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TECHNICAL BULLETIN – TB201

VITREOUS PORCELAIN TILES

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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 manufacturing, 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').

ARDEX noted some years ago that traditional adhesives for bonding porcelain tiles have not performed as well, as they had for many years. 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 apparently no longer holding these tiles as effectively because they develop insufficient 'sticktion' to the surface, which can be exaggerated if the contact coverage is low, a difficult and common issue with large format tiles.

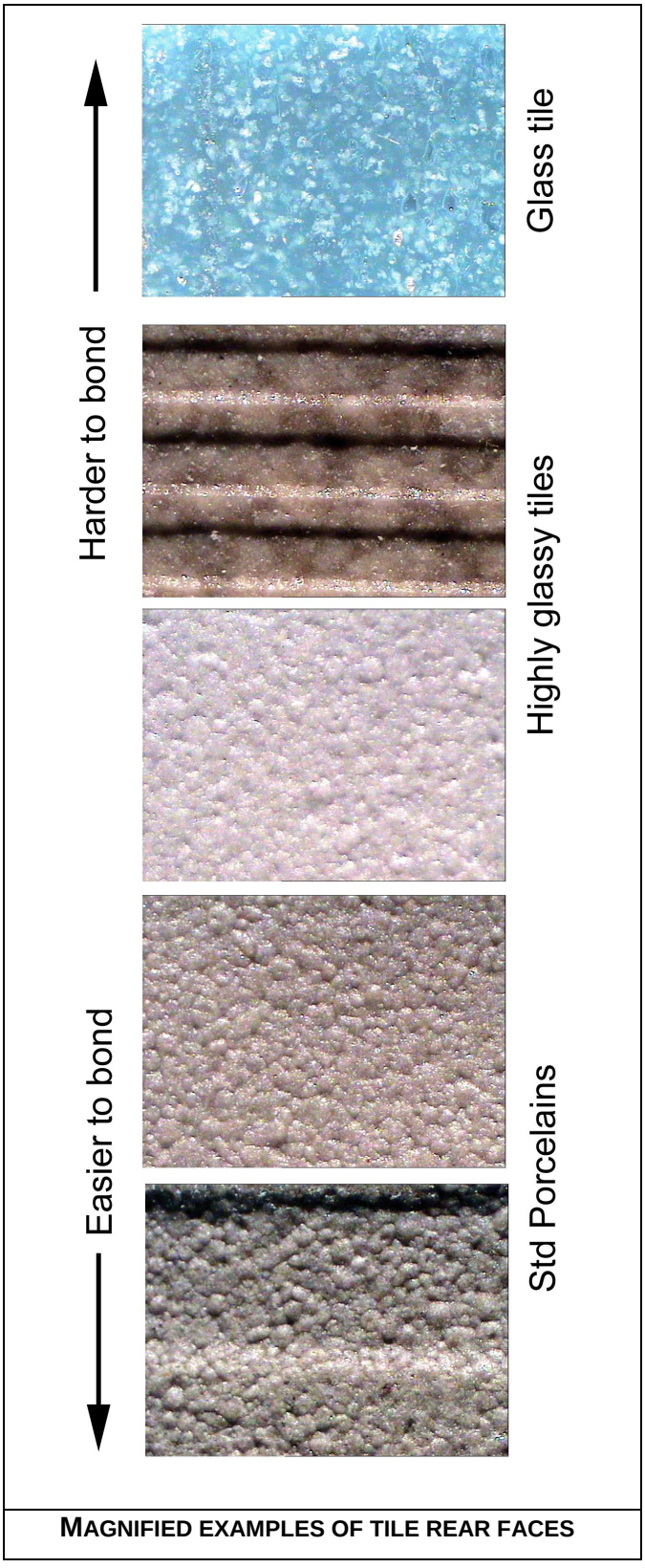
CAN THESE TILES BE IDENTIFIED?

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 (~>1200^{0}C) for the tile processing. Very high temperatures create the glassy texture. These two subjects are discussed in detail in ARDEX Technical Paper TP009.

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, but if it shears cohesively inside the adhesive then the result is satisfactory.

The following picture shows some examples of tile rear faces.



MAGNIFIED EXAMPLES OF TILE REAR FACES

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

Cement-Liquid Dispersion Polymer Adhesives (nominally C2 class / S1-S2)

- ARDEX STS8W + ARDEX E90
- ARDEX X77 + ARDEX E90
- ARDEX X78 + ARDEX E90
- ARDEX X18 + ARDEX E90 or ARDEX Abalastic
- ARDEX X7 + ARDEX E90
- ARDEX Optima (2 part)

Rapid cure adhesives (nominally C2 class, F, S)

- ARDEX S28N + ARDEX E90 (dry internal applications)
- ARDEX Quickbond + Abalastic

Reaction polymer adhesives

- ARDEX WA (adhesive/grout)
- ARDEX WA100
- ARDEX EG15 (when used with filler at the adhesive ratio).

IMPORTANT
This Technical Bulletin provides guideline information only and is not intended to be interpreted as a general specification for the application/installation of the products described. Since each project potentially differs in exposure/condition specific recommendations may vary from the information contained herein. For recommendations for specific applications/installations contact your nearest ARDEX Australia Ofiice.

DISCLAIMER
The information presented in this Technical Bulletin 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 a product for a particular application. Users are asked to check that the literature in their possession is the latest issue.

REASON FOR REVISION
Periodic review. Addition of X7, S28N, WA100 and EG15. Removal of S16. Revisions to text.

DOCUMENT REVIEW REQUIRED
36 months from issue

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