

Natural Stone Tiles with Mesh Reinforcement

INTRODUCTION

There has been an increase in recent years in the number of natural stone tiles i.e. marble or granite imported into the UK which has a mesh reinforced resin backing bonded to the lower interface of the stone.

Typically the resin polymers commonly used for this are epoxide, polyurethane or polyester of which polyester is the most commonly used. A fibre mesh is often embedded within the resin coating i.e. a fibreglass mesh.

The reasons for this vary from providing additional strength to the stone, particularly in the case of thin marble, limestone or granite, or sometimes it may be designed as a 'temporary' backing.

Unfortunately a polyester resin will have a much higher Coefficient of Thermal Expansion compared with the stone itself. Coupled with the surface of the resin which has a 'waxy surface' and may contain free styrene monomer, these will act as barriers to adhesion.

ISSUES & INSTALLATION

When fixing these mesh reinforced resin backed stone tiles, the bond strength achieved is totally dependent upon the quality and consistency of the resin/ mesh backing applied to the stone. This applies to both the dry and wet duty test conditions.

Factors which influence this are, for example;

1. The tensile bond strength between the mesh reinforced resin backing and the stone, which can vary from strong to very weak.
2. The chemical type of resin used e.g. polyester resin has a high coefficient of thermal expansion when compared with different types of stone and differing backgrounds/base.
3. Variability in the quality and application of the mesh and resin between the same stone i.e. where mesh is not completely encapsulated in the resin or when the mesh is weakly bonded to the resin itself.

However the most fundamental factor when considering the feasibility of the use of a cementitious based tile adhesive conforming to the requirements of BS EN 12004: 2007 + A1: 2012 is that the tile adhesive is no longer bonding directly to the stone but to an intermediary (and potentially weaker) layer which has been introduced between the stone and the tile adhesive.

As an alternative to cementitious tile adhesives, reaction resin adhesives conforming to BS EN 12004: 2007 + A1 2012, could also be considered. However the use of a resin based i.e. an epoxide tile adhesive would prove to be very difficult, particularly where elevated temperatures may exist on site. In addition the amount of restraint offered to the mesh reinforced resin backed stone may counter-act against the anticipated levels of movement within any tiling installation, in particular where, for example any thermal and moisture movement is prevalent.

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BS 8000: Part 11 Workmanship on building sites Part 11: Internal and external wall and floor tiling – Ceramic and agglomerated stone tiles, natural stone and terrazzo tiles and slabs, and mosaics – Code of Practice recommends that: *“With large tiles and slabs any reinforcing mesh should be well adhered to the underside, and the mesh and adhesive should not obscure more than 25% of the underside of the tile or slab unless they are mechanically fixed”*.

This advice mirrors that previous recognition is given for mesh backed mosaics which adhesives that the combination of mesh and glue holding the mesh in place should;

1. Not cover more than 25% of the back of *the tesserae*
2. Be no deterioration in the backing material and its glue whilst in service
3. Be compatible with a cementitious tile adhesive in accordance with mosaic suppliers' recommendations.

CONCLUSION

In conclusion, where a mesh reinforced resin backed stone is specified, unless the tile adhesive is able to bond directly to the stone to produce a contact area of 75% or more, it may be possible to consider removing the mesh reinforced resin backing altogether, but this must be undertaken following consultation with the stone supplier or manufacturer.

If this is not feasible to remove the backing without damaging the integrity of the stone, then consideration should be given to mechanically fixing. In the case of external wall cladding, BS 5385: Part 2 2015 advises that *“Stone tiles which are resin mesh backed should not be used”*.

TECHNICAL ADVISORY SERVICE

For free expert guidance on the use of BAL products, or any aspect of ceramic tiling with BAL products, contact the BAL TECHNICAL ADVISORY SERVICE on 01782 591120.

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