

SECTION 08 43 33**FOLDING GLASS STOREFRONTS****SECTION 08 35 13****FOLDING GLASS DOORS**

NOTE: Modify footers to align when using this section name and number.

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes furnishing and installing a floor mounted track supported sliding-folding thermally broken aluminum-framed glass panel system that includes:
1. Aluminum frame
 2. Threshold
 3. Panels
 4. Sliding-folding and locking hardware
 5. Weatherstripping
 6. Glass and glazing
 7. Insect screen
 8. Accessories as required for a complete working installation.
- B. Related Documents and Sections: Contractor to examine Contract Documents for requirements that directly affect or are affected by Work of this Section. A list of those Documents and Sections include, but is not limited to, the following:
1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 General Requirements, Specification Sections, apply to this Section.
 2. Section 06 10 00, Rough Carpentry: Wood framing R.O. and blocking.
 3. Section 07 27 00, Air Barriers: Building wrap
 4. Section 07 62 00, Sheet Metal Flashing and Trim: Flashing and other sheet metal work
 5. Section 07 90 00, Joint Protection
 6. Section 08 42 23, Glass Entrance Swing Doors
 7. Section 08 43 29, Sliding Glass Storefronts: NanaWall LS160
 8. Section 08 51 13, Aluminum Windows: NanaWall SL88, hurricane, tilt-turn, casement window
 9. Section 09 22 16, Non-Structural Metal Framing: Metal framing R.O. and reinforcement
 10. Section 10 22 39, Folding Glass Partitions: NanaWall SL73
 11. Section 10 22 43, Sliding Glass Partitions: NanaWall LS160

1.02 REFERENCES

- A. Reference Standards in accordance with Division 01 and current editions from the following:
1. AAMA. American Architectural Manufacturers Association; www.aamanet.org
 - a. AAMA 503, Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls, and Sloped Glazing Systems
 - b. AAMA 520, Voluntary Specification for Rating the Severe Wind-Driven Rain Resistance of Windows, Doors and Unit Skylights

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- c. AAMA 611, Voluntary Specification for Anodized Architectural Aluminum
 - d. AAMA 920, Operation / Cycling Performance
 - e. AAMA 1304, Voluntary Specification for Forced Entry Resistance of Side-Hinged Door Systems
 - f. AAMA 2604, Voluntary Specifications, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels
 - g. AAMA 2605, Voluntary Specifications, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels
 - h. AAMA/WDMA/CSA 101/I.S.2/A440, NAFS, North American Fenestration Standard - Specification for Windows, Doors and Skylights
2. ANSI. American National Standards Institute; www.ansi.org
 - a. ANSI Z97.1, Safety Performance Specifications and Methods of Test for Safety Glazing Material Used In Buildings
 3. ASTM. ASTM International; www.astm.org
 - a. ASTM C1036, Standard Specification for Flat Glass
 - b. ASTM C1048, Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass
 - c. ASTM E283, Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 - d. ASTM E330, Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 - e. ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
 - f. ASTM E413, Classification for Rating Sound Insulation
 - g. ASTM E547, Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
 - h. ASTM E1332, Standard Classification for Rating Outdoor-Indoor Sound Attenuation
 - i. ASTM E1886, Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials
 - j. ASTM E1996, Standard Specifications for Performance of Exterior Windows, Glazed Curtain Walls, Doors and Storm Shutters Impacted by Wind Borne Debris in Hurricanes
 - k. ASTM E2268, Standard Test Method for Water Penetration of Exterior Windows, Skylights, and Doors by Rapid Pulsed Air Pressure Difference
 - l. ASTM F842, Standard Test Methods for Measuring the Forced Entry Resistance of Sliding Door Assemblies
 4. CPSC. Consumer Product Safety Commission; www.cpsc.gov
 - a. CPSC 16CFR-1201, Safety Standard for Architectural Glazing Materials
 5. CSA Group (Canadian Standards Association); www.csagroup.org/global/en/home
 - a. CSA A440S1 - The Canadian supplement to North American (NAFS) standards
 6. Energy Star, U.S. Environmental Protection Agency (EPA) Program; www.energystar.gov
 7. Metro-Dade County, FL Building Code Compliance Office Protocols; www.miamidade.gov/building/products/windows.asp
 - a. TAS 201, Impact Test Procedures
 - b. TAS 202, Criteria for Testing Impact and Non Impact Resistant Building Envelope Components Using Uniform Static Air Pressure

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- c. TAS 203, Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.
- 8. NFRC. National Fenestration Rating Council; www.nfrc.org
 - a. NFRC 100, Procedure for Determining Fenestration Product U-factors
 - b. NFRC 200, Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence
 - c. NFRC 400, Procedure for Determining Fenestration Product Air Leakage
 - d. NFRC 500, Procedure for Determining Fenestration Product Condensation Resistance Rating Values

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate Folding Glass Storefront system and framing R.O.
- B. Preinstallation Meetings: See Section 01 30 00.

1.04 SUBMITTALS

- A. For Contractor submittal procedures see Section 01 30 00.
- B. Product Data: Submit manufacturer's printed product literature for each Folding Glass Storefront system to be incorporated into the Work. Show performance test results and details of construction relative to materials, dimensions of individual components, profiles and colors.
- C. Shop Drawings: Indicate Folding Glass Storefront system component sizes, dimensions and framing R.O., configuration, swing panels, direction of swing, stacking layout, typical head jamb, side jambs and sill details, type of glazing material, handle height and field measurements.

NOTE: Add "Delegated-Design Submittal" Paragraph below if design services have been delegated to Contractor. Option is an example only.

- D. Delegated-Design Submittal: For structural performance of Folding Glass Storefront system, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

- D. Manufacturers' Instructions: Submit manufacturer's installation instructions.
- E. Operation and Maintenance Data: Submit Owner's Manual from manufacturer. Identify with project name, location and completion date, and type and size of unit installed.

NOTE: Delete the following Article if LEED is not applicable; edit to meet project LEED requirements.

- F. Sustainable Design Submittals (USGBC [LEED®](#)): Refer to Section 01 81 15, LEED Design Requirements.
 - 1. **LEED 2009** (v3) Credits. Complete online LEED forms and submit other required materials as follows:
 - a. Energy and Atmosphere (EA) Credits:
 - 1). EA Credit 1 (EA1): Optimize Energy Performance:
 - b. Materials and Resources (MR) Credits:
 - 1). MR Credit 1.1 (MRc1.1): Building Reuse - Maintain Existing Exterior Walls, Floors and Roof
 - 2). MR Credit 1.2 (MRc1.2): Building Reuse - Maintain Existing Interior Nonstructural Elements
 - 3). MR Credit 2 (MRc2): Construction Waste Management

NOTE: MR Credit 1 above and 3 below can apply to reusing salvaged Folding Glass Storefront.

- 4). MR Credit 3: Materials Reuse - 5% (MRc3.1) or 10% (MRc3.2)

NOTE: MR Credit 5 below can apply to projects within 500 miles (805 km) of the NanaWall fabrication shop located in **Richmond, CA 94801**.

- 5). MR Credit 5: Regional Materials: 10% (MRc5.1) or 20% (MRc5.2) Extracted,

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Processed & Manufactured Regionally

- c. Indoor Environmental Quality (EQ) Credits:
 - 1). IEQ Credit 2 (IEQc2): Increased Ventilation - Case 2 - Naturally Ventilated Spaces
 - 2). IEQ Credit 8.1 (IEQc8.1): Daylight & Views - Daylight 75% of Spaces
 - 3). IEQ Credit 8.2 (IEQc8.2): Daylight & Views - Views for 90% of Spaces
 - 4). IEQ Credit 9 (LEED for Schools - IEQc9): Enhanced Acoustical Performance
- 2. **LEED v4 for Building Design and Construction (BD&C)** Credits. Complete online LEED forms and submit other required materials as follows:
 - a. Energy and Atmosphere (EA) Credits:
 - 1). EA Credit 2 (EAc2): Optimize Energy Performance
 - b. Materials and Resources (MR) Credits:

NOTE: MR Credit 1 below can apply to reusing salvaged Folding Glass Storefront.

- 1). MR Credit 1 (MRc1): Building Life-Cycle Impact Reduction; Option 3 - Building and Material Reuse
- c. Indoor Environmental Quality (EQ) Credits:
 - 1). EQ Credit 7 (EQc7): Daylight
 - 2). EQ Credit 8 (EQc8): Quality Views
 - 3). EQ Credit 9 (EQc9): Acoustic Performance

G. LEED Closeout Documentation:

NOTE: Edit below to meet project LEED requirements.

- 1. **LEED 2009** (v3). Submit completed LEED™ submittal Worksheet Templates for the following credits:
 - a. EAc1, MRc1.1, MRc1.2, MRc2, MRc3, MRc5, IEQc2, IEQc8.1, IEQc8.2, IEQc9
- 2. **LEED v4 (BD&C)**. Submit information and documentation to complete LEED™ Worksheet Templates for the following credits:
 - a. EAc2, MRc1, EQc7, EQc8, EQc9

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer capable of providing complete, precision built, engineered, pre-fitted units with a minimum twenty-five (25) years' experience in the sale of folding-sliding door systems for large openings in the North American market.
- B. Installer Qualifications: Installer experienced in the installation of manufacturer's products or other similar products for large openings. Installer to provide reference list of at least three (3) projects of similar scale and complexity successfully completed in the last three (3) years.
 - 1. Installer to be trained and certified by manufacturer.
- C. Single Source Responsibility: Furnish Folding Glass Storefront system materials from one manufacturer for entire Project.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's instructions and recommendations, Section 01 60 00 requirements, and as follows:
 - 1. Deliver materials to job site in sealed, unopened cartons or crates.
 - a. Upon receipt, inspect the shipment to ensure it is complete, in good condition and meets project requirements.
 - 2. Store material under cover in a clean and dry location, protecting units against weather and defacement or damage from construction activities, especially to the edges of panels.

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1.07 FIELD CONDITIONS

- A. Field Measurements: Contractor to field verify dimensions of rough openings (R.O.) and threshold depressions to receive sill. Mark field measurements on shop drawing submittal.

1.08 WARRANTY

- A. Manufacturer Warranty: Provide Folding Glass Storefront system manufacturer's standard limited warranty as per manufacturer's published warranty document in force at time of purchase, subject to change, against defects in materials and workmanship.
 1. Warranty Period beginning with the earliest of 120 days from Date of Delivery or Date of Substantial Completion:
 - a. Rollers and Glass Seal Failure: Ten (10) years
 - b. All Other Components Except Screens: Ten (10) years
 - 1). Exception: Five (5) years if NOT installed by manufacturer's certified trained installer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Product by Manufacturer: **NanaWall SL73** by **NANA WALL SYSTEMS, INC.** (www.nanawall.com)

NANA WALL SYSTEMS, INC.
 100 Meadow Creek Drive, Corte Madera, CA 94925
 Toll Free (800) 873-5673
 Telephone: (415) 383-3148
 Fax: (415) 383-0312
 Email: info@nanawall.com

1. Substitution Procedures: See Section 01 20 00; Submit completed and signed:
 - a. Document 00 43 25, Substitution Request Form (During Procurement)
 - b. Document 00 63 25, Substitution Request Form (During Construction)

2.02 PERFORMANCE / DESIGN CRITERIA

NOTE: Add "Delegated-Design" Paragraph below if Contractor is required to assume responsibility for design.

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00, Quality Requirements, to design the Folding Glass Storefront system according to the following performance requirements:
 1. (Insert project specific performance / design requirements here.)

NOTE: Select one of the four Performance Criteria paragraphs below for different Sill and Opening types, deleting paragraphs not chosen.

The Low Profile Saddle Sill or Higher Weather Performance Raised Sill, and an Inward or Outward Opening.

Edit for weeps.

Weeps, when provided, are to be drilled in the field by the installer to manufacturer's requirements.

Air infiltration and water penetration testing results are only applicable if the unit matches the tested panel and unit size, direction of opening and type of sill.

Structural load testing results are only applicable for the test unit size and type of locking and rods.

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Comparative analysis charts published by manufacturer shows which panel sizes, if any, meets the structural loading design pressures specifically required for the project.

Check for requirements in the jurisdiction of the project.

Forced entry testing results are only applicable for the test unit type of locking.

See manufacturer's latest published data regarding performance.

It is expected that the installed system's performance would be not more than 2/3rds of the following certified laboratory test data in accordance with AAMA 503.

- A. Performance Criteria (Lab Tested): **Low Profile Saddle Sill - Inward Opening**
1. Air Infiltration (ASTM E283) Inward Opening: 0.10 cfm/ft² (0.51 L/s/m²) at a static air pressure difference: of 1.57 psf (75 Pa)
 - a. Without Weeps: 0.26 cfm/ft² (1.33 L/s/m²) at 6.24 psf (300 Pa).
 - b. With Weeps: 0.31 cfm/ft² (1.59 L/s/m²) at 6.24 psf (300 Pa).
 2. Water Penetration (ASTM E331, ASTM E547): No uncontrolled water leakage at a static (with weeps) test pressure of 5.25 psf (250 Pa)
 3. Structural Load Deflection (TAS 202 / ASTM E330):
 - a. Inward Opening (Standard Unit): Pass
 - 1). Design Pressure Positive: 70 psf (3350 Pa)
 - 2). Design Pressure Negative: 70 psf (3350 Pa)
 - b. Windload Resistance: Pass; +/- 70 psf (+/- 3350 Pa)
 4. Missile Impact & Cycling (TAS 201 & 203; ASTM E1886/ ASTM E1996) with 7/16 inch single glazing or 1-1/8 inch IGU Impact Glass:
 - a. Inward Opening (Standard Unit): Pass
 - 1). Design Pressure Positive: 90 psf (4300 Pa)
 - 2). Design Pressure Negative: 90 psf (4300 Pa)
- B. Performance Criteria (Lab Tested): **Low Profile Saddle Sill - Outward Opening**
1. Air Infiltration (ASTM E283) Outward Opening: 0.11 cfm/ft² (0.56 L/s/m²) at a static air pressure difference: of 1.57 psf (75 Pa)
 - a. Without Weeps: 0.29 cfm/ft² (1.49 L/s/m²) at 6.24 psf (300 Pa).
 - b. With Weeps: 0.32 cfm/ft² (1.64 L/s/m²) at 6.24 psf (300 Pa).
 2. Water Penetration (ASTM E331, ASTM E547): No uncontrolled water leakage at a static (with weeps) test pressure of 6.00 psf (300 Pa)
 3. Structural Loading (ASTM E330)
 - a. Outward Opening Standard Unit: Pass
 - 1). Design Pressure Positive: 70 psf (3350 Pa)
 - 2). Design Pressure Negative: 70 psf (3350 Pa)
 - b. Windload Resistance: Pass; +/- 70 psf (+/- 3350 Pa)
 4. Missile Impact & Cycling (TAS 201 & 203; ASTM E1886/ ASTM E1996) with 7/16 inch single glazing or 1-1/8 inch IGU Impact Glass:
 - a. Outward Opening (Standard Unit): Pass
 - 1). Design Pressure Positive: 90 psf (4300 Pa)
 - 2). Design Pressure Negative: 90 psf (4300 Pa)
- C. Performance Criteria (Lab Tested): **Higher Weather Performance Raised Sill - Inward Opening**
1. Air Infiltration (ASTM E283): 0.08 to 0.30 cfm/ft² (0.41 to 1.54 L/s/m²) at a static air pressure difference of 1.57 psf (75 Pa).

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- a. 0.20 to 0.30 cfm/ft² (1.02 to 1.54 L/s/m²) at 6.24 psf (300 Pa)
 - 2. Water Penetration (ASTM E331, ASTM E547): No uncontrolled water leakage at a static test pressure of 12 psf (715 Pa)
 - 3. Dynamic Water Penetration (AAMA 520 / ASTM E2268): Performance Level 2 at 6-18 psf (300-860 Pa)
 - 4. Structural Load Deflection (TAS 202 / ASTM E330):
 - a. Inward Opening (Standard Unit): Pass
 - 1). Design Pressure Positive: 70 psf (3350 Pa)
 - 2). Design Pressure Negative: 100 psf (4785 Pa)
 - b. Windload Resistance: Pass; +/- 100 psf (+/- 4785 Pa)
 - 5. Missile Impact & Cycling (TAS 201 & 203; ASTM E1886/ ASTM E1996) with 7/16 inch single glazing or 1-1/8 inch IGU Impact Glass:
 - a. Inward Opening (Standard Unit): Pass
 - 1). Design Pressure Positive: 90 psf (4300 Pa)
 - 2). Design Pressure Negative: 110 psf (5260 Pa)
- D. Performance Criteria (Lab Tested): **Higher Weather Performance Raised Sill - Outward Opening**
- 1. Air Infiltration (ASTM E283): 0.02 to 0.14 cfm/ft² (0.10 to 0.72 L/s/m²) at a static air pressure difference: of 1.57 psf (75 Pa).
 - a. 0.07 to 0.30 cfm/ft² (0.36 to 1.54 L/s/m²) at 6.24 psf (300 Pa).
 - 2. Water Penetration (ASTM E331, ASTM E547): No uncontrolled water leakage at a static test pressure of 12 psf (715 Pa)
 - 3. Dynamic Water Penetration (AAMA 520 / ASTM E2268): Performance Level 1 at 5-15 psf (250-715 Pa)
 - 4. Structural Load Deflection (TAS 202 / ASTM E330):
 - a. Outward Opening (Standard Unit): Pass
 - 1). Design Pressure Positive: 70 psf (3350 Pa)
 - 2). Design Pressure Negative: 70 psf (3350 Pa)
 - b. Windload Resistance: Pass; +/- 70 psf (+/- 3350 Pa)
 - 5. Missile Impact & Cycling (TAS 201 & 203; ASTM E1886/ ASTM E1996) with 7/16 inch single glazing or 1-1/8 inch IGU Impact Glass:
 - a. Outward Opening (Standard Unit): Pass
 - 1). Design Pressure Positive: 90 psf (4300 Pa)
 - 2). Design Pressure Negative: 90 psf (4300 Pa)

NOTE: Items below are common to all sill types, except as noted.

- 6. Folding Glass Storefront Units tested to AAMA/WDMA/CSA 101/I.S.2/A440.
- 7. Forced Entry (TAS 202, AAMA 1304, ATSM F842): Meets requirements for +F1
- 8. Hurricane and Impact Rated (AAMA 506; AAMA/WDMA/CSA/I.S2/A440; ASTM E1886/ ASTM E1996): Missile Level D and Wind Zone 4 rated

NOTE: SL73 INSWING system with a raised or low profile saddle sill is approved with Miami-Dade County, Florida NOA No. 15-0226.06 with expiration date of 11th August 2020.
<http://www.miamidade.gov/building/library/productcontrol/noa/15022606.pdf>
 SL73 OUTSWING system with a raised or low profile saddle sill is approved with Miami-Dade County, Florida NOA No. 15-0226.05 with expiration date of 11th August 20120.
<http://www.miamidade.gov/building/library/productcontrol/noa/15022605.pdf>

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Miami Dade County, Florida approval is for any number of panels with any panel size up to a maximum of 3'0" wide increments and 8'0" high. A unit with either a raised sill (with water rating) or low profile saddle sill (with no water rating) is approved. With panel sizes of 3' x 8', SL73 inswing with raised sill has a DP rating of +70 psf / -100 psf, SL73 outswing with raised sill and SL73 inswing/outswing with saddle sill has DP ratings of +/- 70 psf. With smaller panel sizes and using **comparative analysis**, higher DP ratings of up to +80 psf / -110 psf for inswing with raised sill and +80 psf / -90 psf for outswing with raised sill and for inswing/outswing with saddle sill are possible.

- | | |
|---|----------------|
| 9. Thermal Performance (U-factor): | NFRC 100 rated |
| 10. Solar Heat Gain Coefficient (SHGC) + Visible Light Transmission (VT): | NFRC 200 rated |
| 11. Air Leakage: | NFRC 400 rated |
| 12. Condensation Resistance Factor (CRF): | NFRC 500 rated |

NOTE: The NFRC 100, 200, 400 and 500 ratings of the SL73 Folding Glass Storefront System meet **Prescriptive Method** requirements for U-factor, SHGC, Air Leakage and CRF of *California Title 24, Chapter 3, Building Envelope Requirements*.

For the listing of Nana Wall product NFRC testing reports go to the following website <http://search.nfrc.org/search/searchdefault.aspx>; click on **Door** (Find Ratings for Door Products); click on the **Search by Manufacturer** button; click **Manufacturers**, scroll down to and click on **Nana Wall Systems, Inc.**, and click on the **Find Products** button.

- | | |
|----------------------|--------------------|
| 13. EPA Energy Star: | Meets requirements |
|----------------------|--------------------|

NOTE: **Energy Star** values for DOORS with > 50% glass can be achieved through the use of specific glass units meeting the following requirements:

Northern & North-Central Region:	≤ 0.30 U-factor	0.40 SHGC
South-Central & Southern Region:	≤ 0.30 U-factor	0.25 SHGC

Energy Star values for WINDOWS can be achieved through the use of specific glass units meeting the following requirements (U-factor in accordance with NFRC 100 and SHGC in accordance with NFRC 200):

Northern Region (as of 1/1/2016):	≤ 0.27 U-factor	Any SHGC
Northern Region*:	≤ 0.28 U-factor	≥ 0.32 SHGC
Northern Region*:	≤ 0.29 U-factor	≥ 0.37 SHGC
Northern Region*:	≤ 0.30 U-factor	≥ 0.42 SHGC
North-Central Region:	≤ 0.30 U-factor	≥ 0.40 SHGC
South-Central Region:	≤ 0.30 U-factor	≥ 0.25 SHGC
Southern Region:	≤ 0.40 U-factor	≥ 0.25 SHGC

* For Windows with NFRC certified U-factor and SHGC ratings that meet or exceed the listed equivalent energy performance criteria as of 1/1/2016.

Energy Star Air Leakage Rating Requirements (ASTM E283 in accordance with NFRC 400 or AAMA/WDMA/CSA 101/I.S.2/A440-11):

Window, Sliding Door, or Skylight:	≤ 0.3 cfm/ft ² (1.54 L/s/m ²)
Swinging Door:	≤ 0.5 cfm/ft ² (2.56 L/s/m ²)

E. LEED Characteristics:

1. LEED 2009 (v3)

- a. EAc1: *NanaWall* systems using low U-Value designed double or triple IGU and thermally broken frames can provide significant energy performance.

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- b. MRc1.1: *NanaWall* exterior glass wall systems, not demolished in a renovation project, are reused in the same location.
 - c. MRc1.2: *NanaWall* interior glass wall systems, not demolished in a renovation project, are reused in the same location.
 - d. MRc2: *NanaWall* cardboard shipping crates are made of 60% recycled material and are 100% recyclable.
 - e. MRc3: *NanaWall's* components easily disassemble and reassemble to "*Use as salvaged... or reused materials.*"
 - f. MRc5: *NanaWall* glazing, panel, track and door manufacturing final assembly plant is located in **Richmond, CA 94801**.
 - g. IEQc2: *NanaWall* systems provide natural ventilation in the open position, assisting in the 90% required natural ventilation of occupied spaces of ASHRAE 62.1.
 - h. EQc8.1: *NanaWall* glass wall assembly borrowed light brings daylight deeper into the floor plate.
 - i. EQc8.2: *NanaWall* glass wall assemblies provide direct outdoor lines of sight.
 - j. IEQc9: (LEED for Schools) For gasketed *NanaWall* glass wall assemblies with glass units STC testing at up to a 38 dB reduction.
2. **LEED v4 for Building Design and Construction (BD&C)**
- a. EAc2: *NanaWall* systems using low U-Value designed double or triple IGU and thermally broken frames can provide significant energy performance.
 - b. MRc1: *NanaWall* can be easily disassembled for salvage and reuse.
 - c. EQc7: *NanaWall* glass wall assembly borrowed light brings daylight deeper into the floor plate.
 - d. EQc8: *NanaWall* glass wall assemblies provide direct outdoor lines of sight.
 - e. EQc9: *NanaWall* glass wall assemblies can contribute with system acoustic ratings of up to a 38 dB reduction.

F. Design Criteria:

1. Sizes and Configurations: As indicated by the Drawings for selected number and size of panels, location of swing panels, and location of tracks and stacking bays.
2. Unit Operation: Sliding and folding hardware with top and bottom tracks;
 - a. [**inswing type.**]
 - b. [**outswing type.**]
3. Panel Type: Hinged
 - a. Primary swing panel of paired swing panels, looking from inside, to be on the [**left**] [**right**].
 - b. [**Entry/Egress panel hinged to side jamb.**]
4. Panel Pairing Configuration: See drawings.

NOTE: Sizes and Configurations: <http://www.nanawall.com/products/sl73/options>

See manufacturer drawings for selected custom dimensions within maximum frame sizes possible as indicated in manufacturer's literature.

See drawings for selected number of panels and configuration.

5. Panel Configuration: Straight.
6. Stack Storage Configuration:
 - a. [**Inside jamb**]
 - b. [**Outside jamb**]

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7. Mounting Type: Floor track supported with guide track at head.

2.03 MATERIALS

A. Monumental Thermally Broken Aluminum Framed Folding Glass Storefront Description: 2-5/16 inch (58 mm) wide narrow stile frame, bottom-supported system. Manufacturer's standard or post reinforced frame and panel profiles, with head track, side jambs and panels with dimensions as shown on Drawings.

1. Panels with: Single lite.
2. Panel Size (W x H): As indicated.

NOTE: Maximum panel sizes are 10'-0" high and 3'-2" wide with 2'-3" the minimum panel width.

3. Rail Depth: 2-3/4 inch (70 mm)
4. Head Width - Inward Opening: 3-15/16 inch (101 mm)
5. Head Width - Outward Opening: 3-7/8 inch (99 mm)
6. Head and Jamb Rail Width: 2-1/4 inch (57 mm)
7. Bottom Rail Width:
a. [**3-15/16 inch (101 mm) overall with 2-1/4 (57 mm) rail for raised sill.**]
b. [**2-5/16 inch (58 mm) for low-profile saddle sill.**]
c. [**Manufacturer's standard kickplate with height indicated.**]

NOTE: Indicate kickplate height. Select height between 6 and 12 inches (152 and 305 mm) high.

8. Aluminum Extrusion: AlMgSi0.5 alloy, 6063-T5 (F-22 - European standard)
a. Thickness: 0.078 inch (2.0 mm) nominal
b. Thermal Break: 3/4 to 15/16 inch (20 to 24 mm) wide polyamide plastic reinforced with glass fibers. Thinner or poured and de-bridged type thermal breaks not acceptable.
9. Aluminum Finish: Inside and Outside; [**Same (one-color)**] [**Different (two-tone)**]

NOTE: Select finish type below, edit to requirements and delete items not used.

- a. Anodized (AAMA 611):
1). [**Clear**]
2). [**Dark Bronze**]
b. Powder Coat (AAMA 2604):
1). Color as chosen from manufacturer's powder coating finish chart from
a). [**manufacturer's standard selection of 50 colors - matte.**]
b). [**manufacturer's full RAL selection.**]
i. [**High Gloss**]
ii. [**Matte**]
c). [**wood grain.**]
d). [**custom finish.**]
c. PVDF Coat (AAMA 2605): Fluoropolymer Kynar with color to match custom finish.

B. Glass and Glazing:

1. Safety Glazing: In compliance with ANSI Z97.1 and CPSC 16CFR 1201.

NOTE: For storefront units requiring acoustic performance keep the following paragraph. Edit to suit project conditions.

- a. Glass Acoustical Performance (ASTM E413 and ASTM E1332): STC

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NOTE: Acoustical ratings listed below are for the **glass only** and not the full panel system but will most likely be within 2 dB of the glass STC rating when the frame is added.

- 1). [**37; 7/16 inch (11 mm) single, impact rated, laminated glass**]
- 2). [**39; 1-1/8 inch (28 mm) double IGU, air-filled, impact rated, laminated and tempered glass**]
- 3). [**41-43; 1-1/8 inch (28 mm) double IGU, air-filled, impact rated, double-laminated glass**]

NOTE: Unlike wet glazing, NanaWall's standard dry glazing method helps reduce instances of seal failure.

2. Manufacturer's [**tempered**] [**and**] [**laminated**] glass lites, dry glazed with glass stops on the inside.

NOTE: Select and edit glass type(s) to meet building code, wind-load design, acoustic, bullet resistant and/or security, and other project requirements with other glass available from manufacturer.

Anti-fall glazing available where required.

IGU glazing is capable of meeting 2010 Energy Star requirements of a U-factor ≤ 0.32 and SHGC ≤ 0.30 for all climate zones.

Custom layouts with horizontal mullions, simulated divided lites, inserts, and high bottom rails are possible.

Contact NanaWall for availability of other commercial glass types.

a. Glass Lite / Insulated Glass Unit (IGU):

- 1). [**Single:** **7/16 inch (11 mm) thick.**]
- 2). [**Double IGU:** **1-1/8 inch (28 mm) thick.**]
 - a). IGU Fill: **< insert IGU fill >**
 - i. [**Low-E**]
 - ii. [**Argon filled**]
 - iii. [**Air filled**]
 - b). Glass Spacers: Manufacturer's standard [**gray**] [**dark bronze**] finish; [**without**] [**with**] capillary tubes.

b. Glass Lite Type: **< insert glass type >**

- 1). Standard

NOTE: Items below are options and may require an upcharge.

- 2). [**Low iron**]
- 3). [**Solar bronze**]
- 4). [**Solar gray**]
- 5). [**Ornilux bird safe**]
- 6). [**Impact rated**]

C. Locking Hardware and Handles:

NOTE: Select one of the below Main Entry Panel paragraphs WITH or WITHOUT Swing Panels, deleting all others. Edit to suit project requirements.

1. Main Entry Panel(s) for Models WITH a [**Pair of**] Swing Panel(s): Provide manufacturer's standard lever handles on the inside and outside, a standard lockset with a lockable latch, and multi-point locking with a dead bolt and rods at the top and bottom on primary panel [**only**].
 - a. Rods to be concealed and not edge mounted.

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- b. After turn of key or thumbturn, depression of handles withdraws latch.
- c. Lifting of handles engages rods and turn of key or thumb turn engages deadbolt and operates lock.
- d. [**Secondary Swing Panel: Provide matching dummy lever handles on both sides and concealed flush bolts that operate the rods at the top and the bottom for the secondary swing panel.]**

NOTE: Secondary swing panel paragraph above is standard with pairs; hardware for Secondary Panel below is an option.

- e. [**Secondary Swing Panel: Provide two-point locking with standard shaped handles on inside only for the secondary swing panel.]**
- f. Lever Handle - Finish:
 - 1). Brushed satin stainless steel

NOTE: Handle above is standard; optional handle types below may require an upcharge. ADA handle only available in "Brushed satin stainless steel."

- 2). [**Titanium black stainless steel]**
- 3). [**Oil rubbed bronze solid brass]**
- 4). [**Satin nickel solid brass]**
- 5). [**White solid brass]**
- g. Locking:
 - 1). Standard profile cylinder
 - 2). Adapter for Small Format Interchangeable Core (SFIC)
- 2. Main Entry Panel For Models WITH A Swing Panel: Provide manufacturer's push/pull handles with separate lockset and dead bolt and one point locking at the top and bottom consisting of locking rods operated by a 180° turn of a flat handles on the inside.

NOTE: Option above recommended with a door closer, but note that, when sliding the swing panel, the door closer will need to be disengaged if the swing panel is not attached to a side jamb.

- a. Push-pull handles in a brushed stainless steel finish and stainless steel flat handles in a
 - 1). [**brushed satin finish.]**
 - 2). [**titanium black finish.]**
- 3. Main Entry Pair of Panels on Models WITHOUT a Swing Panel: Provide manufacturer's standard L-shaped handles on the inside and outside including a lockset with profile cylinder. Operation of lockset is by turn of key from outside and thumbturn inside with two-point locking hardware operated by 180° turn of the handle.
 - a. L-Shaped Handles - Finish:
 - 1). Brushed satin stainless steel

NOTE: Handle above is standard; optional handle types below may require an upcharge.

- 2). [**Titanium black stainless steel]**
- 4. Main Entry Panel: Provide manufacturer's standard U/L-shaped handle on inside only with concealed two point locking hardware operated by 180° turn of handle.

NOTE: With this option main entry panel is operable from inside only and there is no latch. Other compatible lever, L-shaped and push-pull handle styles and finishes are available from other suppliers.

- 5. Secondary Panels and Pairs of Folding Panels: Provide manufacturer's [**standard handles]** [**removable custodial handles]** and concealed two-point locking hardware operated by 180° turn of handle between each pair. Face applied flush bolt locking NOT acceptable.

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NOTE: Standard handles above are typical; removable custodial handles are an option that may require an upcharge.

- a. Standard Handle Finish:
 - 1). Brushed satin stainless steel

NOTE: Handle above is standard; optional handle types below may require an upcharge.

- 2). [**Titanium black stainless steel**]
- 3). [**Brown nylon**]
- 4). [**Gray nylon**]
- 5). [**White nylon**]
- 6. Handle Height: 41-3/8 inch (105 cm) centered from bottom of panel or as otherwise indicated.
- 7. Aluminum locking rods with standard fiberglass reinforced polyamide end caps at the top and bottom. Rods to have a stroke of 15/16 inch (24 mm).
- 8. Additional profile cylinders to be [**keyed alike.**] [**keyed differently.**]
- D. Sliding-Folding Hardware: Provide manufacturer's standard combination sliding and folding hardware with top and bottom tracks and threshold. All running carriages to be with sealed, self-lubricated, ball bearing multi-rollers. Surface mounted hinges and running carriages NOT acceptable.

NOTE: Weight of panels borne by the bottom of the guide channel in the sill is NOT acceptable.

- 1. Lower Running Carriage Carrying Capacity: 440 lbs (200 kgs)
- 2. Upper guide carriage and lower running carriage provided with four vertical stainless steel wheels and two horizontal polyamide wheels.
- 3. Vertical wheels to ride on top of sill track and lie above the water run-off level.
- 4. Wheels riding below water run-off level and wheels riding on aluminum surfaces are NOT acceptable.

NOTE: Select from the following Sill types, edit to suit and delete those not meeting project requirements.

- 5. Sill Type: < **insert sill type** >
 - a. [**Higher weather performance raised sill (thermally broken)**]
 - b. [**Low profile saddle sill (thermally broken)**]
 - c. Finish: Aluminum with
 - 1). [**a clear anodized finish.**]
 - 2). [**a dark bronze anodized finish.**]
 - 3). [**finish to match panel.**]
 - d. Cover plate over sill NOT acceptable.
 - e. For ADA Compliance: Provide gasket to cover the channel in the sill at swing doors.
- 6. Swing Panel Hinges:
 - a. Zinc die cast with finish closest match to finish of frame and panels and stainless steel security hinge pins with set-screws.

NOTE: Zinc die cast above is standard; stainless steel option below has an upcharge.
Finishes to match are closest matches available by the manufacturer.
Review for acceptability.

- b. [**Stainless steel hinges and security hinge pins with set-screws.**]
- 7. Adjustment: Provide folding/sliding hardware capable of compensation and adjustments without needing to remove panels from tracks, in width, 1/16 inch (1.5 mm) per hinge and in

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height, 5/64 inch (2 mm) up and down.

- E. Weatherstripping: Manufacturer's double layer EPDM between panels, EPDM gasket and Q-Ion gasket, or brush seal between panel and frame, or brush seals with a two-layer fiberglass reinforced polyamide fin attached at both inner and outer edge of bottom of door panels with a recessed sill or on frame for sealing between panels and between panel and frame.

NOTE: The manufacturer's weatherstripping is determined at the factory by the direction of swing, the panel configuration, the type of locking and the type of sill.

- F. Fasteners: Tapered pins or stainless steel screws for connecting frame components.

2.04 FABRICATION

- A. Folding Glass Storefront: Extruded aluminum frame and panel profiles, corner connectors and hinges, sliding and folding hardware, locking hardware and handles, glass and glazing and weatherstripping.
1. Each unit factory pre-assembled and shipped with complete system components and installation instructions.
 2. Exposed work to be carefully matched to produce continuity of line and design with all joints.
 3. No raw edges visible at joints.

2.05 ACCESSORIES

- A. Provide sidelights, transoms, corner posts, or single or double doors as indicated.

NOTE: Screen ONE is 'non-pleated' while Screen Classic is 'pleated.'
Select 'ONE' or 'Classic,' deleting option not chosen.

- A. Insect Screen Panels: Fully retractable non-pleated screen made of ultra-strong, UV resistant fiberglass mesh housed in a single cartridge riding on a single track.
1. Basis of Design Product by Manufacturer: **Screen ONE** or an Architect acceptable equivalent subject to project requirements.
 2. Finish - Aluminum Top Track, Side Jambs and Vertical Struts:
 - a. White powder coated
 - b. [**Clear anodized**]
 - c. [**Black powder coated**]
 - d. [**Classic bronze powder coated**]

NOTE: Above options are standard. Check with NanaWall regarding other available finishes, which may require an upcharge.

- B. Insect Screen Panels: A series of top-hung collapsible pleated UV resistant fiberglass mesh screen panels riding on a single narrow ADA compliant 1/4 inch (5 mm) floor track. Each 4 inch (10 cm) wide vertical cassette can expand to 3'-3" (1 m) wide.
1. Basis of Design Product by Manufacturer: **Screen Classic** or an Architect acceptable equivalent subject to project requirements.
 2. Finish - Aluminum Top Track, Side Jambs and Vertical Struts:
 - a. White powder coated
 - b. [**Clear anodized**]
 - c. [**Dark bronze anodized**]

NOTE: Above options are standard. Check with NanaWall regarding powder coated and other available finishes, which may require an upcharge.

- d. [**Powder coated with color as selected by architect.**]
3. Screen Track Stacking: [**Within opening**] [**Extended beyond opening**]

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PART 3 EXECUTION

3.01 EXAMINATION

- A. Examination and Acceptance of Conditions per Section 01 70 00 and as follows:
1. Carefully examine rough openings with Installer present, for compliance with requirements affecting Work performance.
 - a. Examine surfaces of openings and verify dimensions; verify rough openings are level, plumb, and square with no unevenness, bowing, or bumps on the floor; and other conditions as required by the manufacturer for readiness to receive Work.
 - b. Verify structural integrity of the header for deflection with live and dead loads limited to the lesser of L/720 of the span or 1/4 inch (6 mm). Provide structural support for lateral loads, and both wind load and eccentric load when the panels are stacked open.

NOTE: Prior to installing NanaWall, it is recommended that all building dead loads be applied to the header. Allow a reasonable amount of time for the dead load's effect on the header; only then can the building's live load be used to meet the above requirements of L/720 or 1/4 inch (6 mm). If this is not done, both dead and live loads need to be considered.

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

3.02 INSTALLATION

- A. General: Install Folding Glass Storefront system in accordance with the Drawings, approved submittals, Dade County NOA, manufacturer's recommendations and installation instructions, and as follows:
1. Properly flash, waterproof and seal around opening perimeter.
 2. Securely attach anchorage devices to rigidly fit frame in place, level, straight, plumb and square. Install frame in proper elevation, plane and location, and in proper alignment with other work.
 3. When lower track is designed to drain, provide connections to allow for drainage.
 4. Install panels, handles, lockset, screens and other accessories in accordance with manufacturer's recommendations and instructions.

3.03 FIELD QUALITY CONTROL

- A. Field Tests and Inspections per Section 01 40 00 of the following:
1. Verify the Folding Glass Storefront system operates and functions properly. Adjust hardware for proper operation.
- B. Non-Conforming Work: Repair or replace non-conforming work as directed by the Architect; see General and Supplementary Conditions, and Division 01, General Requirements.

3.04 CLEANING AND PROTECTION

- A. Keep units closed and protect Folding Glass Storefront installation against damage from construction activities.
- B. Remove protective coatings and use manufacturer recommended methods to clean exposed surfaces.

END OF SECTION

DISCLAIMER:

Nana Wall Systems, Inc. takes no responsibility for product selection or application, including, but not limited to, compliance with building codes, safety codes, laws, or fitness for a particular purpose. This guide specification is not intended to be verbatim as a project specification without appropriate modifications for the specific use intended and the particular requirements of a specific construction project.

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