

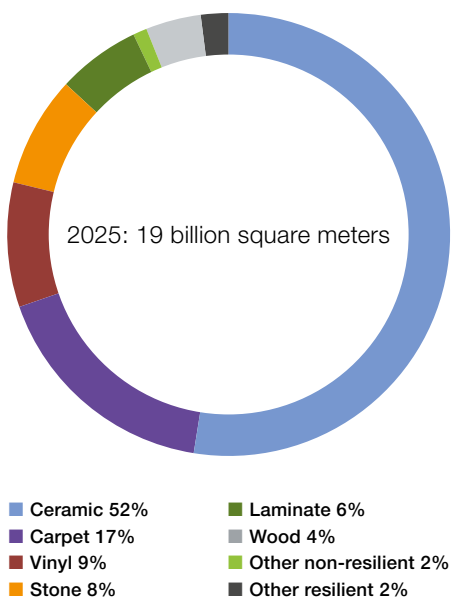
Insight Paper

# THREE MAJOR TILE TRENDS AND THEIR IMPACT ON TILE ADHESIVES

Tiles are on trend globally. And as their sales increase, so does the choice: modern tiles are made of porcelain, glass, composites or synthetic materials. They look like wood, natural stone or concrete, and come in all shapes and sizes – from tiny mosaic tiles to oversized XXL formats. What does this mean for tile installers? Stay flexible!

Today, approx. 50% of all floor coverings worldwide are made of tiles. And the trend is on the rise: in Asia alone, all tiled floor, wall and facade surfaces are expected to increase by 7% by 2025; the corresponding figures in Europe and the Americas will each grow by 4%. One reason is increasing urbanization. At the same time, porcelain tiles are becoming steadily more popular in many countries, because they are universally suitable, hard-wearing and easy to clean. They are also a cost-effective and attractive alternative to popular natural stone. And they open up boundless possibilities in terms of design, shapes and materials.

**Ceramics will account for roughly 52% of floor coverings in 2025**



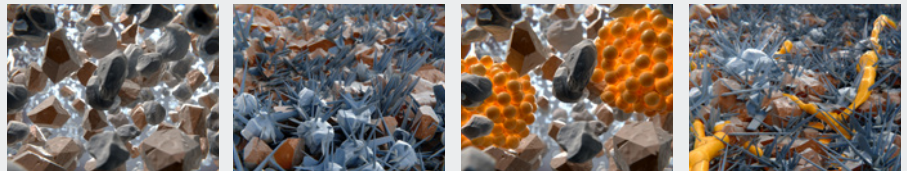
# THE CHALLENGE FOR TILE ADHESIVES

As tile diversity increases, so do demands on the tile adhesives that are used. In many cases, conventional tile adhesives are no match for modern tiles. They were developed for porous materials such as clay or terracotta and do not adhere to the smooth, dense surfaces of porcelain tiles. This is where modern chemistry comes in: polymer modification can improve the properties of tile adhesives so

that porcelain tiles can even be laid on wood. The ability to explore new areas of application is not the only advantage here, however – polymer modification also offers a way of meeting new demands for how tiles are used. Polymer-modified tile adhesives can, for example, help customers implement new design ideas while saving money, energy and resources.

## From Cement to Polymer: the History of Tile Adhesive

Traditionally, pure sand-cement mixtures were used for laying tiles on walls and floors. In this process, the cement works its way into the pores of the substrate and the tile, forming a mechanical bond. If the substrate or ceramic tiles are too smooth, this mechanical bond fails. Adding polymer binders such as VINNAPAS® VAE dispersions and dispersible polymer powders can improve the adhesion of the tile adhesive, as the polymer creates a strong yet flexible bond between substrate and tile. Since the choice of polymer type and quantity depends on various factors, modern tile adhesives are offered as ready-to-use dry mixes. These only need to be mixed with water at the construction site.



Traditional tile adhesives consist of cement and sand. On contact with water, the cement sets and hardens. It forms crystals that interlock with the sand, giving the mortar cohesive strength. At the same time, the cement crystals provide adhesion. They embed themselves in the open-pored surface of the tile and the substrate.

Since the 1950s, tile adhesives have been modified with polymers. Besides sand and cement, dispersible polymer powder is added. When the mortar is mixed with water, the polymer powder redisperses. As the mortar sets, the polymer forms a film and creates polymer bridges. These flexible bridges improve the adhesive's cohesive strength and its adhesion to the tile and the substrate.

## New Tile Adhesives Reduce CO<sub>2</sub> Emissions

Polymer modification has also revolutionized tiling technology. When WACKER developed the first dispersible polymer powders in the 1950s, tiling became much more efficient. The ready-to-use dry-mix mortars that were now possible only had to be mixed with water on-site and applied to the tiles in very thin layers. This change from the thick-bed to the thin-bed method meant that 3 times less material was required on average (from approx. 14 kg/m<sup>2</sup> to approx. 4.5 kg/m<sup>2</sup>). This also means significant CO<sub>2</sub> savings, as less material is consumed and transported. But it's not just CO<sub>2</sub> emissions that can be reduced with VINNAPAS® modified tile adhesives – they make work more efficient too, because the time required for laying tiles is reduced by 75%.

## VINNAPAS® eco: Polymer Binders with a Reduced Carbon Footprint

With VINNAPAS® eco, WACKER offers polymer binders produced from renewable raw materials according to the biomass balance approach. This means that up to 100% of the fossil raw materials in the supply chain are replaced by renewable raw materials that are certified as sustainable. In the case of VINNAPAS® eco dispersions and dispersible powders for tile adhesives, the renewable raw material is bio-based acetic acid. VINNAPAS® eco grades are certified to the REDcert<sup>2</sup> standard and audited by TÜV NORD, an independent test organization. This is a first step and a drop-in-solution that can save CO<sub>2</sub> emissions right now.



# TILE TREND #1: BACK TO NATURE!

## Natural Stone and Wood Tiles

Natural stone is tremendously popular as a floor covering. It is visually attractive, appeals to the senses and gives a touch of luxury. For many, however, it is prohibitively expensive. Porcelain tiles are an affordable alternative – especially if the tiles also look like natural stone. Modern digital printing processes make such an option possible: remarkably realistic marble, granite or slate finishes are simply printed onto the tile. The result is in no way inferior in appearance to the original, while at the same time, tiles are easier to clean and more robust than many types of natural stone. Tiles with printed wood finishes are also in vogue: as a substitute for parquet flooring, they spread a sense of comfort and are more hard-wearing than their original counterparts.

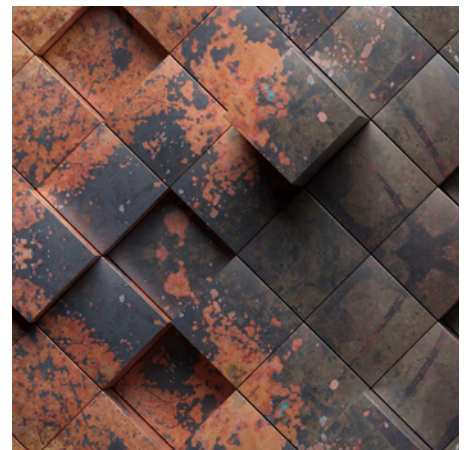
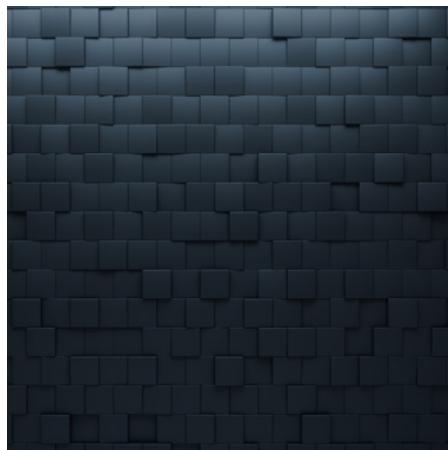
Printed tiles are usually porcelain tiles. They have low porosity and a smooth surface, which makes polymer modification of the tile adhesive applied indispensable.



# TILE TREND #2: ANYTHING BUT STANDARD!

## New Shapes and Structures

Gone are the days when tiles were rectangular by default. Today, hexagons, polygons and cubes are becoming increasingly popular. Round and curved shapes are also gaining popularity, as are sculptural 3D tiles with relief-like structures or studs. There's no question that the trend is toward greater individuality – with porcelain tiles playing a leading role. One thing is certain: with so much diversity, there can, of course, be no standard solution for tile adhesives either. Polymer modification meets the requirements of a wide variety of shapes, structures and types of use.



# TILE TREND #3: BIG IS BOLD!

**Big Tiles, Big Challenges:** Large tiles are becoming increasingly fashionable. They create visual expanse even in tiny rooms and, due to minimal grouting, make the tiled room appear more tranquil. While so-called XXL tiles with edge lengths of up to 120 x 260 cm are primarily reserved for the premium segment, medium-sized tiles are now prevalent as an inexpensive alternative. In China for example, the standard tile size in dining or living rooms is 80 x 80 cm or even bigger. Yet as the dimensions grow, so do the challenges involved – not only in tile production and transport, but especially in tile installation.



## Floors: Solutions for Smooth Sailing

Large-format tiles can only be laid if the substrate is completely level. Minor holes, bumps or areas that are even slightly uneven can cause the tiles to break under strain. Construction chemicals have found answers to this problem too: polymer-modified, self-leveling compounds are quick and easy to apply and produce perfectly smooth surfaces. More properties can be added depending on the formulation. Highly flexible grades can absorb slight movements caused by differences in thermal expansion coefficients, thus preventing cracks. Another reason why this flexibility is essential is because larger tiles also tend to be thinner, meaning they can crack more easily.

## Grout: It all Comes Down to This

Large tiles are often laid with extremely narrow, almost invisible grout joints. This makes the tiled surface appear more spacious, but it also places considerable demands on the grout: the applied grout must be highly flexible to compensate for mechanical stresses. At the same time, it should also be extremely hydrophobic, especially in bathrooms and kitchens, to prevent moisture from penetrating the wall or floor. Special VINNAPAS® grades for large-format tiles take these requirements into account.

## Walls: Now for the Hard Part

Large size tiles are heavier than small-format tiles. This makes mounting them to walls or floors a challenge for both the installer and the tile adhesive. When pressed against the wall on the intended spot, the tiles should adhere firmly enough to prevent them from slipping off – even minimal slip would mar the overall appearance when several large tiles are laid next to each other. At the same time, customers should still be able to reposition tiles if required. This combination of high sag resistance and prolonged correction time can only be achieved by sophisticated tile adhesive formulations. Meeting these requirements while still securely bonding these demanding tiles to the substrate makes polymer modification a must. Special VINNAPAS® grades have therefore been developed for formulating tile adhesives for larger-sized tiles.

**WACKER**

# WOULD YOU LIKE TO KNOW OUT MORE ABOUT OUR TILE ADHESIVE SOLUTIONS?

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