



## New tile manufacturing standard reflects modern market trends and tile testing

**W**ith approval by the American National Standards Institute (ANSI) all but complete, our industry awaits implementation of the revised ANSI A137.1 tile manufacturing standard, which better addresses the way ceramic tile is manufactured, categorized

and sold in the United States today. The long-awaited changes to the twenty-year-old A137.1 standard have already been passed by the Accredited Standards Committee on Ceramic Tile A108, a group of experts representing all segments of the industry. Upon ANSI approval, the

industry benefits from a standard that more accurately conveys “what’s in the box,” or what should be. The first in a three-part series, this article provides an introduction to the standard and its purposes. Subsequent articles will cover technical aspects more specifically.

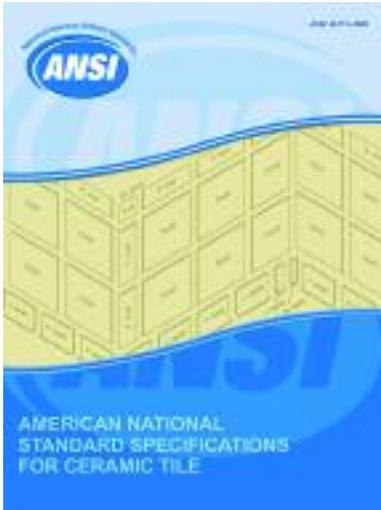
### What is ANSI A137.1?

The ANSI A137.1 standard defines various tile types and the performance, under various tests, that can be expected. To do this, the standard also specifies the tests used to measure performance and the number of tiles required for each test.

For example, it’s important to know how well the glaze of a floor tile will perform. Can it stand up to the heavy traffic of an airport? Or should it only be used in a resi-

**Table 4: Test Classification**

Destructive		Non-Destructive	
Property	Method	Property	Method
Bond Strength	ASTM C482	Coefficient of Friction	ASTM C1028
Breaking Strength	ASTM C648	Color Uniformity	ASTM C609 and Section 9.3
Chemical Resistance	ASTM C650	Facial Dimensions	ASTM C499
Crazing Resistance	ASTM C424	Mounting	Section 9.5
Deep Abrasion	ASTM C1243	Evaluation of Shade Value	Section 9.4
Stain Resistance	ASTM C1378	Thickness	ASTM C499
Visual Abrasion Resistance	ASTM C1027	Evaluation for Facial and Structural Defects	Sections 9.1 and 9.2
Thermal Shock Resistance	ASTM C484	Warpage	ASTM C485
Moisture Expansion	ASTM C370	Wedging	ASTM C502
Thermal Expansion	ASTM C372		
Water Absorption	ASTM C373		
Resistance to Freeze/Thaw Cycling	ASTM C1026		



inch to 3/8 inch thick (6.35 mm – 9.53 mm) and having a facial area of less than 9 square inches. Such tiles are usually mounted in sheets or strips with other mosaic tiles.

**Pressed floor tile:** Floor tile manufactured by having the body of the tile formed by pressing. Has a facial area of

at least 9 square inches.

**Porcelain tile:** a ceramic tile that has a water absorption of 0.5% or less, as measured by ASTM C373, that is generally made by the pressed or extruded method. Does not include materials with very little or no crystallinity, such as glass tile.

dential application? By testing the glaze, a maximum service recommendation with regard to expected traffic can be determined. The A137.1 standard requires that tile glaze be tested using test method ASTM C1027. This test involves subjecting test tiles to abrasives that are “swirled” around on their surface. The number of cycles that a glaze withstands without showing wear determines its glaze wear rating (O – V). This provides a means for consumers to easily compare an aspect of performance among many tiles by many manufacturers. This glaze wear rating is often inaccurately referred to as the PEI rating.

#### **How many tile tests are included in A137.1?**

There are 12 destructive tests and 9 non-destructive tests. (See Table 4)

#### **What tile types are defined in the proposed standard?**

There are five: quarry tile, glazed wall tile, ceramic mosaic tile, pressed floor tile and porcelain tile. They are defined as follows:

**Quarry tile:** glazed or unglazed tile made by the extrusion process from natural clay or shale

**Glazed wall tile:** A glazed tile with a body that is suitable for interior use and which is usually non-vitreous, and is not required nor expected to withstand excessive impact or be subjected to freezing and thawing conditions.

**Ceramic mosaic tile:** Tile, usually 1/4

Each tile type has its own set of performance testing requirements that must be met in order to be labeled “A137.1.” For example, glazed wall tile must have an average breaking strength of at least 125 lbf (pounds of force), with no tile in the tested sample set breaking under less than 100 lbf. Because they may be used on floors, all other tile types must have an average breaking strength of at least 250 lbf, with no tile in the sample breaking under less than 225 lbf.

The old A137.1 standard defined four tile types. Pressed floor tile and porcelain tile previously fell into the single category “paver tile.” Now, “paver tile” is only to be used as a general term for floor tile, not in reference to a specific category of tile with defined characteristics and performance requirements.

### How many tiles are tested?

The number of tiles that must be tested is determined by the test method and the sampling plan referenced in the standard. The sampling plan is based on the Normal Sampling Plan, Level 2, at a 2.5% AQL, per ANSI/ASQ Z1.4-2003. This is a sampling guideline that provides the number of samples that should be tested, based on the size of a shipment or “lot.” It also provides the number of samples that may fail a test with the lot still considered acceptable.

For example, if 2 boxes of tile were ordered for a backsplash, with each box containing 50 tiles, the lot would be 100 tiles. The Level 2 sampling plan requires that, for a lot containing 100 tiles, 20 tiles must be tested. Out of these 20 tiles, one of them may fail a test and the lot would still be considered acceptable. If two tiles failed, the lot would be rejected.

This example illustrates how statistics are applied to tile testing to ensure tile shipments contain no more than 2.5% imperfect tile. Although this allowance is quite stringent, it’s still important for estimators, purchasers, consumers and installers to be aware that a few tiles in a lot would not have to meet all aspects of performance defined in the A137.1 standard for the lot to be acceptable. Where the defects are in the facial appearance, the installer would be expected to notice the defect and not use the tile, or the part of the tile with the defect. **TILE**



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### About the Author

Stephanie Samulski is an instructor at the Ceramic Tile Education Foundation (CTEF) and a project manager for the Tile Council of North America (TCNA). She entered the tile trade in 1999 as an apprentice with the Bricklayers and Allied

Craftworkers (BAC) Local 32 in Detroit, and she went on to install tile as an independent contractor. Ms. Samulski received her BA in Journalism from Wayne State University.