

## SECTION 03460

### PORCELAIN FACED ARCHITECTURAL PRECAST CONCRETE

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#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Site Cast or Tilt-Up Porcelain Faced Concrete Panels.
- B. Shop/Plant Cast Porcelain Faced Concrete Panels.

##### 1.2 RELATED SECTIONS

- A. Section 03300 - Cast-In-Place Concrete: Concrete, reinforcing, anchors, etc.
- B. Section 05120 - Structural Steel: Building structural frame.
- C. Section 07600 – Flashings and Sheetmetal: Supply of metal flashing reglets for placement by this Section.
- D. Section 07900 - Joint Sealers: Caulking of perimeter joint with sealant and backing.
- E. Division 8 – Doors, Windows and Glass: Windows and door frames installed in precast units.

##### 1.3 REFERENCES

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
- B. ACI 318 - Building Code Requirements for Structural Concrete.
- C. ASTM C 67 - Standard Test Methods for Sampling and Testing Brick, Structural Clay Tile, and Porcelain.
- D. ASTM C 1088 - Standard Specification for Thin Veneer Units Made From Porcelain.

- E. ASTM D 256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
- F. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics
- G. AWS D1.1 - Structural Welding Code - Steel.
- H. AWS D1.4 - Structural Welding Code - Reinforcing Steel.

#### 1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Design units to withstand design loads in accordance with applicable code, and erection forces. Calculate structural properties of units in accordance with ACI 318.
- B. Design units to accommodate construction tolerances, deflection of building structural members and clearances of intended openings.
- C. Design and size components to withstand seismic loads and sway displacement as calculated in accordance with the applicable code.

#### 1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Indicate layout and sizes, panel locations, configuration, joint locations, porcelain color and texture, porcelain coursing, porcelain coursing alignment across panel joints, reveal and false joint locations and dimensions, panel identification marks, reinforcement, connection details, support items, location of lifting devices, dimensions, openings, and relationship to adjacent components.
- D. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
  - 1. List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.

2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
- E. Selection Samples: For each porcelain product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- F. Verification Samples: For each porcelain product specified, two samples, actual size, representing actual product, color, and patterns; include form liner sample.
- G. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

## 1.6 QUALITY ASSURANCE

- A. Fabricator: Qualifications: Company specializing in performing Work of this section with minimum five years documented experience.
- B. Design: Design units under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location.
- C. Mock-Up: Provide a minimum 4 foot by 4 foot mock-up for evaluation of surface finish and application workmanship.
  1. Locate in areas designated by Architect.
  2. Do not proceed with remaining work until workmanship and color are approved by Architect.
  3. Rebuild mock-up as required to produce acceptable work.
  4. Accepted mock-up shall be comparison standard for remaining Work

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store form liner in manufacturer's unopened packaging until ready for installation. Form liner should not have prolonged exposure to direct sunlight that may damage the liner product. Avoid top loading or crushing liners in their packages.
- B. Store porcelain in manufacturer's unopened packaging until ready for installation.
- C. Handling Tilt-up Units: Lift units to position, consistent with their shape and design. Lift and support only from support points.
- D. Blocking and Lateral Support During Erection: Clean and non-staining, without causing harm to exposed surfaces.

- E. Protect panels from staining, chipping.
- F. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.8 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.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Porcelain Manufacturer: Crossville, Inc, 346 Sweeney Drive, Crossville, TN 38555. Contact Joe Hartzell. Phone: (720) 244-3868. Web Site: [www.crossvilleinc.com](http://www.crossvilleinc.com). E-mail: [jhartzell@crossvilleinc.com](mailto:jhartzell@crossvilleinc.com).

Series:	Color:
Finish:	Size:

- B. Installation Liner System: Innovative Brick Systems, LLC, 11625 Reed Ct., Broomfield, CO 80020. ASD. Telephone Toll Free: (800) 413-4588. Phone: (720) 890-6032. Fax: (720) 890-6038. Web Site: [www.mbrick.com](http://www.mbrick.com). E-mail: [info@mbrick.com](mailto:info@mbrick.com).
- C. Substitutions: Not permitted.
- D. Requests for substitutions will be considered in accordance with provisions of Section 01600.
- E. Liners or other embedding systems that employs individual connections leaving visible separation in the molds and subsequent joints will not be considered.

2.2 MATERIALS

- A. Cast-In Place Concrete: Forms, concrete, reinforcement, and admixtures as specified is Section 03300 – Cast-In-Place Concrete.
- B. Form Liner Sheets: Versa Liner single use form liner sheets with a seamless joint design that provides a realistic coved joint and fully embeds the

porcelain into concrete walls for superior bonding, durability and weatherproofing. Each liner is designed with an indexing feature that makes setting up the panel easy and fast. Versa Liner is a thermo form high impact polystyrene recyclable material number 6 PS.

1. Physical properties:
  - a. Thickness 20 MIL.
  - b. Weight .142 LBS PER S.F.
  - c. Tensile 4080 psi at yield when tested in accordance with ASTM D 636.
  - d. Izod Impact 3.3 @73 degrees F when tested in accordance with ASTM D 256.
  - e. Vicat Softening 220 degrees F
  - f. Color White-primary; color can vary
2. Liner Sheet Size: Liners are provided in 27 inch by 32 inch panels and are manufactured with an EdgeLock quick connect feature for adjacent panels to lock and align efficiently with seamless panel construction.
3. Patterns and Sizes: (Generally available; Custom patterns made on order)
  - a. Modular, Porcelain size: 2-1/4 inches by 7-5/8 inches. Sizes do not include overlap dimensions.
    - 1) Item Number 100 Modular Running Bond 32 inches wide, 26.66 inches high, 5.92 sf sheet area.
    - 2) Item Number 105, Modular Running Bond 3-5/8 inch coped return 3 5/8 inches wide, 26.66 inches high.
    - 3) Item Number 110, Modular Running Bond 7-5/8 inch coped return 7-5/8 inches wide, 26.66 inches high.
    - 4) Item Number 115, Modular Running Bond 7-5/8 inch by 7-5/8 inch folding return 16 inches wide, 26.66 inches high.
    - 5) Item Number 120, Modular Stack Bond 32 inches wide, 8 inches high.
    - 6) Item Number 125, Modular Soldier Course 32 inches wide, 8 inches high.
    - 7) Item Number 130, Modular 4-wide Stack Bond 32 inches wide, 26.66 inches high, 5.92 sf sheet area.
    - 8) Item Number 140, Modular Flemish Bond Strip 24 inches wide, 2-1/4 inches high.
    - 9) Item Number 150, Modular Rowlock Strip 32 inches wide, 3-5/8 inches high.
  - b. Closure Porcelain size (often called Economy), 3-5/8 inches by 7-5/8 inches:
    - 1) Item Number 200, Closure Running Bond 32 inches wide, 24 inches high, 5.33 sf sheet area.
    - 2) Item Number 220, Closure Stack Bond (4 inch nesting pockets) 32 inches wide, 8 inches high.
    - 3) Item Number 225, Closure Soldier Bond (8 nesting pockets) 32 inches wide, 8 inches high.

- c. Utility size (often called Jumbo), 3-5/8 inches by 11-5/8 inches.
    - 1) Item Number 400, Utility 1/2 Bond 36 inches wide, 24 inches high, 6.0 sf sheet area.
    - 2) Item Number 402, Utility 1/3 Running Bond 36 inches wide, 24 inches high, 6.0 sf sheet area.
    - 3) Item Number 420, Utility Stack Bond 28 inches wide, 12 inches high.
    - 4) Item Number 425, Utility Soldier Course 28 inches wide, 12 inches high.
    - 5) Item Number 215, Utility Corner (8 inch return for Utility and Closure) 16 inches wide, 24 inches high.
  - d. Norman size, 2-1/4 inch by 11-5/8 inch.
    - 1) Item Number 300, Norman 1/3 Running Bond 36 inches wide, 26.66 inches high, 6.67 sf sheet area.
    - 2) Item Number 320, Norman Soldier/Stack Bond 32 inches wide, 12 inches high.
4. Liner Sheet Indexing: VersaLiner sheets have embossed markings (plus and minus signs) around most perimeters that act as indicators for the molded mortar joints of each sheet. Joints near the minus signs are slightly smaller in order to nest properly underneath the larger joints and provide proper overlapping of each adjoining liner.
- C. Form Liner Rolls: Is a patented, single-use roll liner system that provides a seamless cove joint for the precise look of full laid-up porcelain with hand-struck and hand tooled appearances.
- 1. Patterns and Sizes:
    - a. Modular, Porcelain size: 2-1/4 inches by 7-5/8 inches.
    - b. Provided 34 inches wide with 32 inches of porcelain coursings, and a 2 inch nesting overlap flap.
  - 2. Provided in 200 ft long rolls.
- D. Porcelain Stone Tile: Tested in accordance with ASTM C 67.
- 1. Size: Modular 2-1/4 inches (57.2 mm) high, 7-5/8 inches (193.7 mm) long, nominal 3/8 inch thick. Also available 2-1/4 inches high x 7-3/4 inches long, to accommodate 1/4" joint.
  - 2. Size: Closure 3-5/8 inches (92.1 mm) high, 7-5/8 inches (193.7 mm) long, nominal 3/8 inch thick. Also available 3-3/4 inches high x 7-3/4 inches long, to accommodate 1/4" joint.
  - 3. Size: Jumbo 7-5/8 inches (193.7 mm) high, 7-5/8 inches (193.7 mm) long, nominal 3/8 inch thick. Also available 7-3/4 inches high x 7-3/4 inches long, to accommodate a 1/4" joint.
  - 4. Size: Utility 3-5/8 inches (92.1 mm) high, 11-5/8 inches (295.3 mm) long, nominal 3/8 inch thick. Also available 3-3/4 inches high x 11-3/4 inches long, to accommodate a 1/4" joint.

5. Size-Norman 2-1/4 inches (57.2 mm) high, 11-3/4 inches long (305.1mm) long, nominal 3/8 inch thick.
6. Trim Units: Matching.
7. Tolerance:
  - a. Length: Plus 0, minus 1/16 inch (1.6 mm).
  - b. Height: Plus 0, minus 1/16 inch (1.6 mm).
  - c. Thickness: Plus or minus 1/16 inch (1.6 mm).
8. Texture: Smooth.
9. Texture: Textured
10. Texture: Polished.
11. Color: \_\_\_\_\_.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify building structure, anchors, devices, and openings are ready to receive work of this Section.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.2 PREPARATION

- A. Clean form thoroughly prior to installation.
- B. Provide for erection procedures and induced loads during erection. Maintain temporary bracing in place until final support is provided.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### 3.3 PANEL FABRICATION AND INSTALATION

- A. Maintain environmental records and quality control program during production of tilt-up or precast units. Make records available upon request.
- B. Use rigid forms constructed to maintain precast units uniform in shape, size and finish.
- C. Utilize form liners specified.

- D. Prepare, install, and finish form liners in accordance with current release of manufacturer's MBrick Technical Design and Installation Guide.
- E. Trim liner sheets as necessary prior to installation into the form.
- F. Mark the side of the form approximately every 2 feet (610 mm) with course reference points for coursing control purposes.
- G. Begin placing liner sheets in the form in accordance with the shop drawings. Note: The plus (+) edge joint secures over the minus (-) edge joint on the adjoining sheet. Place only one tier of sheets prior to placing the porcelain, face down, in to the liner. Adjust coursing as needed while installation progresses.
- H. Place porcelain face side down into the liner. Once fully tiled, check panel to ensure all tiles are fully nested and flat in the liner.
- I. Install reinforcement and necessary devices to support reinforcement and proceed with the pour as specified in Section 03300.
- J. Embed reinforcing steel, anchors, inserts plates, angles, and other cast-in items as indicated on Drawings.
- K. Place recessed flashing reglets provided by Section 07800 continuous and straight.
- L. Locate hoisting devices to permit removal after erection.
- M. Cure units to develop concrete quality, and to minimize appearance blemishes including non-uniformity, staining, or surface cracking.
- N. Remove liner sheets by peeling them off the cured panel.
- O. Cleanup: Spray panel with a pressure washer ring a minimum of 1000 PSI.
- P. Erect units without damage to shape or finish. Replace or repair damaged panels.
- Q. Erect members level and plumb within allowable tolerances.
- R. Maintain uniform horizontal and vertical joint, alignment and spacing across construction joints as erection progresses.
- S. When members require adjustment beyond design or tolerance criteria, discontinue affected work; advise Architect/Engineer.

- T. Fasten units in place. Perform welding, including tack welds, in accordance with AWS D1.1 and AWS D1.4.
- U. Seal perimeter and intermediate joints in accordance with Section 07900.

### 3.4 ERECTION TOLERANCES

- A. Dimensions of the finished panel, at the time of erection in the structure, shall conform to the tolerances for precast, non-prestressed elements in ACI 117, unless otherwise specified by the Architect.

### 3.5 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements: Testing and Inspection Services.
- B. Field inspection and testing will be performed by Owner's testing laboratory in accordance with applicable code.

### 3.6 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

### 3.7 SCHEDULES

- A. :
  - 1.
  - 2.
  - 3.
- B. :
  - 1.
  - 2.
  - 3.

END OF SECTION