SECTION  – glazing

This section has been edited to include Gensler's Product Sustainability Standards ("GPS Standards") criteria, providing language for only the "Gensler Standard" tier of performance - the required minimum level of performance for sustainable attributes of the product. To include "Market Differentiator" level of performance or for any other questions, please contact your regional specification leader, Tim Taylor, or Kaley Blackstock.

1. GENERAL
   1. summary
      1. Furnish glazing materials and accessories to complete the fabrication and installation of:

SPEC NOTE: Coordinate this Section with the Glazing required for the Project and Delete what is not required.

SPEC NOTE: Low Iron glass is more expensive but is clear and not green in colour. On projects with budgets that can handle clear glass, leave Low Iron in the Spec. Delete when glazing is minimal or when budget is not healthy.

* + - 1. Back-Painted **[Low Iron]** Tempered Glass.
      2. Back-Painted **[Low Iron]** Tempered Laminated Glass, complete with clear interlay.
      3. **[Low-Iron]** Tempered Glass Doors and Sidelites.
      4. **[Low-Iron]** Tempered Laminated Glass.
      5. Custom Washroom Mirrors.
      6. Decorative Interior Glazing.
      7. Fire Rated Glass.
  1. REFERENCE STANDARDS
     1. American Society for Testing and Materials (ASTM):
        1. ASTM C 542-05(2011), Standard Specification for Lock-Strip Gaskets.
        2. ASTM C 920-11, Standard Specification for Elastomeric Joint Sealants.
        3. ASTM C 1172-09e1, Standard Specification for Laminated Architectural Flat Glass.
     2. Canadian General Standards Board (CGSB):
        1. CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
        2. CAN/CGSB-12.3-M91, Flat, Clear Float Glass.
        3. CGSB-12.20-M89, Structural Design of Glass for Buildings.

SPEC NOTE: Delete the following if there is no fire rated glass on the project.

* 1. submittals
     1. Sustainable Design Submittals: Refer to Division 01 Section 01 81 13 – Sustainable Design Requirements.
     2. Provide submittals in accordance with the General Conditions and Section 01 33 00 – Submittal Procedures.
     3. Action Submittals: Provide the following submittals before starting any work of this Section:
        1. Product Data: Submit manufacturer's product data for each type of product specified. Data shall indicate compliance with specification and installation recommendations of manufacturer of products being used.
        2. Shop Drawings: Submit shop drawings, to the Consultant for review prior to fabrication.
        3. Samples for Initial Selection: Submit samples for initial selection by Consultant of the following, prior to ordering:
           1. Spandrel glass coatings.
           2. Tinted glazing.
           3. Back-painted glass coatings.
           4. Low-Iron clear glass.
           5. Patterned glass panels.
        4. Samples for Verification: Submit samples for verification including sample sets showing the full range of variations expected where products involve normal colour variations.
        5. Maintenance Data: Upon completion of installation, supply instructions covering re-glazing, adjustments, and other relevant maintenance data.
  2. INFORMATIONAL SUBMITTALS

The paragraph below aligns with edits made in January of 2023 to Gensler's master specifications for our GC3 initiative. This requires that contractors complete an EPD Reporting Form, referenced in 01 81 33 – Sustainable Design Requirements - Embodied Carbon, disclosing (checking a box) if an EPD exists for the product, and to provide the EPD if available. Edit list below to align with the project.

* + 1. Environmental Product Declaration (EPD) Disclosure Submittals: Completed Environmental Product Declaration Reporting Form in accordance with Section 01 81 33 – Sustainable Design Requirements - Embodied Carbon, for the following product types in this Section:
       1. Laminated glass.
       2. Patterned glass.
       3. Back-painted glass.
       4. Custom Washroom Mirrors.
       5. Fire Rated Glass.
    2. VOC Content: Product data or laboratory reports showing compliance with VOC content limits.

The following submittal is a part of the GPS Standards and is required for all projects. This relates to material ingredient disclosure reports listed under 'Quality Assurance' for select product types.

* + 1. Material Ingredient Disclosure: Submit one of the following reports:
       1. Health Product Declaration.
       2. UL Product Lens.
       3. Living Building Challenge Declare Label or Living Product Challenge Label.
       4. EPEA Material Health Statement.
       5. Cradle-to-Cradle v4 Material Health Certificate or multi-attribute certificate.

The following submittal is a part of the GPS Standards and is required for all projects.

* + 1. Sustainability Reporting: Provide the following for decorative glass products.
       1. Recycled content, including Pre-consumer and post-consumer percentages.
       2. Manufacturing location.
  1. QUALITY ASSURANCE
     1. Conform to the requirements of the GANA Glazing Manual, latest Edition.

The following requirement is a part of the GPS Standards and is required for all projects. This document corresponds with an informational submittal required in this section.

* + 1. Material Ingredient Disclosure: Obtain decorative glass products with publicly available reports disclosing material ingredients to residuals no greater than 1000ppm.
  1. DELIVERY, STORAGE, AND HANDLING
     1. Delivery and Acceptance Requirements: Deliver packaged materials in their original containers with manufacturer's labels and seals intact.
     2. Storage and Handling Requirements: Store vertically, blocked off the floor in a weatherproof enclosure in original containers with manufacturers labels and seals intact until read for installation, and as follows:
        1. Install glass as soon as possible after delivery to site.
        2. Handle glass carefully to its place of installation.
        3. Prevent damage to glass, adjacent materials, and surfaces.
  2. SITE CONDITIONS
     1. Ambient Conditions: Maintain temperature, humidity and solar exposure conditions of Glass Glazing materials during shipping, storage and site installation as required by manufacturer to maintain warranty and performance of installed products.
  3. WARRANTY
     1. Provide manufacturer's warranty for the following types of glass listed, against defects in materials and workmanship for the period indicated, commencing from the date of Substantial Performance of Work:
        1. Seal Failure: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions.
        2. Evidence of Failure: Obstruction of vision by dust, moisture, or film on interior surfaces of glass.
        3. Allowable Specific Exclusions: Breakage resulting from thermal stress will be accepted as a limitation to the warranty in accordance with CAN/CGSB 12.20.
        4. Warranty Period: Ten (10) Years.

1. products
   1. MATERIALS
      1. Float Glass: In accordance with CAN/CGSB-12.3, glazing quality and as follows:
         1. Clear Glass: No tint.

SPEC NOTE: Provide the GL# from the Product and Finish Schedule below.

* + 1. Tempered Glass (GL-#):

SPEC NOTE: Edit the following to reflect the Design of the Project. Remove Low Iron when not needed.

* + - 1. Clear, **[Low-Iron]** conforming to CAN/CGSB-12.1, Type 2, Class 'B'. Tempering shall be performed using horizontal tong free method.

SPEC NOTE: Provide the GL# from the Product and Finish Schedule below.

* + 1. Laminated Safety Glass (GL-#): In accordance with CAN/CGSB-12.1 and ASTM C1172 as follows:

SPEC NOTE: Edit the following to reflect the Design of the Project. Remove Low Iron when not needed.

* + - 1. Glass: Clear, [Low-Iron] tempered glass.
      2. Type: 1 - Laminated.
      3. Class: B - Float Glass.
      4. Category: II - Fully Tempered.

SPEC NOTE: Delete the following when "Custom Mirrors" are not required on the Project.

SPEC NOTE: Section 10 28 13 – Washroom Accessories covers off the shelf mirrors. This paragraph is for custom mirrors, in custom sizes.

* + 1. Mirrors, Silvered: to ASTM C 1503 and as follows:
       1. Type: 1B - Float glass for high humidity use.
       2. Tint: Clear
       3. Edges: Pencil polished edge. Seal edges to prevent chemical or atmospheric penetration of backing.
       4. Mirror Clips: C26 (polished chrome) finished steel, or stainless steel edge clips, with fastening concealed behind mirror.

SPEC NOTE: Delete the following when Fire-Rated Glass is not required on the Project.

* + 1. Fire Rated, Ceramic Fire-Rated Glass: Material used in door and screen applications with fire rating requirements of 60 minutes with hose stream test.
       1. Fire Rated Glass: Two-ply of glass ceramic, laminated with Teflon or PVB interlayer and as follows:
          1. Thickness: 8mm
          2. Fire Rating: 60 minutes.
          3. Labelled: Permanent logo listing name of product, manufacturer, testing laboratory, fire rating period and safety requirements

Basis-of-Design Materials:

Technical Glass Products, FireLite Plus.

VetroTech, Keralite Select L.

SAFTI: Pyran Platinum L.

SPEC NOTE: Delete the following when Wired Glass is not required on the Project.

* + 1. Wired Glass: For use in doors and wall applications with fire rating requirements of 45 minutes with hose stream test in locations where fire safety is of prime importance.
       1. Wired Safety Glass: In accordance with CAN/CGSB-12.11 and as follows:
          1. Type: 1 - polished both sides, transparent.
          2. Wire Mesh Style: 3 - Square.
    2. Gaskets:
       1. Neoprene/EPDM thermoplastic rubber type gaskets of sufficient thickness to be compressed 25% when installed, having 2,000 psi tensile strength, with 50 durometer shore A hardness plus/minus 5, maximum 30% resistance to permanent set, resistance to ozone without cracking, minimum elongation at break of 300% and conforming to ASTM C 542.
       2. Colour - "Black."
    3. Sealant:
       1. One component, silicone base, solvent curing sealant conforming to ASTM C 920. Colour as selected Later by Consultant.
    4. Glazing Compound:
       1. Non-hardening modified oil type glazing compound.
    5. Setting Blocks:
       1. Neoprene/EPDM rubber type, 4" long, with 40 to 50 durometer shore A hardness plus/minus 5; resistant to sunlight, weathering, oxidation and permanent deformation under load and wide enough to extend from fixed stop to opposite face of glass of thickness suitable to glazing condition to provide adequate glazing "bite".
    6. Spacer Shims:
       1. Neoprene/EPDM rubber type, with 40 to 50 durometer shore A hardness plus/minus 5; resistant to sunlight, weathering, oxidation, and permanent deformation under load and of adequate thickness to provide correct glass to face clearance at least 1/8".
    7. Glazing Tape:
       1. Macro-polyisobutylene preformed glazing tape, 'Polyshim' or 'Vision Strip' by Tremco Ltd., division of RPM Company, or approved equal.
  1. BACK-PAINTED GLASS

SPEC NOTE: Provide the GL# from the Product and Finish Schedule below.

* + 1. Back-Painted Glass Units (GL-#): In accordance with CAN/CGSB-12.9 and as follows:
       1. Unit Composition: Clear, Low-Iron tempered glass complete with applied silicone elastomeric coating, minimum thickness 1/64", and safety film backer.
       2. Thickness: 6mm.
       3. Coating Colour: As indicated in Section 09 06 05 Product and Finish Schedule.

SPEC NOTE: The following are examples of Tempered Laminated Glass. Edit the following paragraphs to reflect the Design of the glazing, as indicated on the Glazing Schedule on the Drawings.

SPEC NOTE: Provide the GL# from the Product and Finish Schedule below.

* 1. TEMPERED LAMINATED GLASS
     1. Vestibule Ceiling Glazing (GL-#):
        1. Unit Composition: 13.5mm thick laminated glass comprised of the following:
           1. 6mm thick clear, Low-Iron, tempered outer layer, 1.5mm thick clear interlayer, 6mm thick clear, Low-Iron, tempered inner layer.
           2. Basis of Design Manufacturer: Accuraglass.
     2. Vestibule Side Wall Glazing (GL-#):
        1. Unit Composition: 17.5mm thick laminated glass comprised of the following:
           1. 8mm thick clear, Low-Iron, tempered outer layer, 1.5mm thick clear interlayer, 8mm thick clear, Low-Iron, tempered inner layer.
           2. Basis of Design Manufacturer: Accuraglass.
  2. FABRICATION AND MANUFACTURE
     1. Label each light of glass with the registered name of the product and the weight and quality of the glass.
     2. Check dimensions on site before cutting materials.
     3. Minimum bite or lap of glass on stops and rabbets as recommended by glass manufacturer. Finish surfaces shall be free of tong marks.
     4. Cut glass true to dimensions, square, plumb and level. Verify all dimensions prior to fabrication.
     5. Distortion, pock marking or defects detrimental to appearance and/or performance, as determined by the Consultant, will be rejected.

SPEC NOTE: Delete the following if there is no Wired Glass on the Project.

* + 1. Cut wired glass so that wires are parallel with edges both vertically and horizontally.

SPEC NOTE: Delete the following if there are no "Custom Mirrors" on the Project.

* + 1. Fabricate mirrors to fit measurements of finished spaces, made at the site. Use one piece for mirrors 4' or less in width. Make no horizontal joints except where indicated.

SPEC NOTE: Delete the following when Fire-Rated Glass is not required on the Project.

* 1. GLAZING COMPOUND FOR FIRE RATED GLAZING MATERIALS
     1. Glazing Tape: Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2%, designed for compression of 25% to effect an air and vapour seal.
     2. Silicone Sealant: One-part neutral curing silicone, medium modulus sealant, Type S; Grade NS; Class 25 with additional movement capability of 50% in both extension and compression (total 100%); Use (Exposure) NT; Uses (Substrates) G, A, and O as applicable.
        1. Acceptable Materials:
           1. Dow Corning Corp., Dow Corning 795.
           2. General Electric Co., Silglaze-II 2800.
           3. Tremco Inc., Spectrum 2.
     3. Setting Blocks: Hardwood, glass width by 4" x 1/4" thick.
     4. Spacers: Neoprene or other resilient blocks of 40 to 50 Shore A durometer hardness, adhesive-backed on one face only, tested for compatibility with specified glazing compound.
     5. Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.

SPEC NOTE: Delete the following when Fire-Rated Glass is not required on the Project.

* 1. FABRICATION: FIRE RATED GLASS
     1. Fabricate glass and other glazing products in sizes required to glaze openings indicated for project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standards as required to comply with system performance requirements.

1. execution
   1. EXAMINATION
      1. Examine areas of work affecting the work of this section. Report in writing all defects, errors, and discrepancies immediately to the Consultant.
      2. Commencement of work implies acceptance of surfaces and conditions.
   2. preparation
      1. Openings shall be free from moisture, frost, rust, dirt, and foreign matter.
      2. Clean surface to receive sealant with a clean cloth dampened with xylol or a 50-50 mixture of acetone and xylol. Wipe dry with a clean, dry cloth.
   3. installation
      1. Conform to the recommendation of the glazing manual, Flat Glass Marketing Association, latest edition and as specified herein.
      2. Unless otherwise indicated on drawings, provide tempered glass at all doors, transoms, sidelights, and vision lites within 760mm (2'-6") of grade and/or finished floor.
      3. Glaze doors scheduled to be glazed.
      4. Set sheet glass with draw lines horizontal.
      5. Glaze interior openings using compound or glazing tapes or gaskets.
      6. Install removable stops. Insert spacer shims between glass and stops at 610mm (24") O.C. and not less than 6mm (1/4") below "sight lines". Fill remaining voids with sealant or glazing compound to "sight lines" and trim sealant/glazing compound to produce clean, sharp, straight lines without voids or depressions.
      7. Replace loose stops in their original positions, tighten all screws.
      8. Refer to drawings and door and frame schedule for locations of each type of glass.
   4. CLEANING
      1. Repair all defects caused by the work of this section. Remove as work progresses, all excess or foreign materials or droppings which would set or become difficult to remove from surfaces at time of final cleaning.
      2. Immediately prior to acceptance of work of this section by Consultant, remove temporary protection, clean and polish exposed surfaces of all work of this section. Use proper cleaning materials and methods to prevent damage to surfaces, finishes, sealer, or work of other trades. Make good such damage to Consultant's satisfaction.
      3. Do not use steel wool, wire brushes or steel scrapers on any finished surfaces.
      4. Replace or make good to Consultant's satisfaction, upon completion of work of this section, all defective, scratched, or damaged work, at no extra cost to the Owner.

end of section