

SECTION 08 81 00

GLASS GLAZING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Monolithic two-ply laminated glass for seismic applications, insulating glass units with laminated glass lite(s) for seismic applications.

1.02 REFERENCES

A. Applicable Publications

1. ANSI Z97.1 - American National Standard for Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
2. ASTM C162 - Standard Terminology of Glass and Glass Products.
3. ASTM C1036 - Standard Specification for Flat Glass.
4. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass -- Kind HS, Kind FT Coated and Uncoated Glass.
5. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass.
6. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.
7. ASTM E1300 - Standard Practice for Determining the Minimum Thickness and Type of Glass Required to Resist a Specified Load.
8. ASTM E2188 - Standard Test Method for Insulating Glass Unit Performance.
9. ASTM E2189 - Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units.
10. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
11. CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
12. Insulating Glass Manufacturers Alliance (IGMA)- Glazing Guidelines.

1.03 DEFINITIONS

- A. Two-ply laminated glass: Two sheets of monolithic glass bonded together with a plastic interlayer by heat and pressure.
- B. Sealed Insulating Glass Unit Surfaces & Coating Orientation:
1. Surface 1 - Exterior surface of outer pane (surface facing outdoors of outboard lite).
 2. Surface 2 - Interior surface of outer pane (surface facing indoors of outboard lite).
 3. Surface 3 - Exterior surface of inner pane (surface facing outdoors of inboard lite).
 4. Surface 4 - Room side surface of inner pane (surfacing facing indoors of inboard lite).

C. Performance Characteristics

1. Center-of-Glass - Performance values that take only the center portion of a glass makeup into account and not the framing members. Customarily found in Sweets catalogs and Oldcastle BuildingEnvelope® GlasSelect® and used in 08 81 00 architectural specifications.
2. Glass thermal and optical performance properties shall be based on data and calculations from the current LBNL WINDOW 5.2 or 6.3 computer program.
3. Fenestration Performance - Performance values that take into account the total fenestration (center-of-glass and framing members). Normally identified with building energy codes such as ASHRAE-IESNA 90.1 and the IECC. These values can also be tested and certified by the National Fenestration Rating Council (NFRC).

1.04 SYSTEM DESCRIPTION

A. Design Requirements

1. Provide glazing systems capable of withstanding normal thermal movements, windloads and impact loads, without failure, including loss due to defective manufacture, fabrication and installation; deterioration of glazing materials; and other defects in construction.
2. Provide glass products in the thicknesses and strengths (annealed or heat-treated) required to meet or exceed the following criteria based on project loads and in-service conditions per ASTM E1300.
 - a. Minimum thickness of annealed or heat-treated glass products is selected, so the worst-case probability of failure does not exceed the following:
 - 1) 8 breaks per 1000 for glass installed vertically or not over 15 degrees from the vertical plane and under wind action.
 - 2) 1 break per 1000 for glass installed 15 degrees or more from the vertical plane and under action of wind and/or snow.

1.05 SUBMITTALS

- A. Submit manufacturer's product data sheet and glazing instructions.

1.06 QUALITY ASSURANCE

- A. Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this section or referenced standards.
1. GANA Publications
 2. AAMA Publications
 3. IGMA/IGMAC Publications
- B. Safety glass products in the US are to comply with CPSC 16 CFR Part 1201 for Category II materials.

- C. Insulating Glass products are to be permanently marked either on spacers or at least one insulating unit component with appropriate certification label of inspecting and testing agency indicated below:
 - 1. US - Insulating Glass Certification Council (IGCC)
- D. Single-source fabrication responsibility: All glass fabricated for each type shall be processed and supplied by a single fabricator.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Comply with manufacturer's instruction for receiving, handling, storing and protecting glass & glazing materials.
- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
- D. Exercise exceptional care to prevent edge damage to glass, and damage/deterioration to coating on glass.
- E. Where insulating glass units will be exposed to substantial altitude changes, comply with insulating glass fabricator's recommendations of venting and sealing.

1.08 PROJECT / SITE CONDITIONS

- A. Environmental Requirements: Installation of glass products at ambient air temperature below 40 degrees F (4.4 degrees C) is prohibited.
- B. Field Measurements: When construction schedule permits, verify field measurements with drawing dimensions prior to fabrication of glass products.

1.09 WARRANTY

- A. Provide a written 10-year limited warranty from date of manufacture for insulating glass. Warranty covers deterioration due to normal conditions of use and not to handling, installing, protecting and maintaining practices contrary to glass manufacturer's published instructions.
- B. Provide written 5-year warranty from date of manufacture for PVB laminated glass. Warranty covers deterioration due to normal conditions of use and not to handling installing, protecting and maintaining practices contrary to glass manufacturer's published instructions.
- C. Provide a written warranty from date of manufacture for tempered glass.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer is used in this section to refer to a firm that produces primary glass or fabricated glass as defined in the referenced standards.

1. Oldcastle BuildingEnvelope®
2. Guardian Industries
3. Pilkington
4. PPG Industries

2.02 MATERIALS

A. Sealed Insulating Glass (IG) Units with Two-Ply Laminated Glass Inboard Lite

1. Insulating Glass Unit Makeup

- a. Outboard Lite:
¼" PPG Solarban 60 on Solargray Low-E #2
- b. Spacer
 - 1) Nominal Thickness: ½"
 - 2) Gas Fill: (Air)
- c. Laminated Inboard Lite
 - 1) Outer Ply:
3/16" Clear
 - 2) Interlayer:
0.060" Clear PVB
 - 3) Inner Ply:
3/16" Clear

2. Performance Characteristics

- a. (Thermal) Winter U-factor/ U-value: 0.28
- b. Summer U-factor/U-value: 0.27
- c. Solar Heat Gain Coefficient: 0.25
- d. Shading Coefficient: 0.28
- e. Relative Heat Gain (Btu/hr-sq.ft.): 60
- f. Light to Solar Gain: 1.40
- g. (Optical) Visible Light Transmittance: 35%
- h. Visible Light Reflectance (Outside): 6%
- i. Visible Light Reflectance (Inside): 10%
- j. Total Solar Transmittance: 16%
- k. Total Solar Reflectance (Outside): 11%
- l. Ultraviolet Transmittance: <1%

3. Laminated glass products to be fabricated in autoclave with heat, plus pressure, free of foreign substances and air pockets.

4. Interlayer material: Polyvinyl Butyral sheets.

5. IG units with dehydrated airspace, dual sealed with a primary seal of polyisobutylene (PIB) and a secondary seal of silicone or an organic sealant depending on the application.

6. Requirements:

- a. Insulating glass units are certified through the Insulating Glass Certification Council (IGCC) to ASTM E2190.

- b. Annealed float glass shall comply with ASTM C1036, Type I, Class 1 (clear), Class 2 (tinted), Quality-Q3.
- c. Heat-Strengthened float glass shall comply with ASTM C1048, Type I, Class 1 (clear), Class 2 (tinted), Quality Q3, Kind HS.
- d. Tempered float glass shall comply with ASTM C1048, Type I, Class 1 (clear), Class 2 (tinted), Quality Q3, Kind FT.
- e. Laminated glass shall comply with ASTM C1172 and with other requirements as specified (UL 972, ASTM F1233, etc.).

B. Glazing Products

- 1. Select appropriate glazing sealants, tapes, gaskets and other glazing materials of proven compatibility with other materials that they contact. These include glass products, insulating glass unit seals and glazing channel substrates under installation and service conditions, as demonstrated by testing and field experience.

PART 3 EXECUTION

3.01 EXAMINATION

A. Site Verification and Conditions

- 1. Verify that site conditions are acceptable for installation of the glass.
- 2. Verify openings for glazing are correctly sized and within tolerance.
- 3. Verify that a functioning weep system is present.
- 4. Verify that the minimum required face and edge clearances are being followed.
- 5. Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Protection

- 1. Handle and store product according to manufacturers' recommendations.

B. Surface Preparation

- 1. Clean and prepare glazing channels and other framing members to receive glass.
- 2. Remove coatings and other harmful materials that will prevent glass and glazing installation required to comply with performance criteria specified.

3.03 INSTALLATION

- A. Install products using the recommendations of manufacturers of glass, sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those in the "GANA Glazing Manual".
- B. Verify that Insulating Glass (IG) Unit secondary seal is compatible with glazing sealants.
- C. Install glass in prepared glazing channels and other framing members.

- D. Install setting blocks in rabbets as recommended by referenced glazing standards in GANA Glazing Manual and IGMA Glazing Guidelines.
- E. Provide bite on glass, minimum edge and face clearances and glazing material tolerances recommended by GANA Glazing Manual.
- F. Provide weep system as recommended by GANA Glazing Manual.
- G. Set glass lites in each series with uniform pattern, draw, bow and similar characteristics.
- H. Distribute the weight of the glass unit along the edge rather than at the corner.
- I. Comply with manufacturer's and referenced industry recommendations on expansion joints and anchors, accommodating thermal movement, glass openings, use of setting blocks, edge, face and bite clearances, use of glass spacers, edge blocks and installation of weep systems.
- J. Protect glass from edge damage during handling and installation.
- K. Prevent glass from contact with contaminating substances that result from construction operations, such as weld spatter, fireproofing or plaster.
- L. Remove and replace glass that is broken, chipped, cracked or damaged in any way.
- M. Install glass using a 'wet' seal of structural silicone or other approved structural adhesive between the laminated glass lite and the frame to reduce the possibility of fall-out during a seismic event.

3.04 CLEANING

- A. Clean excess sealant or compound from glass and framing members immediately after application, using solvents or cleaners recommended by manufacturers.
- B. Glass to be cleaned according to:
 - 1. GANA Glass Informational Bulletin GANA 01-0300 - Proper Procedures for Cleaning Architectural Glass Products.
 - 2. GANA Glass Information Bulletin GANA TD-02-0402 - Heat-Treated Glass Surfaces Are Different.
- C. Do not use scrapers or other metal tools to clean glass.

END OF SECTION