

PCI Standard for Thin Brick

The objective of this standard is to outline material standards and specification criteria for brick manufacturers to meet when supplying materials to precast concrete manufacturers. The intent is to establish acceptable dimensional tolerances and consistent testing standards for brick embedded in precast concrete systems. The brick manufacturers must confirm through the provision of independent test results that their brick products comply with the PCI Standard. The PCI Standard should appear in all specifications as the new approved industry standard. Brick manufacturers have agreed to promote the compliance of their brick with the new PCI Standard.

The following parameters have been established based on the successful use of embedded brick in precast concrete projects. The parameters set forth for use in these proposed standards are attainable brick properties that have been derived with input from brick manufacturers, precasters, engineers, and architects as well as consideration of existing test results.

- A. Thin Brick Units: PCI Standard, not less than 1/2 inch (13mm) nor more than 1 inch (25mm) thick with an overall tolerance of plus 0 inches, minus 1/16 inch (+0mm, -1.6mm) for any unit dimension 8 inches (203mm) or less and an overall tolerance of plus 0 inches, minus 3/32 inches (+0mm, -2.4mm) for any unit dimension greater than 8 inches (203mm) measured according to ASTM C67.
1. Face Size: Modular, 2-1/4 inches (57mm) high by 7-5/8 inches (194mm) long.
 2. Face Size: Norman, 2-1/4 inches (57mm) high by 11-5/8 inches (295mm) long.
 3. Face Size: Closure Modular, 3-5/8 inches (92mm) high by 7-5/8 inches (194mm) long.
 4. Face Size: Utility, 3-5/8 inches (92mm) high by 11-5/8 inches (295mm) long.
 5. Face Size, Color and Texture: **[Match Architect's approved samples] [Match existing adjacent brickwork].**
a.<Insert information on existing brick if known.>
 6. Face Size: Metric modular, 57mm high by 190mm long.
 7. Face Size: Metric Norman, 57mm high by 290mm long.
 8. Face Size: Metric Closure, 90mm high by 190mm long.
 9. Face Size: Metric Utility, 90mm high by 290mm long.
 10. Special Shapes: Include corners, edge corners, and end edge corners.
 11. Cold Water Absorption at 24 hours: Maximum 6 percent when tested per ASTM C 67.
 12. Efflorescence: Provide brick that has been tested according to ASTM C 67 and rated "not effloresced."
 13. Out of Square: Plus or minus 1/16 inch (+/-1.6mm) measured according to ASTM C67.
 14. Warpage: Consistent plane of plus 0 inches, minus 1/16 inch (+0, -1.6mm).
 15. Variation of Shape from Specified Angle: Plus or minus 1 degree.
 16. Tensile Bond Strength: Not less than 150 psi (1.0MPa) when tested per modified ASTM E488. Epoxy steel plate with welded rod on a single brick face for each test.
 17. Freeze-Thaw Resistance: No detectable deterioration (spalling, cracking, or chafing) when tested in accordance with ASTM C666 Method B modified to withstand 300 cycles.
 18. Modulus of Rupture: Not less than 250 psi (1.7 MPa) when tested in accordance with ASTM C67.
 19. Chemical Resistance: Provide brick that has been tested according to ASTM C650 and rated "not affected."
 20. Surface Coloring: Brick with surface coloring shall withstand 50 cycles of freezing and thawing per ASTM C 67 with no observable difference in applied finish when viewed from 10 feet (3m).
 21. Back Surface Texture: **[Scored], [Combed], [Wire roughened], [Ribbed], [Keybacked], [Dovetailed]**

Test sample size and configuration shall conform to the following parameters in order to validate compliance by brick manufacturer with PCI Standard for use in embedded brick precast concrete systems:

- 1- Minimum number of tests specimens: Comply with appropriate specifications except for freeze-thaw and tensile bond strength tests on assembled systems.
- 2- Minimum number of test specimens for freeze-thaw and tensile bond strength test: Two (2) assembled systems measuring 12 x 32 inches (300 x 810mm) long with the brick embedded into the concrete substrate (assembled system), and then saw cut into two equal specimens, Sample A and Sample B, each 12 x 16 inches (300 x 405mm). The precast concrete substrate shall have a minimum thickness of 2-1/2 inches (63mm) plus the embedded brick thickness. The precast concrete shall have a minimum compressive strength of 5000 psi (34.5 MPa) and 4 to 6% entrained air. The embedded brick coursing pattern for testing purposes shall be modular size brick on half running bond pattern with a formed raked joint geometry of 3/8 inches (9mm) wide and a depth no greater than 1/4 inch (6mm) from the exterior face of brick. Five brick on each Sample A shall be tested for tensile bond strength, Item #16. Five brick on each Sample B shall be tested for freeze thaw resistance, Item #17 and then tensile bond strength, Item #16.