



**SPECIAL PROVISIONS
FOR
GLASS OVERLOOK**

**Scott County
IM-NHS-074-1(198)5--03-82**

**Effective Date
April 25, 2017**

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

150209.01 DESCRIPTION.

- A.** Custom fabrication, and site erection of glass floor assembly for bridge overlook structure, including glass floor assembly and stainless steel support elements.
- B. References.**
 - 1. American National Standards Institute (ANSI): ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.
 - 2. American Society of Civil Engineers (ASCE): ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
 - 3. American Society for Testing and Materials (ASTM):
 - a. AISI 316 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - b. ASTM C864 - Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
 - c. ASTM C920 - Elastomeric Joint Sealants.
 - d. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid Applied Sealants with Accessories Used in Structural Glazing Systems.
 - e. ASTM C1048 - Heat Treated Flat Glass, Kind HS, Kind FT, Coated and Uncoated.
 - f. ASTM C1172 - Laminated Architectural Flat Glass.
 - g. ASTM C1184 - Structural Silicone Sealant.
 - h. ASTM C1193 - Standard Guide for Use of Joint Sealants.
 - i. ASTM C1330 - Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
 - j. ASTM E331 - Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
 - k. ASTM E1300 - Determining Load Resistance of Glass in Buildings.
 - 4. Consumer Product Safety Commission (CPSC): CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.

5. Glass Association of North America (GANA): GANA - Glazing Manual.
6. International Code Council (ICC): ICC IBC - International Building Code.

C. Glass Floor Assembly Description.

1. Exterior structural glass floor assembly to be custom factory fabricated, and site erected. Assembly shall consist of glass floor panels installed on floor framing with structural silicone sealant.
2. Basic configuration: Multiple structural glass panels installed in floor opening supported by open grid system of laminated glass beams and joists as shown on plans.
3. Dimensions: Glass floor assembly shall be dimensions shown on plans. Minor variations to accommodate manufacturer's design and components shall be submitted for approval.
4. Glass floor panels: Custom shaped panels of sizes and layout indicated on plans.

150209.02 REQUIREMENTS.

A. Submittals.

1. Submit in accordance with Section 1105 of the Standard Specifications:
 - a. Product data for all proposed components, materials, products, and accessories. For each type glass, provide maximum allowable stress in both horizontal and vertical directions.
 - b. **Shop drawings.**
 - 1) Plans and sections showing components, layout, configuration, and dimensions.
 - 2) Illustrate method of assembly, installation, and glazing.
 - 3) Provide details for secondary support framing, connections, joints, and other fabrication and installation conditions.
 - 4) Indicate required tolerances and coordination with adjacent elements and work of other trades.
2. **Samples.**
 - a. 6 by 6 inches minimum size for each type glass.
 - b. 6 inches minimum length of secondary support framing laminated glass joists.
 - c. 6 inches minimum length of glass floor panel and structural silicone sealant joint.
 - d. Sealant colors.
3. Manufacturer's installation and maintenance instructions.
4. Certificates or test reports demonstrating components and methods meet specified requirements.
5. Data showing compliance with manufacturer's and installer's qualifications specified in Articles 150209.02, B, 3 and 4. Provide descriptions, locations, photographs, references, and completion dates for previous projects.
6. Copies of warranties required by Article 150209.02, G,1 for review by Engineer.

B. Quality Assurance.

1. Custom fabrication for glass floor assembly and supply of all components, materials, and products shall be sole responsibility of single manufacturer. Provision of products from numerous sources for site assembly without complete single source design and supply

- responsibility is not acceptable. Components to be fabricated or supplied by single source are:
- a. Stainless steel support framing.
 - b. Glass floor components.
 - c. Structural silicone sealant, backers, setting blocks, spacers, fittings, and other installation accessories.
 - d. All other components, products, and materials required for complete, functional glass floor.
2. Single installation responsibility: All components listed in Article 150209.02, B, 1 shall be installed by a single installer.
 3. Manufacturer qualifications: Company specializing in fabricating unique, custom designed, glass floor assemblies, canopies, facades, entrances, storefronts, and other glazed structures.
 - a. Experience: 5 years minimum successful experience providing glass structures.
 - b. Previous projects: Successfully completed a minimum of three glass structures of scope, type, and size as proposed Project.
 4. Installer qualifications: Company experienced in erecting custom designed, glass floor assemblies, canopies, facades, entrances, storefronts, and other glazed structures and acceptable to manufacturer for installing proposed structure.
 - a. Experience: 3 years minimum successful experience erecting glass structures.
 - b. Previous projects: Successfully completed a minimum of three glass structures of scope, type, and size as proposed project.
 5. Safety glazing: Comply with Consumer Product Safety Commission 16 CFR 1201, ANSI Z97.1, and other applicable safety requirements. Each piece of safety glazing shall be permanently labeled with appropriate marking.
 6. Manufacturer's field representative:
 - a. During installation, provide services of manufacturer's field representative knowledgeable of erection process for proposed glass floor.
 - b. Manufacturer's representative shall observe installation, quality control, and certify work meets specified requirements.
 - c. Manufacturer's representative shall submit report covering observations, procedures, noted deficiencies, corrective measures, and certification of proper installation.
- C. Mock-Up.**
1. Prepare separate mock-up illustrating construction method for glass floor. Mock-up shall demonstrate performance and establish workmanship quality standard.
 2. Provide framing to support floor mock-up to allow inspection from above and below.
 3. Mock-up shall demonstrate all components of floor assembly including glass panels, secondary support framing, spacers, setting blocks, backers, and structural silicone sealant. Construct with materials proposed for actual installation.
 4. Approximate size: 6 by 6 feet.
 5. Test mock-up with applied live loads to verify structural capacity and water hose to verify weather-tightness.
 6. Submit report describing tests, results, and any modifications made to correct deficiencies or to improve performance.
 7. Do not proceed with installation until mock-up has been inspected and accepted by Engineer.

8. Retain approved mock-up during construction as quality standard. Completely remove when work is accepted.

D. Pre-Installation Conference.

1. Convene a pre-installation conference at site prior to commencing work of this Section.
2. Require attendance of entities directly concerned with floor including manufacturer's field representative.
3. Review at meeting:
 - a. Coordination with primary floor system and floor finishes.
 - b. Schedule, sequence, and method for installing glass floor and coordination with other work.
 - c. Safety procedures.
 - d. Availability of system materials.
 - e. Pre-installation test reports and recommendations.
 - f. Chemical compatibility of support framing, glass panels, sealants, and other glazing materials.
 - g. Protection of adjacent items and finishes.
 - h. Approved mock-up to be used a measure of acceptance.
 - i. Other items related to successful execution of work.

E. Product Handling.

1. Protect glass and other components during delivery, storage, and handling in accordance with manufacturer's instructions. Prevent edging chipping and other damage.
2. Do not store glass panels on site for extended time.

F. Environmental Requirements.

During glazing, maintain 40°F minimum temperature.

G. Warranties.

1. Manufacturer's 2 years warranty to cover fabrication and materials against defects and failure to perform and remain air and water tight. Warranty to provide for replacement of defective components.
2. Glass fabricator's warranties: 5 years warranty to cover replacement of laminated glass units in event of delamination, edge separation, and blemishes.

150209.03 MATERIALS.

A. Glass Floor Components.

1. Type of glass: Laminated glass fabricated by bonding two or more glass panes with transparent, flexible interlayer material in accordance with ASTM C1172. Laminated glass shall meet requirements of ANSI Z97.1 and CPSC 16 CFR to qualify as safety glass.
2. Fabricate laminated glass for floor panels and joists from either ASTM C1036 annealed, ASTM C1048 Kind HS heat strengthened, or ASTM C1048 Kind FT fully tempered glass as determined by manufacturer to accommodate Project design and performance requirements specified in the plans.
3. Color: See plans. Coordinate final color selections with Engineer.

4. Clean cut glass units to required sizes. Edges exposed to view after installation shall be highly polished with raised corners and edges.

B. Secondary Stainless Steel Support Framing.

Secondary framing sections: Provide stainless steel framing to support glass floor panels as detailed on plans and approved shop drawings.

C. Structural Sealant Glazing Materials.

1. Provide glazing accessories, anchors, and fasteners of type and size recommended by glass floor manufacturer and as required for complete, functional, weather tight installation.
2. Contact structural sealant: High performance, two component, non-sag, neutral cure, ultraviolet resistant, silicone sealant designed for structural glazing and complying with ASTM C920 and C1184.
3. Sealant backing: Provide backing as recommended by sealant manufacturer and complying with ASTM C1330. Backing shall be greater than joint opening by 25% minimum.
4. Setting blocks and spacers: Compatible with silicone sealant, complying with ASTM C864, and recommended by sealant manufacturer.
5. Masking tape: Non-staining, non-absorbent type compatible with silicone sealant and adjacent surfaces.
6. Cleaners and primers: Recommended by sealant manufacturer to be compatible with substrate and glazing materials.

150209.04 CONSTRUCTION.

A. Coordination.

1. Coordinate provision of glass floor with construction of support framing specified in Bridge Framing Plan. Ensure that provision is made for attachments and transfer of calculated loads.
2. Coordinate provision of glass floor with finishes of overlook concrete slab to ensure that transitions will be flush and smooth.
3. Field verify dimensions prior to fabricating glass floor components.

B. Inspection.

1. Prior to delivery of glass panels to site, verify that support framing and substrates are ready to receive glass floor. Verify alignment, dimensions, and tolerances are correct.
2. Report unacceptable conditions and deficiencies to the Engineer. Do not proceed with installation until corrective action has been performed and approved by the Engineer.
3. Inspect glass panels for chipped edges, scratches, abrasions, and other damage. Damaged panels will be replaced with no additional cost to the State.

C. General Installation.

1. Site assemble and erect glass floor in accordance with approved shop drawings, manufacturer's installation instructions, and GANA Glazing Manual.

2. Damaged glass: Do not install glass with edge damage or other imperfections. Remove from site and replace at no additional cost to the State.
3. Allow for settling, expanding, and contracting to occur without breaking glass.
4. Do not field cut or alter structural framing without written approval from the Engineer.
5. Provide and install exterior gaskets, sealants, and other glazing accessories to resist water penetration. There shall be no penetration at 15 pounds per square foot test pressure and 5 gallons per hour per square foot water rate tested in accordance ASTM E331.

D. Metal Framing.

1. Use anchorage devices to securely attach stainless steel framing to support glass floor panels and to accommodate construction tolerances and irregularities.
2. Insulate dissimilar metals to prevent electrolysis and other forms of corrosion with bituminous paint or non-absorptive gasket to prevent contact as shown on plans.
3. Align framing plumb, level, and free of warp or twist.

E. Pre-Installation Testing.

1. Adhesion testing: Prior to application of sealant, test to ensure sealant satisfactorily adheres to substrate.
 - a. Apply sealant to sample substrate and perform hand-pull tab test in accordance with ASTM C1193, Method A.
 - b. Determine if primer is required. If so, re-test using primer.
2. Compatibility testing: Prior to application of sealant, test spacers, setting blocks, and other glazing accessories to determine compatibility with structural silicone sealant in accordance with ASTM C1087. Incompatible accessories shall be replaced with ones recommended by and tested by sealant manufacturer as acceptable.

F. Structural Silicone Glazing.

1. Install glass floor panels with structural silicone sealant as detailed on plans and approved shop drawings and in accordance with manufacturer's installation instructions.
2. Cleaning: Thoroughly clean all joints and glazing areas immediately prior to sealant application. Remove oil, dust, grease, water, surface dirt, contaminants, and other foreign matter. Vacuum or blow out dust and loose particles from joints and solvent wipe clean in accordance with ASTM C1193.
3. Apply primer only if determined by testing specified in Article 150209.03, E and recommended by sealant manufacturer.
4. Mask areas adjacent to sealant joints to ensure neat sealant line. Do not allow tape to touch surfaces to which sealant will be applied.
5. Glass joists: Install joists in joist bearing assemblies as detailed on approved shop drawings. Use temporary spacers to support joists and offset joist end for support members and bearing assembly. Ensure joists are level and plumb. Apply structural silicone sealant in voids and allow to cure. When cured remove spacers and fill voids with sealant.
6. Glass panel perimeter joint: Install temporary spacers to support glass above perimeter framing and to offset from perimeter framing. Apply structural silicone sealant in space

between glass floor panel and perimeter frame. Tool joints concave. After sealant cures, remove temporary spacers and fill resulting voids with sealant.

7. Glass panel joints over joists: Install temporary spacers to support glass floor panels above joists and to separate floor panels. Apply structural silicone sealant in joint between glass floor panels and between panels and joists. Tool joints concave. After sealant cures, remove temporary spacers and fill resulting voids with sealant.
8. Apply structural silicone sealant in continuous operation. Tool sealant immediate before skin forms. Tool concave to ensure complete contact.
9. Post application test: After structural sealant has cured 14 to 21 days, conduct field test as prescribed by manufacturer to test sealant adhesion. Replace sealant not passing test.

G. Cleaning.

1. Remove excess sealant by moderate use of solvent cleaner acceptable to sealant manufacturer.
2. Exercise care in removing mortar, cementitious materials, and sand from glass and frames. Do not wipe surfaces in order to avoid scratching.
3. Touch up damaged or abraded factory finishes with coating to match type and color of original finish.
4. Wash exposed surfaces with solution of mild detergent applied with soft cloth.

150209.05 METHOD OF MEASUREMENT.

Lump Sum. No method of measurement.

150209.06 BASIS OF PAYMENT.

Payment for the Glass Overlook is full compensation for furnishing and installing the glass overlook on the Eastbound arch superstructure. It includes glass panels, glass beams, all the steel, hardware, sealants, and setting blocks.