

**SECTION 08 80 00
GLAZING**

SPEC WRITER NOTES:

1. Use this section only for NCA projects.
2. Delete between // ---- // if not applicable to project.
3. Also delete any other item or paragraph not applicable in section and renumber paragraph.
4. Coordinate with other sections to specify type of glazing required.
5. See International Building Code and Consumer Product Safety Commission requirements for "Safety Glass." Category II (CPSC 16CFR-1201).
6. Determine design criteria for glazing required by building code. Specify glazing to meet design criteria.
7. To comply with Life-Safety Protected Facility requirements, as it applies to NCA, exterior single pane glass for Administrative Buildings, Public Information Centers, and Public Restrooms must be laminated glass; interior lite of insulating glass units to be laminated glass for these locations.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies glass, related glazing materials and accessories. Glazing products specified apply to factory or field glazed items.

1.2 RELATED WORK

- A. Factory glazed by manufacturer in following units:
1. Section 08 11 13, HOLLOW METAL DOORS AND FRAMES, and Section 08 14 00, INTERIOR WOOD DOORS.
 2. Mirrors: Section 10 28 00, TOILET, BATH, AND LAUNDRY ACCESSORIES.
 3. Section 08 51 13, ALUMINUM WINDOWS (Single // Double // Triple // Hung).
 4. Color of spandrel glass: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 LABELS

- A. Temporary Labels:
1. Provide temporary label on each light of glass identifying manufacturer or brand and glass type, quality and nominal thickness. Identify coated side of glass units.

2. Label in accordance with NFRC (National Fenestration Rating Council) label requirements.
3. Temporary labels must remain intact until glass is approved by RE/COR.

B. Permanent Labels:

1. Locate in corner for each pane.
2. Label in accordance with SGCC (Safety Glass Certification Council) label requirements.
 - a. Tempered glass.
 - b. Laminated glass.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Design glazing system consistent with guidance and practices presented in the GANA Glazing Manual, GANA Laminated Glazing Manual, and GANA Sealant Manual, as applicable to project. Installed glazing must withstand applied loads, thermal stresses, thermal movements, building movements, permitted tolerances, and combinations of these conditions without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; unsafe engagement of the framing system; deflections beyond specified limits; or other defects in construction.
- B. Glazing Unit Design: Design glass, including engineering analysis meeting requirements of authorities having jurisdiction. Thicknesses listed are minimum. Coordinate thicknesses with framing system manufacturers.
 1. Design glass in accordance with ASTM E1300, and for conditions beyond the scope of ASTM E1300, by a properly substantiated structural analysis.

SPEC WRITER NOTES:

1. Verify that design wind pressures and wind design data noted below are provided on structural drawings, or retain optional requirement for Contractor to verify requirements of ASCE 7 or other applicable code.
2. Design Wind Pressures: // As indicated on Drawings // In accordance with ASCE 7 // In accordance with applicable code // .
3. Wind Design Data: // As indicated on Drawings // In accordance with ASCE 7 // In accordance with applicable code // .

SPEC WRITER NOTES:

1. Default values for center-of-glass deflection below are examples only; modify as required for project conditions.
4. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than the structural capacity of the glazing unit, the threshold at which frame engagement is no longer safely assured, 1/100 // ___ // times the short-side length, or 0.75 inch (19 mm)// ___ //, whichever is less.

SPEC WRITER NOTES:

1. Typically delete paragraph below. Retain paragraph for projects located in IBC-defined windborne debris regions. Enhanced protection applies to essential facilities. Verify requirements of authorities having jurisdiction; select appropriate wind zone.
- C. Windborne-Debris-Impact Resistance: Comply with enhanced-protection testing requirements in ASTM E1996 for project wind zone when tested according to ASTM E1886, based upon testing of specimens not less than the size required for project and utilizing installation method identical to that specified for project.
1. Project Wind Zone: // Wind Zone 1 // // Wind Zone 2 // // Wind Zone 3 // // Wind Zone 4 //.
 2. Large-Missile Test: For glazing located within 9.1 m (30 feet) of grade.
 3. Small-Missile Test: For glazing located more than 9.1 m (30 feet) above grade.
- D. Building Enclosure Vapor Retarder and Air Barrier:
1. Utilize the inner pane of multiple pane sealed units for the continuity of the air barrier and vapor retarder seal.
 2. Maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

1.5 SUSTAINABILITY REQUIREMENTS

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for project // local/regional materials, // low-emitting materials, // recycled content, // _____// requirements.

1.6 SUBMITTALS

SPEC WRITER NOTES:

1. List below items intended for use in project, necessary for review prior to manufacture. Refer to Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES for submittal requirements. Include additional submittal requirements for items specified.
- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
 - B. Manufacturer's Certificates:
 1. Provide certificate stating that fire-protective and fire-resistive glazing units meet code requirements for fire-resistance-rated assembly and applicable safety glazing requirements.
 2. Certify solar heat gain coefficient when value is specified.
 3. Certify "R" value when value is specified.
 - C. Warranty: Submit sample warranty, conforming to "Warranty" Article in this Section.
 - D. Manufacturer's Literature and Data:
 1. Glass, each kind required.
 2. Insulating glass units.
 3. Glazing accessories, each type.
 - E. Samples:
 1. Size: 300 mm by 300 mm (12 by 12 inches).
 2. All glazing types specified for the project.
 - F. Preconstruction Adhesion and Compatibility Test Report: Submit glazing sealant manufacturer's test report indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Schedule delivery to coincide with glazing schedules so minimum handling of crates is required. Do not open crates except as required for inspection for shipping damage.
- B. Storage: Store cases according to printed instructions on case, in areas least subject to traffic or falling objects. Keep storage area clean and dry.
- C. Handling: Unpack cases following printed instructions on case. Stack individual windows on edge leaned slightly against upright supports with separators between each.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Field measure openings before ordering tempered glass products. Be responsible for proper fit of field measured products.

1.9 WARRANTY

- A. Warranty: Conform to terms of "Warranty" Article, FAR clause 52.246-21, except extend warranty period for the following:
1. Insulating glass units to remain sealed and free of obstruction of vision by dust, moisture, or film on interior surfaces of glass for 10 years.
 2. Laminated glass units to remain visibly clear without edge separation, delamination affecting vision, and blemishes for 5 years.
 3. Coated glass units to remain visibly clear without peeling, cracking, or discoloration for 10 years.

1.10 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

SPEC WRITER NOTES:

1. Remove reference citations that do not remain in Part 2 or Part 3 of edited specification.
2. Verify and make dates indicated for remaining citations the most current at date of submittal; determine changes from date indicated on the TIL download of the section and modify requirements impacted by the changes.

- B. American Society of Civil Engineers/Structural Engineering Institute (ASCE):

ASCE/SEI 7-2010	Minimum Design Loads for Buildings and Other Structures
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- C. American Society for Testing and Materials (ASTM):

C542-05(2011)	Lock-Strip Gaskets
C716-06(2011)	Installing Lock-Strip Gaskets and Infill Glazing Materials
C864-05(2011)	Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers
C920-11	Elastomeric Joint Sealants

- C1036-06-11e1 Flat Glass
- C1048-12e1 Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass
- C1172-09e1 Laminated Architectural Flat Glass
- E1300-12ae1 Determining Load Resistance of Glass in Buildings
- E1886-05 Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials
- E1996-12a Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- E2190-10 Insulating Glass Unit
- D. Glass Association of North America (GANA):
- Glazing Manual (2009)
 - Laminated Glazing Manual (2009)
 - Sealant Manual (2009)
 - Protective Glazing Manual (2011)
- E. International Code Council (ICC):
- International Building Code IBC), adopted edition applicable to project
- F. National Fenestration Rating Council (NFRC)
- G. Safety Glazing Certification Council (SGCC):
- Certified Products Directory (Issued Semi-Annually)
- H. Sealant, Waterproofing, and Restoration Institute (SWRI):
- Product Validation Program

PART 2 - PRODUCT

SPEC WRITER NOTES:

1. Refer to glass manufacturers' literature for structural properties.
2. Specify glass by thickness and ASTM designations and supplement standard for additional properties. Refer to information following end of section for guides to ASTM C1036 and C1048 designations.
3. Establish and coordinate glass types to identify glass or glazing assemblies on drawings, preferably on

exterior elevations for exterior windows.

4. Coordinate to retain glass types required with glazing assemblies.

2.1 GLASS PRODUCTS

A. Provide minimum thickness stated and as additionally required to meet performance requirements.

1. Provide minimum 6 mm (1/4 inch) thick glass units unless otherwise indicated.

B. Obtain glass units from single source from single manufacturer for each glass type.

SPEC WRITER NOTES:

1. Usually specify quality q3; use q4 for general glazing applications.

C. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1, Quality // q3 // q4 //.

D. Low-emissivity-coated glass: ASTM C1036, Type I, Class 2, Quality q3.

2.2 HEAT-TREATED GLASS

SPEC WRITER NOTES:

1. Specify heat strengthened and fully tempered glass by thickness and ASTM C1048 designations, and supplement standard for additional properties. Refer to information following end of section for guides to ASTM C1036 and C1048 designations.
2. Do not use heat strengthened glass where compliance with ANSI Z97.1 or CFR 16CFR1201 is required except with manufacturer's written documentation of compliance.
3. Retain roller wave limits below when project includes large or extensive glazed openings. Consider deleting for minor work.

A. Roller Wave Limits for Heat-Treated Glass: Orient all roller wave distortion parallel to bottom surface of glazing, and provide units complying with the following limitations:

1. Measurement Parallel to Line: Maximum peak to valley 0.127 mm (0.005 inch).
2. Measurement Perpendicular to Line: Maximum 0.0254 mm (0.001 inch).
3. Bow/Warp: Maximum 50 percent of bow and warp allowed by ASTM C1048.

B. Clear Heat-Strengthened Float Glass: ASTM C1048, Kind HS, Condition A, Type I, Class 1, Quality q3.

- C. Clear Tempered Float Glass: ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3.

2.3 COATED GLASS

SPEC WRITER NOTES:

1. See laminated glass article for other spandrel options.

- A. Ceramic Coated Spandrel Glass: ASTM C1048, Kind HS or FT, Condition B, Type I, Quality q3 with ceramic coating applied over and fused into glass surface.

2.4 LAMINATED GLASS

SPEC WRITER NOTES:

1. Specify laminated flat glass using the "Kind" designation in ASTM C1172, the C1036 designations for each lite of glass, and indicate the thickness and type of interlayer in the glass types schedule.
2. To comply with Life-Safety Protected Facility requirements, as it applies to NCA, drawings must indicate laminated glass for all exterior, single-pane glass at Administrative Buildings, Public Information Centers, and Public Restroom locations.

- A. Laminated Glass: ASTM C1172. Two or more lites of glass bonded with polyvinyl butyral, ionomeric polymer, or cast-in-place and cured-transparent-resin interlayer complying with interlayer manufacturer's written instructions.
- B. Interlayer: Use min. 0.75 mm (0.030 inch) thick interlayer for vertical glazing unless otherwise // indicated in Drawings // scheduled //.
- C. Interlayer: Use 1.5 mm (0.060 inch) thick interlayer for:
1. Horizontal or sloped glazing.
 2. Acoustical glazing.
 3. Assemblies requiring heat strengthened or fully tempered glass.
- D. Interlayer: Use 2.28 mm (0.090 inch) thick interlayer where required to meet performance requirements.
- E. Interlayer Color: Clear, unless otherwise // indicated in Drawings // scheduled //.

2.5 INSULATING GLASS UNITS

- A. Provide factory fabricated, hermetically sealed glass unit consisting of two panes of glass separated by a dehydrated air space and comply with ASTM E2190.
- B. Assemble units using glass types specified.

2.6 GLAZING ACCESSORIES

A. As required to supplement the accessories provided with the items to be glazed and to provide a complete installation. Provide accessories approved by manufacturer for application and compatible with related materials. Provide ferrous metal accessories exposed in the finished work, with a finish that will not corrode or stain while in service.

B. Setting Blocks: ASTM C864:

1. Channel shape; having 6 mm (1/4 inch) internal depth.
2. Shore A hardness of 80 to 90 Durometer.
3. Block lengths: 50 mm (two inches) except 100 to 150 mm (four to six inches) for insulating glass.
4. Block width: Approximately 1.6 mm (1/16 inch) less than the full width of the rabbet.
5. Block thickness: Minimum 4.8 mm (3/16 inch). Thickness sized for rabbet depth as required.

C. Spacers: ASTM C864:

1. Channel shape having a 6 mm (1/4 inch) internal depth.
2. Flanges not less 2.4 mm (3/32 inch) thick and web 3 mm (1/8 inch) thick.
3. Lengths: One to 25 to 76 mm (one to three inches).
4. Shore a hardness of 40 to 50 Durometer.

SPEC WRITER NOTES:

1. Coiled glazing tape will assure continuous seal without joints as compared to cut-to-length tape.

D. Sealing Tapes:

1. Semi-solid polymeric based material exhibiting pressure-sensitive adhesion and withstanding exposure to sunlight, moisture, heat, cold, and aging.
2. Shape, size and degree of softness and strength suitable for use in glazing application to prevent water infiltration.

SPEC WRITER NOTES:

1. Dense wedge gaskets with soft, closed cell gaskets used for dry glazing and wet/dry (sealant or sealing tape) glazing systems may be required by the window manufacturer. Gaskets may be furnished by the window manufacturer with the sash, especially for factory glazing and residential units. Coordinate with Division 8.

E. Glazing Gaskets: ASTM C864:

1. Firm dense wedge shape for locking in sash.
2. Soft, closed cell with locking key for sash key.
3. Flanges may terminate above the glazing-beads or terminate flush with top of beads.

SPEC WRITER NOTES:

1. For design of Glazing Gaskets, see ASTM C542 and C964, Standard Guide for Lock-Strip Gasket Glazing, and GANA Manuals. Use black only.

- F. Lock-Strip Glazing Gaskets: ASTM C542, shape, size, and mounting as indicated.

SPEC WRITER NOTES:

1. Do not use non-skinning sealants.

- G. Glazing Sealants: ASTM C920, silicone neutral cure:

1. Type S.
2. Class 25 or 50 as recommended by manufacturer for application.
3. Grade NS.
4. Shore A hardness of 25 to 30 Durometer.
5. SWRI validated.

SPEC WRITER NOTES:

1. Delete the following if structural glazing does not occur on the project. Glass not retained by a frame having a rabbet and applied stop as per GANA Glazing Manual, Exterior Flush Glazing.

- H. Structural Sealant: ASTM C920, silicone acetoxy cure:

1. Type S.
2. Class 25.
3. Grade NS.
4. Shore a hardness of 25 to 30 Durometer.

- I. Color - Glazing Compounds, Gaskets, and Sealants:

1. Match color of the finished aluminum and be non-staining, when in contact with aluminum.
2. Provide black, gray, or neutral color, when in contact with other exposed and prefinished materials (unpainted).

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Verification of Conditions:

1. Examine openings for glass and glazing units; determine they are proper size; plumb; square; and level before installation is started.

2. Verify that glazing openings conform with details, dimensions and tolerances indicated on manufacturer's approved shop drawings.
- B. Do not proceed with installation until above conditions have been verified or corrected, at no additional cost to government.
- C. Verify that wash down of adjacent masonry is completed prior to erection of glass and glazing units to prevent damage to glass and glazing units by cleaning materials.

3.2 PREPARATION

- A. For sealant glazing, prepare glazing surfaces in accordance with GANA Sealant Manual.
- B. Determine glazing unit size and edge clearances by measuring the actual unit to receive the glazing.
- C. Shop-fabricate and cut glass with smooth, straight edges of full size required by openings to provide GANA recommended edge clearances.
- D. Verify that components used are compatible.
- E. Clean and dry glazing surfaces.
- F. Prime surfaces scheduled to receive sealants, as determined by preconstruction sealant-substrate testing.

3.3 INSTALLATION - GENERAL

- A. Install in accordance with GANA Glazing Manual and GANA Sealant Manual unless specified otherwise.
- B. Glaze in accordance with recommendations of glazing and framing manufacturers, and as required to meet performance requirements specified in other applicable sections of specifications.
- C. Set glazing without bending, twisting, or forcing of units.
- D. Do not allow glass to rest on or contact any framing member.
- E. Glaze doors and operable sash, in a securely fixed or closed and locked position, until sealant, glazing compound, or putty has thoroughly set.

SPEC WRITER NOTE:

1. The following paragraph is required to comply with Life-Safety Protected Facilities requirements, as it applies to the NCA.
- F. Laminated glass and insulating glass units containing laminated glass must be glazed with minimum 12 mm (1/2 inch) bite and continuous bead of structural silicone sealant attaching the inner lite of glass to the frame or mullions.

SPEC WRITER NOTES:

1. Select the following paragraphs in coordination with glass types specified in Part 2.

G. Tempered Glass: Install with roller distortions in horizontal position unless otherwise directed.

H. Laminated Glass:

1. Tape edges to seal interlayer and protect from glazing sealants.
2. Do not use putty or glazing compounds.

I. Insulating Glass Units:

1. Glaze in compliance with glass manufacturer's written instructions.
2. When glazing gaskets are used, provide in sufficient size and depth to cover glass seal or metal channel frame completely.
3. Do not use putty or glazing compounds.
4. Do not grind, nip, cut, or otherwise alter edges and corners of fused glass units after shipping from factory.
5. Install with tape or gunnable sealant in wood sash.

SPEC WRITER NOTES:

1. Select the following articles in coordination with window and framing systems specified in other sections.
2. When glazing a pressure equalized system, it is necessary to create the air barrier and vapor retarder seal at the inside perimeter of the glass unit to create an air space void that equalizes with exterior air pressure and permits moisture drainage to the exterior. For exterior glazing requiring continuity of air and vapor seal from adjacent construction, select the "wet/dry" or "wet" method.

3.4 INSTALLATION - DRY METHOD (TAPE AND GASKET SPLINE GLAZING)

SPEC WRITER NOTES:

1. Select this glazing method where neither air barrier and vapor retarder seal to glazing frame nor pressure equalized glazing space is required.
2. Glazing spline may be a roll-in type or a pressure type. Verify sealant used is compatible with the glazing tape compound.
3. Select this glazing method for horizontal sliding aluminum windows. Install glass in continuous glazing gaskets secured with beads.
4. Select this glazing method for aluminum doors unless door manufacture requires otherwise.

- A. Cut glazing // tape // spline // to length; install on glazing pane. Seal corners by butting and sealing junctions with butyl sealant.
- B. Place setting blocks at // 1/4 // 1/3 // points with edge block no more than 150 mm (6 inches) from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- D. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Trim protruding tape edge.

3.5 INSTALLATION - WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

SPEC WRITER NOTES:

1. Verify sealant used is compatible with the glazing tape compound.
 2. This method is intended to achieve air barrier and vapor retarder seal through glazed assembly to glazing frame and achieve a pressure equalized glazing space.
 3. Use this system with aluminum windows with glazing beads unless window manufacturer requires otherwise.
- A. Cut glazing tape to length and set against permanent stops, 5 mm (3/16 inch) below sight line. Seal corners by butting tape and dabbing with butyl sealant.
 - B. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
 - C. Place setting blocks at // 1/4 // 1/3 // points with edge block no more than 150 mm (6 inches) from corners.
 - D. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to achieve full contact at perimeter of pane or glass unit.
 - E. Install removable stops, with spacer strips inserted between glazing and applied stops, 6 mm (1/4 inch) below sight line. Place glazing tape on glazing pane or unit with tape flush with sight line.
 - F. Fill gap between glazing and stop with _____ type sealant to depth equal to bite of frame on glazing, but not more than 9 mm (3/8 inch) below sight line.

- G. Apply cap bead of _____ type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.6 INSTALLATION - WET METHOD (SEALANT AND SEALANT)

SPEC WRITER NOTES:

1. Verify sealant used is compatible with the glazing tape compound.
 2. This method is intended to achieve air barrier and vapor retarder seal through glazed assembly to glazing frame and achieve a pressure equalized glazing space.
- A. Place setting blocks at // 1/4 // 1/3 // points and install glazing pane or unit.
- B. Install removable stops with glazing centered in space by inserting spacer shims both sides at 600 mm (24 inch) intervals, 6 mm (1/4 inch) below sight line.
- C. Fill gaps between glazing and stops with _____ type sealant to depth of bite on glazing, but not more than 9 mm (3/8 inch) below sight line to ensure full contact with glazing and continue the air and vapor seal.
- D. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.7 INSTALLATION - INTERIOR WET/DRY METHOD (TAPE AND SEALANT)

- A. Cut glazing tape to length and install against permanent stops, projecting 1.6 mm (1/16 inch) above sight line.
- B. Place setting blocks at // 1/4 // 1/3 // points with edge block no more than 150 mm (6 inches) from corners.
- C. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
- D. Install removable stops, spacer shims inserted between glazing and applied stops at 600 mm (24 inch) intervals, 6 mm (1/4 inch) below sight line.
- E. Fill gaps between pane and applied stop with _____ type sealant to depth equal to bite on glazing, to uniform and level line.
- F. Trim protruding tape edge.

3.8 INSTALLATION - INTERIOR WET METHOD (COMPOUND AND COMPOUND)

- A. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 600 mm (24 inch) centers, kept 6 mm (1/4 inch) below sight line.

- B. Locate and secure glazing pane using // glazers' // spring wire // clips.
- C. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

3.9 INSTALLATION - REGLAZING HISTORIC FRAMING

- A. Steel Windows: For glazing with glazing beads: ASTM C920.
- B. Wood Sash: For glazing with glazing beads: Tape or ASTM C920, gunnable sealant.
- C. Lock-strip Gaskets: Follow ASTM C716 for installation.

3.10 REPLACEMENT AND CLEANING

- A. Clean new glass surfaces removing temporary labels, paint spots, and defacement after approval by Resident Engineer.
- B. Replace cracked, broken, and imperfect glass, or glass which has been installed improperly.
- C. Leave glass, putty, and other setting material in clean, whole, and acceptable condition.

3.11 PROTECTION

- A. Protect finished surfaces from damage during erection, and after completion of work. Strippable plastic coatings on colored anodized finish are not acceptable.

SPEC WRITER NOTES:

1. Check details on drawings for types of glazing.
2. Defining glazing required on drawings is preferred to the glazing schedule.
3. Omit schedule or omit following paragraphs where details of glazing unit types, thicknesses and locations of glass are indicated on the drawings.
4. Where not indicated, edit paragraph to suit project; ADD types, thicknesses and locations of the glass not indicated. Coordinate paragraphs in Part-2 with the schedule.
5. Use this glazing schedule as a guide for defining glazing required.
6. In double glazed windows, only the interior pane is to be laminated glass or other safety glazing for interior occupant safety unless otherwise noted.
7. Glass Schedules: Annealed glass is not included as an option for most glass units for safety reasons. Edit text if annealed glass is desired.

8. It is assumed that all interior glass will be either tempered or laminated safety glass.
9. Minimum thickness of glass is established as 6 mm (1/4 inch) in Part 2. Edit requirement for minimum thickness in glass schedules if alternate thickness is desired; otherwise delete requirement from glass types.

3.12 MONOLITHIC GLASS SCHEDULE

SPEC WRITER NOTES:

1. Monolithic glass refers to glass that is made in a single sheet without being laminated.
2. Glass Type below is typically utilized in entry doors.

A. Glass Type MG#__: Clear fully tempered float glass.

1. //Minimum Thickness: 6 mm. //
2. Safety glazing required.

3.13 LAMINATED GLASS SCHEDULE

A. Glass Type LG#__: Clear laminated glass with two plies of fully tempered float glass.

1. Minimum Thickness of Each Glass Ply: 3 mm.
2. Interlayer Thickness: 0.76 mm (0.030 inch).
3. Safety glazing required.
4. Application: Interior glazing of units unless otherwise scheduled.

B. Glass Type LG#__: Clear laminated glass with two plies of // heat-strengthened // fully tempered // float glass.

1. Minimum Thickness of Each Glass Ply: // 3 mm // 4 mm // 5 mm // 6 mm //.
2. Interlayer Thickness: // 0.76 mm (0.030 inch) // 1.52 mm (0.060 inch) // 2.29 mm (0.090 inch) //.
3. Safety glazing required.
4. //Windborne debris-resistant glazing unit required. //

3.14 INSULATING GLASS SCHEDULE

A. Glass Type IG#__: Clear insulating glass.

1. Overall Unit Thickness: // 25 mm (1 inch) // ___ // .
2. Minimum Thickness of Each Glass Lite: // 3 mm // 4 mm // 5 mm // 6 mm //.
3. Outdoor Lite: Annealed float glass, except heat-strengthened float glass where required, and fully tempered float glass where indicated.

4. Interspace Content: // Air // Argon//.
5. Indoor Lite: Annealed float glass, except heat-strengthened float glass where required, and fully tempered float glass where indicated.
6. Visible Light Transmittance: 80 percent minimum.
7. Solar Heat Gain Coefficient: 0.75 maximum.

SPEC WRITER NOTES:

1. Retain subparagraph below if required.

8. Safety glazing required.

B. Glass Type IG#__: Low-E-coated, clear insulating glass.

1. Overall Unit Thickness: // 25 mm (1 inch) // ___ // .
2. Minimum Thickness of Each Glass Lite: // 3 mm // 4 mm // 5 mm // 6 mm//.
3. Outdoor Lite: Annealed float glass, except heat-strengthened float glass where required, and fully tempered float glass where indicated.
4. Interspace Content: // Air // Argon//.
5. Indoor Lite: Annealed float glass, except heat-strengthened float glass where required, and fully tempered float glass where indicated.
6. Low-E Coating: // Sputtered on second // Sputtered on third // surface.
7. Visible Light Transmittance: // 68 // 62 // ___ // percent minimum.
8. Solar Heat Gain Coefficient: // 0.38 // 0.27 // ___ // maximum.

SPEC WRITER NOTES:

1. Retain subparagraph below if required.

9. Safety glazing required.

C. Glass Type IG#__: Ceramic-coated, insulating spandrel glass.

1. Coating Color: As selected by Architect from manufacturer's full range.
2. Opaque Coating Location: Fourth surface.
3. Match adjacent vision unit profile, glass thickness, coating, and performance.

SPEC WRITER NOTES:

1. If spandrel unit varies from adjacent unit profile, edit below to describe spandrel.

4. Overall Unit Thickness: // 25 mm (1 inch) // ___ // .
5. Minimum Thickness of Each Glass Lite: // 5 mm // 6 mm // .

6. Outdoor Lite: Clear annealed float glass, except heat-strengthened float glass where required, and fully tempered float glass where indicated.
 7. Interspace Content: // Air // Argon // .
 8. Indoor Lite: Clear annealed float glass, except heat-strengthened float glass where required, and fully tempered float glass where indicated.
 9. Coating Location: Fourth surface.
- D. Glass Type IG#__: Ceramic-coated, low-E, insulating spandrel glass.
1. Coating Color: As selected by Architect from manufacturer's full range.
 2. Opaque Coating Location: Fourth surface.
 3. Match adjacent vision unit profile, glass thickness, coating, and performance.

SPEC WRITER NOTES:

1. If spandrel unit varies from adjacent unit profile, edit below to describe spandrel.
4. Overall Unit Thickness: // 25 mm (1 inch) // ___ // .
5. Minimum Thickness of Each Glass Lite: // 5 mm // 6 mm // .
6. Outdoor Lite: Heat-strengthened float glass, except fully tempered float glass where indicated.
7. Interspace Content: // Air // Argon // .
8. Indoor Lite: Heat-strengthened float glass, except fully tempered float glass where indicated.
9. Low-E Coating: // Sputtered on second // Sputtered on third // surface.

SPEC WRITER NOTES:

1. Insert performance values for selected glazing units based upon manufacturer's data.
10. Outdoor Visible Reflectance: // ___ // percent maximum.
11. Solar Heat Gain Coefficient: // ___ // maximum.

3.15 INSULATING-LAMINATED-GLASS SCHEDULE

SPEC WRITER NOTES:

1. Follow UFC4-010-01 for thickness of insulating-laminated glass units for windows within the stand-off distance of Life Safety.
2. To comply with Life-Safety Protected Facility requirements, as it applies to NCA, drawings must indicate Insulating-Laminated-Glass for units

at Administrative Buildings, Public Information Centers, and Public Restroom locations.

- A. Glass Type IL#___: Clear insulating laminated glass.
1. Overall Unit Thickness: // 30 mm (1-3/16 inch) // 25 mm (1 inch) // // 19 mm (3/4 inch) // ___ // .
 2. Minimum Thickness of Outdoor Lite: // 3 mm // 4 mm // 5 mm // 6 mm // .
 3. Outdoor Lite: Heat-strengthened float glass, except fully tempered float glass where indicated.
 4. Interspace Content: // Air // Argon // .
 5. Indoor Lite: Clear laminated glass with two plies of heat-strengthened float glass, except fully tempered float glass where indicated.
 - a. Minimum Thickness of Each Glass Ply: // 3 mm // 4 mm // 5 mm // // 6 mm//.
 - b. Interlayer Thickness: // 0.76 mm (0.030 inch) // 1.52 mm (0.060 inch) // 2.29 mm (0.090 inch)//.

SPEC WRITER NOTES:

1. Insert performance values for selected glazing units based upon manufacturer's data.

6. Visible Light Transmittance: // ___ // percent minimum.
7. Solar Heat Gain Coefficient: // ___ // maximum.

SPEC WRITER NOTE:

1. Retain subparagraph below if required.

8. Safety glazing required.

SPEC WRITER NOTES:

1. Retain below if required; coordinate glass selection and interlayer thickness required based upon approved assemblies.

9. //Windborne debris-resistant glazing unit required. //

- B. Glass Type IL#___: Low-E-coated, clear insulating laminated glass.
1. Overall Unit Thickness: // 30 mm (1-3/16 inch) // 25 mm (1 inch) // // 19 mm (3/4 inch) // ___ // .
 2. Minimum Thickness of Outdoor Lite: // 3 mm // 4 mm // 5 mm // 6 mm // .
 3. Outdoor Lite: Heat-strengthened float glass, except fully tempered float glass where indicated.
 4. Interspace Content: // Air // Argon // .

- 5. Indoor Lite: Clear laminated glass with two plies of heat-strengthened float glass, except fully tempered float glass where indicated.
 - a. Minimum Thickness of Each Glass Ply: // 3 mm // 4 mm // 5 mm // 6 mm // .
 - b. Interlayer Thickness: // 0.76 mm (0.030 inch) // 1.52 mm (0.060 inch) // 2.29 mm (0.090 inch) // .
- 6. Low-E Coating: // Sputtered on second // Sputtered on third // surface.

SPEC WRITER NOTES:

- 1. Insert performance values for selected glazing units based upon manufacturer's data.

- 7. Visible Light Transmittance: // ____ // percent minimum.
- 8. Solar Heat Gain Coefficient: // ____ // maximum.

SPEC WRITER NOTES:

- 1. Retain subparagraph below if required.

- 9. Safety glazing required.

SPEC WRITER NOTES:

- 1. Retain below if required; coordinate glass selection and interlayer thickness required based upon approved assemblies.

- 10. // Windborne debris-resistant glazing unit required. //

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