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*Mapei **Coloured** Grouts*

The grout that decorates... your world

Beauty which resists everything.

A range of high-quality, highly-functional products rich in colour for internal and external use. Solvent-free, with very low emission level of volatile organic compounds (VOC) and certified in compliance with the most strict international standards. Suitable for all types and formats of floors and walls: ceramic tiles, terracotta, stone material, mosaics and metal. Available as cementitious, grouting paste and epoxy grout. ***Mapei Coloured Grouts***. The choice that completes every project. From Mapei, world leader in the production of grouts and adhesives.


EASY TO CLEAN


MOULD RESISTANT


DURABLE AND STRONG


WIDE RANGE OF COLOURS

Ultracolor Plus

The safest joint. Mould proof

Cementitious grout with a perfect uniform colour.

- For internal and external use
- Anti-efflorescence
- Water-repellent with DropEffect®
- Mould resistant with BioBlock® technology
- Available in 34 colours
- Very low emission level of volatile organic compounds (VOC)
- Classified CG2WA according to EN 13888

CEMENTITIOUS GROUTS

Mapei **has a complete range of grouts** for **all types of internal and external ceramic**, terracotta, stone and glass mosaic **floors** and **walls**.

For example, cementitious grouts are **particularly suitable** for **residential use** such as bathrooms, kitchens, swimming pools, external façades, balconies and terraces, for commercial environments such as grouting tiles in supermarkets, restaurants, airports and public buildings and for floors in industrial environments.

Ultracolor Plus

- High-performance **mortar** for joints from **2** to **20 mm**
- It is not an irritant
- Anti-efflorescence and mould-resistant (**BioBlock®**)
- Water-repellent (**DropEffect®**)
- **Polymer-modified**
- Available in **34 different colours**
- For **internal** and **external** use
- For all types of ceramic, stone, glass mosaic and marble **floors** and **walls**
- For **swimming pools**

Keracolor FF

- High-performance **mortar** for joints up to **6 mm**
- Water-repellent (**DropEffect®**)
- **Polymer-modified**
- Available in **14 different colours**
- For **internal** and **external** use
- For all types of ceramic, stone, glass mosaic and marble **floors** and **coatings**
- For **swimming pools**

Keracolor SF

- High-performance **mortar** for joints **up to 4 mm**
- **Smooth**, **white**, compact and super fine
- **Polymer-modified**
- For **internal** and **external** use
- For all types of pre-polished ceramic, terracotta, glass mosaic, stone and marble **floors** and **walls**
- **Ideal for grouting thin joints**

Keracolor GG

- High-performance **mortar** for joints from **4 to 15 mm**
- **Polymer-modified**
- Available in **14 different colours**
- For **internal** and **external** use
- For all types of ceramic, terracotta, natural brick and stone **floors** and **coatings**
- For **swimming pools**

Fugolastic

- **Liquid polymeric admixture for Keracolor FF, Keracolor GG** and **Keracolor SF**

Fuga Fresca

- **Acrylic resin-based paint in water dispersion** to bring back the colour of joints between ceramic tiles
- Available in **34 different colours** (all colours from the **Keracolor** and **Ultracolor Plus** range)

Keranet

- **Acid-based cleaning solution for ceramic tiles with cementitious joints** available in powder and liquid form, supplied ready-to-use

Kerapoxy Range
...acid proof

A special range of epoxy grouts developed specifically for the industrial sector.

- For internal and external use
- Very high strength and chemical resistance
- Very high resistance to alkalis and hydrocarbons
- Non-absorbent
- Very hygienic
- Available in a wide range of colours
- Very low emission level of volatile organic compounds (VOC)
- Classified RG according to EN 13888
- Suitable for surfaces in direct contact with foodstuff in compliance with the HACCP System - EC REG. 852/2004

KERAPOXY:
RG R2T EC 1

KERAPOXY DESIGN:
RG R2 EC 1

KERAPOXY CQ:
RG R2 EC 1

KERAPOXY IEG:
RG EC 1

KERAPOXY P:
RG

EPOXY GROUTS

Thanks to their technical characteristics, the range of grouting materials for epoxy joints is particularly suitable when **particular requirements for hygiene** and **resistance to aggressive chemicals** are required.

They are used, therefore, in **residential** and **commercial environments** to guarantee a **highly attractive** and **decorative finish** and **no absorption** along with their good performance figures, and in all **industrial environments** where very high **resistance to chemicals and high strength** are required, together with **resistance to acids and hydrocarbons**, such as for floors in the foodstuffs industries (meat factories, oil mills, etc.).

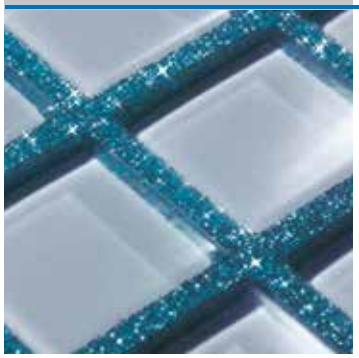
Kerapoxy

- **Two-component** anti-acid **mortar** for joints of at least **2 mm**
- Available in **20 different colours**
- For **internal** and **external** use
- For **ceramic tiles**, **stone**, **cement-fibre** and **concrete**
- Ideal for **commercial environments**
- Suitable for **work-tops**
- May **also** be used as **adhesive**

Kerapoxy IEG

- **Two-component** anti-acid **mortar** for joints of at least **3 mm**
- **Very high strength** and **chemical resistance**
- **Resistance** to **oily acids** and **aromatic hydrocarbons**, including at high temperatures
- **Smooth**, **compact**, non-absorbent, easy-to-clean **surface**
- Available in colours **113** and **130** from the standard range
- For **ceramic floors** or **stone material** in the foodstuffs industries (ham curers, meat factories, oil mills, etc.)

Kerapoxy Design



- **Two-component** anti-acid **mortar**
- Highly **attractive finish**
- **Translucent** finish
- Available in **32 different colours**
- For **internal** and **external** use
- For all types of ceramic and stone with a decorative, attractive finish for **floors** and **coatings**
- Ideal for **glass mosaic**
- May also be used as **adhesive**
- May be mixed with **MapeGlitter** for a wider range of colours and special ornamental finishes

Kerapoxy CQ

- **Two-component** anti-acid **filler,** ideal for **grouting** joints between ceramic tiles and mosaics or **stone material**
- **With a bacteriostatic agent and BioBlock® technology**: it prevents the proliferation of bacteria and the formation of mould on the surfaces of grouts, making tiled surfaces hygienic and safe
- Product **certified by the University of Modena** according to **ISO 22196:2007 standards** as a **grouting mortar protected against the formation and proliferation of micro-organisms**
- **Easy to apply**
- **Very high strength** and **chemical resistance**
- Excellent **workability** and **easy to clean**
- Excellent **resistance to heavy traffic**
- Available in **19 colours**
- For industrial ceramic **floors** and **coatings** where **high strength** and a **high level of hygiene** are required
- May **also** be used as **adhesive**

MapeGlitter

- Metallic coloured **glitter**
- Added to **Kerapoxy Design** up to 10% by weight, to make **grouting mortar** with a **shiny, metallic finish**
- Available in **Light Gold** and **Silver**
- Ideal for **metal tiles**, **mosaic** and **glass tiles**

Kerapoxy P

- **Two-component** anti-acid **mortar** for joints of at least **3 mm**
- **Very high strength** and **chemical resistance**
- Suitable for **large surfaces**
- **Easy to apply by trowel**
- Available in colour **113** from the standard range
- For industrial ceramic **floors** or **stone material** and **coatings**, including particularly large spreads

Kerapoxy Cleaner

- **Special cleaner** for epoxy grout
- Suitable for **cleaning operations after completing laying work** and for **removing traces and stains of epoxy grout** (such as **Kerapoxy, Kerapoxy P, Kerapoxy Design** and **Kerapoxy CQ**) **from the surface of ceramic and glass coverings**

Polymer filler paste for grouting joints in ceramic tiles.

- For internal walls and floors, for external walls
- For joints from 2 to 10 mm
- Ready to use
- Water-repellent (DropEffect®)
- Mould-resistant (BioBlock®)
- Available in 3 colours

READY-TO-USE PASTE PRODUCTS

Mapei has developed a range of **paste products** which, because of their nature, are particularly **easy to use**. The range includes a **flexible polymer grout** suitable for coatings on façades, including those applied on flexible substrates, and a **highly thixotropic adhesive paste** which bonds immediately with no slip.

Flexcolor

- Paste **filler** for joints from **2 to 10 mm**
- **Ready to use**
- Mould-resistant (**BioBlock®**)
- Water-repellent (**DropEffect®**)
- Available in **white (100)**, **manhattan 2000 (110), silver grey (111), medium grey (112)** and **beige 2000 (132)**
- For **internal floors** and **internal** and **external walls**
- For **ceramic tiles** and **mosaic**
- Ideal for **flexible substrates**

Fix & Grout Brick

- **Adhesive paste** for internal and external bonding
- **Ready to use**
- **Easy to apply**, guaranteed laying
- Mould-resistant with **BioBlock®** technology
- Available in **white (100)**, **cement grey (113)** and **beige 2000 (132)**
- **Highly flexible**, excellent bond, good resistance to UV rays and ageing
- **Resistant to temperatures up to +70°C**
- Thixotropic consistency for an **immediate bond with no slip**
- Particularly **suitable for brick slips and cementitious conglomerate elements lightened with synthetic resin**

Choose Mapestone. Time will prove you right.

Mapestone Joint

For pervious elastic paving

Main characteristics:

- Highly pervious
- Allows opening to vehicular traffic in short times
- Resistant to freeze-thaw cycles, de-icing salts and sea-salt
- Sound reducing

Mapestone System

For monolithic paving

Main characteristics:

- High resistance to wear and tear from public transport and commercial vehicles
- Resistant to freeze-thaw cycles, de-icing salts and sea-salt
- Less maintenance
- Flooring rapidly put into service

SOLUTIONS FOR **DECORATIVE STONE SURFACES**

Mapei has developed a range of **specific products for rebuilding decorative stone surfaces** which are ideal for use under various conditions, such as when they have to withstand **heavy loads and intense traffic**. Stone in its various forms and types has been used to create the most beautiful road surfaces in historical town centres and is also used to create **pedestrian zones, cycle lanes and roads exposed to intense traffic**. It is also used in **residential buildings** for external surfaces, stairs and landings.

SYSTEMS FOR LAYING **PORPHYRY** AND **ROUGH-CUT** STONE

Keracolor ***PPN***

- **Pozzolan quick-setting mortar** for grouting paved floors with joints **from 5 to 30 mm**
- **Very low water absorption**
- **High mechanical strength**
- **Ideal for stone floors** subjected to **heavy loads and intense traffic**, such as courtyards in commercial centres, car-parks and public squares and roads with urban traffic

Mapestone ***PFS 2***

- **Pre-blended mortar** for grouting joints in architectonic stone flooring
- **High compressive strength** > 55 MPa after 28 days
- **High resistance to frost, de-icing salts and sea-salt** (XF3, XF4 and XS3)
- **Suitable for grouting architectonic flooring** made from small blocks, smolleri bricks, cobblestones, slabs or blocks
- **Suitable for making piazzas, roads, pavements, car-parks, pedestrian crossings, roundabouts and speed humps**

Mapestone ***PFS PCC 2***

- **Pre-blended, polymer-modified mortar** for grouting joints in architectonic stone flooring
- **Low modulus of elasticity** (20 GPa)
- **Resistant to frost, de-icing salts** and **sea-salt** (XF3, XF4 and XS3)
- **High resistance to abrasion**
- **Suitable for grouting architectonic flooring** made from small blocks, smolleri bricks, cobblestones, slabs or blocks
- **Suitable for use in piazzas, roads, pavements, car-parks, pedestrian crossings, roundabouts and speed humps**

Mapestone ***TFB 60***

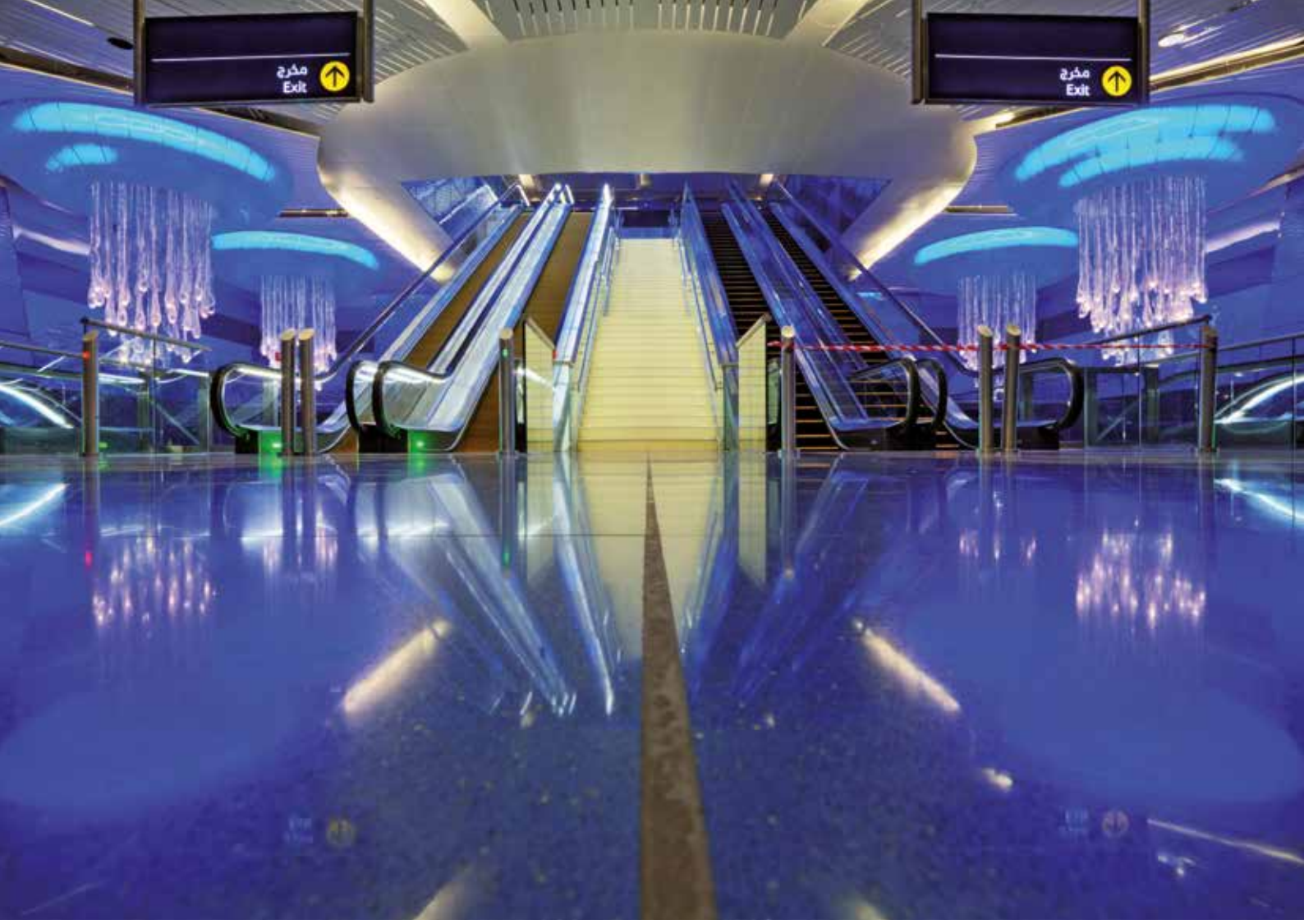
- **Ready-mixed mortar** for installing decorative stone floors
- **High compressive strength** > 60 MPa after 28 days
- **Resistant to frost, de-icing salts and sea-salt** (XF3, XF4 and XS3)
- **High resistance to abrasion**
- **Ideal for installing decorative stone floors** made from slabs, blocks and cobblestones
- **Suitable for creating piazzas, roads, pavements, car-parks, pedestrian crossings, roundabouts and speed humps**

Mapestone ***PFS 2 Visco***

- **Low viscosity ready-mixed mortar** for grouting decorative stone floors
- **High compressive strength** > 55 MPa after 28 days
- **Resistant to frost, de-icing salts and sea-salt** (XF3, XF4 and XS3)
- **High resistance to abrasion**
- **Ideal for installing decorative stone floors made** from slabs and blocks
- **Suitable for creating piazzas, roads, pavements, car-parks and pedestrian crossings**

Mapestone ***Joint***

- **Polyurethane binder for grouting decorative stone floors** in blocks, binderi bricks and cobblestones
- **Gives stone floors** a higher level of elasticity and drainage
- **Resistant to freezing weather** and **de-icing salts**
- **High sound-absorbing capacity**
- **Ideal for grouting decorative stone floors** in blocks, binderi bricks and cobblestones
- **Suitable for creating piazzas, roads, pavements, car-parks, pedestrian crossings, roundabouts and speed humps**



A complete range of coloured products for any request of sealing of floorings and coatings made of ceramic tiles, natural stone and glass mosaics.

- Easy to use
- High performance
- Quick to apply
- Wide range of colours
- Granted results
- Certified according to the most severe international standards
- With very low emission level of volatile organic compounds (VOC)

ELASTIC SEALANTS

Mapei has a **complete range of sealants** developed through constant research with the aim of introducing **high quality products** on the market to make application **easy**, **quick** and **guaranteed**. Only a few of the products from the range are presented in this document, and their characteristics make them suitable for specific applications for ceramic, natural and glass floor finishes. In particular, several one and two-component acrylic, silicone and polyurethane sealants will be presented.

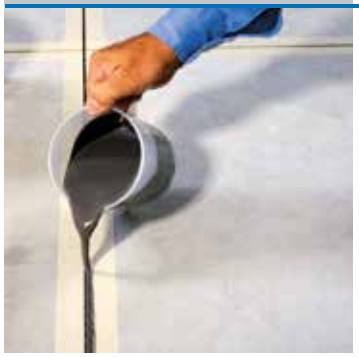
Mapesil AC

- Pure acetic **silicone sealant**
- **Contains no solvents**
- **Low modulus of elasticity**
- **Mould resistant**
- **High strength, high thermal** and **chemical resistance**
- Available in **34 different colours** and **transparent**
- For **glass**, **ceramic**, **sanitary wares** and **varnished surfaces**
- Ideal for **floor joints** and **grouting tiles** in **damp environments** and **swimming pools**
- May be used on concrete, wood, metal, plastics and rubber after treating with **Primer FD**

Mapesil LM

- Neutral **silicone sealant**
- **Odourless**
- **Does not stain** stone surfaces
- **High bond strength** with no primer on a wide range of substrates
- Excellent **resistance to inclement weather and ageing**
- Available in **white (100)**, **manhattan 2000 (110)**, **silver grey (111)**, **grey (112)**, **cement grey (113)**, **grey (114)**, **black (120)**, **jasmine (130)**, **beige 2000 (132)** and **transparent**
- **Ideal for natural stone and ceramic tiles on façades**

Mapeflex PU20



- **Two-component**, high flow epoxy-polyurethane **sealant**
- **High modulus of elasticity**, high strength
- **High chemical resistance**
- **High flow**, quick and easy application on floors
- **Pre-dosed two-component product**
- Available in **grey (113)**
- Ideal for **industrial floors, car-parks, garages, courtyards, commercial areas, warehouses and production areas**

Mapeflex PU30

- **Two-component**, thixotropic epoxy-polyurethane **sealant**
- **High modulus of elasticity**, high strength
- **High chemical resistance**
- Thixotropic consistency **for application on vertical surfaces**
- **Pre-dosed two-component product**
- Available in **grey (113)**
- Ideal for **vertical** and **horizontal joints** in car-parks, garages, commercial areas, warehouses and production areas

Mapeflex PU40

- One-component thixotropic **polyurethane sealant**
- **Low modulus of elasticity** to avoid detachment from the edges of joints
- **Paintable**
- **High bond strength**, no primer required
- **Highly flexible** even at low temperatures
- Available in **white** and **grey (111)** (other colours upon request)
- For **expansion** and **fillet joints** on pre-cast buildings, traditional and ventilated façades, sealing cracks

Mapeflex PU50 SL

- One-component high flow **polyurethane sealant**
- **High flow**, quick and easy application on floors
- **Low modulus of elasticity** to avoid detachment from the edges of joints
- **Paintable**
- **High bond strength**, no primer required
- **Highly flexible** even at low temperatures
- Available in **grey (111)**
- Ideal for **civil** and **industrial floors**, **shopping centres**, car-parks and runways subjected to large movements and with a slope up to 2%

Mapeflex PU 45 FT

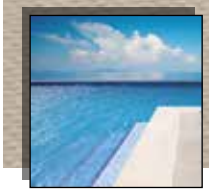
- One-component, thixotropic polyurethane **sealant and adhesive**
- **Single product for flexible bonds and seals**
- **High modulus of elasticity**, high resistance to traffic
- **High sucker effect** for bonding on vertical surfaces and ceilings
- **Paintable**
- **High bond strength**, no primer required
- **Compatible with all absorbent mineral substrates, metal surfaces, varnished surfaces, wood, stone, brickwork and glass**
- Available in **white**, **grey (111)**, **grey (113)** and **black (120)** (300 ml); **grey (111)** and **black (120)** (600 ml)
- Ideal for **sealing civil** and **industrial floors** and **flexible bonding** of construction features instead of using screws, nails and lightweight fittings

Mapeflex PU21

- **Two-component**, thixotropic epoxy-polyurethane **sealant**
- **High modulus of elasticity**, high strength
- **High surface hardness,** good resistance to vehicle traffic
- **Good chemical resistance**
- **High flow**, quick and easy **application on floors**
- Available in **grey (113)**
- Ideal for **internal joints** in covered car-parks, supermarkets, warehouses and store rooms

Kerapoxy CQ

The high-performance, **multifunctional, easy-to-use** epoxy grout with a **bacteriostatic** agent




Available in 19 colours!

Easy-to-use, anti-acid, easy-to-clean, with a **bacteriostatic agent** and **BioBlock® technology**, two-component **epoxy filler**, ideal for grouting the joints of ceramic tiles and mosaics.

- **With a bacteriostatic agent and Mapei BioBlock® technology**: this grout avoids the formation of micro-organisms and moulds on the joints' surface, making the tiled surfaces hygienic and healthy, as certified by the University of Modena (Italy) according to **ISO 22196:2007** standard.
- **The BioBlock® technology** blocks the formation and growth of micro-organism in damp environments.
- **EMICODE EC1 R Plus-certified**: with very low emission level of volatile organic compounds (VOC) - Plus.
- Ideal for grouting floor joints where a high level of hygiene is required (**industrial**, **commercial**, **residential environments**, **swimming pools**, **worktops**, etc.).
- It allows the building of ceramic surfaces complying with the **HACCP** systems and meets the requirements set by **CE 852/2004** regulations concerning the hygiene of food products.

MAPEI TILE JOINTS: THE BEST CHOICE, WHATEVER THE ENVIRONMENT

What are tile joints for?

It is very important that tiles are installed with large joints between each tile, especially with large formats and tiles installed on external surfaces, for the following reasons:

Any difference in the dimensions of the tiles has less influence. This is confirmed by the maximum permitted step between tiles according to Technical Report CEN/TR13548 (*"General rules for the design and installation of ceramic tiling"*). According to this Technical Report, the maximum acceptable step between tiles is 1 mm for joints up to 6 mm wide and 2 mm for joints wider than 6 mm. It is clear, therefore, that as the width of the joint increases, any steps between tiles have less of an impact.

They considerably reduce the modulus of elasticity and, therefore, the stiffness of the tiling. While the stiffness of tiling installed by butting the tiles together is comparable to that of a stiff, seamless surface as if it were a single tile, when tiles are installed with "open" joints, each of the tiles which form the tiled surface is a single element and, within certain limits, has a certain degree of movement. This characteristic helps the tiling withstand stresses induced by the different degrees of movement between the various layers that make up the system, and provides efficient protection against the risk of tiles lifting or becoming detached from the floor. This reduces, the risk of compressive forces being generated in the tiling due to small movements in the floor or dimensional instability in the substrate, thus provoking detachment and/or cracking of the tiling.

They allow the amount of filler, or grout, in the joints to be calibrated correctly. This leads to a number of advantages, such as the durability of the grout and its aesthetic, mechanical and functional characteristics.

For these and many other reasons, installing tiles with a wide joint is a requirement of numerous international standards.

Tile joints: the detail that makes all the difference!

*Figs. **1_2** - Test to measure abrasion resistance*
*Fig. **3** - Verifying the stability of a sample of cementitious grout*

International standards

Up until the 1990's, the situation of international standards covering products for the installation of ceramic tiles and natural stone were extremely complicated and non-uniform. Each European and non-European country had its own set of standards issued by national institutes representing each country. This situation obviously posed serious problems for companies with a vocation for international commerce, such as Mapei. Certifying each product in different countries represented a considerable cost for such companies, and dedicated research teams were required to reproduce the various national test conditions required in our laboratories. Also, there were so many contradictions between the various standards that it would have been necessary to adapt the formulations and products in order to satisfy the minimum requirements for each single country. And what is more, at the beginning of the 1980's, many national standards were obsolete and no longer relevant to the latest application techniques and the new types of covering materials which were taking a foothold during that period. In order to address this situation, in 1989 CEN, the European Standards Committee, formed a dedicated technical group with the aim of developing a series of standards for tiling adhesives and grouts. Mapei has always taken an extremely proactive and propositional position within this group over the years, taking on the role of Chairman. Up until now the technical group has met a total of 44 times, and in 2001 issued Euronorm EN 12004 regarding the specifications and requirements for tiling adhesives, and in 2002 Euronorm EN 13888 which establishes the specifications and requirements for grouts. Revisions of these standards were published in 2007 and 2009. The European approach was used as a model to create a group within the ISO (International Standard Organisation) 189 committee, dedicated to the standardisation of ceramic tiles. Mapei also played a key role in this activity, with the manager of Mapei Corporation Research & Development, acting as group coordinator. In this case, the group has published the ISO 13007 standard which is dived into 4 parts:

ISO 13007 – 1:
terms, definitions and specifications for adhesives

ISO 13007 – 2:
test methods to determine the characteristics of adhesives

ISO 13007 – 3:
terms, definitions and specifications for grouts

ISO 13007 – 4:
test methods to establish the properties of grouts

ISO 13007 - 1 and ISO 13007 - 3 were published in December 2004. ISO 13007 - 2 and ISO 13007 - 4 were published in September 2005. The ISO standards were then approved and published by various national institutes.

The advantages deriving from using products on site which comply with ISO standards are obvious and immediate. Firstly, the classifications defined by the standards offer a clear identification of the properties of products so they may then be selected according to their specific application and prevent them being replaced by other products with inferior characteristics. Also, the practice of classifying products has undoubtedly led to more transparency regarding the quality of products available on the market.
Classification requirements and their relative testing methods were chosen using simplicity and repeatability as their main criteria. They must also represent characteristics which really reflect the most critical application aspects of the product.

*Fig. **4** - Test to measure the flexural strength of a sample of cementitious grout*
*Fig. **5** - Water absorption test*

Cementitious grouts

EN 13888

Cementitious grouts in this standard are defined as CG and are divided into two main classes, CG1 and CG2. These are the normal and improved classes respectively, and are followed by special classes: A for products with high abrasion resistance and W for products with low water absorption. A typical class CG1 grout may be considered sufficient for installing ceramic or porcelain tiling not subject to excessive variations in temperature and humidity in residential and commercial environments. For areas subject to prolonged periods of high humidity and thermal shock or intense traffic, on the other hand, conditions typically found in high-intensity commercial and industrial environments, a class CG2 grout is recommended. Even though the standard does not distinguish between normal-setting and rapid-setting grout, it is recommended to use the latter type when surfaces need to be put back into service quickly, for example in retail, airports, public areas, swimming pools, etc.

Class A is required when the area is subject to intense foot or trolley traffic when in service such as in supermarkets, or if there is a continuous flow of water, typical of fountains. W class products, on the other hand, are recommended when the installation is subjected to continuous immersion in water, such as tiling in fountains and swimming pools. In the test carried out as prescribed in the standard (*Figures 1 and 2*), a 10 x 10 cm sample of the product is subjected to a continuous, constant flow of spheres of abrasive material. At the end of the test, the loss in weight is measured. To measure the risk of cracking due to hygrometric shrinkage in the product, the test prescribed in the standard (*Figure 3*) measures the amount of movement in a 4 x 1 x 16 cm test sample cured for 28 days. A product with adequate dimensional stability (that is, very little hygrometric shrinkage) may also be used to tile surfaces where the width of the joints varies. Testing is carried out after 28 days and include compressive and flexural strength tests, which are carried out on samples measuring 4 x 4 x 16 cm (*Figure 4*).

Appropriate products may even be employed without any particular problem for tiled surfaces subject to particularly heavy traffic. Excessive water absorption by the grout may have a disastrous e ffect on the entire tiled surface if it is subjected to constant immersion in water and tiles become detached. The standard prescribes a test in which the amount of water a product absorbs is estimated by measuring capillary lift. Samples are cured for 28 days, partially immersed in water and their increase in weight is measured after being immersed for 30 minutes and 4 hours (*Figure 5*). Products with low water absorption may be successfully used even in critical situations, such as mosaic tiles in swimming pools.

Grouts made by Mapei, such as **Keracolor FF** for joints up to 6 mm wide, **Keracolor GG** for joints from 4 to 15 mm wide and **Ultracolor Plus** for joints from 2 to 20 mm wide, are all part of the improved class of grouts CG2WA and, as such, are guaranteed when used in particularly critical site conditions, such as those described above. **Ultracolor Plus** is also a fast setting grout, ideal for applications which need to be put back into service quickly with a approximate set to foot traffic time of 3 hours.

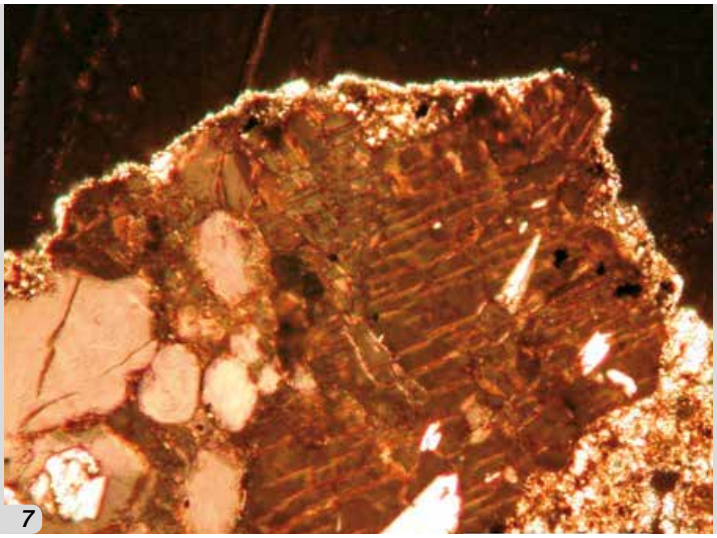


*Fig. **6** - The surface of cementitious grout with efflorescence*
*Fig. **7** - A thin section of cementitious grout with efflorescence viewed through a microscope*

DROPEFFECT®

Amongst the added characteristics of Mapei grouts, which are not covered by current standards and which guarantee that they are colour-fast and easy to clean, there is the so-called DropEffect® technology which allows grouted joints to be created which are particularly water repellent. Thanks to this technology, liquids deposited on the surface are not absorbed but remain on the surface in the form of droplets, so joints are much easier to clean.

BIOBLOCK®

In damp environments, BioBlock® technology inhibits the formation and proliferation of various types of mould on the surface of grouted joints, which not only cause an unsightly finish, but also has a negative effect on pollution levels in internal environments and inevitable consequences on the health of final users.

ANTI-EFFLORESCENCE

Ultracolor Plus also has characteristics which guarantee against the formation of efflorescence, one of the most unsightly defects on ceramic tiling, which forms on both internal and external façades. *Figure 6* shows the surface of a product with efflorescence. The classic white streaks are typical of formulas based on the use of Portland cement as a binder. If a thin section of the joint is analysed through a microscope, the type of chemical which forms the efflorescence may be identified on the surface of the product due to the reaction between carbon dioxide contained in the atmosphere and calcium hydroxide produced by hydration of the cement, represented by the thin white superficial line (*Figure 7*). Further experimental support into the morphologic and chemical study of the efflorescence may be made using an electronic scansion microscope, an instrument which can produce highly magnified images (up to 800,000x magnification) of the surface of the product and assess the exact chemical composition of the surface. *Figure 8* shows the images taken using this technique, which are then used to observe how the efflorescence is made up of numerous groups of flat crystals which, upon analysis, are formed by calcium carbonate. The binder in **Ultracolor Plus** does not contain Portland cement, that is, the source of carbonate, which makes the product completely immune from the formation of efflorescence.

Ultracolor Plus is an ideal product for colour stability.

The aesthetic stability guaranteed by this product obviously does not compromise the characteristics described in the standards, as confirmed by its CG2WA classification status.

Overall, **Ultracolor Plus** is a grout which offers the highest performance on site, prevents problems due to mechanical and thermal stresses, anti-aesthetic effects due to instability of the colour and is nowadays a product with unique characteristics which has no rival on the market.

*Fig. **8** - Tile joint with efflorescence viewed through an electron microscope*

*Fig. **9** - Accelerated ageing test using a weatherometer*
*Figs. **10_11** - Verifying colour with a spectrophotometer*

Epoxy grouts

EN 13888

From a standards point of view the issue related to epoxy grouts is relatively simple since the standard specifies only one class (RG), and all epoxy grouting mortars which meet the minimum requirements are in this class.

Specifications for reactive sealants

Main characteristics		
Characteristic	Requirement	Test method
Resistance to abrasion	≤ 250 mm^3	EN 12808-2
Flexural strength after dry storage	≤ 30 N/mm^2	EN 12808-3
Compressive strength after dry storage	≤ 45 N/mm^2	EN 12808-3
Shrinkage	≤ 1.5 mm/m	EN 12808-4
Water absorption after 240 mins.	≤ 0.1 g	EN 12808-5

Because the values are so high, Euronorm EN 13888 does not have any other sub-classes.

All Mapei epoxy grouts are classified RG because they meet all the aforementioned requirements.

Epoxy grouts are normally used when particularly hygienic surfaces are required, or if there are particular strength or chemical resistance requirements. They are particularly suitable, in industrial environments and in the residential sector in areas such as bathrooms, kitchens, laundry rooms, etc. where total cleanability of the joints is important.

The use of Mapei epoxy grouts allows floors, walls, worktops, etc. to comply with the HACCP system and the requirements of EC Regulation No. 852/2004 regarding the hygiene of foodstuffs.

Colour

There are no national or international standards which cover this issue related to the aspect of the grout, even if it is one of the main characteristics to take into consideration to meet a client's requirements.

Mapei grouts (cementitious and epoxy) are available in a wide variety of colours (more than 50) if we consider the various colour ranges to satisfy even the most demanding client. And if we also consider the addition of **MapeGlitter** coloured metallic glitter, available in 22 different colours, to **Kerapoxy Design** (two-component, anti-acid, translucent, decorative epoxy mortar for grouting glass mosaic, ceramic tiles and stone with a highly attractive finish), the number of possible colour combinations are even higher.

The durability and uniformity in colour of Mapei grouts is guaranteed by their special formulation and the use of pigments which remain stable if subjected to UV rays or other atmospheric phenomena. All our products undergo accelerated ageing tests using a weatherometer (*Figure 9-10*), a very useful instrument used to assess the reaction of products exposed to various weather cycles, such as sunlight, rain (including acid rain) and temperature variations.

Before being marketed, all Mapei grouts are subjected to rigorous quality control tests in compliance with the ISO 9001 system, certification awarded to the company in 1994. A special instrument called spectrophotometer is used to check the colour of cementitious and epoxy grouts before they are put on sale to make sure they comply with Mapei quality standards and that every production batch is the same (*Figures 11 and 12*).

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