SECTION 08.80.00
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Insulating glass units.
   B. Laminated glass units.
   C. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS
   A. Section 08.11.13 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.
   B. Section 08.14.16 - Flush Wood Doors: Glazed lites in doors.
   C. Section 08.43.13 - Aluminum-Framed Storefronts: Requirements for storefront assembly.
   D. Section 08.44.13 - Glazed Aluminum Curtain Walls: Requirements for curtain wall assembly.
   E. Section 08.44.26 - Structural Glass Curtain Walls: Glazing furnished as part of wall assembly.
   F. Section 08.56.59 - Ticket Window Units: Glazing furnished as part of ticket window assembly.
   G. Section 08.83.00 - Mirrors.
   H. Section 10.28.00 - Toilet Room Accessories: Mirrors.

1.03 REFERENCE STANDARDS
   M. GANA (SM) - GANA Sealant Manual; Glass Association of North America; 2008.
1.04 ADMINISTRATIVE REQUIREMENTS
   A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.05 SUBMITTALS
   A. See Section 01.30.00 - Administrative Requirements, for submittal procedures.
   B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
   C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
   D. Samples: Submit two samples 12 by 12 inch in size of glass units.
   E. Manufacturer's Certificate: Certify that glass and glazing products meets or exceeds specified requirements.
   F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE
   A. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years documented experience.

1.07 MOCK-UPS
   A. Provide mock-up of ______ including glass and air barrier and vapor retarder seal.
   B. Provide on-site glazing mock-up with the specified glazing components.
   C. Locate where directed.
   D. Mock-ups may remain as part of the Work.

1.08 FIELD CONDITIONS
   A. Do not install glazing when ambient temperature is less than 40 degrees F.
   B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.09 WARRANTY
   A. See Section 01.78.00 - Closeout Submittals, for additional warranty requirements.
   B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.
   C. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including replacement of failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Glass Fabricators:
   B. Float Glass Manufacturers:

C. Laminated Glass Manufacturers:

D. Fire-Protection-Rated Glass Manufacturers:

2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Select type and thickness of exterior glazing assemblies to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of glass.
   1. Design Pressure: Calculated in accordance with ASCE 7.
   2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
   3. Seismic Loads: Design and size glazing components to withstand seismic loads and sway displacement in accordance with the requirements of ASCE 7.
   4. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
   5. Glass thicknesses listed are minimum.

B. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
   1. In conjunction with vapor retarder and joint sealer materials described in other sections.
   2. To maintain a continuous vapor retarder and air barrier throughout the glazed assembly from glass pane to heel bead of glazing sealant.

C. Thermal and Optical Performance: Provide glass products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
   1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 5.2/6.3 computer program.
   2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 5.2/6.3 computer program.

2.03 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless noted otherwise.
   1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
   2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and FT.
   4. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality-Q3, color and performance characteristics as indicated.
   5. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
   1. Laminated Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 test requirements for Category II.
   2. Ionoplast Interlayer: 0.035 inch thick, minimum.

2.04 INSULATING GLASS UNITS

A. Insulating Glass Units Manufacturers:
   1. Any of the manufacturers specified for float glass.
2. Fabricator certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty.

B. Insulating Glass Units: Types as indicated.
1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
3. Metal Edge Spacers: Aluminum, bent and soldered corners.
5. Spacer Color: Black.
6. Edge Seal:
   a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
7. Color: Black.
8. Purge interpane space with dry air, hermetically sealed.

C. Insulating Glass Units: Vision glass, double glazed.
1. Applications: Exterior glazing unless otherwise indicated.
2. Space between lites filled with air.
3. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
   a. Tint: Viracon VE 1-48 Blue.
   b. Coating: Low-E (passive type), on #2 surface.
4. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
   a. Tint: Clear.
5. Total Thickness: 1 inch.
6. Thermal Transmittance (U-Value): _____, _____.

D. Type IG-5 - Insulating Glass Units: Safety glazing.
1. Applications:
   a. Glazed lites in exterior doors.
   b. Glazed sidelights and panels next to doors.
   c. Other locations required by applicable federal, state, and local codes and regulations.
2. Space between lites filled with air.
3. Glass Type: Same as other vision glazing except use fully tempered float glass for both outboard and inboard lites.
4. Total Thickness: 1 inch.

2.05 GLAZING UNITS

A. Type G-3 - Fire-Resistance-Rated Glazing: Type, thickness, and configuration as required to achieve indicated ratings.
1. Applications:
   a. Glazed lites in fire doors.
2. Glass Type: Laminated float glass.
3. Labeling: Provide permanent label on fire-rated glazing in compliance with ICC (IBC) and authorities having jurisdiction.
4. Provide products listed by Underwriters Laboratories or Intertek Warnock Hersey.
5. Safety Glazing Certification: 16 CFR 1201 Category II.
B. Type G-5 - Monolithic Safety Glazing: Non-fire-rated.
   1. Applications:
      a. Glazed view windows and panels in partitions enclosing athletic activity rooms, except in
         fire-rated walls and partitions.
      b. Other locations required by applicable federal, state, and local codes and regulations.
      c. Other locations indicated on the drawings.
   2. Glass Type: Fully tempered safety glass as specified.
   3. Tint: Clear.

2.06 GLAZING COMPOUNDS
A. Manufacturers:
B. Type GC-5 - Silicone Sealant: Single component; neutral curing; capable of water immersion without
   loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A,
   and G; with cured Shore A hardness range of 15 to 25; color as selected.

2.07 ACCESSORIES
A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. 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.
B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Continuous x
   one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
C. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864
   Option II; color black.

PART 3 EXECUTION
3.01 VERIFICATION OF CONDITIONS
A. Verify that openings for glazing are correctly sized and within tolerances, including those for size,
   squareness, and offsets at corners.
B. Verify that the minimum required face and edge clearances are being provided.
C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede
   moisture movement, weeps are clear, and support framing is ready to receive glazing system.
D. Verify that sealing between joints of glass framing members has been completed effectively.
E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION
A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before
   glazing. Remove coatings that are not tightly bonded to substrates.
B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.
3.03 INSTALLATION, GENERAL
A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
B. Install glazing sealants in accordance with ASTM C1193, GANA Sealant Manual, and manufacturer's instructions.
C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)
A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - BUTT JOINT GLAZING METHOD (SEALANT ONLY)
A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
B. Temporarily brace glass in position for duration of glazing process. Mask edges of glass at adjoining glass edges and between glass edges and framing members.
C. Temporarily secure a small diameter non-adhering foamed rod on back side of joint.
D. Apply sealant to open side of joint in continuous operation; thoroughly fill the joint without displacing the foam rod. Tool the sealant surface smooth to concave profile.
E. Permit sealant to cure then remove foam backer rod. Apply sealant to opposite side, tool smooth to concave profile.
F. Remove masking tape.

3.06 INSTALLATION - STRUCTURAL SILICONE GLAZING
A. Refer to Section 08.44.26 for structural glass framing assembly requirements.
B. Application - Field Glazed: Follow basic guidelines of structural silicone glazing for glazing application.
   1. Glass Mullion: All glass mullion or all-glass system.
C. Provide design review of the glazing system and project details, adhesion testing, proper surface preparation, training and a quality service program.
D. Provide only structural silicone sealant, tested and manufactured for structural glazing.

3.07 FIELD QUALITY CONTROL
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.
3.08 CLEANING
   A. See Section 01.74.19 - Construction Waste Management and Disposal, for additional requirements.
   B. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
   C. Remove non-permanent labels immediately after glazing installation is complete.
   D. Clean glass and adjacent surfaces after sealants are fully cured.
   E. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.09 PROTECTION
   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 glass that is damaged during construction period prior to Date of Substantial Completion.

3.10 SCHEDULES
   A. Aluminum-Framed Storefront Glazing: Glass Viracon VE 1-48, install glass using dry method, and with glass thickness as required to comply with performance requirements indicated in Section 08.43.13.
   B. Glazed Aluminum Curtain Wall Glazing: Glass Viracon VE 1-48, install glass using dry method, and with glass thickness required to comply with performance requirements indicated in Section 08.44.13.

END OF SECTION