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Guidelines for Ceramic Tile and Stone Tile Residential Installations

What to Look Out for When Using a Tile Installer

By

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The information contained in this document is meant to provide general guidelines for homeowners that hire a professional tile installer. It does not address all applications, situations or conditions. Always follow industry standards and manufacturers' recommendations for the tile and installation products that are being used.

Hiring the right installer is the difference between a delightful result and a nightmare. Most installers don't go to school to learn the trade, so even with good intentions, more often than not they don't understand the complexity of the work, and they don't know the *industry standards*. So as a homeowner you need to act as the quality control inspector, making sure that industry standards and manufacturers' instructions are followed. It's important that you do your homework and learn what's required to properly install a tile floor so it will last.

First, you should require that your tile installer is **ITS Verified**, and current, through the **University of Ceramic Tile and Stone (UofCTS)**. Their certificate expires annually so verify they are current by looking at their certificate. Your installer can take an online course called "**Tile Installer Thin-set Standards (ITS) Verification**" that will teach them the industry installation standards and methods for adhering ceramic tile, stone, glass tile, and other types of tile. This certificate doesn't guarantee the installer has the skill set or will do good work, but it verifies they took the course and demonstrated they learned and understood the standards. Information on taking the course is available at www.UofCTS.org.

Cost Estimate

In order to estimate the cost of tiling a floor in a residence using a legitimate professional tile installer, the numbers would work out something like this:

- \$2.00 to \$4.00 per sq. foot to remove existing floor and prepare for the tile.
- \$3.00 to \$10.00 per sq. foot to install new tile (depends on type of tile and application).
- \$3.00 to \$8.00 per sq. foot to purchase a good tile or stone.

So it will cost approximately \$9 to \$22 per square foot to remodel with tile using a professional installer. Of course the size of the area, type of tile, and how many days it's going to take the installer will cause the price to vary one way or the other. If you add a floor warming system, a crack isolation or waterproofing membrane or sound control system, these will also add to the cost. There is always a cheaper way to do things, but as the old saying goes, *you get what you pay for!*

Choosing the Tile

The best place to begin is at a tile distributor's showroom. Look around for ideas. Make sure that whichever tile you choose, it's suitable for the desired application. Ask to take home some samples to see what the tile looks like in the room in which it will be installed. Lighting will sometimes change a tile's color and that could influence your decision to use it.

When selecting a tile, consider the size of the room. Large tiles will make a room look bigger. 16" x 16" or 18" x 18" formats are very fashionable and they look good. If you're tiling a small shower floor, however, you'll need to use small tiles to accommodate the slope-to-drain and the extra grout joints that will add a slip resistant surface. Today natural stone is in high demand and there are many tiles that look very close to natural stone. If you like the stone look ceramic tiles imitating stone normally cost less, are lower maintenance, and if made of porcelain tile will be more durable than some stones.

Purchasing the tile can be a little tricky in that you should have a very good idea of how much you need, including a certain percentage for storage, to compensate for breakage and cutting. It's always important to buy tile from the same manufacturing lot or shipment to assure the color and quality is consistent. You can buy the tile directly from the tile distributor whether you buy at whole sale or retail prices, but then you would be responsible for ordering it, shortages and overages, problems, and picking and delivery. I recommend letting the installer do the purchasing so that he's responsible for correctly ordering it and delivering it to your project. One way or another, the installer will work in his profit, so you may as well allow him to handle the purchasing process, including picking it up and dealing with any other issues that arise.

In recent years porcelain tile and natural stone have been very popular. Porcelain is an impervious denser clay and is commonly used for commercial installations, but it can be used in residential applications, too. Vitreous clay body tiles are also good for residential applications since it has a very low absorption rate and are dense. Tiles with a glazed surface are impervious and will normally be easier to maintain. When tiling in wet areas like showers, be sure and choose a small tile for the floor that has texture as this will add slip-resistance. Unglazed tiles are typically slip-resistant, but not always. Unglazed or through-body tiles are made of the same material from top to bottom. The impervious unglazed tiles are more stain resistant than the more porous tiles. But remember, a sealer can always be applied to make a tile more stain resistant or easier to clean. Natural stone also comes in a variety of types, from denser impervious stones, to more porous stones, and they all should be sealed.

Natural stone is a product of Mother Nature, so expect it to vary in color, texture, overall appearance, and physical properties. The same geological type of stone will vary greatly depending on which quarry it originates from and the place within the quarry that it comes out of. There are ASTM standards that set the minimum required physical properties for each category of stone. Always ask for these test results to determine if the stone meets its classification requirements. Before installing, always get several pieces of the actual material that will be installed to lay out for your approval. The color of the grout you use will make a big difference in the final appearance of the ceramic tile or stone, so have samples made up before approving. Always seal the tile first before grouting to prevent staining, if you use a contrasting color grout.

Some tiles are rectified, which means they're specially cut and gauged during manufacturing so the sizing is very consistent. The result is that you can have narrower grout joints with this type of tile. I would recommend having a minimum 1/8 inch wide grout joint if the tile is relatively consistent in its sizing. For non-rectified tiles you can have a 3/16 to 1/4 inch wide grout joint, depending on the consistency of the tile sizing. For inconsistent tiles the grout joints should be wider to make the final installation look straight. For instance, Mexican pavers typically need to have joints that are over 1/2 inch wide to compensate for the tile's irregularities.

Choosing an Installer

The best way to find an installer is to go to a tile distributor and ask for recommendations or get a referral from someone you know who has used an installer and was satisfied with their work. Don't assume that any of the referrals you get are a guarantee for a good installer. Get at least 3 quotations and ask for references. Even when you are certain that you have a capable installer, you should assume they don't

fully understand the industry standards or the product manufacturer's recommendations and limitations.

Tell the installers that you want them to base their quotations on installing your tile per industry standards to include:

- Tile Council of North America's (TCNA) Tile Hand Book for Ceramic Tile Installation standards
- American National Standards Institute (ANSI) A108 Standard for Tile Installation
- Marble Institute of America (MIA) Dimension Stone Design Manual
- Make sure they have a current TITC Certification.

The following items should be covered in their quotations based on the above standards:

1. Removal of the existing floor and the scarification of the concrete slab underneath. Scarification will eliminate any glue or other materials that may be left from whatever was on the floor previously, and it will make the concrete porous (water readily absorbs). If the floor is new construction, it still needs to be prepared so it is porous and clean.
2. Wood subfloors also require proper preparation. First get a structural engineer to look at the floor joist and subfloor configuration to make sure that the whole floor meets the L/360 maximum deflection requirements for ceramic tile, or L/720 for natural stone. It is legitimate to bond the tile directly to a wood subfloor, if done correctly, but it is more problematic and limiting. We recommend applying a tile backer board or a self-leveling underlayment over a structurally sound wood subfloor first.
3. If there are any shrinkage cracks in the concrete the installer needs to pre-treat them with a crack isolation membrane (meeting ANSI A118.12) placed a minimum 3 times the width of the tile used. Make sure the slab doesn't have any structural cracks, which is when one side of the crack edge is higher than the other. If there are structural cracks they must be properly repaired.
4. The concrete or wood subfloor can't have too much moisture vapor passing through it or problems can arise. Find out the moisture vapor limitations from the manufacturers of the ceramic tile, natural stone, and installation products ahead of time. The following tests can be used: the ASTM F-2170 Relative Humidity (RH) test method and the ASTM F-1869 Calcium Chloride Vapor Transmission

test performed by a qualified third party. Or a moisture meter or a taped piece of plastic can be used to determine if you might have a problem. If you do have too much vapor transmission then the problem needs to be corrected or use a moisture barrier if there isn't excessive moisture vapor transmission.

5. After the concrete floor is prepared (scarified) put a moisture meter or piece of plastic taped down over the slab to make sure there is not excessive vapor transmission. You should perform a simple water absorption test by applying a drop of water the size of a nickel over various spots in the concrete floor. The required result of this test is that the water is readily absorbed in the prepared concrete surface.
6. Tell the installer that you want the concrete or wood subfloor flattened. It doesn't have to be level, but it should be as flat as possible so the tile will lay properly. This is to avoid lippage, which is where the edge of one tile is higher than the adjacent tile. Maximum lippage is 1/32" for grout joints 1/4" wide or less. Many times concrete slabs have low spots or high spots, which will require the installer to fill in the low spots and grind down the high spots. If the installer has a good scarifier he can usually grind down high spots with it. After he preps the slab it should meet the industry standards of no more variation in plane of 1/4" in 10 feet or 1/16" within 1 foot. So using a straight edge, there shouldn't be a gap greater than 1/16" under it, and it shouldn't be out of level more than a 1/4" in 10 feet, unless there is an intended slope. Wet areas should have a slope of 1/4" per foot. For natural stone the requirement is no more variation than 1/8" in 10 feet.
7. Tell the installer that you want the narrowest recommended grout joint width for the tile you have selected, but not less than 1/8 inch on floors. Also tell the installer that the tiles should be back-buttered with the thin-set adhesive to achieve full contact, and to be sure and clean the backs of the tile to remove any residue before they're installed.
8. You need to decide the layout of your tile installation. Keep in mind that if you want the tiles set at a diagonal direction it's more expensive to install because it will require more cutting. You can also have them lined up or off-set from each other. A decorative dot can provide a customized look and is achieved by clipping the corners of 4 intersecting tiles and inserting the dot between them. The dots can be solid colors, geometrics, florals or other designs. Have the tile showroom consultant help you with a customized look if you are interested.
9. Tell the installer to use installation products from a major tile installation product manufacturer that provides at least a single source 10-Year labor and material system guarantee.

10. We recommend applying a waterproof/crack isolation membrane over the whole bathroom floor, laundry room floor and kitchen floor so there is protection against broken water pipes, in the event this ever occurs. Most of the time crack isolation membranes are also moisture barriers. The membrane should be run up the walls of the rooms in which they're being used by 3 inches, if possible (the base tile will cover it up).
11. Tell the installer that the grout joints and tile surfaces should be sealed with a good penetrating breathable sealer. If the tile is glazed and impervious you can apply the sealer over the whole surface, after the grout has cured for a day or two. Within minutes of applying the sealer buff it dry with a lint-free cloth and the surface will be easier to clean and to keep clean. You may want to do this yourself. Just make sure the grout and tile are perfectly clean and dry before applying the sealer.
12. Tell the installer to leave a ¼" wide open joint at the perimeter of the room and at the cabinets (or at any restraining surface) to allow for expansion within the tile installation. A ceramic tile or wood base can be applied to cover that open joint. The open joint should be filled with a suitable silicone or urethane sealant that meets ASTM C920 (do not use latex or acrylic caulking; they don't last) so it will keep bugs out of the house, seal the joint, and provide protection from movement. Expansion joints are suppose to be installed in the field of tile every 20 to 25 feet for interior applications or every 8 to 12 feet for exterior applications. For walking surfaces (i.e. floors) the sealant must also have a minimum Shore "A" hardness of 35. Also tell the installer to undercut the door jams (cleaner look) so the tile can be slid under them, leaving a ¼" joint behind it. A ¼" foam backer rod can be used to put into those spots first so you can slide the tile right up to it leaving the ¼" joint for expansion. Caulk the door jams with the 100% silicone or urethane sealant. Any doorway with a threshold should have a movement joint. If the installer hasn't used a true silicone or urethane like this before (which is likely the case), then keep in mind that they need to tape both sides of the joint with blue masking tape. Work on small sections at a time and immediately after the silicone is applied, tool the joint with a soapy water solution to shape it. Then immediately pull up the tape. This will create a very nice joint. If you leave the tape down too long it will pull the sealant out of the joint.
13. Ceramic tile bases give a more customized look and provides protection for the wall when floors are mopped. Also if a sealant is used at the top and bottom of the base then insects cannot get in the house (at least from this spot!). Some tiles come with a 4 x 12 inch surface bullnose (top edge is rounded) that you can use for the base, but that will add to the installation cost. Or sometimes the tile

itself can be cleanly cut to size, if it looks good, and used for the base, which will cost a lot less.

14. After the tile is installed it should be thoroughly checked. Using a steel rod or something similar, tap the tiles and make sure there are no hollow sounds. Also make sure there is no more lippage than the thickness of a credit card between tile edges. All cut tiles should have the cut edges stoned (smoothed). Tiles must be laid out so there aren't any cuts less than $\frac{1}{2}$ the size of the tile, although sometimes it's hard to avoid. BE SURE the installer lays the tile out in advance so you can see the design and color shading and so any cuts that will be made are anticipated. You should approve the layout before it's installed.

Cleaning

Cleaning your tile floor should occur at least weekly to make sure its beautiful appearance and slip-resistance is maintained.

There are cleaning products that are specifically designed for use with your particular ceramic tile or natural stone. Some are detergents that are added to water for mopping. Be sure to sweep or vacuum prior to mopping (make sure the vacuum is the type that does not make any impact to the floor). The kitchen area and other areas that may get dirty from food preparation should be washed weekly. Use a scrub brush on an extended handle to wash the floor and then use a wet/dry vacuum to remove the dirty water. Change the water frequently during the scrubbing process. This will keep your grout joints from discoloring.

Make sure each entrance to the house has a floor mat so dirt from the outdoors is not tracked in onto your new floor. This is important because the dirt that comes in on your shoes can scratch the floor and cause excessive wear, particularly on marble floors.

In situations such as an office where there are chairs with wheels, make sure to put down a plastic floor protection mat over the tiled floor. Do not use the type of floor protection mat with pointed prongs on the bottom that's used on carpets -- use the one with a flat smooth surface. Pick this mat up off the floor each week, so the floor can breathe, and so you can clean the bottom of the mat and the floor beneath it.

Reseal your floor every 6 months to 1 year, more or less, depending on the type of wear and tear and climatic conditions it's subjected to. If water beads up on the floor surface then the sealer is working, but if the water spreads out, it should be resealed.



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If you diligently follow these guidelines and supervise what your installer is doing as a quality control inspector would, then your tile floor should not crack or debond. In fact, it should last the life of your home!

Good Luck!

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