SECTION 04818 – ALUMINUM GLASS FLOOR SKYLIGHT SYSTEMS

PART 1: GENERAL

1.01 SUMMARY

A. Structural glass floor system, consisting of structural extruded aluminum System or Stainless Steel system and laminated structural glass units, and all other items necessary for a complete assembly. Section includes: Design, structural engineering, manufacture, fabrication, finishing of metal-framed skylights:

1. Glazing for glass floor system.
2. Glass floor -related flashing.
3. Glass floor -related sealants.
4. Steel Containment Ring

B. Related Sections:

1. Section 03300 - Cast-in-Place Concrete: Concrete structure and slabs.
2. Section 05090 - Anchors and Fasteners.
3. Section 05120 - Structural Steel.
4. Section 05160 - Space Frames.
5. Section 05505 - Metal Framing.
6. Section 07620 - Flashing and Sheet Metal.
7. Section 07160 - Roofing systems.
8. Section 07900 - Sealants.
9. Section 08800 - Glazing.

1.02 REFERENCES

A. Aluminum Association (AA): Specifications for Aluminum Structures.

B. American Architectural Manufacturer's Association (AAMA): AAMA 1.603.8 Pigmented Coating’s on Extruded Aluminum.

C. Specification for Stainless and Heat-Resisting Chromium- Nickel Steel Plate, Sheet, and Strip

D. Glass Association of North America (GANA): Glazing Manual.

E. American Society of Testing and Materials (ASTM):

1. A 36 - Specification for Structural Steel.
2. A 123 - Specification for Zinc (Hot-Dip Galvanized) coating on Iron and Steel

Product.

3. A 193 - Specification for Alloy-Steel and Stainless Steel Bolting Materials For High Temperature Service.
4. A 307 - Specification for Carbon Steel Bolts and Studs, 60,000 psi, Tensile.
5. B 209 - Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
6. B 211 - Specification for Aluminum and Aluminum-Alloy Bars, Rods and Wire.
7. B 221 - Specification for Aluminum-Alloy Extrude Bars, Rods, Wire, Shapes and Tubes.
8. B 316 - Specification for Aluminum-Alloy Rivet and Cold Heading Wire and rods.
9. C 719 - Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants under Cyclic Movement.
10. C 864 - Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks and Spacer.
11. C 794 - Test Method for Adhesion-in-Peel of Elastomeric Joint Sealant.
12. C 1036 - Specification for Flat Glass.
13. C 1048 - Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Un-coated Glass.
14. D 395 - Test Methods for Rubber Property - Compression Set.
15. D 412 - Test Methods for Rubber Properties in Tension.
16. D 1171 - Test Method for Rubber Deterioration Surface Ozone Cracking Outdoors or Chamber (Triangular Specimens.)
17. D 2240 - Test Method for Rubber Property-Durometer Hardness.
18. E 283 - Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
19. E 330 - Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
20. E 331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
21. E 773 - Test Method for Seal Durability of Sealed Insulating Glass Units.
22. E 774 - Specifications for Sealed Insulating Glass Units.

F. Code of Federal Regulations (CFR)

1. 16 - Part 1201, Safety Standard for Architectural Glazing Materials.

G. Flat Glass Manufacturer's Association (FGMA)

1. 01 - Glazing Manual.

H. Sealed Insulating Glass Manufacturer's Association (SIGMA)

1. A 1202 - Commercial Insulating Glass Dimensional Tolerances.

I. International Building Code Standards (IBC STD):

1. Structural Aluminum Design Shall Conform to ICB Chapter 20.

1.03 SYSTEM DESCRIPTION

A. Design Requirements:

1. Provide extruded aluminum tubular shaped framing members specifically designed for the construction of Glass floors and having the following physical design characteristics:
    a) Provided with an integral screw track permitting mechanical installation of Frame building structure.

2. Structural design of framing members shall be in accordance with the applicable requirements of AA SAS-30 (IBC STD 20), as required to limit deflections to those specified below.

B. Performance Requirements:

1.Structural Members:

a) All framing components shall be of extruded aluminum shapes and shall be designed to support the following loads:

1. A live load of (170) psf plus dead load.
2. Wind load to correspond to live load.
3. Alternate design loads per state and local codes.

b) The deflection of the framing member when subjected to a uniform load deflection test in accordance with ASTM E 330 and per the above specified loads, shall not exceed 1/180 nor 3/4" of its clear span for clear spans less than 20 feet or 1/240 of clear spans greater than 20 feet.

c) The deflection of a framing member when carrying its full dead load, shall not exceed an amount which will reduce the glass or panel bite below 75 percent of the design dimension, nor shall it impair the function of or damage any joint seals.

d) Structurally glazed Glass Floor work, when tested in accordance with ASTM E330 for three times the maximum uplift pressure shall exhibit no impairment of structural integrity.

10. Water Penetration: No water penetration shall occur when the system is tested in accordance with ASTM E 331 using a differential static pressure of 20 percent of the inward acting design wind load pressure, but not less than 6.24 psf Water penetration is defined as the appearance of uncontrolled water other than condensation on the interior surface of any part of the Glass Floor.

11. Air Infiltration: When tested in accordance with ASTM E283 at a static pressure of 6.24 cfm of the total glazed surface area.

5. Thermal Movement: Provide for such expansion and contraction of component materials as may be caused by a surface temperature range of plus-or-minus 70 degrees F, without causing buckling, stress on glass, failure of seals, undue stress on structural elements, reduction of performance, or other effects detrimental to the physical or functional characteristics of the assemblies.

1.04 SUBMITTALS

A. General: Make submittals in accordance with the requirements of Section 01340.

B. Product Data: Submit complete manufacturer's descriptive literature and specifications.

C. Shop Drawings: Submit shop drawings comprehensively describing the fabrication and installation of Glass Floor and of Glass Floor -related flashings and sealants. Drawings indicating, but not necessarily limited to, the following:

1. Plans, elevations and sections dimensionally locating assembly components in relationship to one another and to contiguous construction.
2. Identification of components by manufacturer's proprietary designations.
3. Typical and special fabrication and installation details, including flashing details and details of anchorage to supporting construction.
4. Provisions for glazing, glazing details, and detailed descriptions of glass proposed for use.
5. Specific identification of sealants, by manufacturer's proprietary designation.
6. Manufacturing and installation tolerances.
7. Provisions of expansion and contraction.

8. Finishes, including corrosion-resisting finish applied to concealed components, and materials used for the isolation of dissimilar metals.

D. Samples: Submit the following:

1. Samples, 6" x 6" in size of specified glazing material proposed for incorporation into the work.
2. Samples, not less than 6" in length, of the principal framing members.
3. Shop Drawing:
    a) Submit structural calculations prepared in accordance with AA SAS-30 and confirming the compliance of the system proposed for use with the requirements of this Specification. Calculations and design details shall be in accordance with Chapter 54 of IBC, and shall be stamped and wet-signed by a registered, licensed Engineer.

E. Contract Closeout Submittals:

1. General:
2. Project Record Documents: In the event of substantive digressions from the Contract Documents, incorporate such digression into the required Project

Record Drawings.

3. Maintenance Data: Upon completion of the Project, submit complete data relative to the maintenance and cleaning of Glass Floor systems.

1.05 QUALITY ASSURANCE

A. Qualifications

1. Glass Floor Manufacturer's Qualifications: Regularly engaged and specializing, for the preceding 5 years, in the design and manufacture of Glass Floor systems, and their components, equivalent in physical and functional characteristics to those upon which the design is based. Capable of assuming full responsibility for fabrication, finishing, assembly, transport and installation.

PART 2: PRODUCTS

2.01 MANUFACTURERS

A. Design is based on the use of products manufactured by Sky-Tech Glazing Systems, "Or Equal"
Sky-Tech Glazing Systems Mailing Address:
160 W. Foothill PKWY Suite 105 #212, Corona, CA 92882,
Telephone number: 800-440-9999, fax number 909-606-1441.
info@sky-techglazing.com / http://www.sky-techglazing.com

2.02 MATERIALS AND COMPONENTS

A. Aluminum Framework: consisting of extruded shapes, and or when required, formed sheet. Sizes, shapes and profiles shall be as indicated on the Contract Drawings.

1.Principal Supporting Members. Extruded tubular, or I beam aluminum, 0.125" minimum thickness, conforming to ASTM B 221 for Alloy 6063, Temper T-5.

B. Glass Floor-related Flashing: Sheet aluminum conforming to ASTM B 209 for Alloy 5005. Except as otherwise indicated, thickness shall be .060" minimum.

C. Fasteners

1. For Framework Connections:; As required by the connection:
a) Series 300 stainless steel screws or bolts conforming to ASTM A 193 for Grade B8.
b) Aluminum rivets conforming to ASTM B 316.
2. For Anchoring glass floor Assemblies to Supporting Structure: Steel bolts conforming to the requirements of ASTM A 307 and galvanized in accordance with ASTM A 123.

D. Miscellaneous Metal: Steel anchorage or support fabrications, including angles, plates, rods, and similar devices, conforming to ASTM A 36.

E. Glass: **SEE SECTION 08800**

1.Basic Glass: Float glass conforming to ASTM C 1036 for Type 1 and the following:

a) Clear: Class 1, Quality q3.

2. Heat Treated Glass: When used in conjunction with laminated glass, conforming to ASTM C 1048 for Kind HS (heat-strengthened), with a surface stress of 5,000 psi, plus- or-minus 1,500 psi.

3. Coating on Glass: As specified.

4. Laminated Glass: Consisting of two lights of glass bonded together with a polyvinyl butyral (PVB) interlayer and conforming to the requirements of ANSI Z97.1 and CFR 16 - Part 1201.

F. Glazing Accessories

1. Glazing Strips (EDPM Rubber) Conditional to Use Formed of ethylene propylene diene terpolymer (EDPM) synthetic rubber having the following characteristics:

a) Hardness: When tested in accordance with ASTM D2240, for Type A Durometer hardness, 60 plus-or-minus.

b) Tensile Strength: When tested in accordance with ASTM D 412, 1,800 psi minimum.
c) Elongation: Not less than 450 percent.
d) Color: Black
e) Compression Set: When tested in accordance with ASTM D395, Method B for 22 hours at 212 degrees F, 25 percent, maximum.
f) Heat Aging Characteristics: When subjected to a temperature of 212 degrees F for a period of 22 hours.

1) Hardness Change: When tested in accordance with ASTM D2240, for Type A Durometer hardness, plus 5.
2) Tensile Strength Change: When tested in accordance with ASTM D 412, minimum 10 percent.
3) Elongation Change: When tested in accordance with ASTM D412, minus 20 percent.

g) Weather Resistance: Exhibiting no cracks when tested in accordance with ASTM D1171 at one part ozone per million for 500 hours a 20 percent elongation.

2. Setting Blocks: Extruded type II silicone rubber, formulated to permit adhesion, black

in color and having a Type A Durometer hardness of 80, plus-or-minus 5, when tested in accordance with ASTM D2240, or extruded EPDM Type A durometer hardness of 80 plus-or-minus 5 dependant on application and compatibility.

G. Sealants:

1. Structural Sealant: For glazing purposes, silicone-based and having the following characteristics:

a) Hardness: When tested in accordance with ASTM D2240 for Type A Durometer hardness, 30.
b) Ultimate Tensile Strength: When tested in accordance with ASTM D412,170.
c) Tensile Strength at 150 percent Elongation: When tested in accordance with ASTM D412, 80 psi.
d) Joint Movement Capability: When tested in accordance with ASTM C719, 50 percent after 14 day cure.
e) Peel Strength (Aluminum/Glass): When tested in accordance with ASTM C794, 32 pounds per inch after 21 day cure.

As for the skylight finish choose one and delete the others and this text.

H. Finish:

1. AA-M10-C22-A44 Class I anodized, color as specified.
2. Baked Polyester AA-M10-C22-R1X Class II painted, color as specified, meets or exceeds AAMA 603.
3. Kynar 500 AA-M10-C22-R1X Class I painted, color as specified, meets or exceeds AAMA 605.

2.05 FABRICATION

A. General: Fabricate Glass Floor assemblies in accordance with the Contract documents, Addenda, the submittals as accepted by the Owner's Representative, authorized Change Orders, if any, and the following:

1. Insofar as practicable fit and assembles work in the factory. Work that cannot be permanently assembled shall be shop-assembled, marked and disassembled before shipment to the jobsite.
2. Use setting blocks to support glass and to provide edge clearances and glass bites as outlined below, in accordance with FGMA 01:

a) Set Blocks not less than 6 inches from edge of glass for support of unit.
b) Assure no less than 3/8" nor more than 5/8" glass bite on any side of glass unit.
c) Maintain 3/16" edge clearance between glass and adjacent metal framework.

5. Surfaces of dissimilar metals in contact and surfaces of otherwise unfinished metals in contact with concrete or masonry shall receive one coat of specified asphaltic emulsion paint.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Prior to work of this Section, examine previously installed work and verify that such work is complete and as required to the point where this installation may properly commence.

3.02 INSTALLATION

A. General: Install system in accordance with manufacturer's submittals as accepted by the Owner's Representative.

1. Installation shall be performed by the Glass Floor manufacturer's own experienced mechanics.
2. Apply sealing materials in accordance with sealant manufacturer's instructions.

B. Installation Tolerances: The Glass Floor framing must be installed square and plumb and aligned within
itself. Any dimensional variance in the building structure shall be taken up through a variable gap between perimeter Glass Floor members and the adjacent building construction and not through a misalignment of the Glass Floor framing.

3.03 WARRANTY

A. General: Furnish the Owner with a warranty, executed by the Glass Floor system manufacturer, stating:

1. That the Glass Floor frame is free of defects in design, material and construction for a period of (10) years from the date of Substantial Completion.
2. Glass manufacturer's warranty against defective materials, delamination, seal failure, and defects in manufacture. Glass breakage will not be warranted except in those instances where such breakage is attributable to a defect in the skylight frame or to installation means or methods.
3. Structural sealant for a period of (10) years per sealant manufacturer's standard warranty of merchantable quality.
4. The Glass Floor finish coating, for a period of not less than (10) years, from defects in materials and workmanship resulting in loss of adhesion and color fading.

END OF SECTION