal break systems will not be acceptable.
11. Weather-stripping
12. All intersections of sashes to frame shall be double weather-stripped with 100% woven pile and 5-fin conforming to AAMA 701/702. Weather-stripping to be secured within extruded shapes of the aluminum profiles to prevent movement. Surface/adhesive applied weather strip shall not be accepted.
13. Hardware
14. The operable sash rail shall have a spring-loaded, automatic metal lock that engages into the jamb frame to lock sash in a closed position. The lock shall be set at a predetermined height to allow the end user to close and lock the window at their level of comfort.

1. Sash rollers: All operable sashes shall have a minimum of two adjustable rollers. Each roller consists of two polyamide wheels, adjustable housing, operating on stainless steel axle. Rollers, recessed into the bottom sash rail eurogroove, shall be installed by tightening the set screw with an Allen wrench.
2. The optional meeting rail sweep lock shall have a steel-painted sweep lock installed on the operable sash meeting rail. When in the closed position, the lock shall engage into the steel-painted sweep lock keeper installed on the stationary sash meeting rail.
3. Glazing
4. All glazing shall comply with the performance requirements outlined in Section 08800 – Glass and Glazing, referenced in 1.02.
5. All windows to be fully factory glazed with ½’’ – 1-5/16’’ overall insulated glass.
6. All glass shall be glazed with removable stops and shall be replaceable without dismantling the sash or frame members.
7. A continuous polyshim tape will be used on the exterior glazing leg and a continuous silicone cap bead over the polyshim bonding to 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.
8. Nominal glass thickness and type shall be:
9. Exterior Glass Lite
10. 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” Air Filled (90% Argon Filled)
6. Interior Glass Lite
7. Thickness: 1/4" (5/16’’) (3/8’’) (7/16’’) (1/2’’)
8. Tint: clear (pattern #62 obscure)
9. Type: annealed (tempered) (laminated)
10. Coating: low E on (#3 surface) (#4 surface) (none)

2.03 FABRICATION

1. Window shall consist of multiple sash units installed within one frame. The mitered sash units shall be interlocked in the closed position by RPVC, UV-resistant black capstock interlock and two sets of weatherstripping. All joints of the sash, frame, and screen frame shall be securely joined by structural corner keys, threaded screws installed into the aluminum extruded screw ports, and Dow neutral cure sealant. All sharp corners of the sash, frame and screen 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, Change Font Color for entire document to Black)*

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

Polyvinylelidene Fluoride 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:

Polyvinylelidene 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:

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

Polyvinylelidene Fluoride 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:

Polyvinylelidene 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 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 insulation materials shall be installed in the frame cavity on the interior portion of the window frame. Area adjacent to the exterior of the window frame shall remain uninsulated. The window installer shall use caution in the insulation operation to avoid overlapping insulation materials across the thermal-barrier connector thus bridging the two separate frame members.

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 TESTING

1. Laboratory Testing
2. At the discretion of the owner, one or a number of operable sash shall be removed from windows installed on the project and exchanged with the appropriate attic stock. The selected stock shall be tested by a certified testing laboratory to verify that glass, glazing, hardware and finish are in conformance to the project specification. Should any component of the test specimen fail to conform to project specification, action shall be taken by the window manufacture to correct each deficiency for every window on the project at no additional cost to the owner.
3. The owner shall assume the cost of the initial verification testing. However, should product be found to be non-compliant, the manufacture shall reimburse the owner for the cost of the initial test. At the architect’s discretion, subsequent testing may be required and the cost of this test shall be borne by the manufacture. All products meet third party laboratory testing requirements.
4. Field Testing
5. On-site testing shall be conducted at owner’s discretion and expense. Up to three test specimens shall be selected by owner or architect.
6. On-site testing shall be conducted for air infiltration and water leakage as specified in section 1.04 – A and B, by an AAMA-certified architectural testing laboratory in accordance with AAMA 502, Method B.
7. On-site testing shall be conducted for sound transmission as specified in section 1.04 – F and G, by NAVLAP-certified acoustic testing laboratory in accordance with ASTM E966-18a and include flanking test. Using ASTM E413-16 and ASTM E1332-16, respectively, specimens tested in the field shall be within five (5) points of the laboratory STC test results and three (3) points of the laboratory OITC test results furnished with product qualification.
8. If a test specimen shall fail any aspect of the field test, it shall be repaired or replaced and re-tested. At the architect’s direction, up to three (3) additional windows may be tested. Upon completion of re-testing, all window units shall be repaired or replaced in the same manner as the test specimen (s) to assure compliance with project performance specification.
9. The cost of re-testing and all subsequent repairs and other associated expenses shall be borne by the window manufacture and/or window contractor.

3.04 ADJUSTMENTS, PROTECTION, AND CLEANING

1. After installation, the erector shall remove all sealants, caulking and other misplaced materials from all surfaces, including adjacent work. The window frame, sash 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 sash and hardware to cause the operating sash to function properly and in accordance with the manufactures 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.