



SECTION - 08520 (08 51 13)
ALUMINUM WINDOWS - G2 INTERNATIONAL WINDOW SYSTEM

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. G2 International Window System.

1.2 RELATED SECTIONS

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 03 45 13 - Faced Architectural Precast Concrete.
- C. Section 04 27 23 - Cavity Wall Unit Masonry.
- D. Section 05 12 00 - Structural Steel Framing.
- E. Section 05 40 00 - Cold-Formed Metal Framing.
- F. Section 06 10 00 - Rough Carpentry.
- G. Section 06 20 00 - Finish Carpentry.
- H. Section 07 21 19 - Foamed-In-Place Insulation.
- I. Section 07 46 16 - Aluminum Siding.
- J. Section 07 62 00 - Sheet Metal Flashing and Trim.
- K. Section 07 91 23 - Backer Rods.
- L. Section 08 00 00 - Glazing.
- M. Section 08 70 00 - Hardware.

1.3 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 611 - Voluntary specifications for anodized architectural aluminum (revised).
 - 2. AAMA 910 - Life Cycle Testing Specification for Architectural Class Windows and Doors.
- B. American Welding Society (AWS): Structural Welding Code.
- C. ASTM International (ASTM):
 - 1. ASTM A36/36M - Standard Specification for Carbon Structural Steel.

2. ASTM B221/B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wires, Profiles, and Tubes.
 3. ASTM B241/B241M - Standard Specification for aluminum and aluminum-alloy seamless pipe and seamless tubes.
 4. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
 5. ASTM C1115 - Standard Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories.
 6. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 7. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 8. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference.
 9. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
 10. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference.
 11. ASTM E1886 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
 12. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
 13. ASTM E2068 - Standard Test Method for Determination of Operating Force of Sliding Windows and Doors.
 14. ASTM F588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact.
- D. Fenestration and Glazing Industry Alliance (FGIA):
1. AAMA 611 - Voluntary Specifications for Anodized Architectural Aluminum.
- E. Flat Glass Marketing Association (FGMA):
1. Glazing Manual.
- F. National Fenestration Rating Council (NFRC):
1. NFRC 100 - Procedure for Determining Fenestration Product U-factors
 2. NFRC 102 - Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems
 3. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficients and Visible Transmittance at Normal Incidence
 4. NFRC 400 - Procedure for Determining Fenestration Product Air Leakage
 5. NFRC 500 - Procedure for Determining Fenestration Product Condensation Resistance Values
- G. Window and Door Manufacturer's Association (WDMA): AAMA/WDMA/CSA 101/I.S.2/A440 - Windows, Skylights and Glass Doors.
- H. Texas Department of Insurance (TDI): Product Evaluations.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data:
 1. Manufacturer's data sheets on each product to be used.

2. Preparation instructions and recommendations.
 3. Storage and handling requirements and recommendations.
 4. Typical installation methods.
- C. Color Selection Samples: Two complete color chip sets representing manufacturer's full range of stocked colors with a standard size of 2 x 3 inches (50 x 75 mm).
- D. Verification Samples: Two representative units of each type, size, color and finish.
1. Aluminum Finish: Two samples, minimum size of 2 x 3 inches (50 x 75 mm), representing actual material and color.
 2. Wood Finish: Two samples, minimum size of 2 x 5 inches (50 x 127 mm), representing actual product and color.
 3. Glazing: Two samples, minimum size of 12 x 12 inches (300 x 300 mm), representing specified glass, including coatings and frit patterns.
 4. Assembly Sample: One sample demonstrating connection details with a maximum size of 12 x 12 x 12 inches (300 x 300 x 300 mm). Glazing included as offered by glass supplier. Sample developed to best represent the specified product.
- E. Shop Drawings: Detailed drawings prepared specifically for the project by manufacturer. Include information not fully detailed in manufacturer's standard product data, including, but not limited to wall elevations and detail sections of every typical composite member.
1. Show opening dimensions, framed opening tolerances, profiles, product components, anchorages, and accessories.
 2. Include details of materials, construction, finish, fastener locations, glazing, hardware arrangements and relationship with adjacent construction.
 3. Include schedule identifying each unit, with marks or numbers referencing Drawings.
 4. Show surrounding substrates and relevant conditions.
 5. Must be drawn in the domestic USA, by the manufacturer of the system.
- F. Maintenance Manuals: Manufacturer's maintenance manuals.
- G. Warranty: Manufacturer's warranty online registry.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum of twenty-five (25) years' documented experience in fabrication and erection of projects of similar scope.
1. Manufacturer must use an extruded aluminum system comprised of domestically produced aluminum and is fabricated and assembled in the USA.
 2. Manufacturer must be recognized by NAMI.
 3. Manufacturer must be a member in good standing of the National Glass Association (NGA).
- B. Installer Qualifications: Company experienced in performing work of this section that has specialized in installation of work similar in scope and complexity required for this project for a minimum of fifteen (15) years.
- C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.
- D. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
1. Intent of mock-up is to demonstrate surface preparation techniques, quality of workmanship and visual appearance.
 2. Approximate Size: _____.

3. Refinish mock-up area as required to produce acceptable work.
4. Finish areas designated by Architect.
5. Do not continue with remaining work until workmanship, color, and sheen are approved by design team.
6. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
7. Do not alter or remove mock-up until work is completed or removal is authorized.
8. Incorporate accepted mock-up as part of the Work.

1.6 PRE-INSTALLATION CONFERENCE

- A. Convene a conference, by phone, approximately two weeks before scheduled commencement of the Work. Attendees to include Architect, Contractor and trades involved. Agenda to include schedule, responsibilities, critical path items and approvals.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the jobsite freight prepaid.
- B. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
- C. Store products in manufacturer's original unopened packaging, covered to protect factory finishes from damage, precipitation, and construction dirt until ready for installation.
- D. Store materials off construction grounds in a secure location that is a dry, covered area and protected from weather conditions.
- E. Inspect and report any freight damages to the manufacturer immediately.
- F. Protect from damage due to weather, excessive temperature, and construction operations.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
- B. Perform structural silicone sealant work when air temperature is between 40 to 120 degrees F (4 to 29 degrees C).

1.9 WARRANTY

- A. Provide manufacturer's standard limited warranty against defects in materials and workmanship for ten (10) years for cases of normal use.
- B. Frame Finish:
 1. Anodized Finishes: Warranty of ten (10) years.
 2. Stock Color AAMA 2605 Finishes: 2 to 3 coats powder or liquid dependent on color and/or application Ten (10) years from date of application.
 3. Custom Color: Paint manufacturer's warranties for color and film integrity.
 - a. AAMA 2605 finishes with 2 to 3 coats powder or liquid dependent on color and/or application. Ten (10) years from date of application.
 - b. Custom Warranty Period: ____ years, to be approved and accepted in writing by manufacturer based on project's scope and application.
 4. Flat Glazing: Glazing manufacturer's standard warranty against defective materials, delamination, seal failure, and defects in manufacturing for ten (10) years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Solar Innovations Architectural Glazing Systems(r), which is located at: 31 Roberts Rd.; Pine Grove, PA 17963; ASD Toll Free: 800-618-0669; Phone: 570-915-1500; Fax: 800-618-0743; Email: skylight@solarinnovations.com; Web: www.solarinnovations.com.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements and the following criteria.
 - 1. Structural Calculations: For products specified; stamped by a professional engineer licensed in the state in which the Project is located.
- D. Basis of Design: G2 International Window Systems as manufactured by Solar Innovations, Inc.

2.2 PERFORMANCE REQUIREMENTS

- A. Air Leakage Performance:
 - 1. Design, fabricate, assemble, and erect the aluminum glazed system to be permanently free of significant air leakage.
 - 2. Significant leakage to be defined as a differential test pressure amounting to 20 percent of specified strength performance pressure required with operable windows doors, or joints, if any, sealed to prevent crack leakage.
 - a. Significant Leakage: Infiltration greater than 0.30 cfm per sq ft at 1.57 psf per ASTM E283.
- B. Structural Performance: Structural performance as tested in accordance with ASTM E330; with no glass breakage or permanent damage to fasteners, anchors, hardware, or actuating mechanisms.
 - 1. Normal wall deflection not exceeding 1/175 of clear span for span lengths of 162 inches (4115 mm) or less and 1/240 plus 1/4 inch (6 mm) for others. Restrict deflection to 3/4 inch (19 mm) maximum for individual glazing lites.
 - 2. Parallel to wall deflection not exceeding 175 percent of glass edge clearance. Restrict deflection to L/360 or 1/8 inch (3 mm) maximum. Restrict deflection to 1/16 inch (1.6 mm) maximum above doors and/or windows. Increasing the deflection to 1/8 inch (3 mm) to be permitted if the door operation is not affected.
- C. Thermal Performance: Tested values, certifications, and simulation protocols.
 - 1. Thermal Characteristics:
 - a. U-Value: ____.
 - b. SHGC: ____.
 - c. VLT: ____.
 - d. CRF: ____.
 - 2. U-Value: Unit complies with U-value, NFRC rating, or simulation in accordance with NFRC 100 protocol, shown in manufacturer's published data for glazing and sill specified.
 - 3. Solar Heat Gain Coefficient: Unit to comply with the Solar Heat Gain Coefficient NFRC rated, or simulation in accordance with NFRC 200 protocol, shown in manufacturers published data for the glazing and sill specified.
 - 4. Visible Light Transmittance: Unit complies with Visible Light Transmittance, NFRC rating, or simulation in accordance with NFRC 200 protocol, shown in manufacturer's published data for glazing and sill specified.
 - 5. Condensation Resistance Factor: Unit to comply with the Condensation Resistance Factor, NFRC rated, or simulation in accordance with NFRC 500 protocol, shown in manufacturers published data for the glazing and sill specified.

- D. Compliance:
1. SI7000HP Impact G2 International Project-out-at-bottom awning window system when tested on a typical size window frame unit:
 - a. Unit Size (W x H): 48 x 72 inches tall (1219 x 1829 mm).
 - b. Panel size (W x H): 46.188 x 70.125 inches (1173 x 1781 mm).
 - c. Manufacturer's certificates showing door system meets or exceeds AP-CW65 Product Designation conforming to AAMA/WDMA/CSA 101.I.S.2/A440 and/or testing indicated.
 - d. Air Infiltration Test per ASTM E283:
 - 1) Force of less than 0.01 cfm per sq ft (less than 0.05 L per sec per sq m) when tested at 1.57 psf (75 Pa) pressure differential.
 - 2) Force of less than 0.01 cfm per sq ft (less than 0.05 L per sec per sq m) when tested at 6.24 psf (300 Pa) pressure differential.
 - e. Water Penetration Test per ASTM E331/ASTM E547: Water pressure of 12.11 psf (580 Pa) and 5.0 gal per hour per sq ft (3.4 L per min per sq m).
 - f. Uniform Structural Load Test (ASTM E330):
 - 1) Structural test pressure (overload): Positive or negative 97.74 psf (4680 Pa)
 - 2) Design Pressure: Positive or negative 65.16 psf (3120 Pa).
 - g. Operating Force and Force to Latch - Method B per ASTM E2068:
 - 1) Initiate Motion: 14 lbf (62 N).
 - 2) Latches: 13 lbf (58 N).
 - h. Forced Entry Resistance per ASTM F588:
 - 1) Type A Window Assembly/Grade 10: Pass.
 - i. Florida Product Approval & Texas Department of Insurance: Impact FL No. 17265.1.
 - 1) Large Missile Impact (ASTM E1886).
 - 2) Cyclic Wind Pressing Loading (ASTM E1996):
 - a) Positive or negative 65 psf (3112 Pa).
 - j. Acoustical Performance Test Report per ASTM E90:
 - 1) Data File No. G3481.01: 1-1/16 inch IGU (3/16 inch annealed - 1/2 inch air space – 5/16 inch laminated (.090 inch SGP interlayer)).
 - a) STC: 35.
 - b) OITC: 28.
 2. SI7000HP Impact G2 International outswing casement window system when tested on a typical size window frame unit:
 - a. Unit Size (W x H): 36 x 72 inches tall (914 x 1829 mm).
 - b. Panel Size (W x H): 34.25 x 70.19 inches (870 x 1783 mm).
 - c. Manufacturer's certificates showing door system meets or exceeds C-CW65 Product Designation conforming to AAMA/WDMA/CSA 101.I.S.2/A440 and/or testing indicated.
 - d. Air Infiltration Test per ASTM E283:
 - 1) Force of 0.10 cfm per sq ft (0.5 L per sec per sq m) when tested at 1.57 psf (75 Pa) pressure differential.
 - 2) Force of 0.01 cfm per sq ft (0.05 L per sec per sq m) when tested at 6.24 psf (300 Pa) pressure differential.
 - e. Water Penetration Test per ASTM E331/ASTM E547: Water pressure of 12.11 psf (580 Pa) and 5.0 gal per hour per sq ft (3.4 L per min per sq m).
 - f. Uniform Structural Load Test (ASTM E330):
 - 1) Structural Test Pressure (Overload): Positive or negative 97.74 psf (4680 Pa).
 - 2) Design Pressure: Positive or negative 65.16 psf (3120 Pa).
 - g. Operating Force and Force to Latch - Method B per ASTM E2068:
 - 1) Initiate Motion: 7 lbf (31.1 N).
 - 2) Latches: 7 lbf (31.1 N).
 - h. Forced Entry Resistance per ASTM F588:

- 1) Type A Window Assembly/Grade 10: Pass.
 - i. Florida Product Approval & Texas Department of Insurance: Impact FL No. 17266.1.
 - 1) Large Missile Impact (ASTM E1886).
 - 2) Cyclic Wind Pressing Loading (ASTM E1996):
 - a) Positive or negative 65 psf (3112 Pa).
 - j. Acoustical Performance Test Report per ASTM E90:
 - 1) Data File No. G3479.01: 1-1/16 inch IGU (3/16 inch annealed - 1/2 inch air space – 5/16 inch laminated (.090 inch SGP interlayer)).
 - a) STC: 36.
 - b) OITC: 29.
3. SI7000HP Impact G2 International fixed window system when tested on a typical size window frame unit:
- a. Unit Size (W x H): 60 x 72 inches tall (1524 x 1829 mm).
 - b. Manufacturer's certificates showing door system meets or exceeds FW-CW65 Product Designation conforming to AAMA/WDMA/CSA 101.I.S.2/A440 and/or testing indicated.
 - c. Air Infiltration Test per ASTM E283:
 - 1) Force of less than 0.01 cfm per sq ft (less than 0.05 L per sec per sq m) when tested at 1.57 psf (75 Pa) pressure differential.
 - 2) Force of less than 0.01 cfm per sq ft (less than 0.05 L per sec per sq m) when tested at 6.24 psf (300 Pa) pressure differential.
 - d. Water Penetration Test per ASTM E331/ASTM E547: Water pressure of 15.04 psf (720 Pa) and 5.0 gal per hour per sq ft (3.4 L per min per sq m).
 - e. Uniform Structural Load Test (ASTM E330):
 - 1) Structural Test Pressure (Overload): Positive or negative 97.74 psf (4680 Pa).
 - 2) Design Pressure: Positive or negative 65.16 psf (3120 Pa).
 - f. Forced Entry Resistance per ASTM F588:
 - 1) Type D Window Assembly/Grade 10: Pass.
 - g. Florida Product Approval & Texas Department of Insurance: Impact FL No. 17267.1.
 - 1) Large Missile Impact (ASTM E1886).
 - 2) Cyclic Wind Pressing Loading (ASTM E1996):
 - a) Positive or negative 65 psf (3112 Pa).
 - h. Acoustical Performance Test Report per ASTM E90:
 - 1) Data File No. G3478.01: 1-1/16 inch IGU (3/16 inch annealed - 1/2 inch air space - 5/16 inch laminated (.090 inch SGP interlayer)).
 - a) STC: 35.
 - b) OITC: 29.
4. SI7000HP Impact G2 International Tilt and Turn window system when tested on a typical size window frame unit:
- a. Unit Size (W x H): 60 x 99 inches tall (1524 x 2515 mm).
 - b. Panel size (W x H): 58 x 97 inches (1473 x 2464 mm).
 - c. Manufacturer's certificates showing door system meets or exceeds DAW-AW60 Product Designation conforming to AAMA/WDMA/CSA 101.I.S.2/A440 and/or testing indicated.
 - d. Air Infiltration Test per ASTM E283:
 - 1) Force of 0.03 cfm per sq ft (0.15 L per sec per sq m) when tested at 1.57 psf (75 Pa) pressure differential.
 - 2) Force of 0.07 cfm per sq ft (0.36 L per sec per sq m) when tested at 6.24 psf (300 Pa) pressure differential.
 - e. Water Penetration Test per ASTM E331/ASTM E547: Water pressure of 20.0 psf (960 Pa) and 5.0 gal per hour per sq ft (3.4 L per min per sq m).
 - f. Uniform Structural Load Test (ASTM E330):
 - 1) Structural Test Pressure (Overload): Positive or negative 90 psf (4320 Pa).

- Pa).
 - 2) Design Pressure: Positive or negative 60 psf (2880 Pa).
 - g. Forced Entry Resistance per ASTM F588:
 - 1) Type B Window Assembly/Grade 10: Pass.
 - h. Life Cycle Testing per AAMA 910:
 - 1) First Half - Vent/Sash/Panels: Passed 1250 Cycles.
 - 2) Second Half – Vent/Sash/Panels: Passed 1250 Cycles.
 - i. Florida Product Approval & Texas Department of Insurance: Impact FL No. 22640.1.
 - 1) Large Missile Impact (ASTM E1886).
 - 2) Cyclic Wind Pressing Loading (ASTM E1996):
 - a) Positive or negative 60 psf (2873 Pa).
 - j. Acoustical Performance Test Report per ASTM E90:
 - 1) Data File No. F3242.01: 1-1/16 inch IGU (1/4 inch annealed - 5/8 inch air space - 3/16 inch annealed).
 - a) STC: 35.
 - b) OITC: 28.
- 5. SI7000HP Impact G2 International Hopper window system when tested on a typical size window frame unit:
 - a. Unit Size (W x H): 48 x 32 inches tall (1219 x 813 mm).
 - b. Panel size (W x H): 46.125 x 30 inches (1172 x 762 mm).
 - c. Manufacturer's certificates showing door system meets or exceeds AP-CW65 Product Designation conforming to AAMA/WDMA/CSA 101.I.S.2/A440 and/or testing indicated.
 - d. Air Infiltration Test per ASTM E283:
 - 1) Force of 0.07 cfm per sq ft (0.1 L per sec per sq m) when tested at 1.57 psf (75 Pa) pressure differential.
 - e. Water Penetration Test per ASTM E331/ASTM E547: Water pressure of 9.82 psf (470 Pa) and 5.0 gal per hour per sq ft (3.4 L per min per sq m).
 - f. Uniform Structural Load Test (ASTM E330):
 - 1) Structural Test Pressure (Overload): Positive or negative 97.74 psf (4680 Pa).
 - 2) Design Pressure: Positive or negative 65.16 psf (3120 Pa).
 - g. Operating Force and Force to Latch - Method B per ASTM E2068:
 - 1) Initiate Motion: Less than 6 lbf (Less than 27 N).
 - 2) Latches: Less than 6 lbf (Less than 27 N).
 - h. Forced Entry Resistance per ASTM F588:
 - 1) Type B Window Assembly/Grade 10: Pass.
 - i. Florida Product Approval & Texas Department of Insurance: Impact FL No. 17265.2.
 - 1) Large Missile Impact (ASTM E1886).
 - 2) Cyclic Wind Pressing Loading (ASTM E1996):
 - a) Positive or negative 65 psf (3112 Pa).
 - j. Florida Product Approval: Non-Impact FL No. 17265.3.

2.3 ALUMINUM WINDOWS

- A. G2 International Window System:
 - 1. Basis of Design: SI7000 G2 International Aluminum Window System - Fixed configuration as manufactured by Solar Innovations Architectural Glazing Systems.
 - 2. Basis of Design: SI7000 G2 International Aluminum Window System - Awning configuration as manufactured by Solar Innovations Architectural Glazing Systems.
 - 3. Basis of Design: SI7000 G2 International Aluminum Window System - Outswing Casement configuration as manufactured by Solar Innovations Architectural Glazing Systems.
 - 4. Basis of Design: SI7000 G2 International Aluminum Window System - Hopper

- configuration as manufactured by Solar Innovations Architectural Glazing Systems.
5. Basis of Design: SI7000 G2 International Aluminum Window System - HP Tilt and Turn configuration as manufactured by Solar Innovations Architectural Glazing Systems.
 6. Basis of Design: As scheduled and indicated on Drawings.
 7. Framing Members: As indicated on Drawings.
 8. Framing Members: Minimum 0.1 inch (3 mm) wall thickness for structural members.
 9. Framing Members: SI7000 Awning window with extruded aluminum frame with a thermal isolation separation 2.5168 in (64.18 mm) width.
 10. Framing Members: SI7000 Outswing casement window with extruded aluminum frame with a thermal isolation separation 2.625 inch (66.675 mm) width.
 11. Framing Members: SI7000 Fixed window with extruded aluminum frame with a thermal isolation separation 2.625 in (66.675 mm) width.
 12. Framing Members: SI7000 Tilt and turn window with extruded aluminum frame with a thermal isolation separation 2.911 inch (73.9394 mm) width.
 13. Framing Members: SI7000 Hopper window with extruded aluminum frame with a thermal isolation separation 2.625 inch (66.675 mm) width.
 14. Configuration: As indicated on Drawings.
 15. Window Panel Size: As indicated on Drawings.
 16. Window Panel Size:
 - a. Width ___ x ___ ft (___ x ___ mm).
 - b. Height ___ x ___ ft (___ x ___ mm).
 17. Drainage: Factory installed weep holes.
 18. Glazing Accessories:
 - a. Type: As indicated on Drawings.
 - b. Type: Decorative mullions.
 - c. Type: Interior grids, 3/16 x 5/8 inch (5 x 16 mm).
 - d. Type: Simulated divided lites, 3/8 x 5/8 inch (9.5 x 16 mm).
 - e. Type: Interior muntin grid on insulated glazing.
 - f. Type: Interior and exterior applied grids:
 - 1) Thin low profile with SDL.
 - 2) Simulated steel with SDL.
 - g. Type: Interior and exterior applied grid patterns:
 - 1) Arched grid.
 - 2) Gothic grid.
 - 3) Double gothic grid.
 - 4) English grid.
 - 5) Traditional grid.
 - 6) Cross grid.
 19. Type: Decorative raised panels.
 20. Perimeter Weather Gaskets: EPDM.
 21. Hardware:
 - a. Handle Sets:
 - 1) Folded Handle.
 - 2) Split Arm Operator.
 - 3) Crank Dyad Operator.
 - 4) Prima Handle.
 - 5) Standard Pole Operator Cam Handle.
 - 6) Handle sets: ____.
 - b. Locks:
 - 1) Standard Single Point Cam Locks.
 - 2) Standard Multi Point Cam Locks.
 - 3) Surface Mount Cam Lock.
 - 4) Locks: ____.
 - c. Hinges:
 - 1) Four Bar Hinge.

- 2) Four Bar Egress Hinge.
- 3) Hinges: ____.
- 22. Sills: As indicated on Drawings.
 - a. Sills: Thermal Sill Pan.
- 23. Mullion Type.
 - a. Fixed Astragal.
 - b. Mulling Block.
- 24. Accessories: Provide accessories as scheduled to achieve design intent and environmental control.
 - a. Motorization/Automation: ____.
 - b. Motorization/Automation: Marvel Motor Operator.
 - c. Screens.
 - 1) Screen Type: G-Series Vertically Retractable Screen.
 - 2) Screen Type: Fixed Interior Insect Mesh Screen Frame.
 - 3) Screen Type: Fixed Exterior Insect Mesh Screen Frame.
 - 4) Screen Type: ____.

B. Materials:

- 1. Aluminum:
 - a. Alloy and Temper: 6063-T52, 6063-T6, or 6061-T6.
 - 1) Other alloys and tempers may be used for non-structural members provided they do not void the required warranties.
 - 2) Indicate alloys and tempers clearly on shop drawings and in structural calculations.
 - 3) Aluminum Flashing and Closures: 0.040 inch (1 mm) thick.
 - b. Snap-on Covers and Miscellaneous Non-Structural Trim: Minimum thickness as recommended by manufacturer.
 - c. Framing Members: Thickness based on design loading, cross sectional configuration, and fabrication requirement.
- 2. Flashings: Sheet aluminum, same finish as for system components; secured with concealed fastening method or fastener with head finished to match; thickness as required for conditions encountered.
- 3. Insulated Panels: Expanded polystyrene insulation at filler panels and sheet metal members.
- 4. Manufacturer's standard system to provide thermal separation between exterior and interior components.
- 5. Internal Reinforcing:
 - a. Structural Aluminum Compliance: ASTM B221/B221M and ASTM B241/B241M.
 - b. Carbon Steel Compliance: ASTM A36/A36M.
 - c. Shapes and sizes to suit installation.
- 6. Structural Glazing Sealant: Manufacturer's standard, black.
- 7. Perimeter Sealant: Manufacturer's standard, color to match framing finish.
- 8. Perimeter Sealant: Manufacturer's standard, color as selected from manufacturer's standard range.
- 9. Glazing: See product section.
- 10. Glazing: Custom, double pane: _____.
- 11. Glazing: Double pane glazing, 1 inch (25 mm) insulated glass unit.
 - a. Exterior and Interior Glazing Lites: 3/16 inch (5 mm) tempered clear glass with LoE 272 low-emissivity coating on surface two.
 - 1) U-factor: 0.25.
 - 2) Visible Light Transmittance: 72 percent.
 - 3) Solar Heat Gain Coefficient: 0.41.
 - b. Exterior and Interior Glazing Lites: 3/16 inch (5 mm) tempered clear glass with LoE 366 low-emissivity coating on surface two.
 - 1) U-factor: 0.24.

- 2) Visible Light Transmittance: 65 percent.
- 3) Solar Heat Gain Coefficient: 0.27.
- c. Exterior and Interior Glazing Lites: 3/16 inch (5 mm) tempered clear glass with LoE 340 low-emissivity coating on surface two.
 - 1) U-factor: 0.25.
 - 2) Visible Light Transmittance: 39 percent.
 - 3) Solar Heat Gain Coefficient: 0.18.
- d. Exterior and Interior Glazing Lites: 1/4 inch (6 mm) tempered clear glass with LoE 272 low-emissivity coating on surface two.
 - 1) U-factor: 0.22.
 - 2) Visible Light Transmittance: 70 percent.
 - 3) Solar Heat Gain Coefficient: 0.40.
- e. Air Spacers: Stainless steel spacer with dual seals of polyisobutylene/silicone and filled with argon gas.
- 12. Glazing: Triple pane glazing, 1-3/8 inch (35 mm) insulated glass unit.
- 13. Glazing: Custom, triple pane: ____.
- 14. Glazing: Specialty, Thermochromic glass - glazing system that is 'tinted' via natural heat.
- 15. Glazing: Specialty, Solera - light diffusion glazing system.
- 16. Glazing: Specialty, Lumira polycarbonate - Lumira filled polycarbonate panels to control light diffusion and insulation characteristics.
- 17. Glazing: Decorative, _____.
- 18. Glazing: Decorative, Pattern 62.
- 19. Glazing: Decorative, single glue chip.
- 20. Glazing: Decorative, glue chip.
- 21. Glazing: Decorative, English reeded.
- 22. Glazing: Decorative, satin/acid etch.
- 23. Glazing Gaskets: Compatible with glazing sealant.
 - a. Compliance: ASTM C864.
 - b. Design Compression type, replaceable, EPDM gaskets; with or without solid strand cord to prevent shrinkage where applicable.
 - c. Profile and hardness as necessary to maintain uniform pressure for watertight seal
 - d. Color: Manufacturer's standard, black.
 - e. Factory molded corners required at interior.
- 24. Setting Blocks, Edge Blocks, and Spacers: As recommended by manufacturer and compatible with insulated glass where required.
- 25. Fasteners: Aluminum and stainless steel, not causing electrolytic action or corrosion.
- 26. Fasteners: Zinc Cadmium-plated, acceptable in locations as approved by manufacturer.
- 27. Finish for Exposed Fasteners: To match finish of aluminum frame.

C. Finishes:

- 1. Aluminum Liquid Finish: ____.
- 2. Aluminum Powder Finish: ____.
- 3. Aluminum Anodized Finish: ____.
- 4. Metal Cladding: ____.
- 5. As scheduled and indicated on Drawings.
- 6. Dual color, as indicated on Drawings.
- 7. Dual finish, as indicated on Drawings.
- 8. Aluminum Mill, unfinished.
- 9. Manufacturer's standard clear anodized finish, Class I AAMA 611.
- 10. Manufacturer's standard dark bronze anodized, Class 1 AAMA 611.
- 11. Powder coating solids standard finish, white, AAMA 2605.
- 12. Powder coating solids standard finish, black, AAMA 2605.
- 13. Powder coating solids standard finish, sandstone, AAMA 2605.

14. Powder coating solids standard finish, natural clay, AAMA 2605.
15. Powder coating solids standard finish, bronze, AAMA 2605.
16. Powder coating solids standard finish, Hartford green, AAMA 2605.
17. Powder coating solids premium finish, bone white, AAMA 2605.
18. Powder coating solids premium finish, fashion gray, AAMA 2605.
19. Powder coating solids premium finish, colonial gray, AAMA 2605.
20. Powder coating solids premium finish, military light blue, AAMA 2605.
21. Powder coating solids premium finish, burgundy, AAMA 2605.
22. Powder coating solids premium finish, charcoal, AAMA 2605.
23. Powder coating solids premium finish, apollo white, AAMA 2605.
24. Powder coating solids premium finish, ivory, AAMA 2605.
25. Powder coating solids premium finish, seawolf, AAMA 2605.
26. Powder coating solids premium finish, antique bronze, AAMA 2605.
27. Metal clad standard finish, Copper (exterior only).
28. Metal clad standard finish, #4 polished Stainless Steel (exterior only).
29. Metal clad premium finish, Rheinzink Bright Rolled.
30. Metal clad premium finish, Rheinzink Blue Gray.
31. Metal clad premium finish, Rheinzink Graphite Gray.
32. Metal clad premium finish, Brass.
33. Metal clad premium finish, Bronze.
34. Decoral finishes, powder coat, Aged Dark Oak.
35. Decoral finishes, powder coat, Aged Light Oak.
36. Decoral finishes, powder coat, American Douglas.
37. Decoral finishes, powder coat, American Maple.
38. Decoral finishes, powder coat, Cherry.
39. Decoral finishes, powder coat, Cherry with Flame.
40. Decoral finishes, powder coat, Colony Maple.
41. Decoral finishes, powder coat, Dark Walnut.
42. Decoral finishes, powder coat, European Cherry.
43. Decoral finishes, powder coat, Golden Oak.
44. Decoral finishes, powder coat, Knotty Pine.
45. Decoral finishes, powder coat, National Walnut.
46. Decoral finishes, powder coat, Oak.
47. Decoral finishes, powder coat, Oregon Douglas.
48. Decoral finishes, powder coat, Table Cherry.
49. Decoral finishes, powder coat, Teak.
50. Wood Veneering: _____.
 - a. Manufacturer's standard water based sealer applied to minimize damage and discoloration during installation. Final sanding and finishing is by others. It is the customer's responsibility to properly maintain finish on the wood to preserve any warranty. Wood veneering is only available on the interior side of the panel.
 - b. ICA 3-coat clear sealer consisting of impregnating agent, base coat, and topcoat.
51. Wood Veneering, standard, Douglas Fir, unfinished.
52. Wood Veneering, standard, White Oak, unfinished.
53. Wood Veneering, standard, Walnut, unfinished.
54. Wood Veneering, standard, Mahogany, unfinished.
55. Wood Veneering, premium, White Pine, unfinished.
56. Wood Veneering, premium, Pecan Pine, unfinished.
57. Wood Veneering, premium, Cherry, unfinished.

D. Fabrication:

1. Fabricate components in accordance with approved Shop Drawings approved by Architect.
2. Major fabrication must done at the manufacturing location.
3. Manufacturer will remove all burrs and rough edges prior to finish application.

4. Install gaskets and tapes at factory.
5. Disassemble only to the extent necessary for shipping and handling limitations.
6. Manufacturer is to be notified of any field modification prior to the activity commencing.
7. Welding is to comply with standards set forth by the American Welding Society.
8. Factory-grind exposed welds smooth and flush with adjacent surfaces prior to finish application; restore mechanical finish.
9. Perform all work in a method that will meet or exceed industry standards.
10. Isolation membrane materials to be used to separate dissimilar metals to prevent galvanic corrosion/action between materials.
11. Fabricate components to allow for accurate and rigid fit of joints and corners. Match components carefully ensuring continuity of line and design. Ensure joints and connections will be flush and weather tight. Ensure slip joints make full, tight contact and are weathertight.
12. Fabricate components true to detail and free from defects impairing appearance, strength or durability.
13. Provide contoured exterior horizontal or purlin glazing retainers to minimize water, ice, and snow buildup.
14. Reinforce components at anchorage and support points, joints, and attachment points for interfacing work.
15. Accurately size glazing to fit openings allowing for clearances as set forth by the "Glazing Manual" published by the Flat Glass Marketing Association (FGMA).
16. Cut glass clean and carefully. Nicks and damaged edges will not be accepted. Replace glass with damaged edges.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. General Contractor will direct, supervise, and inspect all site work related to the aluminum curtain wall.
- B. Prepare substrates in strict accordance with the approved Shop Drawings, using the methods recommended by the manufacturer for achieving best result for the substrates under project conditions. Thoroughly clean surfaces and substrates prior to installation.
- C. Do not proceed with installation until substrates have been prepared using the methods recommended by the manufacturer and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.
- D. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions, approved submittals and in proper relationship with adjacent construction.
 1. Separate dissimilar materials using nonconductive tape, paint, or other material not visible in finished work.
 2. Provide attachments and shims to permanently fasten system to building structure.
 3. Maintain dimensional tolerances and alignment with adjacent work.
 4. Anchor securely in place, allowing for required movement, including but not limited to expansion and contraction.
 5. Install glazing sealants in accordance with manufacturer's instructions, including but not limited to surface preparations.
 6. Set sill members in bed of sealant. Set other members with internal sealants to

- provide weather tight construction.
- 7. Install flashings, bent metal closures, corners, gutters, and other accessories as detailed on Shop Drawings and required for complete installation.
- 8. Clean surfaces and install sealant in accordance with sealant manufacturer's instructions and guidelines.

3.3 FIELD QUALITY CONTROL

- A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.
- B. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.

3.4 TESTING AND ADJUSTING

- A. Adjust hinge set, locksets, and other hardware for proper operation.
- B. Lubricate using a manufacturer approved lubricant compatible with door and frame coatings.

3.5 CLEANING AND PROTECTION

- A. Clean and protect products in accordance with the manufacturer's recommendations.
 - 1. Remove temporary coverings and protection of adjacent work areas.
 - 2. Repair or replace damaged installed products.
 - 3. Clean installed products in accordance with manufacturer's instructions before owner's acceptance.
 - 4. Clean and dress sealant prior to installation completion.
 - 5. Clean glass prior to installation completion.
 - 6. Clean the entire enclosure one time at the completion of the installation. Cleaning to include surface cleaning of aluminum framing and glass and clean up of construction debris.
 - 7. All subsequent cleaning will be the responsibility of the general contractor.
- B. Touch-up, repair or replace damaged products before Substantial Completion.
- C. Areas with Abraded Surface Finish: Clean and touch-up with air dry paint, as approved and furnished by window manufacturer, color to match factory applied finish.
- D. Remove from project site and legally dispose of construction debris associated with this work.

3.6 HOUSEKEEPING

- A. Manufacturer will deliver all related operating instructions, maintenance manuals, and warranty registration cards to the general contractor during the completion of the project.
- B. Installer will protect installed products until completion of the installation from all construction debris and natural elements.
- C. Manufacturer is responsible for all touch-up, repair, or replacement of damaged products during the installation.
- D. Installer will keep area tidy and safe at all times.
- E. Protect installed products until completion of project.

END OF SECTION