

SECTION 04215

BRICK EMBEDDED CONCRETE PANELS

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products, methods and installation for brick inlay system for precast or site-cast concrete as scheduled and drawn.

1.2 RELATED SECTIONS

- A. Section 03120 – Cast-in-Place Concrete Formwork.
- B. Section 03330 -Architectural Concrete.
- C. Section 03450 - Plant-Precast Architectural Concrete.
- D. Section 03460 - Site-Precast Architectural Concrete.
- E. Section 03470 - Tilt-Up Precast Concrete.
- F. Section 04810 - Unit Masonry Assemblies: Brick used in masonry.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

- 1. ASTM C-1088 Standard Specification For Thin Veneer Brick Units Made from Clay or Shale.
- 2. ASTM C-67 Standard Specification For Absorption Rates of Thin Veneer Brick Units Made From Clay or Shale.
- 3. ASTM C-31 Methods of Making and Curing Concrete Test Specimens in the Field.
- 4. ASTM C-33 Specification For Concrete Aggregates
- 5. ASTM C-39 Test Methods For Compressive Strength of Cylindrical Concrete Specimens
- 6. ASTM C-94 Specifications for Ready Mixed Concrete
- 7. ASTM C-150 Specification for Portland Cement.
- 8. ASTM D 2240 - Standard Test Method for Rubber Property - Durometer Hardness.
- 9. [ASTM D 256 Standard Test Methods for determining the Izod Pendulum Impact Resistance of Plastics](#)
- 10. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics.

B. American Concrete Institute (ACI), latest Annual Edition

- 1. All applicable Standard Specifications for Tolerances for Concrete Construction and Materials.
- 2. ACI-301 Specifications for Structural Concrete for Buildings
- 3. ACI-305 Hot Weather Concreting
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- 4. ACI-306 Cold Weather Concreting
- 5. ACI-315 Manual of Standard Practice for Detailing Concrete Structures.

C. Concrete Reinforcing Steel Institute (CRSI)

- 1. All applicable Standard Practice and Specification for Placing Reinforcement.
- ##### 1.4 Design/Performance Requirements

**** NOTE TO SPECIFIER **** Delete references from the list below that are not actually required by the project.

- 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 codes.

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. [Two sets of Brick color and texture chips, loose samples, or boards of each type shall be submitted.](#)
- 2. Form liner samples representing the specified form liner with printed product data for

the form liner system and form release shall be submitted.

3. Preparation instructions and recommendations.

4. Storage and handling requirements and recommendations.

5. Installation methods.

C. Shop Drawings - Provide locations of brick panels in project and submit elevation drawings that indicate:

1. Panel elevations.

2. Panel sizes.

3. Panel joint locations and dimensions.

4. Horizontal and vertical brick coursing.

5. Alignment of brick coursing to adjacent construction.

D. Selection Samples: For each finish product specified, two complete sets of samples, representative of full range of color and finish for each brick type.

E. Verification Samples: For each finish product specified, two samples, representative of selected color and finish of each brick type.

F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

** NOTE TO SPECIFIER ** Delete the following paragraphs if LEED is not applicable.

G. LEED Submittals: Provide documentation of how the requirements of Credit will be met: List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content. Product data and certification letter indicating percentages by weight of postconsumer and pre-consumer recycled content for products having recycled content.

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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 postconsumer and pre-consumer recycled content for products having recycled content.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A minimum of 5 years documented experience producing specified product types.

B. Installer Qualifications:

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. A job mock-up panel shall be a minimum of 4 feet by 4 feet (1219 mm by 1219 mm). Inspect all formed mortar joints for a reasonably similar appearance. A full range of brick sizes, brick patterns, and variances in brick size, general color of brick, variance in color and texture of brick shall be incorporated into the mock-up panel and designated by the Architect.

2. The full range of pigmented color of concrete shall also be submitted in the mock-up panel. The contractor shall maintain mock-up for comparison with finished architectural panels. The finished architectural panels brick and concrete surface shall be pressure washed. Dimensional tolerances of the finished panel, at the time of erection of the structure, shall conform to Industry Standards, ACI Standards and ASTM standards, unless otherwise specified by the Architect.

3. Do not proceed with remaining work until workmanship, color, and detail are approved by Architect.

4. Modify mock-up area as required to produce comparable standard of acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not use damaged products. Do not install products not bearing product trade name and manufacturer's name.

B. Store products in manufacturer's unopened packaging in dry storage area, with ambient temperature between 30 degrees F (-1 degree C) and 120 degrees F (41 degree C), until installation.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

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

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A. Acceptable Manufacturer: Architectural Polymers; 1220 Little Gap Rd., Palmerton, PA 18071. ASD. Tel: (610) 824-3322. Fax: (610) 824-3777. Email: [Request info AP/Arcat link](#)
Web: <http://www.apformliner.com>.

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

D. Liners or other embedding systems that employs individual brick connections leaving visible separation in the molds and subsequent joints will not be considered.

2.2 BRICK INLAY SYSTEMS

A. Versa-Brix® M by Architectural Polymers US Patent# 7,871,054.

1. Standard modular sizes are 4 by 4 (1219 mm by 1219 mm) and 4 by 8 (1219 mm by 2438 mm) sheets with 3/4 inch (19 mm) plywood. Custom sizes are readily available by request or required to limit the cutting of the liner maximizing usage.

2. A Proprietary Blend of urethane providing the stability of the form liner to withstand up to 70 re-uses (guaranteed for 50).

3. Any brick pattern, size, or shape in accordance with ASTM C 1088, Type TBX, tested in accordance with ASTM C 67. Factory or Site applied bond breaker.

** NOTE TO SPECIFIER ** Versa-Brix® S Single-use form liner sheets for small non-repetitive pre-cast panel projects or Tilt-up concrete wall panel construction. Includes a coved or mortar joint configuration. Delete if not required.

B. Versa-Brix® S Single-use form liner sheets by Architectural Polymers US Patent# D544,968 S

1. Brick Form Liner Sheets: Versa-Brix® S single-use form liner sheets connect with a seamless joint design that provides a realistic coved joint and fully embeds the thin brick 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-Brix® S single-use form liner is a thermo formed high impact polystyrene recyclable material number 6 PS.

2. 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 99.5% White-primary; color can vary

3. Liner Sheet Size: Liners of brick size and pattern are provided in varying sizes as dictated by the mason's rule and thermoforming equipment capability. They are manufactured with a connect feature to adjacent sheets that lock and align efficiently with seamless connection.

4. Patterns and Sizes: (Generally available; Custom patterns made on order)

a. Modular, Brick size: 2-1/4 inches by 7-5/8 inches.

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i. #602S Modular Running Bond

ii. #602SC Modular Running Bond Folding Corner Return

iii. #606S Modular Soldier Course

iv. #606S Modular Stack Bond

v. #606S Modular Edge Cap Return

vi. #602S Universal End Round

b. Closure Brick size (often called Economy), 3-5/8 inches by 7-5/8 inches:

- i. #602S Closure Running Bond
 - ii. #602SC Closure Running Bond Folding Corner Return
 - iii. #606S Closure Edge Cap Return
 - iv. #602S Universal End Round
- c. Utility Brick size (often called Jumbo), 3-5/8 inches by 11-5/8 inches.
- i. #601S Utility 1/3 Running Bond
 - ii. #602SC Utility 1/3 Running Bond Folding Corner Return
 - iii. #606S Utility Soldier Course
 - iv. #602S Universal End Round
- d. Norman Brick size, 2-1/4 inch by 11-5/8 inch.
- i. #602S Norman Soldier Course
 - ii. #606S Norman Stack Bond
5. Any Thin Brick Size in accordance with ASTM C 1088, Type TBX, tested in accordance with ASTM C 67.
- C. Type: Vers-Brix® 3D™ US Patent# 8,181,930
1. Any Thin Brick Pattern, Size, or Shape in accordance with ASTM C 1088, Type TBX, tested in accordance with ASTM C 67. Factory or Site applied bond breaker.
 2. A Proprietary Blend of urethane providing the stability of the form liner to withstand up to 70 re-uses (guaranteed for 50).
 3. Custom sizes are readily available by request or required to limit the cutting of the liner maximizing usage.
- C. Type: Versa-Brix® Antique Classic™ patent pending
1. Any Thin Brick Pattern, Size, or Shape(including Tumbled Thin Brick) in accordance with ASTM C 1088, Type TBX, tested in accordance with ASTM C 67. Factory or Site applied bond breaker.
 2. Standard modular sizes are 4 by 4 (1219 mm by 1219 mm) and 4 by 8 (1219 mm by 2438 mm) sheets with 3/4 inch (19 mm) plywood. Custom sizes are readily available by request or required to limit the cutting of the liner maximizing usage.
 3. A Proprietary Blend of urethane providing the stability of the form liner to withstand up to 70 re-uses (guaranteed for 50).
- ** NOTE TO SPECIFIER ** Versa-Brix® Vertical™ Form liner system for Cast-In-Place wall construction, includes a raked mortar joint configuration. It is intended to enable contractors a low-cost construction technique for brick faced retaining walls or on-site vertical surfaces. Delete if not required.
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- D. Type: Versa-Brix® Vertical™ US Patent# 7,871,054
1. Any Ground or Molded Thin Brick in accordance with ASTM C 1088, Type TBX, tested in accordance with ASTM C 67. Factory or Site applied bond breaker.
 2. Standard modular sizes are 4 by 4 (1219 mm by 1219 mm) and 4 by 8 (1219 mm by 2438 mm) sheets with 3/4 inch (19 mm) plywood. Custom sizes are readily available by request or required to limit the cutting of the liner maximizing usage.
- ** NOTE TO SPECIFIER ** Versa-Brix® Versa-Block Multi- use form liner system for pre-cast concrete Thin Masonry inlay wall panel construction. Includes a coved or raked mortar joint configuration. Delete if not required.
- E. Type: Versa-Brix® Versa-Block
1. Standard modular sizes are 4 by 4 (1219 mm by 1219 mm) and 4 by 8 (1219 mm by 2438 mm) sheets with 3/4 inch (19 mm) plywood. Custom sizes are readily available by request or required to limit the cutting of the liner maximizing usage.
 2. A Proprietary Blend of urethane providing the stability of the form liner to withstand up to 70 re-uses (guaranteed for 50).
 3. Any Thin Mason Product Cut or Molded product fabricated to a tolerance of

plus or minus 3mm(1/8") for the following:

- i. Unit Length
- ii. Unit Height
- iii Deviation from Square
- iv. Unit thickness

4. Factory or Site applied bond breaker.

F. Patterns:

- 1. Flemish Bond - #600.
- 2. 1/3 Running Bond - #601.
- 3. Running Bond - #602.
- 4. Stepped 1/3 Bond - #603.
- 5. Herringbone - #604.
- 6. Offset Weave - #605.
- 7. Stack Bond & Soldier Course - #606.
- 8. Basket Weave - #607.
- 9. Versa-Brix Special - #608.

2.3 THIN BRICK MANUFACTURERS

A. Acceptable Thin Brick Manufacturer and Product:

- 1. Type PCI Select, Conforming to ASTM C-1088 by _____ (brick manufacturer).
- 2. Absorption Rates, Conforming to ASTM C-67 by _____ (brick manufacturer).

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- 3. Size: _____ (width, length, depth)
- 4. Tolerance: +0 inch (0 mm) to -1/16 inch (-1.5 mm) in length and width.
- 5. Color: _____
- 6. Texture: _____
- 7. Brick Blending Requirements.

B. Acceptable Thin Brick Manufacturers for Pre-cast (PCI) and Tilt-up (TCA):

- 1. Endicott Clay Products Co.
- 2. Metro Brick as manufactured by Ironrock Capital.
- 3. Summitville Tile Co.

2.4 THIN BRICK PRODUCT

A. Manufacturer: Endicott Clay Products Co.

B. Thin Brick Size:

- 1. Modular: 5/8 inch by 2-1/4 inches by 7-5/8 inches (16 mm by 57 mm by 194 mm).
- 2. Closure: 5/8 inch by 3-5/8 inches by 7-5/8 inches (16 mm by 92 mm by 194 mm).
- 3. BC48 Corner: 5/8 inch by 2-1/4 inches by 7-5/8 inches / 3-5/8 inches (16 mm by 57 mm by 194 mm).
- 4. BC 448 Corner: 5/8 inch by 3-5/8 inches by 7-5/8 inches / 3-5/8 inches (16 mm by 92 mm by 194 mm).
- 5. Utility: 5/8 inch by 3-5/8 inches by 11-5/8 inches (16 mm by 92 mm by 295 mm).
- 6. Edge Cap: 5/8 inch by 2-1/4 inches by 7-5/8 inches by 3-5/8 inches (16 mm by 57 mm by 194 mm by 92 mm).
- 7. Edge Cap Corner (Left and Right): 5/8 inch by 2-1/4 inches by 7-5/8 inches by 3-5/8 inches (16 mm by 57 mm by 194 mm 92 mm).
- 8. Starter Angle and Top/Side Angle.

C. Thin Brick Colors:

- 1. Coppertone.
- 2. Burgundy Sands.
- 3. Medium Ironspot #77.
- 4. Dark Ironspot.
- 5. Autumn Sands.
- 6. Manganese Ironspot.
- 7. Medium Ironspot #46.
- 8. Desert Sands.

9. Desert Ironspot (Lt., Dark).
10. Red Ironspot.
11. Brown Sands.
12. Grey Sands.
13. Sahara Sands.
14. Rose Blend.
15. Orleans Sands.

2.5 THIN BRICK PRODUCT

A. Manufacturer: Metro Brick as manufactured by Ironrock Capital.

B. Thin Brick Size:

1. Modular: 5/8 inch by 2-1/4 inches by 7-5/8 inches (16 mm by 57 mm by 194 mm).
2. Closure: 5/8 inch by 3-5/8 inches by 7-5/8 inches (16 mm by 92 mm by 194 mm).
3. Norman: 5/8 inch by 2-1/4 inches by 11-5/8 inches (16 mm by 57 mm by 295 mm).
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4. Modular Corner: 5/8 inch by 2-1/4 inches by 7-5/8 inches / 3-5/8 inches (16 mm by 57 mm by 194 mm).
5. Closure Corner: 5/8 inch by 3-5/8 inches by 7-5/8 inches / 3-5/8 inches (16 mm by 92 mm 194 mm by 92 mm).
6. Utility: 5/8 inch by 3-5/8 inches by 11-5/8 inches (16 mm by 92 mm by 295 mm).
7. Edge Cap: 5/8 inch by 2-1/4 inches by 7-5/8 inches by 3-5/8 inches (16 mm by 57 mm by 194 mm by 92 mm).

C. Thin Brick Texture:

1. Traditional Texture.
2. Velour Texture.
3. Traditional Texture with Flash.
4. Velour Texture with Flash.
5. Ironspot.

D. Thin Brick Color:

1. #101 – Commons.
2. #105 – Fieldstone.
3. #107 – Parkway.
4. #108 – Brownstone.
5. #205 – Marketplace.
6. #220 – Courtyard.
7. #310 - Main Street.
8. #320 - Schoolhouse Red.
9. #505 – Monument.
10. #507 – Empire.
11. #151 - Commons Flashed.
12. #155 - Fieldstone Flashed.
13. #255 - Marketplace Flashed.
14. #250 - Courtyard Flashed.
15. #365 - Schoolhouse Red Flashed.
16. #350 - Main Street Flashed.
17. #458 - Brownstone Flashed.
18. Blend:
 - 60% - 350 Main Street Flashed.
 - 20% - 250 Courtyard Flashed.
 - 20% - 458 Brownstone Flashed.
19. Blend:
 - 50% - 250 Courtyard Flashed.
 - 50% - 255 Marketplace Flashed.
20. Blend:
 - 60% - 155 Fieldstone Flashed.
 - 40% - 107 Parkway.
21. Blend:

80% - 458 Brownstone Flashed.

20% - 250 Courtyard Flashed.

2.6 THIN BRICK PRODUCT

A. Manufacturer: Summitville Tile Co.

B. Thin Brick Size: Thin Brick is 2-1/4 inches by 7-5/8 inches by 9/16 inch (57 mm by 194 mm by 14 mm)..

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1. Modular Corner: 9/16 inch by 2-1/4 inches by 7-5/8 inches / 3-5/8 inches (14 mm by 57 mm by 194 mm).

2. Modular Corner: 1 inch by 2-1/4 inches by 7-5/8 inches / 3-5/8 inches (25 mm by 57 mm by 194 mm).

3. Edge Cap: 9/16 inch by 2-1/4 inches by 7-5/8 inches by 3-5/8 inches (14 mm by 57 mm by 194 mm by 92 mm).

4. Edge Cap Corner (Left and Right): 9/16 inch by 2-1/4 inches by 7-5/8 inches by 3-5/8 inches (14 mm by 57 mm by 194 mm by 92 mm).

C. Thin Brick Color:

1. #10 - Summitville Red.

2. #14 – Alexandria.

3. #15 – Providence.

4. #16 – Plymouth.

5. #17 – Yorktown.

6. #19 - New Amsterdam.

7. #21 – Raleigh.

8. #24 – Boston.

9. #26 – Savannah.

10. #27 – Georgetown.

11. #94 – Colony.

12. #95 - New Bedford.

13. #97 - Valley Forge.

14. #96 – Williamstown.

15. Landmark Series 01012 – Dungannon.

16. Landmark Series 01009 – Elkton.

17. Landmark Series 01024 – Fredericktown.

18. Landmark Series 01034 – Hanover.

19. Landmark Series 01006 - Olde Salem.

2.7 ACCESSORIES

A. Acceptable Thin brick coating selections for pre-cast or tilt-up concrete applications:

1. Thin brick shall be waxed sufficiently on face to be exposed to prevent adhesion by concrete/mortar.

2. Clean with 200 degree F (93 degrees C). low pressure cleaner using water. Some acid based cleaners may damage grout joints. If necessary to use, test a small area first. Wet with clean water before applying any acid cleaner. Do not use any product containing Hydrofluoric acid, as it will attack both grout and bricks unless specified by the architect.

3. NoxCrete brick coating can be applied to each brick face to facilitate the easy pressure wash cleaning of the cast brick surface.

4. Master Builder's X-Poz-r retarder is an acceptable substitute.

2.8 FABRICATION

A. Inlay Installation Tolerances:

1. Variation in alignment of horizontal or vertical mortar joints maximum 1/4 inch (6 mm) in 10 feet (3 m), non-cumulative.

Maximum offset in plane of adjacent form liner units: 1/16 inch (1.6 mm).

Maximum misalignment between adjacent form liner units: 3/64 inch (1.2 mm).

B. Install brick in accordance with manufacturer's printed installation instructions.

1. Clean brick pockets free of foreign material.

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2. Install in accordance with manufacturer's printed installation instructions.

C. Form, cast, strip and cure concrete per requirements of sections referenced.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until supporting structures have been properly prepared.

B. If support structure is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 INSTALLATION

A. Form-Liner Finish: Cast panel over form liners placed, secured, and sealed over casting slab to produce a textured surface free of pockets, streaks, and honeycombs. Produce a surface appearance of uniform color and texture.

B. Field erect panels in accordance with manufacturer's instructions and Project requirements. Refer to related specification sections for field installation requirements.

3.3 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION