

SECTION - 6250

GLAZING

1. SCOPE

The work under this section of the Specifications consists of furnishing all labour, equipment, tools, appliances, scaffolding and providing in any floor and at any height glass, gaskets, sealants, compound and other materials required for performing all operations in connection with the installation and setting of all types of glass and glazing complete in every respect in accordance with the Drawings or as directed by the Engineer. The scope of this section of Specifications is covered with detailed Specifications as laid down herein.

2. APPLICABLE STANDARDS

Latest editions of following American Society of Testing and Materials, Flat Glass Marketing Association, Federal Specifications, American National Standard Institute, National Fire Protection Association and British Standards are relevant to these Specifications wherever applicable.

2.1 ASTM - American Society of Testing and Materials

ASTM C 920 Elastomeric Joint Sealant

ASTM C 1036 Flat Glass

ASTM C 1048 Heat-Treated Flat Glass – Kind HS, Kind FT Coated and Uncoated Glass

ASTM C 1172 Laminated Architectural Glass

ASTM E 774 Sealed Insulating Glass Units

2.2 FGMA - Flat Glass Marketing Association

Glazing Sealing Systems Manual

Glazing Manual

2.3 FS - Federal Specifications

DD-G-451 Glass, Float or Plate, Sheet, Figured (Flat, for Glazing, Mirrors and other Uses)

DD-G-1403 Glass, Plate (Float), Sheet, Figured, and Spandrel (Heat Strengthened and Fully Tempered)

DD-M-411 Mirrors, Plate, Glass, Framed

2.4 ANSI - American National Standards Institute, Inc.

Z97.1 Performance Specification and Methods of Test for Safety Glazing Material Used in Buildings

2.5 NFPA - National Fire Protection Association

Glazing Manual

2.6 BSI (British Standards Institution)

952 Glass for glazing

5051 Security glazing part I & II

CP.152 Glazing

3. SUBMITTALS

3.1 Product Data: Submit manufacturers technical data for glazing material and fabricated glass product required, including installation and maintenance instructions.

3.2 Samples: Submit 300 mm x 300 mm samples of each type of glass to be used.

3.3 Certificates: Submit certificates from manufacturer attesting that glass and glazing materials furnished for the project comply with requirements.

4. TRANSPORTATION, HANDLING AND STORAGE

4.1 Protect glass and glazing materials during delivery, storage and handling to comply with manufacturer's written directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes, including high altitude limitations for insulating glass.

4.2 Contractor shall deliver materials in manufacturer's original, unopened containers clearly labeled with manufacturer's name and address, material, brand, type, class and rating as applicable.

4.3 Contractor shall store the materials in original unopened containers with labels intact/protected from ground contact and from elements which may damage glass.

5. WARRANTY

5.1 Submit a written guarantee signed by Manufacturer and Installer of glazing for a period of 1 year from the date of substantial completion. The Guarantee shall cover the replacement of defective materials and workmanship as directed by the Engineer.

6. QUALITY ASSURANCE

6.1 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.

- 6.2 Safety Glazing Standard: Where safety glass is indicated, provide type of products which comply with ANSI Z97.1.
- 6.3 Provide insulating glass units permanently marked either on spacers or at least one component pane of unit with appropriate certification label of inspecting and testing organizations.

7. PROJECT CONDITIONS

- 7.1 Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other cause.
- 7.2 Install sealant at ambient and substrate temperatures permitted by sealant manufacturers.

8. GLASS PRODUCTS - GENERAL

- 8.1 Primary Glass Standard: Provide primary glass which complies with ASTM C 1036 requirements, including those indicated by reference to type, class, quality, and if applicable, form, finish, mesh and pattern.
- 8.2 Heat-Treated Glass Standard: Provide heat-treated glass, kind HS (heat-trengthened) and kind FT (fully tempered), complying with the requirements of ASTM C 1048, including those indicated by reference to kind, condition, type, quality, class, and if applicable, form, finish, and pattern.
- 8.3 Laminated Glass: Two panes of annealed glass bonded with an interlayer material for use in building glazing, all complying with the requirements of ASTM C 1172. Provide 24 mm thick double glazed clear laminated window complying with Section 13090 – RADIATION PROTECTION as shown on drawings.
- 8.4 Sizes: Fabricate tempered glass to sizes required 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, but not less than 6 mm thick for windows and 13 mm for doors (single glazing).

9. GLASS

- 9.1 Tempered Float Glass:
 - 9.2 Grade B (fully tempered), Style I (uncoated surfaces), Type I (transparent glass, flat), Class 1 (clear), quality q³ (glazing select), 12 mm thick for
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frameless windows, and for fully glazed doors, unless otherwise indicated on Drawings.

- 9.3 Provide 5 mm thick tinted (Grey) glass for windows and ventilators indicated on Drawings.

10. SEALED INSULATED GLASS UNITS:

- 10.1 Provide pre-assembled 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. Units shall have a U-Value of $2.5 \text{ W/m}^2/\text{K}$ and an overall Shading Coefficient of 0.3. Spacer material shall be manufacturer's standard aluminum or stainless steel. Desiccant shall be either molecular sieve or silica gel or blend of both. Provide insulated laminated glass units with reflective coating on outer pane and clear laminated inner pane for vision panels; and reflective single tempered glass for spandrel panels. Thickness of glass shall be as indicated on drawings. Color of reflective coating shall be as selected by the Engineer from manufacturer's full range of color.

- 10.2 Provide sealed insulating glass units for entrance doors indicated on Drawings to have double-glazing.

10.3 MIRRORS

Type I, Class I, Quality q², Clear float mirror, fully silvered electrically copper-plated, 6 mm thick, exposed edges ground and face corners cased, guaranteed against silver spoilage for 15 years.

Size and location of mirrors shall be as indicated on Drawings.

11. GLAZING MATERIALS AND ACCESSORIES

- 11.1 Glazing Gaskets: Dense elastomeric seal gaskets shall be continuous neoprene or polyvinyl chloride extrusions, of 50 Shore A durometer hardness plus or minus 5 complying with ASTM C 864.
- 11.2 Lock-Strip Gaskets: Conform to ASTM C 542, neoprene extrusions of required size and shape. Frames fabricated with injection molded corners. Provide with separate lock (zipper) strips, Shore A durometer 10 points harder than gasket body.
- 11.3 Setting Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.
- 11.4 Spacers: Neoprene blocks, 40 to 50 Shore A durometer hardness, self-adhesive on one face only; compatible with sealant used. Use EPDM spacers for units set with silicone glazing sealant.
- 11.5 Joint Cleaner, Primer and Sealer: As recommended by the glazing manufacturer.
- 11.6 Compressible Filler Rod: Closed-celled or a waterproof-jacketed rod stock
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of synthetic rubber or plastic foam, compatible with sealants used, flexible and resilient, with 34.5 to 68.9 kPa compression strength for 25 percent deflection.

- 11.7 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.

12. INSTALLATION OF GLAZING

- 12.1 General: Unless otherwise shown or specified, comply with recommendations and requirements of the FGMA Glazing Sealing Systems Manual and Glazing Manual. For the installation of all glass comply with glass manufacturers and glazing materials manufacturer's written instructions and recommendations. Provide watertight and airtight installation of each piece of glass, so as to withstand temperature changes and wind loading normal at the site. Operating sash and doors shall withstand impact loading without failure of any kind including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, and deterioration of glazing materials. Install butt-joint glazing according to the glass manufacturer's recommendations.
 - 12.2 Inspection: Inspect each piece of glass immediately before installation. Do not install any pieces which are improperly sized or have damaged edges, scratches or abrasion or any other evidence of damage. Use suction cups to shift glass units within openings; do not drift glass with pry bars. Remove labels from glass immediately after installation.
 - 12.3 Setting Blocks: Locate setting blocks at sill rabbet one-quarter in from each end of the glass, unless otherwise recommended by the glass manufacturer. Use blocks of proper size to support the glass in accordance with manufacturer's recommendations. Set blocks in thin course of sealant that is acceptable for heel bead use.
 - 12.4 Spacers: Provide spacers for all glass sizes larger than a combined total of 1.27 m or more for any two adjacent sides to separate glass from stops, except where continuous glazing gaskets are provided. Locate spacers no farther than 600 mm apart and no closer than 300 mm to a corner. Place spacers opposite one another. Make bite of spacer on glass a nominal 6 mm or greater.
 - 12.5 Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
 - 12.6 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 joints back surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.
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- 12.7 Sealants: 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.
- 12.8 Glazing Gaskets: Miter-cut and seal joints of glazing gaskets in accordance with manufacturer's written instructions.
- 12.9 Lock-Strip Gaskets: Comply with gasket manufacturer's written instructions and recommendations. Miter-cut corners of loose zipper strips slightly longer to provide permanent compression at joints. Use special tool to install and remove filler strips; lubricate in accordance with manufacturer's instructions.

Comply with glass manufacturer's written instructions for the use of setting blocks, liquid or tape sealants, and weep holes in the glazing recess of lock strip gaskets.

- 12.10 Examine each piece of glass and discard and replace glass with edge damage or face imperfection. All glazing shall be wind tight and fully water tight on completion.
- 12.11 Clean glazing channels and other framing members indicated to receive glass. Remove coatings which are not firmly bonded to the substrate, Remove lacquer from metal surfaces wherever elastomeric sealants are to be used. Apply primer and sealer to joint surfaces wherever recommended by the sealant manufacturer and as shown on the drawings.
- 12.12 Trim and clean excess glazing materials from surrounding surfaces immediately after installation and eliminate stains and discolorations.
- 12.13 Cure glazing sealants and compounds in compliance with manufacturer's instructions to obtain high early bond strength internal cohesive strength and surface durability.
- 12.14 While glazing operation is in progress great care shall be taken to avoid breakage or damage to the glass and adjoining glazing. The Contractor shall make good at his own cost, all glass broken by his workmen while cleaning or carrying out other operations. On the completion of the glazing work, all glass that has been set by the Contractor shall, if it becomes loose, within the maintenance period, be refixed at Contractor's expense.
- 12.15 No glazing shall be considered complete until and unless paint and other stains have been removed from the surface of the glass and checked by the Engineer for water tightness.

13. PROTECTION AND CLEANING OF GLAZING

- 13.1 Protect glass from breakage immediately upon installation by use of crossed streamers or ribbons attached to framing and held away from glass. Do not apply markings to surfaces of glass. Remove nonpermanent labels and clean surfaces.
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- 13.2 Protect glass from contact with contaminating substances resulting from construction operations. Cover glass as required to protect it from additives that might abrade the glass surface. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.
- 13.3 Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.
- 13.4 Maintenance: Maintain glass in a reasonably clean condition during construction.
- 13.5 Cleaning: Wash glass on both faces not more than 4 days prior to acceptance. Comply with instructions and recommendations of the glass manufacturer and glazing materials manufacturer for cleaning in each case.

14. MEASUREMENT AND PAYMENT

No payment shall be made for the works involved within the scope of this section of specifications unless otherwise specifically stated in the Bill of Quantities or herein. The cost thereof shall be deemed to be included in the quoted unit rate of the relevant item of the Bill of Quantities.

*** End of Section 6250 ***
