

**SECTION 08 80 00
GLAZING**

PART 1 - GENERAL

1.1 DESCRIPTION

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. Sound resistant doors: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES, and Section 08 14 00, WOOD DOORS.
4. Mirrors: Section 10 28 00, TOILET, BATH, AND LAUNDRY ACCESSORIES.

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.
 - c. Organic coated glass.
3. Bullet resistance glass or plastic assemblies:
 - a. Bullet resistance glass or plastic assemblies in accordance with UL 752 requirements for power rating specified.
 - b. Identify each security glazing permanently with glazing manufacturer's name, date of manufacture, product number, and DOS Code number inconspicuously located in lower corner on protective side and visible after glazing is framed.

- c. The "attack (threat) side" shall be identified in bold lettering on each side of glazing with removable label.

1.4 PERFORMANCE REQUIREMENTS

- A. 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.
- B. Glass Thickness:
 - 1. Select thickness of exterior glass to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with ASCE 7 and applicable code.
 - 2. Test in accordance with ASTM E 1300.
 - 3. Thicknesses listed are minimum. Coordinate thicknesses with framing system manufacturers.

1.5 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.
 - 4. Certificate test reports confirming compliance's with specified bullet resistive rating.
 - 5. Certificate that blast resistant glass meets the requirements of UFC4-010-01.
- C. Warranty: Submit written guaranty, conforming to General Condition requirements, and to "Warranty of Construction" Article in this Section.
- D. Manufacturer's Literature and Data:
 - 1. Glass, each kind required.
 - 2. Insulating glass units.
 - 3. Transparent (one-way vision glass) mirrors.
 - 4. Elastic compound for metal sash glazing.
 - 5. Putty, for wood sash glazing.
 - 6. Glazing cushion.
 - 7. Sealing compound.
 - 8. Bullet resistive material.

9. Plastic glazing material, each type required.

E. Samples:

1. Size: 150 mm by 150 mm (6 inches by 6 inches).

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.

1.6 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.

1.7 PROJECT CONDITIONS

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

1.8 WARRANTY

A. Warranty: Conform to terms of "Warranty of Construction", FAR clause 52.246-21, except extend warranty period for the following:

1. Bullet resistive plastic material to remain visibly clear without discoloration for 10 years.
2. Insulating glass units to remain sealed for 10 years.
3. Laminated glass units to remain laminated for 5 years.
4. Polycarbonate to remain clear and ultraviolet light stabilized for 5 years.
5. Insulating plastic to not have more than 6 percent decrease in light transmission and be ultraviolet light stabilized for 10 years.

1.9 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):

Z97.1-04.....Safety Glazing Material Used in Building -
Safety Performance Specifications and Methods
of Test.

C. American Society for Testing and Materials (ASTM):

C1363-05.....Thermal Performance of Building Assemblies, by
Means of A Hot Box Apparatus
C542-05.....Lock-Strip Gaskets.
C716-06.....Installing Lock-Strip Gaskets and Infill
Glazing Materials.
C794-06.....Adhesion-in-Peel of Elastomeric Joint Sealants.
C864-05.....Dense Elastomeric Compression Seal Gaskets,
Setting Blocks, and Spacers.
C920-08.....Elastomeric Joint Sealants.
C964-07.....Standard Guide for Lock-Strip Gasket Glazing.
C1036-06.....Flat Glass.
C1048-04.....Heat-Treated Flat Glass-Kind HS, Kind FT Coated
and Uncoated Glass.
C1172-09.....Laminated Architectural Flat Glass.
C1376-10.....Pyrolytic and Vacuum Deposition Coatings on
Flat Glass.
D635-06.....Rate of Burning and/or Extent and Time of
Burning of Self-Supporting Plastic in a
Horizontal Position.
D4802-02.....Poly (Methyl Methacrylate) Acrylic Plastic
Sheet.
E84-09.....Surface Burning Characteristics of Building
Materials.
E1300-09.....Determining Load Resistance of Glass in
Buildings.
E2190-08.....Insulating Glass Unit

D. Commercial Item Description (CID):

A-A-59502.....Plastic Sheet, Polycarbonate

E. Code of Federal Regulations (CFR):

16 CFR 1201 - Safety Standard for Architectural Glazing Materials;
1977, with 1984 Revision.

F. National Fire Protection Association (NFPA):

80-08.....Fire Doors and Windows.

G. National Fenestration Rating Council (NFRC)

- H. Safety Glazing Certification Council (SGCC)2009:
Certified Products Directory (Issued Semi-Annually).
- I. Underwriters Laboratories, Inc. (UL):
752-06.....Bullet-Resisting Equipment.
- J. Unified Facilities Criteria (UFC):
4-010-01-2007.....DOD Minimum Antiterrorism Standards for
Buildings
- K. Glass Association of North America (GANA):
Glazing Manual (Latest Edition)
Sealant Manual (2008)
- L. American Society of Civil Engineers (ASCE):
ASCE 7-10.....Wind Load Provisions

PART 2 - PRODUCT

2.1 GLASS

- A. Use thickness stated unless specified otherwise in assemblies.
- 1. Available Manufacturers: subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - a) Manufacturers of Fire Resistant Glass:
 - .Interedge Technologies .Saftifirst
 - .Oldcastle Glass .TGP (Technical Glass Products)
 - . Pilkington
 - b) Manufacturers of Laminated Glass:
 - .Advanced Coating Technology .Hordis Brothers, Inc.
 - .Environmental Glass Products .PPG Glass, Inc.
 - .Falconer Glass Industries .Saint-Gobain/Euroglass
 - .Ford Glass Division .Viracon, Inc.
 - .Guardian Industries Corp.
- B. Clear Glass:
 - 1. ASTM C1036, Type I, Class 1, Quality q3.
 - 2. Thickness, 6 mm (1/4 inch).
- C. Patterned and Wired Flat Glass:
 - 1. ASTM C1036, Type II, Class 1, Form 1, Pattern Pl, Finish F1, Quality Q5, Mesh m1.
 - 2. Thickness, 6 mm (1/4 inches indicated).

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) as indicated .

B. Tempered Patterned Glass (obscure):

1. ASTM C1048, Kind FT, Type II, Class 1, Form 3, Quality q8, Finish f1, Pattern p3.

2.3 LAMINATED GLASS

- A. Two or more lites of glass bonded with an interlayer material for use in building glazing
- B. Colored Interlayer:
 1. Use color interlayer ultraviolet light color stabilization.
 2. Option: Use colored interlayer with clear glass in lieu of tinted glass and clear interlayer.
 3. Option: Use white interlayer with clear glass in lieu of obscure glass and clear interlayer.
 4. The interlayer assembly shall have uniform color presenting same appearance as tinted glass assembly.
- C. Use 1.5 mm (0.060 inch) thick interlayer for:
 1. Horizontal or Sloped glazing.
 2. Acoustical glazing.
 3. Heat strengthened or fully tempered glass assemblies.
- D. Use min. 0.75 mm (0.030 inch) thick interlayer for vertical glazing where 1.5 mm (0.060 inch) interlayer is not otherwise shown or required.

2.4 LAMINATED GLAZING ASSEMBLIES

- A. Clear Glazing:
 1. Both panes clear glass ASTM C1036, Type I, Class 1, Quality q3.
 2. Thickness: Each pane, 3 mm (1/8 inch) thick.
- B. Clear Tempered Glazing:
 1. Both panes ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3.
 2. Thickness: Each pane 4.8 mm (3/16 inch) thick.
- C. Tinted Tempered Glazing:
 1. Exterior pane ASTM C1036, Type I, Class 3, Quality q3, 3 mm (1/8 inch) thick.
 2. Interior pane ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3, 3 mm (1/8 inch) thick.

2.5 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

2.6 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 2.4mm (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. Spring Steel Spacer: Galvanized steel wire or strip designed to position glazing in channel or rabbeted sash with stops.
- F. Glazing Clips: Galvanized steel spring wire designed to hold glass in position in rabbeted sash without stops.
- G. Glazing Points (Sprigs): Pure zinc stock, thin, flat, triangular or diamond shaped pieces, 6 mm (1/4 inch) minimum size.
- H. 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.
- I. Lock-Strip Glazing Gaskets: ASTM C542, shape, size, and mounting as indicated.
- J. 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.
- K. Structural Sealant: ASTM C920, silicone acetoxycure:
 - 1. Type S.
 - 2. Class 25.
 - 3. Grade NS.
 - 4. Shore a hardness of 25 to 30 Durometer.
- L. Neoprene, EPDM, or Vinyl Glazing Gasket: ASTM C864.
 - 1. Channel shape; flanges may terminate above the glazing channel or flush with the top of the channel.
 - 2. Designed for dry glazing.
- M. Color:
 - 1. Color of glazing compounds, gaskets, and sealants used for aluminum color frames shall match color of the finished aluminum and be nonstaining.

2. Color of other glazing compounds, gaskets, and sealants which will be exposed in the finished work and unpainted shall be black, gray, or neutral color.

N. Smoke Removal Unit Targets: Adhesive targets affixed to glass to identify glass units intended for removal for smoke control. Comply with requirements of local Fire Department.

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. Fire Resistant Glass:
 - 1. Wire glass: Glaze in accordance with NFPA 80.
 - 2. Other fire resistant glass: Glaze in accordance with UL design requirements.

3.4 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 type sealant to depth equal to bite on glazing, to uniform and level line.
- F. Trim protruding tape edge.

3.5 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.

3.6 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.

3.7 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.

3.8 PROTECTION

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

3.9 GLAZING SCHEDULE

- A. Fire Resistant Glass:
 - 1. Use Fire Resistant Glass without wire mesh in the following:
 - a. Door lites and view windows
- B. Tempered Glass:
 - 1. Install in full and half glazed doors unless indicated otherwise.
 - 2. Install in storefront, windows, and door sidelights adjacent to doors.
 - 3. Use clear tempered glass on interior side lights and doors, and on exterior doors and sidelights unless otherwise indicated or specified.
 - 4. Use SEU clear tempered insulating glass on storefronts and sidelights.
 - 5. Use clear tempered glass in exterior and interior panes unless specified otherwise at insulating glass units adjacent to door.
- C. Laminated Glass: Install as specified in non-fire-rated doors, observation windows and interior pane of dual glazed windows where indicated.
 - 1. Provide laminated glass for all windows in Psychiatric Nursing Units, Alcohol Dependency Treatment Nursing Units, Drug Abuse Treatment Nursing Units and Security Bedrooms. Laminated glass shall be 7/16-in thick in locked patient units and security rooms, 5/16-in thick elsewhere. (min. 1.5 mm interlayer).
 - 2. If laminated glass is required for double glazed windows, provide it for interior panes only.

3. Where laminated glass is required for blast-resistant windows, follow UFC4-010-01, DOD Minimum Antiterrorism Standards for Buildings.

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