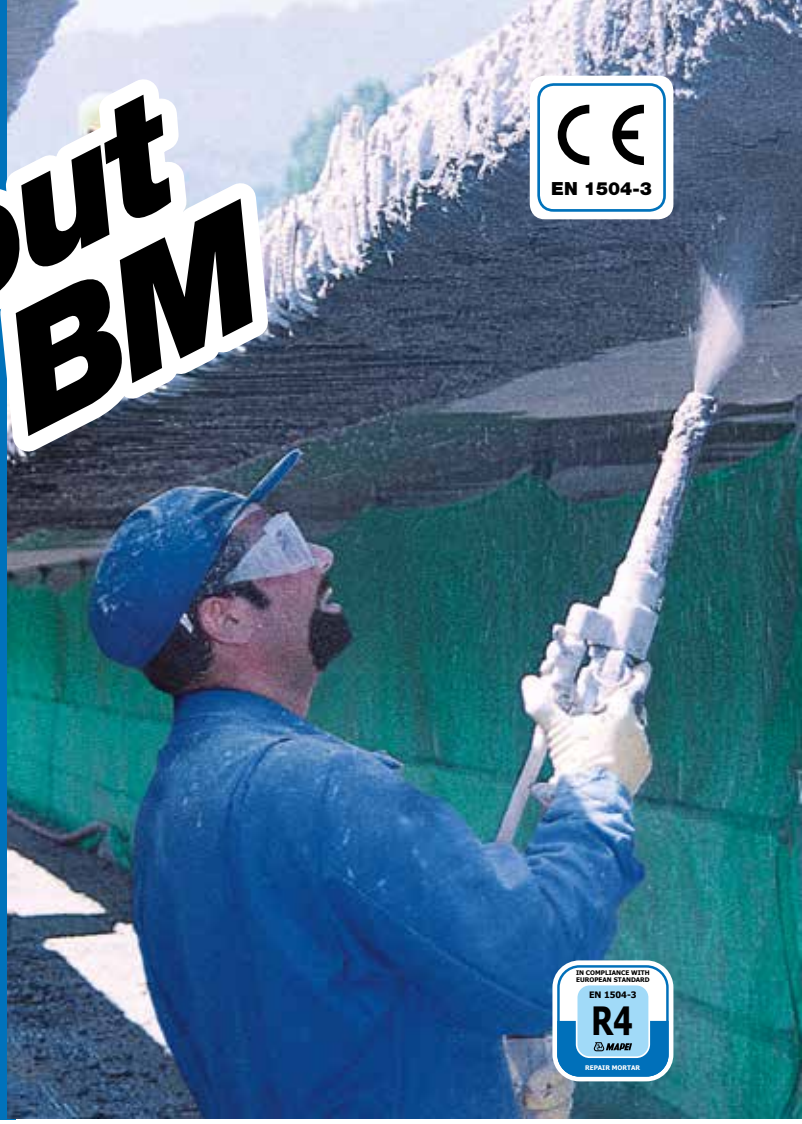
MAPEI

Mapegrout BM



Two-component cementitious mortar with low modulus of elasticity for the repair of concrete

WHERE TO USE

Surface repair of degraded concrete, concrete subject to small deformations under loads or thermal cycles, or concrete exposed to particularly adverse weather conditions.

Some application examples

- Repair of degraded concrete sections, corners of pillars and beams, balconies damaged by rusting of reinforcing bars.
- Filling of rigid joints (e.g. between bases and pillars, cracks in floors, between walls, etc.).
- Repair of precast concrete sections.
- Canals and hydraulic projects where waterproof concrete is required.
- Repair of concrete subject to small deformations under loads.

TECHNICAL CHARACTERISTICS

Mapegrout BM is a pre-blended thixotropic cement-based mortar composed of two components (A and B) to be mixed with each other, 5.3 parts by weight of part A, and 1 part by weight of part B, that needs the addition of no other ingredients (water, cement, etc.), manufactured according to a formula developed in the MAPEI Research & Development laboratories.

Component A (powder) is composed of cement, selected well graded aggregate, synthetic fibres and special additives that reduce plastic shrinkage as well as final hygrometric shrinkage, and is available in 25 kg bags.

Component B (liquid) is a solution of synthetic resins in water and is available in 4.7 kg drums.

If **Mapegrout BM** is prepared by only adding latex, it must be cured under damp conditions in order to guarantee that the product's expansive properties develop completely and correctly. However, there is no guarantee that these conditions can be created on site. Therefore, to guarantee that the expansive properties of **Mapegrout BM** take place when drying in the open air, 0.25% of **Mapecure SRA**, a special additive which has the property of reducing both plastic and hydraulic shrinkage, may be used to great advantage when added it to the mix.
Mapecure SRA has a very important role to play, in guaranteeing better curing of mortar. Also, when mixed with **Mapegrout BM**, it may be considered a technologically advanced system, in that the additive has the capacity of slowing down evaporation of the water and of promoting the development of hydration reactions.
Mapecure SRA behaves like an internal curing agent and, thanks to its interaction with some of the main components which make up the cement, it helps to reduce shrinkage by between 20% and 50% compared with the standard values of the product without the additive. This will obviously lead to a reduced risk of cracking phenomena.
The main characteristics of hardened **Mapegrout BM** (after 28 days) are:

- low modulus of elasticity: 22 GPa;
- high ratio of flexural strength (> 10 MPa) to compressive strength (> 47 MPa);

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- high adhesion to the concrete surface (> 2 MPa);
- little size variation with respect to hygrometric variation;
- excellent performance in adverse weather conditions;
- resistance to aggressive chemicals.

Mapegrout BM meets the requirements defined by EN 1504-9 ("*Products and systems for the protection and repair of concrete structures. Definitions, requirements, quality control and evaluation of conformity. General principles for the use of products and systems*") and the minimum requirements claimed by EN 1504-3 ("*Structural and non structural repair*") for structural mortars of class R4.

RECOMMENDATIONS

- Do not apply **Mapegrout BM** on smooth concrete surfaces: roughen the surface first.
- Do not add cement, water or additives to **Mapegrout BM**.
- Do not use **Mapegrout BM** for repairs involving pouring into formwork (use **Mapegrout Hi-Flow**).
- Do not use **Mapegrout BM** for anchoring (use **Mapefill** or **Mapefill R**).
- Do not use **Mapegrout BM** for creating renders without reinforcement.

HOW TO USE

Preparing the substrate

- Remove degraded and loose concrete until the substrate is sound, resistant and rough. Any previous repair work that is no longer thoroughly bonded must be removed.
- Sandblast the concrete and the reinforcing bars until they are free of dirt, rust, cement laitance, grease, oil, varnish or old paint.
- Saturate the substrate with water.

Before repairing with **Mapegrout BM**, wait until the excess water has evaporated. To facilitate the elimination of free water, use compressed air or a sponge if needed.
The substrate should be saturated with water underneath but dry on the surface.

Preparing the mortar

Pour the liquid part B into a suitable receptacle, then slowly pour in the powder, part A, mixing with an agitator. For every 25 kg bag of part A powder, use one 4.7 kg drum of part B liquid.
Mix thoroughly for several minutes, taking care to scrape any unblended powder from the bottom and sides of the mixer. If improved open-air curing of the mortar is required, add **Mapecure SRA** at the end of the mixing phase at a dosage of 0.25% in weight of the mortar (0.25 every 100 kg of **Mapegrout BM**). Mix until a completely homogeneous, totally lump-free paste is obtained.
When mixing is completed, a plastic mortar is obtained. **Mapegrout BM** remains workable for approx. 1 hour at +20°C.
To facilitate mixing, an immersion mixer or a drill with a mixer attachment should be used at low speed.
Avoid mixing manually. If there is no alternative to mixing manually, press the mortar against the sides of the receptacle with a trowel to break up the lumps. Large quantities of mortar can be mixed in a cement mixer.

N.B. *Do not add water or cement to the mortar because that would alter its final characteristics.*

Application procedure

The mortar can be applied with a trowel or spray without needing formwork even on vertical surfaces or ceilings in a maximum thickness of 35 mm per layer.
Reinforcing bars must be previously treated with **Mapefer** or **Mapefer 1K** before applying **Mapegrout BM**.
The complete repair cycle calls for smoothing with **Mapefinish**, or **Monofinish**, or **Planitop 200**, and then painting with **Elastocolor Paint**.
If a more "flexible" surface finish is required, a coat of **Mapelastic** or **Mapelastic Guard** can be applied over **Mapegrout BM** before applying the **Elastocolor Paint**.

PRECAUTIONS TO BE TAKEN DURING AND AFTER THE APPLICATION

- No special precautions need be taken at temperatures around +20°C. In warm weather the material should not be exposed to direct sunlight.
  Keep it in a cool place. At low temperatures keep the product in a heated area.
- After application, the **Mapegrout BM** mortar must be carefully cured. To prevent the rapid evaporation of water that can cause surface cracks due to plastic shrinkage, spray water on the surface the first 24 hours of curing, or else use an anti-evaporation compound (**Mapecure E**).
- An anti-evaporation compound may only be used if the mortar is not to be covered by flooring materials or other layers of mortar.
- For more effective repair work, a welded mesh may be embedded in the mortar, especially when the thickness of the mortar exceeds 3 cm.

Cleaning

Mortar that has not hardened may be removed from tools with water. After setting, cleaning is difficult and can only be done mechanically.

CONSUMPTION

Approx. 21 kg/m^2 per cm of thickness.

PACKAGING

25-kg bags (component A); 4.7 kg drums (component B).

STORAGE

Mapegrout BM component A may be stored up to 12 months in a dry place in its orginal packaging.

TECHNICAL DATA (typical values)

PRODUCT IDENTITY		
Class according to EN 1504-3:	R4	
Type:	PCC	
	component A	**component B**
Consistency:	powder	liquid
Colour:	grey	white
Maximum aggregate size (mm):	2.5	–
Bulk density (g/cm³):	1,350	–
Density (g/cm³):	–	1,070
Dry solids content (%):	100	13
Chloride ions content: – minimum requirements ≤ 0,05% - according to EN 1015-17 (%):	≤ 0.02	≤ 0.02
pH:	–	9

APPLICATION DATA (at +20°C - 50% R.H.)	
Colour of mix:	grey
Mixing ratio:	component A : component B = 5.3 : 1 100 parts of **Mapegrout BM** component A with 18.8 parts of **Mapegrout BM** component B
Consistency of mix:	thixotropic
Density of mix (kg/m³):	2,100
pH of mix:	> 12.5
Application temperature range:	from +5°C to +35°C
Pot life of mix:	ca. 1 h
Waiting time between one layer and the next:	ca. 4 h

FINAL PERFORMANCE (mixing and compacting according to EN 196-1)

Performance characteristic	Test method	Minimum requirements according to EN 1504-3 for R4 class mortar	Product performance
Compressive strength (MPa):	EN 12190	≥ 45 (after 28 days)	> 8 (after 1 day) > 38 (after 7 days) > 47(after 28 days)
Flexural strength (MPa):	EN 196/1	not required	> 3 (after 1 day) > 5 (after 7 days) > 10 (after 28 days)
Modulus of elasticity in compression (GPa):	EN 13412	≥ 20 (after 28 days)	22 (after 28 days)
Bond strength to concrete (MC 0.40 type substrate water/cement ratio = 0.40) according to EN 1766 (MPa):	EN 1542	≥ 2 (after 28 days)	> 2 (after 28 days)
Resistance to accelerated carbonation:	EN 13295	Depth of carbonation ≤ reference concrete (MC 0.45 type with water/cement ratio = 0.45) according to UNI 1766	test passed
Impermeability to water - penetration depth - (mm):	EN 12390/8	not required	< 10
Capillary absorption ($kg/m^2 \cdot h^{0.5}$):	EN 13057	≤ 0.5	< 0.25
Thermal compatibility measured as bonding according to EN 1542 (MPa): **– freeze-thaw cycles with deicing salts:** **– storm cycle:** **– dry thermal cycle:**	 EN 13687/1 EN 13687/2 EN 13687/4	 ≥ 2 (after 50 cycles) ≥ 2 (after 30 cycles) ≥ 2 (after 30 cycles)	 > 2 > 2 > 2
Exposure class:	EN 206/1	not required	X0, XC1, XC2, XC3, XC4, XS1, XD1, XD2, XF1, XF2, XF3, XF4 (**), XA1
Reaction to fire:	EN 13501-1	Euroclass	E

(**) ***Mapegrout BM*** *was tested according to the standard EN 12390-9 compared with reference concrete with composition in compliance with class XF4 according to EN 206-1.*

Mapegrout BM

The special packaging, made from 25 kg vacuum-packed polyethylene bags, allows the product to be stored outside for the entire duration of the site. Rain has no effect on its characteristics.
Mapegrout BM component B may be stored for 24 months.
Store both components at a temperature not lower than +5°C.

SAFETY INSTRUCTIONS FOR PREPARATION AND INSTALLATION

Instructions for the safe use of our products can be found on the latest version of the Safety Data Sheet, available from our website www.mapei.com.

PRODUCT FOR PROFESSIONAL USE.

WARNING

Although the technical details and recommendations contained in this product data sheet correspond to the best of our knowledge and experience, all the above information must, in every case, be taken as merely indicative and subject to confirmation after long-term practical application; for this reason, anyone who intends to use the product must ensure beforehand that it is suitable for the envisaged application. In every case, the user alone is fully responsible for any consequences deriving from the use of the product.

Please refer to the current version of the Technical Data Sheet, available from our website www.mapei.com

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