Section 08 81 23

EXTERIOR GLASS GLAZING

PART 1 – GENERAL

1.1 GENERAL PROVISIONS

A. The Contract Forms, and Conditions of the Contract provided by Cornell University, and applicable parts of Division 1 - GENERAL REQUIREMENTS, shall be included in and made a part of this Section.

B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section.

1.2 SUMMARY

A. General requirements and definition of glass types for glazing work specified under other individual specifications.
   1. Insulated glass in aluminum windows.
   2. Insulated glass in exterior doors.

B. Furnish and install the following:
   1. All materials required to properly install glass furnished hereunder, including sealant, tapes, setting blocks, and spacers.

C. Work of this section includes installation of glazing beads furnished under related sections.

1.3 RELATED REQUIREMENTS

A. Section 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

B. Section 01 81 13 - SUSTAINABLE DESIGN REPORTING: Special administrative and procedure requirements related to the Owner's *LEED v4.1, LEED for Building Design and Construction*, *LEED BD+C* certificate goals.

C. Section 06 10 00 - ROUGH CARPENTRY: Installation of steel door frames.

D. Section 06 20 00 - FINISH CARPENTRY: Installation of doors.

E. Section 07 92 00 - JOINT SEALANTS: Requirements for sealants and backing materials.

F. Section 08 11 13 - HOLLOW METAL DOORS AND FRAMES: Steel doors, door and window frames, and related glazing stops, for both fire-resistance rated (labeled) and non-rated (labeled) conditions.

G. Section 08 14 33 - STILE AND RAIL WOOD DOORS.

H. Section 08 14 34 - CUSTOM FABRICATED STILE AND RAIL WOOD DOORS.

I. Section 08 51 13 – ALUMINUM WINDOWS.

J. Section 08 14 34 – CUSTOM FABRICATED STILE AND RAIL WOOD DOORS AND FRAMES.

K. Section 08 81 23 - EXTERIOR GLASS GLAZING.

L. Section 10 28 13 - TOILET ACCESSORIES: Framed mirrors.

1.4 REFERENCES

A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. AAMA 804.1 - Ductile Back-Bedding Compound.
2. ASTM C 1036 - Flat Glass.
3. ASTM C 1048 - Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
4. ASTM E 546 - Test Method For Frost Point of Sealed Insulating Glass Units.
5. ASTM E 576 - Test Method for Dew/Frost Point of Sealed Insulating Glass Units in Vertical Position.
6. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
7. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.
8. Federal Safety Standards for Architectural Glazing Materials 16CFR1201.
9. FS TT-S-001543A - Sealing Compound, Silicone Rubber Base.
10. IGCC: Certified Products Directory, and Certification Guidelines.
11. NFPA Publication 80 - Fire Doors and Windows.
12. SGCC: Certified Products Directory, and Certification Guidelines.

B. Inclusionary References: The following reference materials are hereby made a part of this Section by reference thereto:

1. GANA Laminated Glazing Reference Manual (2009 edition).
2. GANA - Glazing Manual (50th Anniversary edition).
3. SIGMA - Vertical Glazing Guidelines, Number A3000-87.
4. Consumer Product Safety Commission (CPSC) 16CFR 1201 Code of Federal Regulations for Architectural Glazing Materials.

1.5 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. General: Coordinate the work of this Section with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.

B. Sequencing:

1. Field Measurements

a. Take field measurements before preparation of shop drawings and fabrication, where possible, to ensure proper fitting of Work.

b. Allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay Work.

1.6 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Product Data:

a. Product data sheets on glazing products: Provide chemical, functional, and environmental characteristics, size limitations, special application requirements. Identify available colors.

b. Sample Warranty: Provide copies of manufacturers' actual warranties for all materials to be furnished under this Section, clearly defining all terms, conditions, and time periods for the coverage thereof.

2. Shop Drawings: Show sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades.

a. Plans and elevations 1/4 inch scale of each type of glazing assembly, and mirror assembly; indicate dimensions, and reference details. Verify dimensions with field measurements.

3. Verification Samples:

a. 12 x 12 inch pieces of each specified type and thickness of glass, bearing labels indicating locations where each type of glass will be used.

b. Glazing tape: 12 inch length of specified type and size.

4. Certificates: Manufacturer's written certification stating that the materials installed, meet or exceed the requirements specified under this Section.

5. Source Quality Control Submittals:

B. Closeout Submittals: Submit the following under provisions of Section 01 78 00 - CLOSEOUT SUBMITTALS.

1. Bonds and Warranty Documentation:

a. Manufacturer’s Warranties and Guarantees as specified elsewhere herein this Section.

1.7 QUALITY ASSURANCE

A. General: Perform glazing work in accordance with GANA Glazing Manual, SIGMA and LSGA standards for glazing and installations methods.

1. Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

B. Glass Labeling:

1. General: Manufacturer’s Label shall be, acid-etched, sandblasted, ceramic-fired, laser-etched, embossed, or other similar type which, once applied, cannot be removed without being destroyed.

a. Safety glass: Label tempered and laminated safety glass with permanent manufacturer's label on each light with the mark visible after installation. Furnish SGCC certification for safety glass in compliance with CPSC 16 CFR 1201 Cat 1 or Cat 11, or ANSI Z-97.1.

2. Fire-rated glass: Label each individual glazing unit with appropriate UL, Warnock Hersey, or other approval labeled markings with the listing mark visible after installation.

C. Qualifications:

1. Installer/Applicator: Minimum of 3 years documented experience demonstrating previously successful work of the type specified herein.

1.8 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:

1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.

2. Deliver materials in labeled, protective packages, when and as required.

B. Storage and Handling Requirements:

1. Store and handle in strict compliance with manufacturer’s instructions and recommendations of GANA Glazing Manual. Use clean gloves and tools when handling materials, avoid contamination. Use rolling blocks and suction cups to move glass units not in shipping crates.

a. Carefully store materials to avoid overloading any building component or structure.

b. Do not unpack material until it is to be set, unless un-packing is required for inspection by the Architect.

2. Protect factory finished materials from damage due to moisture, direct sunlight, excessive temperatures, surface contamination, corrosion and damage from construction operations and other causes.

1.9 SITE CONDITIONS

A. Do not install glazing when ambient temperature is less than 50 degrees Fahrenheit.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.10 WARRANTY

A. Warranties: Provide the following warranties under provisions of Section 01 78 36 – WARRANTIES AND BONDS.

B. Manufacturer Warranty/Guarantee: All shall include replacement of defective glass and mirrors, and delivery of replacement glass products furnished f.o.b. from point of manufacturer to project site.

1. Insulating Glass: Manufacturer's 10 year written guarantee covering insulating glass against defects in materials and workmanship, including failure of seals effective on date of original factory shipment to site.

a. Provide coverage in Guarantee for manufacturing defects, including failure of hermetic seal of air space (except by glass breakage) as evidenced by intrusion of dirt or moisture, internal condensation or fogging, deterioration of protected internal glass coating or other visual indications of seal failure or performance.

2. Laminated glass: Manufacturer's 4 year written guarantee covering against defects in materials and workmanship of laminated glass and replacement of the same. Warranty shall be effective from date of original factory shipment to site.

a. Provide coverage in Guarantee for manufacturing defects, including failure of laminated glass units as evidenced by edge separation, delamination, or discoloration of inner layer.

PART 2 - PRODUCTS

2.1 GLASS - GENERAL

A. General requirements for glass: Of domestic and foreign manufacture, conforming to the referenced standards and with the additional requirements specified herein; factory labeled on each pane stating the strength, type, thickness and quality; with all labels remaining on glass until final cleaning.

1. Glass thickness shown and heat treatment specified are minimum requirements. Provide glass thickness and heat treatment as required to meet specified performance criteria, State and local codes and ordinances.

B. Insulated Glass Units: Conform to Class CBA of Insulating Glass Certification Council (IGCC), with a hermetically sealed dehydrated sealed air space, and tested in accordance with ASTM E 2190.

C. Float Glass: Comply with ASTM C 1036, Class 1 clear, quality q3 glazing select.

D. Heat Strengthened Glass: Comply with ASTM C 1048 HS, heat strengthened, Class 1 clear, quality q3 glazing select.

E. Tempered Glass: Comply with ASTM C 1048 FT, fully tempered, Class 1 clear, quality q3 glazing select, conforming to ANSI Z97.1.

F. Laminated glass: consisting of an outer face and inner face of specified glass, factory laminated to polyvinyl butyl (PVB) interlayer equal to Monsanto "Saflex" or DuPont "Butacite", or DuPont high strength interlayer "SentryGlassPlus". Certified by Safety Glazing Certification Council. Glass shall be free from foreign substances and air pockets.

2.2 REQUIREMENTS FOR SAFETY GLASS

A. Safety Glass (fully tempered glass or laminated) glass is required at conditions identified by applicable codes, which include, but are not limited to the following:

1. Glazing in swinging doors except jalousies.
2. Glazing in fixed and sliding panels of sliding patio door assemblies and panels in other doors, including walk-in closets and wardrobes.
3. Glazing in storm doors.
4. Glazing in unframed swinging doors.

5. Glazing in doors and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers.
6. Glazing in any portion of a building wall enclosing these above compartments where the exposed edge of the glazing is less than 60 inches above a standing surface.
7. Glazing in a individual fixed or operable panel adjacent to a door where the nearest exposed edge of the glazing is within a 24-inch arc of either vertical edge of the door in a closed position and where the bottom exposed edge of the glazing is less than 60 inches above a walking surface. (panels where there is an intervening wall or other permanent barrier between the door and the glazing are exempt.)
8. Glazing in an individual fixed or operable panel where the exposed area of an individual pane is greater than 9 square feet and the exposed bottom edge is less than 18 inches above the floor, the exposed top edge is greater than 36 inches above the floor, and one or more walking surface(s) are within 36 inches horizontally of the plane of the glazing. Exceptions include a panel with a protective bar (1-1/2 inches or more in height and capable of withstanding a horizontal load of 50 pounds per linear foot without contacting the glass installed on the accessible sides of the glazing 34 inches to 38 inches above the floor), and an outboard pane in insulating glass units or multiple glazing where the bottom exposed edge of the glass is 25 feet or more above any grade, roof, walking surface of other horizontal or sloped surface adjacent to the glass interior.
9. Glazing in guards and railings, including structural baluster panels and nonstructural in-fill panels, regardless of height above a walking surface.
10. Glazing in walls and fences enclosing indoor and outdoor swimming pools and spas when the bottom edge of the glazing on the pool side is less than 60 inches above a walking surface on the pool side of the glazing and the glazing is within 60 inches horizontally of a water's edge.
11. Glazing adjacent to stairways, landings and ramps when it is within 36 inches horizontally of a walking surface, within 60 inches horizontally of a bottom tread of a stairway in any direction, and the bottom edge is less than 60 inches above the plane of the adjacent walking surface (or stairway, measured from the nose of the tread).

2.3 GLASS – TYPES

A. Glass Type GL-1: Insulated double “Low-E,” glass 1 inch thick units with internal simulated divided lights coordinated and aligned with window muntins:

1. Basis of Design: ~~Vitro Architectural Glass, Pittsburgh PA (formerly PPG) “Solarban 70XL (2)”.~~ **Guardian Industries Corporation, Auburn Hills, MI., product “SNX62/27”.**
2. Components
   a. Outer layer: 1/4 inch (6 mm) thick heat-strengthened clear glass, with Low-E sputter coating on number 2 surface.
      1) Provide aluminum muntins on number 1 surface (surface applied to glass, or mechanically fastened to window sash), ½ inch flat stock, and internal floating grid between number 2 and 3 surfaces.
   b. Inner layer: 1/4 inch (6 mm) thick clear heat-strengthened glass.

c. Air space: 1/2 inch (13 mm) thick.
   1) Gas fill: 90% Argon/10% Air.

B. Glass Type GL-2 - Insulated Glass with frosted appearance: 1 inch thickness, with internal simulated divided lights coordinated and aligned with window muntins:
   1. Basis of Design: Same as Glass Type 1, as modified herein below.
      a. Outer layer: 1/4 inch (6 mm) thick heat-strengthened clear glass, with Low-E sputter coating on number 2 surface.
         1) Provide aluminum muntins on number 1 surface (surface applied or mechanically fastened), ½ inch flat stock, and internal floating grid between number 2 and 3 surfaces.
      b. Inner layer: 1/4 inch (6 mm) thick clear heat-strengthened glass with laminated "obscure" frosted laminated on number 3 surface..\
         1) 'Frosted' Laminate: Equal to Eastman Chemical Company (Saflex Brand), St. Louis, MO., product "Vanceva Artic Snow."
      c. Air space: 1/2 inch (13 mm) thick.
         1) Gas fill: 90% Argon/10% Air.

b. Inner layer: 1/4 inch (6 mm) thick clear heat- strengthened glass **with laminated** "**obscure**" **frosted laminated on number 3 surface..**
1) '**Frosted**' **Laminate: Equal to Eastman Chemical Company (Saflex Brand), St. Louis, MO., product** "**Vanceva Artic Snow.**"

C. Glass Type GL-3 (areaways): Insulated double "Low-E," glass 1 inch thick units:
   1. Basis of Design: ~~Vitro Architectural Glass, Pittsburgh PA (formerly PPG) "Solarban 70XL (2)".~~ **Guardian Industries Corporation, Auburn Hills, MI., product "SNX62/27".**
   2. Components
      a. Outer layer: 1/4 inch (6 mm) thick heat-strengthened clear glass, with Low-E sputter coating on number 2 surface.
      b. ~~Inner layer: 1/4 inch (6 mm) thick clear heat-strengthened glass.~~
      c. Air space: 1/2 inch (13 mm) thick.
         1) Gas fill: 90% Argon/10% Air.

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D. Glass Type GL-4: Insulated double "Low-E," glass 1 inch thick units:
   1. Basis of Design: ~~Vitro Architectural Glass, Pittsburgh PA (formerly PPG) "Solarban 70XL (2)".~~ **Guardian Industries Corporation, Auburn Hills, MI., product "SNX62/27".**
   2. Components
      a. Outer layer: 1/4 inch (6 mm) thick heat-strengthened clear glass, with pyrolytic Low-E sputter coating on number 2 surface.
         1) Provide with exterior self adhesive Lead Caming Tape, came thickness to match existing caming on number 1 and 2 surfaces.
      b. Inner layer: 1/4 inch (6 mm) thick clear heat-strengthened glass.
      c. Air space: 1/2 inch (13 mm) thick.
         1) Gas fill: 90% Argon/10% Air.

E. Glass Type GL-5 - Insulated Glass with frosted appearance: 1 inch thickness, consisting of:
   1. Basis of Design: Same as Glass Type 1, as modified herein below.
      a. Outer layer: 1/4 inch (6 mm) thick heat-strengthened clear glass, with Low-E sputter coating on number 2 surface.

1) Provide with exterior self adhesive Lead Caming Tape, came thickness to match existing caming on number 1 and 2 surfaces.

b. Inner layer: 1/4 inch (6 mm) thick clear heat-strengthened glass with laminated “obscure” frosted laminated on number 3 surface..\

1) ‘Frosted’ Laminate: Equal to Eastman Chemical Company (Saflex Brand), St. Louis, MO., product “Vanceva Artic Snow.”

c. Air space: 1/2 inch (13 mm) thick.

1) Gas fill: 90% Argon/10% Air.

F. Glass Type GL-6 - Insulated Fire-rated Glass: 1-5/16 inch thickness, consisting of:

1. Basis of Design: Same as Glass Type 1, as modified herein below.

a. Outer layer: 1/4 inch (6 mm) thick heat-strengthened clear glass, with Low-E sputter coating on number 2 surface.

1) Provide aluminum muntins on number 1 surface (surfaced applied or mechanicall fastened), ½ inch flat stock, and internal floating grid between number 2 and 3 surfaces.

2) Inner layer: “Fire Protective Glass”: 45 minute rated 3/4 inch transparent wire-less fire rated laminated ceramic glazing material with polished finish.

a) Basis of Design: Pilkington Pyrostop 25-260.

b) Conform with latest edition of ASTM E152, ASTM E163, NFPA-80, NFPA 252, NFPA 257, and glass to be labeled “O” or “W”.

c) Conform with latest edition of NFPA 257 for Hose Stream Testing, and glass shall be labeled “H” designation.

d) Conforms to ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.

e) In accordance with manufacturer's specifications, Firelite Plus must be glazed into frames with a similar rating, using silicone glazing compound which shall be supplied with the Firelite Plus material.

Permanently identify each individual glazing unit with a listing mark visible after installation.

b. Air space: 1/4 inch (13 mm) thick.

1) Gas fill: 90% Argon/10% Air.

G. Glass Type GL-7: Insulated double “Low-E,” glass 1 inch thick units:

1. Basis of Design: ~~Vitro Architectural Glass, Pittsburgh PA (formerly PPG) “Solarban 70XL (2)”.~~ **Guardian Industries Corporation, Auburn Hills, MI., product “SNX62/27”.**

2. Components

a. Outer layer: 1/4 inch (6 mm) thick tempered clear glass, with Low-E sputter coating on number 2 surface.

1) Provide aluminum muntins on number 1 surface (surface applied or mechanically fastened), ½ inch flat stock, and floating grid ½ inch flat stock.

b. Inner layer: 1/4 inch (6 mm) thick clear tempered glass.

c. Air space: 1/2 inch (13 mm) thick.

1) Gas fill: 90% Argon/10% Air.

H. Glass Type GL-8: IGU/Clear (Shafts): Provide siumated divided lites to match existin grid pattern, color and profile; install muntins at surface 1, and floating grid in-between surfaces numbers 2 and 3.

1. No Low-E coatings for GL-8.

2.4 FABRICATION

A. General: Do not fabricate materials until all specified submittals have been submitted to, and approved by, the Architect.

B. Fabricate glass as required to openings with edge clearances and bite on glass as recommended by the manufacturer with clean-cut edges where concealed, and smooth-ground, polished and seamed edges where exposed to view. Do not cut, seam, nip or abrade glass after heat-tempering.

1. For non-tempered to be cut at site, provide glass larger than required so as to obtain clean cut edges without seaming or nipping.

C. Fabricate glass with the following edge treatments.

1. Exposed edges: Polished-finished radiused (penciled).
2. Concealed edges: Cut edges with minimum edge work.
3. Butt-joint edges: Flat round and finished with edges eased.

D. Shop Fabrication:

1. All vision panels and baffles shall be cut to size by manufacturer or by fabricator prior to delivery to site. All glass edges shall be ground smooth, polished and eased. Provide all necessary holes wherever required by the approved Shop Drawings, drilled and tapped to suite project requirements. Do all cutting and drilling prior to tempering.

2.5 ACCESSORIES

A. Glazing tape: Preformed butyl-polyisobutylene rubber with 100 percent solids contained in extruded tape roll form and complying with AAMA 804.1; coiled on release paper; of sizes required for proper glazing. equal to one of the following:

1. Protective treatments 3030 or 606.
2. Tremco Preshimmed 440.
3. Woodmont Chem-Tape 40.

B. Setting blocks: Neoprene, 80-90 shore A durometer hardness, certified to be “silicone compatible”; sized as follows:

1. Length: 0.1 inch per square foot of glass, but not less than 4 inches.
2. Width: equal to glazing rabbet space minus 1/16 inch.
3. Height to suit glazing method and pane weight and area.

C. Spacers: Neoprene, 60-80 shore A durometer hardness; sized as required.

D. Glazing sealant:

1. Joint Sealer Type SG (Silicone, general-purpose on-site glazing and repair glazing sealant): One-part medium modulus, neutral curing, synthetic rubber sealant, having a useful life expectancy of at least 20 years, conforming to ASTM C 920, Type S, grade NS, Class 50 for uses NT, G and A. Color as selected by Architect:
   a. Dow Corning, product “795”.
   b. GE Silicones, product “SilGlaze II SCS2800”.
   c. Tremco, product, “Spectrim 2”.

E. Bond-breakers and backing materials: Type recommended by manufacturer of sealants and gaskets.

F. Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Inspect receiving surfaces and ensure that they are dry and free from dust, or other foreign materials before glazing. Clean all surfaces with cloth saturated with mineral spirits of high-flash naphtha as recommended by glazing tape manufacturer, before glazing.

B. Field Measurements: Verify that field measurements are as indicated on approved Shop Drawings.
   1. Check all openings, prior to glazing, to make certain that the opening is square, plumb and secure in order that uniform face and edge clearances are maintained.
   2. Determine the actual sizes required by measuring the receiving openings. Size glass and mirrors to permit required clearance and bite around full perimeter of glass, as set forth in the referenced FGMA standards, or as recommended by the glass manufacturer. Do not nip edges, to remove flares or to reduce oversize dimensions, under any circumstance.

C. Beginning of installation means acceptance of existing conditions.

3.2 GENERAL INSTALLATION OF GLASS HAVING PERMANENT LABELS

A. Install glass units so that appropriate manufacturer’s permanent label for safety glass, and permanent label for fire-rated glass are visible.

3.3 INSTALLATION - WET GLAZING

A. Utilize wet glazing methods for field installation of glass in exterior curtainwall, storefront, window systems at exterior custom stile and rail wood doors.

B. Place setting blocks at quarter points on web of sill receiving member. Set glass unit in place with equal spaces on all sides.

C. Install spacers at a spacing not exceeding 24 inches apart uniformly around perimeter, between interior face of glass unit and the fixed glazing rabbet.

D. Apply a continuous heel bead of specified sealant between the outer edges if the glass unit and the web of the receiving member, in sufficient quantity to engage the leg of the applied glazing stop, when installed.

E. As the glazing stop is being applied, install spacers between the outer face of the glass unit and the stop, locating the spacers directly opposite the previously installed interior spacers. Install the glazing stops, ensuring that all clearances around the perimeter of the glass unit conform to the requirements of the respective standards referenced herein.

F. Apply a continuous bead of sealant around the exterior and interior perimeters, between the glass unit and the fixed rabbet, and between the glass unit and the applied glazing stop, extending the sealant material slightly above the sight line to permit proper tooling thereof.

G. Tool all exposed sealant at a 45 degree angle away from the glass surface, leaving the sealant surface uniformly dense and smooth.

H. Immediately remove all excess sealant from surfaces of metal and glass.

3.4 PROTECTION

A. Protect glass from breakage immediately upon installation. Use streamers or ribbons suitably attached to framing and held free of the glass. Do not apply warning markings directly to the glass.

B. Cover glass To protect it from activities that might abrade the glass surface.

3.5 CLEANING

A. Clean glass surfaces promptly after installation, exercising care to avoid damage to the same. Remove excess glazing tape, labels, dirt, and other contaminants.

3.6 SAFETY GLASS SCHEDULE

A. Safety Glass (fully tempered glass or laminated) glass is required at conditions identified by applicable codes, which include, but are not limited to the following:

1. Glazing in swinging doors except jalousies.
2. Glazing in fixed and sliding panels of sliding patio door assemblies and panels in other doors, including walk-in closets and wardrobes.
3. Glazing in storm doors.
4. Glazing in unframed swinging doors.
5. Glazing in doors and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers.
6. Glazing in any portion of a building wall enclosing these above compartments where the exposed edge of the glazing is less than 60 inches above a standing surface.
7. Glazing in a individual fixed or operable panel adjacent to a door where the nearest exposed edge of the glazing is within a 24-inch arc of either vertical edge of the door in a closed position and where the bottom exposed edge of the glazing is less than 60 inches above a walking surface. (panels where

there is an intervening wall or other permanent barrier between the door and the glazing are exempt.)

8. Glazing in an individual fixed or operable panel where the exposed area of an individual pane is greater than 9 square feet and the exposed bottom edge is less than 18 inches above the floor, the exposed top edge is greater than 36 inches above the floor, and one or more walking surface(s) are within 36 inches horizontally of the plane of the glazing. Exceptions include a panel with a protective bar (1-1/2 inches or more in height and capable of withstanding a horizontal load of 50 pounds per linear foot without contacting the glass installed on the accessible sides of the glazing 34 inches to 38 inches above the floor), and an outboard pane in insulating glass units or multiple glazing where the bottom exposed edge of the glass is 25 feet or more above any grade, roof, walking surface of other horizontal or sloped surface adjacent to the glass interior.
9. Glazing in guards and railings, including structural baluster panels and nonstructural in-fill panels, regardless of height above a walking surface.
10. Glazing in walls and fences enclosing indoor and outdoor swimming pools and spas when the bottom edge of the glazing on the pool side is less than 60 inches above a walking surface on the pool side of the glazing and the glazing is within 60 inches horizontally of a water's edge.
11. Glazing adjacent to stairways, landings and ramps when it is within 36 inches horizontally of a walking surface, within 60 inches horizontally of a bottom tread of a stairway in any direction, and the bottom edge is less than 60 inches above the plane of the adjacent walking surface (or stairway, measured from the nose of the tread).

End of Section