

About Porosity

General Remarks

The amount of water a product can absorb corresponds directly to its porosity rating. A high water absorption reading means that the product in question has a porous structure which will almost certainly require protection against spills of liquid contaminants which may be absorbed into the porous structure of the tile or stone.

If protection is required it can be obtained by using an appropriate sealer. It's important to remember that the sealer is a barrier which delays absorption, and subsequent staining. Sealers provide an opportunity for removal of the potential contaminant before it enters the tile's structure creating a stain which may prove difficult to remove.

Ceramic Tile

The vast majority of glazed ceramic floor and wall tiles are not porous; the glaze provides effective protection against spills of virtually any kind of liquid contaminant, with the exception of the most harmful and aggressive liquids.

Glazed ceramic tiles, glazed porcelain, unglazed tiles, klinker and natural (un-polished) porcelain tiles rarely require any special treatment. Maintenance usually consists of light mopping and sweeping. Higher levels of foot traffic will call for increased frequency of cleaning, but the process is usually simple.

Some ceramic products do require higher levels of maintenance.

Polished Porcelain

This high gloss product is extremely popular and the best quality material usually has a porosity value of 0.5 per cent which means that it will not require pre-sealing or sealing after it is laid. Natural and polished porcelain are frequently used in commercial environments, subjected to heavy foot traffic and an increased risk of being subjected to impregnation by liquid contaminants.

However, some polished porcelain products, often manufactured in China are not produced in strict accordance with ISO B1a, and have porosity levels greater than 0.5 per cent. The process used to polish the surface of the tile can produce minor holes (too small to see with the naked eye) in the surface of the tile. These holes may provide opportunities for penetration of liquid and a general build up of a film of dirt.

For this reason many retailers recommend that tiles are sealed after laying, this is a relatively simple process that can be conducted by the homeowner, alternatively a professional sealing and maintenance specialist can be engaged.

Some importers provide pre-sealed tiles that have been treated at the factory. A relatively small percentage of these products may exhibit a visual defect described as 'optical hazing'; which is generally defined as "a fuzzy halo seen around certain types of reflected light, also seen as a milky pattern immediately beside low angle reflected natural light".

Other terms used to describe this kind of porosity are 'shadowing' or 'sealer marks'. Most of these products are made in China.

Registered Infotile members can download a free copy of a paper on this subject by Colin Cass entitled 'Optical Hazing - a Consumers Perspective' which is located in the Advice (link) segment of the site as an archived article.

The vast majority of polished porcelain installations proceed to a satisfactory conclusion, however buyers should carefully assess any pre-sealed polished porcelain by asking the tile retailer about the products merits.

None of the effects described are visible when the tiles are tested against ISO 10545 Part 2, section 7 'surface quality'. So to all intents and purposes they are firstly quality products but some buyers are concerned by the presence of 'optical hazing' which appears to them to be a defect.

Terracotta Tiles (Cotto)

These well tried and tested products retain their popularity. Cotto can be used internally or externally, where many kinds of Cotto can be laid around swimming pools or in entertainment areas. Sealing is often essential. The process is simple and the results are excellent. At some stage it will be necessary to remove the original sealer and re-apply.

Some manufacturers provide factory pre-sealed products which are very effective. Australian made cotto tiles are generally less porous than imported product.

Applicable test method: EN ISO 10545 – Part 3.

Determination of water absorption, apparent porosity, apparent relative density and bulk density.

Natural Stone

Again water absorption is a valid indicator of a stone's susceptibility to staining. Dense, compact stone like granite is considerably less porous than marble. While marble can be honed to reduce its porosity and the surface can be effectively sealed it is usually used on vanity top's in bathrooms, while granite is frequently preferred on kitchen benchtops which are normally subjected to a higher level of contact with a variety of different liquid contaminants.

There are a variety of test methods for determining the porosity of stone. Currently the most popular method used in Australia and many other parts of the world is ASTM C97 which measures the weight change which can be attributed to water absorption. The maximum allowable water absorption for each type of stone is prescribed in the standard specifications for that specific stone. As a guide the required ranges vary from 0.20 per cent for marble to 12 per cent for low density limestone. In accordance with ASTM C97, at least 3 specimens of the stone in question are tested.

While a dense stone like granite rarely requires sealing, softer, porous stones like marble frequently do.

There is a vast range of highly effective sealers and maintenance products available on the market, backed by a wealth of knowledge pertaining to application. Every tile and stone product which requires sealing can be treated effectively. Click [here](#) (link leads to sealers in allied products) for more information and remember to ask about appropriate maintenance products for your chosen floor.