PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included: Furnish and install glass specified.

1.02 RELATED DOCUMENTS

A. Applicable portions of the Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to the execution of the Contract, other documents listed in the Agreement and Modifications issued after the execution of the Contract shall apply to this Section. The general requirements for this work are located in Division 1 of the Specifications.

1.03 SUBMITTALS AND SUBSTITUTIONS

A. In accordance with Section 01 3000.

B. Substitutions will not be considered prior to the award of the General Contract.

1.04 QUALITY ASSURANCE

A. Qualifications of Installers: Provide at least one person thoroughly trained and experienced in skills required, completely familiar with referenced standards and requirements of this work and to personally direct installation performed under this Section.

B. Applicable Standards For Glass and Glazing Work: Conform to the "Manual of Glazing" of the Flat Glass Marketing Association, requirements of Federal Specification DD-G-451c and Safety Standard 16 CFR 1201 of the U.S. Consumer Products Safety Commission.

1.05 PRODUCT HANDLING

A. Protection: Protect glass and glazing materials before, during, and after installation. Protect installed work and materials of other trades.

B. Replacements: In event of damage, immediately make repairs and replacements necessary and at Contractor's expense.

PART 2 - PRODUCTS

2.01 GENERAL QUALITY REQUIREMENTS

A. No manufacturer logos are allowed on any glass. Provide certification to General Contractor that tempered, heat strengthened, annealed, laminated, etc. glass was used

where required.

B. Annealed float glass shall comply with ASTM C1036, Type I, Class 1 (clear), Class 2 (tinted), Quality-Q3.

C. Heat-strengthened float glass shall comply with ASTM C1048, TypeI, Class 1 (clear), Class 2 (tinted), Quality Q3, Kind HS.

D. Tempered float glass shall comply with ASTM C1048, Type I, Class 1 (clear), Class 2 (tinted), Quality Q3, Kind FT.

E. Laminated glass to comply with ASTM C1172.

F. IG units consist of glass lites separated by a dehydrated airspace that is hermetically dual sealed with a primary seal of polyisobutylene (PIB) or Thermoplastic Spacer (TPS) a and a secondary seal of silicone or an organic sealant depending on the application.

G. Insulating glass units are certified through the Insulating Glass Certification Council (IGCC) to ASTM E2190.

H. Special Glass Required by Building Code:
1. Provide safety glazing as required by code.
2. Provide heat strengthened glass where required by design pressures, anticipated thermal stress, or use in spandrel areas.
3. Provide fully tempered glass only where safety glazing is mandatory or where pressures exceed capacity of heat strengthened glass.
4. Provide Fire Resistive and/or Fire Protective rated glass where required.

2.02 GLASS AND COATING SCHEDULES

A. Monolithic Glass Schedule:
GL 1 - ½" Tempered (interior glazing w/o vertical mulls up to 10' and linked with silicone)

GL 1M - ½" Laminated, Mirrored (Simulation Control Room Windows)

GL 2 – 3/4" Tempered Glass, Clear (Cantilevered Glass Guardrail at openings and stairs, interior glazing w/o vertical mulls over 10' and linked with silicone)

B. Laminated Glass: S.A. Bendheim, Ltd., 800-606-7621, www.bendheim.com; or approved substitute.
1. Comply with ASTM C1172, ANSI Z97.1, and CPSC 16 CFR 1201, Category II.
2. Laminate glass by manufacturer's standard heat and pressure process.
3. Description: To match Architect's sample.
4. Annealed or Tempered as required by Code.
5. Interlayer: Bridgestone EVA, Uvekol, or PVB.
6. Overall thickness: As noted
7. Edge treatment: Flat Polished

GL 3F – ¾" Laminated Glass with Integral Pattern Film (Frosted White, Multiple Locations)

GL 3M – ¾" Laminated Glass with Integral Pattern Film (Custom Pattern A) (Monumental Stair)

GL 3L – ¾" Laminated Glass with Integral Pattern Film (Custom Pattern B) (Library Glass)

GL 3G – ¾" Laminated Glass with Integral 'Gold Mirror' Film (Library Bump Out)

C. Glass Film Schedule:
VF: Vinyl Film, Manufacturer: 3M, standard film in custom CNC cut pattern

2.03 INSULATING GLASS UNITS

A. Manufacturer is used in this section to refer to a firm that produces primary glass or fabricated glass as defined in the referenced standards.
1. Oldcastle Glass
2. Guardian Industries
3. Pilkington
4. Vitro Industries
5. Visteon Float Glass
6. Approved equal

B. Insulating glass units are certified through the Insulating Glass Certification Council (IGCC) to either ASTM E774, or to ASTM E2190, or both.

C. Insulating glass shall have double edge seals. Primary seal shall be extruded polyisobutylene continuously bonded to glass surfaces and desiccant filled metal spacer, including corners. Minimum width of primary seal shall be 0.125 inch. Secondary seal shall be Momentive IGS 3723 or Dow Corning 982. Secondary seal shall completely cover spacer with no gaps or voids, and shall be continuously bonded to both plates of glass. Where insulating glass is supported by structural silicone, secondary seal shall be designed to transfer specified pressures from outdoor glass to indoor glass.
1. At structural silicone glazed assemblies, the metal spacer between panes of glass is to be Black.

D. High Performance Coating Schedule:
1. "Low-E" Coating: Vitro Solarban 90 (2) Clear + Clear VLT: 51, SHGC: .23
2. Reflective Coating: Vitro Solarban R100 (2) + Clear VLT: 43, SHGC: .23

E. Insulated Glass Unit Schedule:
All exterior glass noted as 'clear' shall be equal to VITRO 'Acuity' Iron-free glass.

IGU-1: 1" IGU, ¼" Clear Temp - ¼" Clear Temp, ½" Air Space. Low-E Coating (#2) Typical exterior curtainwall

IGU-2: 1" IGU, ¼" Clear Temp - ¼" Spandrel (#3), ½" Air Space. Low-E Coating (#2)

Typical exterior curtainwall

IGU-3: 1+" IGU, ¼"+/- Clear Laminated - ¼" Clear-Laminated, ½" Air Space. Low-E Coating (#2)
North wall, acoustic separation from mech yard

IGU-4: 1" IGU, ¼" minimum Clear Temp - ¼" minimum Clear Temp, ½" Air Space. Reflective Coating (#2)
At engineered angled walls

IGU-5: 1" IGU, ¼" minimum Clear Temp - ¼" minimum Spandrel (#3), ½" Air Space. Reflective Coating (#2)
At engineered angled walls

IGU-6: 1" IGU, ¼" minimum Clear Laminated - ¼" minimum Clear Temp, ½" Air Space. Reflective Coating (#2)
At East Engineered Walls where wall angle exceeds 15 degrees.

IGU-7: 1" IGU, ¼" minimum Clear Laminated - ¼" minimum Spandrel (#3), ½" Air Space. Reflective Coating (#2)
At East Engineered Walls where wall angle exceeds 15 degrees.

IGU-8: 1" IGU, ¼" minimum Clear Laminated - ¼" minimum Clear Temp, ½" Air Space. Low-E Coating (#2)
At West Wall of Building 'Bridge' where wall angle exceeds 15 degrees.

IGU-9: 1" IGU, ¼" minimum Clear Laminated - ¼" minimum Spandrel (#3), ½" Air Space. Low-E Coating (#2)
At West Wall of Building 'Bridge' where wall angle exceeds 15 degrees.

2.04 GLAZING ACCESSORIES

A. Provide glazing accessories required to complete glazing work that are compatible with various components of the glazing system(s), and subject to approval of Architect.

B. Glazing Sealants: As specified in Section 07 9000

C. Glazing gaskets, sealant backers within glazing pockets, and continuous glass spacer pads at structural silicone shall be black extruded dense silicone.

D. Glazing Tape: Bostik "Chem Tape 60", Pecora "Shim-Seal", or Tremco "Pre-shimmed Tremco 440 Tape".

E. Setting Blocks: Silicone blocks tested for compatibility with specified glazing sealants. Provide side blocks at both jambs, between midheight and top corner of glass, at four-side conventional dry glazed openings. Side blocks are not required where glass is continuously sealed with silicone sealant at two or more edges.

F. Spacers: Saint-Gobain Performance Plastics V2100 Thermalbond Tape is acceptable as a glass spacer when used in conjunction with structural silicone, subject to verification of compatibility.

G. Compressible Filler Rod: Closed-cell or waterproof-jacketed foam of polyethylene, butyl rubber, neoprene, polyurethane or vinyl, tested for compatibility with specified glazing sealants, of 5 to 10 psi compression strength (25% deflection), recommended by sealant manufacturer for use in glazing channel to prevent sealant exudation from the channel.

H. Mirror Mastic: An adhesive setting compound, produced specifically for setting mirrors by spot application method (25% coverage) without support, to be used in 1/8" to 1/2" thickness.

2.05 GLASS RAILING SYSTEM

A. Ornamental Glass Stair Railings: Installed glass rail systems/assemblies shall be tested to remain in place as a barrier following impact or glass breakage in accordance with ASTM E2353
   1. Railing Type 1
      a. Locations: L3/L4 Office Guardrails, L2 Gallery Access Stair
      b. Provide glass stair railing system with 3/4" tempered glass CRL/Julius Blum & Co., 201-438-4600.
      c. Components
         1) Recessed, Square Base Shoe, type per details/condition
         2) Exposed top glass edge (without top cap), polished
         3) Satin Brass Guardrail at stairs, where indicated
   2. Railing Type 2
      a. Location : Monumental Stair
      b. Provide custom glass stair railing system with 3/4” laminated glass with components by CRL/Julius Blum
      c. Components:
         1) Recessed, Square Base Shoe
         2) Exposed top glass edge (without top cap), polished
         3) Satin Brass Guardrail
         4) Satin Brass Guardrail attachments per drawings

PART 3 - EXECUTION

3.01 GLASS SIZES

A. Measure sizes for glass from actual frames, doors and windows. Contract requires glass to be set in place, and Contractor assumes responsibility for correct sizes. Use sizes shown on Drawings for estimating only as approximate dimensions.

3.02 GLAZING SURFACES

A. Glaze only dry surfaces, free from dust or ice. Clean dirty surfaces with cloth saturated with turpentine or mineral spirits before glazing. Remove loose dirt particles and mortar from recesses prior to installation of glass and glazing materials.

3.03 SETTING GLASS

A. Set glass to provide equal bearing for entire width of each pane. Contractor responsible for broken glass due to improper setting. Set using glazing stops furnished by door or fixed framing manufacturer unless otherwise shown or specified. Accurately set glass to fit frame, with all edges smooth. Sharp ragged edges are not acceptable. Cushion glass in fixed interior view windows with felt strips around entire perimeter.

3.04 CLEANING GLASS

A. Contractor shall employ services of a professional window washer at completion of all work to wash glass which has been installed under this contract, removing all stains.

B. Clean glass on both sides after painting operations are complete and dry. Do not use acid solutions or caustic soaps to clean glass.

C. Do not use razor blades to clean glass. Any scratches on the glass caused by the cleaning process will be cause for the removal and replacement of the damaged glass at the Contractor's expense.

END OF SECTION