

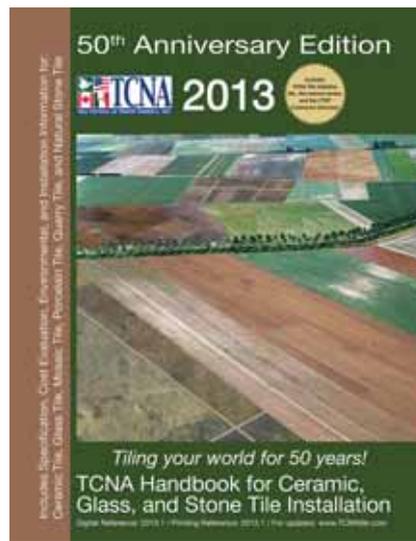
2013 TCNA Handbook addresses concrete slabs that don't measure up

For a flat tile installation with minimal lippage, a flat substrate is required beneath, especially true for larger tiles. With tiles getting ever larger and larger, substrate flatness has become an increasingly important consideration, particularly for tile contractors, who by necessity bid on jobs without knowing how flat the substrate they will inherit will be.

by Stephanie Samulski

The vast majority of commercial tile installations, and a significant percentage of residential ones, are bonded directly to concrete slabs. This means when concrete workers are finishing slabs slated for tile, they're forming the tile installers' substrate. The flatness of these slabs — the concrete installer's workmanship, effectively — can be measured in different ways. Herein lies the challenge for design professionals, general contractors, and concrete and tile contractors. Concrete industry requirements for slab flatness differ from tile industry requirements. Many slabs that meet the former don't meet the latter, and specifications typically don't call out which trade is responsible for bringing the concrete into tolerance with tile industry flatness requirements, tolerances that are in place in order for the tile contractor to be able to provide a flat installation.

Specifications for concrete generally call for flatness to be measured per ASTM E1155, a test method by which many points of a slab are measured, with the values indicating how much higher or lower each individual point is from an established reference point. Each measurement is plugged into a formula to determine the slab's overall floor flatness or its F_F . Because its F_F number



The new *Handbook* section on concrete flatness called "Measuring Concrete Flatness: F-Numbers vs. the Straightedge Method" can be found in the Field and Installation Requirements Guide.

is an average, individual areas of the concrete may not be flat at all, as long as the high spots balance out the low spots enough to achieve the required F_F , which is specified based on the intended use of the area.

Typically an F_F of 35 is specified where ceramic tile will be directly bonded to the slab. For the tile contractor, the high and low spots on a slab meeting

F_F 35 are the problem areas, the severity of which is directly proportionate to the size of the tile. Additional issues compound the problem for the tile contractor. The required F_F applies only to individual sections of a slab, and per the test method, measurements for a given section are taken on one side of construction and isolation joints only. That is to say, the measurements and resulting F_F for a slab section on one side of a construction or isolation joint are not compared to nor required to bear any particular relationship with the adjacent section of the slab. Yet ceramic tile is often expected to continue across such joints seamlessly, a sticky wicket if slab sections finish at different heights.

Now factor in two additional issues: Measurements are not taken in the very places where the most curling of the slab will occur: at column block-outs, the perimeter, and at construction and isolation joints. And, the measurements are taken within a few days of concrete placement, when the slab is at its flattest, a very different slab than that which the tile contractor inherits. To be fair, many of these issues, although they manifest as problems for the tile contractor, make sense when looked at in context. The shrinkage and curling of a slab has little if anything to do with the workers who placed it. The raw materials used, the

concrete mix and Mother Nature are the true culprits. So it makes sense, when measuring concrete flatness, to eliminate what is outside the concrete contractor's sphere of influence.

But fast forward a few months. The tile contractor arrives on the jobsite, checking the floor by placing a 10-foot straightedge on randomly chosen spots. This is not so much an assessment of the concrete installer's workmanship, but rather an evaluation of whether the floor is suitably flat to receive tile. If large tiles are on order, the tile contractor is likely to check more areas and more carefully. Knowing where the worst offenders lie, the seasoned contractor will thoroughly evaluate flatness at construction and isolation joints, column block-outs and the perimeter. For larger tiles, the floor is allowed 1/8 inch of variation in 10 feet; for smaller tiles, 1/4 inch is allowed in 10 feet. Anyplace with more than that is out of tolerance for the tile contractor and something must be done to bring the floor into tolerance so the tile can be installed flat and without excessive lippage.

The concrete contractor could come back to grind down high spots. The tile contractor could grind and patch individual areas, or pour self-leveler over the whole area. But neither contractor is likely to be planning on doing so if their scope of work, and as such their bids, didn't include it. This quandary regularly leads to jobsite disputes and change orders. Considering the steadfast popularity of large tiles, the need has escalated for specification writers to solve the dilemma on paper in advance.

New language in the *2013 Handbook* requires that specifications provide "a bid allowance for any necessary floor preparation needed to bring the floor into tolerance for tile." Otherwise, it says, the tile contractor can assume the floor will meet them. It's imperative that specifiers and general contractors understand the consequence of ignoring this requirement: nullification of what are arguably the most important tile workmanship standards from an



For thin-bed installations, installers check for variations in concrete with a straightedge. Although a slab may meet the flatness tolerances called out in the concrete portion of the specification, it may not be flat enough for a ceramic tile installation, particularly if large tiles are chosen.

aesthetics point-of-view. "Industry standards for tile finish flatness and lippage do not apply if the project owner does not provide a substrate that meets required flatness tolerances for tile or authorize the tile contractor to correct substrate flatness issues."

This new section of the *Handbook* speaks to the need for project specifications to address contradictions that will inherently exist when referencing standards and requirements from multiple sources. While each industry or trade must supply the specialized information needed to specify quality output within their field, the well-crafted job spec includes realistic solutions for known areas of incongruence, to yield a win-win for all. The tile contractor can include what is needed in the bid package, rather than submit a bare bones bid to get a job, knowing a battle lies ahead over

a change order request. The general contractor's budget and schedules can be more accurate and a jobsite glitch avoided; and the design firm can deliver on the fabulous installation the owner is expecting. **TILE**

ABOUT THE AUTHOR



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