SECTION 08 81 10

ARCHITECTURAL GLASS GLAZING

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\*\* NOTE TO SPECIFIER \*\* General Glass International; architectural glass.  
This section is based on the products of General Glass International, which is located at:  
101 Venture Way  
Secaucus, NJ 07094-1808  
Toll Free Tel: 800-431-2042  
Tel: 201-553-1850  
Fax: 201-553-1851  
Email: [request info (sales@generalglass.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=General+Glass+International&coid=44075&rep=&fax=201-553-1851&message=RE:%20Spec%20Question%20(08810ggi):%20%20&mf=)  
Web: <http://www.generalglass.com>   
 [ [Click Here](http://www.arcat.com/arcatcos/cos44/arc44075.html) ] for additional information.  
GGI is a leading custom glass fabricator and distributor of architectural glass, including decorative, fire-rated, bird-friendly and other specialty glass solutions for commercial building facades, insulated glass units, interior design and public art applications. Glass that is functional, decorative and environmentally friendly combined with precision workmanship and five generations of glass industry expertise. This is what you can count on from GGI. GGI sources globally, fabricates locally and distributes nationally. We do the exceptional and the everyday with glass. Learn more www.generalglass.com.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Anti-reflective glass.
    2. Direct-to-glass printing on glass.
    3. Back-painted glass.
    4. Bird protection glass.
    5. Glass surface treatment. (EnduroShield)
    6. Fire rated glass.
    7. Interior fire protective frames glazing assemblies.
    8. Wire glass.
    9. Float glass.
    10. All glass entrance systems.
    11. Ultra Clear Low iron glass.
    12. Low E glass.
    13. Patterned glass.
    14. Satin etched glass.
    15. Mirrors.
    16. Custom shower enclosures.
    17. Glass markerboards.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts.
    2. Section 08 50 00 - Windows.
    3. Section 08 44 16 - Glazed Bronze Curtain Walls.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. American National Standards Institute (ANSI):
       1. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
    2. ASTM International (ASTM):
       1. ASTM C813 - Standard Test Method for Hydrophobic Contamination on Glass by Contact Angle Measurement.
       2. ASTM C912 - Standard Practice for Designing a Process for Cleaning Technical Glasses.
       3. ASTM C1036 - Standard Specification for Flat Glass.
       4. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.
       5. ASTM C1172 - Standard Specification for Laminated Architectural Glat Glass.
       6. ASTM C1323 - Standard Test Method for Ultimate Strength of Advanced Ceramics with Diametrally Compressed C-Ring Specimens at Ambient Temperature.
       7. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass.
       8. ASTM C1624 - Standard Test Method for Adhesion Strength and Mechanical Failure Modes of Ceramic Coatings by Quantitative Single Point Scratch Testing.
       9. ASTM C1674 - Standard Test Method for Flexural Strength of Advanced Ceramics with Engineered Porosity (Honeycomb Cellular Channels) at Ambient Temperatures.
       10. ASTM D3359 - Standard Test Methods for Rating Adhesion by Tape Test.
       11. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
       12. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings.
       13. ASTM E2010 - Standard Practice for Presentation Format of Elemental Cost Estimates, Summaries, and Analyses.
    3. British and European Standards Institute (EN):
       1. EN 1096 - Glass in building. Coated glass.
       2. EN 10025 - Hot rolled products of structural steels. Technical delivery conditions for non-alloy structural steels.
       3. EN 10142 - Continuously hot-dip zinc coated low carbon steels strip and sheet for cold forming. Technical delivery conditions.
    4. German Standards Institute (DIN):
       1. DIN EN 7863 - Elastomer glazing and panel gaskets for windows and claddings - Technical delivery conditions - Part 1: Non cellular elastomer glazing and panel gasket.
       2. DIN 1700 - Non-ferrous Metals; Systematic Symbols.
       3. DIN 1747 - Rubber, Vulcanized - determination of Adhesion To.
    5. Glass Association of North America (GANA):
       1. GANA Sealant Manual; 2008.
       2. GANA - Mirrors: Handle with Extreme Care (Tips for the Professional on the Care and Handling of Mirrors).
    6. International Building Code (IBC).
    7. International Organization for Standardization (ISO):
       1. ISO 9022-2 - Optics and photonics Environmental test methods Part 2: Cold, heat and humidity.
       2. ISO 9211-4 - Optics and photonics Optical coatings Part 4: Specific test methods.
    8. National Fire Protection Association (NFPA):
       1. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
       2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2012.
    9. Standards Council of Canada (CAN):
       1. CAN4 S104
       2. CAN4-S-106 - Standard Method for Fire Tests of Window and Glass Block Assemblies
    10. Uniform Building Code (UBC):
        1. UBC 7-2 - Fire Door Requirements.
    11. United State Code of Federal Regulations (CFR):
        1. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
    12. Underwriter Laboratories (UL): Canada (ULc):
        1. UL 9 - Standard for Fire Tests of Window Assemblies.
        2. UL 10B - Standard for Fire Tests of Door Assemblies.
        3. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
        4. UL 263 - Standard for Fire Tests of Building Construction and Materials; Current Edition, Including All Revisions.
        5. ULc Standards CAN4 S-104-10 - Standard Method for Fire Tests of Door Assemblie
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
     2. Product Data:
        1. Manufacturer's data sheets on each product to be used.
        2. Preparation instructions and recommendations.
        3. Storage and handling requirements and recommendations.
        4. Typical installation methods.

\*\* NOTE TO SPECIFIER \*\* Delete if not applicable to product type.

* + 1. Verification Samples: Two representative units of each type, size, pattern and color.
    2. Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.
  1. QUALITY ASSURANCE
     1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.
     2. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.
     3. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

\*\* NOTE TO SPECIFIER \*\* Include mock-up if the project size or quality warrant the expense. The following is one example of how a mock-up on might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
       1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
       2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
       3. Retain mock-up during construction as a standard to compare with completed work.
       4. Do not alter or remove mock-up until work is completed or removal is authorized.
  1. PRE-INSTALLATION CONFERENCE
     1. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.
  2. DELIVERY, STORAGE, AND HANDLING
     1. Store and handle in per manufacturer's written instructions and recommendations.
     2. Protect from damage due to weather, excessive temperature, and construction operations.
  3. PROJECT CONDITIONS
     1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: General Glass International, which is located at: 101 Venture Way; Secaucus, NJ 07094-1808; Toll Free Tel: 800-431-2042; Tel: 201-553-1850; Fax: 201-553-1851; Email: [request info (sales@generalglass.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=General+Glass+International&coid=44075&rep=&fax=201-553-1851&message=RE:%20Spec%20Question%20(08810ggi):%20%20&mf=); Web: <http://www.generalglass.com>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. ANTI-REFLECTIVE GLASS
     1. Basis of Design: Anti-Reflective Glass as fabricated by GGI.
        1. Reflections Eliminated: 99 percent of reflections.
        2. Residual Reflections: Under 0.5 percent per surface; 8x less than regular glass.
        3. Visible Light transmission: Up to 98 percent.
        4. Uniform color reflection for best viewing experience.
        5. Can be combined with Low-E, Solar control and Heat reflecting coatings.
        6. Cleaning: With appropriate glass cleaner.
        7. Durability Performance: Meets ISO standards.
        8. Standards Compliance:
           1. EN 1096-2 Glass in building - Coated glass - Part 2: Condensation resistance test, neutral salt spray test, and abrasion resistance test.
           2. DIN ISO 9211-4 Optics and optical instruments - Optical coatings - Part 4: Abrasion resistance test, Adhesion test, and Crosshatch test.
           3. ISO 9022-2 Optics and optical instruments - Environmental test method - Part 2: Cold, heat and humidity, resistance test, Climate cycling test.
        9. General Characteristics:
           1. Drilling and Notching: Yes.
           2. Edgework: Yes.
           3. Glass Type: One-Sided: Ultra Clear low iron.

Thickness: 1/4 inches (6 mm).

Thickness: 3/8 inches (10 mm).

Tempered: Yes.

Bent: Yes.

Laminated: Yes.

Printed: Yes.

UV Bonded: Yes.

* + - * 1. Glass Type: Two-Sided: Ultra clear low iron.

Thickness: 1/4 inches (6 mm).

Thickness: 3/8 inches (10 mm).

Thickness: 1/2 inches (13 mm).

Tempered: Yes.

Bent: Yes.

Laminated: Yes.

Printed: Yes.

UV Bonded: Yes.

* + - * 1. Glass Type: Laminated: Ultra clear Low iron.

Thickness: 3/16 inches (5 mm).

Thickness: 1/2 inches (13 mm).

Tempered: No.

Bent: No.

Laminated: No.

Printed: No.

UV Bonded: No.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. DIRECT-TO-GLASS PRINTING

\*\* NOTE TO SPECIFIER \*\* Delete basis of design option not required.

* + 1. Basis of Design: Alice Digital Printed Direct to Glass as manufactured by GGI.
       1. Extremely Durable Ceramic Frit: Fused into ultra clear low iron glass creating permanent designs.
          1. UV, fade, and scratch-resistant.
          2. Suitable for interior or exterior applications.
          3. Unique panel sizes and shapes may be incorporated.
       2. High Resolution Printing: Fine lines, typography, complex images, photographs, artwork adaptation, and material imitation.
       3. Precision Processing and Printing: Print images one-on-top of the other, creating different views on each side of glass.
          1. Tile single images across entire facade or walls. Glass Materials:

\*\* NOTE TO SPECIFIER \*\* Other glass types available. Contact manufacturer for more information.

* + - * 1. Float Glass: Base glass unless specified otherwise.

Heat-Strengthened, Tempered: ASTM C1048, Kind HS and FT.

Tempered Safety Glass: ANSI Z97.1 and 16 CFR 1201.

* + - * 1. Laminated Glass: Float glass laminated per ASTM C1172.
        2. Laminated Safety Glass: Per ANSI Z97.1 and 16 CFR 1201 test requirements
        3. Glass Thickness: 3/16 to 3/4 inches (5 to 19 mm).
      1. Applications: As indicated on drawings.

\*\* NOTE TO SPECIFIER \*\* Delete color options not required.

* + - 1. Colors: \_\_\_\_\_\_\_\_.
      2. Colors: As indicated on drawings.
      3. Printing Style: As indicated on drawings.
  1. BACK-PAINTED GLASS
     1. Basis of Design: Back Painted Glass as manufactured by GGI for Back-Painted.
        1. High-Opacity Coverage. Water based paint, machine sprayed and cured.
        2. Interior Use: Where glass is viewed from non-painted side; wall cladding, backsplashes, furniture, and markerboards. Additional backing is not required.

\*\* NOTE TO SPECIFIER \*\* Other glass types available. Contact manufacturer for more information.

* + - 1. Float Glass: Base glass unless specified otherwise.
         1. Annealed: ASTM C1036, Type I Transparent Flat, Class 1 - Clear, Quality-Q3.
         2. Heat-Strengthened, Tempered: ASTM C1048, Kind HS and FT.
         3. Tempered Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 criteria.
         4. Tinted: ASTM C1036, Class 2 Tinted, Quality-Q3.

Color and performance characteristics as indicated.

* + - * 1. Patterned: ASTM C1036, Type II Patterned Flat Glass, Quality-Q5, Form 3,

Color and performance characteristics as indicated.

* + - 1. Glass Units: Type G-12 - Back Painted Glass: Painted on one surface and highly opaque, silk screened with ceramic frit, or roller coat, or sprayed.
         1. Glass Tint: Ultra clear low iron, or Clear.
         2. Glass Type: Fully tempered or heat strengthened.
         3. Glass Thickness: 3/16 to 3/4 inches (5 to 19 mm).

\*\* NOTE TO SPECIFIER \*\* Standard colors and custom matching of RAL and Pantone colors. Custom colors and patterns are available by special order. Delete color options not required.

* + - 1. Colors: \_\_\_\_\_\_\_\_.
      2. Colors: As determined by the Architect.
      3. Color: As detailed on the Drawings.
      4. Fabrication:
         1. Annealed: Yes.
         2. Tempering: Prior to painting.
         3. Polishing: Yes.
         4. Drilling and Notching: Yes.
         5. Laminating: No.
         6. Bending: No.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. BIRD PROTECTION GLASS

\*\* NOTE TO SPECIFIER \*\* Hundreds of millions of birds are killed annually in North America due to collisions with glass on human-built structures. Bird collisions are a significant cause of avian mortality globally. Approved by the American Bird Conservancy, ORNILUX provides bird protection without compromising thermal performance or light transmission. "Mikado" refers to the unique pattern design.

* + 1. Basis of Design: ORNILUX Bird Protection Glass as manufactured by Arnold Glas and fabricated by GGI.
       1. Bird collision mitigation with a high level of transparency.
          1. Patterned, UV-reflective coating visible to birds but transparent to humans.
          2. Can be combined with Arnold Glass low-emissivity coating or solar control coating for use in insulating glass configuration for energy-efficiency.
       2. Performance Requirements:
          1. Tested and approved "Effective"by American Bird Conservancy.
       3. May be used in triple-laminated glass, or as part of an insulated glass unit.
       4. Heat-strengthened or tempered. Low-iron glass is available.

\*\* NOTE TO SPECIFIER \*\* Delete thickness options not required.

* + - 1. Thickness: 5/32 inch (4 mm).
      2. Thickness: 1/4 inch (6 mm).
      3. Thickness: 5/16 inch (8 mm).
      4. Thickness: 3/8 inch (10 mm).
      5. Thickness: 1/2 inch (13 mm).

\*\* NOTE TO SPECIFIER \*\* Delete glazing system options not required.

* + - 1. Glazing System: Double glazing system.
      2. Glazing System: Triple Insulating.
      3. Glazing System: Triple Laminated.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. GLASS SURFACE TREATMENT
     1. Basis of Design: Enduroshield Glass treatment as fabricated by GGI.
        1. Standards Compliance: ASTM C1036 Type 1 transparent quality Q-3. ASTM C-1048, ASTM C1172, ASTM C1323, ASTM C1624, ASTM C1674, ASTM C813, ASTM C912, and ASTM D2486.
        2. Environmentally Responsible: Can contribute to LEED credits.
        3. Ultra-thin coating to protect glass surfaces from corrosion excessive exposure to water, high-humidity, minerals, dirt and other contaminants.
           1. Permanent and invisible.
           2. Protects from staining over time.
           3. Highly-resistant to UV.

\*\* NOTE TO SPECIFIER \*\* Delete application option not required.

* + - 1. Application: 1-sided.
      2. Application: 2-sided.
      3. Exterior Glass Types:
         1. Clear Float Glass; green hue.
         2. Colored, cast, special or stained glass.
         3. Clear and ultra-clear low iron glass.
         4. Satin etched glass.
         5. Digitally-printed glass.
         6. Patterned glass.
         7. Tempered, annealed or heat strengthened; monolithic, laminated, and IGU,
         8. Spandrel or other non-vision glass types.
         9. Balustrade, guard rail, balcony or other life safety glass types.
         10. Interior Glass Types:

Sliding glass doors and windows.

Door and side lites and transoms.

* + - * 1. Specialty Glass:

Bullet rated, Bomb rated or other specialty impact glass.

Overhead skylights and slope glass.

Curtain wall or ribbon wall sections.

Satin etched and sand blasted design glass.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. FIRE-RATED GLASS
     1. Basis of Design: Pyrobel Series; manufactured by AGC Glass Europe; fabricated by GGI.
        1. Float Glass: Base glass unless noted otherwise.
           1. Annealed: ASTM C1036 Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
           2. Heat-Strengthened and Tempered: ASTM C1048, Kind HS and FT.
           3. Tempered Safety Glass: Per ANSI Z97.1 and 16 CFR 1201.
        2. Glass Units: Type G-3 - Fire-Resistance-Rated Glazing.
           1. Type, thickness, and configuration that contains flame, smoke, and blocks radiant heat, to achieve indicated fire-rating period exceeding 45 minutes.

See Section - 3 for glazing in fire-rated framing assemblies.

* + - * 1. Applications:

Glazing in fire-rated door assembly.

Glazing in fire-rated window assembly.

Glazing in sidelites, borrowed lites, and other glazed openings in fire-rated wall assemblies.

Other locations as indicated on drawings.

* + - * 1. Glass Type: Multi-laminate annealed glass with intumescent fire retardant interlayers. Listed by INTERTEK or UL; approved by authorities having jurisdiction.

UL Design Number: \_\_\_\_\_.

Safety Glazing Certification: 16 CFR 1201 Category II.

Glazing Method: As required for fire rating.

Markings for Fire-Resistance-Rated Glazing Assemblies: Permanent markings on fire-resistance-rated glazing per ICC (IBC), local building code, and authorities having jurisdiction.

W: Meets wall assembly criteria ASTM E119 or UL 263.

D: Meets door assembly criteria NFPA 252, UL 10B, or UL 10C.

H: Meets door assembly hose stream test NFPA 252, UL 10B, or UL 10C.

T: Meets temperature rise not more than 450 degrees F (232 degrees C) above ambient at end of 30 minutes fire exposure per NFPA 252, or UL 10C.

XXX: Placeholder representing fire-rating period, in minutes.

\*\* NOTE TO SPECIFIER \*\* Delete Product attributes paragraph options not required

* + - 1. Product Attributes: Pyrobel 45. Fire Rating: 45 minute fire rating with hose stream.
         1. Maximum Glass: Pyrobel 45. For thickness of 5/8 inch (16 mm).

Doors (WxH): 58-3/4 x 58-3/4 inches (1492 x 1492 mm).

Windows (WxH): 96 x 96 inches (2438 x 2438 mm).

Borrowed Lites (WxH): 96 x 96 inches (2438 x 2438 mm).

Sidelites (WxH): 96 x 96 inches (2438 x 2438 mm).

\*\* NOTE TO SPECIFIER \*\* Delete general characteristics options not required.

* + - * 1. General Characteristics: Interior.

Thickness 5/8 inch (16 mm) minus 0, plus 1.5 mm.

Weight: 8.2 psf (40 kg per sq m).

Light transmission: 85 percent.

Sound Reduction (Rw): 39 dB.

Safety Rating CPSC 16CFR1201 Cat. II 400 ft. lbs. ANSI Z97.1.

R-value: 1.09.

U-value: 0.915.

* + - * 1. General Characteristics: Exterior from minus 20 to 120 degrees F (minus 7 to 49 degrees C).

Thickness 3/4 inch (20 mm) plus or minus 0.04 inches (1 mm).

Weight: 9.8 psf (48 kg per sq m).

Light transmission: 83 percent.

Sound Reduction (Rw): 40 dB.

Safety Rating CPSC 16CFR1201 Cat. II 400 ft. lbs. ANSI Z97.1.

R-value: 1.14.

U-value: 0.881.

* + - * 1. General Characteristics: Insulated Exterior from minus 20 to 120 degrees F (minus 7 to 49 degrees C).

Thickness 1-1/4 inch (34 mm) plus or minus 0.08 inches (2 mm).

Weight: 13.2 psf (64 kg per sq m).

Light transmission: 74 percent.

Sound Reduction (Rw): 42 dB.

Safety Rating CPSC 16CFR1201 Cat. II 400 ft. lbs. ANSI Z97.1.

R-value: 1.89.

U-value: 0.528.

* + - 1. Product Attributes: Pyrobel 60. Fire Rating: 60 minute fire rating with hose stream.
         1. Maximum Glazing Sizes: Pyrobel 60. For thickness of 5/8 inch (16 mm).

Doors (WxH): 87-5/8 x 87-5/8 inches (2226 x 2226 mm).

PyroFrames (WxH): 86-5/8 x 86-5/8 inches (2200 x 2200 mm). 5/8 inch (16 mm) thick.

Vision 60 (WxH): 48 x 96 inches (1219 x 2438 mm).

StileLite (WxH): 93 x 93 inches (2362 x 2362 mm).

* + - * 1. General Characteristics: Interior.

Thickness 1 inch (25 mm) plus or minus 0.08 inches (2 mm).

Weight: 12.3 psf (60 kg per sq m).

Light transmission: 81 percent.

Sound Reduction (Rw): 42 dB.

Safety Rating CPSC 16CFR1201 Cat. II 400 ft. lbs. ANSI Z97.1.

R-value: 1.14.

U-value: 0.881.

* + - * 1. General Characteristics: Exterior from minus 20 to 120 degrees F (minus 7 to 49 degrees C).

Thickness 1-1/4 inch (29 mm) plus or minus 0.08 inches (2 mm).

Weight: 13.94 psf (68 kg per sq m).

Light transmission: 80 percent.

Sound Reduction (Rw): 43 dB.

Safety Rating CPSC 16CFR1201 Cat. II 400 ft. lbs. ANSI Z97.1.

R-value: 1.16.

U-value: 0.862.

* + - * 1. General Characteristics: Insulated Exterior from minus 20 to 120 degrees F (minus 7 to 49 degrees C).

Thickness 1-3/4 inch (45 mm) plus or minus 0.08 inches (2 mm).

Weight: 17 psf (83 kg per sq m).

Light transmission: 71 percent.

Sound Reduction (Rw): 44 dB.

Safety Rating CPSC 16CFR1201 Cat. II 400 ft. lbs. ANSI Z97.1.

R-value: 2.18.

U-value: 0.458.

* + - 1. Product Attributes: Pyrobel 90. Fire Rating: 90 minute fire rating with hose stream.
         1. Maximum Glazing Sizes: For thickness of 5/8 inch (16 mm).

Doors (WxH): 87-5/8 x 87-5/8 inches (2226 x 2226 mm).

PyroFrames (WxH): 86-5/8 x 86-5/8 inches (2200 x 2200 mm).

Vision 60 (WxH): 48 x 96 inches (1219 x 2438 mm).

StileLite (WxH): 93 x 93 inches (2362 x 2362 mm).

* + - * 1. General Characteristics: Interior.

Thickness 1 inch (25 mm) plus or minus 0.08 inches (2 mm).

Weight: 12.3 psf (60 kg per sq m).

Light transmission: 81 percent.

Sound Reduction (Rw): 42 dB.

Safety Rating CPSC 16CFR1201 Cat. II 400 ft. lbs. ANSI Z97.1.

R-value: 1.14.

U-value: 0.881.

* + - * 1. General Characteristics: Exterior from minus 20 to 120 degrees F (minus 7 to 49 degrees C).

Thickness 1-1/4 inch (29 mm) plus or minus 0.08 inches (2 mm).

Weight: 13.94 psf (68 kg per sq m).

Light transmission: 80 percent.

Sound Reduction (Rw): 43 dB.

Safety Rating CPSC 16CFR1201 Cat. II 400 ft. lbs. ANSI Z97.1.

R-value: 1.16.

U-value: 0.862.

* + - * 1. General Characteristics: Insulated Exterior from minus 20 to 120 degrees F (minus 7 to 49 degrees C).

Thickness 1-3/4 inch (45 mm) plus or minus 0.08 inches (2 mm).

Weight: 17 psf (83 kg per sq m).

Light transmission: 71 percent.

Sound Reduction (Rw): 44 dB.

Safety Rating CPSC 16CFR1201 Cat. II 400 ft. lbs. ANSI Z97.1.

R-value: 2.18.

U-value: 0.458.

* + - 1. Product Attributes: Pyrobel 120. Fire Rating: 120 minute fire rating with hose stream.
         1. Maximum Glazing Sizes: For thickness of 5/8 inch (16 mm).

Doors (WxH): 87-5/8 x 87-5/8 inches (2226 x 2226 mm).

PyroFrames (WxH): 86-5/8 x 86-5/8 inches (2200 x 2200 mm).

Vision 60 (WxH): 48 x 96 inches (1219 x 2438 mm).

StileLite (WxH): 93 x 93 inches (2362 x 2362 mm).

* + - * 1. General Characteristics: Interior.

Thickness 1 inch (25 mm) plus or minus 0.08 inches (2 mm).

Weight: 12.3 psf (60 kg per sq m).

Light transmission: 81 percent.

Sound Reduction (Rw): 42 dB.

Safety Rating CPSC 16CFR1201 Cat. II 400 ft. lbs. ANSI Z97.1.

R-value: 1.14.

U-value: 0.881.

* + - * 1. General Characteristics: Exterior from minus 20 to 120 degrees F (minus 7 to 49 degrees C).

Thickness 1-1/4 inch (29 mm) plus or minus 0.08 inches (2 mm).

Weight: 13.94 psf (68 kg per sq m).

Light transmission: 80 percent.

Sound Reduction (Rw): 43 dB.

Safety Rating CPSC 16CFR1201 Cat. II 400 ft. lbs. ANSI Z97.1.

R-value: 1.16.

U-value: 0.862.

* + - * 1. General Characteristics: Insulated Exterior from minus 20 to 120 degrees F (minus 7 to 49 degrees C).

Thickness 1-3/4 inch (45 mm) plus or minus 0.08 inches (2 mm).

Weight: 17 psf (83 kg per sq m).

Light transmission: 71 percent.

Sound Reduction (Rw): 44 dB.

Safety Rating CPSC 16CFR1201 Cat. II 400 ft. lbs. ANSI Z97.1.

R-value: 2.18.

U-value: 0.458.

* + 1. Basis of Design: PyroGuard Series as fabricated by GGI.
       1. Fire-rated 3-PLY laminated glass material listed for use in impact safety-rated locations such as doors.
          1. Wire-free laminated glass for door lites.
          2. Intumescent interlayer protecting against radiant heat.
          3. UV stability for interior and exterior applications.
          4. Exposed Glazing: Maximum dimensions.

Area: 1404 sq in (0.906 sq m).

Width: 28 inch (711 mm). Height: 62 inch (1575 mm).

* + - 1. Fire Rated Glazing: Composed of wired glass with a surface-applied fire-rated film.
         1. Thickness: 5/16 inches (7.2 mm).
         2. Weight: 2.4 lbs per sq ft (11.72 kg per sq m).
         3. Fire-rating: 20 minutes without hose stream for doors.
         4. Impact Safety Resistance: ANSI Z97.1 Class U/B and/or CPSC 16CFR1201 Cat. I. Positive Pressure Test: UL 10C; passes.
      2. Labeling: Permanently label each piece with, UL logo and fire rating, and appropriate marks as approved by local authority having jurisdiction.
      3. Fire Rating: Fire rating classified and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with:

\*\* NOTE TO SPECIFIER \*\* Delete standards options not required.

* + - * 1. ASTM E2010-01,
        2. ULC Standards CAN4 S-104 and CAN4 S-106
        3. NFPA 257
        4. UL 9 and UL 10C.
      1. Glazing Tape: Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides. Maximum water absorption by volume of 2 percent.
      2. Silicone Sealant: One-part neutral curing silicone, medium modulus sealant, Type S; Grade NS; Class 25 with additional movement capability of 50 percent in both extension and compression; total 100 percent.
         1. Dow Corning 795 - Dow Corning Corp.
         2. Silglaze-II 2800 - General Electric Co.
         3. Spectrem 2 - Tremco Inc.
      3. Setting Blocks: Neoprene, EPDM, or silicone; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.
      4. Cleaners, Primers, and Sealers: As recommended by manufacturer.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. INTERIOR FIRE PROTECTIVE FRAMED GLAZING ASSEMBLlES
     1. Basis or Design: PyroFrames with PyroDoors® as manufactured by GGI.
        1. Factory fabricated, factory finished framing members with glazing and related flashings, anchorage and attachment devices.
        2. Structural Performance: Support dead loads and horizontal live loads equivalent to the following; coordinate connection to main structural members.
           1. Design Live Loads: Comply with requirements of the following:

Positive Design Live Load: \_\_\_\_ lbf/sq ft (\_\_\_ Pa).

Negative Design Live Load: \_\_\_\_ lbf/sq ft (\_\_\_ Pa).

* + - * 1. Design Load Resistance per ASTM E1300: For glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
        2. Edge Support System: Limit lateral deflection of supported glass edges to less than 1/175 of their lengths or 3/4 inch (19 mm), whichever is less, under specified design load.
      1. Fire Performance: Hourly fire-resistance-rating as indicated; tested as an assembly including glazing. Comply with ASTM E119 or UL 263 and requirements of local authorities having jurisdiction.
         1. Acceptable evidence of compliance includes listing by UL (DIR), INTERTEK (DIR), or testing agency acceptable to authorities having jurisdiction.
      2. PyroFrames Attributes:
         1. Multiple profile options available, including stainless steel.
         2. Fully weeped system with glazing gaskets.
         3. Shear block construction can be supplied in KD bar lengths or fully fabricated.
         4. Labeling: Manufacturer's name, testing laboratory, rating and safety standards.

\*\* NOTE TO SPECIFIER \*\* Delete profile material option not required.

* + - * 1. Profile Material: Mild steel to ST37-2 quality per DIN 17100. Equivalent to S235 JRG2 per EN10025.

Galvanized interior/exterior profiles to 275 grams per sq m per EN10142.

* + - * 1. Profile Material: Stainless steel to 1.4301 and 1.4404 quality per DIN 17100. Equivalent to 304 and 316L to AISI standards.
        2. Cap Materials: Aluminium alloy to eloxadisable ALMgSi0.5 per DIN 1747 and DIN 17615.
        3. System Fasteners: Zinc coated 1.4301 stainless steel per DIN EN17440. Equivalent to 304 quality to AISI standards.
        4. System Gaskets:

Non cellular elastomer compound per DIN EN7863. Performance classifications per EN13830.

Water Intrusion Resistance 1650 Pa / Air Permeability greater than 600 Pa / Sound Insulation up to 47 dB.

* + - 1. PyroDoors Attributes:
         1. Narrow profile, roll-formed steel doors and frames manufactured for 20 to 90 minute fire rating applications with hose stream.
         2. Tested per UL 10c, UBC 7-2 , NFPA 252, CAN4 S104 with Pyrobel glass.
         3. Internal and external surface protection provided by Sendzimir galvanizing for maximum durability in combination with painted finishes.
         4. Limits Temperature - Rise to 2500 F (1371 degrees C) at 30 minutes
         5. A choice of concealed or surface mounted hinges and closers.
         6. Non-rebated or rebated meeting stiles.
         7. Standard panic bars and automatic operators available.
         8. Fully fabricated door and frame assembly for ease of installation.
         9. Labeling: Manufacturer's name, testing laboratory, rating and safety standards.

\*\* NOTE TO SPECIFIER \*\* Delete profile materials option not required.

* + - * 1. Profile Materials: Mild steel to ST37-2 quality per to DIN 17100.

Sendzimir galvanizing of interior and exterior of profiles to 275 grams per sq m per EN10142.

* + - * 1. Profile Materials: Stainless steel to 1.4301 and 1.4404 quality per to DIN 17100.
        2. System fasteners: Zinc coated 1.4301 stainless steel per DIN EN17440.
        3. System Gaskets:

Non cellular elastomer compound to DIN EN7863.

Water Intrusion Resistance 1650 Pa / Air Permeability greater than 600 Pa / Sound Insulation up to 47 dB.

* + 1. Basis or Design: StileLite Steel Doors and Framing as manufactured by StileLite and fabricated by GGI.
       1. Hollow metal transparent wall systems.

\*\* NOTE TO SPECIFIER \*\* Delete temperature rise option not required.

* + - * 1. Temperature Rise: 60 to 120 minute.
        2. Temperature Rise: 20 to 90 minute
      1. Unlimited number of framing modules up to 49-7/8 inches (1267 mm) wide.
      2. Visible Glass Area: Each opening up to 3,916 sq in (2.53 sq m), not exceeding 46-3/4 x 83-3/4 (1187 x 2127 mm).
      3. Frames: 14 gauge steel; cold-rolled.
      4. Frames: 14 gauge steel; galvanized.
      5. Frames: No 4 stainless steel.
      6. Jamb Size: 4-3/4 to 14 inches (121 x 356 mm) with 5/8 inch (16 mm) glass stops.
      7. Doors (WxH): Up to 48 x 108 inches (1219 x 2743 mm).
      8. Frames and doors per ASTM E119, NFPA 251, UL 263, CANULC S101, and UL 10c.
      9. Finish: Powder coat.
      10. Finish Tnemec factory painted.
      11. Finishing for Doors: Wood grain.
      12. Finishing for Doors: Stainable steel.
      13. Finishing for Doors: Plastic laminate.
      14. Finishing for Doors: Factory-finished wood.
      15. Labeling: Bear manufacturer's name, testing laboratory, rating and safety standards.
      16. General Characteristics:
          1. Maximum Overall Fire-Rated Door and Frame Sizes:

Frames (WxH): 174 x 144 inch (4420 x 3658 mm).

Single Doors (WxH): 51 x 120 inch (1295 x 3048 mm).

Door Pairs (WxH): 102 x 120 inch (2591 x 3048 mm).

Transparent Wall System: No size limit.

* + 1. Basis of Design: SCHOTT PYRAN Platinum; manufactured by Schott; fabricated by GGI.
       1. Fire-rated glass ceramics designed to delay spread of fire, hot gases and smoke. Provides high thermal shock resistance and stays transparent. Available with surface-applied film or laminated, meeting safety impact code requirements. Use with fire-rated frames with same rating. May be used in insulated glass units. May be lightly sandblasted or delivered with surface-applied opacity film.
       2. Standards Compliance:
          1. Classified and labeled by Underwriters Laboratories, Inc. for United States and Canada under File No. R22036.
          2. Fire Tests: Per UL 9, UL 10C, UBC 7-2 (1997), UBC 7-4 (1997), NFPA 257, NFPA 80, ASTM E2010 -01, ASTM E2074-00, and ULC CAN4-S106.

\*\* NOTE TO SPECIFIER \*\* Delete platinum options not required.

* + - 1. Pyran Platinum: Fire-rating: 90 minutes.
         1. Floated glass-ceramic does not require polishing.
         2. Impact Rating: None.
      2. Pyran Platinum F: Fire-rating: 90 minutes. 189 minutes indoors.
         1. Floated glass-ceramic; surface applied film. Does not require surface polishing.
         2. Impact Rating: ANSI Z97.1 Class A and CPSC 16 CFR1201 Cat. l and ll.
      3. Pyran Platinum L: Fire-rating: 90 minutes. 189 minutes in doors.
         1. Specially floated glass-ceramic does not require polishing.
         2. Impact Rating: ANSI Z97.1 Class A and CPSC 16 CFR1201 Cat. l and ll.
         3. STC Rating: 36 dB Approximately.
      4. Sustainability: Meets LEED Innovation in Design requirements.
         1. Cradle to Cradle Certified Silver by MBDC.
         2. Qualifies for Environmentally Preferred Purchasing Program (EPP).
      5. General Characteristics:
         1. Thickness: 3/16 inches (5 mm).
         2. Weight: 2.5 lbs per sq ft (12.2 kg per sq m).
         3. Clear. Must have neutral coloration free of amber tints.
         4. Surface Finish: Float glass quality.
         5. Transparent and wireless.
         6. Withstands thermal shock.
         7. Conforms to positive pressure test standards.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. WIRE GLASS
     1. Basis or Design: New Wire Glass as fabricated by GGI:
        1. Interior applications. Fire-rating is not affected by which surface has the film.
        2. Meets impact safety standards ANSI Z97.1 Class A.

\*\* NOTE TO SPECIFIER \*\* Delete fire rating options not required.

* + - 1. Fire Ratings: UL certifications for 20 minutes.
      2. Fire Ratings: UL certifications for 45, minutes.
      3. Fire Ratings: UL certifications for 60 minutes.
      4. Fire Ratings: UL certifications for 90 minutes.
      5. Glass: Type G-10 - Safety Wired Glazing: Flat glass with embedded wire mesh.
         1. Applications: Locations as indicated on drawings.
         2. Tint: Clear.
         3. Glass Type: Annealed.
         4. Thickness: 1/4 inch (6 mm) nominal.
         5. Weight: 3.85 lbs. per sq ft (18.8 kg per sq m).
         6. Visible Light Transmittance: Approximately 78 percent.

\*\* NOTE TO SPECIFIER \*\* Delete form and mesh options not required.

* + - * 1. Form: No. 1 - Polished both sides.
        2. Form: No. 2 - Patterned Surfaces per ASTM C1036.
        3. Mesh: M1 - Diamond.
        4. Mesh: M2 - Georgian, square, per ASTM C1036.
      1. Must be glazed into appropriate fire-rated framing.
      2. Appropriate glazing compounds, such as Fiberfrax tape, closed cell PVC and Pemko FG300S45, must be used.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. FLOAT GLASS
     1. Basis of Design: Float Glass as furnished by GGI.
        1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
        2. Heat-Strengthened, Tempered: ASTM C1048, Kind HS and FT.
        3. Tempered Safety Glass: ANSI Z97.1 and 16 CFR 1201.

\*\* NOTE TO SPECIFIER \*\* Delete glazing types and options not required.

* + - 1. Glazing Type: Clear glass. Transparent glass with a subtle green tint.
         1. Fabrication: Alice Direct-to-Glass Printing.
         2. Fabrication: EnduroShield single or double sided surface treatment.
         3. Fabrication: Laminated.
         4. Fabrication: Tempered.
         5. Fabrication: Insulated.
         6. Thickness: Up to 3/4 inch (20 mm).

\*\* NOTE TO SPECIFIER \*\* Contact manufacturer for sizes.

* + - * 1. Sizes: \_\_\_\_\_\_\_\_.
      1. Glazing Type: Low-iron glass. Ultra-clear float glass for the highest level of visible light transmission and truest color rendering when viewing objects through the glass. Ultra-Clear with its signature blue edge is available by request.
         1. Fabrication: Alice Direct-to-Glass Printing.
         2. Fabrication: Back painted.
         3. Fabrication: EnduroShield single or double sided surface treatment.
         4. Fabrication: Laminated.
         5. Fabrication: Tempered.
         6. Fabrication: Insulated.
         7. Product: Cut-to-size.

\*\* NOTE TO SPECIFIER \*\* Delete thickness options not required.

* + - * 1. Thickness: 3/16 inch (5 mm)
        2. Thickness: 1/4 inch (6 mm).
        3. Thickness: 3/8 inch (10 mm).
        4. Thickness: 1/2 inch (13 mm).
        5. Thickness: 3/4 inch (20 mm).

\*\* NOTE TO SPECIFIER \*\* Contact manufacturer for sizes.

* + - * 1. Sizes: \_\_\_\_\_\_\_\_.
      1. Glazing Type: Tinted float. Reduces solar heat gain, UV and glare inside a building.
         1. Fabrication: Alice Direct-to-Glass Printing.
         2. Fabrication: Back-painted.
         3. Fabrication: EnduroShield single or double-sided surface treatment.
         4. Fabrication: Laminated.
         5. Fabrication: Tempered.
         6. Fabrication: Insulated.
         7. Product: Cut-to-size.

\*\* NOTE TO SPECIFIER \*\* Delete thickness options not required.

* + - * 1. Thickness: 1/8 inch (3 mm).
        2. Thickness: 3/16 inch (5 mm).
        3. Thickness: 1/4 inch (6 mm).
        4. Thickness: 3/8 inch (10 mm).
        5. Thickness: 1/2 inch (13 mm).

\*\* NOTE TO SPECIFIER \*\* Contact manufacturer for sizes.

* + - * 1. Sizes: \_\_\_\_\_\_\_\_.
        2. Color Tint: Bronze.
        3. Color Tint: Green.
        4. Color Tint: Grey.
        5. Color Tint: Ultra-Clear Low Iron Glass.
      1. Glazing Type: Solarcool reflective glass: Reflects solar heat gain.
         1. Solarcool is applied on first or second surface facing outwards.

First Surface: Bright metallic. Mutes tinted glass substrate color.

Second Surface: Adds reflectivity. Deepens hue of tinted glass substrate.

* + - * 1. Fabrication: Alice Direct-to-Glass Printing.
        2. Fabrication: Back painted.
        3. Fabrication: EnduroShield single or double sided surface treatment.
        4. Fabrication: Laminated.
        5. Fabrication: Tempered.
        6. Fabrication: Insulated.
        7. Thickness: 1/4 inch (6 mm).

\*\* NOTE TO SPECIFIER \*\* Contact manufacturer for sizes.

* + - * 1. Sizes: \_\_\_\_\_\_\_\_.
        2. Color Tint: Bronze.
        3. Color Tint: Grey.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. ALL GLASS ENTRANCE SYSTEMS

\*\* NOTE TO SPECIFIER \*\* Our dedicated entrance systems team GGI has worked with customers for over 10 years creating fully tempered All-Glass glass entrance and wall systems that work best for each project application. Leveraging a combined 30+ years of experience, our glass entrance system team supports our customers with expert consulting and design services. Specify the dimensions and desired hardware, and the GGI team will handle the rest, including defining the optimal door size based on the opening dimensions and all aspects of design.

* + 1. All Glass Entrance Systems:

\*\* NOTE TO SPECIFIER \*\* Delete entrance system location and construction options not required.

* + - 1. Entrance System Location: Exterior.
      2. Entrance System Location: Interior.
      3. Construction: Fully-tempered glass; standard.
      4. Construction: Laminated glass.

\*\* NOTE TO SPECIFIER \*\* Delete the following options not required.

* + - 1. Door Style: Swing doors.
      2. Door Style: Sliding doors.
      3. Door Style: Stacking doors.
      4. Door Style: Sidelites.
      5. Glazing: Clear.
      6. Glazing: Ultra Clear Low iron.
      7. Glazing: Satin etched.
      8. Glass Thickness: 3/8 inch (10 mm).
      9. Glass Thickness: 1/2 inch (13 mm).
      10. Glass Thickness: 5/8 inch (16 mm).
      11. Glass Thickness: 3/4 inch (20 mm).
      12. Decorative Doors and Storefronts: Customized with Alice Direct-to-Glass Printing.

\*\* NOTE TO SPECIFIER \*\* Extensive choice of hardware including standard and custom door pulls, and exit devices such as panic, EG, deadbolt handles, and more. Contact manufacturer for more information.

* + - 1. Hardware: \_\_\_\_\_\_\_\_.
      2. Hardware Finish: \_\_\_\_\_\_\_.
      3. Hardware Finish: Custom-painted.
      4. Hardware Finish: Powder-coated.
      5. Door Sizes: As detailed on the Drawings.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. ULTRA CLEAR LOW IRON GLASS
     1. Basis of Design: Low-Iron Glass as fabricated by GGI.
        1. Ultra-clear for the highest visible light transmission. Provides a virtually colorless aesthetic and the truest color rendering for back-painting and Alice Direct-to-Glass Printing. Excellent quality and clarity.
        2. Thicknesses: Up to 3/4 inches (19 mm).
        3. Ultra Clear Low Iron Glazing Options:

\*\* NOTE TO SPECIFIER \*\* Delete delete glazing type paragraphs and options not required.

* + - * 1. Glazing Type: Anti-Reflective 1-Sided:

Optical coating eliminates 99 percent of reflection, while providing very high light transmission. To be laminated to another piece of anti-reflective glass to achieve full effect.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: Insulated.

Thickness: 1/4 inch (6 mm).

Thickness: 3/8 inch (10 mm).

* + - * 1. Glazing Type: Anti-Reflective 2-Sided:

Optical coating eliminates 99 percent of reflection, while providing very high light transmission.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: Insulated.

Thickness: 1/4 inch (6 mm).

Thickness: 3/8 inch (10 mm).

Thickness: 1/2 inch (13 mm).

* + - * 1. Glazing Type: Anti-Reflective Laminated:

Eliminates 99 percent of reflection, while providing very high light transmission. Two laminated glass pieces, with coating on both exterior surfaces.

Thickness: 3/16 inch (5 mm).

Thickness: 1/2 inch (13 mm).

* + - * 1. Glazing Type: Antique: Made by Schott in Germany with ultra-clear, low-iron glass Also known as German New Antique or GNA. Non-temperable.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: Insulated.

Thickness: 1/8 inch (3 mm).

Thickness: 1/4 inch (6 mm).

Thickness: 3/8 inch (10 mm).

* + - * 1. Glazing Type: Low-Iron.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Back painted.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: Insulated.

Product: Cut-to-size.

\*\* NOTE TO SPECIFIER \*\* contact manufacturer for sizes.

Thickness: 1/4 inch (6 mm).

Thickness: 3/8 inch (10 mm).

Thickness: 1/2 inch (13 mm).

* + - * 1. Glazing Type: Ultra clear low iron Crystal Light.

A softer finish than traditional satin etched glass on a low-iron glass substrate.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Back painted.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: Insulated.

Thickness: 1/4 inch (6 mm).

Thickness: 3/8 inch (10 mm).

Thickness: 1/2 inch (13 mm).

* + - * 1. Glazing Type: Ultra clear low iron Mirror.

Thickness: 1/4 inch (6 mm).

* + - * 1. Glazing Type: Ultra clear low iron Satin Etch:

Virtually colorless glass, with etched surface on one or both sides for a level of translucence that allows the sharing of light between spaces without compromising privacy.

Fabrication: Alice Direct-to-Glass Printing. Only on one-sided.

Fabrication: Laminated. Only on one-sided.

Fabrication: Tempered. Only on one-sided.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 1/4 inch (6 mm).

Thickness: 3/8 inch (10 mm).

Thickness: 1/2 inch (13 mm).

* + - * 1. Glazing Type: Ultra clear low iron Satin Mirror.

The look of silvered stainless steel. When beveled or grooved, the surface becomes a reflective mirror.

Thickness: 1/4 inch (6 mm).

* + - * 1. Glazing Type: Reeded:

Reeds spaced 1/2 inches (13 mm) apart create subtle distortion for limited obscurity and lots of light. Available in low-iron as well.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 5/32 inch (4 mm).

Thickness: 1/4 inch (6 mm).

Thickness: 3/8 inch (10 mm).

* + - * 1. Glazing Type: Thin Ribbed:

Ribs are 1/8 inch (3 mm) wide and run parallel to the long dimension.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 5/32 inch (4 mm).

Thickness: 1/4 inch (1/4 mm).

* + - * 1. Glazing Type: Venetian Blinds: Low-Iron Satin Etched Glass.

Two-sided offset line pattern for added interest, allowing designers to choose which side of the space should be very private and the other with just a hint of privacy.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 3/8 inch (10 mm).

Thickness: 1/2 inch (13 mm).

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. LOW-E GLASS

\*\* NOTE TO SPECIFIER \*\* Delete basis of design options not required.

* + 1. Basis of Design: Energy Select 20 as manufactured by AGC and fabricated by GGI. Exterior use only.
       1. Combines triple-silver low-e coating with an array of tinted glass substrates to yield the lowest solar heat gain coefficient (SHGC) possible. Exterior use only.
       2. Laminated.
       3. Tempered and heat strengthened.

\*\* NOTE TO SPECIFIER \*\* Glazing thicknesses of 5/16 and 3/8 inch (8 and 10 mm) are available. Contact manufacturer for more information.

* + - 1. Glazing Thickness: 1/4 inch (6 mm); standard.
      2. Coating Position: Surface 2.
         1. Insulating Glazing Unit: 1/4-1/2-14 inch (6-13-6 mm).

Energy Select 20 Pure Grey: SHGC: 0.20. Light to Solar Gain: 1.58

Energy Select 20 Pure Bronze: SHGC: 0.21. Light to Solar Gain: 1.77

Energy Select 20 Forest Green: SHGC: 0.23. Light to Solar Gain: 1.99

* + 1. Basis of Design: Energy Select as manufactured by AGC and fabricated by GGI. Exterior use only.
       1. For maximum solar control in hottest climate regions. Featuring a neutral blue-grey reflected color, Lets natural light in, while keeping more heat out, maximizing energy savings and creating greater indoor comfort.
       2. Laminated and insulating.
       3. Tempered and heat strengthened.

\*\* NOTE TO SPECIFIER \*\* Glazing thicknesses of 5/16 and 3/8 inch (8 and 10 mm) are available. Contact manufacturer for more information.

* + - 1. Glazing Thickness: 1/4 inch (6 mm); standard.
      2. Coating Position: Surface 2.
         1. Insulating Glazing Unit: 1/4-1/2-14 inch (6-13-6 mm).

Energy Select 23 Neutral Blue Grey: SHGC: 0.22. Light to Solar Gain: 2.16

* + 1. Basis of Design: Energy Select 25 as manufactured by AGC and fabricated by GGI. Exterior use only.
       1. Provides more options when designing to meet the most challenging energy code requirements.
       2. Laminated and insulating.
       3. Tempered and heat strengthened.

\*\* NOTE TO SPECIFIER \*\* Glazing thicknesses of 5/16 and 3/8 inch (8 and 10 mm) are available. Contact manufacturer for more information.

* + - 1. Glazing Thickness: 1/4 inch (6 mm); standard.
      2. Coating Position: Surface 2.
         1. Insulating Glazing Unit: 1/4-1/2-14 inch (6-13-6 mm).

Energy Select 25 Pure Grey: SHGC: 0.25. Light to Solar Gain: 1.40

Energy Select 25 Pure Bronze: SHGC: 0.27. Light to Solar Gain: 1.47

Energy Select 25 Forest Green: SHGC: 0.26. Light to Solar Gain: 1.87

* + 1. Basis of Design: Energy Select 28 as manufactured by AGC and fabricated by GGI. Exterior use only.
       1. Combination of excellent solar control, a neutral appearance, and low reflectivity. For commercial buildings in warmest climate regions. In areas where air conditioning costs are the primary concern.
       2. Laminated and insulating.
       3. Tempered and heat strengthened.

\*\* NOTE TO SPECIFIER \*\* Glazing thicknesses of 5/16 and 3/8 inch (8 and 10 mm) are available. Contact manufacturer for more information.

* + - 1. Glazing Thickness: 1/4 inch (6 mm); standard.
      2. Coating Position: Surface 2.
         1. Insulating Glazing Unit: 1/4-1/2-14 inch (6-13-6 mm).

Energy Select 28 Neutral: SHGC: 0.28. Light to Solar Gain: 2.18.

* + 1. Basis of Design: Energy Select 31 as manufactured by AGC and fabricated by GGI. Exterior use only.
       1. For commercial and mixed-use building applications; meeting even the most stringent energy code requirements. Exceptional performance for both warm and cold weather throughout North America. Its neutral color offers 21 percent mid-range reflectance, an excellent light-to-solar-gain of 2.01 and high visible light transmittance.
       2. Laminated and insulating.
       3. Tempered and heat strengthened.

\*\* NOTE TO SPECIFIER \*\* Glazing thicknesses of 5/16 and 3/8 inch (8 and 10 mm) are available. Contact manufacturer for more information.

* + - 1. Glazing Thickness: 1/4 inch (6 mm); standard.
      2. Coating Position: Surface 2.
         1. Insulating Glazing Unit: 1/4-1/2-14 inch (6-13-6 mm).

Energy Select 31 Neutral Blue Grey: SHGC: 0.31. Light to Solar Gain: 2.01.

* + 1. Basis of Design: Energy Select 36 as manufactured by AGC and fabricated by GGI.
       1. Designed to block solar heat gain. Provides energy efficiency, attractive neutral appearance, and high visible light transmittance of 65 percent while blocking 68 percent of solar energy.
       2. Laminated and insulating.
       3. Tempered and heat strengthened.

\*\* NOTE TO SPECIFIER \*\* Glazing thicknesses of 5/16 and 3/8 inch (8 and 10 mm) are available. Contact manufacturer for more information.

* + - 1. Glazing Thickness: 1/4 inch (6 mm); standard.
      2. Coating Position: Surface 2.
         1. Insulating Glazing Unit: 1/4-1/2-14 inch (6-13-6 mm).

Energy Select 36: Neutral. SHGC: 0.36. Light to Solar Gain: 1.79.

* + 1. Basis of Design: Energy Select 40 as manufactured by AGC and fabricated by GGI. For exterior use.
       1. For regions with moderate climates, delivers energy savings and high levels of natural light transmission with a neutral appearance. For commercial buildings in moderate climate regions.
       2. Laminated and insulating.
       3. Tempered and heat strengthened.

\*\* NOTE TO SPECIFIER \*\* Glazing thicknesses of 5/16 and 3/8 inch (8 and 10 mm) are available. Contact manufacturer for more information.

* + - 1. Glazing Thickness: 1/4 inch (6 mm); standard.
      2. Coating Position: Surface 2.
         1. Insulating Glazing Unit: 1/4-1/2-14 inch (6-13-6 mm).

Energy Select 40: Neutral. SHGC: 0.39. Light to Solar Gain: 1.79.

* + 1. Basis of Design: Energy Select R42 as manufactured by AGC and fabricated by GGI. Exterior use only.
       1. For high-rise residential and architectural facades. For regions where air conditioning is used most of the year.
       2. Laminated and insulating.
       3. Tempered and heat strengthened.

\*\* NOTE TO SPECIFIER \*\* Glazing thicknesses of 5/16 and 3/8 inch (8 and 10 mm) are available. Contact manufacturer for more information.

* + - 1. Glazing Thickness: 1/4 inch (6 mm); standard.
      2. Coating Position: Surface 2.
         1. Insulating Glazing Unit: 1/4-1/2-14 inch (6-13-6 mm).

Energy Select 31: Neutral. SHGC: 0.42. Light to Solar Gain: 1.45.

* + 1. Basis of Design: Energy Select 63 as manufactured by AGC and fabricated by GGI. Exterior use only.
       1. In colder climates, capitalizes on free solar energy to maximize heat gain and minimize annual heating costs. The ideal choice for the Northern regions. Enables free solar heat gain during winter months, retaining radiant energy within the building and flooding interior with light to create more comfortable interior spaces. Outstanding insulating performance and beautifully neutral color to complement any design.
       2. Laminated and insulating.
       3. Tempered and heat strengthened.

\*\* NOTE TO SPECIFIER \*\* Glazing thicknesses of 5/16 and 3/8 inch (8 and 10 mm) are available. Contact manufacturer for more information.

* + - 1. Glazing Thickness: 1/4 inch (6 mm); standard.
      2. Coating Position: Surface 3.
         1. Insulating Glazing Unit: 1/4-1/2-14 inch (6-13-6 mm).

Energy Select 63: Neutral. SHGC: 0.59. Light to Solar Gain: 1.32.

* + 1. Basis of Design: Energy Select 73 as manufactured by AGC and fabricated by GGI. Exterior use only.
       1. A pyrolytic low-emissivity glass that combines excellent year-round energy efficiency with hard-coat durability. Saves energy costs during colder months by reflecting heat back into the room while also allowing free solar energy into interior spaces. During warmer months, reduces direct sunlight and blocks re-radiated solar heat.
       2. Laminated and insulating.
       3. Tempered and heat strengthened.

\*\* NOTE TO SPECIFIER \*\* Other thickness are available. Contact manufacturer for more details.

* + - 1. Glazing Thickness: 1/4 inch (6 mm); standard.
      2. Insulating Glazing Unit: 1/4-1/2-14 inch (6-13-6 mm).
         1. Energy Select 73 Plus: Neutral. SHGC: 0.69. Light to Solar Gain: 1.06.

Coating Position: Surface 3.

* + - * 1. Energy Select 28/U4: Neutral. SHGC: 0.27. Light to Solar Gain: 2.14.

Coating Position: Surface 2 and 4.

* + - * 1. Energy Select 36/U4: Neutral. SHGC: 0.34. Light to Solar Gain: 1.76.

Coating Position: Surface 2 and 4.

* + - * 1. Energy Select 40/U4: Neutral. SHGC: 0.37. Light to Solar Gain: 1.76.

Coating Position: Surface 2 and 4.

* + 1. Basis of Design: Pilkington Energy Advantage as supplied by GGI.
       1. For insulating glazing units. Low-e coatings applied to the No. 2 and No. 4 surfaces of an insulating unit reducing center of glass U-factor approximately 20 percent compared to an IGU with a pyrolytic low-e and an uncoated clear lite. This proven technology improves thermal performance in a new or reglazed commercial building.

\*\* NOTE TO SPECIFIER \*\* Delete coating configuration options and glass thickness options not required. See manufacturer's website for more detailed information.

* + - 1. Clear Coating Configuration: Energy Advantage Outer Lite (No. 2 surface); Optifloat Clear Inner Lite.
         1. Glass Thickness: 3/16 inch (5 mm). SHGC: 0.63. Shading Coefficient: 0.73.
         2. Glass Thickness: 1/4 inch (6 mm). SHGC: 0.62. Shading Coefficient: 0.71.
         3. Glass Thickness: 5/16 inch (8 mm). SHGC: 0.59. Shading Coefficient: 0.67.
         4. Glass Thickness: 3/8 inch (10 mm). SHGC: 0.56. Shading Coefficient: 0.64.
         5. Glass Thickness: 1/2 inch (12 mm). SHGC: 0.53. Shading Coefficient: 0.31.
      2. Clear Coating Configuration: Energy Advantage Outer Lite (No. 2 surface); Energy Advantage Inner Lite (No. 4 surface).
         1. Glass Thickness: 3/16 inch (5 mm). SHGC: 0.59. Shading Coefficient: 0.68.
         2. Glass Thickness: 1/4 inch (6 mm). SHGC: 0.58. Shading Coefficient: 0.66.
         3. Glass Thickness: 5/16 inch (8 mm). SHGC: 0.54. Shading Coefficient: 0.62.
         4. Glass Thickness: 3/8 inch (10 mm). SHGC: 0.51. Shading Coefficient: 0.59.
         5. Glass Thickness: 1/2 inch (12 mm). SHGC: 0.49. Shading Coefficient: 0.57.
      3. Clear Coating Configuration: Double Silver Sputter Coat Low-e Outer Lite ( No. 2 surface) and Energy Advantage Inner Lite (No. 4 surface).
         1. Glass Thickness: 3/16 inch (5 mm). SHGC: 0.36. Shading Coefficient: 0.42.
         2. Glass Thickness: 1/4 inch (6 mm). SHGC: 0.36. Shading Coefficient: 0.41.
         3. Glass Thickness: 5/16 inch (8 mm). SHGC: 0.35. Shading Coefficient: 0.40.
         4. Glass Thickness: 3/8 inch (10 mm). SHGC: 0.35. Shading Coefficient: 0.40.
         5. Glass Thickness: 1/2 inch (12 mm). SHGC: 0.34. Shading Coefficient: 0.39.
      4. Clear Coating Configuration: Triple Silver Sputter Coat Low-e Outer Lite (No. 2 surface) and Energy Advantage Inner Lite (No. 4 surface).
         1. Glass Thickness: 3/16 inch (5 mm). SHGC: 0.26. Shading Coefficient: 0.30.
         2. Glass Thickness: 1/4 inch (6 mm). SHGC: 0.26. Shading Coefficient: 0.30.
         3. Glass Thickness: 5/16 inch (8 mm). SHGC: 0.26. Shading Coefficient: 0.30.
         4. Glass Thickness: 3/8 inch (10 mm). SHGC: 0.26. Shading Coefficient: 0.30.
         5. Glass Thickness: 1/2 inch (12 mm). SHGC: 0.26. Shading Coefficient: 0.30.
      5. Clear Coating Configuration: Energy Advantage OW Outer Lite (No. 2 surface) and Optiwhite ultra clear low iron Inner Lite.
         1. Glass Thickness: 1/4 inch (6 mm). SHGC: 0.70. Shading Coefficient: 0.81.
      6. Clear Coating Configuration: Energy Advantage OW Outer Lite (No. 2 surface) and Energy Advantage OW Inner Lite (No. 4 surface).
         1. Glass Thickness: 1/4 inch (6 mm). SHGC: 0.66. Shading Coefficient: 0.76.
      7. Clear Coating Configuration: Double Silver Sputter Coat Low-e Outer Lite (No. 2 surface) and Energy Advantage OW Inner Lite (No. 4 surface).
         1. Glass Thickness: 1/4 inch (6 mm). SHGC: 0.37. Shading Coefficient: 0.42.
      8. Clear Coating Configuration: Triple Silver Sputter Coat Low-e Outer Lite (No. 2 surface) and Energy Advantage OW Inner Lite (No. 4 surface).
         1. Glass Thickness: 1/4 inch (6 mm). SHGC: 0.26. Shading Coefficient: 0.30.
      9. Clear Coating Configuration: Solar-E (No. 2 surface) outer lite; Energy Advantage Low-e (No. 4 surface) inner lite.
         1. Glass Thickness: 1/4 inch (6 mm). SHGC: 0.41. Shading Coefficient: 0.47.
         2. Glass Thickness: 5/16 inch (8 mm). SHGC: 0.40. Shading Coefficient: 0.45.
      10. Coating Configuration: Solar-E Plus (No. 2 surface) outer lite; Energy Advantage Low-e (No. 4 surface) inner lite.

\*\* NOTE TO SPECIFIER \*\* Delete tint and glass thickness options not required.

* + - * 1. Tint: Blue-Green.

Glass Thickness: 1/4 inch (6 mm). SHGC: 0.27. Shading Coef.: 0.31.

Glass Thickness: 5/16 inch (8 mm). SHGC: 0.24. Shading Coef.: 0.38.

* + - * 1. Tint: Evergreen.

Glass Thickness: 1/4 inch (6 mm). SHGC: 0.22. Shading Coef.: 0.25.

Glass Thickness: 5/16 inch (8 mm). SHGC: 0.19. Shading Coef.: 0.22.

* + - * 1. Tint: Graphite Blue.

Glass Thickness: 1/4 inch (6 mm). SHGC: 0.29. Shading Coef.: 0.34.

Glass Thickness: 5/16 inch (8 mm). SHGC: 0.26. Shading Coef.: 0.29.

* + - * 1. Tint: Arctic Blue.

Glass Thickness: 1/4 inch (6 mm). SHGC: 0.21. Shading Coef.: 0.25.

Glass Thickness: 5/16 inch (8 mm). SHGC: 0.19. Shading Coef.: 0.22.

* + - * 1. Tint: Grey.

Glass Thickness: 1/4 inch (6 mm). SHGC: 0.23. Shading Coef.: 0.26.

Glass Thickness: 5/16 inch (8 mm). SHGC: 0.20. Shading Coef.: 0.23.

* + - 1. Coating Configuration: Eclipse Advantage (No. 2 surface) outer lite; Energy Advantage Low-e (No. 4 surface) inner lite.

\*\* NOTE TO SPECIFIER \*\* Delete tint and glass thickness options not required.

* + - * 1. Tint: Clear.

Glass Thickness: 1/4 inch (6 mm). SHGC: 0.51. Shading Coef.: 0.58.

Glass Thickness: 5/16 inch (8 mm). SHGC: 0.48. Shading Coef.: 0.55.

* + - * 1. Tint: Blue-Green.

Glass Thickness: 1/4 inch (6 mm). SHGC: 0.35. Shading Coef.: 0.40.

Glass Thickness: 5/16 inch (8 mm). SHGC: 0.30. Shading Coef.: 0.35.

* + - * 1. Tint: Evergreen.

Glass Thickness: 1/4 inch (6 mm). SHGC: 0.26. Shading Coef.: 0.30.

Glass Thickness: 5/16 inch (8 mm). SHGC: 0.23. Shading Coef.: 0.26.

* + - * 1. Tint: Arctic Blue.

Glass Thickness: 1/4 inch (6 mm). SHGC: 0.26. Shading Coef.: 0.30.

Glass Thickness: 5/16 inch (8 mm). SHGC: 0.22. Shading Coef.: 0.25.

* + - * 1. Tint: Bronze.

Glass Thickness: 1/4 inch (6 mm). SHGC: 0.34. Shading Coef.: 0.39.

Glass Thickness: 5/16 inch (8 mm). SHGC: 0.29. Shading Coef.: 0.33.

* + - * 1. Tint: Grey.

Glass Thickness: 1/4 inch (6 mm). SHGC: 0.30. Shading Coef.: 0.35.

Glass Thickness: 5/16 inch (8 mm). SHGC: 0.25. Shading Coef.: 0.29.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. PATTERNED GLASS
     1. Basis of Design Patterned Glass as manufactured by GGI
        1. Glass Materials: Float Glass unless specified otherwise
           1. Annealed: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
           2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and FT.
           3. Tempered Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 criteria.
           4. Patterned Glass: ASTM C1036, Type II - Patterned Flat Glass, Quality-Q5, Form 3 - Patterned glass, color and performance characteristics as indicated.
        2. Glazing Units: Type G-11 - Patterned Glazing: Rolled or textured glass; translucent, showing shadows but not form.
           1. Applications: Locations as indicated on drawings.
           2. Finish: F1 - Patterned one side; ASTM C1036.
           3. Pattern: P1 - Linear; ASTM C1036.
           4. Style: As indicated on drawings.
           5. Tint: Clear.

\*\* NOTE TO SPECIFIER \*\* Delete glass pattern and fabrication and thickness options not required. Some patterns may not be temperable in 1/8 inch (3 mm) thicknesses. Verify with GGI,

* + - * 1. Glass Patterns: Altdeutsch K: A freeform pattern also known as Glacier or Winterlake.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 5/32 inch (5 mm).

* + - * 1. Glass Patterns: Antique: Made by Schott in Germany with ultra-clear, low-iron glass with a vertical draw production process. Also known as German New Antique or GNA. The 3 mm product ranges from 0.098 to 0.118 inches (2.5 to 3 mm) in thickness and is non-temperable.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: Insulated.

Thickness: 1/8 inch (3 mm).

Thickness: 1/4 inch (6 mm).

Thickness: 3/8 inch (10 mm).

* + - * 1. Glass Patterns: Aqualite: A mottled surface obscures views with a classic pattern similar to Aquatex and Spraylite.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 3/16 inch (5 mm).

Thickness: 1/4 inch (6 mm).

Thickness: 3/8 inch (10 mm).

* + - * 1. Glass Patterns: Artico:

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 1/8 inch (3 mm).

* + - * 1. Glass Patterns: Autumn:

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 5/32 inch (4 mm).

Thickness: 1/4 inch (6 mm).

* + - * 1. Glass Patterns: Bamboo: A classic, rolled tropical pattern.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 3/16 inch (5 mm).

Thickness: 3/8 inch (10 mm).

* + - * 1. Glass Patterns: Bubbles: Reminiscent of the surface of foam or water drops on a glass.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Laminated.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Tempered.

Fabrication: Insulated.

Thickness: 1/8 inch (3 mm).

Thickness: 1/4 inch (6 mm).

Thickness: 3/8 inch (10 mm).

* + - * 1. Glass Patterns: Cast: A rolled pattern with a free-flowing, organic pattern.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 1/4 inch (6 mm).

Thickness: 3/8 inch (10 mm).

* + - * 1. Glass Patterns: Chinchilla: A classic European design that creates a surface of soft fur.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 5/32 inch (4 mm).

* + - * 1. Glass Patterns: Cotswold: A deeply textured pattern resembling tree bark.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 5/32 inch (4 mm).

Thickness: 1/4 inch (6 mm).

* + - * 1. Glass Patterns: Cross Reeded Small.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 5/32 inch (4 mm).

* + - * 1. Glass Patterns: Delta Frost: Thick layers of frost pattern are created with sandblasting for additional obscurity.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 5/32 inch (4 mm).

* + - * 1. Glass Patterns: Diamond Cast Wire: A rough texture with 1/4" wire mesh to ensure privacy.

Fabrication: Laminated.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 1/4 inch (6 mm).

* + - * 1. Glass Patterns: Everglade: Lush vines swirl over a pebbled surface.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 5/32 inch (4 mm).

Thickness: 1/4 inch (6 mm).

* + - * 1. Glass Patterns: Flemish: The look of hand-blown glass without the seeds and bubble for a slight distortion in clear glass. Also known as English Flemish.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 5/32 inch (4 mm).

Thickness: 1/4 inch (6 mm).

* + - * 1. Glass Patterns: Georgian Stipolite Wire

Fabrication: Laminated.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 1/4 inch (6 mm). Size: 48 x 72 inch (1219 x 1829 mm)

* + - * 1. Glass Patterns: Glue Chip: Glue is applied to glass and as it dries and contracts, it creates a distinctive and totally unique design. Available in Single and Double (process is applied to same surface twice).

Fabrication: Back painting.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 1/8 inch (3 mm).

Thickness: 3/16 inch (5 mm).

Thickness: 3/8 inch (10 mm).

* + - * 1. Glass Patterns: Master Carre: A high-end, rolled glass with substantive, widely spaced dot grid for visual separation with plenty of light transmission.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Back painting.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: Insulated.

Thickness: 1/8 inch (3 mm).

Thickness: 1/4 inch (6 mm).

Thickness: 3/8 inch (10 mm).

* + - * 1. Glass Patterns: Master Ligne: A high-end, rolled glass with uninterrupted vertical lines that diffuse light and offer privacy.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Back painting.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: Insulated.

Thickness: 5/32 inch (4 mm).

Thickness: 1/4 inch (6 mm).

* + - * 1. Glass Patterns: Master Point: A collection of fine lines diffuses light and offers privacy.

Fabrication: Laminated.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 5/32 inch (4 mm).

* + - * 1. Glass Patterns: Master Ray: A grid of short, horizontal lines creates privacy and allows for plenty of light transmission.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Back painting.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: Insulated.

Thickness: 5/32 inch (4 mm).

Thickness: 1/4 inch (6 mm).

* + - * 1. Glass Patterns: Monumental: Similar to Aqualite, but with deeper patterning of organic forms for a more distinctive appearance.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 5/32 inch (4 mm).

Thickness: 1/4 inch (6 mm).

* + - * 1. Glass Patterns: Morisco:

Fabrication: Laminated.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 5/32 inch (4 mm).

* + - * 1. Glass Patterns: Rain: Patterned after water cascading over a surface.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Back painting.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 1/8 inch (3 mm).

Thickness: 5/32 inch (4 mm).

Thickness: 3/16 inch (5 mm).

Thickness: 1/4 inch (6 mm).

Thickness: 3/8 inch (10 mm).

* + - * 1. Glass Patterns: Reeded: Reeds spaced 1/2" apart create subtle distortion for limited obscurity and lots of light. Available in low-iron as well.

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Back painting.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 5/32 inch (4 mm).

Thickness: 1/4 inch (6 mm).

Thickness: 3/8 inch (10 mm).

* + - * 1. Glass Patterns: Seedy Import:

Fabrication: Laminated.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 5/32 inch (4 mm).

* + - * 1. Glass Patterns: Seedy Marine:

Fabrication: Laminated.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 1/8 inch (3 mm).

* + - * 1. Glass Patterns: Soft Hammered:

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

\*\* NOTE TO SPECIFIER \*\* contact manufacturer for thicknesses and sizes.

Thickness (inch/mm): \_\_\_\_\_\_\_\_.

Size (inch/mm): \_\_\_\_\_\_\_\_.

* + - * 1. Glass Patterns: Stipolite:

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Back painting.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: Insulated.

Thickness: 3/32 inch (2 mm).

Thickness: 1/8 inch (3 mm).

Thickness: 5/32 inch (4 mm).

Thickness: 3/16 inch (5 mm).

Thickness: 1/4 inch (6 mm).

Thickness: 3/8 inch (10 mm).

* + - * 1. Glass Patterns: Taffeta:

Thickness: 5/32 inch (4 mm).

* + - * 1. Glass Patterns: Textured Flutes:

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 3/16 inch (5 mm).

Thickness: 3/8 inch (10 mm).

* + - * 1. Glass Patterns: Thin Ribbed:

Fabrication: Alice Direct-to-Glass Printing.

Fabrication: Laminated.

Fabrication: Tempered.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

Thickness: 5/32 inch (5 mm).

Thickness: 1/4 inch (6 mm).

* + - * 1. Glass Patterns: Waterwave:

Fabrication: Laminated.

Fabrication: EnduroShield single or double sided surface treatment.

Fabrication: Insulated.

\*\* NOTE TO SPECIFIER \*\* contact manufacturer for thicknesses and sizes.

Thickness (inch/mm): \_\_\_\_\_\_\_\_.

Size (inch/mm): \_\_\_\_\_\_\_\_.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. SATIN ETCHED GLASS
     1. Basis of Design: Satin Etched Glass as manufactured by GGI.
        1. Patterns are etched directly into glass and do not wear down or degrade over time. Consistent smooth finish and appearance with no peeling or discoloration.
        2. Float Glass: Base glazing unless specified otherwise.
           1. Annealed: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3
           2. Heat-Strengthened, Tempered: ASTM C1048, Kind HS and FT.
           3. Tempered Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 criteria.
        3. Glazing Units: Type G-17 - Satin etched glazing. Etched glass patterns as full-coverage or as discrete designs, applied to single side or to both sides.
           1. Applications: Locations as indicated on drawings.

\*\* NOTE TO SPECIFIER \*\* Delete glass type and glass thickness options not required.

* + - * 1. Glass Type: Clear Fully tempered, Heat Strengthened or Monolithic glass system.

Single-sided etched 1/4 inch (6 mm) thick. Light Transmission: 81 percent.

Single-sided etched 3/8 inch (9 mm) thick. Light Transmission: 80 percent.

Single-sided etched 1/2 inch (13 mm) thick. Light Transmission: 80 percent.

* + - * 1. Glass Type: Ultra clear low iron Satin Etched Glass as manufactured by GGI.

Single-sided etched 1/4 inch (6 mm) thick. Light Transmission: 91 percent.

Single-sided etched 3/8 inch (9 mm) thick. Light Transmission: 90 percent.

Single-sided etched 1/2 inch (13 mm) thick. Light Transmission: 90 percent.

Two-sided etched 1/4 inch (6 mm) thick. Light Transmission: 81 percent.

Two-sided etched 3/8 inch (9 mm) thick. Light Transmission: 80 percent.

Two-sided etched 1/2 inch (13 mm) thick. Light Transmission: 80 percent.

Two-sided Cross fuzzy 1/2 inch (13 mm) thick. Light Transmission: 83 percent.

Two-sided Illusion lines 1/2 inch (13 mm) thick. Light Transmission: 83 percent.

Two-sided Venetian blinds 3/8 inch (9 mm) thick. Light Transmission: 83 percent.

Two-sided Venetian blinds 1/2 inch (13 mm) thick. Light Transmission: 83 percent.

Two-sided Wavy lines 3/8 inch (9 mm) thick. Light Transmission: 83 percent.

Two-sided Wavy lines 1/2 inch (13 mm) thick. Light Transmission: 83 percent.

\*\* NOTE TO SPECIFIER \*\* Delete either the one or two sided pattern options not required.

* + - * 1. Glass Type: Patterned, One-Sided:
        2. Glass Type: Patterned, Two-Sided: Ideal for vertical interior applications such as partitions and walls. Create a three-dimensional.

\*\* NOTE TO SPECIFIER \*\* Delete pattern options not required.

Pattern: Bamboo. Thickness: 1/4 inch (6 mm).

Pattern: Coral. Thickness: 1/4 inch (6 mm).

Pattern: Coral. Thickness: 3/8 inch (9 mm).

Pattern: Coral. Thickness: 1/2 inch (13 mm).

Pattern: Dots. Thickness: 1/4 inch (6 mm).

Pattern: Dots. Thickness: 3/8 inch (9 mm).

Pattern: Dots. Thickness: 1/2 inch (13 mm).

Pattern: Ice. Thickness: 1/4 inch (6 mm).

Pattern: Ice. Thickness: 3/8 inch (9 mm).

Pattern: Ice. Thickness: 1/2 inch (13 mm).

Pattern: Ice. Thickness: 1/4 inch (6 mm).

Pattern: Ice. Thickness: 3/8 inch (9 mm).

Pattern: Ice. Thickness: 1/2 inch (13 mm).

Pattern: Lines. Thickness: 1/4 inch (6 mm).

Pattern: Lines. Thickness: 3/8 inch (9 mm).

Pattern: Lines. Thickness: 1/2 inch (13 mm).

Pattern: Linen. Thickness: 1/4 inch (6 mm).

Pattern: Linen. Thickness: 3/8 inch (9 mm).

Pattern: Linen. Thickness: 1/2 inch (13 mm).

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. MIRRORS

\*\* NOTE TO SPECIFIER \*\* Delete basis of design options not required.

* + 1. Basis or Design: Antique Mirror as manufactured by GGI
       1. Select materials and provide supports to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing materials, whichever is less.
       2. Glass Type: Antique Mirror. Clear annealed float glass per ASTM C1036.
          1. Thickness: 1/4 inch (6 mm).

\*\* NOTE TO SPECIFIER \*\* Maximum Size: 48 x 94-1/2 inches (1219 x 2400 mm). Delete size options not required.

* + - * 1. Size: As dimensioned in the Drawings.
        2. Size: As determined by the Architect.
        3. Size (WxH): \_\_\_\_\_\_ inch (\_\_\_\_\_\_ mm).

\*\* NOTE TO SPECIFIER \*\* Delete pattern and edges options not required.

* + - * 1. Pattern: Bianco E Nero.
        2. Pattern: Cometa.
        3. Pattern: Golden Antique.
        4. Pattern: Grigio Argento.
        5. Pattern: Luna.
        6. Pattern: Meteora.
        7. Pattern: Policromo.
        8. Pattern: Saturno.
        9. Edges: Chamfered arris.
        10. Edges: Flat polished.
        11. Edges: Pencil polished
        12. Edges: Flat ground
        13. Edges: Seamed.
        14. Size (WxH): \_\_\_\_\_\_ inch (\_\_\_\_\_\_ mm).
    1. Basis or Design: Clear Mirror as manufactured by GGI
       1. Select materials and provide supports to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing
       2. Glass Type: Clear, annealed float glass per ASTM C1036.

\*\* NOTE TO SPECIFIER \*\* Delete thickness option not required.

* + - * 1. Thickness: 1/8 inch (3 mm).
        2. Thickness: 1/4 inch (6 mm).

\*\* NOTE TO SPECIFIER \*\* Contact manufacturer for sizes.

* + - * 1. Size: As dimensioned in the Drawings.
        2. Size: As determined by the Architect.
        3. Size (WxH): \_\_\_\_\_\_ inch (\_\_\_\_\_\_ mm).
    1. Basis or Design: Ultra Clear Low Iron Mirror as manufactured by GGI
       1. Mirror Design Criteria: Select materials and provide supports to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing
       2. Glass Type: Ultra clear low iron float glass.
          1. Thickness: 1/4 inch (6.4 mm).

\*\* NOTE TO SPECIFIER \*\* Maximum Size: 84 x 120 inches (2134 x 3048 mm). Delete size options not required.

* + - * 1. Size: As dimensioned in the Drawings.
        2. Size: As determined by the Architect.
        3. Size (WxH): \_\_\_\_\_\_ inch (\_\_\_\_\_\_ mm).
    1. Basis or Design: Ultra Clear Low Iron Satin Mirror as manufactured by GGI
       1. The look of silvered stainless steel. When beveled or grooved, the surface becomes a reflective mirror.
       2. Mirror Design Criteria: Select materials and provide supports to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing.
          1. Glass Type: Ultra clear low iron float glass.
          2. Thickness: 1/4 inch (6 mm).

\*\* NOTE TO SPECIFIER \*\* Maximum Size: 88-1/2 x 126 inches (2248 x 3200 mm). Delete size options not required.

* + - * 1. Size: As dimensioned in the Drawings.
        2. Size: As determined by the Architect.
        3. Size (WxH): \_\_\_\_\_\_ inch (\_\_\_\_\_\_ mm).
    1. Basis or Design: One-Way Mirror as manufactured by GGI
       1. One-way vision glass creates an opaque mirror-like visual barrier between subjects while allowing observers to see through the glass.
       2. Glass Type: Pilkington Mirropane Grey Glass.

\*\* NOTE TO SPECIFIER \*\* Maximum Size: 96 x 130 inches (2438 x 3302). Delete size options not required.

* + - * 1. Size: As dimensioned in the Drawings.
        2. Size: As determined by the Architect.
        3. Size (WxH): \_\_\_\_\_\_ inch (\_\_\_\_\_\_ mm).
    1. Basis or Design: Tinted Mirror as manufactured by GGI
       1. Mirror Design Criteria: Select materials and provide supports to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing
       2. Glass Type: Tinted, ultra clear low iron float glass.
          1. Thickness: 1/4 inch (6 mm).

\*\* NOTE TO SPECIFIER \*\* Maximum Size: 84 x 120 inches (2134 x 3048 mm). Delete size options not required.

* + - * 1. Size: As dimensioned in the Drawings.
        2. Size: As determined by the Architect.
        3. Size (WxH): \_\_\_\_\_\_ inch (\_\_\_\_\_\_ mm).

\*\* NOTE TO SPECIFIER \*\* Delete tint color options not required.

* + - * 1. Tint Color: Black
        2. Tint Color: Bronze
        3. Tint Color: Gold
        4. Tint Color: Grey

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. CUSTOM SHOWER ENCLOSURES
     1. Shower Enclosures.

\*\* NOTE TO SPECIFIER \*\* Plans are created by GGI based on client input. Plans are submitted for approval prior to production. GGI fabricates the glass with high precision. Quality, industry-standard hardware is supplied to complement the glass. The glass and hardware are shipped together in a single delivery. Contact a manufacturer representative for more details, information, and coordination.

* + - 1. Simple custom clear glass shower doors and enclosures.
         1. Decorative Glazing: \_\_\_\_\_\_\_\_.
         2. Patterned Glass: \_\_\_\_\_\_\_\_.
         3. Satin Etched Glass: \_\_\_\_\_\_\_\_.
         4. Laminate Glass: \_\_\_\_\_\_\_\_.

\*\* NOTE TO SPECIFIER \*\* Glazing thickness up to 3/4 inch (19 mm)

* + - * 1. Glass Thickness: \_\_\_\_\_\_\_\_.
        2. Hardware: \_\_\_\_\_\_\_\_.
        3. Hardware Finish: \_\_\_\_\_\_\_\_.
        4. Framing: \_\_\_\_\_\_\_\_.

Finish: \_\_\_\_\_\_\_\_.

* + - * 1. Frameless.
        2. Sizes and dimensions: As detailed on the Drawings.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. GLASS MARKERBOARDS
     1. Basis of Design: Glass Markerboards as manufactured by GGI.
        1. Interior applications only. Easy to clean, no staining. No special cleaning agent required. Non-porous hygienic surface.

\*\* NOTE TO SPECIFIER \*\* Delete customization options not required or delete entire paragraph.

* + - 1. Customization:
         1. Shapes: As detailed on the Drawings.
         2. Shapes: \_\_\_\_\_\_\_\_.
         3. Cut-outs, holes and notches: As detailed on the Drawings.
         4. Cut-outs, holes and notches: \_\_\_\_\_\_\_\_.
         5. Color back-painting. As detailed on the Drawings.
         6. Color back-painting. \_\_\_\_\_\_\_\_.
         7. Custom printed designs made easy. As detailed on the Drawings.
         8. Custom printed designs made easy. \_\_\_\_\_\_\_\_.
         9. Simulated chalkboards: Green or black.
         10. Simulated chalkboards: Black.
      2. Markerboard Attributes:

\*\* NOTE TO SPECIFIER \*\* Custom Sizes Are Available. Delete attribute options not required.

* + - * 1. Sheet Size (inch/mm): \_\_\_\_\_\_\_\_.
        2. Sheet Size; Minimum: 12 x 12 inch (305 x 305 mm)
        3. Sheet Size; Maximum: 70 x 144 inch (1778 x 3658 mm)
        4. Glass Thickness; Single-Sided: 3/16 to 1/4 inch (5 to 6 mm).
        5. Glass Thickness; Double-Sided: 3/8 to 1/2 inch (10 to 13 mm).
        6. Glass Type: Clear.
        7. Glass Type: Ultra-Clear Low-Iron
        8. Glass Type: Crystal Light for a soft matte finish
        9. Magnetic.
        10. Non-Magnetic.

1. EXECUTION
   1. EXAMINATION
      1. Do not begin installation until substrates have been properly constructed and prepared.
      2. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.
   2. PREPARATION
      1. Clean surfaces thoroughly prior to installation.
      2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
   3. INSTALLATION
      1. Install in accordance with manufacturer's instructions approved submittals and in proper relationship with adjacent construction.
   4. FIELD QUALITY CONTROL
      1. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

\*\* NOTE TO SPECIFIER \*\* Include if manufacturer provides field quality control with onsite personnel for instruction or supervision of product installation, application, erection or construction. Delete if not required.

* + 1. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.
  1. CLEANING AND PROTECTION
     1. Clean products in accordance with the manufacturers recommendations.
     2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION