**SECTION 07 05 43**

**DRAINED AND BACK VENTILATED RAIN SCREEN FACADE SYSTEMS**

**PART 1 – GENERAL**

* 1. **SUMMARY**

1. The Drained and Back Ventilated Façade system shall consist of a thermally broken, non-continuous, aluminum sub-framing assembly for attachment of various cladding types, installed in conjunction with exterior insulation. The system shall be engineered, installed and tested to incorporate flashing components, drainage components, air barriers and water barriers in such a way that the system will meet the designed performance.

**1.2 RELATED SECTIONS** [List appropriate spec sections and numbers as applicable]

1. Section 04 25 00 – Unit Masonry Panels
2. Section 04 25 00 – Stone Composite Panels
3. Section 05 40 00 – Cold-Formed Metal Framing
4. Section 06 10 00 – Rough Carpentry
5. Section 06 16 00 – Sheathing
6. Section 07 21 00 – Thermal Insulation
7. Section 07 27 00 – Air Barriers
8. Section 07 42 00 – Wall Panels
9. Section 07 62 00 – Sheet Metal Flashing and Trim
   1. **REFERENCES**
10. American Society for Testing and Materials (ASTM) Publications:
11. ASTM E330 – Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
12. ASTM E331 – Test Method for Water Penetration of Exterior Windows
13. American Society of Civil Engineers (ASCE) Publications:
14. ASCE 7 – Minimum Design Loads for Buildings and Other Structures
15. European Standards: DIN 4102 – Building Material Class – Germany
16. IBC 1403.2: Reference Standard for Selection of Weather Resistive Barriers
17. AAMA 509: Test and Classification Method for Drained and Back-Ventilated Rain Screen Wall Cladding Systems
    1. **SYSTEM DESCRIPTION**
18. System assembly shall include the following components from the substrate out:
19. Substrate: Wall framing assembly and sheathing
20. Weather Resistant/Air Barrier over substrate
21. Exterior Insulation
22. Thermally broken, non-continuous aluminum rain screen attachment system
23. Exterior cladding
24. Design Requirements
25. Provide, in conjunction with wall substrate and air barrier, a weather tight wall assembly utilizing rain screen principle
26. Manufacturer is responsible for designing system, including anchorage to structural system.
27. Design modifications shall be provided only as necessary to satisfy as built conditions and to meet performance requirements.
28. Manufacturer shall provide structural design complying with building codes where project is located.
    1. **PERFORMANCE REQUIREMENTS**
29. Thermal Performance
30. Rainscreen Attachment System must be thermally modeled to demonstrate, at minimum, a compliance with ANSI/ASHRAE 90.1-2010 maximum U-Value for walls
31. Continuous framing profiles (including C- or Z-shaped sections or furring) penetrating insulation are not permitted
32. Perform effective R-Value calculation or modeling in accordance with ASHRAE guidelines.
33. Wall Assembly effective R-Value (U-Factor): [INSERT R-VALUE (U-0.XXX)]
34. Design Loads [as required by applicable codes for Project location]
35. System shall be optimized based on design loads
36. Maximum panel deflection: 1/300 [or applicable for product] of span or less of span when tested in accordance with positive and negative pressures and as required to prevent cracking or damage to panel facing
37. Comply with applicable seismic requirements for Project location
38. Adequately resist wind forces and uplift for Project location with minimum of [\_\_\_\_\_\_] [PSF] [kilopascals] [\_\_\_\_\_\_] for wall surface and [\_\_\_\_\_\_] [PSF] [kilopascals] for parapet and corner panels tested in accordance with ASTM E330
39. Accommodate movement of cladding components without undue stress on fasteners or other detrimental effects, when subjected to seasonal temperature range of :
    1. Ambient: [120 degrees F] [67 degrees C]
    2. Cladding surface: [180 degrees F] [100 degrees C]
40. Accommodate tolerances of support structure
41. Condensation: System shall accommodate positive drainage for moisture entering or condensation occurring within panel system.
42. Flatness: System shall be flat with no noticeable warpage, buckling, deflections or other surface irregularities
    1. **SUBMITTALS**
43. Product data information describing materials and fabrication for aluminum rain screen attachment system
44. Shop Drawings: Submit detailed shop drawings showing:
45. Location, layout, and dimensions of panels, including special pieces and trim
46. Locations of fixed and sliding fastening points
47. Details at top, bottom, corner, windows, doors, etc.
48. Installation details: attachment methods, fasteners, joints, corners, openings, intersections with adjacent materials, flashings, closures, trim and other critical conditions
49. Manufacturer of rain screen substructure shall design and approve fastener and the use of selected screws confirming use in a rainscreen wall assembly.
50. Engineering Calculations: Submit engineering calculations as required by local building code
51. Samples
52. Typical anchor brackets and fasteners
53. Provide manufacturer’s sample warranty, installation and maintenance instructions
    1. **QUALITY ASSURANCE**
54. System Manufacturer’s Qualifications: Provide exterior wall system manufactured by a firm with minimum 20 years’ experience in the production of systems that are similar to those indicated for this project
55. Installer Qualifications: Company experienced in installing rain screen systems and acceptable to Rain Screen Attachment System supplier.
56. Attachment details shall be designed under direct supervision of licensed professional structural engineer. Calculations and shop drawings shall bear seal of supervising engineer.
    1. **QUALITY CONTROL**
57. Single Source Responsibility: Furnish engineered rain screen attachment system components under direct responsibility of single manufacturer
58. Field Measurements: Verify actual supporting and adjoining construction before fabrication. Record measurements on project record shop drawings.
59. Established Dimensions: Where field measurements cannot be made without delaying work, guarantee dimensions and proceed with fabrication of rain screen attachment system corresponding to established dimensions.
    1. **DELIVERY, STORAGE, AND HANDLING**
60. Prior to shipping, pack and crate system components to prevent damage during transit and storage.
61. Deliver materials and components in manufacturer’s original, unopened, and undamaged containers or bundles, full identified. Exercise care to avoid damage during unloading, storing and installation
62. Inspect aluminum attachment components immediately upon delivery at site. Notify manufacturer of damage.
63. Follow manufacturer’s instruction for storage of product. Keep pieces in original packing material until ready to install.
    1. **WARRANTY**
64. One Year Warranty: Provide manufacturer’s written warranty for aluminum rain screen attachment system to cover repair and replacement of defective components

**PART 2 – PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

1. Basis of Design: Hilti Rain Screen Façade System;
   1. Represented locally by: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 – Product Requirements

**2.2 PRODUCT REQUIREMENTS**

1. Provide all rain screen attachment system components from a single source
2. Materials
   1. Bracket and rail components
3. Made from 6000 series architectural grade aluminum or stainless steel
4. Finish: Mill finish
5. Brackets shall be self-shimming for out of plumb conditions, with at least 1½” of built in adjustability
   1. Fasteners
6. Should be in accordance to façade manufacturer’s recommendations of anchor type, size and spacing required for type of substrate and Project conditions, to meet performance requirements specified in Paragraph 1.4 and as indicated in design calculations and shop drawings
   1. The following characteristics are not acceptable:
7. Continuous framing profiles (including C- or Z-shaped sections or furring) penetrating insulation
8. Components made from galvanized steel, galvalume, or other carbon-based metals
9. Components made from fiberglass materials

**2.3 EXTERIOR INSULATION**

1. Refer to Section 07 21 00 – Thermal Insulation

**2.4 SIDING/RAIN SCREEN PANEL**

1. Refer to Division 7 Sections applicable to project.

**PART 3 – EXECUTION**

**3.1 EXAMINATION**

1. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of rainscreen cladding
2. Do not proceed with cladding installation until deficiencies have been addressed

**3.2 RAIN SCREEN ATTACHMENT SYSTEM INSTALLATION**

1. Install rain screen attachment system in accordance with manufacturer’s instructions and approved shop drawings
2. Establish level lines for panel coursing and positioning of all Hilti brackets and support rail
3. Attach Hilti brackets with engineered fasteners to accomplish performance requirements specified in Paragraph 1.4
4. Install exterior insulation to fit between wall brackets as specified by Section 07 21 00 prior to installing vertical support rails.
5. Attach vertical support rails with engineered fasteners to accomplish performance requirements specified in Paragraph 1.4
   1. Provide [1/2”- 1”] [12 to 25mm] space between end of adjacent profiles

**3.3 QUALITY CONTROL**

1. The installing contractor shall perform daily inspections to maintain and confirm that tolerances are being met and that manufacturer’s instructions are complied with
2. The owner may engage a third-party inspection agency to verify that installed rain screen attachment system meets performance requirements and tolerances

**3.4 CLEANING AND PROTECTION**

1. Remove and replace damaged, bowed, or bent pieces of aluminum
2. Immediately after installing, wipe down work. Do not use wire brushes, metallic tools, or abrasives for cleaning.
3. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities

**END OF SECTION 07 05 43**