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SECTION 07 05 43.04

CLADDING SUPPORT SYSTEM – DELTA ADJUSTABLE

This document is intended to serve as a proprietary guide that provides Advanced Architectural Products' recommendation for specification language that applies to their products.

This document does not inherently serve as a pre-written master specification. Review and edit as needed to suit each Project's individual requirements. Text in bold parenthesis indicates choices or options that the specifier preparing the Project specifications must select.

ABOUT US

Advanced Architectural Products, based in Allegan, Michigan, is a leading innovator in high-performance building enclosure and continuous insulation systems. Since our founding in 2012, we have been dedicated to developing cutting-edge solutions that enhance energy efficiency, structural integrity, and sustainability in modern construction.

Our flagship products, **GreenGirt®** CMH and **SMARTci®** systems, utilize advanced composite metal hybrid technology to provide superior thermal performance and moisture control, supporting Architects, Engineers, and builders in creating more efficient and durable structures.

With a state-of-the-art headquarters in Allegan, a 100,000-square-foot manufacturing and research facility in Hamilton, Michigan, and a West Coast distribution center in Washington, we are committed to innovation, quality, and customer success. Recognized as one of Inc.'s Fastest Growing Companies, we continue to push the boundaries of construction technology.

PART 1 - GENERAL

This section specifies the **GreenGirt CMH Delta™ Adjustable** continuous insulation system, a high-performance composite metal hybrid (CMH) system featuring adjustable Z-girt clips designed to accommodate various wall conditions. The system provides secure cladding attachment, eliminates thermal bridging, and integrates seamlessly with mineral wool or spray foam.

1.01 SECTION INCLUDES

- A. Adjustable composite metal hybrid (CMH) sub-framing support system for exterior cladding.

1.02 RELATED REQUIREMENTS

Keep the following subparagraph(s) to reference requirements that may typically be expected in this Section but are specified in other Sections.

- A. Section 03 3000 – Cast-in-Place Concrete for concrete wall substrates supporting the sub-framing system.
- B. Section 04 2000 – Unit Masonry for concrete masonry unit (CMU) wall substrates receiving cladding support system.

- C. Section 05 4000 – Cold-Formed Metal Framing for backup stud framing supporting insulation and cladding.
- D. Division 06 Sections for requirements for exterior sheathing and wood stud substrate support framing.

Coordinate with Division 07 Sections for cladding, air barriers, insulation, and firestopping to ensure proper sequencing and performance. Update related section numbers as appropriate.

- E. Division 07 Sections for exterior wall panel systems.
- F. Section 07 92 00 – Joint Sealants for perimeter sealants around facade system penetrations and transitions.
- G. Section 07 40 00 – Exterior Wall Cladding for metal panels or other rainscreen cladding attached to the system.
- H. Section XX XX XX (**Insert Spec Section Name Here**) for (**Insert Description of what item is for here**)

1.03 REFERENCE STANDARDS

- A. ASCE – Design Guide for FRP Composite Connections.
- B. ASCE 7 – Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
- C. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated or Zinc-Iron Alloy-Coated by the Hot-Dip Process.
- D. ASTM C518 – Steady-State Thermal Transmission Properties by Heat Flow Meter Apparatus.
- E. ASTM C1363 – Thermal Performance of Envelope Assemblies by Means of a Hot Box Apparatus.
- F. ASTM D638 – Tensile Properties of Plastics.
- G. ASTM D790 – Flexural Properties of Plastics.
- H. ASTM E84 – Surface Burning Characteristics of Building Materials.
- I. ASTM E119 – Fire Tests of Building Construction and Materials.
- J. ASTM E330/E330M – Structural Performance by Uniform Static Air Pressure Difference.
- K. NFPA 285 – Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies.

1.04 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct preinstallation (**teleconference**) (**conference at Project site**).
 - 1. Attendees: Invite Contractor, Architect, Owner's representative, and Installer to preinstallation conference.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate installation of continuous insulation sub-framing support system as indicated on drawings for proper drainage, flashing, trim, backup support, soffits, and other related Work.
 - 1. Review and finalize construction schedule.
 - 2. Verify availability of materials, installer's personnel, equipment, and facilities needed to meet established schedule.
 - 3. Review means and methods related to installation in accordance with manufacturer's installation instructions.
 - 4. Examine support conditions for compliance with installation requirements, including alignment and attachment to structural support system.
 - 5. Review flashings, wall cladding details, wall penetrations, drainage plane, openings, and condition of other construction that is related to this Work.
 - 6. Review temporary protection requirements for during and after installation of this Work.

1.06 SUBMITTALS

- A. Product Data: Submit manufacturer's printed product data for each type of product and component included in composite cladding support system.
- B. Shop Drawings: Submit details on layout, spacing, sizes, thicknesses, and types of composite cladding systems including fabrication, fastening, and anchorage details.
 - 1. Provide details on accessories, connections, and attachment to adjacent work.
 - 2. Provide a list of locations where composite cladding support systems are to be used and indicate depth of product at each location.
- C. Certificates:
 - 1. Any other manufacturer must certify that products meet or exceed specified requirements.
 - 2. Certificate of compliance with Buy America Act, verifying that all materials meet applicable domestic production requirements.
 - 3. Certificate confirming all system components, including sub-framing members and fasteners, are manufactured in the United States.

Retain "Delegated Design Submittals" Paragraph below if structural calculations for sub-framing are required.

- D. Delegated Design Submittals: Submit comprehensive structural analysis for composite cladding support systems in compliance with performance requirements and design criteria, signed and sealed by the qualified professional engineer responsible for preparation.
- E. Structural Composite Sub-Framing Submittal:
 - 1. Provide professional engineer-stamped calculations for the composite sub-framing system supporting the associated cladding system considering the following:
 - a. Anisotropic properties of the sub-framing.
 - b. Point loading effects of fasteners and representative dynamic responses of cladding system.
 - c. Uniform loading calculations are not allowed as they are not representative to composite wall systems.
 - d. Calculations for eccentric cantilever conditions.
 - 2. Provide calculations demonstrating a minimum safety factor of 4 under maximum design loads at a service temperature of 180 degrees F.

3. Fastener Creep and Durability Test for FRP sub-girts, certified by third party/PE. Test to be completed in accordance with specified Fastener Creep and Durability Test requirements.
4. Provide finite element analysis (FEA) to model and evaluate areas of the longest composite girt cantilever span possible between intermediate framing members/attachment.
 - a. FEA shall include maximum dead load and wind load conditions.
 - b. FEA shall include point loads representative of fastener locations.
 - c. FEA for composite materials shall:
 1. Provide crosswise material properties of tensile strength and modulus of elasticity.
 2. Provide lengthwise material properties of tensile strength and modulus of elasticity.
 3. Failure to provide tested crosswise material properties are cause for product rejection.
 - d. Maximum directional stresses in model shall have a safety factor of 4 or greater.
 - e. Stresses shall be indicated and analyzed in 3 directions.
 - f. FEA shall accurately replicate the wall system and physical loading dynamics.
 - g. Report shall be furnished with submittal

Retain "Sustainable Design Submittals" Paragraph below if required to attain sustainability rating or to track sustainability submittals. Coordinate with sustainability consultant to determine if there are requirements for additional documentation for particular a sustainability accreditation.

F. Sustainable Design Submittals:

1. Environmental Product Declarations (EPDs): CMH Manufacturer shall provide a product-specific EPD Type III report in accordance with EN 15805 and ISO 14025.
2. System components to be manufactured in a process meeting net-zero energy emissions criteria.
3. CMH system to be registered as red list chemical free with the Declare Label.
4. The components shall be certified to be halogen/bromine free.
5. CMH composite member shall utilize a minimum of 25 percent post-consumer recycled material content.

G. Warranty: Provide five (5)-year manufacturer's warranty for composite metal hybrid (CMH) sub-framing support system commencing on the date of manufacture or date of substantial completion.

Informational Reference:

"FRP Fails, CMH Prevails: What Designers Need to Know to Prevent 'Unavoidable Failure' in Continuous Insulation Systems"

Overview of the structural and thermal performance issues associated with fiber-reinforced polymer (FRP) Z-girts and the advantages of composite metal hybrid (CMH) and steel alternatives.

Available at: <https://greengirt.com/articles/frp-fails-cmh-prevails-what-designers-need-to-know-to-prevent-unavoidable-failure-in-continuous-insulation-systems>

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with at least ten years of documented experience.

1. Engineering Review: Manufacturer to provide Technical Engineering Report (TER) based on **GreenGirt CMH Delta™ Adjustable** system and cladding system design.
2. Code Conformance: **GreenGirt CMH Delta™ Adjustable** system to have been evaluated by IAPMO Uniform Evaluation Service and found satisfactory for compliance with 2018 International Building Code.

- B. Installer Qualifications: Company specializing in performing work as indicated in this section with at least five years of documented experience and approved by manufacturer.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site without damage or deformation in manufacturer's original unopened containers and with labels that clearly identify product name and manufacturer.
- B. Storage: Store materials in clean, dry, and level interior or exterior areas for limited duration in accordance with manufacturer's written instructions.
- C. Protect components during transportation, handling, and installation from moisture, excessive temperatures, and other construction operations in accordance with manufacturer's written instructions.
- D. Handle components in accordance with manufacturer's written instructions and in a manner to prevent bending, warping, twisting, and surface, edge, or corner damage.

1.09 SITE CONDITIONS

- A. Weather Limitations: Proceed with installation when existing and forecasted weather conditions allow for assembly of this Work in accordance with manufacturer's written installation instructions.

PART 2 - PRODUCTS

2.01 PRODUCTS, GENERAL

- A. Provide sub-framing materials from a single manufacturer to ensure material compatibility and uniformity, and to establish sole-source responsibility for performance and warranty.
- B. Components specified in this Section shall be manufactured in the United States of America.

2.02 MANUFACTURER

The CMH system is proprietary and substitution requests should be evaluated carefully. Ensure structural equivalence and thermal performance match the specified system before considering alternates.

A. Advanced Architectural Products (A2P)

1. 959 Industrial Drive, Allegan, Michigan, 49010
2. Phone: (269) 355-1818
3. Website: www.GreenGirt.com

B. Basis of Design Products:

1. **GreenGirt CMH Delta™ Adjustable** high-performance continuous insulation sub-framing system.

2.03 PRODUCT DESCRIPTION

- A. Adjustable cladding support system designed to establish a level and continuous insulation layer over structural substrates with irregularities. System includes composite metal hybrid (CMH) Z or L-profile

base brackets engineered for dimensional stability, corrosion resistance, and compatibility with various insulation and cladding types.

2.04 SYSTEM COMPONENTS

A. Z- or L-Profile Clips:

1. Composite metal hybrid construction combining fiber-reinforced polymer with steel reinforced flanges with minimum thickness of 0.20 inches. Steel reinforcements to be G90 coated.

Select depth based on insulation thickness and cladding system standoff. Coordinate clip size with wall section details and cladding attachment strategy.

2. Depth: **(2) (3) (4) (5) (6)** inches
3. Standard length: 6 inches
4. Orientation: Vertical installation.

B. Continuous Insulation Accommodation:

1. Designed to support insulation in continuous exterior wall applications. CMH materials to have integral Dual Grip™ feature incorporated into girt profile, in order to provide insulation retention without the additional need for insulation fasteners.
2. Maintains full insulation thickness across substrate variations.
3. Supports installation of insulation materials in compliance with ASHRAE 90.1 and IECC thermal performance standards.
4. System shall accommodate insulation thicknesses from 2 inch to 6 inches (or greater) and be compatible with mineral wool or spray foam insulation materials.

C. Structural Support: Manufacturer to perform engineering analysis to determine:

1. Structural capacity to support cladding systems in accordance with project loading requirements.
2. Compatibility with multiple cladding attachment methods.

2.05 PERFORMANCE CHARACTERISTICS

Coordinate with design team to confirm project-specific wind load, dead load, and thermal requirements. Adjust safety factors or additional testing requirements as needed.

A. Adjustability:

1. 0.25 inch to 3.5 inches, plus base bracket depth.

B. Thermal Efficiency:

1. Cladding support system shall contribute to assembly thermal performance with R-value retention between 92 and 99 percent by minimizing or eliminating thermal bridging.

C. Structural Capacity:

1. Fastener pull-out capacity shall meet or exceed the performance of 16-gauge cold-formed steel framing.
2. System shall exhibit a high strength-to-weight ratio suitable for vertical and lateral cladding loads.
3. Comply with structural design requirements of ASCE 7, including wind load and component/support criteria.

4. Fastener creep and Durability Test: For fasteners anchored into an FRP substrate without metal backer/retention system, perform per ASTM D7332-B, seven (7) day continuous fastener loading at the project's specified high service temperature of 180 degrees F.
 5. The fastener thread pull-out test is to be performed for self-drilling screws anchored solely into an FRP substrate. Test with ASTM D7332-B fixture using a fixture with a clearance opening of 34mm (1.313") in diameter. The pulling yoke is to be attached to the fastener head, with the load transferring into the anchoring threads. Ramp loading for no less than 30 seconds and no more than 120 seconds.
 - a. Testing to be performed inside a climate chamber at a temperature of 180 degrees F for a period of 7 days at ultimate fastener load. Passing load values to be considered ultimate pull-out values for project engineering purposes.
 - b. Test for 5 samples at same loading and temperature without pull-out. Testing to be certified by independent 3rd party.
 - c. Test results of fastener head/thread pull-through performed at room temperature with static ASTM D7332-B are not considered valid for creep and durability testing and are not to be used for determining Tensile Properties.
 6. Flexural Properties: Engineered lengthwise and crosswise flexural properties of CMH sub-framing comply with performance loading criteria and specified safety factors in accordance with ASTM D790.
 7. Modulus of Elasticity: CMH sub-framing is engineered to meet performance loading criteria and specified safety factors in accordance with ASTM D638.
 - a. Lengthwise 29,000,000 psi and crosswise 3,300,000 psi, minimum.
 - b. Failure to provide tested crosswise material properties are cause for product rejection.
- D. Fire Resistance Ratings:
1. Provide CMH sub-framing support system with fire testing in accordance with ASTM E119 test methods and applied by approved testing agency acceptable to authorities having jurisdiction (AHJ).
 2. Surface Burning Characteristics: Test in accordance with ASTM E84 test method for continuous insulation, composite metal hybrid (CMH), and interior surfaces as follows:
 - a. Flame Spread Index (FSI): 25 or less.
 - b. Smoke Developed Index (SDI): 450 or less.
 3. Immediate Scale Multistory Fire Test: If required by code, provide compliance documentation for full wall assemblies with NFPA 285 and/or IBC acceptance criteria for wall height above grade and fire separation distances when wall type and other noted conditions require such testing or compliance with requirements as indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are clean, dry, structurally sound, and free from oil, grease, debris, or irregularities that would impair system performance.
- B. Ensure framing is installed to meet project tolerances for alignment and spacing per contract documents and manufacturer requirements.
- C. Confirm that environmental conditions are suitable for installation, including ambient temperature, wind conditions, and moisture levels.

- D. Verify compatibility and continuity with adjacent assemblies including sheathing, air/water barriers, fenestrations, and transitions.

3.02 INSTALLATION

- A. Install adjustable Z-girt clips in accordance with the manufacturer's instructions, ensuring proper alignment and spacing.
- B. Attach components to the substrate using approved fasteners, penetrating through the fiber-reinforced polymer into the galvanized steel insert.
- C. Place insulation materials between adjustable Z-girt clips, ensuring a snug fit without gaps.
- D. Insert vertical rails into the adjustable Z-girt clips per manufacturer guidelines, followed by the cladding system.

3.03 FIELD QUALITY CONTROL

- A. Inspect system during and after installation for:
 - 1. Proper spacing and secure fastening of clips.
 - 2. Tight compression of insulation material.
 - 3. Secure mechanical fastening.
 - 4. Continuity of insulation across entire surface with no voids or bypasses.
- B. Correct any deficiencies before proceeding with cladding installation.

3.04 CLEANING AND PROTECTION

- A. Remove construction debris from installation area.
- B. Protect installed system components from damage caused by weather, other trades, and subsequent construction.
- C. Replace damaged or non-performing materials with new components as approved by the manufacturer.

END OF SECTION