



# Ceramic Tile & Stone Installed Over Fly Ash Concrete TDS 165

There are many types of concrete mixes available for specification on projects. Some types of concrete utilize coal fly ash in the design mix. Does fly ash concrete affect the way in which a ceramic tile or stone floor is installed? Are there any potential bonding problems with fly ash concrete?

It is important to note that successful ceramic tile and stone installation can be made over concrete design mixes which utilize normal amounts of fly ash. A large majority of concrete slabs being poured today contain some measure of fly ash as a component of their design. Typically, concrete is proportioned to use a mix with all portland cement along with fine and coarse aggregate, but in fly ash concrete, portland cement is replaced with fly ash at a 1:1 ratio (by weight). In some instances, the portland cement can be replaced with fly ash at a 1:1.25 ratio and even a 1:1.5 ratio (depending on the type of fly ash used). However, it is difficult to determine exactly when too much fly ash is utilized because so many variables are involved (e.g. water to cement ratio, type of fly ash, design requirements, etc...). ASTM C618 “Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete” defines the type of fly ash and the physical, chemical and mechanical properties for use in concrete.

Therefore, when specifying and tiling over fly ash concrete, some basic requirements for applying tile on concrete must be observed:

1. Specify and utilize the appropriate amounts of fly ash in the design mix.
2. Concrete should have a wood float finish or light steel trowel finish.
3. No curing compounds, sealers or coatings shall be applied to the concrete. If curing compounds, sealers or coatings are present then they must be scarified (e.g. bead-blast, shot-blast, etc...) to remove any trace of the compound from the concrete – refer to [TDS 154](#) for more information on curing compounds.
4. Refer to [TDS 128](#) for more information on tiling over new concrete slabs.

When normal amounts of fly ash are exceeded, the concrete will act as if it were sealed. The use of fly ash creates a denser, less porous finished concrete. This is typically a good thing for concrete as it creates a stronger more consolidated mix. However, when it comes to tiling over fly ash concrete, too much of a good thing may not be good at all. Excessive amounts of fly ash cause the concrete surface layer to become almost impervious. This would be fine if the concrete was to be left as the wearing surface. However, ceramic tile and stone adhesive mortars need to form a bond with the concrete pore structure in order to achieve a suitable bond.

It may also be important to note that the slower strength development of concrete containing fly ash may require that the moisture be retained in the concrete for a longer period of time than what is required for conventional concrete. This fact may have an effect on the installation of waterproofing and anti-fracture membranes as well as certain types of tile or stone installation materials. The use of LATICRETE NXT<sup>®</sup> Vapor Reduction Coating may provide the ability to install tile or stone in a timely manner.

Pouring a few drops of water on the concrete slab can indicate whether the concrete will absorb the water and thereby facilitate a suitable bond with the ceramic tile and stone adhesive mortar.

If the concrete slab appears to be too dense, shiny or does not absorb any water into its surface, it will become necessary to mechanically abrade the concrete. This process will open up the pore structure of the concrete and also create a mechanical profile that will allow the adhesive mortar to achieve a mechanical bond.

Use a suitable LATICRETE® Latex Thin-Set Mortar (e.g. 254 Platinum, 257 TITANIUM™, MULTIMAX™ LITE) to install the ceramic tile or stone in accord with all LATICRETE installation instructions and all applicable industry standards.

If a waterproofing, sound control or crack isolation membrane is to be installed, follow the same water absorption and scarification process (if necessary) prior to installing these materials.

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