

Under floor heating and sealers

When I first started in the tile industry in the very early 1980's under floor heating (UFH) was not widely used in our country. This was because ceramic tile and hard surfaces in general were in their infancy and the technology for UFH was also almost totally confined to in slab heated water systems which were cumbersome and expensive. How times have changed. Today UFH is widely used due to the huge increase in the use of ceramic tile and natural stone and the rapid advance in UFH technology. However in recent times along with this is a growth in the number of sealer problems over UFH installations. The problems generally fall into two categories, sealer performance and sealer installation and there is no doubt that UFH definitely needs to be considered and compensated for when installing a sealer. The most pragmatic way to look at these issues is to discuss each type of generic sealer separately, penetrating and topical.

Penetrating:

The main problems I have inspected with penetrating sealers over UFH are poor or reduced sealer performance, uneven application and surface residue that is more difficult to remove than normal. All of these are directly related to the use and operation of UFH.

Reduced or poor sealer performance:

In every case I have inspected where sealer performance has been reduced the UFH has been turned on to speed up the cure of the sealer. Penetrating sealers use predominantly silicate, silane or fluoro bases and these all undergo change during cure. In the case of the silicate they tend to expand as the water carrier evaporates where the others contract as their respective carrier leaves. In each case the speed at which they cure is critical. Too fast and the reaction is sudden, putting additional stress on the curing sealer which inevitably results in a poor seal being set up. If the UFH is on when the sealer is applied (and the constant temperature of the floor is within the sealer manufacturers application temperature range) maintaining a constant temperature will not be a problem. The adverse sealer reaction happens when the UFH is turned on to heat a cool floor. This creates expansion in the tile or stone at the same time the sealer is trying to bond to the materials' internal structure. For many sealers this means they are contracting while the tile or stone is expanding. This problem is much more common with the newer wire systems that sit just below the tile usually under a self leveling underlayment. They are designed to heat the floor quickly and hence rapidly expand the floor as well as

the curing sealer. I have yet to have this problem with an in slab water heating system mainly because they take much longer to heat and hence create expansion. Enhancers such as Aqua Mix Enrich N Seal are especially sensitive to UFH during cure. I have had two jobs where Enrich N Seal has not only had poor sealer performance but also poor colour enhancement. This again was due to the UFH creating excessive expansion but also due to the fact that Enrich N Seal uses a polymer that requires a degree of water to cure. In the cases I inspected the heating was not only turned on to a high temperature while the sealer was applied but the house was not well ventilated and had double glazed windows further restricting ventilation. This meant that moisture was driven out of the stone as well as the air hence the Enrich N Seal struggled to find moisture to cure.

Uneven application:

The first job I saw associated with UFH was a basalt job sealed with a solvent based sealer. Solvents invariably leave the stone looking somewhat darker and in this case the bathroom floor was extremely patchy whereas the main living room was not. The difference was that the UFH had been turned on by the owner 30 minutes after the sealer had been applied in the bathroom. I have seen this exact same result on sandstone with Enrich N Seal.

Surface residue difficult to remove:

The job that comes to mind here is polished porcelain where grout sealer had been used to seal the joints. The installer turned the UFH on just before he started to apply the sealer. His routine way of installing grout sealer was to seal all the joints and then come back the next day and buff the entire floor surface. On this

occasion he called me up to say that our Grout Sealer was incredibly hard to remove. What he didn't tell me was that he had turned on the UFH. It took NanoScrub to rectify the problem. However once it was cleaned we found that the sealer in the joints was not sealing well at all. The UFH had also gone to work on the cement in the grout joint that had only been installed 4 days before he applied the sealer. With a more rapidly contracting cement grout joint and an increasingly hot tile surface it is no wonder the sealer did not work properly in the joint and became more difficult to remove from the surface.

Topical Sealer:

The problems I have seen with topical sealers over UFH are the same poor or reduced sealer performance, uneven application and in some instances problems with opacity.

Reduced Sealer Performance:

This happens for the exact same reasons as already discussed. However with topical or coating sealers it often manifests itself as pinholes in the surface of the sealer. It can also create peeling or a weak mechanical bond to the floor which results in the coating sealers life being dramatically reduced.

Uneven application:

Most topical sealers have some degree of gloss or finish and the consistency of this finish can be affected by excessive expansion and contraction created by UFH. Some years back I inspected the worst case I have seen of this problem when an owner turned on the UFH under a Saltillo tile sealed with Seal N Finish Low Sheen. The result over approximately 65m² was parts of the floor with almost no sheen at all. The floor was also riddled with pinholes.

Opacity:

Topical sealers are designed to cure clear. However in two cases I looked at last year (not Aqua Mix products) the coatings did not cure completely clear. Not knowing the products used I conducted some tests on another bathroom floor in the same house. We applied the sealer to a test area without turning on the UFH and everything cured perfectly. Then we tested a small area after the UFH had been on for 2 days and it also cured correctly. The last test was done 2 weeks after with a floor cooled to ambient temperature – sealer applied – and then the UFH immediately cranked up to 23 degrees Celsius. It must be remembered that when you turn on a UFH system from cold it will work overtime to create the temperature selected as quickly as possible and this creates rapid temperature change and expansion. The sealer did not cure totally clear due to this rapid expansion proving my point to the client.

It is this last example that leads me to my conclusion about contemporary sealers and UFH. Most good sealers work perfectly well when applied to tiles or stone that have UFH installed. They have good temperature tolerance once cured and work perfectly in these conditions. The problems arise when sealers are applied and UFH systems are

turned on too soon or too high while the sealer is curing. My rule of thumb is to turn off UFH before sealing and allow the floor to be sealed at the surrounding ambient temperature. The UFH should not be turned on again for 48 hours. If however someone does not want to turn off their UFH then the rule is to have the temperature of the floor within the recommended temperature range of sealer application. Most importantly the temperature must also be constant during application and for 48 hours after application because it is this relatively rapid change in temperature that creates all of the problems.

Product of the Month



Sealers Choice Gold Premium Water Based Penetrating Sealer

- Premium stain resistance
- Ideal for food preparation and serving areas
- Non toxic, non flammable
- Effective for interior and exterior applications

Recommended for:
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