

Installing Large-Format Ceramic Tile

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It doesn't make much difference what the installer thinks; consumers love it! As technology allows, ceramic tile continues to get bigger and the quality better. It's not very hard to understand why consumers love it; bigger tile, less grout, easier maintenance and some would even say it adds ambiance.

This is all very true. I remember when large unit tile, 12-by-12 at the time, first appeared with regularity 20 to 25 years ago. The salespeople were quick to sell the purchaser on the "cutting edge" of such fashionable quality material and how much easier the care of less grout would be. There was also a promised benefit for the installer, bigger meant faster installation and more money. On the other hand, the sales people on the floor would tell the consumer faster installation should be less costly, a quandary that still exists today in many minds. Anyone who has ever installed large tile can tell you it certainly isn't easier or less time consuming; if anything, the opposite is true. The bigger tile gets, the more difficult the installations have become. With 18-by-18 becoming the norm and 24-by-24 gaining ground, can 3-foot-by-3-foot or 4-foot-by-4-foot be far from coming? Surprise, they are already here.

Manufacturers have responded with many new products to aid in installation. We have new thinsets that are able to disperse more easily under the tile, more shrinkage resistant to compensate for the increased thickness of thinset sometimes required to "bed" the tile, and faster drying formulations to allow traffic. While installation products have kept pace with the bigger-is-better trend, unfortunately it has not brought on the change in techniques needed by many installers and those who provide the substrates.

Builders have not compensated for the flatter floors that such tile requires. Installers continue to use a swirl troweling technique providing poor coverage and trapping air under the tile to prevent good bonding. While other issues exist, those are the two most prominent challenges with large size tile. Let's look at a few ways we can meet those challenges.

When it comes to substrates, those who created the supporting surface, concrete, wood, or drywall are the ones responsible for their tolerances. Contrary to popular belief, tile industry recommendations for substrate tolerances are not established by the tile trade, they are established by substrate trade organizations. The Tile Council of America Handbook for Ceramic Tile Installation and the American National Standards for the Installation of Ceramic Tile (ANSI A108) rely on recommendations in published guidelines from the American Concrete Institute (ACI), The Gypsum Association, and the American Plywood Association (APA)/ Engineered Wood Association (EWS). Those organizations have established a generic tolerance of 1/4-inch in 10 feet for their surfaces.

Space limits my ability to elaborate at length about all the various other recommendations contained in these industry documents, but if you were ever wondering about how soon, how far apart, and how deep control joints should be, purchase a book from the American Concrete Institute. Likewise, if you were wondering what difference gluing plywood or OSB to the floor joist made on the nailing pattern of the subfloor, buy a book from the Engineered Wood Association. How close should the fasteners be in gypsum panels that are to receive tile in dry areas? The Gypsum Association's book, GA 216, can tell you. These books and those published by the Tile Council of America, contain minimum guidelines for acceptable installations of their products. The word minimum is key for this article. A tolerance of 1/4-inch in 10 feet would be great for an 8-inch-by-8-inch tile, may be acceptable for a 12-inch-by-12-inch tile, but it can be near impossible for an 18-inch-by-18-inch or larger tile.

Combing the thinset with parallel ridges and placing the tile perpendicular with a back and forth movement is one method of achieving good coverage.



Shown here are both the traditional and some new notch configurations. The newer notch designs have shown some very impressive coverage.

This suction cup available from several tool manufacturers is a real time saver for installing large tile.



In a perfect world, we would know ahead of time that we would be installing large tile and the more exacting tolerances of substrates needed could be specified in the home or building prior to construction. There is definitely a cost factor involved when trying to construct super flat surfaces of any material, so the appropriate price increase could be included in the bid.

But, unfortunately, we live in the real world. Those of us who make a living crawling on floors know that to get a surface even with a 1/4-inch in 10-foot tolerance is a real treat, much less the second part of that recommendation, which is “and no greater than a 1/16-inch variation in 3 feet.” Before we launch into how to deal with these issues, I would like to offer a comment. My own ignorance of other industry guidelines has cost me tens if not hundreds of thousands dollars over the years. Once I became educated in their recommendations, I started turning the dreaded subfloor prep into an income opportunity. I strongly urge you to familiarize yourself with written recommendations of other trades relative to floors so you too can turn disaster into income opportunity. Ok, back to the subject at hand. Let’s look at concrete first. Can you install large tile on a floor that is not flat? Sure; one of two things usually happens. Most common is the tile is not flat to the floor, leaving edges exposed and an esthetic nightmare that no customer is going to willingly pay for. Scenario two, if it is only a little bit flat, I will just add a little thinset under the tile. Lo and behold, we get to the other side of the room and the tile is 3/4-inch higher in the doorway than the other side of the room! Sound familiar? Sure, I have done it too, in my younger days. Time is a great teacher all by itself. If the floor needs to be flattened, flatten it before you start. The first product that comes to most minds is a self-leveler. These are fantastic products available from nearly all setting material manufacturers in formulations to use in virtually any circumstance. To reduce finger pointing should a problem occur, it would be wise to use a product from

the same manufacturer as the rest of your setting materials. Those products have been tested for compatibility with each other. Before you start to correct the substrate deficiencies, you should also consider the difference between flat and level. Flat is flat; if the floor is an inch higher on one side than the other, it can still be flat; we want flat! If you start pouring a self-leveler, you're going to have flat and level, a wonderful thing but somewhat expensive to do if you're just looking for flat. If all you need to do is take out a 1/4-inch high spot, you're going to use four times the material needed to do it. Think this through carefully before you decide on how to proceed. It may be appropriate just to do some spot repair in some instances.

The next big challenge in large tile is getting the appropriate amount of bonding material on the floor and transferred to the tile, permanently. This is where most problems lay: insufficient coverage or the wrong type of thinset. Here again, manufacturers have come to the plate trying their best to offer products for virtually every possible circumstance.

When using a self leveler you can use the "rake" shown here with an adjustable height feature once you have determined approximately what depth of fill will be required.



Those of you who haven't been around 30 or more years would find it impossible to truly appreciate the continuing advances here. When I started in the trade, we had dryset, which was unmodified thinset, a base-grade material that only stuck to cement substrates. Unsanded thinset to set on wet mortar beds was also common. Now we have Porcelain mortar, EGP (Exterior Grade Plywood) thinset, Rapid Set, Medium Bed thinset plus many others. The first step to success is to select proper thinset for application. If you are looking for a rapid-setting thinset for direct bond of porcelain tile to an exterior concrete deck, you have several concerns. Is the thinset stable in submerged applications (not all are), and does it contain enough of the right latex or polymer to keep the tile bonded in what is sure to be a wide variation of temperatures. If we were to install the same tile on an interior plywood deck, our needs change. Now we need a thinset with high bond strength and some flexibility that will properly cure as the plywood tries to draw all the water out of it.

Next comes selecting our metering device, more commonly known as a trowel. For many years, the acceptable thinbed method of installing large unit tile, anything over an 8-by-8, was to trowel the floor and back-butter each piece of tile.

This was an industry recommendation for many years and remains a sound method of installing large tile. In the mid '90s, research by the National Tile Contractors Association showed that using a U-notch trowel and combing all the ridges the same direction followed by placing the tile perpendicular to the ridges with a back and forth motion achieved the needed coverage without back-buttering. Talk to any old time installer and you will get some argument here. Applying thinset to the back of the tile is a good thing but very time consuming in today's competitive environment. Research has continued on ways to achieve good coverage with minimal effort. Some thinset manufacturers have made their thinsets more "flowable" for lack of a better term. To make them flow with water, as is commonly done, is a bad thing and often leaves thinset with very weak bond strengths. If the notches slump, it is too wet. Tool manufacturers have also stepped up their research in this area. Several have come up with some oddly appearing notch configurations with amazing differences in coverage when compared to a

conventional trowel. Personally, I have found these to be the simplest way yet to achieve good coverage under the tile. Whatever your choice of methods, there is no right or wrong as long as you get good coverage under the tile.

And finally, for this article, one other little offering on how to get big tile flat on the floor: buy a straight edge. I could not set any amount of tile without a 6-foot level, or my preference, a 10-foot straight edge.

Understandably, not everyone has a vehicle that can carry a 10-foot-long piece of anything, so you have to stick within your limitations. If you stay in this trade long enough, you will find all your tools and wet saws don't fit in the trunk or back of the minivan either. Your tools grow as you grow with the trade. If you are trying to explain your dilemma on a bumpy floor to a contactor or homeowner, there is nothing more visual that makes the point than a straight edge. They are also very helpful in keeping your rows straight and checking to make sure the tile is flat. Lasers are wonderful tools for layouts and determining the quantity of a self-leveler should you need one. They can make some good visual presentations on showing a floor out of level but remember, we want FLAT! Flat floors, good coverage with appropriate thinset, and proper movement accommodation is the recipe for a quality job using big tile.