SECTION 08630 –
METAL FRAMED MULTI WALL POLYCARBONATE SKYLIGHTS

PART 1: GENERAL

1.01 SUMMARY

A. Section includes: Design, structural engineering, manufacture, fabrication, finishing of metal-framed skylights:

1. Glazing for skylights.
2. Skylight-related flashing.
3. Skylight-related sealants.

B. Related Sections:

1. Section 05090 - Anchors and Fasteners.
2. Section 05120 - Structural Steel.
3. Section 05160 - Space Frames.
4. Section 05505 - Metal Framing.
5. Section 07620 - Flashing and Sheet Metal.
6. Section 07160 - Roofing systems
7. Section 07900 - Sealants.
8. 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. Glass Association of North America (GANA): Glazing Manual.

D. 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.

E. Code of Federal Regulations (CFR)

F. California Building Code Standards (CBC STD):

1. 28-1 - Standard for Aluminum Structures.

1.03 SYSTEM DESCRIPTION

A. Design Requirements:

1. Provide extruded aluminum tubular shaped framing members specifically designed for the construction of skylights and having the following physical design characteristics:
   a) Provided with an integral screw track permitting mechanical installation of exterior glazing caps and glass supports without use of exposed fasteners.

   b) Manufactured with integral guttering system which provides positive drainage of condensation and water penetration to the exterior.

2. Structural design of framing members shall be in accordance with the applicable

requirements of AA SAS-30 (CBC STD 28-1), 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 (20) psf plus dead load.
2. Dead load plus wind load of (20) psf.
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 skylight work, when tested in accordance with ASTM E330 for three times the maximum uplift pressure shall exhibit no impairment of structural integrity.

3. 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 skylight.

4. 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 skylights and of skylight-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, 12" x 12" 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 UBC, 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 skylight systems.

1.05 QUALITY ASSURANCE

A. Qualifications

1. Skylight Manufacturer's Qualifications: Regularly engaged and specializing, for the preceding 5 years, in the design and manufacture of skylight 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 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.
2. Snap-on Covers and Non-supporting Trim: Extruded aluminum, 0.050" minimum thickness, conforming to ASTM B 221 for Alloy 6063, Temper T-5.

B. Skylight-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 Exterior Cap Retainers: Series 300 stainless steel screws conforming to ASTM A 193 for Grade B8.
2. 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.
3. For Anchoring Skylight 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** 08841

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

F. Polycarbonate Glazing Panels:

1A. **10mm** Thermal and solar performance:
   a. Insulation Value ("U") per ASTM C236 configured for/or NFRC 100 _.52___.
   b. Light Transmission _____/_____; Quadrants (L.T.%) _____ per ASTM E1175.
   c. Solar Transmission _____/_____; Quadrants (L.T.%) _____ per ASTM #1084.

1B. **16mm** Thermal and solar performance:
   a. Insulation Value ("U") per ASTM C236 configured for/or NFRC 100 _.40___.
   b. Light Transmission _____/_____; Quadrants (L.T.%) _____ per ASTM E1175.
   c. Solar Transmission _____/_____; Quadrants (L.T.%) _____ per ASTM #1084.

1C. **25mm** Thermal and solar performance:
   a. Insulation Value ("U") per ASTM C236 configured for/or NFRC 100 _.26 to .32___.
   b. Light Transmission _____/_____; Quadrants (L.T.%) _____ per ASTM E1175.
   c. Solar Transmission _____/_____; Quadrants (L.T.%) _____ per ASTM #1084.

2. Flammability
   a. The exterior and interior faces shall be an approved light transmitting panel with a CC1 fire rating classification per ASTM D-635. Smoke density no greater than 50 (10mm) or 250 (16mm) per ASTM D2843 and self-ignition temperature of 1058°F per ASTM 1929.
   b. The exterior and interior faces shall have a flame spread per ASTM E84 of 5 for 10mm and 55 for 16mm.
3. Weatherability:
   a. The exterior and interior faces shall not change color more than 3.0 units (DELTA-E by ASTM D2244) after 120 months outdoor weathering an average of at least two samples.
   b. The exterior and interior faces shall be tested by recognized laboratory for weathering evaluation per ASTM D4364-84 (EMMAQUA, UNBACKED), after exposure to minimum concentrated natural sunlight radiation of 5600 MJ/M^2 U.V.(200-385 NM). The exterior and interior faces shall not change.
      2.1 Color more than 3.0 units Delta E, 5.0 units Delta L and Delta B
      2.2 Yellowing index more than 10 units Delta Y per ASTM D1925.
   c. The light transmission as measured by ASTM D1003, shall not decrease more than 6% over ten (10) years.
4. Appearance:
   a. The panels shall be uniform in color, with cellular cross section.
5. Impact Resistance:
   a. The panels shall provide for the following minimum performance:
      1.1. ASTM E-822-81 - Velocity up to 82-ft. per second using ice balls of up to 1.1-in..
      1.2. ASTM D-3841/SPI - Impact and Shatter Resistance of 200 ft. lbs.

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.
h) General: Material shall exhibit no visible checks or breaks after completion of tests for compression set, heat aging and weather resistance.

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 skylight 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. Attach glazing cap retainers using stainless steel fasteners into the screw track. Providing for not more than 10 pounds per lineal inch of compression on the glazing caps and glass edge.
3. Use snap type caps to conceal glazing cap retainer fasteners. Where applicable, shop fasten or weld aluminum clips to framing members or field bolt at installation.
4. 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. Locate weepholes in curb to positively drain condensation to exterior of skylight at each rafter connection.
6. 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 skylight manufacturer's own experienced mechanics.
2. Apply sealing materials in accordance with sealant manufacturer's instructions.

B. Installation Tolerances: The skylight/solarium 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 skylight/solarium members and the adjacent building construction and not through a misalignment of the skylight/solarium framing.

C. All skylight/solarium framing that is intended to be installed between wall conditions shall be designed, fabricated, and erected to the minimum actual field dimension. All skylight/solarium framing that is intended to fit over a curb condition shall be designed, fabricated and erected to the maximum actual field dimension.

3.03 WARRANTY

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

1. That the skylight 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 skylight 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