



## With Two Standards for Tile Mortar, Everyone's a Winner

Standards are authoritative. They give us a means for testing and evaluating. They set out rules to define what is normal, what meets expectations and what doesn't. ANSI and ISO standards and testing for tile setting mortars are two halves of a puzzle for the tiling industry—two halves that can help us get a better synthesized picture of what is going on underneath all of those tiles being laid everyday around the country.

And yet, how can we have two standards for the same thing? The answer lies in multiple perspectives, and sometimes two perspectives are better than one, just like heads.

### What's the history behind these standards?

A working draft of the ISO standard for tile setting mortars, 13007, was finalized with the help of ANSI committee participants early in the year 2000. The standard was important as the tile market grew transnationally. As the ISO standard was being developed internationally, the United States largely continued to use the domestically

developed ANSI standards, parts of which were drafted nearly fifty years ago and have been regularly updated. The ANSI standards, which for tile setting mortars are 118.1, 118.3, 118.4, 118.5,

118.8, 118.11 and 136.1, have been the main way Americans have understood tile setting mortars for a long time now. In the 2011 TCA Handbook, the ISO standards will be placed alongside the customary ANSI standards for the first time. So, it's important to understand what those specifications mean as they become more widely used and specified for tile setting mortars.

In case you're unfamiliar with the ISO standard, according to the ISO website, it's pronounced "iso" not "I-S-O." ISO isn't an acronym because it has to be used by multiple countries around the world, all of whom speak different languages. Instead, ISO is the Greek word for

### Here is a simplified breakdown of the various specification labels you might see under the ISO classification system:

- C=Cementitious (related to, but not the same as, ANSI 118.1, 118.4, 118.11)
- D=Dispersions or Mastics (related to, but not the same as, ANSI 136.1)
- R=Reaction Resins or Epoxies and Urethanes (related to ANSI 118.3, except 118.3 does not include urethanes)

Each of these will have a 1 or a 2 after it determining its bond strength to a concrete block.

1 denotes normal adhesion, and a 2 signifies an improved adhesion.

Additional Characteristics appear as follows:

- E=Extended Open Time
- F=Fast Setting
  - P (1 or 2) = for Plywood Bond Strength
  - S (1 or 2) = for Deformability or Flexibility
- T=Thixotropic (where the mortar resists sagging in vertical installations)

For more information and detailed criteria, go to [www.tileusa.com/ISOSpecs.pdf](http://www.tileusa.com/ISOSpecs.pdf).

Right: Table 1: ISO Classification System

“equal,” which essentially embodies the goal of the International Organization for Standardization, to make all things equal for international businesses to function well across boundary lines. If Italy and China and the United States are all running the same tests on tile setting mortars, we can all get a better sense of the tile setting technologies that are developing on an international scale.

### What do the two sets of standards involve?

Both sets of specifications test to evaluate cementitious, dispersion, and resin based tile setting systems. Both standards use tests involving destructive mechanical analysis of the mortar, but in two distinct, but overlapping approaches. Additionally, both sets look at aspects of open time, sag resistance, and flexural strengths of mortars, albeit with slight differences. While there are a few differences between the two sets of standards, one central point is the different way in which the tests specified in the standards evaluate the bond strength of tile setting mortars. The ISO tests make tensile measurements while the ANSI tests make shear measurements. More specifically, a tensile test pulls the tile vertically from the substrate and a shear test pushes the tile sideways off the substrate. Both measurements give good, but different, insights into how well the tile is bonded to the substrate.

For bond strength, the ISO standard specifies that the force to pull off a tile under a variety of curing conditions should be 0.5 MPa (approximately 72 psi) to earn a 1 rating and 1 MPa (approximately 145 psi) to earn a 2 rating. Meanwhile, the ANSI standard tests the resistance to shear, also under a variety of curing conditions, with typical values of 100 to 300 psi being required depending on the parameters of the tests.

Under the ISO system, letters and numbers are assigned to the tile-setting mortars based on their performance. For example, a C2S2P1E mortar is a cement-based mortar that has improved bond strength over concrete, improved

deformability, normal plywood adhesion, and extended open time.

### What's the end result of having two sets of standards?

These standards offer two different paradigms from which to view a tile setting mortar and an understanding of the different levels of performance that may be achieved among the wide range of tile setting mortars available.

Strangely enough, a standard is also another name for a flag that is carried into battle. Rather than thinking of these as two competing systems meeting on the battlefield of the US tile industry, we might think of them as partners in revealing the intricacies of how tile can be bonded, a Sherlock and Watson, a Batman and Robin.

In the end, this isn't a rivalry. It's synergy. **TILE**



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### About the Author

Jimmy Butts is a contracted technical specialist for the Tile Council of North America and

has been working with different aspects of the tile industry for over six years. He has written and developed technical documents for private and public laboratories, and has researched and developed various tile products for end users. He is also currently working on his Ph.D. in Communications at Clemson University.