

SECTION 07450
FIBER REINFORCED CEMENTITIOUS PANEL CLADDING

1.0 GENERAL

1.1 DOCUMENTS

This section of the specification forms part of the contract documents and is to be coordinated with all other parts.

1.2 SECTION INCLUDES

- A. Fiber reinforced cementitious (FRC) panels, fasteners and accessories.
- B. Panel support profiles (sub framing) including fasteners.
 - 1. Metal sub framing
 - 2. Timber sub framing

1.3 DEFINITIONS

- A. DIM = Panel manufacturers design + installation manual
- B. System components = Panel, panel fastener, bore gauge, rivet setting device (for metal), Torx bit, depth stop, EPDM strip (for timber), impregnation liquid
- C. Accessories = I-flashing, perforated angles, rain deflection profile

1.4 REFERENCES

- A. American Society of Testing and Materials (ASTM)
 - 1. ASTM C 120-90
 - 2. ASTM C 1185-95
 - 3. ASTM D 1308-87
 - 4. ASTM E 84
 - 5. ASTM E 228-95
 - 6. ASTM G 155-05

1.5 RELATED SECTIONS

- A. Division 5 Sub framing to cladding panels in metal or timber
- B. Division 5 External wall structure in metal or timber framing
- C. Division 6 Sheathing, thermal insulation
- D. Division 7 Wind proofing and water proofing
- E. Division 7 Flashing and trim
- F. Division 8 Windows and external doors

1.6 PERFORMANCE REQUIREMENTS

- A. Provide wall cladding comprising panels, system components, accessories and supports such that the cladding complies with performance requirements indicated below and is capable of withstanding structural movement, thermally induced movement and exposure to weather without failure.
- B. Structural performance : Provide cladding panels and sub framing capable of withstanding design wind loads as follows:
 - 1. In the field : lbs / sqft (positive and negative)
 - 2. Fringe zone : lbs / sqft (positive and negative)
- C. Maximum allowable deflection ratio is 1/300 between panel support profiles
- D. Temperature range between - 40°F and + 176°F

1.7 SUBMITTALS

- A. Test data to panel and fasteners. ASTM tests as per PRODUCTS 2.2
- B. Product data of panels and panel fasteners
- C. Panel samples 3" x 8"
- D. Panel manufacturer's DIM (Design and Installation Manual)
- E. Provide shop drawings of panels and sub framing including all details and showing all panel fastening points
- F. Installer and professional engineer qualification
- G. Standard 10 year warranty letter from panel manufacturer

1.8 QUALITY ASSURANCE

- A. Obtain panels, panel fasteners and system components through one source.
- B. Professional engineer qualification: A professional engineer who is legally qualified to practice and experienced in providing engineering services.
- C. Installer qualification: Installer to assume engineering responsibility and to perform the work of this section.
Installer to be approved by panel manufacturer's representative.
- D. Build mock up of typical wall section as directed by architect.
Approved mock ups may become part of the completed works if undisturbed at time of substantial completion.
- E. Conduct pre installation meeting on site in the presence of contractor, GC, PM, and panel manufacturer's representative.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Store and handle material in accordance with DIM.

1.10 SEQUENCING

- A. Coordinate installation with all adjoining trades to ensure proper sequencing.

1.11 WARRANTY

- A. Special warranty: Panel manufacturer's standard 10 year warranty covering functional quality of the supplied material.
 - 1. Failures include, but are not limited to the following:
Structural failure, including cracking, rupturing, warping, spalling, peeling
Surface finish failure, including efflorescence, fading, discoloration

1.12 EXTRA MATERIAL

- A. Furnish extra panel and fasteners equal to percent of each panel color.

2. PRODUCTS

2.1 BASIS OF THE DESIGN PRODUCT

- A. SWISSPEARL FRC panels, guaranteed Swiss origin
- B. Authorised SWISSPEARL distributor : Arcspec, 225 Peterson Rd.,
Libertyville, IL 60048, phone: 847-362-1590, fax: 847-362-1557

2.2 PHYSICAL AND MECHANICAL PANEL PROPERTIES

- A. Density 1.8 g / cm³ (as per ASTM C 1186)
- B. Color change (as per ASTM G 155-05)
 - 1. 1'000 hours: Change in E ≤ 1.8
 - 2. 1'500 hours: Change in E ≤ 2.2
 - 3. 2'000 hours: Change in E ≤ 2.5
- C. Fire resistance (as per ASTM E-84, E-136 and NFPA 285)
 - 1. Flame spread index: 0
 - 2. Smoke developed index: ≤ 15
 - 3. No flaming after 30 sec. weight loss ≤ 50%, final center temp. ≤ 30°C
- D. Fire classification
UBC Class I, NFPA Class A
- E. Frost resistance (as per ASTM C 1185-95)
2'944 psi / 20.3 MPa)
- F. Minimum strength and bending characteristics (as per ASTM C 120 / C 1185-95)
Modulus of rupture 24 MPa / 24 N/mm² (average cross/length)
Modulus of elasticity 16 GPa / 16 kN/mm²
- G. Moisture properties (as per ASTM C 1185-95)
Moisture content normal 6 percent (by mass)
Moisture content maximum 20 percent (by mass)
- H. Water tightness: No visible droplets or surface wetting (ASTM C 1185-95)
- I. Coefficient of thermal expansion: 10 x 10⁻⁶ K⁻¹ (as per ASTM E 228-95)
- J. Guaranteed to be free from efflorescence

2.3 FRC PANEL CHARACTERISTICS

- A. Panels shall be made from:
 - 1. Portland cement, ground lime stone, additives
 - 2. Polyvinyl alcohol fibers, cellulose fibers
 - 3. Acrylic coating to panel face, rear side and edges
- B. The following characteristics are not acceptable
 - 1. Autoclaved product
 - 2. Reinforcement with only cellulose fibers
 - 3. Efflorescence
- C. FRC panels shall be air cured for at least 4 weeks

2.4 FASTENERS AND ACCESSORIES

- A. Supplied by panel manufacturer and installed per DIM.
Rivets 4.0 x 18.0 mm, 15 mm head (for metal sub frame)
Screws 4.8 x 38 mm, 12 mm head (for timber sub frame)
- B. Performance values as per test results under 1.7 A

2.5 PANEL SUPPORT FRAMING

- A. Sub frame material

.....
.....
.....
.....
.....
.....

- B. Shims
 - 1. Allow for 50 year durable shims as required.
 - 2. The shims are to be located under the panel support profiles. Shims between support profile and panel are not allowed.

2.5 PANEL FABRICATION

- A. General: Fabricate panels at the factory to greatest extent possible.
- B. Field dimensions: Field verify overall dimensions prior to panel fabrication.
- C. Dimensional tolerances:
 - 1. Overall panel dimensions within ± 1 mm of panel width and height
 - 2. Squareness within ± 0.5 mm/m
- D. Labelling: Apply identification label to back side of each fabricated panel

3.0 EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of rear ventilated rain screen cladding.
- B. Proceed with installation only after unsatisfactory conditions have been corrected
- C. Prior to panel installation verify sub framing on compliance with DIM.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Coordinate panel installation with rain drainage work, flashing, trim, soffit, roofing, parapet, wall and other adjoining work to provide a leakproof, secure and non corrosive installation.
- C. Allow for scaffolding or mobile access to all parts of the cladding.

3.3 INSTALLATION

- A. Comply with panel manufacturer's DIM.
- B. Sub framing installation tolerances: Shim and align sub framing to the following installed tolerances :
 - 1. Within $\frac{1}{4}$ inch in 20 feet on level, plumb and panel joint lines
 - 2. Joint widths shall be within $\frac{1}{16}$ of specified widths
 - 3. Sub frame profile face alignment max. $\frac{1}{300}$ between panel support profiles

3.4 QUALITY CONTROL

- A. The installing contractor shall perform daily inspections of panel installation to maintain and confirm that tolerances are being met and that panel manufacturer's DIM is complied with.
- B. The owner may engage a third party inspection agency to verify that installed panels meet performance requirements and tolerances.

3.5 ADJUSTING AND CLEANING

- A. Remove damaged, improperly installed or otherwise defective cladding material and replace with new material. Damage requiring replacement includes, but is not limited, to chips and scratches on panels.

- B. Clean finished surfaces according to panel manufacturer's instructions and maintain in a clean condition during construction.

END OF SECTION 07450