SECTION 07 42 46

FIBER CONCRETE PANELS AND CLADDING SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included: The Work of this Section shall include but not be limited to the following:

B. Fiber concrete panels

C. Cladding system accessories components

D. Flashing, weather-seals, cover plates and formed metal trim

1.2 RELATED SECTIONS:

A. Section 05120 – Structural Steel

B. Section 05500 – Metal fabrications

C. Section 06100 – Rough Carpentry

D. Section 07200 – Building Insulation

E. Section 07600 – Flashing and Sheet Metal

F. Section 07270 – Air Barriers: Self Adhered Sheet Air and Water Barrier

G. Section 07900 – Joint Sealers

H. Section 08925 – Glazed Aluminum Curtain Walls and Sloped Glazing

1.3 DEFINITIONS

A. Rainscreen principle: Method for controlling rain penetration through wall cladding system. Ventilation grills/slots allow air pressure in cavity behind cladding to equal outside air pressure thus resisting wind driven rain. Rainscreen system includes:

B. Drained and vented wall cladding.

C. Air barrier on cladding substrate (as provided for in waterproofing specification SECTION 07270 Air Barriers).

D. Subdivision of cavity behind cladding into sealed compartments.

E. Flashings and weep holes in ventilation grills to drain water from cavity.

1.4 DESIGN AND PERFORMANCE REQUIREMENTS

A. Design and install Fiber Concrete Panel and attachment system to provide in conjunction with wall substrate and air barrier a weather tight wall assembly utilizing rain screen principle.

B. SYSTEM DESIGN - System design shall be responsibility of cladding supplier. Products provided must conform with design intent shown.

C. PANEL SYSTEM: Rear Ventilated Rain Screen Design. System shall drain water and condensation to exterior by provided ventilation grills and positioned as instructed by manufacturer. Wall panels shall be removable. There are no surface fasteners on the panels, but pression trims at perimeter. The panels shall be secured to a metal support structure (or wood) which secures to cold-formed metal framing, wood studs or concrete substrate. Spacing of cold formed metal framing indicated on structural drawings shall not be greater than 24 inches OC. Membrane should be visually inspected for breaches (and repaired as recommended by membrane manufacturer) prior to installation of support system.

D. JOINTS: shall be dry and un-caulked, installing structural trims provided by panel manufacturer.

E. METAL FLASHING: provide metal flashing for a proper water managed assembly, to direct condensation and water infiltration within the wall to ventilation grills. Coordinate details and installation with Air and Water Barrier provided with Section 07270. All flashings shall be provided by installer per manufacturer's recommendations and manufacturer is to provide ventilation profiles.

1. Drainage flashing is the primary component of a water managed system which diverts water that has penetrated the exterior cladding away from the cladding compartment or condensation that occurs at the interior face of cladding surface.
2. Provide metal drainage flashing at locations listed below prior to installation of membrane to assure proper water drainage. Membrane shall assure proper lap over flashing:
    a. At Bottom of System
    b. At penetrations: Windows, Doors, Louvers, etc.
    c. At Floor line or other locations which accommodate vertical movement
    d. End Dams: provide shop-formed end dams where drainage flashing terminates at openings.
3. Attachment – solder joints and miters for an air and watertight condition.
4. Design Modifications – shall be provided as necessary to satisfy as built conditions and to meet performance requirements.
5. Contractor shall be responsible for engineering system per architectural design criteria and performance requirements.

1.5 PERFORMANCE REQUIREMENTS

A. Maximum panel deflection: 1/360 of span or less of span when tested in accordance with positive and negative pressures and as required to prevent cracking or damage to panel facing.

B. System shall have a design load of positive and negative pressures in accordance with ASTM E330 (if required).

C. Accommodate tolerances of support structure.

D. Condensation: System shall accommodate positive drainage for moisture entering or condensation occurring within panel system.

E. Flatness: System shall be flat with no noticeable warpage, buckling, deflections or other surface irregularities

1.6 SUMBITTALS

A. Provide in accordance with Section 01330 - Submittal Procedures:

B. Product data describing materials and fabrication for Fiber concrete panels.

C. Shop drawings showing (if required):

1. Layout, profiles and dimensions for panels, product components, edge conditions, special shapes, and trim pieces.
2. Installation details: Attachment methods, fasteners, joints, corners, openings, intersections with adjacent materials, flashings, closures, trim, and other critical conditions.
3. Layout of Fiber concrete panels on wall and locations of special pieces and trim.

D. Samples (2 sets each):

1. 4" x 6" samples for review by Architect. Samples to match chosen product series.
2. Color-match accessories samples (if required)

E. Manufacturer's installation and maintenance instructions.

1.7 QUALITY ASSURANCE

A. System Manufacturer's Qualifications: Provide exterior wall system fabricated by a manufacturer experienced in manufacturing systems that are similar to those indicated for this project and have a record of successful in-service performance.

1. Installer qualifications: Company/contractor experienced in installing exterior wall cladding systems and acceptable to Fiber concrete panels supplier.

B. Prior to installation of cladding, membrane suppliers field representative shall inspect wall substrate and air barrier to confirm proper installation and submit a report of observations and findings to the Architect.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Prior to shipping, pack and crate Fiber concrete panel system components to prevent damage during transit and storage. During transport, handle the panels with special care taken not to damage the edges of the sheets. Do not walk on the packages/crates.

B. Inspect Fiber concrete panels and cladding accessories components immediately upon delivery at site. Notify manufacturer of damage prior to installation of materials. Do not install any damaged materials.

C. Follow manufacturer's instructions for storage of Fiber concrete panels. Keep pieces in original packing material until ready to install. Use original tarp to cover materials at each end of workday and skids should be on a leveled ground.

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

1.9 WARRANTY

A. Warrant the fiber concrete panels of this section for a period of 20 years from the date of purchase completion against defects in material.

B. Warrant the workmanship for this Section for a period of _ years from the date of substantial completion against defects in the workmanship.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. The CEMFORT cladding system is a global not divisible system which consists in an installation of prefabricated CEMFORT fiber concrete panel and cladding accessories components, prefabricated in a workshop environment; thereby creating a rain screen cladding system.

2.2 ACCEPTABLE MANUFACTURER

A. Subject to compliance with requirements, manufacturer of exterior wall panels for Fiber concrete panels in a rainscreen system is:

B. Basis of Cladding Design:

1. _____ **product series**
2. Manufactured by CEMFORT PANELS INC, 450-373-0455 / info@cemforthd.com

2.3 MATERIALS

A. **CEMFORT PANELS, fiber reinforced concrete panels**

1. Panels: Fiber concrete panels made from mineral raw materials, (Portland cement, additives). Reinforced with PVA (polyvinyl alcohol) fibers in continuous linear fiber strands and short fibers.
   a. Color selected from manufacturer full range of colors or designer's choice (Xpr. Colors).
   b. Color 1#
   c. Color 2#
   d. Surface and finishing types
   e. Select from the following:
      1) Matt finish 25%
      2) Gloss finish 80%
      3) Coarse or finish grain (Xpr. Stone)
   f. Panel's thickness:
      1) 10mm-3/8" (Standard)
      2) 12mm-1/2" (Light Grey only)

B. Panel must have the following criteria/specifications:

PHYSICAL PROPERTIES		**10MM (3/8")**	**12MM (1/2")**
Density	Kg / m^3	± 1,550	± 1,550
Weight	Lbs / sq.ft.	3.2	4.4
Moisture content	%	Up to 10%	Up to 10%

FABRICATION TOLERANCE

Width / length	mm (In)	± 3 (1/8")	± 3 (1/8")
Thickness	mm (In)	± 1.5 (1/16")	± 1.5 (1/16")
Squareness	mm / m	± 1.5 / m	± 1.5 / m

OTHER PROPERTIES

Compression Resistance	N	950	950
Flexural Strength	Mpa (Psi)	15 (2,175)	15 (2,175)
Min. fasteners pull resistance	N	4,000	4,000
Freeze / Thaw resistance	200 cycles	No loss of mass	No loss of mass
Humidified deflection		1/588 of span	1/588 of span
Dimensional change	Moisture	0.15%	0.15%
Thermal resistance	R value	0.23	0.29
Modulus of Elasticity (longitudinal) ASTM C120	Kg / cm^2	1125	1125
Modulus of Elasticity (Transversal) ASTM C120	Kg / cm^2	915	915
Modulus of Rupture (dry) Longitudinal ASTM C1185	Kg / cm^2	130	130
Modulus of Rupture (dry) Transversal ASTM C 1185	Kg / cm^2	90	90
Moisture Movement Normal to Saturation	mm / m	1.7	1.7
Moisture Movement Normal to dry	mm / m	2.5	2.5
Coefficient of Thermal Expansion	mm / m C	1.2 x 10-5	1.2 x 10-5
Thermal Conductivity	W/mK	0.24	0.26
Impact Resistance	ASTM D1037	Passed	Passed

SURFACE BURNING CHARACTERISTICS

Fire Resistance (Propagation)	ULC S102	0	0
Fire Resistance (Smoke Formation)	ULC S102	0	0
Incombustibility	ULC S114	Passed	Passed
Incombustibility	ASTM E136	Passed	Passed

2.4 CLADDING ACCESSORIES – CEM-TRIM

A. *Mechanical Attachments*

Self drilling stainless steel screw, with 'round head design, grade # 10, 25mm long, provided by the system manufacturer. Pre-painted with same color and quality product than panels and trims, by Cemfort Panels Inc.

B. *Pressure Trims*

Extruded aluminum T-6 grade, pressure moldings, enamel of same quality and color as panel, or as specified on plans. Pressure molding must be self-sealant on winglet's rear with length corresponding to cross seal.

C. *Ventilation grill*

24-gauge caliber metal ventilation grill specific to the system, of 13mm x 64mm, pre-painted, provided by the system manufacturer.

2.5 STEEL FRAMING

1. Needs to be at least 20 gauges, minimal width of 75 mm (3 in) to receive the panels at joints, 37 mm (1.5 in) elsewhere, maximum length according to the dimensions noted in the plans.
2. The total assembly needs to allow a maximum refraction of L/360.
3. Is galvanised by hot-dip process according to the standard ASTM-A525 (G90)
4. Manufactured according to the local enforced building norms and codes.

2.6 SHEET METAL AND FLASHING

Sheet metal: Provide sheet metal flashings and trim as required for cladding system in accordance with Section 07600 - Flashing and Sheet Metal.

1. Shop form components to profiles, dimensions, and thicknesses indicated on Drawings. Items to be provided include:
   a. Cavity drainage flashings: Aluminum flashing at bottom of air cavities and pressurized compartments to gravity drain water from cavity.
   b. Flashing joint profiles at horizontal joint conditions.
   c. Formed profiles fabricated and installed to shed water within horizontal joint condition (non-continuous, interrupted at vertical U profile).
2. Window and door sills and other exposed trim: Aluminum fabrications with mill aluminum finish.
3. 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 INSPECTION

A. Examine walls to receive cladding system. Ensure substrate is structurally sound, clean, and free of contaminants which inhibit bond of air barrier.

B. Maximum substrate deflection: L/360 or as recommended by Cemfort Panels Inc.

C. Maximum substrate surface variation: 3/16 inch in 10 feet

D. Stud construction with gypsum sheathing: Verify stud framing is adequately braced without deflection and sheathing is properly secured with edges over firm bearing. Ensure proper framing and supports are provided and located for secure attachment of support rails.

E. Do not proceed with cladding installation until deficiencies have been addressed.

3.2 PREPARATION

A. Install assembly of thermal insulation, furring, and sheathing as specified in Section 07210 - Building Insulation and detailed on Drawings and approved shop drawings.

B. Air barrier: Install air barrier to wall sheathing as specified in Section 07270 - Air Barriers and detailed on Drawings and approved shop drawings. Install horizontally starting at bottom of wall. Do not leave air barrier membrane exposed for lengthy period of time. Exercise care not to puncture or tear barrier with subsequent cladding operations.

C. Flashings: Install sheet metal flashings, pressure compartment dividers, and trim as specified in Section 07600 - Flashing and Sheet Metal and as positioned and detailed on Drawings and approved shop drawings. Ensure flashings at bottom of wall and pressure compartments properly drain water from air cavity to exterior through weep holes. Turn up flashings 4 inches minimum and seal to substrate.

D. At the end of each day, cover the top of the installation to protect against water infiltration, until the wall cap is installed.

3.3 CLADDING INSTALLATION

IMPORTANT NOTICE: PLEASE ALWAYS REFER TO MANUFACTURER'S MOST RECENT INSTALLATION INSTRUCTIONS.

A. Assembly:

1- Construct the wall system as stated in the drawings and according to the composition described in the wall description tables. The cladding steel framing shall be aligned with each other with a maximum deviation of 3mm (1/8 inch) on 2400mm (8 ft).

2- For the ceilings or soffit, assure the dead weight of the panel (including the weight of the panel, etc) does not exceed 48 kg/m2 (10lb/sq.ft) and the ventilation is sufficient, thus avoiding condensation at the back of the panels. The furring should have a maximum spacing of 400 mm c/c (16 inches).

3- For wall application, do not assemble the panels directly on the wall studs. Install the steel furring (in Z or omega shape) vertically on wall studs or horizontal Z-girts. Assure the ventilation is adequate at the base of the wall with at least 25mm (1") spacing between Z-trim and flashing. The vertical omega furring must be wide enough to support 50 mm (2") of the panel on each side of the architectural joint. The junction between two vertical supports must correspond to an architectural horizontal panel joint the wall furring should be spaced with a maximum distance of 400 mm (16 in.). The furring and cladding should be discontinued at the building construction joint. The maximum deflection of the building including the frame should be within L/360. The contractor should assure the architect has approved the support before having the CEMFORT panels installed.

B. For panel installation:

1. Start by placing the "Cem-Trim®" junction/starter pressure molding at 25mm (1") from the flashing for an efficient air circulation and partially fix the trim to each of the vertical omega furring (16"), using 25mm (1'') stainless steel screws. Slide the CEMFORT panel in the upper part of the trim and completely fix the trim afterwards.
2. Position the horizontal/vertical molding "Cem-Trim®" on the upper part on the panel and adjust the molding with panel's length. Partially fix the molding with 25mm (1") stainless steel screws on each hat channel furring and once the next panel has been inserted into the trim, fix completely. Secure the trims winglet with panel's surface without deforming it. Trims must be fasten each 16" on omega furring. Repeat the above steps for each CEMFORT panel.
3. When panels are horizontally fixed to the furring with "Cem-Trim®" pressure moldings system, insert a compressible foam bloc inside both ends of adjacent horizontal pressure moldings. Important: Place correctly the compressible foam piece inside the horizontal pressure molding.
4. Position the appropriate "Cem-Trim®" pressure molding vertically, overlapping horizontal moldings and compressible foam pieces. Joint only when it meets horizontal moldings. Make sure the compressible foam piece is subjected to the cavity in the cross meeting of the vertical and horizontal moldings. Attach the molding with 25mm (1") stainless steel screws at 400mm (16") c/c on the vertical furring and at intersection of architectural lines, press it without deforming it. Make sure that the straight alignment is maintained at all time.
5. For larger panels (24" and more in width), the use of an adhesive supplied by Cemfort will be needed on the intermediary supports.
6. For any wall opening or junction with another siding material, use the starter/junction "Cem-Trim®" in order to make the connection between the window/door frame or the other siding and the Cemfort cladding system. For any opening in projection/recess, use bended aluminium sheets to make the connection.

3.4 CLEANING AND PROTECTION

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

B. Immediately after installing, wipe down work with a non-abrasive soap diluted with water. Do not use wire brushes, metallic tools, or abrasives for cleaning.

C. Protect cladding from roof run-off, splashed water, mud, sealants, bitumen, and other contaminants from remaining construction activities.

END OF SECTION 07 42 46