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 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 panels with factory supplied color matched rivets to attach the panel to a metal supporting frame
2. Face-fastened panels with factory supplied color matched screws to attach the panel to a timber supporting frame
3. Concealed fastened with an undercut anchor

C. [Metal] [Wood] vertical panel supports and fasteners.

1.2 REFERENCES

A. ASTM International

1. ASTM A653/A653M; Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM A792; Standard Specification for Steel Sheet, 55 percent Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
3. ASTM C120; Standard Test Methods of Flexure Testing of Slate (Breaking Load, Modulus of Rupture, Modulus of Elasticity.

4. ASTM C1185; Standard Test Methods for Sampling and Testing Non–Asbestos Fiber Cement Flat Sheet, Roofing and Siding Shingles, and Clapboards.
5. ASTM C1186; Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems.
6. ASTM E84; Standard Test Method for Surface Burning Characteristics of Building Materials.
7. ASTM E136: Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°F
8. ASTM E228; Standard Test Method for Linear Thermal Expansion of Solid Materials with a Push Rod Dilatometer.
9. ASTM E330 Standard Test Method for Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
10. ASTM G155; Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials.

Specifier Note: DELETE Florida Building Code reference standards paragraph when not required.

B. IAPMO UES_0551

1. Acceptance Criteria for Fiber Cement Siding used as Exterior Siding

C. Environmental Product Declaration: According to ISO 14025 and EN 15804, completed by IBU (Institut Bauen und Umwelt)

D. Florida Building Code

1. Test Application Standard (TAS) 203: Criteria for Testing Products subject to Cyclic Wind Pressure Loading

E. National Fire Protection Agency (NFPA)

1. NFPA 285: Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

F. National Lumber Grades Authority (NLGA)

G. Southern Pine Inspection Bureau (SPIB)

H. West Coast Lumber Inspection Bureau (WCLIB)

I. Western Wood Products Association (WWPA)

J. 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 a 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. IAPMO USE_0551 Evaluation report for installation on a rear ventilated open joint system.

G. Provide test reports indicating compliance with performance criteria.

H. Provide manufacturer's Design and Installation Manual.

I. Provide manufacturer's sample warranty.

J. 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.

K. 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.

L. 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.

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 60 00 Product Requirements] [Insert section number and title].

B. Storage and handling to comply with Design and Installation Manual.

1.7 WARRANTY

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. The Zenor panel line is NOT included in the 20 year warranty, it has a 10 year warranty.

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

1. Authorized National Distributor: Element Architectural Products, Addison, TX. www.elementpanels.com
   Mike Watson: mike@elementpanels.com, 469-518-5860
   Logan Raivio: logan@elementpanels.com 503-487-0822

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 the basis of design.
   c. Test reports indicating compliance with the performance criteria.
   d. Substitute needs to be an identical color match in core and surface.
   e. 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
2. Density: 1.8 grams per cubic centimeter according to ASTM C1186.

Specifier Note: EDIT 3 pounds per square foot is for 8 millimeter panel; 4.5 pounds per square foot is for 12 millimeter panel.

3. Panel Weight: [3] [4.5] pounds per square foot
4. Moisture properties per ASTM C1185, by mass
    a. Normal: 6 percent
    b. Maximum: 20 percent
5. Water tightness per ASTM C1185: No visible droplets or surface wetting.
6. Fire resistance per ASTM E84 and NFPA 285:
    a. Noncombustible
    b. Flame spread index: 0
    c. Smoke developed index: Less than or equal to 15
    d. NFPA Class A.
    e. No flaming after 30 seconds; weight loss less than or equal to 50 percent; final center temperature less than or equal to 30 deg. C.

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.

7. Cyclic Wind Pressure Loading: Tested in accordance with Florida Building Code, TAS 203 and ASTM E330 for wind loading up to 63 pounds per square foot.
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^{-6} 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

A. Metal vertical panel support manufactured by Xkelex. www.xkelex.com
Supplied by Architectural Façade Systems, Denton, TX. www.afs-na.com
Larry Potvin: 940-323-2343

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 / Zincalume].

[OR]

    b. Minimum 2 millimeter extruded aluminum alloy AlMgSi, [mill finish] [black anodized].

[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: [8] [12] millimeters.

Specifier Note: SWISSPEARL offers to optimize panel layouts to minimize cutting of panels and panel waste. Contact a SWISSPEARL Representative to find out more about panel optimization.

2. Panel size: [2510 by 1250 millimeters] [3050 by 1250 millimeters]

Specifier Note: Select panel fastening method, exposed or concealed, based on project requirements.

3. Panel Fastening: Exposed

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

a. Fasteners: [Rivets - 4 by 18 millimeters with 15 millimeter head] [Screws - 4.8 by 38 millimeter with 12 millimeter head]
b. Fastener Finish: [Panel color] [Blank].

[OR]
Specifier Note: Concealed panel fastening requires panels be fabricated at the manufacturing facility where the concealed fastener and panel hanging clips are installed.

4. Panel Fastening: Concealed

Specifier Note: SIGMA 8 concealed fastening system is for the 8 millimeter panels and the SIGMA 12 concealed fastening system is for 12 millimeter panels.

a. SIGMA [8] [12] concealed fastening system.

2.6 FINISH

Specifier Note: HR finish is scratch and graffiti resistant.

A. Finish: Select a color according to the Swisspearl Delivery Program

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] [mill].

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 minus1/16 inch of indicated width.
3. Sub frame profile face alignment maximum L/300 between supports.

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.

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 on 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*

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