



CERAMIC TILE INSTITUTE OF AMERICA, INC.

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CTIOA REPORT 99-6-27

SUBJECT: CONSUMERS GUIDE TO THE INSTALLATION OF PORCELAIN TILES

These fully vitrified tiles are manufactured to the highest standards, incorporating the Industries most current technologies. In order to enrich your enjoyment of the porcelain tiles we offer these guidelines which we recommend you review before installation.

Setting Materials:

Since porcelain tiles are very dense, normal portland cement dry set bonding mortars without the aid of special additives may not render a satisfactory bond. We therefore suggest latex portland cement bonding mortars that bear the designation ANSI A118.4. It is also of critical importance that these bonding mortars be mixed in accordance with their manufacturer's instructions. Improper liquid ratios, over or under mixing, and dwell time before placement of bonding mortar and tile will also affect bond.

Substrate Materials:

The substrate is the surface over which the bonding mortar and tile is placed. First and foremost is the substrate's ability to resist bending or flexing. A good example would be a concrete slab that has been poured over well compacted earth verses a plywood subfloor attached to a suspended wood frame system. The latter may very well bend beyond the tiles capacity to absorb same resulting in loss of bond or cracking of the tile body. For tiles that have a facial area not exceeding 8 inches in its greatest dimension, we would recommend that bending of the substrate not exceed 1/360th of its length as measured in inches. For tiles that have a facial area exceeding 8 inches in its greatest dimension, we would recommend that bending of

the substrate not exceed 1/720th of its length as measured in inches.

All surfaces that are to receive bonding mortar and tile, must also be stable when exposed to their relative environment. For example a tile bonded directly to a properly supported and fastened plywood substrate, may perform well in a dry and temperature stable room, such as a residential entry. But this same method of installation on an exterior deck would most likely fail. The following chart is offered as a general guideline:

ENVIRONMENT	FLOORS	DECK	WALL	SUBSTRATE
Exteriors	X	X	X	Cement based products only
Showers/Tubs	X	X	X	Cement based products only
Counters light use. Not exposed to direct sunlight or moisture		X X	X X	Cement based products, exterior grade plywood gypsum board
Counters regular use		X	X X	Cement based products Water resistant gypsum board
Counters heavy use		X	X	Cement based products
Interiors light use Not exposed to direct sunlight or moisture	X X			Cement based products Exterior grade plywood
Interiors regular use	X			Cement based products only

It is also of primary importance that the substrates be clean and free of any contaminants that would inhibit the performance of the bonding mortar. This would include dirt, dust, sealers, curing compounds, waxes, or similar materials. In the case of concrete or masonry surfaces old or new, mechanical scarifying is recommended.

CONTROL OF EXPANSION DYNAMICS

All materials expand and contract on a regular basis. To protect your tilework from the accumulation of forces brought on by these phenomena, it is prudent to incorporate soft joints within tilework. This is accomplished by substituting caulking in lieu of cement grout at key areas. For smaller jobs, use soft joints at perimeters where tilework abuts restraining surfaces. For larger jobs, soft joints in fields of

tilework are also necessary. In some instances, the substrate (over which tile is to be applied) may also have these control joints already in them. It is mandatory that you not bridge these joints with tile but rather continue the joint through the tilework.

DEALING WITH CRACKS IN THE SUBSTRATE

Often substrates that are cementitious in origin and of a large mass such as concrete or leveling mortars, may develop hairline cracks caused by normal shrinkage during their curing process. These cracks may work their way into your tiles if you install them directly onto the cracks. A successful method of preventing this is to introduce a buffer that is sandwiched in between the substrate and tilework where the crack occurs. These products are commonly referred to as thin load bearing direct bond membranes and are available through any major tile products distributor. Be sure to follow the membrane manufacturer's instructions when using these products.

USE OF THE BONDING MORTAR & COVERAGE

The use of a cement based bonding mortar with a latex additive (ANSI A118.4) is acceptable for installing the tiles over most substrates. As mentioned before, proper mixing techniques are critical and usually the bonding mortar manufacturer will include mixing ratios and methods with their products. Once the bonding mortar is mixed, the timing of applying the mortar becomes important. These mortars usually have a pot life (amount of time they stay fresh in the receptacle) of about one hour, and should never have additional materials added to them and remixed. A small area of the substrate (approx. 2' x 4') is then covered with the mortar and combed to an even depth and consistency using a notched trowel. If the substrate is absorptive, such as concrete or leveling mortar, it is a good idea to moisten it with water just prior to application of bonding mortar. This prevents the moisture that is needed for the bonding mortar to reach full strength from being drawn into the substrate.

Once the bonding mortar has been properly spread into the substrate, the tiles should be installed by firmly pressing them into place within five minutes. When starting the tile placement process, the contact of bonding mortar to tile should be checked by lifting a freshly set tile. When lifted the coverage of bonding mortar to tile should be complete. If voids between tile and mortar are observed, then a heavier application of mortar is required. In many instances application of bonding mortar to the backs of tiles as well as to the substrate, will achieve the full coverage.

As the tile setting procedure commences, any excess bonding mortar within the joints between tiles should be scraped out so that at least two-thirds the depth of the tile is available to receive the grout filler material. Any excess bonding material that contacts the surface of the tile should be thoroughly washed with clean water and sponge. Those joints that are to be soft joints should be scraped out so that they are completely void of bonding materials. Once the tiles are in place any final adjustments for the aligning of tile should be accomplished within one hour of

original mixing of the bonding mortar. Foot traffic on tiles should not be allowed for a minimum of 48 hours after setting.

GROUT

Grout refers to the filler material that is placed into the open lines or joints between the tiles. Usually having a cement base, these products vary in that various size aggregates and coloring are blended into the cement to achieve the desired working characteristics and appearance. These products must be mixed with water (or water gauged with other additives) in order to begin their working process. The amount of liquid and proper mixing techniques are as important as those for bonding mortars. Many factors affect the hydration (drying) process as the water reacts with the cement in grout, and it is not possible to achieve a uniform cure. It follows then that grout colors are rarely uniform and variations in color and shade should be anticipated. Listed below are tips to help minimize these variations.

1. Follow the manufacturer's instructions for material ratios - mixing times, etc.
2. Whenever possible mix the complete container (bag, box) of grout at one time.
If the project requires more than one bag/box of grout, try to keep the material ratios and mixing times as uniform as possible from one batch to the next. This would include cleaning the container into which the mixed grout is placed between each batch.
3. Maintain as uniform an environment as possible. For example, if you are grouting tiles that have been installed in a living room, direct sunlight from a window may impact that area of grout. Covering the window or closing blinds is a simple answer. For exteriors exposed to direct sunlight, shading the work area is advisable.
4. The residue of bonding mortar within the joints of tile can impact the drying of grout when it is installed. This is more likely to occur if the bonding mortar was not scraped out to a uniform depth during the tile laying process. It also follows that the amount of residual moisture within these joints (even after 48 hours) will cause the bonding mortar to draw moisture from the grout at different rates. This can be controlled by lightly moistening the joints with water just prior to grouting.
5. Uniform curing of grout after its application and final cleaning is important. This is

best achieved by covering the installation with non staining butcher or kraft paper for 72 hours. Make sure the paper covers all tiled areas and if possible weight or tape the paper down at tilework perimeters.

THE GROUTING PROCESS

Once the grout has been prepared according to manufacturer's instructions, it is packed into the tile joints using a rubber grout float. As with the bonding materials the pot life of grout is approximately one hour. The timing of the cleanup process is critical in that the grout residue that is left on the surface of the tile will tend to set up faster than the grout that is in the tile joints. Initial cleanup from tile surface and smoothing of the grout in the tile joints is accomplished at the same time using a sponge and clean water. As the water quickly becomes tainted with grout residue, a change of water for every 100 to 150 square feet is recommended. Do not use excessive amounts of water within the sponge when cleaning as this will affect the shading, color and strength of the grout. The sponge should be completely immersed in water and rung out to a damp consistency after every two to four square feet washed.

FINAL WASH & CLEAN UP

Once the initial wash is done, a second pass is made with cleaned sponge and clean water to remove as much grout residue as possible, that will still remain on the tile surface. This is a process where the sponge is submerged and wrung out as before but is now lightly pulled across the surface. Change the water and clean the sponge for every 200 to 300 square feet cleaned, depending on amount of residue. This secondary cleaning process may be repeated as necessary to render the tile surface as clean as possible. Finally as the surface of the tile dries, any light residue or haze is buffed off with a clean towel. The installing of the grout in the joints, and primary and secondary wash should all be accomplished within one (1) hour of initial mixing of grout. The timing may vary slightly due to temperature variables, however, it is critical to remove the grout residue from the surface of the tile before the cement dries to a point where it cannot be washed. Once the cleanup is finished, cover the installation as mentioned before, for 72 hours.

MAINTAINING YOUR TILE INSTALLATION

Tile installations are not maintenance free, however, routine cleaning with neutral detergent and then rinsing with clean water is all that is normally required. Food and drink spills or tracked in contaminants such as oil or grease, should be cleaned immediately. If heavy duty cleaning becomes necessary, concentrated cleaners will not harm the tiles but the use of abrasives or products containing acids should be avoided.

AFFECT ON LIVING ENVIRONMENT

Tiles are not toxic and are non flammable and do not promote bacteria growth.

For further information on Products, Installation Procedures, Specialty Jobs or Maintenance, call: [310] 574-7800 OR

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