

**SECTION 08 80 00  
GLAZING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

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. Mirrors: Section 10 28 00, TOILET, BATH, AND LAUNDRY ACCESSORIES.
  - 2. Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS.
  - 3. Section 08 51 13, ALUMINUM WINDOWS.
  - 4. Color of tinted (heat absorbing or light reducing) glass, and reflective (metallic coated) 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.
  - 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.

**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. Certificate on shading coefficient.
  2. Certificate on "R" value when value is specified.
- 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. Elastic compound for metal sash glazing.
  4. Glazing cushion.
  5. Sealing compound.
- E. Samples:
  1. Size: 150 mm by 150 mm (6 inches by 6 inches).
  2. Tinted glass.
- 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. Insulating glass units to remain sealed 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.
  - C864-05.....Dense Elastomeric Compression Seal Gaskets,  
Setting Blocks, and Spacers.
  - C920-08.....Elastomeric Joint Sealants.
  - C1036-06.....Flat Glass.
  - C1048-04.....Heat-Treated Flat Glass-Kind HS, Kind FT Coated  
and Uncoated Glass.
  - C1172-09.....Laminated Architectural Flat Glass.
  - E84-09.....Surface Burning Characteristics of Building  
Materials.
  - E1300-09.....Determining Load Resistance of Glass in  
Buildings.
  - E2190-08.....Insulating Glass Unit
- D. Code of Federal Regulations (CFR):
- 16 CFR 1201 - Safety Standard for Architectural Glazing Materials;  
1977, with 1984 Revision.
- E. National Fire Protection Association (NFPA):

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

F. National Fenestration Rating Council (NFRC)

G. Safety Glazing Certification Council (SGCC)2009:

Certified Products Directory (Issued Semi-Annually).

H. Unified Facilities Criteria (UFC):

4-010-01-2007.....DOD Minimum Antiterrorism Standards for  
Buildings

I. Glass Association of North America (GANA):

Glazing Manual (Latest Edition)

Sealant Manual (2008)

J. 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.

B. Clear Glass:

1. ASTM C1036, Type I, Class 1, Quality q3.

2. Thickness, 6 mm (1/4 inch) as indicated.

C. Tinted Heat reflective and low emissivity coated glass:

1. ASTM C1036, Type I, Class 2, Quality q3.

2. Color: Clear

3. Thickness, 6 mm (1/4 inch) as indicated.

D. Patterned Glass:

1. ASTM C1036, Type II, Class 1, Form 1, Pattern Pl, Finish F1, Quality  
Q5.

2. Thickness, 6 mm (1/4 inch) as 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.

### **2.3 COATED GLASS**

A. Low-E Tempered Glass:

1. ASTM C1048, Kind FT, Condition C, Type I, Class 1, Quality q3 with  
low emissivity pyrolytic coating having an E of 0.15.

2. Apply coating to second surface of insulating glass units.

3. Thickness, 6 mm (1/4 inch) as indicated.

B. Pyrolytic-coated Glass:

1. Self-cleaning, low maintenance, fully tempered float glass.
2. Thickness, 6 mm (1/4 inch) as indicated.

**2.4 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:

C. Sealed Edge Units (SEU):

1. Insulating Glass Unit Makeup

a. Outboard Lite

1. Glass type: Float glass.
2. Glass Tint: Clear.
3. Nominal Thickness: 1/4 inch (6.0mm).
4. Glass Strength: Tempered if required.
5. Coating Orientation: #2.

b. Spacer

1. Nominal Thickness:
2. Gas Fill: Air.

c. Inboard Lite

1. Glass Type: Heat-strengthened, float glass.
2. Glass Tint: Clear.
3. Nominal Thickness: 1/4 inch (6.0mm).
4. Glass Strength: Heat-Strengthened.
5. Coating Orientation: #2.

2. Performance Characteristics (Center of Glass)

- a. Visible Transmittance: 54%
- b. Visible Reflectance: 33%
- c. Winter U-factor (U-value): 0.29
- d. Shading Coefficient (SC): 0.32
- e. Solar heat Gain Coefficient (SHGC): 0.28

3. Glass shall be annealed, heat strengthened or tempered as required by codes, or as required to meet thermal stress and wind loads.

4. Glass heat-treated by horizontal (roller hearth) process with inherent roller wave distortion parallel to the bottom edge of the glass as installed when specified.

## 2.13 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 C864-05:
  - 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 C864-05:
  - 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 C864-05:
  - 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. 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.

H. 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.

**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. Patterned Glass:
  - 1. Install units with one patterned surface with smooth surface on the weather side.
  - 2. Install units in interior partitions with pattern in same direction in all openings.
- G. Tempered Glass: Install with roller distortions in horizontal position unless otherwise directed.
- H. Insulating Glass Units:
  - 1. Glaze in compliance with glass manufacturer's written instructions.
  - 2. When glazing gaskets are used, they shall be of 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.

#### **3.4 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.

#### **3.5 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.

### 3.6 PROTECTION

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

### 3.7 GLAZING SCHEDULE

- A. To establish an acceptable level of quality for the glazing materials, the following manufacturers are listed as approved manufacturers for the purpose of identifying manufacturers that provide work and materials generally complying with these specifications. Their selection for this work does not relieve them from performing the work as specified (**BASIS-OF-DESIGN PRODUCTS**):

- 1. Guardian Sunguard (insulated units).
- 2. Or Approved Equal.

- 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 Low E tempered and clear glass, G-41, on storefront and sidelights.
- 5. Tempered Glass Types:
  - a. Glass Type (**G-4**): Clear, tempered glass  
Overall Unit Thickness: 1/4 inch (6.0mm).  
Lite: Clear, tempered glass.

- C. Insulating Glass:

- 1. Install SEU clear/coated tempered glass in windows, storefronts, adjacent to entrances or walks.
- 2. Insulating Glass Types:
  - a. Glass Type (**G-1**): Clear insulated, Low E, tempered glass  
Overall Unit Thickness: 1-3/16 inch (30mm).  
Thickness of Outdoor Lite: 1/4 inch (6.0mm).  
Outdoor Lite: Clear, float glass.  
Coating: Sunguard SuperNeutral 54 (#2)  
Thickness of Indoor Lite: 1/4 inch (6.0mm).

Indoor Lite: Heat-strengthened clear, float glass.

Interspace Content: Air.

Winter Nighttime U-Value: 0.29

Summer Daytime U-Value: 0.27

Visible Light Transmission %: 54

b. Glass Type (**G-2**): Clear insulated, Low E glass

Overall Unit Thickness: 1-3/16 inch (30mm).

Thickness of Outdoor Lite: 1/4 inch (6.0mm).

Outdoor Lite: Clear, float glass.

Coating: Sunguard SuperNeutral 54 (#2)

Thickness of Indoor Lite: 1/4 inch (6.0mm).

Indoor Lite: Clear, float glass.

Interspace Content: Air.

Winter Nighttime U-Value: 0.29

Summer Daytime U-Value: 0.27

Visible Light Transmission %: 54

J. Pattern Glass (obscure):

1. Install in interior pane of dual glazed windows of toilets and where indicated.

2. Pattern Glass (obscure), unless specified otherwise.

3. Patterned Glass Types:

a. Glass Type (**G-3**): Patterned insulated, Low E, glass

Overall Unit Thickness: 1-3/16 inch (30mm).

Thickness of Outdoor Lite: 1/4 inch (6.0mm).

Outdoor Lite: Clear, float glass.

Coating: Sunguard SuperNeutral 54 (#2)

Thickness of Indoor Lite: 1/4 inch (6.0mm).

Indoor Lite: Frosted, float glass.

Interspace Content: Air.

Winter Nighttime U-Value: 0.29

Summer Daytime U-Value: 0.27

Visible Light Transmission %: 54

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