

**SECTION 08 80 00**  
**GLAZING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies glass, plastic, 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. Mirrors: Section 10 28 00, TOILET, BATH, AND LAUNDRY ACCESSORIES.
  - 2. Section 08 44 13, GLAZED ALUMINUM CURTAIN WALLS.
- B. Section 08 56 53 BLAST RESISTANT FAÇADE FOR LIFE SAFETY RATED BUILDINGS.
- C. 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.
  - 2. Label in accordance with NFRC (National Fenestration Rating Council) label requirements.
  - 3. Temporary labels shall remain intact until glass is approved by Resident Engineer.
- B. Permanent labels:
  - 1. Locate in corner for each pane.
  - 2. Label in accordance with ANSI Z97.1 and SGCC (Safety Glass Certification Council) label requirements.
    - a. Tempered glass.
    - b. Laminated glass or have certificate for panes without permanent label.

**1.4 SUBMITTALS**

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Certificates:
  - 1. Certificates stating that wire glass, meets requirements for safety glazing material as specified in ANSI Z97.1.
- C. Manufacturer's Literature and Data:
  - 1. Glass, each kind required.
  - 2. Elastic compound for metal sash glazing.
  - 3. Glazing cushion.
  - 4. Sealing compound.

**1.5 QUALITY ASSURANCE**

- A. Exterior glazing shall meet VA blast resistance criteria. Refer to section 08 56 53 BLAST RESISTANT FAÇADE FOR LIFE SAFETY RATED BUILDINGS

**1.6 SUSTAINABLE DESIGN REQUIREMENTS**

- A. General: Refer to Section 01 81 11 SUSTAINABLE DESIGN REQUIREMENTS.
- B. LEED Submittals:
  - 1. Product Data for Credit IEQ 4.1: For glazing sealants used inside the weatherproofing system, documentation including printed statement of VOC content.
  - 2. Laboratory Test Reports for Credit IEQ 4: For glazing sealants used inside the weatherproofing system,

documentation indicating that they comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

**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.
- D. Protect laminated security glazing units against face and edge damage during entire sequence of fabrication, handling, and delivery to installation location. Provide protective covering on exposed faces of glazing plastics, and mark inside as "INTERIOR FACE" or "PROTECTED FACE":
  - 1. Treat security glazing as fragile merchandise, and packaged and shipped in export wood cases with width end in upright position and blocked together in a mass. Storage and handling shall comply with Manufacturer's directions and as required to prevent edge damage or other damage to glazing resulting from effects of moisture, condensation, temperature changes, direct exposure to sun, other environmental conditions, and contact with chemical solvents.
  - 2. Protect sealed-air-space insulating glazing units from exposure to abnormal pressure changes, as could result from substantial changes in altitude during delivery by air freight. Provide temporary breather tubes which do not nullify applicable warranties on hermetic seals.
  - 3. Temporary protections: The glass front and polycarbonate back of glazing shall be temporarily protected with compatible, peelable, heat-resistant film which will be peeled for inspections and re-applied and finally removed after doors and windows are installed at destination. Since many adhesives will attack polycarbonate, the film used on exposed polycarbonate surfaces shall be approved and applied by manufacturer.
  - 4. Edge protection: To cushion and protect glass clad, polycarbonate, and Noviflex edges from contamination or foreign matter, the four edges shall be sealed the depth of glazing with continuous standard-thickness Santoprene tape. Alternatively, continuous channel shaped extrusion of Santoprene shall be used, with flanges extending into face sides of glazing.
  - 5. Protect "Constant Temperature" units including every unit where glass sheet is directly laminated to or directly sealed with metal-tube type spacer bar to polycarbonate sheet, from exposures to ambient temperatures outside the range of 16 to 24 C, during the fabricating, handling, shipping, storing, installation, and subsequent protection of glazing.

**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 of Construction", FAR clause 52.246-21, except extend warranty period for the following:
1. Insulating glass units to remain sealed for 10 years.
  2. Laminated glass units to remain laminated for 5 years.
  3. Insulating plastic to not have more than 6 percent decrease in light transmission and be ultraviolet light stabilized 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 basic designation only.
- B. American National Standards Institute (ANSI):
1. Z97.1-04 Safety Glazing Material Used in Building - Safety Performance Specifications and Methods of Test.
- C. American Society for Testing and Materials (ASTM):
1. C542-05 Lock-Strip Gaskets.
  2. C920-08 Elastomeric Joint Sealants.
  3. C1036-06 Flat Glass.
  4. C1048-04 Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
  5. C1172-09 Laminated Architectural Flat Glass.
- D. Code of Federal Regulations (CFR):
1. 16 CFR 1201 Safety Standard for Architectural Glazing Materials; 1977, with 1984 Revision.
- E. National Fire Protection Association (NFPA):
1. 80-08 Fire Doors and Windows.
- F. National Fenestration Rating Council (NFRC)
- G. Safety Glazing Certification Council (SGCC)2009
1. Certified Products Directory (Issued Semi-Annually).
- H. Glass Association of North America (GANA):
1. Glazing Manual (Latest Edition)
  2. Sealant Manual (2008)

**PART 2 - PRODUCTS**

**2.1 GLASS**

- A. Use thickness stated unless specified otherwise in assemblies.
- B. Clear Glass:
1. ASTM C1036, Type I, Class 1, Quality q3.
  2. Thickness, 6 mm (1/4 inch).
  3. Coordinate color/tint/coating to accommodate required security monitoring.

**2.2 HEAT-TREATED GLASS**

- A. Clear Tempered Glass:
1. ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3.
  2. Thickness: 6 mm (1/4 inch) and 8 mm (5/16 inch) as indicated on the Drawings and Section 09 06 00, SCHEDULE FOR FINISHES.

**2.3 VISION GLASS 1 (VG-1 and VG-3): SOLAR CONTROL INSULATING LAMINATED COATED GLASS -- LAMINATED INBOARD**

- A. Double-Glazed Sputter-Coated Insulating Glass Units with Laminated Inboard Lite:

1. Conformance: ASTM E 2190, Class CBA.
  2. Conformance: ASTM C 1172 and complying with testing requirements in CPSC 16CFR-1201 for Category II materials and with "Windborne-Debris-Impact Resistance" Paragraph in "Quality Assurance" Article.
  3. Outboard Lite: Sputter-coated clear float glass.
    - a. Annealed Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
    - b. Vacuum Deposition Sputtered Coating: ASTM C 1376.
    - c. Coating on Surface No. 2: SunGuard Light Blue 63.
    - d. Glass Thickness: 6 mm (1/4 inch).
    - e. Heat Treatment: Heat-strengthened, ASTM C 1048, Kind HS
  4. Air Space: 12 mm (1/2 inch) wide, hermetically sealed, dehydrated air space.
  5. Inboard Laminated Glass Unit:
    - a. Conformance: ASTM C 1172, CPSC 16CFR-1201
    - b. Inner Lite:
      - 1) Annealed Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
      - 2) Glass Thickness: 3 mm (1/8 inch)
      - 3) Heat Treatment: None
    - c. Interlayer: Polyvinyl butyral (PVB) plastic interlayer, clear, 0.060 inch thick.
    - d. Inboard Lite
      - 1) Annealed Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
      - 2) Glass Thickness: 3 mm (1/8 inch).
      - 3) Heat-Treatment: None.
  6. Glass Unit Performance Characteristics:
    - a. Visible Light Transmittance: 62 percent
    - b. Visible Light Reflectance Outdoors: 15 percent
    - c. Winter U-Value Nighttime: .34
    - d. Summer U-Value Daytime: .35
    - e. Shading Coefficient: .59
    - f. Solar Heat Gain Coefficient: .51
    - g. Summer Relative Heat Gain: 122
    - h. Color Rendering Index (CRI): 95
  7. Edge Seals: ASTM E 773, with aluminum spacers and silicone sealant for glass-to-spacer seals.
  8. Sealant: Approved by glass manufacturer.
- 2.4 VISION GLASS 2 (VG-2): SOLAR CONTROL INSULATING LAMINATED COATED GLASS -- LAMINATED INBOARD - TO GLAZING ASSEMBLY TO INCLUDE AN INTEGRAL BLIND AND 1/4" TEMPERED INBOARD GLASS**
- A. Double-Glazed Sputter-Coated Insulating Glass Units with Laminated Inboard Lite:
1. Conformance: ASTM E 2190, Class CBA.
  2. Conformance: ASTM C 1172 and complying with testing requirements in CPSC 16CFR-1201 for Category II materials and with "Windborne-Debris-Impact Resistance" Paragraph in "Quality Assurance" Article.
  3. Outboard Lite: Sputter-coated clear float glass.
    - a. Annealed Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
    - b. Vacuum Deposition Sputtered Coating: ASTM C 1376.

- c. Coating on Surface No. 2: SunGuard Light Blue 63.
  - d. Glass Thickness: 6 mm (1/4 inch).
  - e. Heat Treatment: Heat-strengthened, ASTM C 1048, Kind HS
  - 4. Air Space: 12 mm (1/2 inch) wide, hermetically sealed, dehydrated air space.
  - 5. Inboard Laminated Glass Unit:
    - a. Conformance: ASTM C 1172, CPSC 16CFR-1201
    - b. Inner Lite:
      - 1) Annealed Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
      - 2) Glass Thickness: 3 mm (1/8 inch)
      - 3) Heat Treatment: None
    - c. Interlayer: Polyvinyl butyral (PVB) plastic interlayer, clear, 0.060 inch thick.
    - d. Inboard Lite
      - 1) Annealed Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
      - 2) Glass Thickness: 3 mm (1/8 inch).
      - 3) Heat-Treatment: None.
  - 6. Glass Unit Performance Characteristics:
    - a. Visible Light Transmittance: 62 percent
    - b. Visible Light Reflectance Outdoors: 15 percent
    - c. Winter U-Value Nighttime: .34
    - d. Summer U-Value Daytime: .35
    - e. Shading Coefficient: .59
    - f. Solar Heat Gain Coefficient: .51
    - g. Summer Relative Heat Gain: 122
    - h. Color Rendering Index (CRI): 95
  - 7. Edge Seals: ASTM E 773, with aluminum spacers and silicone sealant for glass-to-spacer seals.
  - 8. Sealant: Approved by glass manufacturer.
- 2.5 SPANDREL GLASS 1 (SG-1): SOLAR CONTROL INSULATING LAMINATED COATED GLASS -- LAMINATED INBOARD WITH SPANDREL**
- A. Double-Glazed Sputter-Coated Insulating Glass Units with Laminated Inboard Lite:
- 1. Conformance: ASTM E 2190, Class CBA.
  - 2. Conformance: ASTM C 1172 and complying with testing requirements in CPSC 16CFR-1201 for Category II materials and with "Windborne-Debris-Impact Resistance" Paragraph in "Quality Assurance" Article.
  - 3. Outboard Lite: Sputter-coated clear float glass.
    - a. Annealed Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
    - b. Vacuum Deposition Sputtered Coating: ASTM C 1376.
    - c. Coating on Surface No. 2: SunGuard Light Blue 63.
    - d. Glass Thickness: 6 mm (1/4 inch).
    - e. Heat Treatment: Heat-strengthened, ASTM C 1048, Kind HS.
  - 4. Air Space: 12 mm (1/2 inch) wide, hermetically sealed, dehydrated air space.
  - 5. Inboard Laminated Glass Unit with Spandel:
    - a. Conformance: ASTM C 1172, CPSC 16CFR-1201
    - b. Inner Lite:

- 1) Annealed Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
      - 2) Glass Thickness: 3 mm (1/8 inch)
      - 3) Heat Treatment: None
    - c. Interlayer: Polyvinyl butyral (PVB) plastic interlayer, clear, 0.060 inch.
    - d. Inboard Lite
      - 1) Annealed Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
      - 2) Glass Thickness: 3 mm (1/8 inch).
      - 3) Spandrel Opacifier on Surface #6: Ferro Frit #24-8026 Solar Gray Ceramic Frit Spandrel.
      - 4) Heat-Treatment: Heat-strengthened, ASTM C 1048, Kind HS (Tempered if required)
  6. Glass Unit Performance Characteristics:
    - a. Visible Light Transmittance: N/A
    - b. Visible Light Reflectance Outdoors: N/A
    - c. Winter U-Value Nighttime: .34
    - d. Summer U-Value Daytime: .35
    - e. Shading Coefficient: N/A
    - f. Solar Heat Gain Coefficient: N/A
    - g. Summer Relative Heat Gain: N/A
    - h. Color Rendering Index (CRI): N/A
  7. Edge Seals: ASTM E 773, with aluminum spacers and silicone sealant for glass-to-spacer seals.
  8. Sealant: Approved by glass manufacturer.
- 2.6 FRITTED GLASS 1 (FG-1): SOLAR CONTROL INSULATING LAMINATED COATED GLASS -- LAMINATED INBOARD WITH FRIT**
- A. Double-Glazed Sputter-Coated Insulating Glass Units with Laminated Inboard Lite:
1. Conformance: ASTM E 2190, Class CBA.
  2. Conformance: ASTM C 1172 and complying with testing requirements in CPSC 16CFR-1201 for Category II materials and with "Windborne-Debris-Impact Resistance" Paragraph in "Quality Assurance" Article.
  3. Outboard Lite: Sputter-coated clear float glass.
    - a. Annealed Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
    - b. Vacuum Deposition Sputtered Coating: ASTM C 1376.
    - c. Coating on Surface No. 2: SunGuard Light Blue 63.
    - d. Glass Thickness: 6 mm (1/4 inch).
    - e. Heat Treatment: Heat-strengthened, ASTM C 1048, Kind HS.
  4. Air Space: 12 mm (1/2 inch) wide, hermetically sealed, dehydrated air space.
  5. Inboard Laminated Glass Unit:
    - a. Conformance: ASTM C 1172, CPSC 16CFR-1201
    - b. Inner Lite:
      - 1) Annealed Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
      - 2) Glass Thickness: 3 mm (1/8 inch)
      - 3) Ceramic Frit on Surface No. 3: Silk Screened Ceramic Frit Warm Gray Dot Pattern with 50% Surface Coverage (Screen to be approved by architect).

- 4) Heat Treatment: Heat-strengthened, ASTM C 1048, Kind HS (Tempered if required)
- c. Interlayer: Polyvinyl butyral (PVB) plastic interlayer, clear, 0.060 inch thick.
- d. Inboard Lite
  - 1) Annealed Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
  - 2) Glass Thickness: 3 mm (1/8 inch).
  - 3) Heat-Treatment: None.
- 6. Glass Unit Performance Characteristics (Dependent on Silk Screen Pattern):
  - a. Visible Light Transmittance: Varies
  - b. Visible Light Reflectance Outdoors: Varies
  - c. Winter U-Value Nighttime: .34
  - d. Summer U-Value Daytime: .35
  - e. Shading Coefficient: .59 or better
  - f. Solar Heat Gain Coefficient: .51 or better
  - g. Summer Relative Heat Gain: Varies
  - h. Color Rendering Index (CRI): Varies
- 7. Edge Seals: ASTM E 773, with aluminum spacers and silicone sealant for glass-to-spacer seals.
- 8. Sealant: Approved by glass manufacturer.

**2.7 LAMINATED GLASS (VG-3): SOLAR CONTROL LAMINATED COATED GLASS UNIT (DOOR)**

- A. Sputter-Coated Laminated Glass Units:
  - 1. Conformance: ASTM E 2190, Class CBA.
  - 2. Conformance: ASTM C 1172 and complying with testing requirements in CPSC 16CFR-1201 for Category II materials and with "Windborne-Debris-Impact Resistance" Paragraph in "Quality Assurance" Article.
  - 3. Outboard Lite: Sputter-coated clear float glass.
    - a. Annealed Clear Float Glass: ASTM C 1036, Type I, Class 1, Quality q3.
    - b. Vacuum Deposition Sputtered Coating: ASTM C 1376.
    - c. Coating on Surface No. 2: SunGuard Light Blue 63.
    - d. Glass Thickness: 6 mm (1/4 inch).
    - e. Heat Treatment: Heat-strengthened, ASTM C 1048, Kind HS (Tempered if required by code)
  - 4. Interlayer: Polyvinyl butyral (PVB) plastic interlayer, clear, 0.090 inch thick.
  - 5. Inboard Lite:
    - a. Clear Float Glass: ASTM C 1036, Type I, Class 1, Quality q3.
    - b. Glass Thickness: 6 mm (1/4 inch).
    - c. Heat Treatment: Heat-strengthened, ASTM C 1048, Kind HS (Tempered if required by code)
  - 6. Sealant: Approved by glass manufacturer.

**2.8 LAMINATED GLASS (GL-7): LAMINATED ACID-ETCHED INTERIOR WALL GLASS UNIT**

- A. Laminated Acid-Etched Glass Units:
  - 1. Conformance: ASTM C 1172
  - 2. Outboard Lite: Clear float glass.
    - a. Annealed Clear Float Glass: ASTM C 1036, Type I, Class 1, Quality q3.

- b. Glass Thickness: 6 mm (1/4 inch).
- c. Heat Treatment: None.
- 3. Interlayer: Polyvinyl butyral (PVB) plastic interlayer, clear, 0.060 inch thick.
- 4. Inboard Lite: Guardian SunGuard SatinDeco glass.
  - a. Clear Float Glass: ASTM C 1036, Type I, Class 1, Quality q3.
  - b. Acid-Etched Surface on Surface No. 4: SunGuard SatinDeco.
  - c. Glass Thickness: 6 mm (1/4 inch).
  - d. Heat Treatment: None.
- 5. Sealant: Approved by glass manufacturer.

**2.9 LAMINATED GLASS (GL-8): LAMINATED INTERIOR WALL GLASS UNIT WITH EMBEDDED TRANSLUCENT FRIT CERAMIC SILK SCREEN PAINT LINES**

A. Laminated ~~Acid-Etched~~ Glass Units With Ceramic Silk Screen Paint Lines:

- 1. Conformance: ASTM C 1172
- 2. Outboard Lite: Clear float glass.
  - a. Annealed Clear Float Glass: ASTM C 1036, Type I, Class 1, Quality q3.
  - b. Glass Thickness: 6 mm (1/4 inch).
  - c. Heat Treatment: None.
- 3. Interlayer: Polyvinyl butyral (PVB) plastic interlayer, clear, 0.060 inch thick.
- 4. Inboard Lite: Clear float glass.
  - a. Clear Float Glass: ASTM C 1036, Type I, Class 1, Quality q3.
  - b. Glass Thickness: 6 mm (1/4 inch).
  - c. Ceramic Silk Screen Paint Lines~~Frit~~ on Surface No. 3: Silk Screened Ceramic Frit Translucent (To resemble acid etch appearance) Dot Pattern with 50% Surface Coverage~~Silk screen translucent simulated sandblast ceramic paint lines (50% surface coverage) that are horizontally arranged with 1/2" wide lines and 1/2" wide spaces. Line appearance to resemble SunGuard SatinDeco acid etch glass found in GL-7. (Screen must be provided by fabricator and approved by architect prior to installation).~~
  - d. Heat Treatment: Heat-strengthened, ASTM C 1048, Kind HS (Tempered if required)
- 5. Sealant: Approved by glass manufacturer.

**2.10 LAMINATED GLASS (GL-9): LAMINATED INTERIOR WALL GLASS UNIT**

A. Laminated Glass Units:

- 1. Conformance: ASTM C 1172
- 2. Outboard Lite: Clear float glass.
  - a. Annealed Clear Float Glass: ASTM C 1036, Type I, Class 1, Quality q3.
  - b. Glass Thickness: 6 mm (1/4 inch).
  - c. Heat Treatment: None.
- 3. Interlayer: Polyvinyl butyral (PVB) plastic interlayer, clear, 0.060 inch thick.
- 4. Inboard Lite: Clear float glass.
  - a. Clear Float Glass: ASTM C 1036, Type I, Class 1, Quality q3.

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- b. Glass Thickness: 6 mm (1/4 inch).
- c. Heat Treatment: Heat-strengthened, ASTM C 1048, Kind HS (Tempered if required)

- 5. Sealant: Approved by glass manufacturer.

**2.102.11 FIRE RESISTANT GLASS WITHOUT WIRE MESH**

- A. Fire resistant glass or glass assembly classified by UL in Building Materials Directory or other approved testing laboratory bearing permanent mark of classification.
- B. Firelite.
  - 1. UL listing R13377-1, 4.8 mm (3/16 inch) thick, unpolished.
  - 2. Distributed by Technical Glass Products; Kirkland, WA 98033.
- C. Pyrovue Commercial.
  - 1. UL listing R10178(N), 41 mm (1-5/8 inch) thick.
  - 2. Represented by Advanced Glass Systems Corporation, Trumbauersville, PA 18970-0051

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**2.112.12 GLAZING ACCESSORIES**

- A. As required to supplement the accessories provided with the items to be glazed and to provide a complete installation. Ferrous metal accessories exposed in the finished work shall have 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.
- 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.
- E. Glazing Clips: Galvanized steel spring wire designed to hold glass in position in rabbeted sash without stops.
- F. 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.
- G. Lock-Strip Glazing Gaskets: ASTM C542, shape, size, and mounting as indicated.
- H. Glazing Sealants: ASTM C920, silicone neutral cure:
  - 1. Type S.
  - 2. Class 25
  - 3. Grade NS.
  - 4. Shore A hardness of 25 to 30 Durometer.

**2.122.13 FABRICATION OF GLAZING UNITS**

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
- B. Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets.

**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. Advise Contractor of conditions which may adversely affect glass and glazing unit installation, prior to commencement of installation: Do not proceed with installation until unsatisfactory conditions have been corrected.
- 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-02 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-01 Glazing Manual and GANA-02 Sealant Manual unless specified otherwise.
- B. Glaze in accordance with recommendations of glazing and framing manufacturers, and as required to meet the Performance Test 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.
- F. Tempered Glass: Install with roller distortions in horizontal position unless otherwise directed.
- G. Laminated Glass:
  - 1. Tape edges to seal interlayer and protect from glazing sealants.
  - 2. Do not use putty or glazing compounds.
- H. Insulated Glazing Units: Glazing is to be attached to supporting

mullion and frame elements with a minimum ¼-inch wide bead of structural silicone applied at all edges of the interior face of glass and a minimum ½" bite.

I. Fire Resistant Glass:

1. Glaze in accordance with UL design requirements.

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

- A. Cut glazing spline to length; install on glazing pane. Seal corners by butting and sealing junctions with butyl sealant.
- B. Place setting blocks at 1/4 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)**

- 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 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 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 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)**

- A. Place setting blocks at 1/4 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 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 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 sealant to depth equal to bite on glazing, to uniform and level line.
- F. Trim protruding tape edge.

**3.8 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.

**3.9 PROTECTION**

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

**3.10 GLAZING SCHEDULE**

- A. Glazing Types: See Section 09 06 00 SCHEDULE FOR FINISHES and Door schedule.

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