

**SECTION 08970
STRUCTURAL GLASS CANOPY OR ROOF**

PART 1: GENERAL

1.1 SUMMARY

- A. Section Includes: Glass, glazing and connections for the Structural Glass Canopy in accordance with the Contract Documents.
- B. Related Sections:
 - Section 05500 Misc. Steel sub frames
 - Section 07900 - Sealants: Sealants for Glazing
 - Section 08800 - Glass and Glazing
- C. Substitutions:
 - 1. The following specifications and related drawings are based on the performance of the Pilkington Planar System structural laminated substrate as a standard of quality. Substitutions will be accepted **if and only if** they comply in all respects with the drawings and profiles shown, as well as all elements of the specifications contained herein. **Manufacturer must have a minimum of three years experience in the U. S. with Sentry Glass laminate by DuPont and must submit a minimum of five other projects completed in the U.S. within the last three years similar to the scope of this project using exposed edge laminated glazing.** Any substitutions to the specified product must be approved by the architect no later than fifteen (15) days prior to bid.

1.2 QUALITY ASSURANCE

- A. Sole Source Responsibility: Glazing Material and System Design: Glass, glazing, system design and accessories are the sole responsibility of Pilkington Architectural.
- B. Sole Source Responsibility: Provide installation by installer acceptable to Pilkington Architectural. Provide a letter signed by representative of Pilkington Architectural with company's authorization stating that installer is acceptable and qualified to install system.
 - 1. The installer of the Pilkington Planar System is responsible for supplying and erecting the complete structural glazing system, coordinating and maintaining tolerances between structure and glazing system with individual suppliers and manufacturers, and installation of glazing system.
- C. Where safety glass is indicated or required by authorities having jurisdiction, provide type of products which comply with ANSI Z97.1 and testing requirements of 16 CFR, Part 1201 for category II materials.

1.3 SYSTEM DESCRIPTION

- A. Design Requirements: to be filled in _____ by architect
 - 1. Design Wind Load: to be filled in by architect

2. Live load deflection of supporting structure if any: [to be filled in by architect](#)
3. Snow load / drift: [to be filled in by architect](#)

B. Pilkington Planar Glazing System:

1. Fittings are designed to give flush appearance to outward surface of glazing system. **NO EXTERIOR FITTINGS OR PLATES WILL BE PERMITTED.**
2. The design of the Planar fittings is the sole responsibility of Pilkington Architectural.
3. Spring plate members are designed to prevent high stress concentration at the hole positions and must cope with:
 - a. Negative and positive wind loading
 - b. Seismic loads
 - c. Thermal movement
 - d. Construction tolerances
 - e. Live load and dead load movements
4. Movement diaphragms of stainless steel and durable flexible discs must be incorporated in connections to accommodate oversize holes in spring plate members which allow for thermal movement and glass manufacturing tolerances.
5. The system shall provide for unitized pre-fixing of all items to glass prior to erection.

1.4 SUBMITTALS

- A. Submit the following in accordance with Section: [to be filled in by architect](#).
1. Shop Drawings: Shop drawings shall clearly indicate materials and methods, indicate coordination with other trades, and bear signed approval of the glazing system manufacturer and the glazing system installer, as well as the stamp of a licensed Professional Engineer in the State: [to be filled in by architect](#)
 2. Product Data: Material description and installation instructions for tapes, compounds, gaskets and other materials.
 3. Samples:
 - a. Submit sample of glass and glazing materials required for the Project. Samples of glass shall be 12" x 12", samples of sealant or gasket shall be 12" long.
 - b. Submit sample of spring plate complete with glass, bolt and accessories.
 4. Quality Assurance Compliance: Submit letters from Pilkington's authorized representative and from the project installer stating that they are in compliance with the requirements of the Contract Documents.

5. Calculations: Submit calculations proving structural glazing systems performance and compliance with specified loads with stamp of licensed Professional Engineer registered in the State of: [to be filled in by architect](#)

1.5 WARRANTIES

- A. Manufacturer Warranty: Provide **twelve year** warranty for the design integrity, weatherability and durability of the entire system on the letterhead of the manufacturer. Warranties not written by the glass manufacturer for the entire system will not be accepted. **Separate warranties for fittings and glass or warranties written by the glazing subcontractor will not be acceptable.**
- B. Installer Warranty: Warrant the installation for a period of **five years** for installation and repairs of failures. Provide written requirements for notification of installer and terms for maintaining warranty provisions. Do not contradict the requirements of the Contract Documents.
- C. The Warranties submitted under this Section shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and the laws of governing jurisdictions and is in addition to and runs concurrently with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2: PRODUCTS

2.1 MATERIALS

- A. Structural Glass Wall System:
BASIS OF DESIGN:

The drawings and specifications herein are based on The Pilkington PLANAR system as a standard of quality as distributed by:

W&W Glass, LLC
302 Airport Executive Park, Nanuet, NY 10954
Telephone: (800) 452-7925 Fax: (845) 578-1596

1. Substitutions: The following specifications and related drawings are based on the performance of the Pilkington Planar System as a standard of quality. Other manufacturers listed below will be accepted if and only if they comply in all respects with the drawings and profiles shown, as well as all elements of the specifications contained herein. Manufacturer must have a minimum of five years experience in the U. S. in tall structural glass projects and must submit a minimum of ten other projects completed in the U.S. within the last five years similar to the scope of this project.
- B. **Glass will be tempered to a minimum stress level of 16000 psi. Glass fabricated to lower stress levels will not be accepted.**
- C. Glass types:

1. Makeup of glass will be as follows: [Thickness to be determined by architect after consultation with W&W Glass, LLC.](#)

2.

2.. PVB interlayers will not be acceptable as an exposed edge laminate.

D. All tempered glass must be heat soak tested to convert nickel sulfide inclusions from the alpha phase to the beta phase so that the glass will fracture in the test. Heat soak must comply with the European Din standard requiring a minimum 12 hour cycle at a temperature of between 280 and 300 degrees C and must be warranted for twelve years as part of the system warranty.

E. Written warranties against nickel sulfide inclusions in lieu of heat soaking will not be accepted.

F. All edges will be ground flat with a frosted appearance unless otherwise noted.

G. All edgework, holes and notches in the tempered glass panels will be completed before tempering and shall comply with the requirements of Pilkington Architectural as stated below:

a. Dimensional tolerance on panel size will be ± 1 mm of the theoretical dimension required.

b. Squareness of each panel will be within 3 mm.

c. Bow allowance is 0.1%.

d. The positional tolerances on all holes will be ± 1 mm from a single datum point.

7. Flatness of glass is a key element of this specification. Average tempered glass rollerwave distortion must be certified not to exceed an average of 0.0007 inches peak to valley, with a maximum sag at the leading and trailing edge of 0.25 mm. A site inspection if required for roller wave and bow tolerances should be from a minimum distance of 3 meters.

8. All glass must be manufactured in a factory where the quality control procedures are created under the terms of ISO 9000 and are independently monitored.

9. Prestress glass around holes to a level which is compatible with the design and use of the fittings. Check by differential surface refractometer on stress level.

C. Fittings:

1. Planar fittings shall be predominantly manufactured from stainless steel Grade 316. Fittings will be Planar series 905J fittings ([or fittings will be chosen by architect after consultation with W & W](#)) **Spider type larger fittings are not acceptable.**

2. The subcontractor shall demonstrate to the Architect's satisfaction that the stresses induced in the glass by these fittings are compatible with the strength of the glass and the needs of the performance section of this specification.
3. The finish of all fittings will be "as machined".
4. Spring plates shall be designed to the Architect's specification. The design shall be shown by the Subcontractor to be compatible with the performance specification in all respects.
 - 4.1 Spring plates shall provide a tolerance capability which will cope with the full range of movements shown below:
 - a. Thermal movements occurring as a result of differential coefficients of thermal expansion within the range specified. The components used within the system shall withstand noiselessly all thermal movements without any buckling, distortion, cracking, failure of joint seals or undue stress on the glass or fixing assemblies.
 - b. Deflection of edge beams due to loading applied after erection of the cladding to magnitude specified.
 - c. Maximum side sway of structure due to wind load to the magnitude specified or seismic movement to the degree specified.
 - d. Deflection due to self weight of the Planar system.
 - e. Inward and outward movements due to the design wind loads specified.
5. Countersunk Planar bolts will be bright machine finished, socket head bolt diameter 1-1/8" with hexagonal shank, stainless steel Type 303.
 - 5.1 No exterior plates, caps, disks or buttons will be permitted.
6. Bushings will be Nylatron Polyamide.
7. Gaskets will be fully vulcanized fiber, neoprene or precured silicone.

PART 3: EXECUTION

3.1 EXAMINATION

- A. Examine surfaces receiving the Work. Verify dimensions of in-place and subsequent construction. Follow the recommendations of the FGMA as to inspection procedures. Do not begin work until unsatisfactory conditions have been corrected. Installation of work shall constitute acceptance of the related construction.

3.2 PREPARATION:

- A. Pre-Installation Meeting: Meet at the project site with the representatives of the glass and glazing materials manufacturers, architectural exposed structural steel fabricator and erector, sealant manufacturer, the glazing installer, Architect's representative and Owner's representative. Review the glazing procedure and schedule, including the method of delivering and handling glass, and installing glazing materials. The chemical compatibility of all glazing materials and framing sealants with each other and with like materials used in glass fabrication shall be established.

3.3 INSTALLATION OF GLASS:

- A. Install in accordance with Pilkington Architectural's requirements and the shop drawings.
- B. Employ only experienced glaziers who have had previous experience with the materials and systems being applied. Use tools and equipment recommended by the glass manufacturer.
- C. Plate to plate joints of glass are sealed with silicone sealant. Joint dimensions shall be designed to be compatible with sealant properties and live load movement of the structure.
- D. Bolt Torque: Torque bolts to torques specified on shop drawings using calibrated tool. Lock torqued bolts into position to prevent backoff. Reset calibrations regularly to ensure accurate torquing.
- E. Maintain a minimum temperature of 40 degrees F. during glazing unless the manufacturer of the glazing material specifically agrees to application of this material at lower temperature. If job progresses or other conditions require glazing work when temperature is below 40 degrees F. (or below the minimum temperature recommended by the manufacturer), consult the manufacturer and establish the minimum provisions required to ensure satisfactory work.
- F. Clean glazing connectors receiving glazing materials of deleterious substances which might impair the work. Remove protective coatings which might fail in adhesion or interfere with bond of sealants. Comply with manufacturer's instructions for final wiping of surfaces immediately before application of primer and glazing sealants. Wipe metal surfaces with xylol or toluol.
- G. Inspect each unit of glass immediately before installation. Glass which has significant impact damage at edges, scratches or abrasion of faces, or any other evidence of damage shall not be installed.
- H. Sealants: Prime surfaces to receive glazing sealants where required, in accordance with manufacturer's recommendations, using recommended primers.

- I. Locate setting blocks, if required by the drawings, at the quarter points of sill, but no closer than 6 inches to corners of glass. Use blocks of proper sizes to support the glass in accordance with manufacturer's recommendations.
- J. Provide spacers to separate glass from spring plates.
- K. Set glass in a manner which produces greatest possible degree of uniformity in appearance. Face all glass, which has dissimilar faces, with matching faces in the same direction.
- L. Use masking tape or other suitable protection to limit coverage of glazing materials to the surfaces intended for sealants.
- M. Tool exposed surfaces of glazing materials.
- N. Clean excess sealant from glass and support members immediately after application, using solvents or cleaners recommended by manufacturers.

3.4 CURING, PROTECTION, AND CLEANING

- A. Cure sealants in accordance with the manufacturer's instructions to attain maximum durability and adhesion to glass.
- B. Clean all surfaces after installation, leaving all in a clean and workmanlike manner.
- C. Final cleaning and protection after installation is the responsibility of others.