

## SECTION 08 35 13

### THERMALLY BROKEN ALUMINUM FRAMED FOLDING GLASS SYSTEM

#### SECTION 08 43 33

#### THERMALLY BROKEN ALUMINUM FRAMED FOLDING GLASS DOOR STOREFRONT

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 sliding-folding thermally broken, aluminum-framed glass panel system that includes:
1. Aluminum framed panels.
  2. Threshold.
  3. Sliding-folding and locking hardware.
  4. Weather stripping.
  5. Bionic Turtle® thermal break.
  6. Multipurpose frame insert.
  7. Glass and glazing.
  8. Panel Catch.
  9. Insect screen (optional).
  10. 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 06 20 00, Finish Carpentry.
  4. Section 07 27 00, Air Barriers: Building paper and buildingwrap.
  5. Section 07 62 00, Sheet Metal Flashing and Trim: Flashing gutters, and other sheet metal work.
  6. Section 07 90 00, Joint Protection.
  7. Section 08 32 13, Sliding Aluminum-Framed Glass Doors: NanaWall cero.
  8. Section 08 42 23, Glass Entrance Swing Doors.
  9. Section 08 43 33, Thermally Broken Aluminum Framed Folding Partitions: NanaWall NW Aluminum 840.
  10. Section 08 51 13, Aluminum Windows: NanaWall SL88, tilt-turn, casement window.
  11. Section 09 22 16, Non-Structural Metal Framing: Metal framing R.O. and reinforcement.
  12. Section 10 22 39, Thermally Broken, Acoustically Rated, Aluminum Framed Folding Glass Partitions: NanaWall NW Acoustical 645.

## 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](http://www.aamanet.org)
    - a. AAMA 205-15, In-Plant Testing Guidelines for Manufacturers and Independent Laboratories.
    - b. AAMA 502, Voluntary Specification for Field Testing of Newly Installed Fenestration Products.
    - c. AAMA 611, Voluntary Specification for Anodized Architectural Aluminum.
    - d. AAMA 920-11, Specification for Operating Cycle Performance of Side-Hinged Exterior Door Systems.
    - e. AAMA 1304, Voluntary Specifications 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/WDMA/CSA 101/I.S.2/A440-17, NAFS, North American Fenestration Standard Specification for Windows, Doors and Skylights.
  2. ANSI. American National Standards Institute; [www.ansi.org](http://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](http://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 E283-04 (2012), Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
    - d. ASTM E330-00 (2016), Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
    - e. ASTM E331-00 (2016) Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
    - f. ASTM E547-00 (2016), Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference.
    - g. ASTM E2068-00 (2016) Standard Test Method for Determination of Operating Force of Sliding Windows and Doors.
    - h. ASTM E987-88 (2017) Standard Test Methods for Deglazing Force of Fenestration Products.
    - i. ASTM E1332, Standard Classification for Rating Outdoor-Indoor Sound Attenuation.
    - j. ASTM F842, Standard Test Methods for Measuring the Forced Entry Resistance of Sliding Door Assemblies, Excluding Glazing Impact.
  4. Construction Products Directive (CPD), a legal mandate of the European Commission; [http://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/construction-products/index\\_en.htm](http://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/construction-products/index_en.htm)
    - a. CE Mark; [http://ec.europa.eu/growth/single-market/ce-marking/index\\_en.htm](http://ec.europa.eu/growth/single-market/ce-marking/index_en.htm)
  5. CPSC. Consumer Product Safety Commission; [www.cpsc.gov](http://www.cpsc.gov)
    - a. CPSC 16CFR-1201, Safety Standard for Architectural Glazing Materials

6. CSA Group (Canadian Standards Association); [www.csagroup.org/global/en/home](http://www.csagroup.org/global/en/home)
  - a. CSA A440S1 - The Canadian supplement to North American (NAFS) standards
7. FL. Florida Building Commission – Product Approval; [https://floridabuilding.org/pr/pr\\_app\\_srch.aspx](https://floridabuilding.org/pr/pr_app_srch.aspx)
8. DIN. "Deutsches Institut für Normung" (German institute for standardization); [www.en-standard.eu/din-standards](http://www.en-standard.eu/din-standards)
  - a. DIN EN 1090, Manufacturing qualification for welding of supporting building components.
  - b. DIN EN 1627, Pedestrian door sets, windows, curtain walling, grilles, and shutters - Burglar resistance - Requirements and classification.
  - c. DIN EN 1630, Pedestrian door sets, windows, curtain walling, grilles, and shutters - Burglar resistance - Test method for the determination of resistance to manual burglary attempts.
  - d. DIN EN ISO 9001, 2015 quality management system registration.
  - e. DIN EN ISO 12400, Windows and pedestrian doors - Mechanical durability - Requirements and classification.
  - f. DIN EN ISO 14001, 2015 environmental management system registration.
9. Energy Star, U.S. Environmental Protection Agency (EPA) Program; [www.energystar.gov](http://www.energystar.gov)
10. EN Standards – Construction Materials and Building (European Standards); [www.en-standard.eu/din-standards](http://www.en-standard.eu/din-standards)
  - a. CSN EN 1191, Windows and Pedestrian Doors – Mechanical Durability.
11. NFRC. National Fenestration Rating Council; [www.nfrc.org](http://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 Door system and framing R.O.
- B. Pre-installation 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 Door 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. Product Drawings: Indicate Folding Glass Door 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, and handle heights.
- D. Certificates: Submit CE Mark Certificate.
- E. Manufacturers' Instructions: Submit Owner's Manual from manufacturer which includes installation instructions, operation, and maintenance data: 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](https://www.usgbc.org/)®): 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 (EAc1): Optimize Energy Performance: System.
  - 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 3 below can apply to reusing salvaged Folding Glass Door.

- 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, 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 Door.

- 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
    - a). Submit calculations or measurements for occupant spaces to meet sound transmission class ratings between adjacent spaces and reverberation time requirements within a room.

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, MRc6, 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. Regulatory Requirements: Folding Glass Door to be CE Mark certified.

**NOTE:** The CE mark serves as verification that the product conforms with the essential requirements of the Construction Products Directive (CPD), a legal mandate of the European Commission. CE certified windows and doors provide building professionals with a uniform set of technical standards to evaluate and specify product performance with added assurance that NanaWall products are safe and fit for purpose.

- B. Manufacturer Qualifications: Manufacturer capable of providing complete, precision built, engineered, pre-fitted units with a minimum thirty (30) years' experience in the sale of folding-sliding door systems for large openings in the North American market.
  - 1. Manufacturer to have DIN EN ISO 9001: 2015 quality management system registration.
  - 2. Manufacturer to have DIN EN ISO 14001: 2015 environmental management system registration.
- C. 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.
- D. Single Source Responsibility: Furnish Folding Glass Door 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.

#### 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 product drawing submittal.

#### 1.08 WARRANTY

- A. Manufacturer Warranty: Provide Folding Glass Door 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 Insulated 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 specific system approved or certified trained installer.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Basis-of-Design Product by Manufacturer: **Generation 4 Folding Glass Walls by NanaWall NW Aluminum 640** ([www.nanawall.com](http://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](mailto: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:** Select one of the eight Performance Criteria paragraphs below for different Sill and Opening type, deleting paragraphs not chosen.

Choose the Hybrid Sill, Low Profile Saddle Sill, Low Profile Saddle Sill with UniverSILL®, Low Profile Raised Sill, or Flush Sill for Inward or Outward Opening Units.

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. Results shown only apply to odd-odd, odd-even, odd-frame and even-frame configurations and NOT to even-even configurations. Even higher ratings may be possible for odd-odd and odd-frame configurations.

Structural load testing results are only applicable for the test unit size and type of locking and rods. 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 limitations on the use of these charts in the jurisdiction of the project.

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

Check for requirements in the jurisdiction of the project.

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 502.

- A. Performance Criteria (Specific or equivalent to lab tested): **Hybrid Sill - Inward Opening**
1. Folding Glass Door Units tested to AAMA/WDMA/CSA 101/I.S.2/A440-17 (NAFS-17):
    - a. Class CW-PG25 - FLD 157-1/2 inch x 102-3/8 inch (4000 mm x 2600 mm) and Class LC-PG50 - FLD 157-1/2 inch x 102-3/8 inch (4000 mm x 2600 mm) with 1L3R configuration for inward opening units.
  2. Structural Load Deflection (ASTM E330):
    - a. Design Pressure - Positive: 50 psf (2400 Pa)
    - b. Design Pressure - Negative: 55 psf (2670 Pa)
    - c. Uniform Load deflection, L/175: Pass 25 psf (1190 Pa)
  3. Air Infiltration (ASTM E283):
    - a. 0.03 cfm/ft<sup>2</sup> (0.15 L/s/m<sup>2</sup>) at a static air pressure difference of 1.57 psf (75 Pa)
    - b. 0.07 cfm/ft<sup>2</sup> (0.35 L/s/m<sup>2</sup>) at a static air pressure difference of 6.24 psf (300 Pa)
    - c. Canadian Air Infiltration/Exfiltration Level: A3

4. Water Penetration (ASTM E331, ASTM E547):
  - a. No uncontrolled water leakage at a static test pressure of 9 psf (450 Pa).  
(Not applicable for even-even configurations)
- B. Performance Criteria (Specific or equivalent to lab tested): **Hybrid Sill - Outward Opening**
  1. Folding Glass Door Units tested to AAMA/WDMA/CSA 101/I.S.2/A440-17 (NAFS-17):
    - a. Class CW-PG25 - FLD 157-1/2 inch x 102-3/8 inch (4000 mm x 2600 mm) and Class LC-PG50 - FLD 157-1/2 inch x 102-3/8 inch (4000 mm x 2600 mm) with 1L3R configuration for outward opening units.
  2. Structural Load Deflection (ASTM E330):
    - a. Design Pressure - Positive: 55 psf (2670 Pa)
    - b. Design Pressure - Negative: 50 psf (2400 Pa)
    - c. Uniform Load deflection, L/175: Pass 25 psf (1190 Pa)
  3. Air Infiltration (ASTM E283):
    - a. 0.03 cfm/ft<sup>2</sup> (0.15 L/s/m<sup>2</sup>) at a static air pressure difference of 1.57 psf (75 Pa)
    - b. 0.07 cfm/ft<sup>2</sup> (0.35 L/s/m<sup>2</sup>) at a static air pressure difference of 6.24 psf (300 Pa)
    - c. Canadian Air Infiltration/Exfiltration Level: A3
  4. Water Penetration (ASTM E331, ASTM E547):
    - a. No uncontrolled water leakage at a static test pressure of 9 psf (450 Pa).  
(Not applicable for even-even configurations)
- C. Performance Criteria (Lab Tested): **Low Profile Saddle Sill - Inward Opening**
  1. Folding Glass Door Units tested to AAMA/WDMA/CSA 101/I.S.2/A440-17 (NAFS-17):
    - a. Class CW-PG25 - FLD 157-1/2 inch x 102-3/8 inch (4000 mm x 2600 mm) and Class LC-PG35 - FLD 157-1/2 inch x 102-3/8 inch (4000 mm x 2600 mm) with 1L3R configuration for inward opening units.
  2. Structural Load Deflection (ASTM E330):
    - a. Design Pressure - Positive: 50 psf (2400 Pa)
    - b. Design Pressure - Negative: 50 psf (2400 Pa)
    - c. Uniform Load deflection, L/175: Pass 25 psf (1190 Pa)
  3. Air Infiltration (ASTM E283):
    - a. 0.12 cfm/ft<sup>2</sup> (0.61 L/s/m<sup>2</sup>) at a static air pressure difference of 1.57 psf (75 Pa)
    - b. 0.30 cfm/ft<sup>2</sup> (1.52 L/s/m<sup>2</sup>) at a static air pressure difference of 6.24 psf (300 Pa)
    - c. Canadian Air Infiltration/Exfiltration Level: A2
  4. Water Penetration (ASTM E331, ASTM E547):
    - a. No uncontrolled water leakage at a static (with weeps) test pressure of 5.43 psf (260 Pa).  
(Not applicable for even-even configurations)
- D. Performance Criteria (Lab Tested): **Low Profile Saddle Sill - Outward Opening**
  1. Folding Glass Door Units tested to AAMA/WDMA/CSA 101/I.S.2/A440-17 (NAFS-17):
    - a. Class CW-PG25 - FLD 157-1/2 inch x 102-3/8 inch (4000 mm x 2600 mm) and Class LC-PG35 - FLD 157-1/2 inch x 102-3/8 inch (4000 mm x 2600 mm) with 1L3R configuration for outward opening units.
  2. Structural Load Deflection (ASTM E330):
    - a. Design Pressure - Positive: 50 psf (2400 Pa)
    - b. Design Pressure - Negative: 50 psf (2400 Pa)
    - c. Uniform Load deflection, L/175: Pass 25 psf (1190 Pa)

3. Air Infiltration (ASTM E283):
  - a. 0.12 cfm/ft<sup>2</sup> (0.61 L/s/m<sup>2</sup>) at a static air pressure difference of 1.57 psf (75 Pa)
  - b. 0.28 cfm/ft<sup>2</sup> (1.50 L/s/m<sup>2</sup>) at a static air pressure difference of 6.24 psf (300 Pa)
  - c. Canadian Air Infiltration/Exfiltration Level: A2
4. Water Penetration (ASTM E331, ASTM E547):
  - a. No uncontrolled water leakage at a static (with weeps) test pressure of 5.43 psf (260 Pa). (Not applicable for even-even configurations)
- E. Performance Criteria (Specific or equivalent to lab tested): **Low Profile Saddle Sill with UniverSILL® - Outward Opening**
  1. Folding Glass Door Units tested to AAMA/WDMA/CSA 101/I.S.2/A440-17 (NAFS-17):
    - a. Class CW-PG35 - FLD 157-1/2 inch x 102-3/8 inch (4000 mm x 2600 mm) and Class LC-PG50 - FLD 157-1/2 inch x 102-3/8 inch (4000 mm x 2600 mm) with 1L3R configuration for outward opening units.
  2. Structural Load Deflection (ASTM E330):
    - a. Design Pressure - Positive: 50 psf (2400 Pa)
    - b. Design Pressure - Negative: 50 psf (2400 Pa)
    - c. Uniform Load deflection, L/175: Pass 25 psf (1190 Pa)
  3. Air Infiltration (ASTM E283):
    - a. 0.04 cfm/ft<sup>2</sup> (0.20 L/s/m<sup>2</sup>) at a static air pressure difference of 1.57 psf (75 Pa)
    - b. 0.07 cfm/ft<sup>2</sup> (0.35 L/s/m<sup>2</sup>) at a static air pressure difference of 6.24 psf (300 Pa)
    - c. Canadian Air Infiltration/Exfiltration Level: A3
  4. Water Penetration (ASTM E331, ASTM E547):
    - a. No uncontrolled water leakage at a static (with weeps) test pressure of 7.5 psf (360 Pa). (Not applicable for even-even configurations)
- F. Performance Criteria (Specific or equivalent): **Low Profile Raised Sill - Inward Opening**
  1. Folding Glass Door Units tested to AAMA/WDMA/CSA 101/I.S.2/A440-17 (NAFS-17):
    - a. Class CW-PG25 - FLD 157-1/2 inch x 102-3/8 inch (4000 mm x 2600 mm) and Class LC-PG35 - FLD 157-1/2 inch x 102-3/8 inch (4000 mm x 2600 mm) with 1L3R configuration for inward opening units.
  2. Structural Load Deflection (ASTM E330):
    - a. Design Pressure - Positive: 50 psf (2400 Pa)
    - b. Design Pressure - Negative: 50 psf (2400 Pa)
    - c. Uniform Load deflection, L/175: Pass 25 psf (1190 Pa)
  3. Air Infiltration (ASTM E283):
    - a. 0.12 cfm/ft<sup>2</sup> (0.61 L/s/m<sup>2</sup>) at a static air pressure difference of 1.57 psf (75 Pa).
    - b. 0.30 cfm/ft<sup>2</sup> (1.52 L/s/m<sup>2</sup>) at a static air pressure difference of 6.24 psf (300 Pa).
  4. Water Penetration (ASTM E331, ASTM E547):
    - a. No uncontrolled water leakage at a static (with weeps) test pressure of 5.43 psf (260 Pa). (Not applicable for even-even configurations)
- G. Performance Criteria (Specific or equivalent to lab tested saddle sill): **Flush Sill - Inward Opening**
  1. Structural Load Deflection (ASTM E330):
    - a. Design Pressure - Positive: 50 psf (2400 Pa)



- b. Design Pressure - Negative: 50 psf (2400 Pa)
- c. Uniform Load deflection, L/175: Pass 25 psf (1190 Pa)
- 2. Air Infiltration (ASTM E283):
  - a. 0.12 cfm/ft<sup>2</sup> (0.61 L/s/m<sup>2</sup>) at a static air pressure difference of 1.57 psf (75 Pa)
  - b. 0.30 cfm/ft<sup>2</sup> (1.52 L/s/m<sup>2</sup>) at a static air pressure difference of 6.24 psf (300 Pa)
  - c. Canadian Air Infiltration/Exfiltration Level: A2
- H. Performance Criteria (Specific or equivalent to lab tested saddle sill): **Flush Sill - Outward Opening**
  - 1. Structural Load Deflection (ASTM E330):
    - a. Design Pressure - Positive: 50 psf (2400 Pa)
    - b. Design Pressure - Negative: 50 psf (2400 Pa)
    - c. Uniform Load deflection, L/175: Pass 25 psf (1190 Pa)
  - 2. Air Infiltration (ASTM E283):
    - a. 0.12 cfm/ft<sup>2</sup> (0.61 L/s/m<sup>2</sup>) at a static air pressure difference of 1.57 psf (75 Pa)
    - b. 0.28 cfm/ft<sup>2</sup> (1.50 L/s/m<sup>2</sup>) at a static air pressure difference of 6.24 psf (300 Pa)
    - c. Canadian Air Infiltration/Exfiltration Level: A2

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

- I. Performance Criteria (Lab Tested):
  - 1. Swing Panel – Operation / Cycling Performance (AMMA 920): 500,000 cycles
  - 2. System – Life Cycle Performance (DIN EN 1191/12400): 20,000 cycles
  - 3. Operating Force (ASTM E2068):
    - a. Swing Panel: Open 1 lbf (2.8 N) & Close 1 lbf (3.9 N)
    - b. Folding Panels:
      - 1). Initiate Motion - Open 4 lbf (20 N) & Close 3 lbf (15 N)
      - 2). Maintain Motion - Open 1 lbf (3 N) & Close 1 lbf (4 N)

**NOTE:** Retain Florida Product Approval subparagraph below when needed to meet wind loading requirements.

- 4. Florida Product Approval Units with panel sizes up to 157 1/2" (4000 mm) wide x 102 3/8" (2600 mm) high subject to manufacturer size chart: FL 38736

**NOTE:** FL 38736 web-link is:

[https://www.floridabuilding.org/pr/pr\\_app\\_dtl.aspx?param=wGEVXQwtDqsRVWgCiOK1WnOu3%2fik4Mp2ltvC36TIWMcZmzdrjlnfOw%3d%3d](https://www.floridabuilding.org/pr/pr_app_dtl.aspx?param=wGEVXQwtDqsRVWgCiOK1WnOu3%2fik4Mp2ltvC36TIWMcZmzdrjlnfOw%3d%3d)

- 5. Forced Entry (AAMA 1304, DIN EN 1191): Pass
- 6. Forced Entry Resistance (ASTM F842, AMMA 1304, CAWM 300): Meets Grade 40; +F2

**NOTE:** Forced entry testing results are only applicable for the test unit type of locking. See manufacturer's latest published data regarding performance.

Retain Burglary Resistance subparagraph below when desired; this additional security option is available for an upcharge.

- 7. Unit Burglary Resistance: EN 1627-30, Class RC2/ RC2N Certified
- 8. Thermal Performance (U-factor): NFRC 100 Rated, Certified, and Labeled
- 9. Solar Heat Gain Coefficient (SHGC) + Visible Light Transmission (VT): NFRC 200 Rated, Certified, and Labeled

10. Air Leakage: NFRC 400 Rated, Certified, and Labeled  
 11. Condensation Resistance (CR): NFRC 500 Rated, Certified, and Labeled

**NOTE:** The NFRC 100, 200, 400, and 500 ratings of the NW Aluminum 640 Folding Glass Storefront System with specific glass 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.

12. EPA Energy Star: Meets requirements

**NOTE:** **Energy Star** values for DOORS with > 50% glass can be achieved by 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** Air Leakage Rating Requirements (ASTM E283 in accordance with NFRC 400 or AAMA/WDMA/CSA 101/I.S.2/A440-11):

Swinging Door: ≤ 0.5 cfm/ft<sup>2</sup> (2.56 L/s/m<sup>2</sup>)

For guidance only as Nana Wall Systems is not a participant of the Energy Star Program.

#### J. 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.
- b. MRc1.1: *NanaWall* exterior glass wall systems, not demolished in a renovation project, are reused in the same location.
- c. MRc2: *NanaWall* cardboard shipping crates are made of 60% recycled material and are 100% recyclable.
- d. MRc3: *NanaWall's* components easily disassemble and reassemble to "Use as salvaged... or reused materials."
- e. MRc5: *NanaWall* glazing, panel, track and door manufacturing final assembly plant is located in Richmond, CA 94801.
- f. IEQc2: *NanaWall* systems provide natural ventilation in the open position, assisting in the 90% required natural ventilation of occupied spaces of ASHRAE 62.1.
- g. EQc8.1: *NanaWall* glass wall assembly borrowed light brings daylight deeper into the floor plate.
- h. EQc8.2: *NanaWall* glass wall assemblies provide direct outdoor lines of sight.

##### 2. LEED v4 for Building Design and Construction (BD&C)

- a. EAc2: *NanaWall* systems using low U-Value designed double IGU 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.

#### K. Design Criteria:

1. Sizes and Configurations: As indicated by the Drawings for selected number and size of panels, location of swing panels, and number of panels stacking to the left and to the right.

2. Unit Operation: Adjustable sliding and folding hardware with top and bottom tracks.
3. Mounting Type: Floor track supported with upper guide track.
4. Panel Configuration:
  - a. [ Straight ]
  - b. [ Window / door combination ]
  - c. [ 90° angle turn ]
5. Stack Storage Configuration:
  - a. [ Inswing type ]
  - b. [ Outswing type ]
6. Panel Type: Hinged
  - a. Primary swing panel of paired swing panels, looking from inside, to be on the [ left ] [ right ].
  - b. [ With Entry/Egress panel hinged to bi-folding panels ]
  - c. [ With Entry/Egress panel hinged to side jamb ]
  - d. [ Without Entry/Egress panel ]
7. Panel Pairing Configuration: See drawings.
  - a. [ Bi-folding panels hinged to side jamb ]
  - b. [ Bi-folding panels unhinged FourFold or SixFold panel sets ]

**NOTE:** Sizes and Configurations: <https://www.nanawall.com/products/nw-aluminum-640/options>  
See manufacturer's 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.

## 2.03 MATERIALS

- A. Thermally Broken Aluminum Framed Folding Glass Door Description: 2-5/8 inch (67 mm) thick, floor track supported system. Manufacturer's standard thermally broken panels and frame profiles, with head track, side jambs, sill, and panels with dimensions as shown on Drawings.

1. Panels and Frame:
  - a. Panels
    - 1). Single lite.

**NOTE:** Single lite above is standard; other options below may require an upcharge.  
Refer to manufacturer's size chart for glass panel sizes requiring the use of horizontal mullions.

- 2). [ Multiple lites with horizontal mullion(s) at height(s) indicated from the bottom of the panel. ]
- 3). [ Single lite with simulated divided lites in pattern as shown on Drawings. ]
- 4). Panel Size (W x H): As indicated.

**NOTE:** Maximum panel width is 3' 3" (1000 mm) with a maximum unit height of 10' 2" (3100 mm).  
Refer to NanaWall size chart. Note that heavier glass may limit maximum sizes possible.

- 5). Rail Depth: 2-5/8 inch (67 mm)
- 6). Top Rail Width: 2-5/8 inch (67 mm)
- 7). Typical Stile Width: 1-3/4 inch (45 mm) on both stiles for a nominal frame stile width of 3-7/8 inch (99 mm) between folding panels.

- 8). Bottom Rail Width:
  - a). [ 2-5/8 inch (67 mm) ]
  - b). [ Manufacturer's standard kick-plate of 10 inches (254 mm) ]
- b. Frame:
  - 1). Thermally broken top track and side jambs with multipurpose frame insert to hide anchoring frame connections and conceal cable routing to security system by others. For long-term tight, consistent sealing, provide a lateral patented (Patent Number: US10683688B2) adjustment feature at the side jambs capable of adjustment of +/- 3/16" (5 mm). Frame finish to match panel finish.

**NOTE:** Frame fasteners, attachment points and screw heads should be concealed by the multipurpose frame insert for enhanced aesthetics.

- 2). Side Jamb Depth: 2-5/8 inch (67 mm)
- 3). Head Track Width:
  - a). [ 2-13/16 inch (72 mm) standard ]
  - b). [ 3-7/8 inch (99 mm) anti-tilt feature for unhinged FourFold or SixFold panel set configurations ]
- 4). Side Jamb Width: 2 inches (51 mm)

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

- 5). Sill Type - Extruded Aluminum:
  - a). [ Hybrid sill with high heel protector insert (thermally broken) ]
  - b). [ Low profile saddle sill - ADA compliant with high heel protector insert (thermally broken) ]
  - c). [ Low profile saddle sill with UniverSILL® and high heel protector insert (thermally broken) ]
  - d). [ Low profile raised sill with high heel protector insert (thermally broken) ]
  - e). [ Flush sill - ADA compliant with high heel protector insert (thermally broken) ]
- 6). Sill Finish:
  - a). [ Clear anodized ]
  - b). [ Black anodized ]
2. Aluminum Extrusion: AIMgSi0.5 alloy, 6063-T5 (F-22 - European standard)
  - a. Thickness: 0.078 inch (2.0 mm) nominal
  - b. Thermal Break: 1-15/16 inch (49 mm) wide specially designed and patented (Patent Number: US10550625B2) glass fiber reinforced (GFR) polyamide "Bionic Turtle®" for panels. Standard thermal break elsewhere.
3. Aluminum Finish:
  - a. Inside and Outside;
    - 1). [ Same (one-color) ]
    - 2). [ Different (two-tone) ]

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

- b. Anodized (AAMA 611):
  - 1). [ Clear ]
  - 2). [ Dark Bronze ]

- 3). [ Black ]
- c. 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). [ Custom finish. ]
- B. Glass and Glazing:
  1. Safety Glazing: In compliance with ASTM C1036, ASTM C1048, ANSI Z97.1 and CPSC 16CFR 1201.

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

2. Manufacturer's [ **tempered** ] [ **and** ] [ **laminated** ] glass lites in insulated glazing units, 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.

Glass thickness from 15/16" (24 mm) to 1-3/4" (45 mm) possible. Note that heavier glass may limit maximum sizes possible.

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. Insulated Glass Unit (IGU) Lites:
  - 1). Single: 1/4 inch (6 mm)
  - 2). Double IGU: 15/16 inch (24 mm) thick.
  - 3). Triple IGU: 1-3/8 inch (35 mm) thick.
- b. IGU Fill:
  - 1). Air filled
  - 2). [ Argon filled ]
- c. Glass Lite Type:
  - 1). Standard reduced iron

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

- 2). [ Low iron ]
- 3). [ Solar bronze ]
- 4). [ Solar gray ]
- 5). [ Bird safe ]
- d. Glass Spacers: Manufacturer's standard
  - 1). [ silver gray finish with capillary tubes ]
  - 2). [ black finish with capillary tubes ]
  - 3). [ silver gray finish without capillary tubes ]
  - 4). [ black finish without capillary tubes ]

- e. IGU Surface:
  - 1). Clear
  - 2). [ Low-E coating on # 2 surface of double IGU ]
  - 3). [ Low-E coating on # 2 and # 4 surface of double IGU ]
  - 4). [ Low-E coating on # 2 and # 5 surface of triple IGU ]

**NOTE:** "Alarmed Glazing" by others subparagraph below is an option.

- 3. Alarmed Glazing: Connection wiring to alarm system, position monitoring, locking detection and notification systems such as glass-breakage sensors by others.

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: Provide manufacturer's standard lever handles on the inside and outside, and a lockset with lockable latch, multi-point locking with a dead bolt and rods at the top and bottom on primary panel only.
  - a. Locking:
    - 1). Standard profile cylinder
    - 2). [ Adapter for Small Format Interchangeable Core (SFIC) by others ]
  - b. Rods to be concealed and not edge mounted.
  - c. After turn of key or thumb-turn, depression of handles withdraws latch.
  - d. Lifting of handles engages rods and turn of key or thumb-turn engages deadbolt and operates lock.
  - e. Lever Handle - Finish:
    - 1). Brushed satin stainless steel
    - 2). [ Black titanium stainless steel ]

**NOTE:** Handles above are standard; option below may require an upcharge.

Other compatible lever handle styles and finishes are available from other suppliers.

- 3). [ Copper-nickel stainless steel antiviral and antimicrobial ]
  - f. Secondary Swing Panel: Provide concealed two-point, edge locking.
- 2. Main Entry Panel(s) for Models WITH a [ **Pair of** ] Swing Panel: Provide manufacturer's [ **Accurate 18L lever handles** ] or [ **Accurate 20L lever handles with return** ] on the inside and outside for commercial application, and a lockset with lockable latch, single point locking with a deadbolt on primary panel [ **only** ].
  - a. Locking:
    - 1). [ 5 pin US rim cylinder ]
    - 2). [ US mortise cylinder that can accommodate 5-7 pin, SFIC, FSIC or LFIC cores ]
  - b. Secondary Swing Panel: Provide concealed two-point, edge locking.

**NOTE:** Other compatible lever handle styles and finishes are available from Accurate and other suppliers.

- 3. Main Entry Panel(s) for Model WITH a Swing Panel: Prepped for commercial applications with a single motion locking operated by lever handles with locking with a US mortise cylinder that can accommodate 5 - 7 pin, SFIC, FSIC or LFIC cores for interior application.
  - a. Locking:
    - 1). [ Yale 8808-2 Series with Mortise Lock ]

- 2). [ L/LV9000 Series from Schlage with Mortise Lock ]
4. Main Entry Panel: Provide manufacturer's standard flat handle on inside only with concealed two-point locking hardware operated by 180° turn of handle.

**NOTE:** With the option above, the main entry panel is operable from inside only and that there is no latch.

5. Main Entry Panel(s) for Models WITH a Swing Panel: No hardware or locking provided by manufacturer; Field installed panic device by Section 08 71 00 prepped for commercial application.

**NOTE:** Structural test load results will not apply for locking devices by others.

- a. Panic Hardware:
  - 1). [ Von Duprin 33/35A Series Narrow Stile Rim Exit Device ]
  - 2). [ Von Duprin 98/99 Series Rim Exit Device ]
  - 3). [ DORMA 9700 Series Narrow Stile Rim Exit Device ]
6. Pairs of Folding Panels: Provide manufacturer's flat handle and concealed two-point locking hardware operated by 180° turn of handle between each pair. Face applied flush bolt locking NOT acceptable.
  - a. Flat Handle - Finish:
    - 1). Brushed satin stainless steel
    - 2). [ Black titanium stainless steel ]

**NOTE:** Handles above are standard; option below may require an upcharge.

- 3). [ Copper- nickel stainless steel antiviral and antimicrobial ]
7. Handle Height: 41-3/8 inch (105 cm) centered from bottom of panel or as otherwise indicated.
8. Locking rods with standard end caps at the top and bottom. Rods to have a stroke of 15/16 inch (24 mm).
9. Additional profile cylinders to be [ **Keyed alike.** ] [ **Keyed differently.** ]
10. Burglary Resistance to be [ **Standard** ] [ **Class RC2/ RC2N certified** ].
11. Panel Catch: panel catch to hold swing panel to adjacent folding panel to prevent incorrect operation when moving the panel.
- D. Sliding-Folding Hardware: Provide manufacturer's standard combination sliding and folding hardware with top and bottom tracks and threshold. All bottom rollers to be with sealed, self-lubricating, double ball bearing multi-rollers. Surface mounted hinges and bottom rollers NOT acceptable.
  1. Bottom Rollers Carrying Capacity: 240 lb. (110 kg). Bottom rollers provided with two vertical stainless-steel wheels with double row of ball bearings and two horizontal polyamide wheels.

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

2. Vertical wheels with Gothic arch feature to ride on top of stainless-steel guide track covers over the full length of the sill track.
3. Upper guide rollers with two horizontal polyamide guiding wheels. For configurations with unhinged FourFold and SixFold panel sets that can slide left or right, additional concealed, additional vertical tilt protection hardware.
4. Hinges and Rollers: [ **Clear** ] [ **Black** ] anodized aluminum with stainless steel security hinge pins and set-screws. Concealed panel alignment with a tight seal through the patented (Patent Number: US10711510B2) TwinX mechanism reinforced between panels. Double ball bearing stainless-steel wheel rollers match hinge finish.

5. Spring-Loaded Pull Handle: For outswing units with larger panel sizes, a spring-loaded pull handle is supplied for ease of closing the system. The pull handle is located above the flat handle. When not in use, the handle lays flat against the adjacent panel and is supplied with bumpers to avoid metal to metal contact. Handles are stainless steel with the attachment to coordinate the hinge hardware of the system.
  - a. Pull Handle - Finish:
    - 1). Silver stainless steel
    - 2). [ Black titanium stainless steel ]
6. Weather stripping: Manufacturer's double layer EPDM between panels and EPDM gasket, 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 weather stripping is determined at the factory by the direction of swing, the panel configuration, the type of locking and the type of sill.

- a. UniverSILL® (Patent No. US011174673B2): For outswing low profile saddle sill, UniverSILL sill adaptor is available for additional air and water performance when needed.
- E. Fasteners: Installation plates for connecting frame components made of stainless steel with sealing cushion to avoid thermal conductivity.

## 2.04 FABRICATION

- A. Folding Glass Wall: Extruded aluminum frame and panel profiles, corner connectors and hinges, sliding and folding hardware, locking hardware and handles, glass and glazing and weather stripping.
  1. Each unit factory pre-assembled and shipped with complete system components, installation mounting plates, 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. **Insect Screen:** 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: **The Horizon** by **Wizard Industries, Inc.**

**WIZARD INDUSTRIES, INC.**  
4263 Phillips Ave, Burnaby, BC, Canada V5A 2X4  
Toll Free: (888) 949-3667  
Telephone: (604) 299-8878  
Fax: (604) 299-4496  
Email: [sales@wizardindustries.com](mailto:sales@wizardindustries.com)  
<https://www.wizardscreens.com/>

## 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 Door system in accordance with the Drawings, approved submittals, 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 Door 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 Door 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 requirements of a specific construction project.

[www.nanawall.com](http://www.nanawall.com)