

SECTION 08800

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. **Section Includes:** Glazing for the following:
 - 1. Windows
 - 2. Doors
 - 3. Butt glazed system at interior.
 - 4. Glazed curtain walls
 - 5. Glazed entrances
 - 6. Mirrors at toilet rooms
- B. **Related Sections:**
 - 1. Section 07410 - Prefinished Insulated Metal Panel System
 - 2. Section 07920 - Joint Sealants: Sealant and backup material.
 - 3. Section 08110 - Steel Doors and Frames: Glass for door lights.
 - 4. Section 08411 - Aluminum-Framed Entrances And Storefronts
 - 5. Section 10800 - Toilet Room Accessories: Framed wall mirrors.

1.2 SYSTEM PERFORMANCE REQUIREMENTS

- A. **Provide glazing systems** capable of withstanding normal thermal movement and wind and impact loads without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. **Provide mirrored glass** that will not fail under normal usage. Failure includes glass breakage and deterioration attributable to defective manufacture, fabrication, and installation.
- C. **Glass thickness designations** indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions.
- D. **Entrances and storefronts** shall be designed for component and cladding wind loads determined in accordance with the International Building Code, 2000 Edition, and the referenced standard ASCE 7-98 05 for the parameters specified and the following criteria:
 - 1. Basic wind gust - $V = 130$ mph.
 - 2. Importance factor - = Category 2.
 - 3. Exposure - B.
- E. **Impact Resistance:** System to meet requirements for coastal hurricane missile impact loads.
 - 1. All glazed aluminum curtain walls shall be designed for Large Missile Impact (LMI) in accordance with ASTM E 96 and SSTD12.

1.3 DEFINITIONS

- A. **Manufacturer** is used in this Section to refer to a firm that produces primary glass or fabricated glass as defined in the referenced glazing standard.
- B. **Glass Thicknesses:** Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. **Deterioration of Coated Glass:** Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's directions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.
- D. **Deterioration of Laminated Glass:** Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
- E. **Deterioration of Silvered Mirrored Glass:** Defects developed from normal use that are due to causes other than glass breakage and practices for maintaining and cleaning mirrors contrary to mirror manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.
- F. **Terminology:** The use of the terms "glass", "glazing materials", and "glazing" in this Section is understood to include mirrors and glazing plastics, and their installation as shown on the Drawings and specified.

1.4 SUBMITTALS

- A. **Product Data:** Submit for each glass product and glazing material indicated including installation and maintenance instructions.
 - 1. Incorporate written warranties and maintenance instructions in Maintenance Manuals specified in "Section 01770 - Closeout Procedures".
- B. **Samples:** Submit for selection:
 - 1. Mirror clips and trim.
 - 2. Tinted glass to match Architect's sample.
 - 3. 12-inch square samples of each type of glass indicated except for clear monolithic glass products, and 12-inch long samples of each color required (except black) for each type of sealant or gasket exposed to view. Install sealant or gasket sample between two strips of material representative in color of the adjoining framing system.
- C. **Product Certificates:** Signed by glazing materials and mirror mastic manufacturers certifying that products furnished comply with requirements.
- D. **Mirror Mastic Glass Coating Compatibility Test Reports:** From an organic protective coating manufacturer indicating that mirror mastic has been tested for compatibility and adhesion with organic protective coating applied to silvered mirrored glass.
- E. **Test Reports:** Submit compatibility and adhesion test reports from sealant manufacturer indicating that glazing materials were tested for compatibility and adhesion with glazing sealants. Include sealant manufacturer's interpretation of test

results relative to sealant performance and recommendations for primers and substrate preparation needed for adhesion.

1.5 QUALITY ASSURANCE

- A. **Glazing Publications:** 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 in referenced standards.
 - 1. FGMA Publications: "FGMA Glazing Manual".
 - 2. LSGA Publications: "LSGA Design Guide".
 - 3. SIGMA Publications: TM-3000 "Vertical Glazing Guidelines".
 - 4. GANA Laminated Division's "Laminated Glass Design Guide."
 - 5. GANA's "Glazing Manual" unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.
 - 6. NAAMM's "Mirrors, Handle with Extreme Care, Tips for the Professional on the Care and Handling of Mirrors."
- B. **Safety Glass:** Products complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.
 - 1. Subject to compliance with requirements, provide each pane of safety glass with a removable (non-permanent) label certifying compliance with Safety Glazing Certification Council (SGCC) or other certification agency acceptable to authorities having jurisdiction. Labels shall be securely affixed to prevent loss before final acceptance of glass.
- C. **Glazier Qualifications:** Engage an experienced glazier who has completed glazing similar in material, design, and extent to that indicated for Project with a record of successful in-service performance.
- D. **Single-Source Responsibility for Glass:** Obtain each type of glass from a single source.
- E. **Single-Source Responsibility for Glazing Accessories:** Obtain glazing accessories from one source for each product and installation method indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. **Protection:** Protect glazing materials during delivery, storage, and handling to comply with manufacturer's directions and as required to prevent loss of identifying labels or damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.7 PROJECT CONDITIONS

- A. **Environmental Conditions:** Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing manufacturer or when glazing channel substrates are wet from rain, frost, condensation, or other causes.
- B. **Do not install mirrored or decorative glass** until spaces are enclosed, weatherproof, and dry, and ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.8 WARRANTY

- A. **Special Project Warranty:** Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents, and shall be in addition to and concurrent with other warranties made by the Contractor.
- B. **Warranty on Coated Glass Products:** Provide written warranty signed by manufacturer of coated glass agreeing to furnish f.o.b. point of manufacture, freight allowed project site, within specified warranty period indicated below, replacements for those coated glass units which exhibit manufacturing defects. Manufacturing defects include peeling, cracking or deterioration in metallic coating due to normal conditions and not due to glass breakage or cleaning and maintenance practices contrary to glass manufacturer's published instructions.
 - 1. **Warranty Period:** Manufacturer's standard but not less than 10 years after Substantial Completion.
- C. **Warranty on Laminated Glass:** Manufacturer's standard form, made out to Owner and signed by laminated-glass manufacturer agreeing to replace laminated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - 1. **Warranty Period:** Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. **Acceptable Manufacturers:** Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include, but are not limited to, the following:
 - 1. PPG Industries, Inc. Pittsburgh, PA 15272; (412) 434-2858.
 - 2. Pilkington, Toledo, OH 43697; (419) 247-3731.
 - 3. AFG Glass
- B. **Acceptable Fabricators:**
 - 1. Viracon, Owatonna, MN 55060; (507) 451-9555.
 - 2. PPG Industries, Inc., Harmarville, PA; (412) 820-8500.
 - 3. AFG Glass
- C. **Other Manufacturers/Fabricators:** Products of other manufacturers/fabricators require pre-bid approval.

2.2 GLASS TYPES

- A. **Clear Tempered Glass:** 1/4" (6 mm) thick (unless otherwise indicated), uncoated clear heat-treated float glass, Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), Kind FT (fully tempered).
 - 1. Where safety glass is required, tempered glass shall comply with ANSI Z97.1 and 16 CFR Part 1201, Category II.
 - 2. Fabricate by horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
 - 3. Exposed tong marks shall not be permitted
 - 4. Butt glazed panels: 1/2" thick, factory chamfered and polished at exposed edges, including edges at butt joints with sealant. Cut prior to tempering, to tolerances necessary to provide even joints (size as shown) within plus or minus 1/16"

- B. **Annealed Float Glass:** ASTM C 1036, Type I (transparent flat glass), Quality-Q3; Class 1 (clear).
- C. **Laminated Glass:** ASTM C 1172, and complying with other requirements specified and with the following:
 - 1. Interlayer: Polyvinyl butyral of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation. Laminate lites in autoclave with heat plus pressure.
 - 2. Fabricate laminated glass to produce glass free of foreign substances and air or glass products.
- D. **Pyrolytic-Coated Float Glass:** ASTM C 1376, float glass with metallic-oxide coating applied by pyrolytic deposition process during initial manufacture, and complying with other requirements specified.
- E. **Sputter-Coated Float Glass:** ASTM C 1376, float glass with metallic-oxide or -nitride coating deposited by vacuum deposition process after manufacture and heat treatment (if any), and complying with other requirements specified.
- F. **Mirrored Glass:** Clear annealed or tempered float glass with successive layers of chemically deposited silver, electrically or chemically deposited copper, and manufacturer's standard organic protective coating applied to second glass surface to produce a coating system complying with FS DD-M-411.
 - 1. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1, Quality- q1 (mirror select).

2.3 GLASS AT EXTERIOR - TYPE I

- A. **Vision Glass:** 1-5/16" VRE 1-46 StormGuard Insulated Laminated with low-e coating (sputter coat or pyrolytic coating) on inside face (by Viracon or approved equal), Heat Strengthened or tempered as required by code, Laminated - 0.100 inch clear PVB interlayer.
 - 1. Inside light
 - a. 1/4" (clear) Heat Strengthened or tempered as required by code.
 - b. 0.050 inch clear PVB interlayer, except 0.100 inch where required by Code.
 - c. 1/4" clear
 - 2. Outside Light
 - a. Clear Low-e coating on 2nd surface - Heat Strengthened - except tempered where required by Code
 - 3. Missile Impact Rating, Width
 - a. Large Missile Impact (LMI) - LMI glass occurs from elevation 0 to 30 feet, 1-5/16".
- B. **Performance Data:**
 - 1. Visible Light Transmittance: 43%
 - 2. Solar Energy Transmittance: 23%
 - 3. Ultra-violet Transmittance: 16%
 - 4. Visible Light Reflectance - Exterior: 34%
 - 5. Visible Light Reflectance- Interior: 15%
 - 6. Solar EnergyReflectance: 40%
 - 7. ASHRAE U-Values:

a. Winter (night):	0.25 (Btu/hr/sq-ft/°F)
b. Summer (day)	0.22 (Btu/hr/sq-ft/°F)
8. Shading Coefficient:	0.32
9. Solar Heat Gain Coefficient:	0.28
10. Relative Heat Gain:	68 (Btu/hr/sq-ft)

2.4 GLASS AT INTERIOR - TYPE II

- A. Vision Glass: - ¼" Clear, Tempered.
- B. Butt glazed system: ½" Clear, Tempered

2.5 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to glaze 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. Grind smooth and polish exposed glass edges and corners.
- C. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with outdoor and indoor faces.
- D. Heat-Treated Glass: Perform all fabrication prior to heat-treating.
- E. Mirrored Glass Cutouts: Fabricate cutouts for notches and holes in mirrored glass without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrored glass.
- F. Mirrored Glass Edge Treatment: Treat edges as indicated below:
 - 1. Flat polished edge.
 - 2. Seal edges of silvered mirrored glass after edge treatment to prevent chemical or atmospheric penetration of glass coating.
 - 3. Require mirrored glass manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.
- G. Vinyl-Backed Safety Mirrored Glass: Apply vinyl backing with pressure-sensitive adhesive coating over glass coating as recommended by vinyl-backing manufacturer to produce a surface free of bubbles, blisters, and other imperfections. Use adhesives and vinyl backing compatible with mirrored glass as certified by organic coating manufacturer.

2.6 GLASS-SETTING MATERIALS AND ACCESSORIES

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials involved for glazing application indicated, and with a proven record of compatibility with surfaces contacted in installation and complying with the following requirements:
 - 1. Compatibility: Select glass-setting materials of proven compatibility with other materials with which they will come into contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.

2. Suitability: Comply with recommendations of sealant and glass manufacturers for selection of glazing sealants and tapes which have performance characteristics suitable for applications indicated and conditions at time of installation.
 3. Colors: Provide indicated color of exposed glass-setting materials or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.
- B. Silicone Sealant:** Provide manufacturer's standard chemically curing, elastomeric, silicone polymer sealant which complies with ASTM C 920 requirements for Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to uses indicated, O.
1. Silicone Glazing Sealant: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. "Dow Corning 999"; Dow Corning Corp.
 - b. "SCS 1200"; General Electric Corp.
 - c. "863"; Pecora Corp.
 2. Structural Silicone Sealant: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 - a. "Dow Corning 795"; Dow Corning Corp.
 - b. "Ultraglaze SSG 4000"; General Electric Corp.
 3. Compatibility and Adhesion: Provide test reports from manufacturer of sealant indicating compatibility and adhesion with glazing and framing materials which sealant will contact. Provide priming and other specific preparation recommended by the sealant manufacturer to assure adhesion and compatibility.
- C. Glazing Tape:** Provide manufacturer's standard preformed solvent-free butyl-polyisobutylene formulation with a solids content of 100 percent; complying with AAMA A 804.1; in extruded tape form; non-staining and non-migrating in contact with nonporous surfaces; packaged on rolls with a release paper on one side; with or without continuous spacer rod as recommended by manufacturers of tape and glass for application indicated. Subject to compliance with requirements, glazing tapes which may be incorporated in the work include, but are not limited to, the following:
1. Glazing Tape Without Spacer Rod:
 - a. "S-M 5700 Poly-Glaze Tape Sealant"; Schnee-Morehead, Inc.
 - b. "Extru-Seal"; Pecora Corp.
 - c. "Tremco 440 Tape"; Tremco Inc.
 2. Glazing Tape With Spacer Rod:
 - a. "Chem-Tape 60"; Bostik Construction Products Div.
 - b. "Shim-Seal"; Pecora Corp.
 - c. "Pre-shimmed Tremco 440 Tape"; Tremco Inc.
- D. Glazing Gaskets:** Molded or extruded dense elastomeric compression seal gaskets complying with ASTM C 864 or C 1115, of profile and hardness required to maintain watertight seal, and as follows:
1. Material: Neoprene, EPDM, silicone, or thermoplastic polyolefin rubber.
 2. Manufacturers: Subject to compliance with requirements, provide products of the manufacturer of the window or standard door unit involved.
- E. Glazing Compounds:** Non-hardening, permanently elastic compound recommended by the manufacturer for channel glazing with removable stops in wood or metal surrounds, as applicable. Use putty for glazing labeled doors and frames.

- F. **Cleaners, Primers and Sealers:** Type recommended by sealant or gasket manufacturer.
- G. **Setting Blocks:** Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.
- H. **Spacers:** Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape and hardness recommended by glass and sealant manufacturers for application indicated.
- I. **Edge Blocks:** Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement (side-walking) of glass.
- J. **Metal channels for butt glazing:** Extruded aluminum, anodized, sized as shown and as required to support and provide full engagement of glass.
- K. **Edge Sealer (Mirrored Glass):** Coating compatible with glass coating and approved by mirrored glass manufacturer for use in protecting against silver deterioration at mirrored glass edges.

2.7 MIRROR INSTALLATION MATERIALS

- A. **Mirror Mastic:** An adhesive setting compound, produced specifically for setting mirrored glass by spot application, certified by both mirrored glass manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrored glass will be installed.
 - 1. Available Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Palmer Products Corporation; Mirro-Mastic Adhesive, Mirro-Mastic Bond Primer, and Mirro-Bac Paint Sealer.
 - b. Gunther Mirror Mastics; Ultra-Bond Adhesive, Prime-N-Seal Primer, and Seal Quick Edge Sealer.
- B. **Extruded-Aluminum Top, Bottom and Side Trim (Mirrored Glass):** J-channels formed with a return deep enough to produce a glazing channel to accommodate mirrored glass units of thickness indicated and in lengths required to cover all edges of each mirrored glass unit in a single piece.
 - 1. Bottom Trim: J-channels formed with a front leg and back leg not less than 3/8 and 7/8 inch in height, respectively, and a thickness of not less than 0.04 inch.
 - 2. Top and Side Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch in height, respectively, and a thickness of not less than 0.04 inch.
 - 3. Available Products: Subject to compliance with requirements, provide one of the following:
 - a. Bottom Trim:
 - 1) CRL Standard "J" Channel; C.R. Laurence Co., Inc.
 - 2) Medium Gauge Aluminum Shallow Nose "J" Moulding Lower Bar; Sommer & Maca Industries, Inc.
 - b. Top and Side Trim:
 - 1) CRL Deep "J" Channel; C.R. Laurence Co., Inc.
 - 2) Medium Gauge Aluminum Deep Nose "J" Moulding Upper Bar; Sommer & Maca Industries, Inc.
- C. **Fasteners (Mirrored Glass):** Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

- D. **Anchors and Inserts (Mirrored Glass):** Provide devices as required for mirror hardware installation. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors or inserts for applications on inside face of exterior walls and where indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. **Examination:** Examine glass framing, with glazier present, for compliance with the following:
1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
 2. Presence and functioning of weep system.
 3. Minimum required face or edge clearances.
 4. Effective sealing between joints of glass-framing members.
- B. **Surface Conditions:** Do not proceed with glazing until glazing rebates and stops of wood doors, transoms and sidelights have been primed and painted, and until any unsatisfactory conditions for the glazing work have been corrected.

3.2 PREPARATION

- A. **Clean glazing channels** and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.3 GLAZING, GENERAL

- A. **Safety Glazing:** Where indicated or required by International Building Code, install safety glass (tempered glass or laminated glass at Contractor's option).
- B. **Glazing Methods:** Glaze aluminum windows, doors, and fixed glass framing using resilient gaskets and snap-in stops (where appropriate) supplied by the window and door manufacturer.
1. Labeled doors and frames: Set glass using putty, with removable stops supplied by door/frame manufacturer. Glass shall be well embedded in putty at both faces and all exposed joints between the stops and glass shall be struck and pointed.
 2. Metal doors and frames: Set glass using glazing tape at both glass faces, with removable stops supplied by door/frame manufacturer.
 3. Wood and plastic laminate doors: Set glass using glazing compound at both glass faces, with removable stops supplied by door/window manufacturer.
 4. Openings smaller than 50 united inches: Set glass using glazing compound, with removable stops supplied by door/frame manufacturer. Glass shall be well embedded in compound at both faces and all exposed joints between the stops and glass shall be struck and pointed.
 5. Openings 50 united inches and larger: Set glass using tape at fixed stop and glazing sealant with spacers at removable stop side. Use removable stops supplied by door/frame manufacturer. Exposed sealant joint between the stops and glass shall be tooled uniform and straight.
- C. **Installation Standards:** Comply with combined printed recommendations of glass manufacturers and of manufacturers of sealants, gaskets and other glass-setting materials, except where more stringent requirements are indicated, including those of referenced glazing standards.

1. Adjust glazing channel dimensions indicated in details as necessary to provide for necessary bite on glass, minimum edge and face clearances, and adequate glass-setting materials thicknesses, with reasonable tolerances, at time of installation.
- D. **Handling Glass:** Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge, which would occur in vicinity of setting blocks so that these are located at top of opening. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.
- E. **Substrate Priming:** Apply primers to joint surfaces where required for adhesion of glass-setting materials.
- F. **Install glass such that markings, such as manufacturer's name or tempered glass designations, are right-side up, level and straight. Locate markings in accordance with shop drawings. If not reviewed on shop drawings, locate markings in the lower left-hand corner of glass panels.**

3.4 INSTALLATION

- A. **Setting Blocks:** Install setting blocks of proper size in 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. Set blocks in thin course of sealant, which is acceptable for heel bead use.
- B. **Spacers:** Provide spacers at both faces of glass to preserve required face clearances, for glass sizes larger than 50 united inches (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with glazing tape use thickness slightly less than final compressed thickness of tape.
- C. **Edge Blocks:** Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass manufacturer. Do not exceed edge pressures stipulated by glass manufacturers for installing glass.
- D. **Orientation:** Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
- E. **Compound Glazing:** Fully bed glass with compound in glazing channels to eliminate voids and to ensure complete "wetting" or bond of compound to glass and channel surfaces.
 1. Tool exposed surfaces of compound to provide a substantial "wash" away from glass.
- F. **Tape Glazing:** Position tapes on fixed stops so that when compressed by glass their exposed edges are flush with or protrude slightly above sightline of stops.
 1. Install tapes continuously but not in one continuous length. Do not stretch tapes to make them fit opening.
 2. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.

3. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
 4. Do not remove release paper from tape until just before each lite is installed.
 5. Center glass lites in openings on setting blocks and press firmly against tape. Apply tape or compression gaskets against faces of removable stops and secure removable stops in position.
- G. Gasket Glazing (Dry):** Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.
1. Secure compression gaskets in place with joints located at corners to compress gaskets producing a weather-tight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
 2. Install gaskets so they protrude past face of glazing stops.
- H. Sealant Glazing (Wet):** Install continuous spacers between glass lights and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel weep systems until sealants cure. Secure spacers in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
1. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
 2. Tool exposed surfaces of sealants to provide a substantial wash away from glass. Install pressurized gaskets to protrude slightly out of channel to eliminate dirt and moisture pockets.
- I. Lock-Strip Gasket Glazing:** Comply with ASTM C 716 and gasket manufacturer's printed recommendations. Provide supplementary wet seal and weep system unless otherwise indicated.

3.5 MIRROR INSTALLATION

- A. Install mirrors** to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
1. Provide a minimum air space of 1/8 inch between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.
 2. For wall-mounted mirrors, install mirrors with mastic and mirror hardware.
 3. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.
- B. Mastic Spot Installation System (Mirrored Glass):** Install mirrored glass units with mastic as follows:
1. Apply barrier coat to mirrored glass backing where approved in writing by manufacturers of mirrored glass and backing material.
 2. Apply mastic in spots to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrored glass units and face of mounting surface.
 3. After mastic is applied, align mirrored glass units and press into place while maintaining a minimum air space of 1/8 inch between back of mirrored glass and mounting surface.

- C. **Wall-Mounted Mirrored Glass Units:** Install permanent means of support at bottom and top edges with bottom support designed to withstand mirrored glass weight and top support designed to prevent mirrored glass from coming away from wall along top edges.
1. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrored glass units.
 2. For continuous bottom supports, provide setting blocks 1/8 inch thick by 4 inches long at quarter points. For channels or other continuous supports in which water could be trapped, provide between setting blocks, two slotted weeps not less than 1/4 inch wide by 3/8 inch long.
 3. Install bottom, top and side trim. Fabricate trim in single lengths to fit and cover top, bottom and side edges of mirrored glass units.
 4. For metal or plastic clips, place a felt or plastic pad between mirrored glass and each clip to prevent spalling of mirrored glass units.
 5. Where indicated, install bottom trim and top clips. Fabricate bottom trim in single lengths to fit and cover bottom edge of mirrored glass units. Locate top clips so they are symmetrically placed and evenly spaced.
 6. Where indicated, install bottom and top clips symmetrically placed and evenly spaced.

3.6 COMPLETION

- A. **Protection and Replacement:** Protect glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.
1. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.
 2. Protect mirrored glass from breakage and contaminating substances resulting from construction operations.
 3. Maintain environmental conditions that will prevent silvered mirrored glass from being exposed to moisture from condensation or other sources for continuous periods of time.
 4. Remove and replace glass and mirror which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.
- B. **Cleaning:** Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for build-up of dirt, scum, alkali deposits or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.
1. Wash glass on both faces and mirrors on exposed face not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Wash glass by method recommended by manufacturer.

2. Wash mirrored glass not more than four days before date scheduled for inspections intended to establish date for Substantial Completion. Wash mirrored glass by methods recommended in NAAMM publication and in writing by mirrored glass manufacturer. Use water and glass cleaners free from substances capable of damaging mirrored glass edges or coatings.

END OF SECTION