

**SECTION 08 8000
GLAZING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Glass.
- B. Glazing compounds and accessories.

1.02 RELATED SECTIONS

- A. Section 07 2100 - Thermal Insulation: Insulation fill around window units.
- B. Section 07 9005 - Joint Sealers: Sealant and back-up material.
- C. Section 08 1416 - Flush Wood Doors: Glazed doors.
- D. Section 08 4313 - Aluminum-Framed Storefronts.

1.03 REFERENCES

- A. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2004.
- B. ASTM C 864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 1999 (Reapproved 2005).
- C. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2005.
- D. GANA (GM) - GANA Glazing Manual; Glass Association of North America; 2004.
- E. GANA (SM) - FGMA Sealant Manual; Glass Association of North America; 1990.
- F. SIGMA TM-3000 - Glazing Guidelines for Sealed Insulating Glass Units; Sealed Insulating Glass Manufacturers Association; 2004.

1.04 PERFORMANCE REQUIREMENTS

- A. Wind Loads: Comply with wind load criteria specified in Metal-Framed Storefronts section.
- B. Thermal Insulating Units: Units shall comply with the requirements of ASTM E774-97 and be certified by Associated Laboratories, Inc., (ALI) or insulating Glass Certification Council (IGCC) for Class A.
- C. Tinted Glass Types: Whether used in a monolithic state or as a lite of thermal insulating unit, shall each be the product of a single manufacturer.
 - 1. Basis of Color Design:
 - a. PPG Solarban 60 on clear Low-E (3) Solargray Tinted or equal.
 - b. Minimum 1/4" thickness except as otherwise indicated.
 - c. Visible light transmittance for insulated unit: 35%.
 - d. Thermal transmittance ("U" value) winter, night for insulated unit: 0.29.
 - e. Thermal transmittance ("U" value) summer, day for insulated unit: 0.27.
 - f. Shading coefficient for insulated unit: 0.33.
- D. Glazing Materials: Whether in a monolithic state or as a lite of a thermal insulating unit, shall be heat treated where required by glass manufacturer's design calculations to resist stress caused by glass orientations, sizes and configurations, heat stress, inherent imperfections, wind loading, glazing conditions, temperature differential, inside window treatments or other conditions affecting breakage probability. Maximum allowable breakage probability at design loads shall be eight lites per thousand for vertical glazing.
- E. For heat-treated glass, orient lites with roll distortion parallel to head and sill members.
- F. Tempered and laminated glazing materials shall comply with CPSC 16-CFR, Part 1201, Category II.
- G. Tinted and spandrel glass types, whether used in a monolithic state or as a lite of a thermal insulating unit, shall each be the product of a single manufacturer.

1.05 SUBMITTALS

- A. See Division 01 - Administrative Requirements, for submittal procedures.
- B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements. Include technical data, storage and handling procedures and performance characteristics.
- C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- D. Samples: Submit two samples 12 x 12 inch in size of glass units, showing coloration and design.
- E. Certificates: Certify that products meet or exceed specified requirements.
- F. Manufacturer's Certificate: Certify that sealed insulated glass meets or exceeds specified requirements.
- G. Framing Manufacturer's Approval: Prior to submission of shop drawings, indicate by letter that an authorized representative of hollow metal frames and metal-framed storefront framing manufacturer has reviewed and approved details, including glass bite, clearances and glazing methods.
- H. Calculations: Submit for Gardner Spencer Smith Tench and Jarbeau, PC's information only. Submit calculations prepared by glazing material manufacturer indicating recommendations for glass thickness and heat treating of glazing materials as a result of heat stress, building orientation, inside window treatments, shading by exterior building components or wind loading. Identify factors affecting breakage probability which have been taken into consideration and breakage probability anticipated by calculations.
- I. Maintenance Data: Submit glazing material manufacturer's maintenance data for cleaning and care of each type of glazing material.

1.06 QUALITY ASSURANCE

- A. Labeling: Label each piece of glass and glazing and mirrors with manufacturer's name, and the grade or quality of the material. Labels shall be intact before and after installation.
 - 1. Glazing shall bear manufacturer's label identifying type, quality and thickness of material. Labels for single thickness annealed float glass, if not available on each lite shall at least be factory applied to shipping crates. All other glazing materials shall be required to bear labels on each lite either temporary or permanent types as required by governing building codes or certification agency where specified.
 - 2. Tempered glass shall have permanent etched or ceramic fired identification on each unit indicating compliance with safety glazing standard. Identification shall be visible in completed installation and oriented in an inconspicuous corner.
- B. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum ten years documented experience.

1.07 MOCK-UP

- A. See Division 01 - Quality Requirements, for additional mock-up requirements.
- B. Construct a masonry wall as part of the brick mock-up panel. See Section 04 2100 - Brick Masonry for related items to be installed and coordinated.
- C. Locate where directed.

1.08 PRE-INSTALLATION MEETING

- A. Convene one week before starting work of this section.
- B. Contractor, Gardner Spencer Smith Tench and Jarbeau, PC, storefront supplier and erector, a representative of glass manufacturer, a representative of sealant manufacturer and glazing

subcontractor will be present.

- C. Material submitted by Contractor, interfacing of glass and glazing and window wall work, dimensions and tolerances, sealant joint widths and depths and butt joint glazing will be reviewed.

1.09 DELIVERY, STORAGE, AND PROTECTION

- A. Move no cases which have been partially unpacked. Unpack glazing materials in accord with manufacturer's product data for type of material being handled. Stack individual lites as recommended by manufacturer's product data.
- B. Utilize rolling blocks to rotate glazing materials.
- C. Handle insulating units without rotating, warping or cartwheeling units. Prevent damage to glazing material or edge seal.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.11 WARRANTY

- A. See Division 01 - Closeout Submittals, for additional warranty requirements.
- B. Provide a ten (10) year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.
- C. Provide a ten (10) year warranty guaranteeing to correct failures in weathertightness signed by the installer and contractor. Failure is defined as water leakage through glazing assembly. Correction may include repair or replacement.
- D. Provide a ten (10) year warranty to cover silver spoilage in mirrors.
- E. Provide a two (2) year warranty to cover materials and labor to replace glazing damage for any reason other than natural disasters, vandalism or damage resulting from accident or abuse arising out of the Union County Commissioner's Office's operations.
- F. All warranties shall commence on the Date of Substantial Completion of the Project.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS AND FABRICATORS

- A. To maximum extent possible, provide domestically manufactured and fabricated glass, and provide glass from one manufacturer.
- B. Types of glass specified or indicated shall be subject to compliance with specified requirements and manufactured or fabricated by one of the following:
 - 1. Basis of Design: Vitro Architectural Glass: www.vitroglasshub.com.
 - 2. ACH Glass/Versalux: www.versaluxglass.com
 - 3. AFG Industries, Inc: www.afgglass.com.
 - 4. Global Security Glazing: www.security-glazing.com.
 - 5. Pilkington North America: www.pilkington.com.
 - 6. Viracon, Inc: www.viracon.com.
- C. Substitutions: Refer to Division 01 - Product Requirements.

2.02 GLASS MATERIALS

- A. General: Conform to ASTM C 1036, ASTM C 1048 and to ANSI Z97.1. Label factory cut panes.
- B. Float Glass: Type I, (transparent glass flat), Class 1 (clear), Quality q3, (glazing select), minimum 1/4 inch thickness unless otherwise indicated or required.
- C. Tinted Float Glass: Type I, Class 2 (tinted heat absorbing and light reducing), quality q3, color as selected by Gardner Spencer Smith Tench and Jarbeau, PC, minimum 1/4 inch thickness

unless otherwise indicated or required.

- D. Tempered Glass: Condition A, Type I or II, Class 1, Quality q3, Kind FT, match color of clear or tinted glass as applicable; fully thermal tempered, heat strengthening or chemical tempering is not permitted. Perform tempering by horizontal oscillating roller hearth or high speed roller hearth process. Do not permit fabrication processes leaving gripper or tong marks. Handle and size glass according to manufacturer's written instructions.
- E. Insulated Glass: Pre-assembled sealed lite units with dehydrated space between glass units, complying with ASTM E 774 for Class CBA units.
- F. Low Emissivity Glass (Low E Glass): Provide units with thin metallic high-transmittance coating applied to the number 3 surface of the unit, unless otherwise indicated. The U-value for the IGU shall be no greater than 0.29, unless otherwise indicated.

2.03 GLASS SETTING MATERIALS

- A. Setting Blocks: ASTM C 864, channel shape; having 1/4 inch internal depth, Shore A hardness of 80 to 90 Durometer. Blocks shall be a minimum 2 inch long. Block width shall be approximately 1/16 inch less than the full width of the rabbet. Block thickness shall be at least 3/16 inch, sized for rabbet depth as required.
- B. Spacers: ASTM C 864, channel shape, with 1/4 inch internal depth, 3/32 inch flanges, web, 1/8 inch thick, one to 3 inches long. Spacers shall provide Shore A hardness of 40 to 50 Durometer.
- C. Vinyl Glazing Channels: Profile compatible with framing system and designed to accommodate glass of specified thickness, light gray in color. Provide for dry glazing aluminum frames where indicated or permitted.
- D. Glazing Tape: Poly-isobutylene based sealant tape, conforming to AAMA 804.1, with adhesive one side protected by temporary paper cover, Extru-Seal manufactured by Pecora Corp., No. 303 by Protective Treatments, Inc., or equal.
- E. Spring Steel Spacers: Galvanized steel wire or strip designed to position glazing in channel or rabbet sash with stops.
- F. Glazing Clips: Galvanized steel spring wire designed to hold glass in position in rabbet sash without stops.
- G. Glazing Points (Sprigs): Pure zinc stock, thin, fiat, triangular or diamond-shaped pieces, 1/4 inch minimum size.
- H. Glazing Sealants for Metal Sash: GE Silicones Silglaze II 2800, GE Silicones Silpruf, GE Silicones 1200 Silicone, and Dow Corning 999A. Polybutylene, oleoresinous, asphalt, and oil base sealants are not permitted. Provide sealant of same color as structural silicone sealant unless otherwise required.
- I. Glazing Compound for Wood Sash: Acrylic latex caulk by Tremco. Provide for bedding and caulking glass in wood frames.
- J. Glazing Compounds and Sealants for Thermoplastic: Provide silicone, butyl, or polysulfide glazing compound.
- K. Mirror Setting Materials: Manufactured by Palmer Products Corporation, or equal, for installation of mirrors, and as follows:
 - 1. Mirror backing paint: Mirro-Bac Paint, or equal, formulated to protect mirror silvering.
 - 2. Mirror bond coat: Mirro-Mastic Bond, or equal, formulated to isolate deleterious backing materials from mastic and mirror.
 - 3. Mirror mastic: Mirro-Mastic, or equal, formulated for adhering mirrors and glass to substrates.

2.04 FLAT GLASS MATERIALS

- A. Clear Float Glass (Type G1): Clear, fully tempered for interior applications unless otherwise indicated.

1. 1/4" thick complying with ASTM C1048-92. Glass for butt-joint glazing shall be free of tong marks and surface defects on exposed edges.
- B. Tinted Float Glass (Type G3): Clear, fully tempered for exterior applications unless otherwise indicated.
 1. 1/4" thick complying with ASTM C1048-92. Glass for butt-joint glazing shall be free of tong marks and surface defects on exposed edges.
 2. Security Film: Product 3M Scotchshield Safety & Security Window Film Ultra S800 caulked into the frame or approved equal by Gardner Spencer Smith Tench and Jarbeau, PC

2.05 SEALED INSULATING GLASS MATERIALS

- A. Tinted Insulated Unit (Type IG1): Low-E Tinted Insulating Glass. Cool Gray color, low-reflective glass outdoor appearance. Fully tempered glass for both inboard and outboard lites in units designated with a "T" on the Drawings. Located at exterior locations unless otherwise indicated.
 1. Product: "Solarban" 60 + "Solargray" (2) Clear by Vitro Architectural Glass.
 2. Insulating Unit Construction: 1/4 inch (6mm) "Solargray" + "Solarban" 60 Solar Control Glass (2), + 1/2 inch (13mm) air space + 1/4 inch (6mm) Clear Float Glass.
 3. Total unit thickness of 1", minimum.
 4. Performance Values:
 - a. Visible Light Transmission – 35 percent.
 - b. SHGC – 0.25.
 - c. Shading Coefficient – 0.33.
 - d. Outdoor Visible Light Reflectance – 6 percent.
 - e. Heat Transfer Coefficient: U-Value Winter – 0.29, U-Value Summer – 0.24
 5. Spacers: Manufacturer's standard steel or aluminum spacer with welded, fused or bent corners and welded or fused splices and joints, filled with desiccant; hermetically sealed, dehydrated air space.

2.06 GLAZING COMPOUNDS

- A. Manufacturers:
 1. Dow Corning Corp; Product #795 Silicone Building Sealant: www.dowcorning.com.
 2. GE Silicones; Product Ultraglaz SSG4000: www.gesilicones.com.
 3. Tremco, Inc; Product Spectrem II: www.tremcosealants.com.
 4. Substitutions: Refer to Division 01 - Product Requirements.
- B. Silicone Sealant : Single component; chemical curing; capable of water immersion without loss of properties; non-bleeding, non-staining; cured Shore A hardness of 15 to 25; color as selected.
- C. Provide primers as required by adhesion testing, backer rod and accessories acceptable to sealant manufacturer.

2.07 GLAZING ACCESSORIES

- A. Manufacturers:
 1. Pecora Corp: www.pecora.com.
 2. Saint-Gobain: www.plastics.saint-gobain.com.
 3. Tremco, Inc: www.tremcosealants.com.
 4. Substitutions: Refer to Division 01 - Product Requirements.
- B. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- C. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- D. Interior Hollow Metal Partition Glazing: Manufacturer's standard resilient glazing beads.

- E. Glazing Gaskets: Resilient polyvinyl chloride extruded shape to suit glazing channel retaining slot; ASTM C 864 Option I; black color.
- F. Glazing Clips: Manufacturer's standard type.
- G. Muntin Spacer Bars: Manufacturer's rectangular aluminum spacer bars factory-installed within air space of sealed insulated glazing units, simulating divided lites in patterns indicated on drawings.
 - 1. Grille members shall be 5/8" face width by depth of air space in finish matching storefront system at locations coinciding with applied-on muntins.
- H. Glazing Gaskets for Metal Framed Skylights: Glazing assembly manufacturer's standard extruded or molded neoprene, Ethylene Propylene Diene Monomer (EPDM) or silicone rubber gaskets as required or recommended for system specified.
- I. Fire-Rated Glazing Accessories:
 - 1. Fire-Rated Glazing Frames: Fire-rated glazing manufacturer's fire tested frames used with glazing assemblies for required ratings. Furnish for installation in fire-rated doors and hollow metal work in wall openings as required by manufacturer's fire tested assemblies.
 - 2. Glazing Gaskets and Tapes: Closed cell polyvinyl chloride (PVC) foam tape, EPDM tape, ceramic glazing tape or other flame resistant gasket material as recommended by fire-rated glazing manufacturer and fire tested with glazing assemblies for specified ratings.
 - 3. Setting Blocks: Neoprene, EPDM or calcium silicate setting blocks as recommended by fire-rated glazing manufacturer and fire tested with glazing assemblies for specified ratings.
 - 4. Cleaners, Primers and Sealers: Types as recommended by glazing and gaskets manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.
- C. Verify compliance with the following requirements prior to beginning glazing work:
 - 1. That framing is anchored in position, plumb and square within 1/8" of normal dimensions indicated.
 - 2. That fastener heads, and other projections are removed from glazing rabbets.
 - 3. That corners and fabrication intersections are sealed and framing is weathertight.
 - 4. That rabbets at sills weep to outside and rabbets are sufficient depth and width to receive glazing material and provide the required bite of the glazing material.
 - 5. That surfaces to receive zipper type gaskets comply with tolerances required by gasket manufacturer.
 - 6. That hollow metal frames have received paint finish in accord with Painting section.

3.02 PERFORMANCE REQUIREMENTS

- A. Install glazing materials to obtain air-tight and water-tight installation and to withstand normal temperature changes and wind loads without failure.
- B. Protect glazing material faces and edges during handling and installation.
- C. Size glazing materials for each opening to ensure correct bite on glazing material, without imposing strain, in accordance with manufacturer's product data.
- D. Maintain minimum bed clearance between glazing material and sash of 1/8", both sides, except where greater clearances is required by either glazing material or framing manufacturer.

3.03 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.

- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.
- D. Install sealants in accordance with ASTM C 1193 and FGMA Sealant Manual.
- E. Install sealant in accordance with manufacturer's instructions.
- F. Inspect glazing material prior to installation. Eliminate lites having face or edge damage.
- G. of tempered and insulating glass shall not be cut or otherwise altered in the field.

3.04 GLAZING PROCEDURES

- A. General: Install glazing materials in accordance with manufacturer's written product data and applicable standards, except where more stringent requirements are specified.
- B. Setting Blocks: Install setting blocks for all glazing materials over six square feet in area. Install at sill rabbet located one quarter of glass width from each corner, but with edge nearest corner not closer than 6" from corner, unless otherwise required. Size setting blocks in proportion to glass weight; minimum 4" in length.
- C. Shims: Shim all lites over 100 united inches, inboard and outboard, on all sides using continuous shims, except where gaskets accomplish shimming; unless otherwise specified.
- D. Edge Blocks: Provide edge blocks at vertical jambs to prevent lateral movement of glass. Provide edge blocks at 3" minimum in length. Maintain 1/8" clearance between edge of glass and edge block.
- E. Interior Hollow Metal Glazing: Glaze using specified glazing beads in accordance with manufacturer's instructions.
- F. Fire-Rated Glazing: Comply with glazing manufacturer's instructions and NFPA 80 requirements for installation in doors and windows or framed openings.
 - 1. Install glazing materials of ratings scheduled for fire-rated doors and framed openings.
 - 2. Install glazing so that permanent labels are positioned in an inconspicuous corner for visual inspection by building official.
- G. Exterior Hollow Metal Window Channel Glazing:
 - 1. Glaze using specified glazing tape inboard and outboard.
 - 2. Shim lites over 75 united inches, inboard and outboard, on all sides in accordance with glazing tape manufacturer's recommendations.
 - 3. Cut tape to size to allow for tight butted joints; install to horizontal members first, then to verticals. Install tape to exterior stops so that top edge is approximately 1/8" below sight line of stop for sealant cap bead installation.
 - 4. Remove backing paper from tape prior to setting glass; center glazing in rabbet and pressed firm against tape. Apply heel bead sealant to interior side for minimum 3/16" bite and positive bond with metal framing.
 - 5. Install glazing tape to interior glass edges so that top edge will be flush with sight line of interior stop when installed. Install stops to framing and secure in position.
 - 6. Apply cap bead sealant to exterior side of glass over edge of glazing tape full perimeter of frame.
- H. Glazing Sealant Installation: Comply with applicable provisions of Joint Sealers section. Prevent filling of weep holes with sealant.

3.05 MANUFACTURER'S FIELD SERVICES

- A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- B. Monitor and report installation procedures and unacceptable conditions.

3.06 ALLOWABLE TOLERANCES

- A. Mirrors:
 - 1. Fabrication tolerances:

- a. Variation in mirror dimensions: $\pm 1/32"$.
- b. Variation in square (diagonal measurements): $\pm 1/16"$.
2. Installation tolerances:
 - a. Variation in plumb or square: $\pm 1/8"$ in 10'-0".
 - b. Variation in face plane of adjacent mirrors: $\pm 1/32"$.

3.07 CLEANING

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

3.08 PROTECTION OF FINISHED WORK

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace broken, cracked, chipped or otherwise damaged glazing materials and materials not meeting specified design criteria prior to Date of Substantial Completion.
- C. Final cleaning: Just prior to Date of Substantial Completion, clean glass inside and out. Clean using pretested detergent and water. Flush with clean water. Repair or replace work which cannot be cleaned or which has been damaged during construction operations.

END OF SECTION