SECTION 07 4247

HIGH PERFORMANCE GFRC WALL PANELS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. Glassfiber reinforced concrete panels installed as a rainscreen system.

B. Related Documents and Sections: Examine Contract Documents for requirements that directly affect or are affected by Work of this Section. Other Documents and Sections that directly relate to work of this Section include, but are not limited to:

1. General provisions of the Contract, including General and Supplementary Conditions, and Division 01 General Requirements Specification Sections.
2. Section 05 4000 - COLD-FORMED METAL FRAMING.
3. Section 07 2100 - THERMAL INSULATION.
4. Section 07 2700 - AIR BARRIER MEMBRANES.
5. Section 074210.11 - COMPOSITE FRAMING SUPPORT SYSTEM.
6. Section 07 6200 - SHEET METAL FLASHING AND TRIM.

1.2 CONTRACTOR'S DESIGN RESPONSIBILITY

A. The design process for the Work of this Section will follow a process wherein the Architect will work with design professionals separately retained by the Contractor or system manufacturer(s) to develop the most appropriate and economical system. Refer to Section 01 3399 - CONTRACTOR’S DESIGN RESPONSIBILITY.

B. The Contractor shall include all labor, materials, tools, equipment, and services required to manufacture, deliver, furnish and install all items necessary for the proper execution as required by job conditions to provide a complete installation.

C. Contractor is responsible for samples, preparation and submittal of shop drawings for review by the design team. Contractor’s final engineered design shall be based on mutually agreed upon design as submitted by Contractor for review and acceptance by the Architect.

1. Note: Manufacturer's shop drawings stamped by the engineer are acceptable instead of those actually prepared by the engineer.

1.3 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Product data describing system materials and fabrication
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Installation methods.

B. Shop Drawings:

1. Layout, profiles and dimensions for panels, product components, edge conditions, special shapes, and trim pieces.

2. Installation details including attachment methods, fasteners, joints, corners, openings, intersections with adjacent materials, flashings, closures, trim, and other critical conditions.
3. Layout of Glass Fiber Concrete Panels on wall and locations of special pieces and trim/

C. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis and calculations data signed and sealed by the qualified professional structural engineer responsible for their preparation.

D. Calculations: Structural calculations signed and sealed by a professional engineer registered in the State where project is located,

E. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

F. Verification Samples: For system specified, two panel assembly samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns and attachment profile, fasteners, brackets and anchors.

G. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

H. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic checking, cleaning and maintenance of all components.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in production of Glass Fiber Concrete Rain Screens of the type specified with a minimum 10 years documented experience.

B. Installer Qualifications: Company specializing in installation of Glass Fiber Concrete Rain Screen Products of the type specified with a minimum 5 years documented experience.

C. Design structural elements under direct supervision of Professional Engineer experienced in design of this Work and registered in the state of the project.

D. Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, and manufacturer's installation instructions.

E. Field Measurements: Verify actual dimensions by field measurement before fabrication; show recorded measurements on shop drawings.

F. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by Architect.
2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inspect product components immediately upon delivery at site. Notify manufacturer of damage prior to installation of materials.

B. Store products in accordance with the manufacturer's instructions and in manufacturer's unopened packaging until ready for installation.

C. Do not store exterior wall system components in contact with other materials that might cause staining, denting, surface damage, or other deleterious effects

1.6 SEQUENCING

A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Warrant the materials specified for a period of 10 years from the date of substantial completion against defects.

B. Warrant the workmanship of the installed system for a period of 2 years from the date of substantial completion against defects.

PART 2 PRODUCTS

2.1 DESIGN / PERFORMANCE REQUIREMENTS

A. Glass Fiber Concrete Rain Screen: System is a rear ventilated rain screen designed to drain water and condensation to exterior. System is a complete pre-engineered system including Glass Fiber Concrete cladding, aluminum metal support structure, closure pieces, trim and flashing.

1. Wall panels shall be removable and fasteners are exposed (or concealed fastened).
2. Panels are secured to an aluminum or galvanized metal support structure and secured to cold-formed metal framing.
3. Spacing of cold formed metal framing shall not be greater than 16 inches O.C.
4. Aluminum metal support structure has multiple components, with one component attaching to structure over the air barrier using an attachment bracket and one component fastening to bracket horizontally to allow for attachment of concrete panels.
5. Rain screen weather resistive barrier membrane should be visually inspected for breaches and repaired as specified in Section 07 2700 - AIR BARRIER MEMBRANES prior to installation of support system.
6. Provide metal drainage flashing to direct condensation and water infiltration within the wall to weeping points. Coordinate with Air and Water Barrier specified in Section 07 2700 - AIR BARRIER MEMBRANES.

B. Performance Requirements:

1. Thermal Movement: Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of minus 20 degrees F to 180 degrees F without buckling, opening of joints, undue stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.
2. Wind Performance: System shall withstand a design load of positive and negative pressures up to 40 PSF in accordance with ASTM E 330 without buckling, opening of joints, undue

stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.

3. Maximum panel deflection of 1/360 of span or less of span when tested in accordance with positive and negative pressures without cracking or damage to panel facing.
4. Comply with applicable seismic requirements for Project location.
5. Comply with ASTM C 1186.
6. Meet Class A per ASTM E 84.
7. Classified as noncombustible per ASTM E 136 & ULC S114
8. Panels shall container no detectable amounts of Crystalline Silica. Panels that do contain Crystalline Silica will be rejected.
9. System shall accommodate positive drainage for moisture entering or condensation occurring within panel system for 100 year rain cycle.
10. System shall be flat with no noticeable warpage, buckling, deflections or other surface irregularities.

C. Panels must NOT contain any crystalline silica (Crystalline silica < 0% - not detectable)

2.2 MANUFACTURERS

A. Acceptable Manufacturer: Rieder North America, Weyerhaeuser, WI.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 6000 - PRODUCT REQUIREMENTS.

2.3 FIBER CONCRETE RAIN SCREEN SYSTEM

A. Flat panels: öko skin panels - fibreC glass fiber reinforced concrete is a extruded, fiber reinforced concrete panel made from pure mineral raw materials, (sand cement, water) and reinforced with AR (alkali-resistant) glass fibers as woven glass fiber mat and short fibers in the matrix.

1. Color: As selected by the Architect
2. Surface: As selected by the Architect
3. CoatingHydrophobic.
4. Panel Size:
   a. 5.78” x 70.87” (147 mm x 1800 mm)
   b. Tolerances: Length up to 1m: +- 1mm / 1 - 2m: +- 1,5mm / 2 – 2,5m: +- 2mm

B. Support Structure: Galvanized Steel.

1. Horizontal Girts: Prefinished 1 in. 18 ga galvanized steel hat channel, equal to to Tekko.
   a. Color: Kuro

C. Composite Framing Support System: Refer to Section 074210.11.

D. Exposed Fasteners: Provide with öko skin fastening system using Rieder Power Anchors.

1. Use fastening components required for type of substrate and project conditions to meet performance requirements specified and indicated in design calculations.

E. Board Insulation: To ASTM C612 Type IVB.

1. Fire performance:
   a. Non-combustibility: To CAN/ULC S114.
   b. Maximum use temperature: 1200 ºF.
   c. Surface Burning Characteristics: To ASTM E84.
      1). Flame spread: 0.

2). Smoke developed: 0.

2. Thermal Resistance (R value/1 inch at 75 ºF: 4.3 h ft2 ºF/Btu to ASTM C518.
3. Moisture Absorption: 1 % maximum to ASTM C1104.
4. Water Vapor Permeance: 27.2 Perm minimum.
5. Fungi Resistance: Zero mold growth to ASTM C1338.
6. Basis-of-Design: Roxul Inc., CavityRock. Furnish with with black mat facer.

F. Flashing: Provide sheet metal flashings and trim as required for cladding system in accordance with Section 07 6000 - FLASHING AND SHEET METAL.

1. Shop form components to profiles, dimensions, and thicknesses indicated on Drawings. Items to be provided include:
   a. Aluminum flashing at bottom of air cavities and pressurized compartments to gravity drain water from cavity.
   b. Formed profiles fabricated and installed to shed water within horizontal joint condition (non-continuous, interrupted at vertical U profile).
   c. Aluminum flashing at window sills, parapet caps, transition pieces to adjacent materials and other exposed trim. Attach with clips or other means to avoid exposed fasteners.
2. Form sheet metal fabrications in longest possible lengths. Turn back all exposed edges to form hem. Fabricate vertical faces with bottom edge formed outward and hemmed to provide drip

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved shop drawings.

1. Establish level lines for panel coursing and positioning of support rails.
2. Attach horizontal rails with engineered fasteners and anchors.
3. Attach rails to substrate at 24 inches O.C. or at the distance recommended by system manufacturer.
4. Provide 1 to 2 inches of space between ends of adjacent rails for expansion and contraction.

3.2 INSULATION INSTALLATION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

1. Apply insulation in vertical and overhead conditions using impaling clips and caps. Space clip a minimum of 24 inches on center. Coordinate with the weather resistive barrier applied over the insulation.
2. Seal joints between units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

B. Protect installed insulation and vapor retarders from harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.3 PANEL INSTALLATION

A. öko skin panels: Start at bottom of wall and fasten panels into vertical aluminum profile at locations of predrilled holes in fiber concrete panels

1. Layout work to avoid or minimize cuts. Site cut composite wood panels using power saw with appropriate blade type to prevent broken corners, edges and chips.
2. Install panels with continuous vertical and horizontal joints unless otherwise indicated on the Drawings. Vertical and horizontal joints shall be open approximately 5/16 inch (8 mm) wide.
3. Tolerances: Shim and align composite wood panels to form a level or plumb alignment of 1/4 inch in 20 feet maximum, non-accumulative.

B. Separate dissimilar metals; use gasket fasteners, isolation shims, or isolation tape where needed to eliminate possibility of electrolytic action between metals.

3.4 CLEANING

A. Remove and replace broken, chipped, stained, or otherwise damaged panels

B. Immediately after installing, wipe down panels. Do not use wire brushes, metallic tools, or abrasives for cleaning.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Protect system from roof run-off, splashed water, mud, sealants, bitumen, and other contaminants from remaining work.

C. Provide protective boards at exposed external corners which may be damaged by construction activities

D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION