SECTION 084126 - ALL-GLASS ENTRANCES AND STOREFRONTS

Revise this Section by deleting and inserting text to meet Project-specific requirements.

1. GENERAL
	* + 1. SUMMARY
				1. Section Includes:

Exterior all-glass entrance and storefront systems.

Refer to sections listed below for cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections. Sections listed below are for spec editor’s and design team coordination and are to remain as Editor’s Notes. Remove referenced specification sections within the body of the specification if not applicable to the project.

Section 055000 "Metal Fabrications" for overhead-steel support for all-glass systems.

* + - 1. PREINSTALLATION MEETINGS

Retain "Preinstallation Conference" paragraph below if Work of this Section is extensive or complex enough to justify a conference.

* + - * 1. Preinstallation Conference: Conduct conference at Project site.

<**Insert participant requirements**>.

* + - 1. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Product Data: For each type of product.

Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for all-glass system.

Include manufacturer’s installation instructions.

USE PARAGRAPH BELOW WITH EPD REQUIREMENT WHEN PROJECT ESTIMATE IS $1M OR MORE.

* + - * 1. Submit an Environmental Product Declaration (EPD) from the manufacturer for glass within this specification section, if available. A statement of the contractor’s good faith effort to obtain the EPD shall be provided if not available.

Manufacturer-provided EPDs must be Product Specific Type III (Third-Party Reviewed), in adherence with ISO 14025 *Environmental labels and declarations*, ISO 14044 *Environmental management – Life cycle assessment*, and ISO 21930 *Core rules for environmental product declarations of construction products and services.*

* + - * 1. Shop Drawings: For all-glass entrances and storefronts.

Include plans, elevations, and sections.

Include details of fittings and glazing, including isometric drawings of fittings.

Door hardware locations, mounting heights, and installation requirements.

Retain "Samples for Initial Selection" and "Samples for Verification" paragraphs below for two-stage Samples.

* + - * 1. Samples for Initial Selection: For each type of exposed finish indicated.
				2. Samples for Verification: For each type of exposed finish indicated, prepared on Samples of sizes indicated below:

Metal Finishes: 6-inch- long sections of fittings, and other items.

Glass: 6 inches square, showing exposed-edge finish.

Door Hardware: For exposed door hardware of each type, in specified finish, full size.

Retain "Fabrication Sample" paragraph below to verify details of all-glass systems. Delete if an isometric drawing included in Shop Drawings is sufficient.

* + - * 1. Fabrication Sample: [**Patch fitting at sill on pivot side only**] [**Continuous rail fitting at bottom**] <**Insert requirements**>, made from 12-inch lengths of full-size components and showing details of the following:

Joinery.

Anchorage.

Glazing[**with butt glazing**].

* + - * 1. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication, and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with all-glass entrance-system components, assemblies, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

Retain "Delegated-Design Submittal" paragraph below if design services have been delegated to Contractor.

* + - * 1. Delegated-Design Submittal: For all-glass systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
			1. QUALITY CONTROL SUBMITTALS
				1. Qualification Data:

For Installer.

For testing agency.

Retain subparagraph below if retaining "Egress Door Inspections" subparagraph in "Field Quality Control" Article.

For egress door inspector.

Retain first or second subparagraph below. First subparagraph applies to NFPA 101. Certification in second subparagraph should be acceptable by all authorities having jurisdiction.

Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.

Submit copy of DHI's Fire and Egress Door Assembly Inspector (FDAI) certificate.

Product Test Reports: For all-glass systems, for tests performed by [manufacturer and witnessed by a qualified testing agency] [a qualified testing agency].

Retain "Field quality-control reports" paragraph below if Contractor is responsible for field quality-control testing and inspecting.

Field quality-control reports.

Sample Warranty: For special warranty.

* + - * 1. Contract Closeout Submittals

Maintenance Data: For all-glass systems to include in maintenance manuals. Furnish a complete set of specialized tools and maintenance instructions as required for Director’s Representative's continued adjustment, maintenance, and removal and replacement of entrance door hardware.

* + - 1. QUALITY ASSURANCE
				1. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation of units required for this Project.

Retain "Egress Door Inspector Qualifications" subparagraph below if retaining "Egress Door Inspections" subparagraph in "Field Quality Control" Article.

Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies shall comply with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:

Retain subparagraph below if requiring egress door inspectors to be certified under DHI's certification program. Verify, with authorities having jurisdiction, if other DHI certifications are acceptable, such as AHC (Architectural Hardware Consultant), CDC (Certified Door Consultant), and AOC (Architectural Opening Consultant).

DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

* + - * 1. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

Retain subparagraph below or revise to suit Project.

Do not change intended aesthetic effects, as judged solely by Director’s Representative, except with Director’s Representative's approval. If changes are proposed, submit comprehensive explanatory data to Director’s Representative for review.

* + - 1. BENCHMARKS
				1. Build benchmarks to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

Retain first subparagraph below for large-scale benchmark. Coordinate requirements with those in other Sections specifying glazing and cladding materials installed with all-glass entrances and storefronts.

Build benchmark of typical all-glass system as indicated on Drawings.

Retain first subparagraph below if subjecting benchmark to field testing.

Testing shall be performed on benchmarks according to requirements in "Field Quality Control" Article.

Approval of benchmarks does not constitute approval of deviations from the Contract Documents contained in benchmarks unless Director’s Representative specifically approves such deviations in writing.

* + - 1. WARRANTY

When warranties are required, verify with Director’s Representative that warranties stated in this article are not less than remedies available to the Facility under prevailing local laws.

* + - * 1. Special Warranty: [**Manufacturer**] [**Installer**] agrees to repair or replace components of all-glass systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

Failures include, but are not limited to, the following:

Retain option in first subparagraph below if specifying air leakage and water-penetration performance requirements in Part 2 for all-glass storefront.

Structural failures including excessive deflection[**, air leakage, or water penetration**].

Deterioration of metals, metal finishes, and other materials beyond normal weathering.

Failure of operating components.

Verify, with manufacturers, available warranties and warranty periods for all-glass systems.

Warranty Period: [**Two**] <**Insert number**> years from date of Substantial Completion for assembly and components unless otherwise indicated.

Retain "Concealed Floor Closers" subparagraph below for manual-swinging, all-glass entrance doors; revise to suit Project.

Concealed Floor Closers: [**Five**] [**10**] [**25**] <**Insert number**> years from date of Substantial Completion.

1. PRODUCTS
	* + 1. MANUFACTURERS

Local New York State and area manufacturers and distributers are preferred.

Retain this article if a single source is required.

The Director may prefer that certain hardware devices throughout the building be by same manufacturer. If that is the case, specify the device in this Section by named manufacturers' products in coordination with Section 087100 "Door Hardware.”

* + - * 1. Source Limitations: Obtain all components of all-glass entrances and storefront system, including framing and accessories, from single manufacturer.
			1. PERFORMANCE REQUIREMENTS

Retain "Delegated Design" paragraph below if Contractor is required to assume responsibility for design.

* + - * 1. General Performance: Comply with performance requirements specified, as determined by testing of all-glass entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
				2. Structural Loads:

Usually indicate on Drawings design loads determined by Project's structural engineer. Verify requirements of authorities having jurisdiction. See the Evaluations for additional information.

Wind Loads: As indicated on Drawings.

Other Design Loads: [**As indicated on Drawings**] <**Insert loads**>.

Retain "Deflection Limits" subparagraph below for deflection limits and revise to suit Project. GANA's "Fully Tempered Heavy Glass Door and Entrance Systems Design Guide" recommends deflection to be limited to 1 inch. Recommendations by manufacturers for deflection limits may vary. Consult manufacturers for additional information based on Project-specific requirements.

Deflection Limits: Deflection normal to glazing plane is limited to [**1 inch**] [**1/175 of clear span or 3/4 inch, whichever is smaller**] <**Insert deflection limit**>.

Retain "Seismic Performance" paragraph below for projects requiring seismic design. Model building codes and ASCE/SEI 7 establish criteria for buildings subject to earthquake motions. Coordinate requirements with structural engineer.

* + - * 1. Seismic Performance: All-glass entrances and storefronts shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
				2. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.

Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

Air leakage and water-penetration performance requirements generally cannot be met by all-glass entrance systems. For all-glass storefronts, consult manufacturers and insert Project-specific requirements.

See "Design Loads" Article in the Evaluations for discussion of windborne-debris-impact resistance and blast loads.

* + - 1. EXTERIOR ALL-GLASS ENTRANCE AND STOREFRONT SYSTEMS

Standard fitting designs and configurations vary among manufacturers. Verify availability with manufacturers and revise "Fitting Configuration" paragraph below to suit Project. Other optional features may be available for specialized applications. See "Metal Components" Article in the Evaluations.

* + - * 1. Fitting Configuration:

Manual-Swinging, All-Glass Entrance Doors: [**Patch fittings at head and sill on pivot side only (A-Style)**] [**Patch fittings at head and sill on pivot side, and for lock at sill of swing side (F-Style)**] [**Patch fitting at top and continuous rail fitting at bottom (BP-Style)**] [**Continuous rail fitting at top and bottom (P-Style)**] <**Insert fitting configuration**>.

All-Glass Storefronts: [**Recessed glazing channel at top and continuous rail fitting at bottom**] [**Recessed glazing channel at top and bottom**] [**Continuous rail fitting at top and bottom**] <**Insert fitting configuration**>.

Fitting materials vary among manufacturers. Verify availability with manufacturers and revise "Fitting Material" paragraph below to suit Project.

* + - * 1. Fitting Material: [**Aluminum**] [**Bronze-clad aluminum**] [**Brass-clad aluminum**] [**Stainless steel clad aluminum**].

Retain "Rail Fittings" paragraph below if required. Rail-fitting heights and profiles vary among manufacturers. Verify availability with manufacturers and revise paragraph to suit Project. Comply with authorities having jurisdiction for bottom-rail height and profile. See "Accessibility" Article in the Evaluations for discussion of rail fittings.

* + - * 1. Rail Fittings:

Height:

Top Rail: [**3-1/2 inches**] [**As indicated**] <**Insert dimension**>.

Bottom Rail: [**3-1/2 inches**] [**10 inches**] [**As indicated**] <**Insert dimension**>.

Profile: [**Tapered**] [**Tapered flat**] [**Tapered at 60 degrees minimum from horizontal**] [**Square**] [**Curved**] [**As indicated**] <**Insert profile**>.

End Caps: Manufacturer's standard precision-fit end caps for rail fittings.

Retain "Accessory Fittings" paragraph below for accessory fittings. Verify availability with manufacturers and revise paragraph to suit Project.

* + - * 1. Accessory Fittings:

Overhead doorstop.

Center-housing lock.

U-channel.

Retain subparagraph below to comply with structural performance requirements or to accommodate storefront span. Consult manufacturers to determine if support fins are required.

Glass-support-fin brackets.

* + - * 1. Anchors and Fastenings: Concealed.
				2. Weather Stripping: Pile type; replaceable without removing all-glass entrance doors from pivots.
				3. Materials:

Aluminum: ASTM B221, with strength and durability characteristics of not less than Alloy 6063-T5.

Retain one of two options in "Clear Anodic Finish" subparagraph below. Verify availability with manufacturers.

Clear Anodic Finish: AAMA 611, [**AA-M12C22A41, Class I, 0.018 mm**] [**AA-M12C22A31, Class II, 0.010 mm**] or thicker.

Retain one of two options in "Color Anodic Finish" subparagraph below. Verify availability with manufacturers.

Color Anodic Finish: AAMA 611, [**AA-M12C22A42/A44, Class I, 0.018 mm**] [**AA-M12C22A32/A34, Class II, 0.010 mm**] or thicker.

Color: [**Light bronze**] [**Medium bronze**] [**Dark bronze**] [**Black**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors and color densities**] <**Insert color**>.

Bronze Cladding: ASTM B36, alloy [**as standard with manufacturer**] <**Insert requirements**>.

Finish: [**Polished M21-O6x**] [**Satin M31-M34-O6x**] [**Statuary M31-C5**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry finishes**] <**Insert finish**>.

Brass Cladding: ASTM B36, alloy [**as standard with manufacturer**] <**Insert requirements**>.

Finish: [**Polished M21-O6x**] [**Satin M31-M34-O6x**] [**As selected by Director’s Representative from full range of industry finishes**] <**Insert finish**>.

Stainless Steel Cladding: ASTM A240 or ASTM A666, Type 304.

Finish: [**ASTM A480 No. 4 directional satin finish**] [**ASTM A480 No. 8 mirrorlike reflective, nondirectional polish**] <**Insert finish**>.

* + - 1. GLASS
				1. Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated surfaces), Type I (transparent), Quality-Q3, tested for surface and edge compression in accordance with ASTM C1048 and for impact strength in accordance with 16 CFR 1201 for Category II materials.

If retaining both "Class 1" and "Class 2" subparagraphs below, indicate locations of each glass type on Drawings or by inserts. Generally, clear glass is used for vestibules; tinted glass, for exterior locations.

Verify thickness required for glass areas; 10-mm-thick glass is available in limited sizes.

Class 1: Clear monolithic.

Thickness: [**10**] [**12**] [**16**] [**19**] mm.

Locations: [**As indicated**] <**Insert locations**>.

Class 2: Tinted monolithic.

Color: [**Gray**] [**Bronze**] <**Insert color**>.

Thickness: [**10**] [**12**] mm.

Locations: [**As indicated**] <**Insert locations**>.

Insert performance properties in "Visible Light Transmittance," "Solar Heat-Gain Coefficient," and "Outdoor Visible Reflectance" subparagraphs below to suit Project.

Visible Light Transmittance: <**Insert number**> percent minimum.

Solar Heat-Gain Coefficient: <**Insert value**> maximum.

Outdoor Visible Reflectance: <**Insert number**> percent maximum.

Retain "Exposed Edges" subparagraph below for exposed edges of all-glass entrances and storefronts.

Exposed Edges: Machine ground and flat polished.

Retain "Butt Edges" subparagraph below for butting glass edges.

Butt Edges: Flat ground.

Retain "Corner Edges" subparagraph below if lap-joint corners are required. Revise for mitered corner edges if needed.

Corner Edges: Lap-joint corners with exposed edges polished.

* + - 1. ENTRANCE DOOR HARDWARE

Entrance door hardware items in this article are examples only and must be adapted to specific configurations of manual-swinging all-glass entrance doors required.

* + - * 1. General: Entrance door hardware units in sizes, quantities, and types recommended by manufacturer for all-glass entrance systems indicated. For exposed parts, match metal and finish of fittings.
				2. Concealed Floor Closers and Top Pivots: Center hung; ANSI/BHMA A156.4, Grade 1; including cases, bottom arms, top walking beam pivots, plates, and accessories required for complete installation.

Swing: [**Single**] [**Double**] acting.

Retain "Positive Dead Stop" subparagraph below for single-acting closers.

Positive Dead Stop: Coordinated with hold-open angle if any, or at angle selected.

Hold Open: [**Automatic, at angle selected**] [**Selective**] [**None**].

Opening-Force Requirements:

"Egress Doors" subparagraph below is based on both the BCNYS and NFPA 101 requirements for means-of-egress doors. Option is a requirement of NFPA 101 only.

Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbf to set the door in motion[**and not more than 15 lbf to open the door to its minimum required width**].

Retain "Concealed Overhead Holder" paragraph below for manual-swinging, all-glass entrance doors subject to racking. Concealed overhead holders require a door top rail and custom tube or a channel housing at door head. Verify requirements with manufacturers.

* + - * 1. Concealed Overhead Holder: ANSI/BHMA A156.8, Grade 1, with dead-stop setting coordinated with concealed floor closer.
				2. Push-Pull Set: [**As selected from manufacturer's full range**] [**As indicated**] <**Insert description**>.
				3. Single-Door and Active-Leaf Locksets: [**Center-housing deadbolt with pulls**] [**Center-housing combination deadbolt and latchbolt with lever handles**] [**Bottom-fitting or bottom-rail deadbolt**] <**Insert description**>.

Deadbolt operated by key outside and [**key**] [**thumbturn**] inside.

* + - * 1. Inactive-Leaf Locksets: Bottom-fitting or bottom-rail deadbolt.

Deadbolt operated by key outside and [**key**] [**thumbturn**] inside.

Retain first option in "Cylinders" paragraph below for master-keyed lock cylinders.

* + - * 1. Cylinders: As specified in Section 087100 "Door Hardware." [**Six-pin cylinder, ANSI/BHMA A156.5, Grade 1.**] <**Insert requirements.**>
				2. Exit Devices: UL 305.

Function: Operation by push-pull when [**inside operator is locked down (dogged)**] [**inside operator is locked down (dogged); outside operation by key**].

Latching: At [**threshold or floor plate**] [**door head**] [**threshold or floor plate and door head**].

Style: [**Exposed vertical rod**] [**Concealed vertical rod in housing style indicated**] <**Insert style**>.

Provide exit devices on both leaves of pairs of doors.

Retain "Threshold" paragraph below if required. Coordinate requirements of floor closers with thresholds specified.

* + - * 1. Threshold: Not more than 1/2 inch high.
			1. BUTT-GLAZING SEALANTS

Retain this article for butt-glazed systems.

* + - * 1. Single-Component, Nonsag, Acid-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, for Uses NT, G, and A.

[Manufacturer’s:](http://www.specagent.com/Lookup?ulid=7630) Subject to compliance with requirements, provide one of the following:

[GE Construction Sealants; Momentive Performance Materials Inc](http://www.specagent.com/Lookup?uid=123457191495).; [SCS1000 Contractors][SCS1200 Construction].

[Pecora Corporation](http://www.specagent.com/Lookup?uid=123457191497); 860.

[Polymeric Systems, Inc](http://www.specagent.com/Lookup?uid=123457191498); PSI-601.

[The Dow Chemical Company](http://www.specagent.com/Lookup?uid=123457191494); DOW CORNING® 999A SILICONE GLAZING SEALANT.

[Tremco Incorporated](http://www.specagent.com/Lookup?uid=123457191500); [Proglaze][Tremsil 200].

Or equal.

* + - 1. FABRICATION
				1. Provide holes and cutouts in glass to receive hardware, fittings, and accessory fittings before tempering glass. Do not cut, drill, or make other alterations to glass after tempering.

Fully temper glass using horizontal (roller-hearth) process, and fabricate so that when glass is installed, roll-wave distortion is parallel with bottom edge of door or lite.

* + - * 1. Factory assemble components and factory install hardware and fittings to greatest extent possible.
1. EXECUTION
	* + 1. EXAMINATION
				1. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
				2. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. INSTALLATION OF EXTERIOR ALL-GLASS ENTRANCE AND STOREFRONT SYSTEMS
				1. Install all-glass entrance and storefront systems and associated components according to manufacturer's written instructions.
				2. Set units level, plumb, and true to line, with uniform joints.
				3. Maintain uniform clearances between adjacent components.
				4. Lubricate hardware and other moving parts according to manufacturer's written instructions.
				5. Set, seal, and grout floor closer cases as required to suit hardware and substrate indicated.

Retain paragraph below for butt-glazed all-glass storefronts.

* + - * 1. Install butt-joint sealants according to manufacturer's written instructions and as specified in Section 079200 "Joint Sealants" to produce weathertight installation.
			1. FIELD QUALITY CONTROL

Retain "Testing Agency" paragraph below to identify who shall perform tests and inspections. Retain "Field quality-control reports" paragraph in "Informational Submittals" Article.

* + - * 1. Testing Agency: Engage a qualified testing agency to perform the following tests and inspections:

Consider including water-spray field test for storefront portion of the all-glass entrance and storefront system. All-glass entrance doors are generally not weathertight.

Water-Spray Field Test: After completion of all-glass storefront installation and nominal curing of sealant and glazing compounds, but before installation of interior finishes, test storefront for water leaks according to AAMA 501.2.

Perform test for total areas [**as designated by Director’s Representative**] <**Insert description**>.

Retain "Egress Door Inspections" subparagraph below for projects per NFPA 101, for assembly, educational, daycare, and residential board and care occupancies.

Egress Door Inspections: Inspect each all-glass entrance door equipped with panic hardware, each all-glass entrance door located in an exit enclosure, each electrically controlled all-glass egress door, and each all-glass entrance door equipped with special locking arrangements, according to NFPA 101, Section 7.2.1.15.

* + - * 1. All-glass entrances and storefronts will be considered defective if they do not pass tests and inspections.
				2. Prepare test and inspection reports.
			1. ADJUSTING AND CLEANING
				1. Adjust all-glass entrance doors and hardware to produce smooth operation and tight fit at contact points and weather stripping.

subparagraph below is based on the United States Access Board's ADA-ABA Guidelines; verify requirements of authorities having jurisdiction.

For all-glass entrance doors accessible to people with disabilities, adjust closers to provide a three-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch measured to the leading door edge.

* + - * 1. Remove excess sealant and glazing compounds and dirt from surfaces.

Insert a hardware schedule if required.

END OF SECTION 084126