SPEC NOTE: U-KON SYSTEM ATTACHMENT SYSTEMS FOR EXTERIOR INSULATION:

This guide specification is intended for use when specifying an exterior wall assembly consisting of a fully engineered thermally broken highly corrosion resistant rainscreen attachment system fastened directly to the substrate for placement of up to 14-inches of exterior insulation between wall brackets.

This rainscreen attachment system is versatile and suitable for common face fastened rainscreen panel assemblies and concealed fastener panels such as (but not limited to) metal panels, fiber cement, ceramic, phenolic panels, Aluminum Composite Material (ACM), stone cladding, brick veneer, terracotta panels, corrugated metal panels, standing seam metal panels and Portland cement plastering.

Wall brackets with thermal isolators are attached to the substrate then the vertical aluminum bar is attached to the relevant brackets.

The **U-kon Systems components such wall brackets and vertical rail** bring the value of allowing the rail to bracket connection adjustability for substrate irregularities and help to install a straight and plumb façade installation. The rail can be moved outward from the bracket a total of 1.3 inches.

The air cavity could be between 0.5 inches to 3 inches. All depend on the requirements.

Please contact manufacture for further information or questions.

U-KON FAÇADE SYSTEMS, LTD
Web: www.u-kon.com
E-mail: info@u-kon.com

Facade Systems Inc
Web : www.facadesystemsinc.com
E-mail: blair@facadesystemsinc.com

DISCLAIMER: *The manufacturer has reviewed the product information contained in this guide specification. The information is organized and presented to assist the specification writer working on a construction project to select the appropriate products and to save time in writing the project specification Section. The specification writer is responsible for product selection as well as the use and application of this information, and should contact the manufacturer to ensure that all options are available and that the associated specification information is valid and correct*.

SECTION 07 05 42

RAINSCREEN CLADDING SUPPORT SYSTEM

PART 1 – GENERAL

1.SUMMARY

A. Provide a thermally broken, rainscreen attachment system for exterior cladding [INSERT TYPE OF CLADDING] installed over exterior insulation.

B. Related Sections:

1. Section 04 25 00 - Unit Masonry Panels
2. Section 04 42 00 - Stone Composite Panels
3. Section 07 42 43 - Stone Composite Wall Panels
4. Section 07 21 13 - Mineral Board Insulation
5. Section 07 21 16 - Blanket Insulation
6. Section 07 27 26 - Fluid-Applied Membrane Air Barriers
7. Section 07 42 13 - Metal Wall Panels
8. Section 07 42 43 - Composite Wall Panels
9. Section 07 42 47 - Fiber Reinforced Concrete Wall Panels
10. Section 07 62 00 - Sheet Metal Flashing and Trim
11. Section 07 92 00 - Joint Sealants

2.SYSTEM DESCRIPTION

A. System assembly shall include the following components from the substrate out:

1. Substrate: Wall framing assembly and sheathing [Concrete masonry unit wall] [Concrete wall]
2. Weather Resistant/Air Barrier over substrate.
3. Insulation layer.
4. Thermally broken rainscreen attachment system U-kon.
5. Exterior cladding.

B. Design Requirements:

1. Manufacturer is responsible for designing system, including anchorage to structural system and necessary modifications to meet specified requirements and maintain visual design concepts.
2. Employ registered professional engineer, licensed to practice engineering in jurisdiction where Project is located, to engineer each component of rainscreen attachment system.
3. Structural Design: Exterior insulated rainscreen wall assembly capable of withstanding effects of load and stresses from dead loads, wind loads, ice loads (if applicable) as indicated on Structural General Notes on Structural Drawings, and normal thermal movement without evidence of permanent defects of assemblies or components.
    a. Thermal Movements: Provide assemblies that allow for thermal movements resulting from the following maximum ambient temperatures by preventing overstressing of components and other detrimental effects:

        Temperature Change (range): 120 degrees Fahrenheit (67 degrees C), ambient.
4. Support Framing/Attachment System:
    a. Frequency and spacing of brackets as indicated by manufacture in project specific engineering package.

C. Performance Requirements:

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SPEC NOTE: COORDINATE WITH COMPLETE WALL ASSEMBLY TO DETERMINE APPLICABLE THERMAL PERFORMANCE CRITERIA TO SUIT PROJECT REQUIREMENTS, INCLUDING TOTAL WALL EFFECTIVE R-VALUE (U-FACTOR) REQUIRED.

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1. Rainscreen Attachment System Performance: Comply with ASHRAE 90.1
2. Thermal Performance:
    a. Wall Assembly effective R-Value (U-Factor): [INSERT R-VALUE (U-0.XXX)]
    b. Framing system must not degrade complete wall assemblies thermal resistance by more than 17 percent and conform to ASHRAE 90.1 prescriptive U-value of wall assembly for appropriate climate zone.
    c. Stem for Connecting Rail to Bracket: Must not penetrate exterior layer of insulation.
3. Structural Performance:
    a. Framing Members:
        1) Localized bending stress for eccentrically loaded framing members must be evaluated with the maximum effective length of resisting element not more than 12 inches.
    b. Fasteners:
        1) Tension shall be taken as sum of direct tension plus tension due to prying for eccentrically loaded connections. Prying may be reduced or eliminated if proven via engineering analysis or testing.

3. ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Meeting: Arrange in conformance to requirements of Division 01

1. Attendance: Contractor, Installer, Owner, Architect, Manufacturer's Engineer. Providing rainscreen wall systems design, manufacturer's technical representative, and those representing related work requested to attend.

2. Meeting time: minimum 2 weeks prior to prior to beginning work of this section and work of related sections affecting work of this section.

3. Location: project site.

B. Sequencing and scheduling: conform to construction progress schedule for critical. Path and scheduling for long lead items and to avoid delaying work.

4.SUBMITTALS

A. Product Data: Submit manufacturer's product literature and descriptions of testing performed on system components to indicate meeting or exceeding specified performance.

B. Shop Drawings:

1. Plans, elevations, framed openings, bearing, details, thermal isolation, fasteners, connectors and anchorage devices, and attachments as needed for project execution.
2. Interface of aluminum assembly with adjacent construction.
3. Stamped and signed by licensed professional engineer, registered with the [State] [Province] of

C. Structural Calculations:

1. Submit rainscreen attachment manufacturer's comprehensive Structural Design analysis signed and sealed by a Professional Engineer.

D. Samples: Submit following material samples for verification:

1. Wall Brackets: Two (2) samples.
2. Vertical Rails: Two (2) 12-inch long samples.
3. Fasters for system assembly

E. Test Reports:

1. Comprehensive three-dimensional thermal modeling report indicating framing systems impact on exterior insulation rated R-value.

5.QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Minimum 5 years' experience specializing in the manufacturing of façade attachment/support framing similar to those specified.
2. Maintain locally available technical product representation available to meet at project site as needed for meetings and inspections of work.

B. Installer Qualifications:

1. Minimum of 3 years' documented experience or minimum of 5 completed projects of equivalent scope and quality and recommended by manufacturer to perform work of this Section.
2. Onsite superintendent or foreman overseeing installation on site during entire work of this Section with experience equivalent to installer and in good standing with the manufacturer.

C. Engineer Qualifications: Registered professional engineer experienced in the design of curtain wall systems, anchors, fasteners and licensed to practice engineering in the jurisdiction where Project is located.

D. Pre-Installation Meeting:

1. Discuss sequence and scheduling of work and interface with other trades.
2. Review metal wall framing assemblies for potential interference and conflicts and coordinate layout and support provisions for interfacing work.
3. Review and document methods, procedures and manufacturer's installation guidelines and safety procedures for exterior wall assembly.

E. Mock-Ups: Provide under Quality Assurance provisions of Division 01.

1. Mock up complete system at location as directed by Architect.
2. Provide as required to illustrate substrate, air barrier, insulation, framing, flashing, thermal isolation, and treatments at fenestrations, corners, and transitions.
3. Verify mock-up as conforming to manufacturer's instructions and provisions of Contract Documents.
4. Do not begin work of this Section until after inspection by manufacturer's representative is complete and mock-up has been accepted in writing by Architect.
5. Protect and maintain accepted mock-up as standard of quality for work of this Section.
6. Accepted mock-ups may be incorporated into the work of this Section.

6.QUALITY CONTROL

A. Single source responsibility:

1. Furnish engineered rainscreen attachment system components under direct responsibility of single manufacturer.

B. Field Measurements: Verify actual supporting and adjoining construction before fabrication.

C. Record field measurements on project record shop drawings.

D. Established Dimensions: Where field measurements cannot be made without delaying work, guarantee dimensions and proceed with fabrication of rainscreen attachment system corresponding to established dimensions.

7.DELIVERY, STORAGE AND HANDLING

A. Conform to provisions of Division 01 and manufacturer's instructions.

B. Ordering: Conform to manufacturer's ordering instructions and lead time requirements to avoid construction delays.

C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

D. Store and handle to keep clean, dry, and protected from damage due to weather and construction activities

8.SEQUENCING

A. Ordering: Comply with manufacturers' ordering instructions and lead-time requirements to avoid construction delays.

B. Coordinate construction to ensure that assemblies fit properly to supporting and adjoining construction; coordinate schedule with construction in progress to avoid delaying work.

9.WARRANTY

A. Manufacturer Warranties:

1. Conform to Warranty requirements specified by Division 01.
2. Manufacturer: 15-year materials warranty covering defective materials of extruded aluminum framing system.
3. Limitation of Warranties: Exclude repairs, replacement, and corrective work to the substrate, primary structure, finish panels, and/or property – unless otherwise noted above. Warranties exclude mechanical damage due to abuse, neglect, primary structure failure, or forces of nature greater than normal weather conditions.

1.10 SOURCE QUALITY CONTROL

A. Single Source Responsibility: Furnish engineered design and fabrication by or under direct responsibility of single manufacturer.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. U-kon System, LT-147p (Vertical/Exposed Fastener) Attachment System, thermally insulated and isolated between metal components and substrate, specified as a basis of design. Used with HPL, Fiber-cement, ACM flat panels, Standing seam and corrugated metal cladding.

B. U-kon System, LT-228 (Concealed Fastener) Attachment System, thermally insulated and isolated between metal components and substrate, specified as a basis of design. Used with HPL, Fiber-cement, Ceramic, Stone panels

C. U-kon System, LT-316/325 (Concealed Fastener) Attachment System, thermally insulated and isolated between metal components and substrate, specified as a basis of design. Used with Natural Stone panels over 20 mm thickness.

D. U-kon System, LT-247 (Vertical/Exposed Fastener) Attachment System, thermally insulated and isolated between metal components and substrate, specified as a basis of design. Used with Ceramic and Fibre-cement panels 6-10 mm thickness.

E. U-kon System, LT-147i/SZ (Rout and return/Concealed Fastener) Attachment System, thermally insulated and isolated between metal components and substrate, specified as a basis of design. Used with Rout and Return ACM, MCM panels.

F. U-kon System, LT-447 (Concealed Fastener) Attachment System, thermally insulated and isolated between metal components and substrate, specified as a basis of design. Used with Terracotta panels.

G. U-kon System, LT-572 (Concealed Fastener) Attachment System, thermally insulated and isolated between metal components and substrate, specified as a basis of design. Used with large format Porcelain panels (3.5- 6.0 mm), Structural Glass cladding panels, Solar cell panels

1. Email info@u-kon.com
2. Web Site: www.u-kon.com

2.2 PERFORMANCE / DESIGN CRITERIA

A. Structural Design: Provide engineered design capable of withstanding combined effects of stresses from dead loads, wind loads, normal thermal movement, and other anticipated stresses without evidence of permanent defects or failure.
1. Wind Load: Uniform pressure (velocity pressure) as indicated on Structural Drawings, acting inward or outward.
2. Dead Loads: Design for loading to accommodate support of cladding systems specified by related sections and shown on Drawings and as required by applicable building code.
3. Seismic Loads: Design and size components to withstand seismic loads and sway displacement.
4. Snow Loads.

B. Thermal Expansion and Contraction: Design for movement due to cyclic day and night temperatures to not exceed safety factors for fasteners, joints, seals, and components.

C. Cladding Accommodation: Design framing support assembly to maintain dimensions to face of cladding materials indicated on Drawings. Design framing supports configuration, size, spacing, and make adjustments as needed to accommodate support for each cladding type, including:
1. Unit Masonry Panels specified by Section 04 25 00
2. Stone Composite Panels specified by Section 04 42 00
3. Stone Composite Wall Panels specified by Section 07 42 43
4. Metal Wall Panels specified by Section 07 42 13
5. Composite Wall Panels specified by Section 07 42 43
6. Fiber Reinforced Concrete Wall Panels specified by Section 07 42 47
7. Terracotta Cladding panels by Section 07

D. Rain Screen Design: Design ventilating system assembly to accommodate movement of air movement into the rain screen cavity and move water vapor out.

E. Tolerances:
1. Accommodate deflection of structural members.
2. Maintain clearances at adjacent construction.
3. Prevent load transfer to non-structural elements.

F. Thermal Insulation: As specified by Section 07 21 13.
1. Design thickness and type of insulation into system assembly.
2. Perform thermal analysis to determine framing systems effect on wall assembly.

G. Effect on Wall Assemblies Thermal Resistance: Framing system must not degrade complete wall assemblies thermal resistance by more than 17 percent and conform to ASHRAE 90.1

prescriptive U-value of wall assembly for appropriate climate zone.

2.3 RAINSCREEN ATTACHMENT/SUPPORT FRAMING SYSTEM

B. Aluminum Classification: Structural Aluminum (SA), Alloy 6060 T6. appropriate for rainscreen cladding support construction

C. Spacing: Comply with manufacturer's Professional Engineer's project specific calculations.

D. Wall Brackets:

1. Minimum 0.106 inch thick (10 gauge) aluminum.

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SPEC NOTE: MINIMUM DIMENSION OF BRACKET DEPTH WILL BE DETERMINED BY INSULATION THICKNESS. THE MINIMUM DEPTH 2" (50 MM), MAXIMUM 14" (355 MM)

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1. Dimensions:

a.Bracket Base: Minimum 2 inch high by 4.72 inch wide.

2. Pre-Punched Holes: Three or Two wall anchors per bracket. For easy engagement and placement of stainless steel self tapping hex-head screws or rivets for use in attaching vertical rail.

3. Rail Connector Stem:

a. Pilot Drill Holes:

1) Holes allow fastening vertical profiles with sliding and fix points to control thermal extension and contraction. Spaced appropriately to maintain proper alignment of rails.

4. Dimensions: As needed to offset cladding from wall plane where meeting substrate and to allow for installation of insulation equal in thickness to offset.

a. Offset Brackets – 50mm, 80mm,120 mm,150 mm,190 mm, 220 mm, 280 mm, depths with up to 40mm of adjustment on the vertical axis.

1) Align offsets to differing wall planes as shown on Drawings.

5. Recommended Product: U-kon Thermal Isolator PD-131, PD-132, PD-133 (color: Black); PD-061, PD-062, PD-063 (color: Blue)

E. Primary Vertical Rail:

1. Minimum 0.071-inch thick (13 gauge) extrusion aluminum alloy 6060 T6.

2. Profile: different shape according to cladding material.

3. Adjustment capability: 1,2 -inches.

4. Basis of Design: by U-kon Systems.

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SPEC NOTE: OPTIONAL SECONDARY RAILS ATTACH TO PRIMARY RAILS TO PROVIDE ADDITIONAL PANEL SUPPORT OR REVEAL CONFIGURATION FOR PANEL DESIGN. USE OF SECONDARY RAILS IS DEPENDENT UPON THE PANEL TYPE, LAYOUT, ITS ORIENTATION AND/OR CONFIGURATION.

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F. Thermal Isolation:

1. Material: Polypropylene

2. Size: To accommodate plate

a. Framing member to framing member isolation: minimum 0.395 inch thick (10 mm)

b. Isolator must match support bracket and must not decrease structural performance of system.

Recommended product: U-kon Thermal Isolator PD-131, PD-132, PD-133; PD-061, PD-062, PD-063 (color: Blue)

G. Fasteners:

1. Sufficient length to provide solid attachment to structure as required by manufacturer.
2. Framed substrate with sheathing: Self-drill hex-washer-head stainless steel with 1,000 hour salt-spray rated thermoset polyester coating.
    a. Embedment depth: 0.625 inches or three full threads minimum, whichever is greater.
    b. Minimum ultimate pull-out capacity from 18 gauge steel: 450 pounds.
3. Concrete and concrete masonry units substrate:
    a. Embedment depth: 1.25 inches minimum.
    b. Minimum ultimate pull-out capacity from substrate material: 2000 N.
    c. 1/4 inch Kwik-Con II+ by Hilti
    d. 1/4 inch Tapcon by Buildex
    e. 1/4 inch UltraCon by Elco Industries
    f. Or approved equal.
4. For primary to secondary rail connection: Self-drill hex-washer-head stainless steel with 1,000 hour salt-spray rated thermoset polyester coating.
    a. Embedment depth: 0.625 inches or three full threads minimum, whichever is greater.
    b. Minimum ultimate pull-out capacity from 18 gauge steel: 2000 N.

H. Accessories:

1. Bracing, Furring, Bridging, Plates, Gussets, and Clips: Formed sheet steel, thickness as necessary to meet structural requirements for special conditions encountered.
2. Galvanic Protection: Utilize tapes and other methods as necessary to separate and prevent contact between dissimilar metals.

2.4 SIDING/CLADDING PANEL

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SPEC NOTE: SPECIFIER OPTION TO INCLUDE SIDING/CLADDING PANEL HERE OR MAKE REFERENCE TO DIVISION 07 SECTION "CLADDING".

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I. Refer to Division 07 Section 07 4X XX

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify conditions ready to receive work of this Section before beginning.

B. Backup Wall: Verify level and plumb, free of defects, and conforming to tolerances suitable for installation of subsequent work.

C. Weather Resistive Barrier: Verify complete, cured, and conforming to manufacturer’s instructions. Verify fenestrations, transitions, discontinuities, and sills and ledgers flashed and sealed to move moisture to exterior of building as part of air barrier system.

3.2 PREPARATION

A. Review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing work.

B. Adjust and perform work as necessary for plumb and true alignments.

3.3 INSTALLATION

A. Conform to manufacturer's instructions and provisions of Contract Documents.

B. Erect cold-formed rain screen assembly to be level, plumb, and in alignment with building features including corners, offsets, and fenestrations.

C. Wall Brackets and Vertical Rail:

1. Mount wall brackets at 16 inch on center horizontally on support wall (at each stud location) or (according to certified engineer calculation), using self-drilling self-tapping screws at metal stud framed walls and expansion or adhesive anchors at concrete and masonry walls.
2. Attach vertical or horizontal rail to wall bracket stem by use of a stainless steel self-tapping screw or stainless steel rivets fastener through pre-punched pilot holes on the bracket.

D. Semi-Rigid Mineral Wool Insulation: Install to expand into and tightly fit between wall brackets to make continuous, unbroken insulated face of wall as specified by Section 072116

E. Cut installed vertical rails to minimum 16 inch lengths and mechanically attach to at least two separate wall brackets.

F. Cut installed horizontal rails to minimum 12 inch lengths and mechanically attach to at least two separate vertical rails to prevent rotation of rail.

1. At unsupported span of installed horizontal rails that extend past closest vertical rails, do not exceed 7.5 inch in length for 16 inch on center spaced studs or 11.5 inch in length for 24 inch on center spaced studs.
2. At opening jambs (i.e. windows, doors, and other fenestrations) do not extend the horizontal rails past vertical rails by more than 3 inch in length.

3.4 FIELD QUALITY CONTROL

A. Manufacturer’s Field Technical Service: Make intermittent and final inspection to verify installation in conformance to manufacturer instructions and suitable as framing assembly for subsequent metal panels, acrylic plastering, and other cladding installations.

1. Confirm snug tight and fastener sizing.
2. Confirm framing members installed in correct orientation.

3.5 ADJUSTING

A. Inspect and adjust after installation. Replace or repair defective work.

B. Adjust, and reconfigure as necessary to accommodate cladding systems for installations over work of this Section. Do not reuse pre-drilled holes unless fastener size is increased.

The End