



PCI Standard for Architectural Terra Cotta

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

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

- A. Terra Cotta Units: PCI Standard, not less than 3/4 in. nor more than 1 1/2 in. thick surface to be embedded.
 1. Size- Dimensional Tolerances:
 - a. Width: ----- Plus or minus 0.039 in. for any length up to 60 in.
 - b. Height:----- Plus or minus 0.0625 in. up to 10 in.
----- Plus or minus 0.09375 in. up to 15 in.
----- Plus or minus 0.125 in. up to 20 in.
----- Plus or minus 0.15625 in. up to 24 in.
 - c. Thickness:-- Plus or minus 0.0625 in.
 2. Color and Texture: **[Match Architect's approved samples].**
[Match existing adjacent terra cotta]
 - a. **<Insert information on existing terra cotta if known>**
 3. Special Shapes: Include corners, edge corners, and end edge corners.
 4. Cold Water Absorption at 24 hours: Maximum 7.5% when tested in accordance with ASTM C 67.
 5. Efflorescence: Rated "not effloresced" when tested in accordance with ASTM C 67.
 6. Out of Square: Plus or minus 1/16 in. when measured in accordance with ASTM C 67.
 7. WarpageTolerances:
 - a. Straightness (sweep) ----- Plus or minus 0.025% of length
 - b. Diagonal Flatness ----- Plus or minus 0.25% of diagonal
 - c. Vertical Flatness ----- Plus or minus 1.0% of height
 8. Variation of Shape from Specified Angle: Plus or minus 1 degree.

9. Tensile Bond Strength: Not less than 150 psi, before and after freeze-thaw testing, when tested in accordance with modified ASTM E 488. Epoxy steel plate with welded rod on total terra cotta surface for each test.
 10. Freeze - Thaw Resistance: No detectable deterioration (spalling, cracking, or chafing) after 300 cycles when tested in accordance with ASTM C 666 Method A or B.
 11. Modulus of Rupture: Not less than 1400 psi when tested in accordance with ASTM C 67.
 12. Compressive Strength: Not less than 6000 psi when tested in accordance with ASTM C 67.
 13. Chemical Resistance: Rated "not affected" when tested in accordance with ASTM C 126.
 14. Glaze Resistance to Crazeing: Rated "not affected" when tested in accordance with ASTM C 126.
 15. Back Surface: Dovetail
- B. Test sample size and configuration shall conform to the following parameters in order to validate compliance by terra cotta manufacturer with PCI Standard for use in embedded terra cotta precast concrete systems:
1. Minimum number of test 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: Ten (10) assembled systems measuring 18 in. x 10 in. long with a 16 in. x 8 in. piece of terra cotta embedded into the concrete substrate (assembled system). Note the piece of terra cotta shall have a dovetail back surface geometry. The ten (10) assembled systems are divided into 5 Sample **A** assemblies and 5 Sample **B** assemblies. The precast concrete substrates shall have a minimum thickness of 2 ½ in. plus an embedded maximum 1 ½ in. thick piece of terra cotta. The precast concrete shall have a minimum compressive strength of at least 5000 psi and 4% to 6% entrained air. The 16 in. x 8 in. embedded terra cotta piece shall be centered in the 18 in. x 10 in. sample.

The terra cotta unit from the center of each Sample **A** assembly shall be tested for tensile bond strength in accordance with Item #9. In place of anchor specified in ASTM E488, use 3/4 in. minimum thickness steel plate of same size as single terra cotta unit bonded with epoxy (conforming to ASTM C 881, Type IV, Grade 3) to entire terra cotta unit for each tensile bond strength test. The steel plate shall have a centrally located pull-rod welded to the plate. Each Sample **B** assembly shall first be tested for freeze-thaw resistance in accordance with Item #10 and then the terra cotta unit from the center of each Sample **B** assembly shall be tested for tensile bond strength, Item #9.