

## TECHNICAL BULLETIN

# MODERN VITREOUS PORCELAIN TILES

### INTRODUCTION & SCOPE

The properties of a tile's surface, controls the ability of the adhesive to form a bond to its rear face. These differences are one of the controlling factors that determines the properties and types of tile adhesive recommended for the installation.

Recent trends in porcelain tile manufacture, have seen a move towards faster firing times, and also higher firing temperatures. This has apparently altered the tiles and as a result, changes are required in how these tiles are used.

In this bulletin we will examine some features of highly vitrified tiles and the types of adhesives required to bond them.

### WHAT ARE THE ISSUES?

Historically, vitrified porcelain tiles have been bonded with the 'medium' range adhesives as the minimum. These are normally a cement base with either a liquid dispersion polymer, or a 'dried' polymer powder added to cement base. The bonding mechanism is a combination of mechanical bond from crystal growth by hydrated cement phases into the tile matrix, together with chemical bonding to the surface by the polymer material (which for simplicity we will call 'sticktion').

We have noticed however, that in recent times traditional adhesives for bonding porcelain tiles have not performed as well. Examination of these new porcelains, have revealed that the back face of the tiles

have a glass like appearance, with little surface texture. By contrast older and less vitrified tiles have a rougher texture and less glassy appearance.

The highly glassy nature of these newer tiles means that the adhesives cannot easily develop the mechanical bond by crystal impingement, but have to rely on 'sticktion' by the polymeric material. Low to medium polymer adhesives of the medium quality range are no longer holding these tiles because they develop insufficient 'sticktion' to the surface.

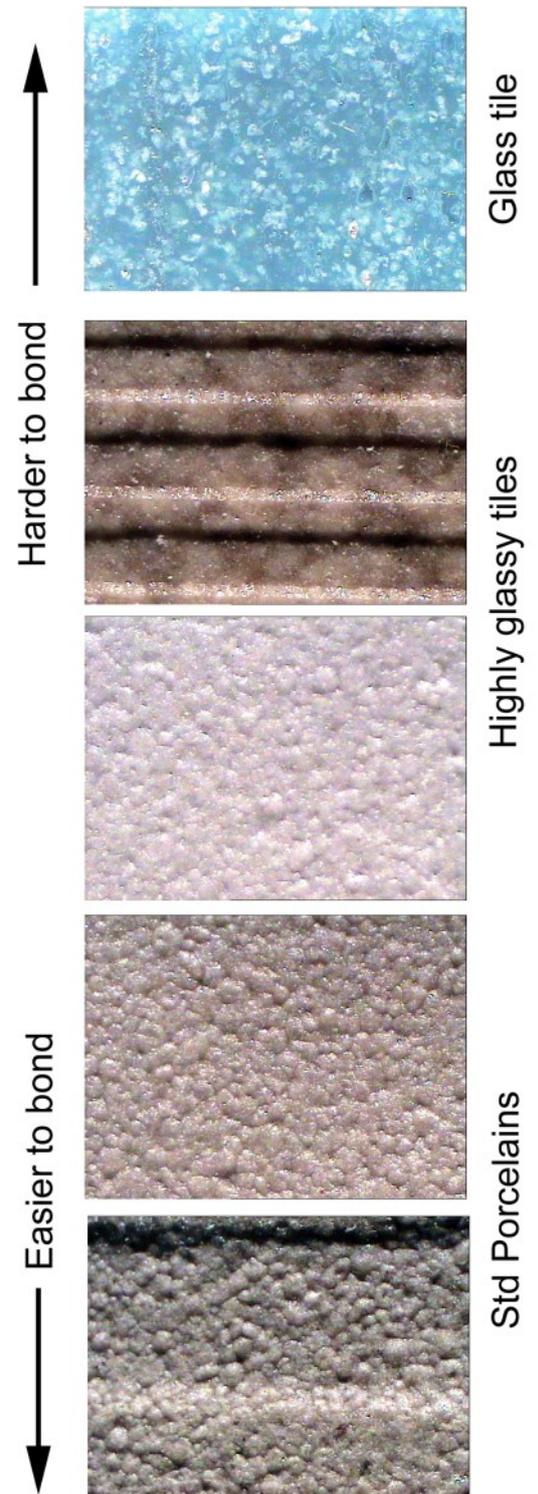
### CAN THESE TILES BE IDENTIFIED?

These new tiles can be normally be identified by examination of the back face with a 10x magnification hand lens. If they look glassy and 'glittery', and have no surface texture, then it is a good chance they are of this type.

Another indicator is if the manufacturer quotes a very high firing temperature ( $\sim >1200^{\circ}\text{C}$ ) for the tile manufacture. Very high temperatures create the glassy texture.

A third is simply whether or not a specific adhesive actually holds the tile in place. The last can be checked by bonding a piece of the tile 150x150mm onto the surface, leave for seven days and then strike it off with a hammer and chisel. If the tile comes off easily and is 'clean' then it is quite likely a higher performing adhesive is required.

The following picture shows some examples of tile rear faces.



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### WHAT ARE THE SOLUTIONS?

Once the tiles have been identified as potentially highly vitrified and difficult to bond, the simplest solution is select a high end adhesive with significant polymer modification. Another option is to go reaction polymer adhesives such as epoxies suitable for bonding tiles or natural stone.

Within the DUNLOP range the following adhesives should be considered as suitable for bonding these tiles.

Cement-liquid dispersion polymer adhesives (C2 class), Dispersion adhesives (D1-D2 class) and high polymer flexible C1S2 class adhesives.

DUNLOP TILE ALL (C2)

DUNLOP UNIVERSAL TILE ADHESIVE (C2)

DUNLOP WALL AND FLOOR FLEXIBLE TILE ADHESIVE (C1S2)

DUNLOP PREMIXED MASTIC (not over waterproofing and non-porous surfaces) (D1)

DUNLOP WALL TILE ADHESIVE (not over waterproofing and non-porous surfaces) (D1)

### NOTES

Always refer to the product data sheets for specific usage details.

The information contained herein is to the best of our knowledge true and accurate.

No warranty is implied or given as to its completeness or accuracy in describing the performance or suitability of the product application.

Users are asked to check that the literature in their possession is the latest issue.

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