SECTION 08800
GLAZING

PART 1 - GENERAL

1.01 PROVISIONS INCLUDED

A. The general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 General Requirements, apply to this Section.

1.02 SUMMARY

A. This Section specifies glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
   1. Glazed aluminum curtain walls.
   2. Aluminum windows.
   3. Steel doors.
   4. Wood doors.

B. Related Work Specified in Other Sections:
   1. Factory glazing of aluminum windows: Section 08520
   2. Insulated metal panels: Section 08910.

1.03 REFERENCED STANDARDS

A. American National Standards Institute (ANSI): ANSI Z97.1, "Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings."

B. American Society for Testing and Materials (ASTM):
   1. ASTM C 1036, "Specification for Flat Glass."
   2. ASTM C 1048, "Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass."
   3. ASTM E 774, "Specification for Seal Durability of Insulating Glass Units."
   4. ASTM E 1300, "Practice for Determining the Minimum Thickness and Type of Glass Required to Resist a Specified Load."

C. Code of Federal Regulations: 16 CFR-1201, "Safety Standard for Architectural Glazing Materials."

D. Glass Association of North America (GANA): "Glazing Manual."

E. National Fire Protection Association (NFPA):
   1. NFPA 80, "Fire Doors and Windows."
   2. NFPA 252, "Fire Tests of Door Assemblies."
   3. NFPA 257, Fire Test for Window and Glass Block Assemblies."

F. Insulating Glass Manufacturer's Association (SIGMA/IGMA): SIGMA TM-3000 "Vertical Glazing Guidelines."

1.04 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) 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. Glass Design for Glass in Exterior Walls: Glass thicknesses indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lights for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria. Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:

1. Design Wind Load: See specifications for framing systems into which glass is installed.

2. Probability of Breakage for Vertical Glazing: 8 lights per 1000 for lights set vertically or not more than 15 degrees off vertical and under wind action, for load duration of 60 seconds or less.

3. Maximum Lateral Deflection: For the following types of glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch (25 mm), whichever is less.
   a. Monolithic glass heat-treated to resist wind loads.
   b. Insulating glass.
   c. Laminated glass.

4. Minimum Glass Thickness for Exterior Lights: Not less than 6 mm.

5. Thickness of Tinted and Heat-Absorbing Glass: Provide the same thickness for each tint color indicated throughout Project.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2. Interior applications of glass are exempt from this requirements.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified in this Section, based on manufacturer's published test data, as determined according to procedures indicated below:

1. For monolithic-glass lights, properties are based on units with lights 6 mm thick.

2. For insulating-glass units, properties are based on units with lights 6 mm thick and a nominal 1/2-inch- (13-mm-) wide interspace.

3. Center-of-Glass U-Values: NFRC 100 methodology using LBL-35298 WINDOW 4.1 computer program, expressed as Btu/ sq. ft. x h x deg F (W/sq. m x K).

4. Center-of-Glass Solar Heat Gain Coefficient: NFRC 200 methodology using LBL-35298 WINDOW 4.1 computer program.

5. Solar Optical Properties: NFRC 300.

6. As specified performance is based on the product of a single manufacturer (Viracon), some variation from the specified performance will be acceptable to permit consideration of a substitute product, provided that (a) the performance of the proposed product meets the criteria used to calculate building heating and cooling loads, and (b) in the Architect's judgement, the appearance of the proposed product is equal. In judging the appearance, the Architect may consider hue, color density, reflectivity, perceived transparency, or any other visual properties which the Architect's deems important to this project.

1.05 SUBMITTALS

A. Product Data: Submit manufacturer’s descriptive literature, specifications, handling and installation information for each glass product and glazing material indicated.

B. Samples:

1. Glass: Submit 12-inch-square samples of each type of glass and fabricated glass unit specified, except for clear monolithic glass.

2. Butt Glazed Corner: Submit a sample showing how the two insulating glass units meet at the butt glazed corner. Include spacers, primary and secondary seals.

3. Glazing Accessories: Submit 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. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

D. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

1. Permanent label on each unit, designating type and thickness of glass, will be accepted in lieu of certification, provided the label represents a quality control program of a recognized certification agency or independent testing agency acceptable to authorities having jurisdiction.

E. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials, such as laminated glass interlayer, glazing tape, gaskets, setting blocks, and edge blocks.

F. Product Test Reports: From a qualified testing agency indicating the following products comply with requirements, based on comprehensive testing of current products:
1. Tinted float glass.
2. Coated float glass.
3. Insulating glass.
4. Fire-resistive glazing products.
5. Glazing sealants.
6. Glazing gaskets.

G. Operation and Maintenance Data: Submit manufacturer's maintenance recommendations for glass and other glazing materials, for inclusion in the project Operation and Maintenance Manual specified in Section 01770.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations: Obtain glass from one manufacturer for each product indicated below:
1. Tinted float glass, one source for each color.
2. Coated glass, one source for each type of coating and each type and class of glass coated.
3. Insulating Glass: Obtain insulating glass units from one manufacturer, using the same type of glass and other components for each type of unit.

C. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

D. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified testing agency based on testing glass products.

1. Glass Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

E. Silicone Glazing Sealant Product Testing: Obtain sealant test results for product test reports in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.

1. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.

2. Test silicone glazing sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.

3. Test silicone glazing sealants according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.

F. Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing indicated below, samples of each glass type, tape sealant, gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants.

1. Use manufacturer's standard test methods to determine whether priming and other specific preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.

2. Submit not fewer than nine pieces of each type and finish of glass-framing members and each type, class, kind, condition, and form of glass (monolithic, laminated, and insulating units) as well as one sample of each glazing accessory (gaskets, tape sealants, setting blocks, and spacers).

3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

4. For materials failing tests, obtain sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.

5. Testing will not be required if elastomeric glazing sealant manufacturers submit data based on previous testing of current sealant products for adhesion to, and compatibility with, glazing materials matching those submitted.

G. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

H. Safety Glass: Products complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials. Provide safety glass permanently marked with certification label of Safety Glazing Certification Council (SGCC).

I. 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. GANA Publication: "Glazing Manual."
2. SIGMA Publications: TM-3000 "Vertical Glazing Guidelines"

J. Insulating Glass Certification Program: Furnish insulating glass units permanently marked either on spacers or at least one component light of units with certification label of the Insulating Glass Certification Council (IGCC); indicate class of glass:

K. Mockups: Provide glazing for coordinated masonry, curtain wall and glazing mock-up described in Section 04810, to verify selections glass products and to demonstrate aesthetic effects and quality of materials and execution.

L. Pre-Installation Conference: Conduct conference at Project site to comply with requirements of Section 01310, "Project Management and Coordination."

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, and other causes.

B. If insulating glass units will be exposed to substantial altitude changes, comply with insulating glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.08 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing materials manufacturer or when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1.09 WARRANTY

A. General: Special warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Coated Glass Products: Submit written warranty signed by coated glass manufacturer agreeing to furnish replacements for coated glass units that deteriorate within specified warranty period. Deterioration includes peeling, cracking, and other indications of deterioration in metallic coating, unless such damage is a result of glass breakage.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Insulating Glass: Submit written warranty signed by manufacturer of insulating glass agreeing to furnish replacements for insulating glass units if the hermetic seal fails within the specified warranty period. Obstruction of vision by dust, moisture, or film on the interior surfaces of glass shall be deemed sufficient evidence of failure.

1. Warranty Period: 10 years From date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PRIMARY FLOAT GLASS PRODUCTS

A. Clear Float Glass: ASTM C 1036, Type I (transparent glass, flat), Class 1 (clear), and Quality q3 (glazing select).

B. Tinted Glass: ASTM C 1036, Type I (transparent glass, flat), Class 2 (tinted, heat-absorbing, and light-reducing), and Quality q3 (glazing select).

1. Tint: Blue; with optical and thermal performance properties consistent with the performance specified in Article 2.05 for the insulating glass unit.

2.02 HEAT-TREATED FLOAT GLASS

A. Furnish glass complying with ASTM C1048, Type I (transparent glass, flat); Quality q3 (glazing select); Class, Kind and Condition as indicated for the product or assembly of which the glass is a component, or as scheduled at the end of Part 3

1. Kind: Kind HS (heat strengthened) or Kind FT (fully tempered) where indicated.

B. For exterior glazing, provide Kind HS (heat-strengthened) coated float glass except provide Kind FT (fully tempered) products where required to resist thermal stresses and to comply with glass design requirements specified in "Performance Requirements" article. Provide Kind FT (fully tempered) in doors and at other locations where safety glass is indicated.

C. For interior glazing, provide annealed glass, except where Kind FT (fully tempered) is indicated or required to meet safety glazing requirements. Provide Kind FT (fully tempered) in doors, except where fire-rated glazing is indicated, provide fire-rated glazing product.

D. Fabrication of Fully Tempered Glass: Cut glass to size and drill for hardware and accessories before tempering.

2.03 COATED GLASS

A. General: Provide coated glass complying with requirements indicated in this Article, in the article specifying insulating glass units, and in schedules at the end of Part 3.

1. Performance characteristics designated for coated monolithic glass products are nominal values based on manufacturer's published test data for glass products 6.0 mm thick (0.23 inch thick), unless otherwise indicated.

B. Low-E Coated Glass: Float glass with metallic oxide or metallic nitride coating deposited by magnetic sputtering process after manufacture and heat treatment, complying with requirements specified for the insulating glass unit of which it is a part.

1. Manufacturer and Product: Viracon "2M" or glass of equal performance by Guardian

C. Ceramic Coated Spandrel Glass: ASTM C 1048, Condition B (spandrel glass, one-surface ceramic coated), Type I (transparent glass, flat), Class (color) as specified below, Quality q3 (glazing select).

1. Glass Color: Class 2 (tinted) – Blue.

2. Frit Color: Warm Gray matching Viraspan V-933.

3. Glass Thickness: As scheduled in the Insulating Glass article, this section.

4. Fallout Resistance: Provide spandrel units identical to those passing fallout resistant test for spandrel glass specified in ASTM C 1048.

2.04 INSULATING GLASS UNITS

A. Insulating Glass Units: Preassembled units consisting of sealed lights of glass separated by dehydrated interspace, and complying with ASTM E 774 for Class CBA units, with requirements specified in this Article, and with requirements specified in the Glass Schedule at the end of Part 3 of this section.

B. Overall Unit Thickness and Thickness of Glass: Dimensions indicated in the Glass Schedule at the end of Part 3 are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lights at unit's edge.

C. Sealing System: Twin primary seals of polyisobutylene and a secondary seal of silicone sealant.

D. Spacer: Aluminum, with mill or clear-anodized finish. Bend four corners and solder along horizontal; keyed corners will not be acceptable.

E. Tinted Insulating Glass Unit: Basis of specification, Viracon "Solarscreen 2000" VE5-2M #2.

1. Assembly: 1 inch overall thickness; 1/4" thick blue outboard pane with Low-E coating on No. 2 surface; 1/2-inch air space; 1/4" thick clear inboard pane.

2. Performance:

a.	Visible light transmittance:	44%
b.	Solar transmittance:	20%
c.	U-V transmittance:	6%
d.	Winter nighttime U-value:	0.29 Btu/hour x sq. ft. x deg F.
e.	Summer U-value:	0.30 Btu/hour x sq. ft. x deg F.
f.	Visible light reflectance:	7% indoors, 10% outdoors.
g.	Solar reflectance:	12%
h.	Shading coefficient	0.31
i.	Relative heat gain:	66 BTU/hr x ft^2

F. Insulating Glass Spandrel Panels: Match construction of the tinted insulating glass unit, and add ceramic frit on No. 4 surface. Install with frit to the interior of the building.

G. Butt Glazed Corners: Where shown provide butt glazed corners as detailed with cantilevered face glass overlapping sealed edge of adjacent unit.

2.05 FIRE-RATED GLAZING PRODUCTS

A. Laminated Ceramic Glazing Material: Proprietary product in the form of two sheets of clear ceramic glazing material laminated together to produce a laminated pane of 5/16-inch (8-mm) nominal thickness; polished on both surfaces; weighing 4 lb/sq. ft. (19.5 kg/sq. m); and as follows:

1. Fire-Protection Rating: As indicated for the assembly in which the glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.

2. Polished on both surfaces, transparent.

3. Product: Subject to compliance with requirements, provide "FireLite Plus" manufactured by Nippon Electric Glass Co., Ltd. and distributed by Technical Glass Products.

2.06 GLAZING SEALANTS

A. General: Select glazing sealants and tapes of proven compatibility with other materials they will 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. Unless specific materials or products are indicated, comply with sealant and glass manufacturer's recommendations for selecting glazing sealants and tapes that are suitable for applications indicated and conditions existing at time of installation.

B. Elastomeric Glazing Sealants: ASTM C 920, chemically curing, elastomeric sealants.

C. Structural Glazing Sealant: ASTM C920, Type S, Grade NS, Class 25, one-component, high modulus, neutral cure silicone sealant recommended by sealant manufacturer specifically for structural glazing; Dow Corning "795" or approved equal.

D. Glazing Sealant for Fire-Resistive Glazing Products: Identical to product used in test assembly to obtain fire-protection rating.

E. Color of exposed sealants: Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.

2.07 GLAZING TAPES AND GASKETS

A. Mastic Glazing Tape: Preformed, butyl-based elastomeric tape, 100 percent solids, nonstaining and nonmigrating in contact with nonporous surfaces, with or without spacer rod as recommended by tape and glass manufacturers for application indicated, packaged on rolls with a release paper backing, and complying with ASTM C 1281 and AAMA 800.

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

2. AAMA 807.3 tape, for interior non-fire-rated glazing and other glazing applications in which tape is not subject to continuous pressure.

B. Glazing Gaskets: Provide glazing gaskets of type, profile, and hardness standard with framing system manufacturer profile and required maintain watertight seal, and complying with the following specifications for properties:

1. Dense Compression Gaskets: Molded or extruded gaskets fabricated from neoprene, (ASTM C 864), EPDM (ASTM C 864), or Silicone (ASTM C 1115).

2. Soft Compression Gaskets: Extruded or molded closed-cell, integral-skinned, neoprene, EPDM or silicone gaskets, complying with ASTM C 509, Type II, black color.

2.08 MISCELLANEOUS GLAZING MATERIALS

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.

B. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85 ± 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lights in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side-walking).

F. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistive rating.

2.09 FABRICATION OF GLASS AND GLAZING PANELS

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

A. 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. Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.02 PREPARATION

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

3.03 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, and with recommendations in referenced glazing publications, unless more stringent requirements are indicated in this section.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass from edge damage during handling and installation by using a rolling block and suction cups to move glass; do not use pry bars. Install glass with flares or bevels at top of opening, unless otherwise indicated by manufacturer's label.

1. Remove damaged glass from Project site and legally dispose of off site. Damaged glass is glass with edge damage or other imperfections that, when installed, weaken glass and impair performance and appearance.

D. Prime joint surfaces where required by manufacturer to promote adhesion of sealants.

E. Install setting blocks in sill rabbets. Size and locate blocks to comply with referenced glazing standard, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lights.

G. Provide spacers for glass lights where the length plus width is larger than 50 inches, to maintain required face clearances, unless gaskets or glazing tapes will perform this function.

1. Locate spacers directly opposite each other on both inside and outside faces of glass.

2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lights from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lights in each series with uniform pattern, draw, bow, and similar characteristics.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.04 TAPE GLAZING

A. Position tapes on fixed stops so that when compressed by glass their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. 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.

D. 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.

E. Do not remove release paper from tape until just before each light is installed.

F. Center glass lights in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

G. Apply cap bead of elastomeric sealant over exposed edge of tape. Tool exposed surface of sealant to provide a substantial wash away from glass.

3.05 GASKET GLAZING

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lights in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.06 STRUCTURAL SILICONE GLAZING

A. General: Comply with structural silicone glazing manufacturer's instructions for surface preparation, mixing, application, and curing.

B. Masking: If necessary to protect adjacent surfaces, mask them with masking tape.

C. Surface Preparation: Thoroughly clean glass surfaces with solvent before applying sealant; use MEK or 50% solution of isopropyl alcohol in water, subject to approval of framing system and sealant manufacturer. (Test solvent to make sure it does not damage sealant.)

D. Install continuous spacers between glass and interior mullions. Select spacers to provide correct joint width (face clearance) and depth, based on glass size and wind load. Set spacers accurately into position.

E. Provide temporary support for glass until sealant has developed full tensile strength and adhesion.

F. Fill joint with sealant and immediately tool to slightly concave profile using light pressure to obtain full contact with substrates.

G. Immediately after tooling, remove excess sealant and smears from glass and mullion surfaces using cleaning materials and methods recommended by the glass and sealant manufacturers.

H. Remove masking immediately after tooling, before the sealant skins.

I. Fixed Windows: Apply cap bead of silicone sealant and tool to beveled, slightly concave profile.

J. Curtainwall Weatherseal: Install sealant at vertical glass-to-glass joints. Comply with Section 07920 requirements for joint preparation, application and tooling.

3.07 PROTECTION AND CLEANING

A. Protect exterior glass from breakage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkali deposits, or stains, and remove as recommended by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents and vandalism, during construction period.

E. No more than 4 days prior to date scheduled for inspections that establish date of Substantial Completion, wash glass on both faces. Use materials and methods recommended by the glass manufacturer, taking care not to scratch or mar the surface of the glass.

3.08 GLAZING SCHEDULE

A. General: Provide glass in accordance with the following schedule. Schedule is not intended to limit scope of glazing work. Glass may be required at other locations not scheduled below; in such cases, provide glass as noted on drawings or as required by code (whichever is more stringent); consult with Architect in other cases.

B. Location		Type of Glass
1.	Glazed Aluminum Curtain Wall:	
	a. Vision glass:	1" thick insulating unit; blue outboard light with low-E on No. 2 surface; clear inboard light.
	b. Spandrel unit:	1" thick insulating unit; blue outboard light; clear inboard light with ceramic frit on No. 4 surface.
2.	Aluminum Windows:	1" thick insulating unit; blue outboard light with low-E on No. 2 surface; clear inboard light.
3.	Exterior flush steel doors:	1/4 inch thick clear tempered safety glass.
4.	Interior steel and wood doors, rated construction:	5/16" thick clear, fire-rated, laminated glass.
5.	Interior steel doors and wood doors and hollow-metal frames, non-rated construction:	1/4" thick clear, tempered safety glass.

END OF SECTION 08800