SECTION 074213.23 - METAL COMPOSITE MATERIAL WALL PANELS.

3A Composites Inc.

ALUCOBOND PLUS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes MCM wall panels.

1.3 DEFINITIONS

A. DBVR: Drained and back-ventilated rainscreen system; rainscreen system designed to drain and dry cavity entering water through drainage channels, weeps, and air ventilation.

B. MCM: MCM; cladding material formed by joining two thin metal skins to polyethylene or fire-retardant core and bonded under precise temperature, pressure, and tension.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at [**Project site**] <**Insert location**>.

1. Meet with Owner, Architect, Owner's insurer if applicable, MCM panel Fabricator and Installer, MCM sheet manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects MCM panels, including installers of doors, windows, and louvers.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
4. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect MCM panels.
5. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
6. Review temporary protection requirements for MCM panel assembly during and after installation.
7. Review procedures for repair of panels damaged after installation.
8. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings:

1. Include fabrication and installation layouts of MCM panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of the flashing, trim and anchorage, at a scale of not less than 1-1/2 inches per 12 inches (1:10).

C. Samples for Initial Selection: For each type of MCM panel indicated with factory-applied color finishes.

1. Include similar Samples of trim and accessories involving color selection.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.

1. MCM Panels: 12 inches (305 mm) long by actual panel width. Include fasteners, closures, and other MCM panel accessories. Submit custom color samples in paint manufacturer's standard size.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each product, tests performed by a qualified testing agency.

1. MCM Manufacturer's Material Test Reports: Certified test reports showing compliance with specific performance or third-party listing documenting compliance to comparable code sections IBC 1407.14 and IBC 1703.5.
2. MCM System Fabricator's Certified System Tests Reports: Certified system test reports showing system compliance with specific performance or third-party listing documenting compliance code section. Base performance requirements on MCM system type provided.

a. Wet System: Tested to AAMA 501.
b. DBVR System: Tested to AAMA 509.
c. PER System: Tested to AAMA 508.

C. Field quality-control reports.

D. Sample Warranties: For special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For MCM panels to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by MCM Fabricator.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for MCM fabrication and installation.

1. Build mockup of typical MCM panel assembly [**as shown on Drawings**] <**Insert size**>, including [**corner,**] [**soffits,**] supports, attachments, and accessories.
2. Water-Spray Test: Conduct water-spray test of mockup of MCM panel assembly, testing for water penetration in accordance with AAMA 501.2.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, MCM panels, and other manufactured items so as not to be damaged or deformed. Package MCM panels for protection during transportation and handling.

B. Unload, store, and erect MCM panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack MCM panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store MCM panels to ensure dryness, with positive slope for drainage of water. Do not store MCM panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on MCM panels during installation.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of MCM panels to be performed in accordance with manufacturers' written instructions and warranty requirements.

1.11 COORDINATION

A. Coordinate MCM panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.12 WARRANTY

A. Warranty on Panel Material: Manufacturer's standard form in which manufacturer agrees to replace MCM that fails within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace MCM panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Finish Warranty Period: [**20**] [**10**] [**Five**] years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide MCM panel systems capable of withstanding the effects of the following loads, based on testing in accordance with ASTM E330:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: [**As indicated on Drawings**] <**Insert loads**>.
3. Panel Deflection Limit: For wind loads, no greater than [**1/60**] <**Insert deflection**> of the span
4. Framing Member Deflection Limits: For wind loads, no greater than [**1/175**] [**1/240**] or <**Insert deflection**> of the span.
5. <**Insert serviceability requirements**>.

B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) of wall area when tested in accordance with ASTM E283 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).

C. Water Penetration under Static Pressure: No water penetration to room side of assembly when tested for 15 minutes in accordance with ASTM E331 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).

D. Thermal Movements: Locate expansion and contraction points to allow for free and noiseless thermal movements from surface temperature changes.

1. Temperature Change (Range): minus 20 deg F to 180 deg F (minus 29 to 82.2 deg C), material surfaces.

E. Fire Propagation Characteristics: MCM wall assembly passes NFPA 285 testing.

2.2 MCM WALL PANELS <**Insert drawing designation**>

A. MCM Wall Panel Systems: Provide factory-formed and -assembled, MCM wall panels fabricated from two metal facings that are bonded to a solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment assembly components[**, panel stiffeners**], and accessories required for weathertight system.

1. Basis-of-Design Product: Subject to compliance with requirements, provide ALUCOBOND®; 3A Composites USA Inc.; ALUCOBOND® PLUS or comparable product by:
   a. <**Insert manufacturer's name**>.

B. Aluminum-Faced Composite Wall Panels: Formed with 0.020-inch- (0.50-mm-) thick, [**coil-coated**] [**anodized**] aluminum sheet facings.

1. Panel Thickness: [**0.157 inch (4 mm)**].
2. Core: [**Fire retardant**].
3. Exterior Finish: [**PVDF fluoropolymer**] [**FEVE fluoropolymer**] [**Siliconized polyester**] [**Clear anodized**] [**Color anodized**].
   a. Color: [**As indicated by manufacturer's designations**] [**As selected by Architect from manufacturer's full range**] [**As indicated on drawing schedule**].
      1) Color 1: <**Insert color**>.
      2) Color 2: <**Insert color**>.
      3) Color 3: <**Insert color**>.
      4) Color 4: <**Insert color**>.
4. Peel Strength: 22.5 in-lb/in. (100 N x mm/mm) when tested for bond integrity in accordance with ASTM D1781.
5. Fire Performance: Flame spread less than 25 and smoke developed less than 450, in accordance with ASTM E84.

C. Attachment Assembly Components: Formed from [**extruded aluminum**] [**material compatible with panel facing**].

2.3 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet ASTM A653/A653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A792/A792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide Fabricator's standard sections as required for support and alignment of MCM panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of MCM panels unless otherwise indicated.

C. Flashing and Trim: Provide flashing and trim formed from same material as MCM panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent MCM panels.

1. Basis-of-Design Product: Subject to compliance with requirements, provide ALUCOBOND®; 3A Composites USA Inc.; ALUCOBOND® Axcent™ Trim or comparable product by one of the following:

   a. Arconic Architectural Products (USA).
   b. Mitsubishi Chemical Composites.
   c. <**Insert manufacturer's name**>.

2. Aluminum Trim: Formed with 0.040-inch (1.00-mm-) thick, coil-coated aluminum sheet facings.
3. Color: [**As indicated by manufacturer's designations**] [**As selected by Architect from manufacturer's full range**] [**As indicated on drawing schedule**].

   a. Color 1: <**Insert color**>.
   b. Color 2: <**Insert color**>.
   c. Color 3: <**Insert color**>.
   d. Color 4: <**Insert color**>.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of MCM panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

E. Panel Sealants: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in MCM panels and remain weathertight; and as recommended in writing by MCM panel manufacturer.

2.4 FABRICATION

A. General: Fabricate and finish MCM panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Fabricate MCM panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations or recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
4. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.

    a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Aluminum Panels and Accessories:

1. PVDF Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. FEVE Fluoropolymer: AAMA 2605. One-coat [**clear**] [**tinted**] fluoropolymer finish containing 100 percent fluorinated ethylene vinyl ether resin in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
3. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil (0.005 mm) for primer and 0.8 mil (0.02 mm) for topcoat.
4. Exposed Anodized Finish:

    a. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
    b. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, MCM panel supports, and other conditions affecting performance of the Work.

1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by MCM wall panel manufacturer.
2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by MCM wall panel manufacturer.

a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and assemblies penetrating MCM panels to verify actual locations of penetrations relative to seam locations of MCM panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages in accordance with ASTM C754 and MCM panel manufacturer's written recommendations.

3.3 MCM PANEL INSTALLATION

A. General: Install MCM panels in accordance with Fabricator's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor MCM panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving MCM panels.
2. Flash and seal MCM panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by MCM panels are installed.
3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as MCM panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of MCM panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Aluminum Panels: Use aluminum or stainless steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by MCM panel manufacturer.

D. Attachment Assembly, General: Install attachment assembly required to support MCM wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.

1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.

E. Panel Installation: Attach MCM wall panels to supports at locations, spacings, and with fasteners recommended by Fabricator to achieve performance requirements specified.

1. Wet Seal Systems: Seal horizontal and vertical joints between adjacent MCM wall panels with sealant backing and sealant. Install sealant backing and sealant in accordance with requirements specified in Section 079200 "Joint Sealants."

a. Clip Installation: Attach panel clips to supports at locations, spacings, and with fasteners recommended in writing by Fabricator. Attach routed-and-returned flanges of wall panels to panel clips with Fabricator's standard fasteners.
b. Panel Installation:

1) Seal horizontal and vertical joints between adjacent panels with sealant backing and sealant. Install sealant backing and sealant in accordance with requirements specified in Section 079200 "Joint Sealants."
2) Seal horizontal and vertical joints between adjacent MCM wall panels with Fabricator's standard gaskets.
3) Joint Sealing: Seal all joints in accordance with AAMA 501.

2. PER Installation: Install using Fabricator's standard assembly with vertical channel that provides support and secondary drainage assembly, draining at base of wall. Notch vertical channel to receive support pins. Install vertical channels supported by channel brackets or adjuster angles and at locations, spacings, and with fasteners recommended by manufacturer. Attach MCM wall panels by inserting horizontal support pins into notches in vertical channels and into flanges of panels. Leave horizontal and vertical joints with open reveal.

a. Track-Support Installation: Install support assembly at locations, spacings, and with fasteners recommended by Fabricator. Use Fabricator's standard horizontal tracks and vertical [**tracks**] [**drain channels**] that provide support and secondary drainage assembly, draining to the exterior at horizontal joints through drain tube. Attach MCM wall panels to tracks by interlocking panel edges with Fabricator's standard "T" clips.
b. Panel Installation:
1) Attach routed-and-returned flanges of wall panels to perimeter extrusions with Fabricator's standard fasteners.
2) Install wall panels to allow individual panels to "free float" and be installed and removed without disturbing adjacent panels.

c. Joint Sealing: Seal all joints in accordance with AAMA 508. Do not apply sealants to joints unless indicated.

3. DBVR System: Install using Fabricator's standard assembly with vertical channel that provides support and secondary drainage assembly, draining at base of wall. Notch vertical channel to receive support pins. Install vertical channels supported by channel brackets or adjuster angles and at locations, spacings, and with fasteners recommended by Fabricator. Attach MCM wall panels by inserting horizontal support pins into notches in vertical channels and into flanges of panels. Leave horizontal and vertical joints with open reveal.
   a. Track-Support Installation: Install support assembly at locations, spacings, and with fasteners recommended by manufacturer. Use Fabricator's standard horizontal tracks and vertical [**tracks**] [**drain channels**] that provide support and secondary drainage assembly, draining to the exterior at horizontal joints through drain tube. Attach MCM wall panels to tracks by interlocking panel edges with Fabricator's standard "T" clips.
   b. Panel Installation:
      1) Attach routed-and-returned flanges of wall panels to perimeter extrusions with manufacturer's standard fasteners.
      2) Install wall panels to allow individual panels to "free float" and be installed and removed without disturbing adjacent panels.
   c. Joint Sealing: Seal all joints in accordance with AAMA 509. Do not apply sealants to joints unless otherwise indicated.
4. Face Fastened System:. Attach MCM wall panels by inserting horizontal support pins into notches in vertical channels and into flanges of panels. Leave horizontal and vertical joints with open reveal.
   a. Space, locate, align, and fasten subgirt hat channel framing over gypsum sheathing after application of air barrier specified by Section 07 25 00.
   b. Install fasteners in lengths and locations required in order to penetrate hat channels and structural metal wall framing in accordance with fastener manufacturers’ instructions.
   c. Torque screws as necessary for a snug fit. Do not over-torque; prevent ‘oil canning’ of panels.
   d. Install wall panels to allow individual panels expand and contract and be installed and removed without disturbing adjacent panels.

F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete MCM panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by MCM panel Fabricator; or, if not indicated, provide types recommended in writing by MCM system Fabricator.

G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, or SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (605 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3.4 ERECTION TOLERANCES

A. Site Verifications of Conditions:

1. Verify conditions of substrate previously installed under other Sections are acceptable for the MCM system installation. Provide documentation indicating detrimental conditions to the MCM system performance.
2. Once conditions are verified, MCM system installation tolerances are as follows:

    a. Shim and align MCM wall panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m), non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.5 FIELD QUALITY CONTROL

A. Water-Spray Test: After installation, test area of assembly [**shown on Drawings**] [**as directed by Architect**] <**Insert area**> for water penetration in accordance with AAMA 501.2.

B. Fabricator's Field Service: Engage a factory-authorized service representative to test and inspect completed MCM wall panel installation, including accessories.

C. MCM wall panels will be considered defective if they do not pass test and inspections.

D. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

E. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as MCM panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of MCM panel installation, clean finished surfaces as recommended by MCM panel manufacturer. Maintain in a clean condition during construction.

B. After MCM panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

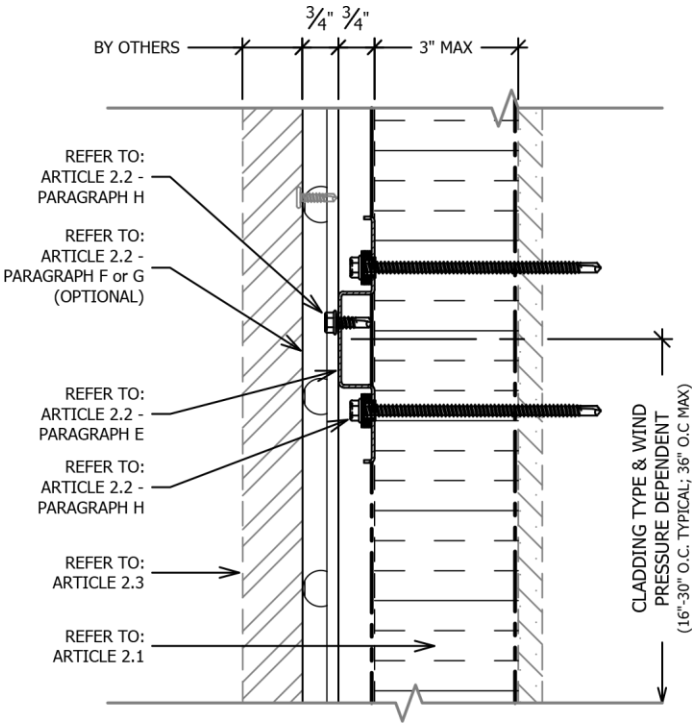
C. Replace MCM panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074213.23

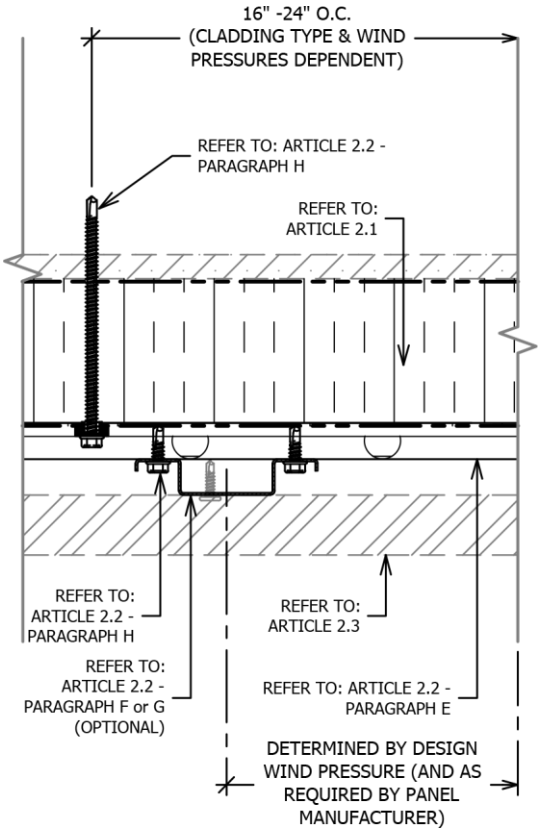
07 48 00
HCI SYSTEM GUIDE SPECIFICATION

SPEC NOTE: **THESE DRAWINGS ARE TO BE TREATED AS A SPEC NOTE AND ONLY INTENDED TO ASSIST WITH IDENTIFICATION OF COMPONENTS. THEY ARE NOT INTENDED FOR INCORPORATION INTO THE FINAL SPECIFICATION.**

HORIZONTAL HCI-Girt (+ VERTICAL PanelRail)



SECTION VIEW



PLAN VIEW

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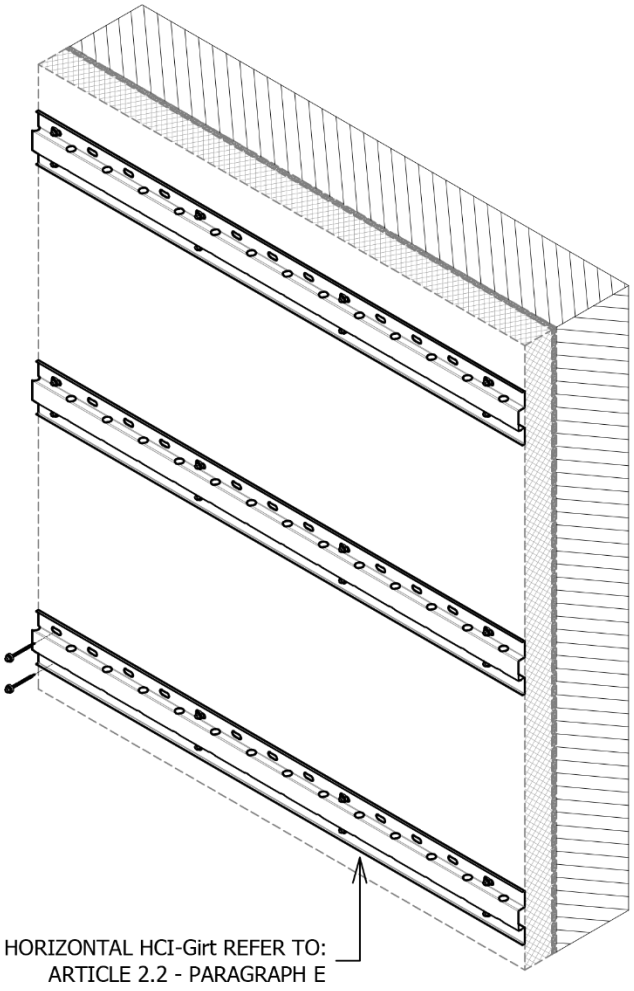

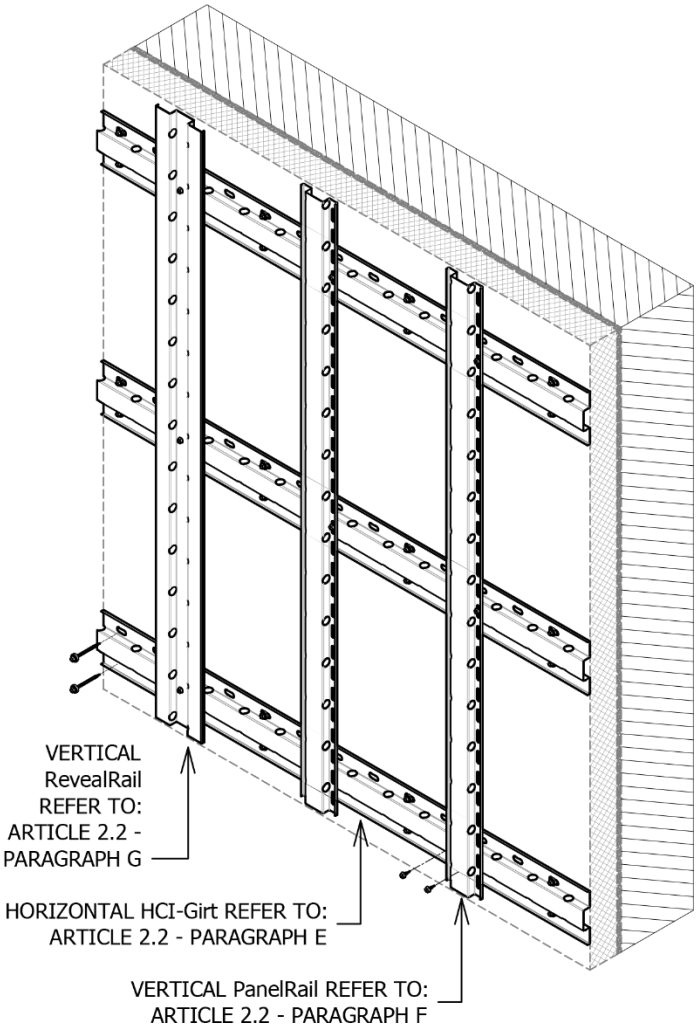

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SPEC NOTE: HCI™ SYSTEM: HORIZONTAL GIRTS ATTACHED OVER CONTINUOUS INSULATION:

This guide specification is intended for use when specifying a code compliant, continuously insulated, wall assembly consisting of a fully engineered thermally broken highly corrosion resistant rainscreen attachment system fastened over 25 PSI rigid foam insulation. The system can attach directly to the substrate without exterior insulation as well.

This specification is written with optional secondary rails (PanelRail™ and RevealRail™) which are vertical rails that attach to the HCI™ girts. The cladding size, type, orientation and configuration will determine if this system is required.

This rainscreen attachment system is versatile and suitable for common rainscreen panel assemblies such as (but not limited to) metal panels, fiber cement and Aluminum Composite Material (ACM). Cladding type must meet IBC requirements and weigh not more than 9 PSF. The framing system creates a minimum of 0.75 inch total air cavity for drainage and ventilation.

Please contact manufacture for further information or questions.

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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.

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SECTION 07 48 00

RAINSCREEN ATTACHMENT SYSTEM (HCI™ + VERTICAL GIRTS)

PART 1 - GENERAL

1.1 SUMMARY

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

B. Related Sections:

1. Refer to Division 05 Section “Steel Stud Framing”.
2. [Refer to Division 06 Section “Rough Carpentry” for wood framing.]
3. [Refer to Division 06 Section “Sheathing”.]
4. Refer to Division 07 Section “Air Barrier”.
5. Refer to Division 07 Section “[INSERT TYPE Siding/Cladding Panel]”.
6. Refer to Division 07 Section “Thermal Insulation” for exterior continuous insulation.
7. [Refer to Division 07 Section “Spray Applied Polyurethane Insulation”.]

1.2 SYSTEM DESCRIPTION

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

1. [Spray polyurethane foam (applied to interior wall cavity for steel stud wall framing).]
2. Substrate: Wall framing assembly [and sheathing] [Concrete masonry unit wall] [Concrete wall].
3. Weather Resistant/Air Barrier [over substrate OR over continuous insulation].
4. Continuous insulation.
5. Thermally broken rainscreen attachment system.
6. 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:
        1) Temperature Change (range): 120 degrees Fahrenheit (67 degrees C), ambient:
4. Support Framing/Attachment System:

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a. No framing component may penetrate the layer of continuous exterior insulation other than thermally isolated fasteners.

b. Frequency and spacing of stiffened horizontal girts as indicated by manufacture in project specific engineering package.

C. Performance Requirements:

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.

1. Rainscreen Attachment System Performance: Comply with ANSI/ASHRAE 90.1-2010 definition of continuous insulation (c.i.).

2. No thermal bridges other than fasteners and service openings.

3. Thermal Performance:

a. Full constructed assembly must have a minimum 90% EFFECTIVE R-value when compared to the exterior continuous insulations rated R-Value.

b. Continuous framing profiles (including C- or Z-shaped sections or furring) penetrating insulation not allowed.

c. Perform effective R-Value calculation or modeling in accordance with ASHRAE guidelines.

SPEC NOTE: WALL ASSEMBLY EFFECTIVE R-VALUE SHOULD BE IN ACCORDANCE WITH ASHRAE 90.1-2010 REQUIREMENTS OR LOCALLY ADOPTED VERSION. FOR EXAMPLE IN CLIMATE ZONES 4-8 FOR STEEL FRAMED BUILDINGS THE EFFECTIVE R-VALUE IS 15.63 (U-0.064).

d. Wall Assembly effective R-Value (U-Factor): [INSERT R-VALUE (U-0.XXX)]

4. Framing Members:

a. Test framing components to AAMA TIR- A8-[04] – Section 7.2 to determine structural performance and effective moment of inertia for each perforated component. Minimum Effective Moment of Inertia: 0.0150 in^4.

b. Localized bending stress for eccentrically loaded framing members must be evaluated with the maximum effective length of resisting element not more than 12 inches.

5. Fasteners:

a. Minimum Safety Factor of 3 for both tension and shear values.

b. Combined tension and shear shall be evaluated according to an interaction formula. Sum of terms shall not exceed 1.0.

1.3 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. Submit connection details to the cladding manufacturer, showing interface of rainscreen attachment system to substrate and panels with adjacent construction, signed and sealed by Professional Engineer.

2. Show system installation and attachment, including fastener size and spacing.

C. Structural Calculations:

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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. Horizontal Vented Stiffened Girts: Two (2) 12-inch long samples.

2. [Vertical Rails: Two 12-inch long samples of each.]

E. Test Reports:

1. Test to the following standards and provide written test reports by a third party:

a. AAMA TIR-A8-[04]: Structural Performance of Composite Thermal Barrier Framing Systems – Section 7.2.

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

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Minimum 5 years' experience specializing in the manufacturing of façade attachment/support framing similar to those specified.

2. Ability to demonstrate conformance to testing requirements.

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: Coordinate mock-up materials and requirements with mock-up specified in Division 01 [and exterior cladding specification].

1.5 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.

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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.

1.6 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials and components in manufacturers' original, unopened and undamaged containers or bundles, fully identified. Exercise care to avoid damage during unloading, storing and installation.

B. Store, protect and handle materials and components in accordance with manufacturer recommendations to prevent damage, contamination and deterioration. Keep materials clean, dry, and free of dirt and other foreign matter, and protect from damage due to weather or construction activities.

1.7 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.

1.8 WARRANTY

A. Manufacturer Warranties:

1. Attachment System: Ten (10) year Limited Warranty.

a. Covers components of the attachment system, including structural failure of components when all the materials and components are supplied and installed per manufacturer's requirements.

b. Includes labor and material for removal and replacement of defective material.

c. Includes labor to remove and reinstall façade finish panels, finish closures and façade finish accessories necessary to access defective material.

B. Contractor's Warranties: 2-year labor warranty, starting from [date of Owner acceptance of completed work] [Substantial Completion], to cover repair of materials found to be defective as a result of installation errors.

C. 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.

1.9 MAINTENANCE

A. Extra Materials: For use by Owner in building maintenance and repair, provide [a recommended percentage of] [3 percent] additional rainscreen attachment components in new, unopened cartons, packaged with protective covering for storage and identified with appropriate labels.

PART 2 - PRODUCTS

2.1 RIGID INSULATION

SPEC NOTE: SPECIFIER MAY INCLUDE BASIS OF DESIGN RIGID INSULATION HERE OR IN DIVISION 07 SECTION THERMAL INSULATION. INSULATION TYPES THAT WORK WITH THE SYSTEM INCLUDE BUT ARE NOT LIMITED TO THERMAX™ CI, THE DOW CHEMICAL COMPANY;

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EnergyShield PRO, ATLAS ROOFING CORPORATION; ECOMAXci, RMAX; Xci Class A, HUNTER PANELS; ETC. IF INSULATION IS SPECIFIED HERE, INCLUDE ACCESSORIES SUCH AS FASTENERS, WASHERS, AND TAPES.

RIGID FOAM PLASTIC INSULATION USED IN CONJUNCTION WITH THE HCI-GIRT MUST HAVE COMPRESSION STRENGTH OF 25 PSI PER ASTM D1621. REVIEW CODE REQUIREMENTS OF FOAM PLASTIC, INCLUDING FIRE.

A. Refer to Section 07 21 00 – Thermal Insulation.

2.2 RAINSCREEN ATTACHMENT/SUPPORT FRAMING SYSTEM

A. Comply with ANSI/ASHRAE 90.1-2010 definition of continuous insulation (c.i.).

B. Coating Material: ASTM A1046, Zinc-Aluminum-Magnesium, minimum thickness ZM40.

1. ASTM A653 Galvanized steel is not acceptable.

C. Steel Classification: Structural Steel (SS), Grade 50, 50 ksi Yield.

SPEC NOTE: HORIZONTAL GIRTS MAY BE SPACED UP TO 36 INCHES ON CENTER VERTICALLY (DEPENDING ON CLADDING WEIGHT & DESIGN WIND PRESSURES) AND SUPPORT CLADDINGS THAT WEIGH UNDER 9 POUNDS PER SQUARE FOOT. THE MAXIMUM ALLOWABLE SPACING AND DEAD LOAD IS DETERMINED PER PROJECT. THIS IS A FUNCTION OF THE LIVE LOAD PLUS THE DEAD LOAD BEING EQUAL TO LESS-THAN THE ALLOWABLE LOAD PER WALL ANCHOR. SPACING AND MAXIMUM LOADS ARE TYPICALLY DETERMINED BY THE MANUFACTURER.

D. Spacing: Comply with manufacturer's Professional Engineer's calculations.

E. Horizontal Girt: Stiffened horizontal girt with pre-punched drainage holes, directly attached on top of rigid insulation [directly to substrate] at regular spacing, with engineered thermally isolated washer assembly and fasteners.

1. Steel Thickness: Minimum 0.046-inch thick (18 gauge).
2. Profile Depth: 0.75 inches.
3. Girt Fastening Face: 2-inches.
4. Overall Girt Profile: 5-1/8-inches.
5. [Finish: Painted black at open joint panel assemblies.]
6. Basis of Design: HCI™ by Knight Wall Systems.
7. Or approved equal.

SPEC NOTE: 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. PLEASE CONTACT KNIGHT WALL SYSTEMS IF THERE IS ANY UNCERTAINTY OR QUESTIONS.

2" VERTICAL PANELRAIL IS TYPICALLY USED. IF PANEL CLADDING HAS LARGE CLIPS THAT REQUIRE ADDITIONAL MATERIAL FOR ATTACHMENT. VERTICAL RAILS ARE ALSO AVAILABLE WITH 3-INCH, 4-INCH, OR 5-INCH FACE FOR FASTENING. SEE GUIDE DETAILS FOR FURTHER INFORMATION AND EXAMPLES OF USE.

F. [Secondary Vertical Rail: Nominal 0.046 inch thick (18 gauge) [0.054-inch thick (16 gauge)] cold-formed steel.

1. Profile: Hat channel with stiffening lips.
2. Profile Depth: 0.75 inches.

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3. Girt Fastening Face: 2.0 inches [3.0 inches] [4.0 inches] [5.0 inches] [Manufacturer's recommendation as Engineered].
4. Weep Drains: 0.75 inches diameter at 4 inches on center along flanges to allow for free air flow laterally.
5. Attachment Holes: Locate at 2 inch on center along back to facilitate number 14 self-drilling self-tapping screw attachment to primary rail.
    a. Oversize holes to allow for thermal contraction and expansion of rail.
6. [Finish: Painted black at open joint panel assemblies.]
7. Basis of Design: PanelRail™ by Knight Wall Systems.
8. Or approved equal.]

SPEC NOTE REVEAL RAIL WOULD TYPICALLY BE USED AT VERTICAL JOINTS AT FACE FASTENED PANELS TO CREATE PANEL SEPARATION OR SHADOW EFFECT.

G. [Secondary Reveal Rail: Nominal 0.046 inch thick (18 gauge) [0.054-inch thick (16 gauge)] cold-formed steel.
1. Profile: Square hat channel with stiffening lips.
2. Depth: 0.75 inches.
3. Dimensions: 2.0 inches at web, 1.625 inches at each flange with 0.25 stiffening lips.
4. [Finish: Painted black at open joint panel assemblies.]
5. Basis of Design: RevealRail™ by Knight Wall Systems.
6. Or approved equal.]

H. Fasteners:
1. Sufficient length to provide solid attachment through rigid insulation to structure as required by manufacturer.
2. Thermal Isolating Washers: Minimum 0.125 inch thick Polyoxymethylene copolymer (POM) washers with integral centering lip to act as a thermal break between wall anchor fasteners and girt.
    a. Tensile Yield Strength: 9.57 ksi per ISO 527.
    b. Melting Temperature: 329 degrees Fahrenheit per ISO 3146.
    c. Basis of Design: ThermaStop™ Isolator by Knight Wall Systems.
    d. Or approved equal.

SPEC NOTE: SELECT THE FOLLOWING FOR STEEL STUD FRAMING SUBSTRATES:

3. Steel stud framing substrate: 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.

SPEC NOTE: SELECT THE FOLLOWING FOR CONCRETE AND CMU SUBSTRATES:

4. Concrete and concrete masonry units substrate:
    a. Embedment depth: 1.25 inches minimum.
    b. Minimum ultimate pull-out capacity from substrate material: 450 pounds.
    c. 1/4 inch Kwik-Con II+ by Hilti
    d. 1/4 inch Tapcon by Buildex

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e. 1/4 inch UltraCon by Elco Industries

f. Or approved equal.

5. Secondary Vertical Rail to Horizontal Girt 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: 450 pounds.

I. Accessories:

1. Galvanic Protection: Utilize tapes and other methods as necessary to separate and prevent contact between dissimilar metals.

2.3 SIDING/CLADDING PANEL

SPEC NOTE: SPECIFIER OPTION TO INCLUDE SIDING/CLADDING PANEL HERE OR MAKE REFERENCE TO DIVISION 07 SECTION "CLADDING". THE KNIGHT WALL HCI GIRT IS CAPABLE OF SUPPORTING ANY OF THE FOLLOWING TYPES OF CLADDING AT LESS THAN 9 PSF: METAL WALL PANELS; ALUMINUM COMPOSITE METAL PANELS; FIBER CEMENT PANELS; LIGHT WEIGHT TERRA COTTA, AND SIMILAR.

A. Refer to Division 07 Section 07 4X XX.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with manufacturer requirements for installation conditions affecting performance of the work.

SPEC NOTE: RETAIN THE FOLLOWING IF SYSTEM IS INSTALLED OVER STUDS WITH NO SHEATHING.

1. [Verify that wall studs, opening framing, bridging, bracing and other framing support members and anchorage have been installed within thermal wall system alignment tolerances and requirements.]

2. Do not proceed with installation until unsatisfactory conditions have been corrected.

3. Ensure weather-resistant barrier (WRB) and rigid insulation is installed prior to installing rainscreen attachment system.

4. Ensure fenestration, transitions, discontinuities, sills, and ledgers are flashed and sealed to move moisture to the exterior of the building.

B. Field verify architectural details and mechanical and electrical requirements prior to commencing installation.

C. Commencement of installation constitutes acceptance of existing conditions and acceptance of responsibility for satisfactory performance.

3.2 RAINSCREEN ATTACHMENT SYSTEM INSTALLATION

A. Preparation:

SPEC NOTE: RETAIN THE FOLLOWING IF SYSTEM IS INSTALLED OVER STUDS WITH NO SHEATHING.

1. [Verify horizontal girt spacing and framing clearances relative to studs or other points of attachment.]

2. Verify horizontal girt does not cantilever past rigid insulation.

B. Installation

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1. Install in strict accordance with manufacturer's installation instructions.
2. Use laser or chalk line to mark starting height of horizontal girt.
3. Do not use shims to plumb the wall between the horizontal girt and insulation.
4. Minimum length of installed cut girt is 24-inches and shall be attached with at least two (2) fasteners.
5. Mount stiffened horizontal girts, fastened up to 36 inches on center (as determined by the manufactures engineering calculations) over installed rigid insulation, using one self-tapping screw with thermal isolator, for each pre-punched attachment hole at spacing indicated on engineering calculations.
    a. Check plumb of horizontal girts both parallel and perpendicular to the structure.
    b. Tighten screws that attach horizontal girt through insulation to substructure to a snug tight condition and not stripped. Do not over-torque beyond manufacturer's recommendation. If installed using hand tools, verify for each installer at beginning of project using snug-tight criteria. Do not use stripped holes.
    c. Where obstructions are present and unavoidable (i.e. window openings), use laser or chalk line to restart girt.
    d. Use shearing instruments (i.e. snips, nibbler, etc.) for cutting metal framing components. Saws are not recommended, as the sparks produced during cutting will damage the anti-corrosion coating. If sparks are generated during cutting, be sure the portion of the component to be installed on the building is protected from sparks and that any stockpile near the cutting station is also protected.
    e. The systems components should not be cut while installed on the building, unless using a shearing instrument.
    f. Replace thermal isolator pieces that break during installation.
    g. Provide a 3/8" – 1/2" gap between girts for expansion when multiple lengths of horizontal girts are installed.

SPEC NOTE: RETAIN THE FOLLOWING IF SECONDARY VERTICAL RAILS ARE USED.

6. [Attach secondary vertical rails to horizontal girts plumb, straight and square.
    a. Tighten screws to a snug tight conditions and not stripped. Do not use stripped holes or screws.
    b. Shims can be used between vertical rail and horizontal girt or cladding panel and vertical rail (if approved by cladding manufacturer). Shims cannot be used between horizontal girt and insulation.
    c. Both flanges/edges of stiffened vertical rail must be attached to horizontal girt.]

3.3 SPRAY INSULATION

A. Fully secure exterior insulation prior to spray foam (SPF) within stud cavity to prevent deformation of exterior insulation due to expansion of SPF.

3.4 SIDING/CLADDING PANEL INSTALLATION – REFER TO SECTION 07 4X XX

A. The cavity must be clear and free from air flow and drainage obstructions.

END OF SECTION 07 48 00

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SECTION 07 21 13 - BOARD INSULATION

This section includes editing notes to assist the user in editing the section to suit project requirements. These notes are included as hidden text, and can be revealed or hidden by the following method in Microsoft Word:

Display the FILE tab on the ribbon, click OPTIONS, then DISPLAY. Select or deselect HIDDEN TEXT.

The following should be noted in using this specification:

Hypertext links to specific websites are included after manufacturer names and names of organizations whose standards are referenced within the text, to assist in product selection and further research. Hypertext links are contained in parenthesis and shown in blue, e.g.:

(www.astm.org)

Optional text requiring a selection by the user is enclosed within brackets and as red text, e.g.: “Color: [Red.] [Black.]"

Items requiring user input are enclosed within brackets and as red text, e.g.: "Section [_____ - _____]."

Optional paragraphs are separated by an "OR" statement included as red text, e.g.:

**** OR ****

For assistance on the use of the products in this section, contact Atlas Roofing Corporation by calling (800) 388-6134, or by email at lance.williams@atlasroofing.com, or visit their website at www.atlasrwi.com.

PART 1 GENERAL

1.1 SUBMITTALS

A. Action Submittals:
   1. Product Data.
   2. Samples.

B. Informational Submittals:
   1. Certificate of Compliance.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract Documents/Basis of Design are based on products by Atlas Roofing. www.atlasroofing.com

B. Equivalent products by following manufacturers are acceptable:

   1. Firestone.
   2. IKO.
   3. OX.
   4. Johns Manville.

C. Substitutions: Refer to Division 01.

2.2 MATERIALS

A. Board Insulation:

Product: EnergyShield Pro.
Description: ASTM C1289, Type 1 and 2, Class 3; closed cell polyisocyanurate foam core faced with reflective 12 mil reinforced foil facer on one side and white 12 mil reinforced acrylic-coated aluminum facer on the other.

1. Approved for use in NFPA 285 wall assemblies.
2. Flame spread/smoke developed rating: Class A, maximum 25/450, tested to ASTM E84.
3. Free from CFCs, HCFCs, and HFCs.
4. Compressive strength: Minimum 25 PSI, tested to ASTM D1621.
5. Moisture vapor transmission: Maximum 0.1 perm, tested to ASTM E96 desiccant method.
6. Water absorption: Maximum 1 percent by volume, tested to ASTM C209.
7. Dimensional stability: Maximum 1.5 percent linear change, tested to ASTM D2126.
8. Pass ASTM E2357 air barrier assembly test.
9. Qualify as weather resistive barrier per AC 71 with sealed joints; ICC-ES-ESR 1375.
10. Service temperature: Minus 100 to plus 250 degrees F.
11. Potential heat: 12,000 BTU/LB, tested to NFPA 259.
12. Auto ignition temperature: 800 degrees F, tested to ASTM D1929.
13. Microbial resistance:
    a. Pass ASTM D6329.
    b. Pass, UL2824.
14. Recycled content: Minimum 10 percent.
15. Tested to UL 2818; GreenGuard Gold certified.
16. Comply with CDPH 01350 low-emitting chamber requirements.
17. Pass NFPA 286.
18. Thickness and insulation value: [0.75 inch, R-value 5.0.] [1.0 inch, R-value 6.5.] [1.2 inches, R-value 97.5.] [1.5 inches, R-value 9.8.] [1.6 inches, R-value 10.5.] [2.0 inches, R-value 13.1.] [2.5 inches, R-value 16.0.] [3.0 inches, R-value 19.7.] [3.1 inches, R-value 20.2.]

**** OR ****

B. Board Insulation:

Product: EnergyShield CGF Pro.
Description: ASTM C1289, Type 2, Class 2, closed cell polyisocyanurate foam core faced with high-performance coated glass facers on both sides.

1. Approved for use in NFPA 285 wall assemblies.
2. Flame spread/smoke developed rating: Class A, maximum 25/450, tested to ASTM E84.
3. Free from CFCs, HCFCs, and HFCs.
4. Compressive strength: Minimum 25 PSI, tested to ASTM D1621.
5. Moisture vapor transmission: Maximum 1.2 perms, tested to ASTM E96 desiccant method.
6. Water absorption: Maximum 1.0 percent by volume, tested to ASTM C209.
7. Dimensional stability: Maximum 2 percent linear change, tested to ASTM D2126.
8. Pass ASTM 2357 air barriers assembly test.
9. Qualify as weather resistive barrier per AC 71 with sealed joints; ICC-ES-ESR 1375.
10. Service temperature: Minus 100 to plus 250 degrees F.
11. Potential heat 12,000 BTU/LB, tested to NFPA289
12. Auto ignition temperature 800 deg F, tested to ASTM D1929
13. Microbial resistance:
    a. Pass ASTM D6329.
    b. Pass UL2824.
14. Recycled content: minimum 10 percent
15. Tested to UL 2818; GreenGuard Gold certified.
16. Comply with CDPH 01350 low-emitting chamber requirements.
17. Thickness and insulation value: [0.50 inch, R-value 3.0.] [0.75 inch, R-value 4.5.] [1.0 inch, R-value 6.0.] [1.5 inches, R-value 9.0.] [2.0 inches, R-value 12.1.] [2.5 inches, R-value 15.3.] [3.0 inches, R-value 18.5.] [3.5 inches, R-value 21.7.]

**** OR ****

C. Board Insulation:

Product: EnergyShield Ply Pro.
Description: ASTM C1289, Type 5, grade 3 (25psi), closed cell polyisocyanurate foam core faced with coated glass facers on both sides, bonded to nominally [5/8] [3/4] inch thick 4' x 8' fire-retardant treated plywood.

1. Approved for use in NFPA 285 wall assemblies.
2. Flame spread/smoke developed rating: Class A, maximum 25/450, tested to ASTM E84.
3. Moisture vapor transmission: Maximum 1.2 perms, tested to ASTM E96 desiccant method.
4. Water absorption: Maximum 1.0 percent by volume, tested to ASTM C209.
5. Dimensional stability: Maximum 2 percent linear change, tested to ASTM D2126.
6. Microbial resistance; polyisocyanurate layer:
   a. Pass ASTM D6329.
   b. Pass UL 2824.
7. Service temperature: Minus 100 to plus 250 degrees F.

Retain the following for insulation bonded to 5/8 inch thick plywood.

8. Nominal thickness and insulation value: [1.625 inches, R-value 6.8.] [2.125 inches, R-value 9.8.] [2.625 inches, R-value 12.9.] [3.125 inches, R-value 16.1.] [3.625 inches, R-value 19.3.] [4.125 inches, R-value 22.5.]

**** OR ****

Retain the following for insulation bonded to 3/4 inch thick plywood.

7. Nominal thickness and insulation value: [1.75 inches, R-value 7.0.] [2.25 inches, R-value 10.0.] [2.75 inches, R-value 13.1.] [3.25 inches, R-value 16.3.] [3.75 inches, R-value 19.5.] [4.25 inches, R-value 22.7.]

PART 3 EXECUTION

3.1 INSTALLATION

A. Install insulation in accordance with manufacturer's instructions.
B. Atlas recommends standard or light duty insulation fastener with #2 light duty drill point specifically engineered for attaching Atlas EnergyShield Ply Pro to light steel and wood substrates.

END OF SECTION

EnergyShield® Pro
Continuous Wall Insulation

DESCRIPTION: Atlas EnergyShield® Pro is composed of a Class A closed cell polyisocyanurate (polyiso) foam core faced with a reflective 12 mil reinforced foil facer on one side and a white 12 mil reinforced acrylic-coated aluminum facer on the other. The blowing agent used to produce the polyiso foam core does not contain any CFCs, HCFCs or HFCs. EnergyShield® Pro has zero Ozone Depletion Potential (ODP) and negligible Global Warming Potential (GWP). EnergyShield® Pro combines high R-value, Class A foam core, durable aluminum facers and water resistive barrier attributes in a high performance rigid wall insulation. EnergyShield® Pro is designed to be used as exterior continuous insulation (CI) or may be reversed for interior applications in compliance with NFPA 286 for interior walls only or ceilings only where a clean white surface is desirable. Panel sizes are 4′ by 8′ or 4′ by 9′. Panels can be supplied in nominal 16″ or 24″ widths for use in masonry cavity wall applications. Custom sizes are also available.

APPLICATION: EnergyShield® Pro is recommended for use in both commercial and residential construction (Type I through Type V) where a Class A flame spread is needed.

Common applications include:

- Exterior or interior continuous insulation (CI) in commercial and residential construction.
- Exterior or interior continuous insulation (CI) for masonry or concrete wall systems, including exterior masonry cavities
- Exterior or interior continuous insulation (CI) in commercial and residential wood stud construction
- Exterior continuous insulation (CI) over wood or gypsum sheathings
- Use over existing cladding to improve energy efficiency with continuous insulation (CI) and provide a level surface prior to installing a new cladding
- Various OEM applications
- Approved for use in attics and crawlspaces without requiring the use of a thermal barrier (ICC-ES A12, Appendix B)
- Interior exposed applications installed with white facer facing outward for interior walls only or ceilings only

ENERGYSHIELD® PRO MEETS OR EXCEEDS THE FOLLOWING PHYSICAL PROPERTIES

PROPERTY	TEST METHOD	TEST METHOD MINIMUM REQUIREMENTS
FLAME SPREAD	ASTM E84	< 25
SMOKE DEVELOPMENT	ASTM E84	< 450
MOISTURE VAPOR TRANSMISSION (ASTM E96 DESICCANT METHOD)	ASTM E96	< 0.1 Perm (5.7ng/(Pa▪s▪m2)) Class I vapor retarder per ICC
COMPRESSIVE STRENGTH	ASTM D1621	25 psi
WATER ABSORPTION	ASTM C209	< 1% by Volume *Typical Results < 0.5% by Volume
DIMENSIONAL STABILITY	ASTM D2126	< 1.5% Linear Change *Typical Results < 1% Linear Change
SERVICE TEMPERATURES	-	-100°F to +250°F (-73°C to 122°C)
POTENTIAL HEAT	NFPA 259	12,000 Btu/lb
AUTO-IGNITION TEMPERATURE	ASTM D1929	800°F
RECYCLED CONTENT	-	10.4 -13.8%

THERMAL DATA

R-VALUE[1,2]	NOMINAL BOARD THICKNESS[3]
5.0	0.75″
6.5	1.0″
7.5	1.2″
9.8	1.5″
10.5	1.6″
13.1	2.0″
16.0	2.5″
19.7	3.0″
20.2	3.1″
22.2	3.5″
26	4.0″

[1] Conditioned thermal values were determined by ASTM Test Method C 518 at 75° mean temperature. Test specimens were conditioned in accordance with procedures outlined in ASTM C1289, Section 11.1.2.1
[2] "R" means resistance to heat flow. The higher the R-value, the greater the insulating power.
[3] Other sizes available upon request. Contact your local Atlas sales office.

CODES AND COMPLIANCES

- **ASTM 1289 Type I Class 1 and Type I Class 2**
- **ASTM E2357 Air Barrier Assembly Test –** Passed
- **UL Listed for flame spread,** see BRYX.R13089
- **ANSI/UL 263 (E119)** hourly rated wall approvals (see UL Online Certification Directory)
- **NFPA 285** (consult Atlas for our extensive list of approved assemblies)
- **NFPA 286** Interior walls only or interior ceilings only
- **PE Evaluation of fire Properties,** see TER 1306-03
- **International Building Code (IBC),** Section 2603
- **International Residential Code (IRC),** Section R316
- **Water Resistive Barrier** ICC-ES ESR-1375
- **ASHRAE 90.1 / ASHRAE 189.1 / IECC / IGCC** Continuous Insulation Standards
- **Foil faced insulation** greater than .5″ thick is prescriptively defined as an air barrier material by **IECC and ASHRAE 90.1**
- **Class I vapor retarder** (< 0.1 perm)
- **California Approved** Insulation Registry T 1231
- **Has acheived GREENGUARD GOLD Certification**

PRODUCT CERTIFIED FOR LOW CHEMICAL EMISSIONS: UL.COM/GG UL 2818

EnergyShield® Pro
Continuous Wall Insulation

INSTALLATION: EnergyShield® Pro may be installed on the exterior, interior, or within wall assemblies using fasteners, adhesives, girts, or any combination. Some of the common installations for EnergyShield® Pro include, but are not limited to, steel stud walls, over exterior gypsum, masonry walls, over air and vapor barrier membranes, concrete walls, wood stud walls. Also, the dual use allows the product to be used in interior exposed/interior visible applications installed with white facer facing outward for interior walls only or ceilings only. For specific installation instructions, contact Atlas. Check local building codes for thermal barrier requirements when using EnergyShield® Pro.

CONFIGURATION FOR WATER RESISTIVE BARRIER (WRB) AND AIR BARRIER:

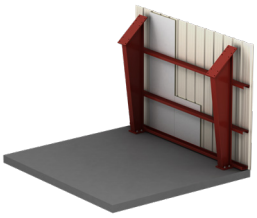
EnergyShield® Pro can be used as part of a WRB and potentially part of an air barrier assembly. EnergyShield® Pro has passed ASTM E2357 as a component of an Air Barrier Assembly. In these types of assemblies it is required that all joints, penetrations and openings be taped or sealed by other means. Atlas recommends flashing EnergyShield® Pro into rough openings and other building transitions. The foil facers are compatible with most flashing or sheathing tape, joint fillers, sealants, and adhesives. Consult the product manufacturer for specific compatibility.

EnergyShield® Pro combines high R-value, durable foil facers, water resistive attributes and a Class A foam core for use in approved NFPA 285 assemblies.

EnergyShield® Pro is a Class A product and may be reversed for interior applications in compliance with NFPA 286 for interior walls only or ceilings only where a clean white surface is desirable.

Concrete Tilt Up Wall

Engineered Metal Building Ceiling



Engineered Metal Building Wall

PRECAUTIONS / LIMITATIONS:

- While EnergyShield® Pro is a Class A foam product, it will burn and may contribute to flames spreading and smoke developing.
- When designing with or using this product always follow local codes, especially with regards to WRB, Air Barrier and Vapor Retarder. Atlas highly recommends the use of a dew point calculation of the proposed wall assembly to determine the types and locations of weather resistive barriers as well as needed R-value to mitigate any condensation potential.
- EnergyShield® Pro is not a structural product so local codes must be followed for required bracing of the frame wall.
- Storage: Prior to installation EnergyShield® Pro should be stored indoors. If left outdoors for any length of time it must be kept dry by covering completely with a waterproof tarpaulin. Store on flat pallets elevated at least 4 inches above the floor or ground and standing water.
- Follow the cladding manufacturer's recommendation for attachment of the cladding.
- Installed EnergyShield® Pro is not intended to be left exposed to the elements in excess of 180 days. Atlas recommends that all wall cladding material be installed within 180 days of installing the EnergyShield® Pro.

WARRANTY: A 15-year limited thermal warranty is available. Please see atlasroofing.com or contact your Atlas representative. Atlas Roofing Corporation assumes no responsibility for building design or construction, which is solely the responsibility of the owner, architect, engineer or contractor.

Technical specifications are intended as general guidelines only, physical properties are representative based on testing, no warranties are given except for those specifically written by Atlas for its products.

LOCAL Production and Support: Atlas has the largest production footprint of any polyiso manufacturer for quick access to the products you need.

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Fax: (717) 975-6957	Fax: (936) 829-5363	Fax: (866) 740-6019	Fax: (706) 882-4047	Fax: (303) 252-4417	Fax: (602) 477-8897	Fax: (877) 909-4001	Fax: (604) 395-836

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Photo for visual effect

Vented Cladding w/ PIR CI
Heat / Air / Moisture Observations

Tom Harris PUR Consulting, LLC
October 9, 2023
Prepared by Tom Harris

Observations and Considerations

The 2021 IECC for commercial construction states the following minimum opaque wall insulation levels are required.

HAM analysis were conducted for zones 4 and 5 using the assemblies provided.

TABLE C402.1.3 OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, *R*-VALUE METHOD[a]

CLIMATE ZONE	0 AND 1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Roofs												
Insulation entirely above roof deck	R-20ci	R-25ci	R-25ci	R-25ci	R-25ci	R-25ci	R-30ci	R-30ci	R-30ci	R-30ci	R-30ci	R-30ci
Metal buildings[b]	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-25 + R-11 LS	R-30 + R-11 LS
Attic and other	R-38	R-38	R-38	R-38	R-38	R-38	R-49	R-49	R-49	R-49	R-49	R-49
Walls, above grade												
Mass[i]	R-5.7ci[c]	R-5.7ci[c]	R-5.7ci[c]	R-7.6ci	R-7.6ci	R-9.5ci	R-9.5ci	R-11.4ci	R-11.4ci	R-13.3ci	R-13.3ci	R-15.2ci
Metal building	R-13+ R-6.5ci	R-13 + R-6.5ci	R13 + R-6.5ci	R-13 + R-13ci	R-13 + R-6.5ci	R-13 + R-13ci	R-13 + R-13ci	R-13 + R-14ci	R-13 + R-14ci	R-13 + R-14ci	R-13 + R-14ci	R-13 + R-14ci
Metal framed	R-13 + R-5ci	R-13 + R-5ci	R-13 + R-5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-10ci	R-13 + R-10ci	R-13 + R-12.5ci	R-13 + R-12.5ci
Wood framed and other	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-7.5ci or R20 + R3.8ci	R-13 + R-7.5ci or R-20 + R-3.8ci	R-13 + R-7.5ci or R-20 + R-3.8ci	R-13 + R-7.5ci or R-20 + R-3.8ci

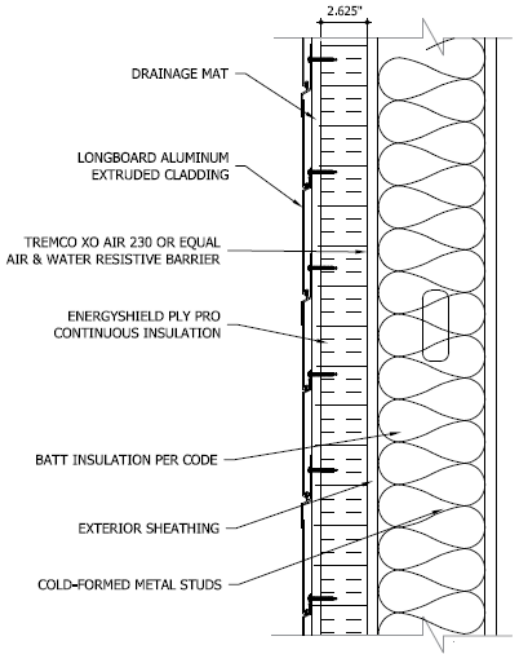
Assembly 1 – Longboard Panel Assembly

The exterior cladding system is considered vented. The inclusion of a drainage mat is essential to provide Liquid water drainage behind the cladding system.

The attachment of CI board is not provided but assumed to be mechanically fastened.

The WRB is included.

The inboard insulation (FG) is included. R-7.5 for zone 4 and R-10 for zone 5.

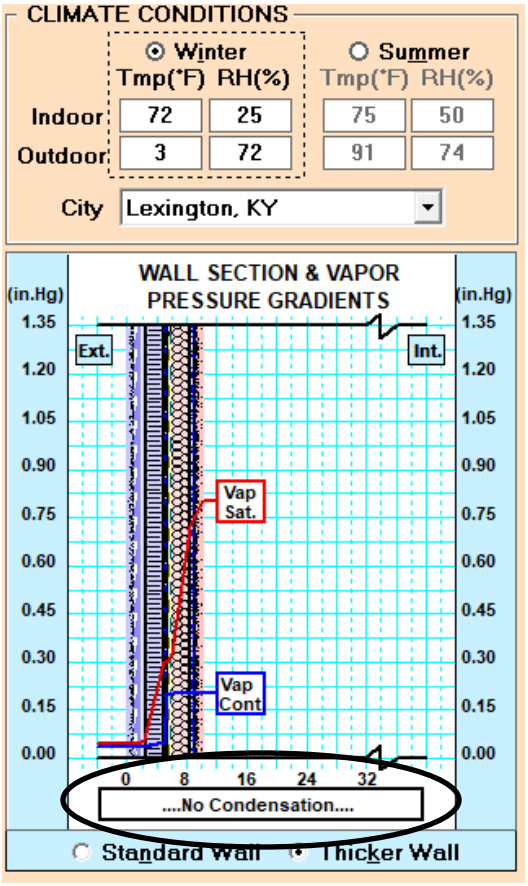


HAM analysis

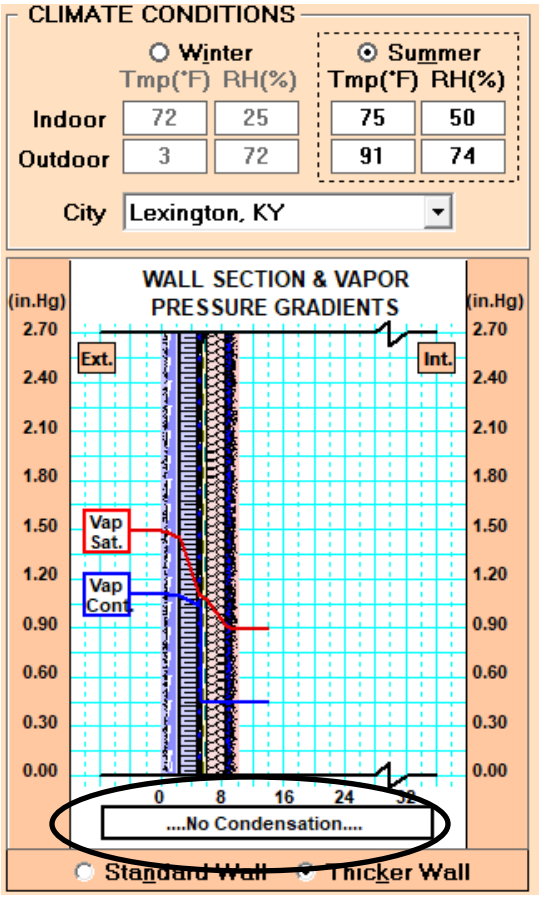
Longboard Panel System

Zone 4

Winter



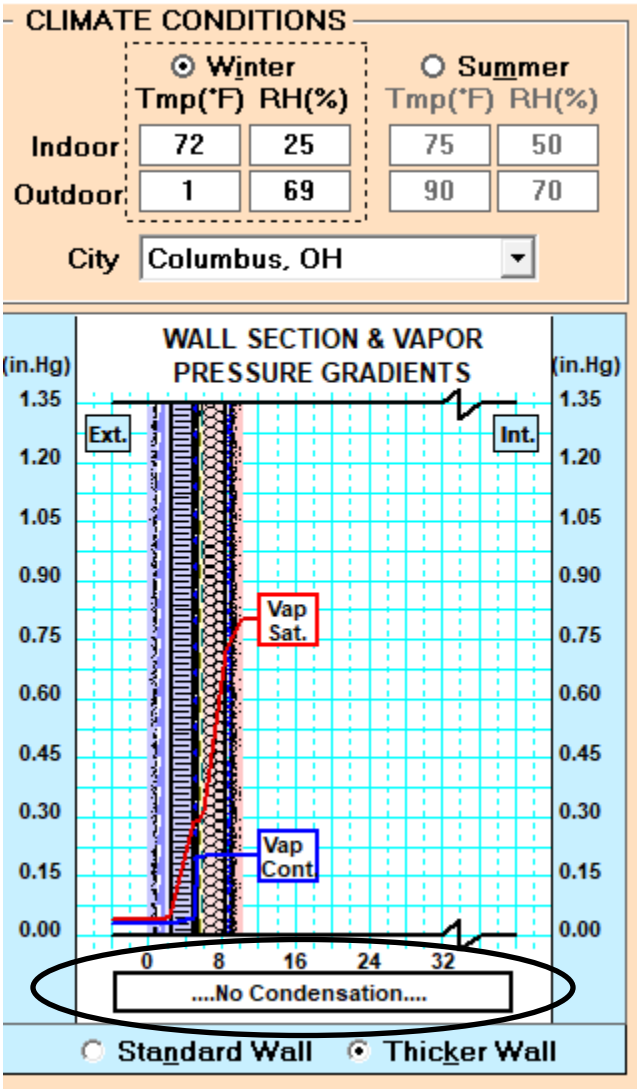
Summer



The impact/need of an interior VB was not evaluated as it is not considered necessary in the proposed assemblies.

Zone 5 **Longboard Cladding System**

Winter



The potential for condensation within the Longboard vented cladding assembly is minimal under normal winter (most severe) conditions in Zone 5.

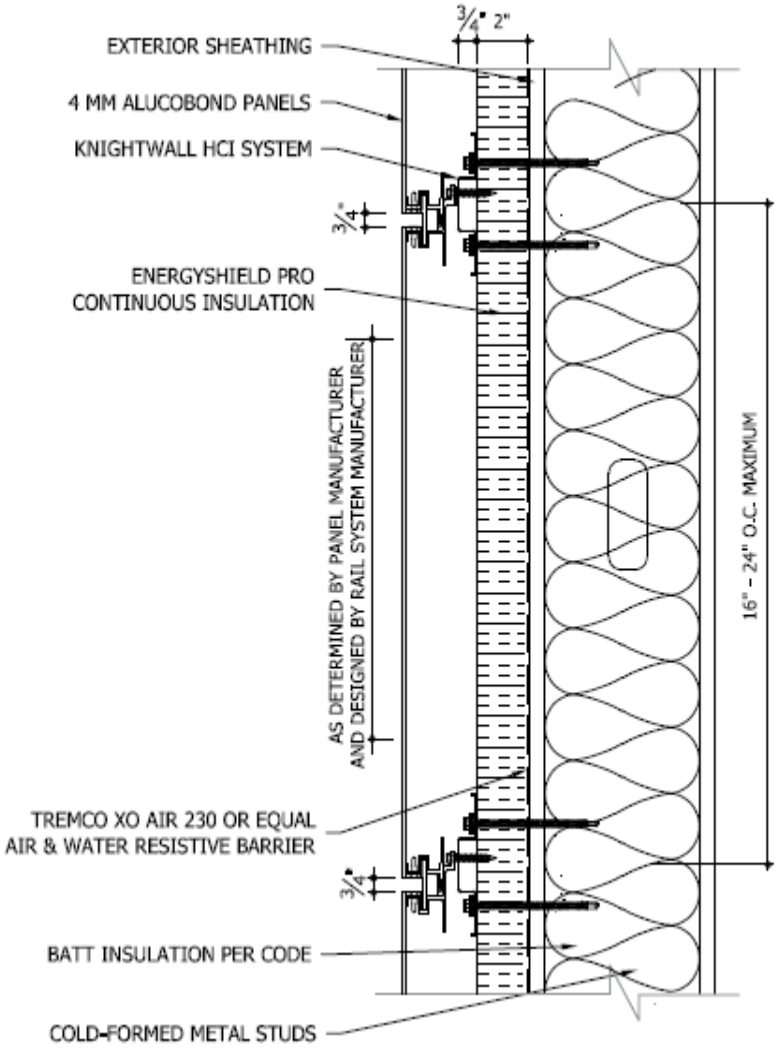
Alucobond Cladding System

The exterior cladding system is considered vented. The inclusion of a drainage hole is essential to provide liquid water drainage behind the cladding system. (not shown on drawings)

The attachment of CI board is shown as mechanically fastened. Minimal thermal bridging is expected.

The WRB is included.

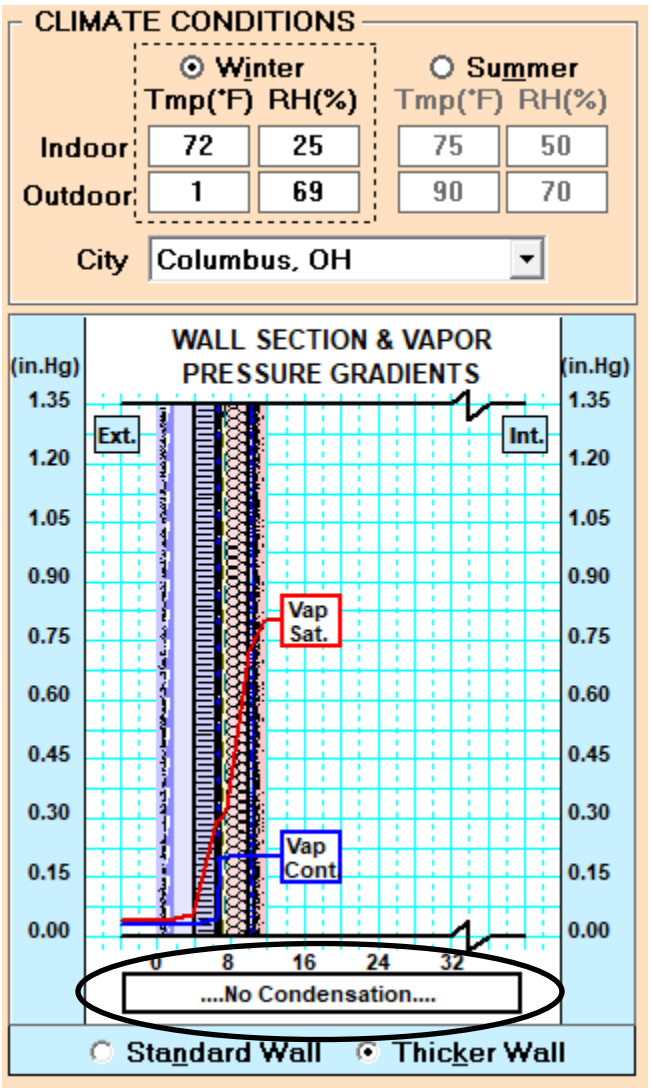
The inboard insulation (FG) is included.
R-7.5 for zone 4 and R-10 for zone 5.



The HAM model below is provided for zone 5 – winter in order to evaluate a “worst case” scenario.

Zone 5

Winter



The potential for condensation within the Alucobond vented cladding assembly is minimal under normal winter (most severe) conditions in Zone 5.

Terra Cotta Cladding System

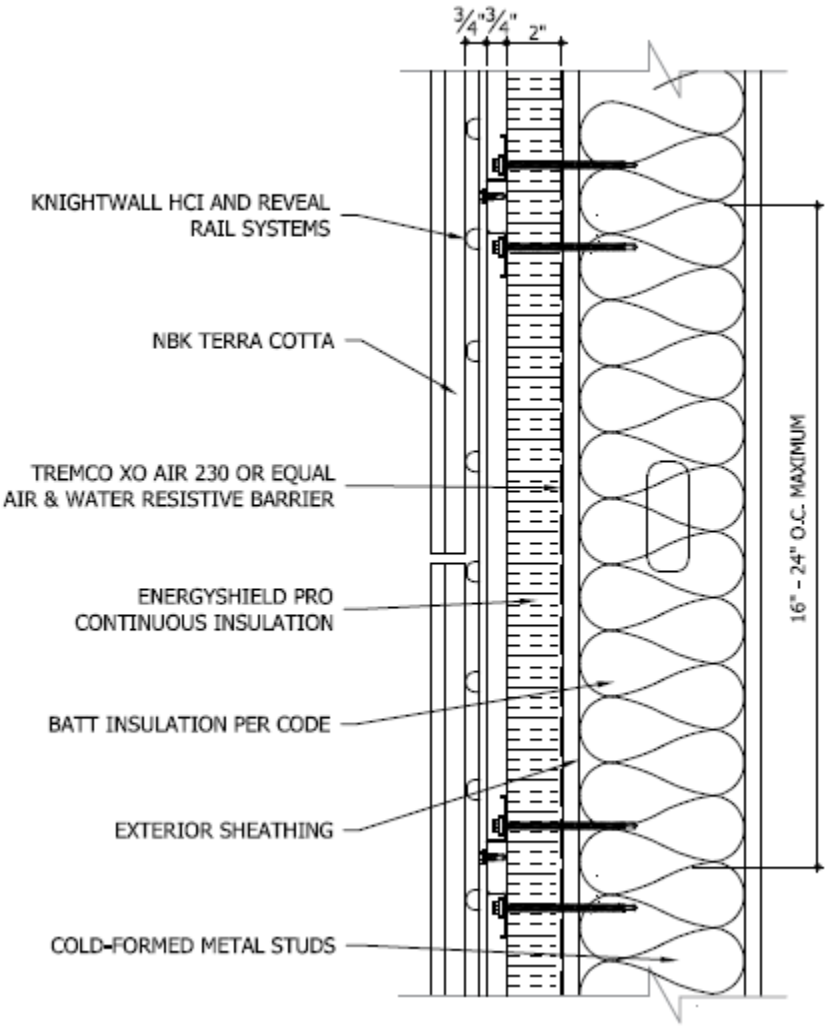
The exterior cladding system is considered vented. ¾ inch cavity was used for HAM modeling purposes.

The inclusion of a drainage hole is essential to provide liquid water drainage behind the cladding system. (not shown on drawings)

The attachment of CI board is shown as mechanically fastened. Minimal thermal bridging is expected.

The WRB is included.

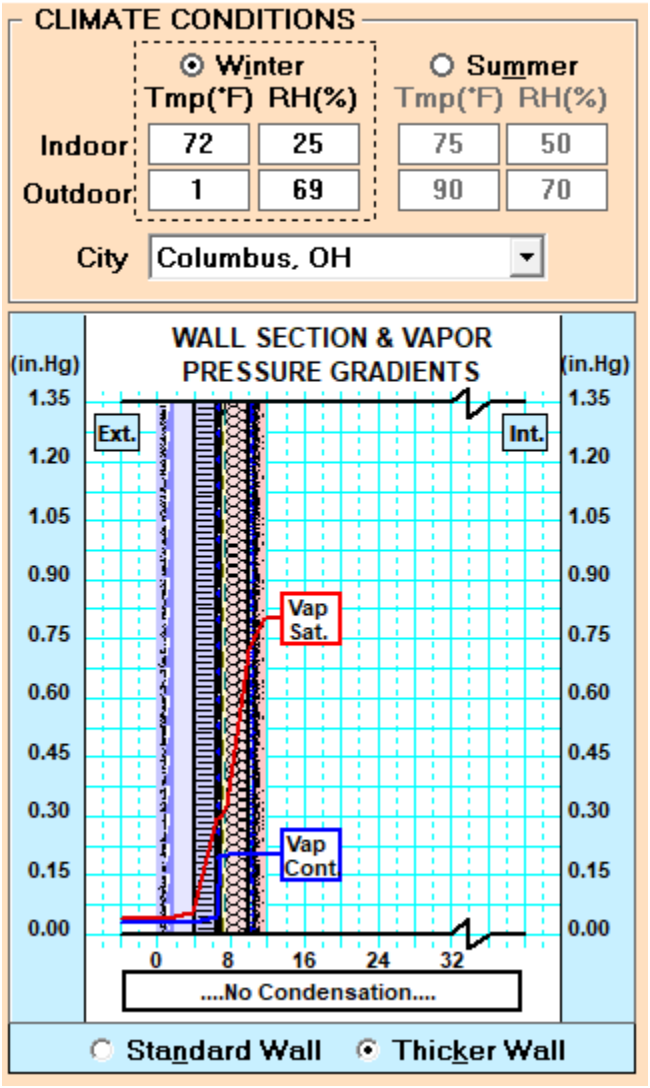
The inboard insulation (FG) is included. R-7.5 for zone 4 and R-10 for zone 5.



The HAM model below is provided for zone 5 – winter in order to evaluate a “worst case” scenario.

Zone 5

Winter



The potential for condensation within the Terra Cota vented cladding assembly is minimal under normal winter (most severe) conditions in Zone 5.

Design Review

Under the most severe environmental conditions, Zone 5, an interior vapor barrier is not required in the designs provided – Longboard, Alucobond and Terra Cota cladding systems. The potential for the formation of condensation within each assembly is minimal. The analysis does not consider extreme temperatures and conditions outside the IECC/ASHRAE 15 year average climate model.

In all cases, a vented cladding design is essential to permit drying to the outside of any moisture vapor which may be present in the insulation layer. Bulk water is addressed with the use of a drainage mat in the case of the Longboard assembly to direct any bulk water which may enter the assembly through gaps/hole in the exterior cladding.

In the case of Terra Cota and Alucobond, these assemblies are considered vented, with no need for an additional outboard drainage mat. Any bulk water which enters the assembly will be directed downward to drainage holes – presumed as these drainage holes were not indicated on the drawings provided.

Thermal bridging through fasteners is not a concern and will be mitigated by the inclusion of inboard cavity insulation and the outboard CI.

In all cases, the plane of air tightness is maintained through the assembly with Tremco ExoAir 230, a fluid applied vapor permeable air barrier material installed directly onto the exterior sheathing. Install ExoAir 230 in accordance with manufacturers installation instructions. As a result, the seams of the exterior insulation do not require tape of sealant be installed at joints.

Conclusions:

In all cases provided, the Longboard, Alucobond and Terra Cota cladding systems will not result in condensation and do not require an additional internal vapor control layer.

Bulk water management is appropriately provided by the inclusion of a drainage mat in the case of Longboard and a vented cavity cladding system in the case of Alucobond and Terra Cotta.

The insulation design – R-17 outboard combined with R- 7.5 (zone 4) and R-10 (zone 5) exceed the requirements of 2021 IECC for metal framed commercial construction.

The plane of air tightness is identified as directly applied to the exterior of the exterior sheathing material thereby eliminating the need to tape/seal the joints of the outboard insulation system,

Should you have any questions regarding this report or HAM analysis, please do not hesitate to call.

Sincerely,

Tom Harris

President
Tom Harris PUR Consulting, LLC

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