



## Tile Testing – What it Means for You

The Tile Council Product Performance Testing Laboratory offers a variety of testing for both tile and tile installation materials. There are a few tests that examine the basic properties of ceramic materials and provide some insight into the performance of ceramic tile and related setting materials. Test results can be used to show compliance with a given standard, to evaluate a certain physical property, or to gain information about performance in a specific application. For this Q&A, I will describe one of those common tests and what it represents in the real world.

It is important to remember that in the United States compliance with a manufacturing standard for ceramic tile is voluntary. If a product does not state compliance with a given standard, then there is no guarantee of performance with respect to any standard. On the other hand, products that indicate they meet a certain specification must actually meet that specification. It is important to note that if a design specification calls for a tile to meet a certain standard, then only products indicating that they meet that standard should be selected for the job.

### How is water absorption measured and what does it mean?

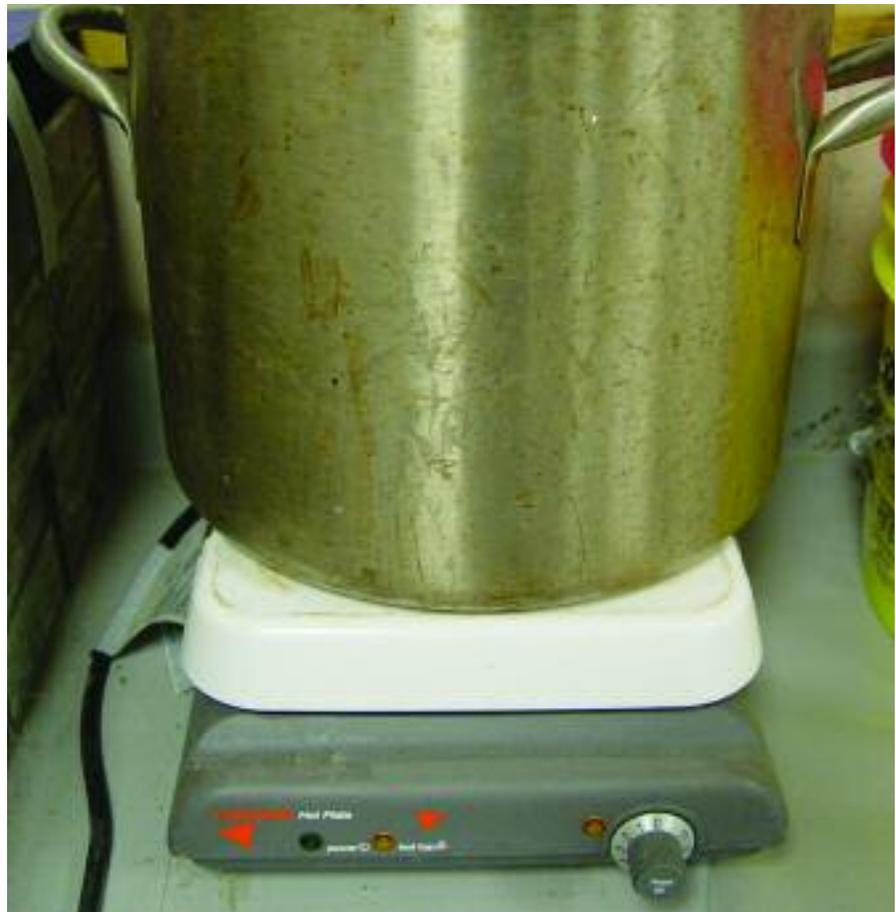
Water absorption is one of the most important properties of a ceramic tile. Water absorption is defined as the amount of water that a tile will absorb when subjected to given conditions. The water

absorption of a ceramic tile can be measured by ASTM C373 or ISO 10545-3. Both tests are conducted by boiling the tile in water (ISO also includes a vacuum test) and measuring the weight gain after a specified amount of time.

Along with a direct correlation to density, the water absorption of a ceramic tile

will directly affect the way a tile absorbs moisture from the setting material and thus the bond that is established. Extremely high or low water absorption may necessitate the need for specific bonding materials or specific substrate preparation. For example, when setting tiles with a water absorption over ten percent, it is especially important to make sure that the mortar bed, backerboard, or plywood be sufficiently moist that the tile does not dry the moisture out of the thin-set before it properly cures. On the other end of the spectrum, many manufacturers provide mortars that are designed to improve adhesion

**Below: Apparatus for testing water absorption.**



to porcelain tiles which have a water absorption measurement of 0.5 percent or less. The manufacturers of both the tile and setting materials should always be consulted as to the appropriate products for a given application.

Tiles made specifically for the wall are

often designed with a higher water absorption and lower breaking strength, therefore care should be taken if attempting to use these tiles on the floor. In addition, tiles which are highly water absorbent may not be suitable for freeze-thaw conditions due to an increased level of moisture which may

expand during cold weather and cause damage to the tile. Only the manufacturer of the tile can state whether or not the product is approved for freeze-thaw conditions.

As with everything, choosing the right products for the job is crucial to the long-term success of any installation.



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### What other tests are available to evaluate ceramic tile?

There are many other tests that are used to evaluate ceramic tile. Some tests have requirements that manufacturers claiming compliance must achieve, and others are used to gain information about performance of the product, but have no set criteria. Other tests that are frequently used include, but are not limited to, dimensional analysis, chemical resistance, stain resistance, freeze-thaw cycling, abrasion resistance (glazed and unglazed), scratch hardness, moisture expansion, and coefficient of friction.

Standards for ceramic tile and ceramic tile installation can be obtained from ASTM (test methods for tile), ANSI (specifications for tile and installation materials), ISO (international methods and specifications for tile and installation materials), and the Tile Council of North America, Inc. (TCA Handbook for Ceramic Tile Installation and ANSI standards). **TILE**

### About the Author



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Noah Chitty, Director of Product Standards and Laboratory Services, is a ceramic engineer with the Tile Council of North America, Inc. TCA is a publisher of the American National Standards Institute's (ANSI) Specifications for the Installation of Ceramic Tile and the TCA Handbook for Ceramic Tile Installation, the industry's guidelines for ceramic tile installation.

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