



## Lighting Lessons for Tile

By Dave Gobis

Anyone who has installed a few square miles of tile can no doubt teach others some lighting lessons about ceramic tile. Those with less experience typically give little if any consideration to the critical effects of lighting on ceramic tile. I was not very far along on my career path doing commercial tile work before I learned to look at the lighting plan on every single project I bid. Anytime I saw wall-washed lighting, where the fixture was set in the cove of the ceiling shining directly down the wall for that subtle design element, I knew a “discussion” about the inferior quality of the tile or workmanship was probable. Fortunately in most cases, (as a matter of fact only once I can recall in nearly 30

years), the claim was without merit. While not a new problem, with the larger size tile being used today, we are increasingly hearing this same complaint about floors when exposed to natural lighting. So let’s delve into the issue and explore why it happens and how to prevent it.

This may come as a surprise to some but all tile is warped to some degree. Yes, it is true, there is no such thing as a perfectly flat tile, even polished tile. It is also true that all tile varies in size. Most ceramic tile made today is manufactured by the dust-press process. This is a process where relatively dry clay and other minerals are mixed together and compressed under high pressure. The resulting tile product is called *greenware*. At this stage, the tile is

both thicker and larger than it will be after firing in a kiln. Tile shrinks to size as it is fired. Warpage and shrinkage are one of the inherent characteristics of the firing process when the tile body is fused together. This can be influenced by many things such as the content of the tile body or the firing curve of the kiln that has both high spots and low spots like a sheet of music. Shrinkage of the tile during the firing process can be anywhere from 5- to 8-percent on average.

### New Technology

Today’s large tile is made possible by knowledge and technology that did not exist 20 or 30 years ago. The biggest problem to overcome in producing today’s most popular types of tile was warpage and size variation. An improvement in ceramic engineering, manufacturing, and automa-

tion of product quality inspection now allows manufactures to ship tile in tightly controlled lots or “calibers” within specified performance parameters.

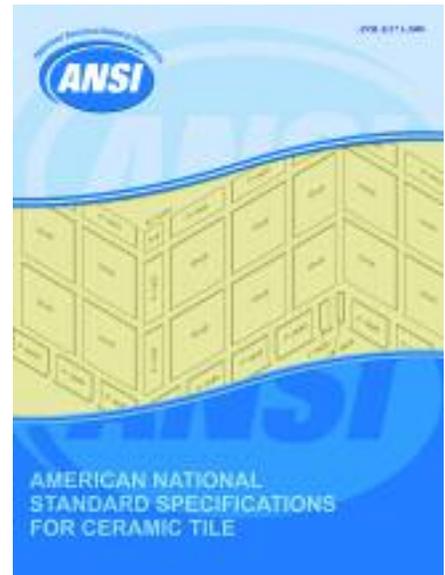
And what about these performance parameters? Who sets them and when do they apply? In the United States, we use American National Standards created by the American National Standards Institute for ceramic tile. The recently revised tile product document is American National Standard Specifications for Ceramic Tile ANSI A137.1.

There are also International Standards for tile that originates in other countries published by the International Standards Organization, ISO 13006. Both of these standards are similar and in some cases use the same test equipment with some minor variations in testing equipment and

**Light placed parallel or on sharp angles with a tile surface places a tile’s natural properties in a critical position. Lighting placed near a wall at a lesser angle does not have the same effect. Photo courtesy of Courtesy of Mapei Corp.**

performance requirements. Why even mention standards? Unless a tile is purchased and installed as meeting standards, then the manufacturer and installer may set their own standards. There is no requirement that any tile sold or installation method used must meet standards. If an issue does arise,

standards only apply if they are referenced as a requirement. Obviously this can change when you get in front of a Judge or 12 of your peers but hopefully if such an issue arises it will be resolved long before that point in time. If not, standards typically prevail whether or not they are referenced.



Recently, ceramic tile product standards have been revised. The changes are quite substantial and the new book (available at [www.tileusa.com](http://www.tileusa.com)) has tripled in size from the previous edition. If you sell or install tile, you need this book.

### Lighting Distortion, Shadows

Lighting can take the smallest variance in the tile surface and cast a large shadow. The severity of the shadow is determined by the angle of the light. Obviously the most critical view is seen when the light source washes straight down or across the surface of the tile installation. While installing the tile flat is always important, it is of much greater importance if the light will wash across the surface.

Even with perfect installation, some light distortion caused by the natural variation in the tile surface is inevitable. This is the effect that is often challenged by the end user and typically starts with an allegation of inferior workmanship. A savvy installer will be aware of lighting issues and point out that the tile has some variations that are amplified by the critical lighting. The end user then redirects their concerns to the manufacturer only to be told the tile is within tolerances. In most instances, both the installation and product are just fine. I was never big on placing undue stress in my business relationships by sending letters with all the typical concerns that come along in any construction project. However, as nearly every wall-wash lighting job I did generated a complaint, it caused me to modify my position when it



To get this floor perfectly flat and avoid shadowing required not only substantial floor preparation but careful selection of the tile product as well. Photo courtesy of Courtesy of Mapei Corp.

came to lighting (*and expansion joints*) sending out a personalized standard form letter noting the potential problem(s).

If that still proved inadequate to circumvent the complaint, then I would ask for an onsite meeting, cover the lighting and demonstrate the cause of their aesthetic concerns by concealing the offending lighting source. It can be resolved by moving

the light source 12- to 24-inches away from the wall, which will eliminate the problem. However, once the project is completed, this type of ~~demonstration~~ isn't feasible.

Natural light shining across a floor can also present problems. With larger size tile comes greater warpage. Recently, those limits were reduced under newly revised industry standards dependent on the type of tile used. Prior to that revision, the tolerances were much greater as they were given as a percentage with no cap in consideration of tile size. The new standards establish a maximum deviation — regardless of size.

The angle of natural sunlight can magnify naturally occurring, acceptable variations in ceramic tile as much, and if not

even more than, artificial lighting. I have had a few of those mysterious “you have to be here no later than 7:30 a.m.” with no further explanation phone calls only to find out once I had arrived that they could not see the problem after 8 a.m. because the sun had risen a little higher.

Coincidentally, as I was writing this article, I actually received an email describing this issue. Assuming the floor otherwise appears flat and on plane, it would be prudent to check if the lighting is the culprit. Explaining natural variation after the installation can be challenging. It really should take place during the sales process. Our sales force regularly referred to ceramic tile as *clay surfacing units* at various random points in the sales process to reduce the expectation of perfection in the product.

Color appearance of the tile itself can also be affected by lighting. Natural, white, and gray lighting can make tile appear as a completely different hue. My male eyes evidently do not possess the keen vision that

some of my female counterparts have in being able to detect two to three shades of variation possible under varied lighting conditions. One of my best salespersons was actually color blind so they had the safest response, take a sample home and view it in the lighting that it will be installed in. In installations where the same

tile extends from the floor up the wall, the change from vertical to horizontal will manifest itself by making the appearance of a close but apparently different color. Lighting does and certainly will make a contribution to shade variation in the tile as perceived by the human eye. It is now possible to quantify shading variations



Anyone recognize this? It is a wall at the Tram Platform in McCarran Airport, Las Vegas. It shows the affect of shadowing on a well-installed wall with wall-wash lighting.

under industry standards testing using a Light Reflective Spectrometer. This testing device will be used under newly published standards to establish maximum shade variation and will be used to determine acceptable variation in a given range.

Lighting does play an important part in the appearance of the finished project. Temporary lighting makes it very difficult to provide a satisfactory installation and provides the source for many complaints that could have been avoided. It is always recommended that permanent lighting be installed before the ceramic tile installation takes place. This allows the installer to understand the conditions and make every effort to provide an acceptable installation. You can't fix it if you can't see it. I have done more than my share of tile work using a single 100-watt bulb or some fancy halogen set-up and it just doesn't get it. We need light! **TILE**

### About the Author

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