SECTION 088813 - FIRE-RATED GLAZING

TIPS:

To view non-printing **Editor's Notes** that provide guidance for editing, click on MasterWorks/Single-File Formatting/Toggle/Editor's Notes.

To read **detailed research, technical information about products and materials, and coordination checklists**, click on MasterWorks/Supporting Information.

Access Product MasterSpec Sections:

<Double click here to view the list of manufacturer Sections available at ProductMasterSpec.com>

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-protection-rated glazing.
2. Fire-resistance-rated glazing.

1.2 DEFINITIONS

A. Fire-Protection-Rated Glazing: Glazing in rated doors and openings up to 45 minutes, limited in size, and not capable of blocking radiant heat.

B. Fire-Resistance-Rated Glazing: Glazing that prevents spread of fire and smoke and radiant heat; used in rated wall and door applications 60 minutes and above without size limitations.

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

D. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.

1.3 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For sealants, indicating VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
3. Environmental Product Declaration (EPD): For each product.
4. Third-Party Certifications: For each product.
5. Third-Party Certified Life-Cycle Assessment: For each product.
6. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.
7. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
8. Product Certificates: For indigenous materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each indigenous material.
9. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each regional material.

C. Glass Samples: For each type of glass product; approximately 6 inches (150 mm) square.

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

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For [**Installer**] [**and**] [**glass testing agency**].

B. Product Certificates: For each type of glass and glazing product.

1. Certification not required for glazing materials bearing manufacturer's permanent label designating type of glass, provided labels represent a quality-control program involving a Nationally Recognized Testing Laboratory (NRTL) acceptable to authorities having jurisdiction.

C. Product Test Listings: From an acceptable NRTL, indicating fire-rated glass complies with requirements, based on comprehensive testing of current product.

D. Sample warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the NGA's Certified Glass Installer Program.

1.7 DELIVERY, STORAGE, AND HANDLING

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

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install fire-resistant glazing until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature conditions at occupancy levels during remainder of construction period.

1.9 WARRANTY

A. Manufacturer's Special Warranty on Fire-Protection-Rated Tempered Glass: Manufacturer agrees to replace units that deteriorate within specified warranty period.

1. Deterioration of tempered glass is defined as defects developed from normal use not attributed to glass breakage or to maintaining and cleaning tempered glass contrary to manufacturer's written instructions.

    a. Defects are not to exceed those allowed by referenced tempered glass standard.

2. Warranty Period: Five years from date of Substantial Completion.

B. Manufacturer's Special Warranty for 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**] [**10**] <**Insert number**> years from date of Substantial Completion.

C. Manufacturer's Special Warranty for Surface-Laminated Monolithic Ceramic Glazing: Manufacturer agrees to replace defective glazing within specified warranty period. Surface-laminated monolithic ceramic glazing defects are defined as edge separation, delamination

materially obstructing vision through glass, and blemishes exceeding those allowed by referenced surface-laminated-glass standard.

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

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Glass: For each glass type, obtain from single source from single manufacturer.

B. Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems to withstand normal thermal movement and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.

2.3 GLASS PRODUCTS, GENERAL

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

1. NGA Publications: [**"Laminated Glazing Reference Manual" and**]"Glazing Manual."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of [**the SGCC**] [**the SGCC or another certification agency acceptable to authorities having jurisdiction**] [**or**] [**manufacturer**]. Label indicates manufacturer's name, type of glass, glass thickness, and safety glazing standard with which glass complies.

2.4 GLASS PRODUCTS

A. Float Glass: ASTM C1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

B. Low-Iron Float Glass: ASTM C1036, Type I, Quality-Q3, Class I (clear), with visible light transmission not less than 91 percent.

C. Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class I (clear) unless otherwise indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

D. Laminated Glass: [**ASTM C1172**] [**and**] [**EN 12543-6**]. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Construction: Laminate glass with polyvinyl butyral interlayer unless fire-protection or fire-resistance rating is based on another product.
2. Interlayer Thickness: Provide thickness as needed to comply with requirements.
3. Interlayer Color: Clear unless otherwise indicated.

2.5 FIRE-PROTECTION-RATED GLAZING

A. Fire-Protection-Rated Glazing: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on positive-pressure testing in accordance with NFPA 257 or UL 9, including hose-stream test, and complies with NFPA 80.

1. Fire-protection-rated glazing required to have a fire-protection rating of 20 minutes to be exempt from hose-stream test.

B. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label indicates manufacturer's name; test standard; whether glazing is permitted to be used in doors or openings; if permitted in openings, whether glazing has passed hose-stream test; whether glazing meets 450 deg F (250 deg C) temperature-rise limitation; and fire-resistance rating in minutes.

C. Fire-Protection-Rated Tempered Glass: [**6**] [**8**] [**10**] [**12**] [**15**] [**19**]-mm thickness; fire-protection-rated tempered glass; complying with 16 CFR 1201, Category II.

1. Basis-of-Design Product: Subject to compliance with requirements, provide McGrory Glass, Inc.; FireDefend 20 fire-rated glass or comparable product by one of the following:

a. Technical Glass Products.
b. Vetrotech Saint-Gobain.
c. <**Insert manufacturer's name**>.

D. Fire-Protection-Rated Monolithic or Single-Glazed Laminated Glass for Doors and Protected Openings: 19-mm thickness; low-iron fire-protection-rated glass; complying with 16 CFR 1201, Category II. UL- or ITS-listed and tested in accordance with NFPA 252 for fire-rated doors and NFPA 257 for protected openings with hose-stream testing.

1. Basis-of-Design Product: Subject to compliance with requirements, provide McGrory Glass, Inc.; Pyrobel 45 fire-rated glass or comparable product by one of the following:

a. SAFTI FIRST Fire Rated Glazing Solutions.
b. <**Insert manufacturer's name**>.

E. Fire-Protection-Rated Single-Glazed Laminated Glass for Doors Only: 3/4-inch (19-mm) thickness; clear, fire-protection glass; complying with 16 CFR 1201, Category II. UL- or ITS-listed and tested in accordance with NFPA 252 for fire-rated doors with hose-stream testing.

1. Basis-of-Design Product: Subject to compliance with requirements, provide McGrory Glass, Inc.; Pyrobel 45 fire-rated glass or comparable product by one of the following:

    a. <**Insert manufacturer's name**>.

F. Fire-Protection-Rated Film-Faced Ceramic Glazing: [**Clear**] [**Warm tint**], ceramic flat glass; 5-mm thickness; faced on one surface with a clear glazing film; complying with 16 CFR 1201, Category II.

1. Basis-of-Design Product: Subject to compliance with requirements, provide McGrory Glass, Inc.; Pyran Platinum F fire-rated glass or comparable product by one of the following:

    a. Schott North America, Inc.
    b. Vetrotech Saint-Gobain.
    c. <**Insert manufacturer's name**>.

G. Fire-Protection-Rated Laminated Ceramic Glazing: Laminated glass made from two plies of [**clear**] [**warm tint**], ceramic glass; 8-mm total thickness; complying with 16 CFR 1201, Category II.

1. Basis-of-Design Product: Subject to compliance with requirements, provide McGrory Glass, Inc.; Pyran Platinum ML fire-rated glass or comparable product by one of the following:

    a. Schott North America, Inc.
    b. Vetrotech Saint-Gobain.
    c. <**Insert manufacturer's name**>.

H. Fire-Protection-Rated Laminated Glass with Intumescent Interlayer: Laminated glass made from multiple plies of uncoated, low-iron float glass; with intumescent interlayers; complying with 16 CFR 1201, Category II.

1. Basis-of-Design Product: Subject to compliance with requirements, provide McGrory Glass, Inc.; Pyrobel fire-rated glass or comparable product by one of the following:

    a. AGC Glass.
    b. Pilkington North America.
    c. <**Insert manufacturer's name**>.

2.6 FIRE-RESISTANCE-RATED GLAZING

A. Fire-Resistance-Rated Glazing: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-resistance ratings indicated, based on testing in accordance with ASTM E119 or UL 263.

B. Fire-Resistance-Rated Glazing Labeling: Permanently mark fire-resistance-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label indicates manufacturer's name, test standard, that glazing is approved for use in walls, and fire-resistance rating in minutes.

C. Fire-Resistance-Rated Framing and Doors: Fire-resistance-rated glazing with 60-, 90-, and 120-minute ratings requires framing and doors from glass supplier, tested as an assembly complying with ASTM E119 or UL 263.

D. Fire-Resistance-Rated Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, low-iron float glass; with intumescent interlayers; complying with 16 CFR 1201, Category II.

1. Basis-of-Design Product: Subject to compliance with requirements, provide McGrory Glass, Inc.; Pyrobel fire-rated glass or comparable product by one of the following:

a. AGC Glass.
b. Pilkington North America.
c. <**Insert manufacturer's name**>.

2.7 GLAZING ACCESSORIES

A. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.

B. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.

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

a. GE Construction Sealants; Momentive Performance Materials Inc.
b. The Dow Chemical Company.
c. Tremco Incorporated.
d. <**Insert manufacturer's name**>.

2. Sealant to comply with testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
3. Sealant to comply with testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Formaldehyde emissions to not exceed 9 mcg/cu. m or 7 ppb, whichever is less.
4. Sealant to comply with testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
5. Sealant to comply with testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." The building concentration of formaldehyde to not exceed half of the indoor recommended exposure limit, or 33 mcg/cu. m, and that of acetaldehyde to not exceed 9 mcg/cu. m.

6. Colors of Exposed Glazing Sealants: [**As indicated by manufacturer's designations**] [**Match Architect's samples**] [**As selected by Architect from manufacturer's full range of industry colors**].

C. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 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.

D. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on one or 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 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.

E. Setting Blocks: Glazing manufacturer to provide setting blocks, if unavailable in standard retail channels, in accordance with manufacturer's written installation instructions.

2.8 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

C. Perimeter Insulation for Fire-Resistance-Rated 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.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with manufacturing and installation tolerances, including those for size, squareness, and offsets at corners, and for compliance with minimum required face and edge clearances.

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 fire side and protected side. Label or mark units as needed so that fire side and protected side are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Use methods approved by testing agencies that listed and labeled fire-resistant glazing products.

B. 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.

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 sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.

I. Set glass lites with proper orientation so that coatings face fire side or protected side as specified.

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 in writing by gasket manufacturer.

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.

D. 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. 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 CLEANING AND PROTECTION

A. Immediately after installation, remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. 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 buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces 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.

3.8 FIRE-PROTECTION-RATED GLAZING SCHEDULE

A. Glass Type[**FPGL-1**]: 20-minute fire-protection-rated glazing without hose-stream test; fire-protection-rated [**tempered glass**] [**film-faced ceramic glazing**] [**laminated ceramic glazing**] [**laminated glass with intumescent interlayers**].

B. Glass Type[**FPGL-2**]: 20-minute fire-protection-rated glazing with hose-stream test; fire-protection-rated [**film-faced ceramic glazing**] [**laminated ceramic glazing**] [**laminated glass with intumescent interlayers**].

C. Glass Type[**FPGL-3**]: 45-minute fire-protection-rated glazing; [**fire-protection-rated monolithic glass**] [**fire-protection-rated film-faced ceramic glazing**] [**fire-protection-rated laminated ceramic glazing**] [**or**] [**fire-protection-rated laminated glass with intumescent interlayers**].

D. Glass Type[**FPGL-4**]: [**60**] [**90**]-minute fire-protection-rated glazing with 450 deg F (250 deg C) temperature-rise limitation in rated doors only, with a maximum vision area of 100 sq. in. (0.065 sq. m); [**fire-protection-rated monolithic glass**] [**fire-protection-rated film-faced ceramic glazing**] [**fire-protection-rated laminated ceramic glazing**] [**or**] [**fire-protection-rated laminated glass with intumescent interlayers**].

3.9 FIRE-RESISTANCE-RATED GLAZING SCHEDULE

A. Glass Type[**FRGL-1**]: [**60**] [**90**] [**120**]-minute fire-resistance-rated glazing complying with ASTM E119 or UL 263 in a tested assembly of glass and framing with 250 deg F (121 deg C) temperature-rise limitation; 450 deg F (250 deg C) temperature-rise limitation for door vision areas; fire-resistance-rated laminated glass with intumescent interlayers.

END OF SECTION 088813