

## Aqua Mix Sealers and Glazed Ceramic Tiles

It is often thought that sealers have no role to play when discussing glazed ceramic tile. However this is not exactly true and I thought it worthwhile looking at the issues where sealers could be applicable. Firstly let's make it very clear that a properly applied and fired glaze is totally impervious and therefore does not require sealing. A glaze is actually a super cooled liquid and once properly fired is totally vitrified (the correct definition of vitrified is in the state of being glassy and is where the term vitrified originates). Within these terms sealers have no use. However it is not always the case that the glaze is applied or fired correctly and it is in these instances that sealers may have a role to play so let's look at each of these cases.

**Crazing:** This is perhaps the most widely known issue with glazes and where a sealer can sometimes have a positive effect. Crazing is where a network of small (spider web like) cracks appears on the glazed surface. They are created because the thermal expansion of the body is less than the glaze. When this happens the body expands and then contracts less than the glaze. The glaze then tries to stretch itself over the greater surface area of the body and cracks to do so because glaze has relatively poor tensile properties. The resulting cracks are not always completely through the total glaze profile due to the fact that most modern glaze effects use multiple glaze applications. When the cracks go right through to the body a penetrating sealer can be useful in reducing water absorption and hence any contamination brought about by this absorption. However where the cracks do not penetrate the total glaze surface a penetrating sealer will really do very little because the issue is not one of water absorption but rather one of soiling as dirt gets physically ground and trapped in the cracks and fissures.

In the latter case cleaners such as Heavy Duty Tile and Grout Cleaner and NanoScrub are the most effective way to maintain these surfaces. Bear in mind that other than those few antique glazes where crazing is engineered into the tile most crazing should be treated as a tile fault.

**Dunting:** This fault is often incorrectly assumed to be crazing or caused by impact. The effect is where you have a single hairline crack in the glaze similar in width to a crazed glaze. The difference is that it is a single crack that has a smooth curved radius with no jagged parts to the crack. This is caused in the kiln when the tile is either brought up to temperature too quickly or cooled too quickly causing thermal shock. The crack is not only in the glaze but is actually right through the body as well. They can be so fine that it takes a reasonable amount of impact to actually crack right through explaining why many dunted tiles actually get installed. Like crazing cracks dunted cracks can gather dirt very quickly. However as they penetrate the complete body sealing is not a solution. Dunted tiles are a manufacturing fault and should be replaced.

**Pinholes:** Pinholes in the glaze can also gather contaminants but the success of a sealer in reducing maintenance depends on the type of pinhole. The most common pinhole is where the top most glaze layer is affected. This happens when the layers of glaze below the surface and the ceramic body exhaust their hydrocarbons and the kiln atmosphere or the glaze formulation (perhaps too much refractory component such as alumina) does not allow the surface pinholes to anneal. When this happens a sealer is not really going to help as the penetration is not deep enough hence a cleaner such as NanoScrub is the answer. However when the pinhole does actually go right through to the body a sealer can do a great job. This happens when an engobe is used underneath the

glaze. Many manufacturers use either red or off white bodies and then apply a white clay slip (engobe) to act as a buffer layer between the body and glaze. In some cases the engobe can fire prematurely creating excess hydrocarbons which in turn creates surface pin holing. Penetrating type sealers can do a great job in reducing the adverse effects of these pinholes and in conjunction with a good cleaner such as NanoScrub the problem should be easily kept in check.

**Texture:** Items 1-3 are really manufacturing faults that sometimes find their way on to a job and then become impractical to remove or replace – hence the need to manage them. However there are many glazes today that are textured. This texture is created in many ways – by application methods such as spinning discs and spray guns – by glaze formulation where high and low temperature glazes are used together to create texture – and by manipulation of the kiln atmosphere where moving between an oxygenated and reduced atmosphere can create varying degrees of vitrification and texture. The resulting texture can in many cases create issues with maintenance as well as with grout application. In fact it is texture that currently creates the most problems associated with glazed tile maintenance. When confronted with this issue the first step is to look at implementing pre-sealing to assist in the grout clean up. Because the tiles are glazed a penetrating sealer is not going to do the job. To pre-seal a textured glazed tile a coating material should be used such as Aqua Mix Floor Shine and Hardener or High Gloss Sealer. This will put a sacrificial coat over the glazed surface that can easily be removed using a non-acid cleaner (Heavy Duty Tile and Grout Cleaner or NanoScrub). If the problem occurs when the tile is in service the application of a penetrating sealer will not help. The first thing to do is to clean the floor with NanoScrub to make sure there is no grout left on the surface and then implement a more robust maintenance schedule as the problem is related to dirt being trapped in the glazed surface texture. In other words more maintenance overall is the solution.

**Scaling:** Most people often do not realise that glaze is in fact glass. Therefore a glazed surface suffers from the same issues as glass the most common one being the accumulation of mineral deposits as commonly found on glass shower screens. If you look closely at especially gloss ceramic glazed tiles in a shower cubicle you will see exactly the same mineral scaling as that on the glass. Some people insist that a sealer will protect the tile and glass. However this is simply not true.

The glaze is already totally vitrified and hence the mineral scaling is an issue of surface accumulation and not water absorption. Some people feel that the application of a hydrophobic sealer helps (by reducing the surface area in contact with the water) and others recommend a hydrophilic sealer (where they feel that the rinsing effect of water shear cleans the surface). In my opinion both opinions have some merit but neglect the fact that in both cases some water is always left on the surface and this leaves minerals behind as it evaporates which eventually accumulates into a problem. So the real answer is to use good cleaners on a very regular basis. In the short term the minerals can be removed, however in the longer term when left untouched their bond increases to the point of being almost impossible to remove. The use of a good pH neutral cleaner such as Aqua Mix Concentrated Stone and Tile Cleaner and periodic use of Aqua Mix NanoScrub will insure any mineral deposit never accumulates.

In summary many in our industry feel that the glazed tile market offers few opportunities to promote and use specialist products such as sealers and tile and stone cleaners and problem solvers believing that a glaze surface is “bullet proof”. This would be the case if glazes were always applied correctly and they were always smooth. However this is not the case. As shown above there are many instances where a sealer can be used on a glazed tile. Even more important is the fact that a glazed surface must be maintained with specialist cleaning products otherwise it can easily become a problem.

## Aqua Mix IAP Tile, Stone & Grout Course

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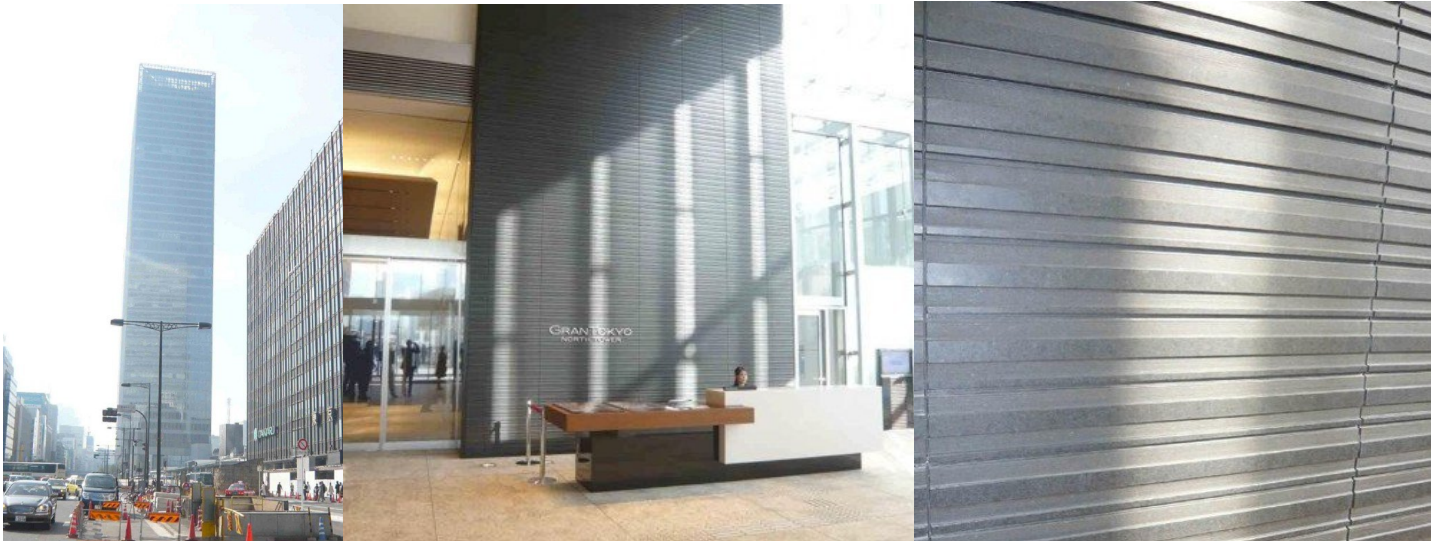
Our next course is on Wednesday 27th - Thursday 28th February 2008.

Visit [www.aquamix.com.au](http://www.aquamix.com.au) for full details

## Project News

### Grand Tokyo Towers - Japan:

North and South Tower interior stones have been treated with Enrich'N'Seal and Penetrating Sealer. The stones vary between granite and basalt with a total area treated of approx 4500m2



## Trade Show News - International

### Surfaces 2008, Las Vegas, USA

The Surfaces Expo was held in Las Vegas, USA from January 29-February 1 at the Sands Expo and Convention Centre. Over 40,000 visitors visit this unique trade show which incorporates tile, stone, carpet, laminates, concrete, cork, wood and vinyl. I had the opportunity to attend a few of the seminars which are part of the success of this show and also had the opportunity to address the Ceramic Tile Education Foundation Board (CTEF) in my capacity as National President of the Australian Tile Council. Below are some pictures from the CBP and Aqua Mix stand which were busy throughout the 3 days. Rod Sigman and Danny McNair were involved in a Stone Workshop which had over 50 people in attendance.



## Trade Show News - Australia

### CleanExpo - Gold Coast Australia –April 2008



[www.cleanexpo.com.au](http://www.cleanexpo.com.au)

Aqua Mix Australia will be exhibiting at CleanExpo at Parklands Gold Coast, QLD which will be held from Friday April 11 - Sunday April 13. We will also be involved with the seminar programme and doing live demo's on purpose built tile and stone floor. Further details on the show will be in our March Newsletter.