SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary General Conditions, Division 00 and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Entrance Doors.
2. Storefront and Entrance Systems.
3. Fire Rated Glazing in Fire Rated Doors.

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Inter-space: Space between lites of an insulating-glass unit.

1.4 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain water-tight and air-tight; deterioration of glazing materials; or other defects in construction.

1.5 ACTION SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of glass product including clear monolithic vision glass ; 12 inches (300 mm) square.

1. Tinted Glass.
2. Coated Glass.

3. Insulating Glass.
4. Clear Glass.
5. Fire Glass with Applied Film.

C. Glazing Accessory Samples: For gaskets, sealants and colored spacers, in 12 inch (300 mm) lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installers.

B. Product Certificates: For glass and glazing products, from Manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for coated glass insulating glass glazing sealants and glazing gaskets.

1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36 month period.

D. Warranties: Sample of Special Warranties.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program. Installer must be a manufacturers' authorized representative who is trained and approved for installation of units required for this project, with completion of at least five (5) similar projects. Installer to provide list of these similar projects, with the Owners' contact name and telephone number.

B. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

C. Comply with applicable codes and regulations and with the Consumer Product Safety Commission CPSC 16 CFR 1201 and applicable recommendations of Flat Glass Marketing Association (FGMA) " Glazing Manual.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

E. Source Limitations for Glass: Obtain coated float glass laminated glass and insulating glass from single source from single fabricator for each glass type.

F. Source Limitations for Glazing Accessories: Obtain from single source from single fabricator for each product and installation method.

G. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. Flat Glass Marketing Association (FGMA), “Glazing Manual”.

H. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

I. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

J. Pre-Installation Conference: Conduct conference at Project Site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for glazing during and after installation.

1.8 DELIVERY, STORAGE, AND HANDLING

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

B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.9 PROJECT CONDITIONS

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

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 degrees F (4.4 degrees C).

1.10 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period for Laminated Glass: Five (5) years from date of Substantial Completion.

2. Warranty Period for Coated and Insulating Glass: Ten (10) years from date of Substantial Completion.

B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to 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.

1. Warranty Period: Five (5) years from date of Substantial Completion.

C. Manufacturer's Special Warranty on Coated and Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

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

2. Warranty Period on Fire Rated Glazing Film: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

B. Strength: Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites of thickness indicated.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x degrees F (W/sq. m x K).

Application	Exposure	Type
View Glass (non-daylighting apertures) with blinds between glass	South	Clear sealed insulated unit, low-e
	North	Clear sealed insulated unit, low-e
	East/West, unshaded	Tinted sealed insulated unit, low-e
High Windows above view glass	North	Clear sealed insulated unit
Roof Monitor	South	Clear sealed insulated unit

5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.
7. Solar Heat Gain Coefficient (SHGC); Assembly maximum 0.40.

2.2 GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
2. For uncoated glass, comply with requirements for Condition A.
3. For coated vision glass, comply with requirements for Condition C (other coated glass).

C. Reflective-Coated Vision Glass: ASTM C 1376, coated by vacuum deposition (sputter coat) process, and complying with other requirements specified.

1. Kind: Kind CV (coated vision glass).
2. Coating Color: Selected from Manufacturers' Standard
3. Glass: Clear Float.
4. Tint Color: Selected from Manufacturers' Standard

2.3 FIRE-PROTECTION-RATED GLAZING

A. Fire-Protection-Rated Glazing, General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 for door assemblies. Basis-of-Design: Nippon Electric Glass Co., Ltd. , distributed by Technical Glass Products (TGP); fireLite NT, available in 20 minute to 90 minute rating. Provide minimum required ratings as shown on the Door Schedule.

B. Film-Faced Glazing: Clear, tempered flat glass; faced on one surface with a clear glazing film; complying with testing requirements in 16 CFR 1201 for Category II materials.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Nippon Electric Glass Co., Ltd. (distributed by Technical Glass Products); FireLite NT.

b. Safti First; SuperLite II XL 45/60/90.

c. Schott North America, Inc.; Filmed Pyran Star.

d. Vetrotech Saint-Gobain; SGG Keralite FR-F.

C. Glass Types in Doors, to achieve required ratings per Door Schedule:
1. 1” Tinted Insulated
2. 1/4" Clear Tempered
3. 1/4" Fire Rated

2.4 INSULATING GLASS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Basis-of-Design: Guardian Industries Corporation; SunGuard.
2. Oldcastle Glass.
3. AGC Flat Glass, Inc.
4. PPG Industries, Inc.
5. Vitro Architectural Glass

B. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary.
2. Spacer: Manufacturer's standard spacer material and construction.
3. Desiccant: Molecular sieve or silica gel, or blend of both.

C. Glass: Comply with applicable requirements in "Glass Products" Article and in "Laminated Glass" Article as indicated by designations in "Insulating-Glass Types" Article and in "Insulating-Laminated-Glass Types" Article.

2.5 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain water-tight seal, made from one of the following:

1. Neoprene complying with ASTM C 864.
2. EPDM complying with ASTM C 864.
3. Silicone complying with ASTM C 1115.
4. Thermoplastic polyolefin rubber complying with ASTM C 1115.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene EPDM silicone or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain water-tight seal.

1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

2.6 GLAZING SEALANTS

A. General:

1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Sealants used inside the weather-proofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.7 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; non-staining and non-migrating in contact with non-porous surfaces; with or with-out spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.8 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 for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

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

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

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

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.9 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit 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. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

2.10 MONOLITHIC-GLASS, TEMPERED GLASS, and INSULATING GLASS TYPES

A. Glass Type GL-1: Fully Tempered Float Glass. Vision Glass.

1. Thickness: 1/4 inch Clear – Tempered Glass.
2. Provide Safety Glazing Labeling.

B. Glass Type GL-2: Fully Tempered Float Glass. Vision Glass. Insulating Unit.

1. Thickness: 1 inch Insulating Glass Unit, consists of:
2. Outboard Lite: 1/4" Clear – Fully Tempered Glass, Solar Control; Guardian Sunguard SuperNeutral 68 on Clear Low “E” Surface #2 (see design values below, “Solar Control – Glass Types – Design Values”)
3. Air Space: 1/2” Air Fill (Argon Fill)
4. Inboard Lite: 1/4" Clear – Fully Tempered Glass.
5. Provide Safety Glazing Labeling.

C. Glass Type GL-3: Insulating Triple Glazing. Fully Tempered Float Glass, Vision Glass
1. Thickness: 1”
2. Outboard Lite: ¼” Clear Tempered, Guardian SN68 on Clear Low “E” Surface 2 (on East and West unshaded window elevations provide ¼” gray tinted tempered glass.)
3. ½” Air space, Argon Fill
4. ½” Clear Tempered Glass
5. Integral Blinds: 5/8” Blinds Series 625 by WACI
6. Inboard Lite: ¼” Clear Tempered Glass
7. Provide Safety Glazing Labeling.

D. Glass Type GL-4: Insulating-Laminated Glass. Vision Glass
1. Thickness: 1- 1/8”
2. Outboard Lite: 1/4”, Fully Tempered.
3. 9/16” Air space – Argon fill.
4. Glass 2 – 1/8” Clear ,Fully Tempered.
5. 0.060” “Frosted” Polymer-Resin Interlayer (0.015” Medium white PVB, 0.15” Medium White PVB and .030” Saflex R Clear PVB)
6. Inboard Lite: 1/8” Clear, Fully Tempered.
7. Provide Safety Glazing Labeling.

E. Glass Type GL-5: Insulating- Laminated Glass. Vision Glass
1. Thickness: 1”
2. Outboard Lite: 5/16” Laminate (1/8” Clear, Fully Tempered and on East and West Unshaded Elevations provide 1/8” Tinted Fully Tempered) - 0.060” Polymer Resin Interlayer, 1/8” Clear) Fully Tempered, Solar Control with Low-E on #4 surface.
3. ½” Air Space – Argon Fill
4. Inboard Lite: ¼” Clear, Fully Tempered.
5. Provide Safety Glazing Labeling.

F. Glass Type GL-7: Laminated Glass. Vision Glass
1. Thickness: 5/16”
2. Outboard Lite: 1/8” clear, Fully Tempered.
3. Polymer Resin Interlayer, 0.060” Clear.
4. Inboard Lite: 1/8” clear, Fully Tempered.

2.11 SOLAR CONTROL - GLASS TYPES – DESIGN VALUES

A. Basis-of-Design Glass Types Design Values are based on Guardian Industries Corporation, Sunguard Series of High Performance Glass :

1. Design Performance Characteristics for TYPE GL-2 GLASS; 1” thick (OB 1/4" Guardian SunGuard SuperNeutral 68 on Clear Low E on Surface #2 and on East and West Side Unshaded Elevations provide with Guardian Gray SunGuard Supernatural 68 on Clear Low E on Surface 2 , 1/2" AS, Air/Argon Fill, IB 1/4" Clear) :
   a. Transmittance % : 68 and 34
   b. Reflectance OUT % : 11and 6
   c. Reflectance IN % : 12 and 11
   d. U-V Transmittance % : 30 and 13

e. Shading Coefficient : 0.43 and 0.27
f. Solar Heat Gain Coefficient : 0.37 and 0.24
g. Light to Solar Gain LSG : 1.82 and 1.43
h. Solar Transmittance % : 33 and 18
i. Solar Reflectance OUT % : 33 and 16
j. Winter U-Factor : 0.25 and 0.25
k. Summer U-Factor : 0.22
l. Relative Heat Gain : 89 and 58

2. Design Performance Characteristics for TYPE GL-3 GLASS; 1" thick (OB 1/4" Guardian SunGuard SuperNeutral 68 on Clear Low E on Surface #22 and on East and West Unshaded Elevations provide OB with Guardian Gray SunGuard Supernatural 68 on Clear Low E on Surface 2 , 1/2" AS Argon Fill, IB 1/4" Clear) Exterior Appearance Light Gray:

a. Visible Light Transmission %: 68 and 34.
b. Solar Energy Transmission %: 33 and 18.
c. Visible Light Out Reflectivity %: 11 and 6.
d. Visible Light In Reflectivity %: 12 and 11.
e. Solar Energy Reflectivity %: 33 and 16.
f. U-Value Winter Nighttime: 0.24
g. U-Value Summer Daytime: 0.22
h. Solar Heat Gain Coefficient: 0.37 and 0.24

3. Design Performance Characteristics for TYPE GL-4 GLASS; 1-1/8" thick (OB 1/4" Guardian SunGuard SuperNeutral 68 on Clear Low E on Surface #2 Tempered, Air Space 9/16" 10% air 90% ARGON Fill, IB 1/8" Clear, Interlayer 1 = 0.015" Medium White PVB, Interlayer 2 = 0.015 Medium White PVB and Interlayer 3 = 0.030" Saflex R Clear PVB, IB2 1/8" Clear Tempered) :

a. Transmittance % : 34
b. Reflectance OUT % : 15
c. Reflectance IN % : 16
d. U-V Transmittance % : 0
e. Shading Coefficient : 0.38
f. Solar Heat Gain Coefficient : 0.33
g. Light to Solar Gain LSG : 1.05
h. Solar Transmittance % : 17
i. Solar Reflectance OUT % : 35
j. Winter U-Factor : 0.25
k. Summer U-Factor : 0.20
l. Relative Heat Gain : 78

4. Design Performance Characteristics for TYPE GL-5 GLASS; 1" thick (OB 5/16" Guardian Lami (1/8" Clear Tempered; .060 clear PVB; 1/8" Clear Guardian SN-68 #4 Tempered) on East and West Unshaded Elevations provide OB with 5/16" Gray Lami (1/8" Gray tempered; 0.60 clear PVB; 1/8" Clear Guardian SN-68 #4 Tempered); airspace: 7/16 standard spacer – ARGON Fill, IB. ¼" Clear Tempered:
a. Transmittance % : 67 and 46.
b. Reflectance OUT % : 11and 7.

c. Reflectance IN % : 12 and 11.
d. U-V Transmittance % : 0
e. Shading Coefficient : 0.43 and .33
f. Solar Heat Gain Coefficient : 0.37 and .029.
g. Light to Solar Gain LSG : 1.81 and 1.58.
h. Solar Transmittance % : 32 and 22.
i. Solar Reflectance OUT % : 27 and 15.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, square-ness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

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

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

C. Review existing conditions at existing building where door and window assemblies are being replaced with new storefront / framing / glazing systems. Review locations and conditions that are base bid and locations and conditions that are part of the alternate bid.

3.3 GLAZING, GENERAL

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

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

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

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

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

G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8 inch (3 mm) 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 lites from moving side-ways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

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

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

K. 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.

L. 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.

M. Fire Rated Glazing Film: Where Fire Rated Glazing Film is required, install / apply per manufacturers' recommendations, in the minimum fire ratings shown in the Door Schedule.

3.4 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. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing 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 right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites 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.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch 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. Installation with Drive-in Wedge Gaskets: Center glass lites 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 weather-tight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weather-tight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

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

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 LOCK-STRIP GASKET GLAZING

A. Comply with ASTM C 716 and gasket manufacturer's written instructions. Provide supplementary wet seal and weep system unless otherwise indicated.

3.8 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove non-permanent labels and clean surfaces.

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

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

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

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000