

*Specifier Note: The purpose of this guide specification is to assist the Specifier in correctly specifying fiber-reinforced cementitious panels and their installation. The Specifier needs to edit these guide specifications to fit the needs of each specific project. Remove "SWISSPEARL" from the Section Title and the Footer when using this guide specification for a project. This Section is proprietary to SWISSPEARL. Contact a SWISSPEARL representative to assist in appropriate product selections. Throughout the guide specification, there are Specifier Notes to assist in the editing of the file. Brackets [ ]; "AND/OR"; and "OR" have been used to indicate when a selection is required, in most cases the first option is the standard feature. The term Architect is used throughout these guide specifications and may be revised to read "Design Professional", "Engineer", "Owner" or other appropriate designation as required for specific projects.*

*References have been made within the text of the specification to current MasterFormat Section numbers and titles. The Specifier needs to coordinate these numbers and titles with sections included for the specific project.*

*SWISSPEARL Panels can also be used in interior applications, contact SWISSPEARL for panel requirements when used in an interior application.*

## SECTION 07 44 50

### FIBER-REINFORCED CEMENTITIOUS PANELS

#### SWISSPEARL

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION OF WORK

- A. Swisspearl Clinar and Clinar Clip: tone in tone through-colored fiber-reinforced cementitious panels mounted using the back ventilated rainscreen design principle.
- B. Fixed in three ways:
  - 1. Face-fastened overlapping panels with factory supplied rivets to attach to a metal supporting frame
  - 2. Face-fastened overlapping panels with factory supplied screws/nail to attach to a timber supporting frame
- C. [Metal] [Wood] vertical panel supports and fasteners.

##### 1.2 REFERENCES

- A. ASTM International
  - 1. ASTM C1185; Standard Test Methods for Sampling and Testing Non-Asbestos Fiber Cement Flat Sheet, Roofing and Siding Shingles, and Clapboards.
  - 2. ASTM E84; Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 3. ASTM E136: Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°F

4. ASTM G155; Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials.
- B. Environmental Product Declaration: According to ISO 14025 and EN 15804, completed by IBU (Institut Bauen und Umwelt)
- C. National Lumber Grades Authority (NLGA)
- D. Southern Pine Inspection Bureau (SPIB)
- E. West Coast Lumber Inspection Bureau (WCLIB)
- F. Western Wood Products Association (WWPA)
- G. CEN - European Committee For Standardization:
  1. EN12467 - Fiber Cement Flat Sheets - Product Specification and Test Methods.
  2. EN13501-1 - Fire classification of construction products and building elements.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation meeting: Conduct a pre-installation meeting at the job site attended by Owner, Architect, manufacturer's technical representative, panel installer, and contractors of related trades.

### 1.4 SUBMITTALS

- A. Refer to Section [01 33 00 Submittal Procedures] [Insert section number and title].
- B. Product Data: Submit manufacturer Design and Installation manual for each type of panel and panel fastener.
- C. Shop Drawings - Submit detailed drawings showing
  1. Location, layout and dimensions of panels
  2. Locations of fasteners
  3. Locations of panel fixed fastening points (only for metal sub frame)
  4. Cladding details at top, bottom, corner, windows, doors, etc.
- D. Samples:
  1. Provide nominal 3" by 7" inch panel of each panel color indicated.
  2. Provide sample of each type of panel fastener.
- E. Delegated Design: Design cementitious panel assembly; submit comprehensive engineering analysis by a qualified professional engineer, using design requirements indicated.

*Specifier Note: DELETE Test Reports submittal requirements when proprietary specification is used and can be held. MAINTAIN Test Reports submittal requirement when other products may be submitted as substitution.*

- F. Provide manufacturer's Design and Installation Manual.
- G. Provide manufacturer's sample warranty.

- H. Submit evidence of manufacturer's qualifications; provide examples of previous projects of similar type and exposure that have been in place for a minimum of 5 years.

*Specifier Note: DELETE LEED submittal requirements when project is not pursuing LEED certification.*

- I. LEED Submittals:
  - 1. Material and Resources (MR)
    - a. Product Certificates for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
- J. Closeout Submittals
  - 1. Refer to Section [01 78 00 Closeout Submittals] [Insert section number and title].
  - 2. Submit manufacturer's cleaning instructions for maintenance of panels.

## 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum of twenty years experience in the production of fiber-reinforced cementitious panels.
- B. Installer Qualifications: Acceptable to panel manufacturer's representative.

*Specifier Note: SWISSPEARL recommends mock-ups for all projects. DELETE if mock-ups are not desired.*

- C. Mock-up:
  - 1. Provide a full-size project specific mock-up to ensure a high standard of quality workmanship by installers. Incorporate surrounding construction in mock-up, including wall assembly fasteners, flashing, and other related accessories all in accordance with manufacturer's Design and Installation Manual.
    - a. Mock-up size: [Insert size] [As indicated on drawings.]
    - b. Mock-up **[may] [may not]** remain as part of the work.
    - c. Do not proceed with remaining work until workmanship is approved by Architect

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Refer to Section **[01 78 36 Warranties] [Insert section number and title]**.
- B. Manufacturer standard warranty against material failure for a period of twenty (20) years from date of delivery. Provided panels have been installed according to the Design and Installation Manual.
- C. Failures covered in the first 10 years of the warranty:
  - 1. Structural failure: Cracking, rupture, warping, spalling, or peeling from water/frost damage.
  - 2. Surface failure: Efflorescence, fading, discoloration.

3. Accessory failure: Functional quality of accessories supplied: rivets, fixed point sleeves, screws, EPDM strips, etc.
- D. Failures covered in years 11-20 of the warranty:
  1. Structural failure: Cracking, rupture, warping, spalling, or peeling, from water/frost damage.
  2. Accessory failure: Functional quality of accessories supplied: rivets, fixed point sleeves, screws, EPDM strips, etc.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURER

- A. Basis of Design: SWISSPEARL; [www.swisspearl.com](http://www.swisspearl.com)
  1. Exclusive Distributor: Element Architectural Product [www.elementpanels.com](http://www.elementpanels.com)  
Northwest Territory: 503-487-0822  
Southern Territory: 469-518-5860

Specifier Note: DELETE Substitution Limitations paragraph if Section 00 26 00 – Procurement Substitution Procedures and/or Section 01 25 00 – Substitution Procedures are included in Division 01 – General Requirements.

- B. Substitutions: Not Permitted

[OR]

- C. Substitution Limitations
  1. Submit written request for approval of substitutions to the Architect [a minimum of [14] [insert number of days] days prior to the date for receipt of bids] [a minimum of [60] [90] days after contract is signed]. Include the following information:
    - a. Name of the materials and description of the proposed substitute.
    - b. Performance and test data need to be equal to basis of design
    - c. Substitute needs to be an identical color match in core and surface
    - d. Only Air-cured products allowed

### 2.2 PERFORMANCE CRITERIA

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 - Quality Requirements, to design the vertical panel supports to support the cementitious panels.
- B. Provide panels and panel fasteners from a single source. Panels must be Air-cured, factory coated, and tone and tone through colored.
- C. Provide panels and vertical panel supports capable of the following:

1. Wind Loads:
    - a. Field: **[Insert loading pressure]** pounds per square foot, positive and negative pressure.
    - b. Perimeter: **[Insert loading pressure]** pounds per square foot, positive and negative pressure.
  2. Deflection Limits: Withstand deflection L/300, maximum.
- D. Panel Performance:
1. Minimum strength and bending characteristics in accordance with ASTM C120 and ASTM C1185.
    - a. Modulus of rupture: 0.024 kilonewton per square millimeter (average cross/length)
    - b. Modulus of elasticity: 16 ~~gigapascal~~ per kilonewton per square millimeter (ist: 15000 N/mm<sup>2</sup>)
    - c. Bending strength lengthwise: ~~18-16~~MPa (characteristic value!)
    - d. Bending strength crosswise: ~~24-22~~ MPa (characteristic value!)
  2. Density:- 1.7 grams per cubic centimeter according to ASTM C1186.
  3. Resistance of panel against pull-through of rivet head and screw head
    - a. Edge: Clinar 4mm = 0.38kN, Clinar 6mm/Clinar Clip = 0.79kN (characteristic value!)
    - b. Corner: Clinar 4mm = 0.20kN, Clinar 6mm/Clinar Clip = 0.48kN (characteristic value!)
  4. Panel Weight: 6mm = 2.5 pounds per square foot
  5. Moisture properties per ASTM C1185, by mass
    - a. Normal: 6 percent
    - b. Maximum: 20 percent
  6. Water tightness per ASTM C1185: No visible droplets or surface wetting.
  7. Fire resistance per ASTM E84 and ASTM E136
    - a. Noncombustible
    - b. Flame spread index: 0
    - c. Smoke developed index: Less than or equal to 15
- Specifier Note: DELETE Cyclic Wind Pressure Loading requirement if project is not located in a High Wind Velocity Zone.*
- Specifier Note: If Notice of Acceptance (NOA) documentation is required by local Authority Having Jurisdiction contact SWISSPEARL for assistance. Miami-Dade County is one such jurisdiction.*
8. Temperature Range: Minus 40 degrees F to plus 176 degrees F
  9. Frost Resistance per ASTM C1185: 2944psi
  10. Coefficient of thermal expansion per ASTM E228: 10 by 10<sup>-6</sup> m/m/deg K
  11. Color Change in accordance with ASTM G155

- a. 2000 Hours: Change in E less than or equal to 1.9
  - b. 5000 Hours: Change in E less than or equal to 3.6
12. Water tightness per ASTM C1185: No visible droplets or surface wetting.

## 2.3 MATERIALS

- A. Panels made from
1. Portland cement, ground lime stone, additives
  2. Polyvinyl alcohol fibers and cellulose fibers
  3. Acrylic coating to panel face and rear side
- B. The following characteristics are not acceptable
1. Autoclaved products
  2. Reinforcement with only cellulose fibers
  3. Efflorescence
  4. Uncoated fiber cement
- C. Fiber reinforced cementitious panels air cured for minimum of 4 weeks.

## 2.4 VERTICAL PANEL SUPPORTS

*Specifier Note: EDIT Select panel framing material based on project requirements.*

- A. Metal vertical panel supports:

*Specifier Note: EDIT metal framing requirements to suit Project needs. Thickness of panel supports should be based on design criteria and engineering analysis for support of cementitious panels, minimum 18 gauge for steel supports and 2 millimeter for aluminum supports.*

*Specifier Note: Rainscreen cavity depth is based on overall height of panel façade. Minimum cavity depth is 20 millimeter). Refer to manufacturer's Design and Installation Manual for minimum cavity requirements.*

1. General:
  - a. Minimum 18 gauge, cold-formed metallic-coated steel sheet, [ASTM A653, G60 hot-dip galvanized] [ASTM A653, G90 hot-dip galvanized] [ASTM A792, AZ50 Galvalume / Zinalume].
  - b. Minimum 2 millimeter extruded aluminum alloy AlMgSi, [mill finish] [black anodized].

[OR]

[OR]

- B. Wood vertical panel support battens:

*Specifier Note: EDIT wood framing requirements to suit Project needs. SWISSPEARL does not recommend using the SIGMA 12 concealed fastening system with wood vertical panel supports.*

1. General: Provide kiln-dry lumber with a maximum moisture content of 19 percent.
2. Species: [Southern Pine; SPIB] [Douglas fir-larch; WCLIB or WWPA] [Hem-fir (north); NLGA]
3. Grade: Select Structural No. 2
4. Size: batten sizes as per design and installation manual

*Specifier Note: EDIT Minimum recommended size of battens at vertical panel joints is 120 by 27 millimeter , for intermediate battens minimum size is 60 by 27 millimeter . Batten sizes should be based on design criteria and engineering analysis.*

- a. Vertical panel support battens: 120 by 27 millimeter
  - b. Intermediate battens: 60 by 27 millimeter intermediate battens.
5. EPDM Backing Strips: Manufacturer's backing strip, color black.
- C. Shims: 50 year durable material compatible with vertical panel supports.

*Specifier Note: SWISSPEARL also offers panels with both the front, back, and edges finished when a project uses panels which are left exposed on the back side of the façade.*

*Specifier Note: SWISSPEARL panels can be installed on inclined applications. Contact a SWISSPEARL Representative for assistance.*

## 2.5 FABRICATION

- A. Fabricate panels at the factory or certified fabricator
- B. Field dimension: Field verify overall dimensions prior to panel fabrication
- C. Dimensional tolerances
  1. Overall panel dimensions within 1 millimeter of panel width and height
  2. Squareness within 0.5 millimeter per meter
- D. Labeling. Apply identification label to back side of each fabricated panel

*Specifier Note: Panels installed using concealed fasteners must be factory cut to size.*

- E. [Factory] [Shop] cut cementitious panels
  1. Panel thickness: [4] [6] millimeters.

*Specifier Note: Contact a SWISSPEARL Representative to find out more about panel optimization.*

2. Panel size: [1200 by 600/460/360/240/200/150 by 6 millimeters] [900 by 300 by 4 millimeters]

*Specifier Note: Select panel fastening method, [exposed or overlapped] based on project requirements.*

3. Panel Fastening: Exposed

*Specifier Note: Rivets are used when panels are attached to metal vertical panel supports. Screws/nails are used when panels are attached to wood framing.*

## 2.6 FINISH.

A. Finish: Select a color according to the Swisspearl Clinar Brochure

1. Color: [Selected from current SWISSPEARL color chart] [Custom color as selected by Architect] [Insert Color]

## 2.7 ACCESSORIES

A. Horizontal joint flashings: Manufacturer's standard [aluminum] [stainless steel] flashings, color [black] [to match panel].

## PART 3 - 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. Prior to panel installation verify vertical panel support compliance with Design and Installation Manual.

### 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 leak-proof, secure and non-corrosive installation
- C. Allow for scaffolding or mobile access to all parts of cladding

### 3.3 INSTALLATION

- A. Install panels in accordance with manufacturer's Design and Installation Manual and recommendations.
- B. Shim and align vertical panel supports. Install shims between substrate and panel supports; no shims between panel and panel supports.
- C. Install shims to the following tolerances:
  1. 1/4 inch in 20 feet on level, plumb and panel joint lines
  2. Joint widths – plus or minus 1/16 inch of indicated width.

*Specifier Note: When wood panel supports are used in place of metal panel supports, the EPDM backing strips are required to separate the materials. DELETE if using metal panel supports.*

D. Attach EPDM backing strips to wooden battens.



### 3.4 FIELD QUALITY CONTROL

- A. Perform daily inspections of panel installation to maintain and confirm that tolerances are being met and that panel manufacturer's design and installation manual is being complied with.

*Specifier Note: DELETE requirement for Owner to engage inspection agency if not required or desired for specific project.*

- B. Owner engaged 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 panels and replace with new panels. Damage requiring replacement includes, but is not limited to, chips and scratches to panel surfaces.
- B. Clean finished surfaces according to manufacturer's instructions.

### 3.6 PROTECTION

- A. Protect installed panel from damage.

#### END OF SECTION

***DISCLAIMER:** This Guide Specification provided by SWISSPEARL has been written as an aid to the professionally qualified Specifier and Design Professional. The use of this Guide Specification requires the sole professional judgment and expertise of the qualified Design Professional to adapt the information to the specific needs for the Building Owner and the Project, to coordinate with their Construction Document Process, and to meet all the applicable building codes, regulations and laws. SWISSPEARL EXPRESSLY DISCLAIMS ANY WARRANTY, EXPRESSED OR IMPLIED, INCLUDING THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE OF THIS PRODUCT FOR THE PROJECT.*