

## **SECTION 08800 – GLASS AND GLAZING**

### **PART 1 – GENERAL**

#### **1.00 RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

#### **1.01 SCOPE:**

Work included in this section: Providing all labor, materials, tools, equipment, and services necessary to complete all non-historic glass and glazing work of this section required to complete Contract work as shown on drawings, as specified herein, and as required by job conditions.

Types of work in this section include glass and glazing for:

- ☐ Window units, not indicated as “preglazed”
- ☐ Storefront construction
- ☐ Curtain wall construction
- ☐ Entrances and other doors, not indicated as “preglazed”

#### **SYSTEM DESCRIPTION:**

Provide glass and glazing that has been produced, fabricated, and installed to withstand normal thermal movement, wind loading and impact loading, without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials, and other defects in the work.

Normal thermal movement is defined as that resulting from an ambient temperature range of 120° F (67° C) and from a consequent temperature range within glass and glass framing members of 180° F (100° C).

Deterioration of insulating glass is defined as failure of hermetic seal due to other causes than breakage that results in intrusion of dirt or moisture, internal condensation or fogging, deterioration of protected internal glass coating, if any, resulting from seal failure, and any other visual evidence of seal failure or performance.

### **1.03 SUBMITTALS:**

**Product Data:** Submit manufacturer's technical data for each glazing material and fabricated glass product indicated, including installation and maintenance instructions.

**Samples:** Submit, for verification purposes, 12" square samples of each type of glass indicated except for clear, single pane units and 12" 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 of adjoining framing system in color as selected by Architect.

**Certificate:** Submit certificates from respective manufacturers attesting that glass and glazing materials furnished for project comply with the requirements of this specification.

Separate certification will not be required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authorities having jurisdiction.

**Compatibility and Adhesion Test Report:** Submit statement from sealant manufacturer indicating that glass and glazing materials have been tested for compatibility and adhesion with glazing sealants and interpreting test results relative to material performance, including recommendations for primers and substrate preparation needed to obtain adhesion.

### **1.04 QUALITY ASSURANCE:**

**Glazing Standards:** Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.

**Safety Glazing Standard:** Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials.

Subject to compliance with requirements, provide safety glass permanently marked with certification label of Safety Glazing Certification Council (SGCC) or other certification agency acceptable to authorities having jurisdiction.

Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component pane of units with appropriate Certification label of inspecting and testing organization indicated below:

Insulating Glass Certification Council (IGCC)  
Associated Laboratories, Inc. (ALI)

Field-Constructed Mock-Up: Prepare full-height, one module width mock-ups for the following types of glass installed in window frames in locations directed by Architect. Construct mock-ups to match glazing systems indicated for project, including typical pane sizes, framing system, and glazing materials and methods.

Obtain Architect's acceptance of visual qualities before proceeding with the work. Retain mock-ups in undisturbed condition during construction as a standard for judging completed work. Approved mock-up (framing system and glazing) may be incorporated into the finished work.

Single Source Responsibility for Glass: To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type and class specified.

Preconstruction Compatibility and Adhesion Testing: Submit samples of all glass, gaskets, glazing accessories, and glass framing members proposed for use in contact with, or proximity of, glazing sealants, to sealant manufacturer for compatibility and adhesion testing in accordance with sealant manufacturer's standard testing methods and the following requirements:

Submit not less than 9 pieces of each type and finish of glass framing member and of each type, class, kind, condition, and form (monolithic, laminated, insulating units) of glass for adhesion testing and one sample of substrates (gaskets, setting blocks, and spacers) for compatibility testing.

Schedule sufficient time for testing and analysis of results to prevent delay in progress of the work.

Investigate materials failing compatibility or adhesion tests and obtain sealant manufacturer's written recommendations for corrective measures, including use of specially formulated primers.

## **1.05 DELIVERY, STORAGE, AND HANDLING**

Protect glass and glazing materials during delivery, storage, and handling to comply with manufacturer's directions and to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, temperature changes, direct exposure to sun, and from other causes.

Where insulating glass units will be exposed to substantial altitude changes, avoid hermetic seal ruptures by complying with insulating glass fabricator's recommendations for venting and sealing.

### **1.06 PROJECT CONDITIONS:**

Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation, or other causes.

Install liquid sealants at ambient and substrate temperatures above 40° F (4.4° C).

### **1.08 WARRANTY:**

General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.

Manufacturer's Special Project Warranty on Insulating Glass:

Provide written warranty signed by manufacturer of insulating glass agreeing to furnish f.o.b. from point of manufacture to a freight-allowed project site, within specified warranty period indicated below, replacements for those insulating glass units developing manufacturing defects. Manufacturing defects are defined as failure of hermetic seal of air space (beyond that due to glass breakage) as evidenced by intrusion of dirt or moisture, internal condensation or fogging, deterioration of protected internal glass coatings, if any, and other visual indications of seal failure or performance; provided the manufacturer's instructions for handling, installing, protecting, and maintaining units have been complied with during the warranty period.

Warranty Period: Manufacturer's standard but not less than 10 years after date of substantial completion.

## **PART 2 – PRODUCTS**

### **2.01 MANUFACTURERS:**

Manufacturers: Subject to compliance with requirements of this specification, provide products by one of the following:

Manufacturers of Clear and Tinted Float Glass:

Ford Glass Division  
Hordis Brothers, Inc.  
LOF Glass, Inc.  
PPG Industries, Inc.  
Saint-Gobain/Euroglass

Manufacturers of Insulating Glass:

Ford Glass Division  
Hordis Brothers, Inc.  
PPG Industries, Inc.

## **GLASS PRODUCTS, GENERAL:**

Primary Glass Standard: Provide primary glass that complies with ASTM C 1036 requirements, including those requirements indicated by reference to type, class, quality, and, if applicable, form, finish, mesh, and pattern.

Heat-Treated Glass Standard: Provide heat-treated glass for tempered glass units that complies with ASTM C 1048 requirements, including those requirements indicated by reference to kind, condition, type, quality, class, and, if applicable, form, finish, and pattern.

Sizes: Fabricated glass to sizes for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer. Provide thicknesses indicated or, if not otherwise indicated, as recommended by glass manufacturer for application indicated.

## **PRIMARY GLASS PRODUCTS:**

Clear Float Glass: Type I (transparent glass, flat), Class1 (clear), Quality q3 (glazing select), Low-E.

Tinted Float Glass: Type I (transparent glass, flat), Class 2 (tinted heat absorbing and light reducing), Quality q3 (glazing select), PPG, "Solar Cool Gray (2)" and as follows:

Green: Manufacturer's standard tint, with visible light transmittance of 50 – 52 percent and shading coefficient of 0.69 – 0.71 for ¼" thick glass.

Refer to requirements for sealed insulating glass units for performance characteristics of assembled units composed of tinted glass, coated or uncoated, relative to visible lights transmittance, U-values, shading coefficient, and visible reflectance.

Clear Tempered Float Glass: Grade B (fully tempered), Style I (uncoated surfaces), Type I (float), Class 2 (heat absorbing), or tint and with performance characteristics specified for 1/4" thick glass indicated below:

Match tint and performance characteristics specified for tinted float glass. Refer to "coated glass products" for tint and performance characteristics of coated, tinted glass.

## **2.04 SEALED INSULATING GLASS UNITS:**

General: Provide preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed, dehydrated air space and complying with ASTM E 774 for performance classification indicated as well as with other requirements specified for glass characteristics, air space, sealing system, sealant, spacer material, corner design, and desiccant.

For properties of individual glass panes making up units, refer to product requirements specified elsewhere in this section applicable to types, classes, kinds, and conditions of glass products indicated.

Provide heat-treated panes for tempered glass units at locations indicated or, if not indicated, provide heat-strengthened panes where recommended by manufacturer for application indicated and where tempered glass is designated or required.

Performance characteristics designated for coated insulating glass are nominal values based on manufacturer's published test data for units with 1/4" thick panes of glass and 1/2" thick air space.

U-values indicated are expressed Btu/hour/sq. ft./degree F difference.

Performance Classification per ASTM E 774: Class A.

Thickness of Each Pane: 1/4"

Air Space Thickness: 1/2"

Sealing System: Dual seal; primary and secondary sealant: manufacturer's standard materials.

Spacer Material: Manufacturer's standard metal.

Desiccant: Manufacturer's standard; either molecular sieve or silica gel or blend of both.

Corner Construction: Manufacturer's standard corner construction.

Coated Insulating Glass Units: Manufacturer's standard units complying with the following requirements:

Exterior Pane: Bronze tinted float glass (PPG)

Kind: As indicated

Kind FT (fully tempered). Provide at all locations including doors, where glass is less than eighteen inches above finished floor.

## **2.06 ELASTOMERIC GLAZING SEALANTS AND PREFORMED GLAZING TAPES:**

General: Provide products of type indicated and complying with the following requirements:

Compatibility: Select glazing sealants and tapes of proven compatibility with other materials with which they will come into contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.

Suitability: Comply with recommendations of sealant and glass manufacturers for selection of glazing sealants and tapes which have performance characteristics suitable for applications indicated and conditions at time of installation.

Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated that complies with ASTM C 920 requirements, including those for type, grade, class, and uses.

Colors: Provide color of exposed sealants as selected by Architect from manufacturer's standard colors.

Two-Part Polysulfide Glazing Sealant: Type M; Grade NS; Class 25; Uses NT, M, G, A, and, as applicable to uses indicated, O.

One-Part Acid-Curing Silicone Glazing Sealant: Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to uses, O.

One-Part Non-Acid-Curing Silicone Glazing Sealant: Type S; Grade NS;

Class 25; Uses NT, G, A, and, as applicable to uses indicated, O; and complying with the following requirements for modulus and additional joint movement capability.

Medium Modulus: Tensile strength of not less than 45 nor more than 75 psi at 100 percent elongation when tested per ASTM D 412 after 14 days at 77° F(20° C) and 50 percent relative humidity.

Additional capability, when tested per ASTM C 719 for adhesion and cohesion under maximum cyclic movement, to withstand the following percentage increase and decrease of joint width, as measured at time of application, and remain in compliance with other requirements of ASTM C 920.

50 percent

Preformed Butyl-Polyisobutylene Glazing Tape: Provide manufacturer's standard solvent-free butyl-polyisobutylene formulation with a solids content of 100 percent; complying with AAMA A 804.1; in extruded tape form; non-staining and non-migrating in contact with nonporous surfaces; packaged on rolls with a release paper on one side; with or without continuous spacer rod as recommended by manufacturers of tape and glass for application indicated.

Products: Subject to compliance with requirements of this specification, provide one of the following:

Glazing Sealant:

"Synthacalk GC-5"; Percora Corp.

"863"; Percora Corp.

"Proglaze"; Tremco

"Dow Corning 795"; Dow Corning Corp.

Preformed Butyl-Polyisobutylene Glazing Tape without Spacer Rod:

"Tremco 440 Tape"; Tremco Inc.

Preformed Butyl-Polyisobutylene Glazing Tape with Spacer Rod:

"Shim-Seal"; Percora Corp.

## **GLAZING GASKETS:**

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

Dense Elastomeric Compression Seal Gaskets: Molded or extruded gaskets of material indicated below, complying with ASTM C 864, of profile and

hardness required to maintain watertight seal:

- ☐ Neoprene
- ☐ EPDM
- ☐ Thermoplastic polyolefin rubber
- ☐ Any material indicated above

Cellular Elastomeric Preformed Gaskets: Extruded or molded closed cell, integral-skinned neoprene of profile and hardness required to maintain watertight seal; complying with ASTM C 509, Type II; black.

Manufacturers: Subject to compliance with requirements of this specification, provide products that Kawneer recommends.

### **MISCELLANEOUS GLAZING MATERIALS:**

Compatibility: Provide materials with proven record of compatibility with surfaces contacted in installation.

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

Setting Blocks: Neoprene, EPDM, or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.

Spacers: Neoprene, EPDM, or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape, and hardness recommended by glass and sealant manufacturers for application indicated.

Edge Blocks: Neoprene, EPDM, or silicone blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement (side-walking) of glass.

Compressible Filler Rods: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, flexible and resilient, with 5-10 psi compression strength for 25 percent deflection.

## **PART 3 – EXECUTION**

### **EXAMINATION:**

Require Glazier to inspect work of glass framing erector for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners; for presence and functioning of weep system; for existence of minimum required fade or edge clearances; and for effective sealing of joinery. Obtain Glazier's written report listing conditions detrimental to performance of glazing work. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected.

## **PREPARATION:**

Pre-installation Meeting: At Contractor's direction, Glazier, sealant and gasket manufacturer's technical representatives, glass framing erector, and other trades whose work affects glass and glazing shall meet at project site to review procedures and time schedule proposed for glazing and coordination with other work.

Clean glazing channels and other framing members to receive glass, immediately before glazing. Remove coatings that are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

### **1.04 GLAZING, GENERAL:**

Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.

Glazing channel dimensions as indicated in details are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as dictated by job conditions at time of installation.

Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge that would occur in the vicinity of setting blocks so that these are located at the top of the opening. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.

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

### **1.04 GLAZING:**

Install setting blocks of proper size in sill rabbet, located one quarter of glass width from each corner, but with edge nearest corner not closer than 6" from corner. Set blocks in thin course of sealant that is acceptable for heel bead use.

Provide spacers inside and out, or correct size and spacing to preserve necessary face clearances, for glass sizes larger than 50 united inches (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape, use thickness slightly less than final compressed thickness of tape.

Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass manufacturer.

Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.

Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joint's back surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.

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

Tool exposed surfaces of sealants to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.

Where edge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement.

Miter cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacturer to prevent pull away at corners; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

Lock-Strip Gasket Glazing: Comply with ASTM C 716 and gasket manufacturer's printed recommendation. Provide supplementary wet seal and weep system unless otherwise indicated.

### **3.03 PROTECTION AND CLEANING:**

Protect exterior glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass.

Remove nonpermanent labels and clean surfaces.

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

Examine glass surfaces adjacent to or below exterior concrete and masonry surfaces at frequent intervals during construction, but not less often than once a month, for build-up of dirt, scum, alkali deposits, or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.

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

Wash glass on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Wash glass by method recommended by glass manufacturer.

## **END OF SECTION**