SECTION 088113 - DECORATIVE GLASS GLAZING

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

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

Decorative glass may be a combination of descriptions.

Patterned glass.

Coated glass.

Acid-etched glass.

Sandblasted glass.

Laminated glass.

Glass with decorative film overlay.

Glass with finished edges.

* + - * 1. Related Requirements:

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.

Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

Section 057313 "Glazed Decorative Metal Railings" for glass panels in metal railings and in glass- and plastic-supported railings.

Section 088300 "Mirrors" for mirror glass.

Section 088400 "Plastic Glazing" for acrylic and polycarbonate glazing.

* + - 1. DEFINITION

Retain terms that remain after this Section has been edited for a project.

ASTM C1036 also includes traditional thickness designations in IP units, but the actual thickness is based on the equivalent IP designation in millimeters.

* + - * 1. Glass Thickness: Indicated by thickness designations in millimeters in accordance with ASTM C1036.
      1. COORDINATION
         1. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
      2. PREINSTALLATION MEETINGS

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

* + - * 1. Preinstallation Conference: Conduct conference at [Project site] <**Insert location**>.

If retaining subparagraphs below, revise to include Project-specific requirements. Insert additional requirements to suit Project.

Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

Review temporary protection requirements for glazing during and after installation.

* + - 1. ACTION 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 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 decorative glass. Show fabrication and installation details. Include the following:

Revise list below to coordinate with products retained.

Size and location of penetrations.

Glazing method.

Mounting method.

Attachments to other work.

Full-size details of edge-finished profiles.

* + - * 1. Glass Samples: For the following products, 12 inches (300 mm) square:

Revise list below to coordinate with products retained that require Samples.

Each type of decorative glass.

Each edge treatment on type of decorative glass.

Each decorative film overlay on type of decorative glass.

Each applied coating on type of decorative glass.

* + - * 1. Glazing Accessory Samples: For sealants, in 12-inch (300-mm) lengths.[**Install sealant Samples between two strips of material representative of the glazed system.**]

Retain "Decorative Glazing Schedule" Paragraphparagraph below for decorative glass glazed openings.

* + - * 1. Decorative Glazing Schedule: List decorative glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

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

* + - * 1. Delegated Design Submittal: For decorative glass 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. INFORMATIONAL SUBMITTALS

Coordinate “Qualification Data” Paragraph below with qualification requirements in Section 014000 “Quality Requirements” and as may be supplemented in "Quality Assurance" Article.

Generally, retain "Product Certificates" Paragraph below unless types of glass retained require labeling by authorities having jurisdiction or if certification is required as well as labels. For other than tempered glass, the IBC BCNYS allows certificates instead of labels for safety glazing if approved by the building official. Labeling may affect the appearance of decorative glass.

* + - * 1. Quality Control Submittals:

Product Certificates: For each type of decorative glass.

Retain first paragraph below if glazing sealants are specified for installing laminated glass or if glass with decorative film overlay is in contact with glazing sealants.

Preconstruction adhesion and compatibility test report.

Sample Warranty: For special warranty.

* + - 1. CLOSEOUT SUBMITTALS 
         1. Contract Closeout Submittals:

Retain first option in "Maintenance Data" Paragraphparagraph below if decorative film overlay is required for Project. Retain second option if an applied protective coating, such as antifingerprint coating on sandblasted glass, or a decorative coating, such as color coat on acid-etched glass, is required for Project.

Maintenance Data: For each type of decorative glass [**and each decorative film overlay**] [**and each applied coating**] to include in maintenance manuals.

* + - 1. QUALITY ASSURANCE

If retaining "Installer Qualifications" Paragraphparagraph below, verify, with prospective installers, that they can comply with certification requirements referenced.

* + - * 1. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under NGA's Certified Glass Installer Program.
        2. Sealant Testing Agency Qualifications: An independent testing agency qualified in accordance with ASTM C1021 to conduct the testing indicated.
        3. Mockup Benchmarks: Build mockup benchmarks to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

Build mockup benchmarks in the location and of the size indicated or, if not indicated, as directed by Architect Director’s Representative.

Retain subparagraph below if the intention is to make an exception to the default requirement in Section 014000 "Quality Requirements" for demolishing and removing mockupbenchmarks.

Subject to compliance with requirements, approved mockup benchmarks may become part of the completed Work if undisturbed at time of Substantial Completion.

* + - 1. PRECONSTRUCTION TESTING

Retain this article if laminated glass is installed with glazing sealants or if glass with decorative film overlay in contact with glazing sealants is specified. Adhesion and compatibility testing is essential and usually performed by sealant manufacturer. Tests require many Samples, and some tests require four weeks to complete. If retaining, also retain "Preconstruction adhesion and compatibility test report" Paragraphparagraph in "Informational Submittals" Article.

* + - * 1. Preconstruction Adhesion and Compatibility Testing: Test each [**laminated decorative glass product,**] [**glass with decorative film overlay,**] tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

Retain first subparagraph below if previous testing is acceptable.

Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

Use ASTM C1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.

Test no fewer than [**eight**] <**Insert number**> Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.

Schedule enough time for testing and analyzing results to prevent delaying the Work.

For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

* + - 1. DELIVERY, STORAGE, AND HANDLING
         1. Protect decorative glass and glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

Retain paragraph below for sequenced decorative glass panel installation.

* + - * 1. Retain packaging and sequencing numbers for decorative glass units.
      1. FIELD CONDITIONS
         1. Environmental Limitations: Do not deliver or install decorative glass until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
         2. Field Measurements: Verify actual dimensions of openings and construction contiguous with decorative glass by field measurements before fabrication.
      2. WARRANTY

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

Special warranty in this article is an example only. See the Evaluations in Section 088000 "Glazing" for warranty discussion.

* + - * 1. Special Warranty on Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

Verify available warranties and warranty periods. Revise "Warranty Period" Subparagraphsubparagraph below if glass manufacturers insist on warranty beginning on date of manufacture. See the Evaluations.

Warranty Period: [**Five**] [**10**] <**Insert number**> years from date of Substantial Completion.

1. PRODUCTS

Manufacturers and products listed in this Section are neither recommended nor endorsed by the AIA or Deltek. Before selecting manufacturers and products, verify availability, suitability for intended applications, and compliance with minimum performance requirements. For definitions of terms and requirements for Contractor's product selection, see Section 016000 "Product Requirements."

Product options commonly available from manufacturers are included in square brackets throughout the Section Text. Not every manufacturer listed can provide every option offered; verify availability with manufacturers. For definitions of terms and requirements for Contractor's product selection, see Section 016000 "Product Requirements."

* + - 1. MANUFACTURERS OF DECORATIVE GLASS
         1. Source Limitations for Glass: Obtain each type of decorative glass from single source from single manufacturer.
         2. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer, for each product and installation method.
      2. PERFORMANCE REQUIREMENTS
         1. General Performance: Installed glazing systems shall withstand normal thermal movement and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.

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

* + - * 1. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design decorative glass.

The IBC BCNYS contains requirements for interior glass installed adjacent to walking surfaces.

* + - * 1. Structural Performance: Decorative glass installed adjacent to walking surfaces shall withstand the following design loads within limits and under conditions indicated:

Differential deflection of adjacent unsupported edges shall not exceed glass thickness when subjected to 50 lbf/ft. (730 N/m) applied horizontally to one panel at any point up to 42 inches (1067 mm) above the adjacent walking surface.

Base design on thickness at thinnest part of the glass.

Revise "Safety Glazing" Paragraphparagraph below if Category I materials are acceptable to authorities having jurisdiction and are required. Indicate safety glazing on Drawings or in Part 2 paragraphs where decorative glass types are specified.

* + - * 1. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
      1. GLASS PRODUCTS, GENERAL

Retain option in "Glazing Publications" Paragraphparagraph below if specifying laminated glass.

* + - * 1. Glazing Publications: Comply with glass product manufacturers' written instructions[**, NGA's "Laminated Glazing Reference Manual,"**] and NGA's "GANA Glazing Manual" unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

Retain "Safety Glazing Labeling" Paragraphparagraph below if applicable and if labeling is required. Not all manufacturers participate in third-party testing programs.

* + - * 1. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of [**the SGCC**] [**the SGCC or another certification agency acceptable to authorities having jurisdiction**] [**or**] [**manufacturer**]. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
        2. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
        3. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with requirements indicated. Where heat-strengthened glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with requirements indicated. Where fully tempered glass is indicated, provide fully tempered float glass.
      1. GLASS PRODUCTS

Retain this article to establish general requirements for glass properties used for decorative glass products; additional requirements are included in other Part 2 articles for each type of decorative glass. Revise this article if needed to suit products retained, or revise subsequent articles for each type of decorative glass as appropriate.

* + - * 1. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.

Retain "Low-Iron Float Glass" Paragraphparagraph below if this glass type is a component of decorative glass.

* + - * 1. Low-Iron Float Glass: ASTM C1036, Type I, Class I, Quality-Q3, and with visible light transmission not less than 91 percent.
        2. Tinted Annealed Float Glass: ASTM C1036, Type I, Class 2 (tinted), Quality-Q3.

Retain "Fully Tempered Glass" Paragraphparagraph below even if plain, tempered float glass is not required; other paragraphs in this article and glass types articles depend on it for definition of "fully tempered float glass." Always retain paragraph if Contractor is responsible for determining glass thickness and strength.

* + - * 1. Fully Tempered Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

Retain "Heat-Strengthened Glass" Paragraphparagraph below even if plain, heat-strengthened float glass is not required; other paragraphs in this article and glass types articles depend on it for definition of "heat-strengthened float glass." Always retain paragraph if Contractor is responsible for determining glass thickness and strength.

* + - * 1. Heat-Strengthened Glass: ASTM C1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
        2. Patterned Glass: ASTM C1036, Type II, Class 1 (clear) or Class 2 (tinted) as indicated, Form 3; finish, pattern, and quality as indicated.
        3. Tempered Patterned Glass: ASTM C1048, Kind FT (fully tempered), Type II, Class 1 (clear) or Class 2 (tinted) as indicated, Form 3; finish, pattern, and quality as indicated.
        4. Patterned Low-Iron Glass: ASTM C1036, Type II, Class 1 (clear), Form 3, with visible light transmission not less than 91 percent; finish, pattern, and quality as indicated.
        5. Tempered Patterned Low-Iron Glass: ASTM C1048, Kind FT (fully tempered), Type II, Class 1 (clear), Form 3, with visible light transmission not less than 91 percent; finish, pattern, and quality as indicated.
        6. Ceramic-Coated Glass: ASTM C1048, Condition C, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3; and complying with Specification No. 95-1-31 in NGA's "Engineering Standards Manual."
        7. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
        8. Bent Glass: ASTM C1464, kind, glass type, bend, and other properties as indicated.
        9. Decorative Film Overlay: Translucent, dimensionally stable, cast PVC film, 2-mil- (0.05-mm-) minimum thickness, with pressure-sensitive, clear adhesive back for adhering to glass and releasable protective backing.
      1. GLAZING MATERIALS
         1. Glazing Sealants, Tapes, and Miscellaneous Glazing Materials: As specified in Section 088000 "Glazing."

Color selection of glazing materials may be limited.

Colors: As selected by Architect Director’s Representative from manufacturer's full range.

* + - 1. HARDWARE FOR GLASS INSTALLATION

Retain "Hardware" Paragraphparagraph below if glass hardware is used to install Project's decorative glass. Indicate locations on Drawings.

* + - * 1. Hardware: [**Edge grips**] [**Glass panel to ceiling clamps/connectors**] [**Glass panel to floor clamps/connectors**] [**Glass panel to wall clamps/connectors**] [**Glass to glass panel clamp/connectors**] [**Panel support bars**] [**Stand-off display system with caps**] [**Swivel fittings**] [**Continuous top track**] [**Continuous floor track**] <**Insert hardware description**>.

Retain "Dimensions" and "Material and Finish" subparagraphs below if information is not indicated by product name or designation, or to establish salient characteristics.

Dimensions: <Insert dimensions>.

Material and Finish: <**Insert manufacturer's material and finish name and designation**>.

* + - * 1. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.
        2. Gaskets: Manufacturer's standard, compatible with decorative glass type indicated.
        3. Anchors and Inserts: Provide devices as required for hardware installation. Provide metal expansion-bolt devices for drilled-in-place anchors. Provide [**galvanized**] [**stainless steel**] anchors and inserts for applications on inside face of exterior walls and where indicated.
      1. DECORATIVE GLASS FABRICATION

Retain first paragraph below if glazed application is required for Project.

* + - * 1. Fabricate decorative glass and provide other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with product manufacturer's written instructions and with referenced glazing standard.
        2. Edge Finishing: Finish edges smooth and polished, without chips, scratches, or warps.

Retain last option in "Finished Edge" Subparagraphsubparagraph below for butt-glazed lites.

Finished Edge: [**Clean cut**] [**Chamfered/Seamed/Swiped**] [**Flat polished**] [**Rounded polished**] [**Beveled polished edge of width shown**] [**Clean cut or flat grind vertical edges of butt-glazed lites in a manner that produces square edges with slight kerfs**] <**Insert treatment**>.

Retain "Edge-Finished Glass Adhesive" Subparagraphsubparagraph below if edge-finished glass is adhered to decorative glass lite.

Edge-Finished Glass Adhesive: Clear, nonyellowing, as recommended by manufacturer.

ASTM C1048 includes specific requirements for the placement, dimensions, and dimensional tolerances of holes in heat-treated flat glass.

* + - * 1. Lite Treatment: [**Drilled**] [**Notched**] [**Cut out**] [**Surface cut**] as indicated on Drawings with smooth, uniform edge.

Retain "Decorative Film Overlay" Paragraphparagraph below for PVC film. Revise to suit Project.

* + - * 1. Decorative Film Overlay: Apply squarely aligned to glass edges, uniformly smooth, and free from tears, air bubbles, wrinkles, and rough edges, [**in single sheet completely overlaying**] [**in pattern indicated on Drawings to**] [**with graphic image as indicated on Drawings to**] the back face of clean glass, according to manufacturer's written instructions, including surface preparation and application temperature limitations.

1. EXECUTION
   * + 1. EXAMINATION

Retain, revise, or delete this article to suit Project.

* + - * 1. Examine decorative glass framing members, with Installer present, for compliance with the following:

Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.

Minimum required face or edge clearances.

Effective sealing between joints of decorative glass framing members.

* + - * 1. Proceed with installation only after unsatisfactory conditions have been corrected.
      1. PREPARATION
         1. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

Retain paragraph below if glass units are installed with a particular surface orientation.

* + - * 1. Examine glazing units to locate orientation of outer surfaces[**as indicated on Drawings**]. Label or mark units as needed so that surface orientation is readily identifiable. Do not use materials that leave visible marks in the completed Work.
      1. INSTALLATION

Retain, revise, or delete this article to suit Project.

* + - * 1. Set decorative glass units in each series true in line with uniform orientation, pattern, draw, bow, and similar characteristics.

Retain first paragraph below if glass units are installed with a particular surface orientation.

* + - * 1. Set glass lites with proper orientation so that each outer surface faces the direction [**indicated on Drawings**] <**Insert orientation**>.

Retain and revise first paragraph below for decorative glass installed with hardware.

* + - * 1. Set decorative glass in locations indicated on Drawings. Install glass with hardware and accessories according to hardware manufacturer's written instructions. Attach hardware securely to mounting surfaces[**and building structure**].

Retain and revise paragraph below for decorative glass incorporated into other Work such as architectural woodwork.

* + - * 1. Set decorative glass in locations indicated on Drawings and as specified in <**Insert Section number and title**>.
      1. GLAZING, GENERAL

Retain this article if glazing of decorative glass is specified in this Section.

Retain "Decorative Glass" Paragraphparagraph below if glazing of decorative glass is specified in Section 088000 "Glazing."

* + - * 1. Decorative Glass: Install glazing as specified in Section 088000 "Glazing."

Retain seven paragraphs below if glazing of decorative glass is best specified in this Section.

* + - * 1. Comply with combined written instructions of manufacturers of glass, gaskets, sealants, tapes, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.
        2. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
        3. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
        4. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
        5. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
        6. Provide spacers for glass lites where length plus width is more than 50 inches (1270 mm).

Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances, and to comply with system performance requirements.

Provide 1/8-inch- (3-mm-) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

* + - * 1. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
      1. SEALANT GLAZING (WET)

Retain this article if glazing of decorative glass is best specified in this Section and if wet sealant glazing method is suitable for Project. Revise this article if another glazing method is more suitable. See Section 088000 "Glazing."

* + - * 1. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

Retain option in first paragraph below for butt-glazed joints.

* + - * 1. Force sealants into glazing channels[**and between glass-to-glass joints**] to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
        2. Tool exposed surfaces of sealants smooth.
      1. CLEANING AND PROTECTION
         1. Immediately after installation, remove nonpermanent labels and clean surfaces.
         2. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
         3. Remove and replace glass that is damaged during construction period.

Retain paragraph below to suit Project. Delete if covered in Section 017700 "Closeout Procedures."

* + - * 1. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.
      1. DECORATIVE GLASS SCHEDULE

This article includes examples of several types of decorative glass distinguished by different manufacturing processes. Combinations of processes may be suitable for projects and products.

* + - * 1. Patterned Glass[**Type GL-#**]: [**Clear**] [**Low-iron**] [**Tinted**], [**patterned**] [**tempered patterned**] glass, [**Finish F1 (patterned one side)**] [**Finish F2 (patterned both sides)**], Quality-Q[**5**] [**6**].

Retain "Basis-of-Design Product" Subparagraphsubparagraph below to require a specific product or a comparable product from manufacturers listed in "Manufacturers of Decorative Glass" Article.

Basis-of-Design Product: <**Insert manufacturer's name; product name or designation**>.

Glass Thickness: [**4 mm**] [**5 mm**] [**6 mm**] <**Insert thickness designation**>.

Pattern: [**P1 (linear)**] [**P2 (geometric)**] [**P3 (random)**] [**P4 (special)**] [**As indicated by manufacturer's designations**] [**Match Architect Director’s Representative's samples**] [**As selected by Architect Director’s Representative from manufacturer's full range**].

Tint Color: [**Blue**] [**Blue-green**] [**Bronze**] [**Green**] [**Gray**] <**Insert color**>.

Retain subparagraph below if required for fully tempered glass.

Safety glazing required.

Coated glass is often called "silk-screened glass," especially if the coating is applied in a pattern, although the coating may be applied by inkjet or other means.

* + - * 1. Coated Glass[**Type GL-#**]: Coated glass with decorative [**ceramic frit applied and heat-fused to glass surface**] [**glass paint or ink applied to glass surface and cured**].

Retain "Basis-of-Design Product" Subparagraphsubparagraph below to require a specific product or a comparable product from manufacturers listed in "Manufacturers of Decorative Glass" Article.

Basis-of-Design Product: <**Insert manufacturer's name; product name or designation**>.

Glass Type: [**Clear**] [**Low-iron**] [**Tinted**], [**annealed**] [**heat-strengthened**] [**fully tempered**] float glass.

Tint Color: [**Blue**] [**Blue-green**] [**Bronze**] [**Green**] [**Gray**] <**Insert color**>.

Glass Thickness: [**4 mm**] [**5 mm**] [**6 mm**] <**Insert thickness designation**>.

Retain first subparagraph below if required.

Safety glazing required.

Coating Colors: [**As indicated by manufacturer's designations**] [**Match Architect Director’s Representative's samples**] [**As selected by Architect Director’s Representative from manufacturer's full range**] [**As indicated**].

Retain last option in "Pattern" Subparagraphsubparagraph below if custom pattern or graphics are available. Indicate custom pattern and graphics on Drawings.

Pattern: [**Solid color**] [**As indicated by manufacturer's designations**] [**Match Architect Director’s Representative's samples**] [**As selected by Architect Director’s Representative from manufacturer's full range**] [**As indicated**].

* + - * 1. Acid-Etched Glass[**Type GL-#**]: Acid-etched glass with decorative pattern evenly etched into glass.

Retain "Basis-of-Design Product" Subparagraphsubparagraph below to require a specific product or a comparable product from manufacturers listed in "Manufacturers of Decorative Glass" Article.

Basis-of-Design Product: <**Insert manufacturer's name; product name or designation**>.

Glass Type: [**Clear**] [**Low-iron**] [**Tinted**], [**annealed**] [**fully tempered**] float glass.

Tint Color: [**Blue**] [**Blue-green**] [**Bronze**] [**Green**] [**Gray**] <**Insert color**>.

Glass Thickness: [**4 mm**] [**5 mm**] [**6 mm**] <**Insert thickness designation**>.

Retain last option in "Pattern" Subparagraphsubparagraph below if custom pattern or graphics are available. Indicate custom pattern and graphics on Drawings. Verify, with manufacturers, perimeter of etched area related to edge of glass.

Pattern: [**As indicated by manufacturer's designations**] [**Match Architect Director’s Representative's samples**] [**As selected by Architect Director’s Representative from manufacturer's full range**] [**As indicated**].

See the Evaluations for limits and cautions about colored silicone back coatings. Retain option in "Silicone Back Coating" Subparagraphsubparagraph below to allow fabricator to choose product or insert specific product names or designations.

Silicone Back Coating: [**Recommended in writing by glass fabricator**] <**Insert manufacturer's name; product name or designation**> for shop application.

Color: [**As indicated by manufacturer's designations**] [**Match Architect Director’s Representative's samples**] [**As selected by Architect Director’s Representative from manufacturer's full range**].

* + - * 1. Sandblasted Glass[**Type GL-#**]: Sandblasted glass with decorative pattern applied uniformly.

Retain "Basis-of-Design Product" Subparagraphsubparagraph below to require a specific product or a comparable product from manufacturers listed in "Manufacturers of Decorative Glass" Article.

Basis-of-Design Product: <**Insert manufacturer's name; product name or designation**>.

Glass Type: [**Clear**] [**Low-iron**] [**Tinted**], [**annealed**] [**fully tempered**] float glass.

Tint Color: [**Blue**] [**Blue-green**] [**Bronze**] [**Green**] [**Gray**] <**Insert color**>.

Glass Thickness: [**Not less than**] [**4 mm**] [**5 mm**] [**6 mm**] [**8 mm**] [**10 mm**] [**12 mm**] <**Insert thickness designation**>.

Retain last option in "Pattern" Subparagraphsubparagraph below if custom pattern or graphics are available. Indicate custom pattern and graphics on Drawings. Verify, with manufacturers, perimeter of sandblasted area related to edge of glass.

Pattern: [**As indicated by manufacturer's designations**] [**Match Architect Director’s Representative's samples**] [**As selected by Architect Director’s Representative from manufacturer's full range**] [**As indicated**].

See the Evaluations for limits and cautions about antifingerprint coatings. Retain option in "Antifingerprint Coating" Subparagraphsubparagraph below to allow fabricator to choose product or insert specific product names or designations.

Antifingerprint Coating: Protective coating [**recommended in writing and provided by glass fabricator**] <**Insert manufacturer's name; product name or designation**>.

Retain "Acid-Etched Finish" Subparagraphsubparagraph below if this finish is required on sandblasted glass. Acid-etched finish reduces appearance of dust and fingerprints on sandblasted glass.

Acid-Etched Finish: Acid etching the glass evenly, maintaining detail of sandblasted pattern.

* + - * 1. Laminated Glass[**Type GL-#**]: Laminated glass.

Retain "Basis-of-Design Product" Subparagraphsubparagraph below to require a specific product or a comparable product from manufacturers listed in "Manufacturers of Decorative Glass" Article.

Basis-of-Design Product: <**Insert manufacturer's name; product name or designation**>.

Revise "Construction" Subparagraphsubparagraph below if more than two plies are required. Insert other types of glass, such as patterned, silk-screened, acid-etched, or sandblasted glass; copy descriptions from paragraphs above or reference decorative glass types specified above.

Construction: Two plies of [**clear**] [**low-iron**] [**tinted**], [**annealed**] [**heat-strengthened**] [**fully tempered**] float glass.

Tint Color: [**Blue**] [**Blue-green**] [**Bronze**] [**Green**] [**Gray**] <**Insert color**>.

Revise "Thickness of Each Glass Ply" Subparagraphsubparagraph below if glass plies are not same thickness. Length and width restrictions may be significant for laminated glass with nonsymmetrical glass plies.

Thickness of Each Glass Ply: [**3 mm**] [**4 mm**] [**5 mm**] [**6 mm**] <**Insert thickness designation**>.

Interlayer Type: Laminate glass with [**PVB interlayer**] [**or**] [**cast-in-place and cured, transparent, resin interlayer**] to comply with interlayer manufacturer's written instructions.

All options in "Interlayer Thickness" Subparagraphsubparagraph below are suitable for PVB interlayer. Cured-resin thickness is a function of spacer dimension used during fabrication. NGA's "Laminated Glazing Reference Manual" states that 0.030-inch- (0.76-mm-) thick or thicker PVB or cured resin "may meet the requirements for Category I and II of the CPSC 16 CFR 1202 standard." Verify, with manufacturers, interlayer thickness and safety performance.

Interlayer Thickness: [**0.030 inch (0.76 mm)**] [**0.060 inch (1.52 mm)**] [**0.090 inch (2.29 mm)**].

Interlayer Color and Pattern: [**As indicated by manufacturer's designations**] [**Match Architect Director’s Representative's samples**] [**As selected by Architect Director’s Representative from manufacturer's full range**].

Retain first subparagraph below if required.

Safety glazing required.

If retaining a colored interlayer, insert light-transmittance value in "Visible Light Transmittance of Interlayer" Subparagraphsubparagraph below.

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

Retain "Sound Transmission Requirements" Subparagraphsubparagraph below if needed for Project, and retain one STC rating. Verify, with manufacturers, availability of sound-tested products.

Sound Transmission Requirements: Sound transmission loss performance is tested in accordance with ASTM E90, determined by ASTM E413, and rated for STC plus or minus 1 of [**35**] [**40**] <**Insert rating**>.

* + - * 1. Silk-Screened Glass[**Type GL-#**]:

Retain "Basis-of-Design Product" Subparagraphsubparagraph below to require a specific product or a comparable product from manufacturers listed in "Manufacturers of Decorative Glass" Article.

Basis-of-Design Product: <**Insert manufacturer's name; product name or designation**>.

Glass Type: [**Clear**] [**Low-iron**] [**Tinted**], [**annealed**] [**heat strengthened**] [**fully tempered**] float glass.

Tint Color: [**Blue**] [**Blue-green**] [**Bronze**] [**Green**] [**Gray**] <**Insert color**>.

Glass Thickness: [**4 mm**] [**5 mm**] [**6 mm**] <**Insert thickness designation**>.

Retain last option in "Pattern" Subparagraphsubparagraph below if custom pattern or graphics are available. Indicate custom pattern and graphics on Drawings. Verify, with manufacturers, perimeter of etched area related to edge of glass.

Pattern: [**As indicated by manufacturer's designations**] [**Match Architect Director’s Representative's samples**] [**As selected by Architect Director’s Representative from manufacturer's full range**] [**As indicated**].

See the Evaluations for limits and cautions about colored silicone back coatings. Retain first option in subparagraph below to allow fabricator to choose product or insert specific product names or designations.

[**Ceramic Frit**] [**Silicone Back Coating**]: [**Recommended by glass fabricator**] <**Insert manufacturer's name; product name or designation**> for shop application.

Color: [**As indicated by manufacturer's designations**] [**Match Architect Director’s Representative's samples**] [**As selected by Architect Director’s Representative from manufacturer's full range**].

* + - * 1. Digitally Printed Glass[**Type GL-#**]:

Retain "Basis-of-Design Product" Subparagraphsubparagraph below to require a specific product or a comparable product from manufacturers listed in "Manufacturers of Decorative Glass" Article.

Basis-of-Design Product: <**Insert manufacturer's name; product name or designation**>.

Glass Type: [**Clear**] [**Low-iron**] [**Tinted**], [**annealed**] [**heat strengthened**] [**fully tempered**] float glass.

Tint Color: [**Blue**] [**Blue-green**] [**Bronze**] [**Green**] [**Gray**] <**Insert color**>.

Glass Thickness: [**4 mm**] [**5 mm**] [**6 mm**] <**Insert thickness designation**>.

Retain last option in "Pattern" Subparagraphsubparagraph below if custom pattern or graphics are available. Indicate custom pattern and graphics on Drawings. Verify, with manufacturers, perimeter of etched area related to edge of glass.

Pattern: [**As indicated by manufacturer's designations**] [**Match Architect Director’s Representative's samples**] [**As selected by Architect Director’s Representative from manufacturer's full range**] [**As indicated**].

* + - * 1. Bent Glass[**Type GL-#**]: Kind [**BA (bent, annealed)**] [**BCS (bent, chemically strengthened)**] [**BFT (bent, fully tempered)**] [**BHS (bent, heat strengthened)**] [**BL (bent, laminated)**] [**BX (bent, other combination)**]

Retain "Basis-of-Design Product" Subparagraphsubparagraph below to require a specific product or a comparable product from manufacturers listed in "Manufacturers of Decorative Glass" Article.

Basis-of-Design Product: <**Insert manufacturer's name; product name or designation**>.

Glass Type: [**Clear**] [**Low-iron**] [**Tinted**], [**annealed**] [**heat strengthened**] [**fully tempered**] float glass.

Tint Color: [**Blue**] [**Blue-green**] [**Bronze**] [**Green**] [**Gray**] <**Insert color**>.

Glass Thickness: [**4 mm**] [**5 mm**] [**6 mm**] <**Insert thickness designation**>.

Shape: [**Cylindrical bend**] [**single bend**] [**multiple bend**] [**spherical**] [**compound**] [**complex bend**] <**Insert requirements**>.

Retain paragraph below for glass with PVC film overlay that simulates an acid-etched or sandblasted appearance.

* + - * 1. Decorative Film Overlays[**Type GL-#**]: Glass with decorative film overlay.

Retain "Basis-of-Design Product" Subparagraphsubparagraph below to require a specific product or a comparable product from manufacturers listed in "Manufacturers of Decorative Glass" Article.

Basis-of-Design Product: <**Insert manufacturer's name; product name or designation**>.

Glass Type: [**Clear**] [**Low-iron**] [**Tinted**], [**annealed**] [**heat-strengthened**] [**fully tempered**] float glass.

Tint Color: [**Blue**] [**Blue-green**] [**Bronze**] [**Green**] [**Gray**] <**Insert color**>.

Glass Thickness: [**4.0 mm**] [**5.0 mm**] [**6.0 mm**] <**Insert thickness designation**>.

Retain first subparagraph below if required.

Safety glazing required.

Use: Suitable for exterior and interior applications.

Outdoor Durability: Not less than [**five**] <**Insert number**> years.

Pattern: [**As indicated by manufacturer's designations**] [**Match Architect Director’s Representative's samples**] [**As selected by Architect Director’s Representative from manufacturer's full range**] [**As indicated**].

END OF SECTION 088113