MAPEI

IN COMPLIANCE WITH
EUROPEAN STANDARD
EN 1504-3
R3
MAPEI
REPAIR MORTAR

CE
EN 1504-3

Mapegrout LM2K

Two-component, thixotropic, fibre-reinforced, cementitious mortar with a low modulus of elasticity and added organic corrosion inhibitor for repairing concrete, applied in a single layer at a thickness of from 3 to 20 mm

WHERE TO USE
Repairing deteriorated surfaces and smoothing and levelling concrete structures subject to small deformations under load.

Some application examples
- Smoothing over surface defects in cast concrete, such as honeycombing, spacer holes, construction joints, etc.
- Repairing deteriorated parts in concrete, the corners of beams and pillars and the front edges of balconies.
- Repairing prefabricated concrete structures.

TECHNICAL CHARACTERISTICS
Mapegrout LM2K is a pre-blended thixotropic cementitious mortar with corrosion inhibitor made from two pre-dosed components (A and B) to be mixed together, according to a formula developed in MAPEI's research laboratories.
Component A (powder) is made from cement, selected mixed aggregates, synthetic fibres and special additives which reduce both plastic shrinkage and final hygrometric shrinkage, and is available in 25 kg sacks.
Component B (liquid) is a solution of synthetic resin in water and is available in 5.25 kg canisters.
After hardening, **Mapegrout LM2K** has the following properties:
- low modulus of elasticity: 17 GPa;
- excellent bond strength to both old concrete (> 2 MPa) if wetted beforehand with water, and steel reinforcement, when treated with **Mapefer** or **Mapefer 1K** anti-corrosion and re-alkalising cementitious mortar; certified according to EN 1504-7 "*Corrosion protection of reinforcement*";

- high dimensional stability and, therefore, low risk of cracking during the plastic phase and when hardened. To improve the excellent inherent performance of **Mapegrout LM2K**, especially at high temperatures, add 0.25% of the weight of components A+B of **Mapecure SRA** while mixing. This is a special internal curing agent which reduces surface tension in the capillary pores and, as a result, improves dimensional stability;
- thermal compatibility measured as bond strength according to EN 1542;
- resistance to aggressive agents in the atmosphere (e.g. CO_2).

Mapegrout LM2K complies with the principles defined in EN 1504-9 ("*Products and systems for protecting and repairing concrete structures: definitions, requirements, quality control and conformity assessment. General principles for the use and application of systems*"), and the minimum requirements for EN 1504-3 ("*Structural and non-structural repairs*") for R3-class structural mortars.

RECOMMENDATIONS
- Do not apply **Mapegrout LM2K** on smooth substrates: create a slightly rough surface beforehand.
- Do not add cement or additives to **Mapegrout LM2K**.
- Do not use **Mapegrout LM2K** to carry out repairs by casting into formwork (in such cases, use **Mapegrout Hi-Flow** or **Mapegrout Hi-Flow GF**).
- Do not use **Mapegrout LM2K** for fixing elements in place (use **Mapefill** or **Mapefill R**).
- Do not apply **Mapegrout LM2K** if the temperature is below +5°C.

Application of Mapegrout LM2K by trowel

Tamping Mapegrout LM2K

- Do not use **Mapegrout LM2K** if the bag is damaged or if it has been opened previously.

APPLICATION PROCEDURE
Preparation of the substrate
- Remove all deteriorated and loose concrete to form a solid, rough and strong substrate. Any areas previously repaired and which are not bonded must also be removed.
- Remove all dust, rust, cement laitance, grease, oil and paint from the concrete and reinforcement rods by sandblasting or hydro-sandblasting.
- Treat reinforcement rods with **Mapefer** or **Mapefer 1K**, according to the procedure illustrated in the relative technical data sheet for each product.
- Wait until **Mapefer** or **Mapefer 1K** has dried.
- Before applying the **Mapegrout LM2K**, damp the substrate without leaving pools of water.

Preparation of the mortar
Pour component B (liquid) into a suitable clean container and slowly add component A (powder) while stirring with a mechanical mixer. For each bag of component A powder (25 kg), add a 5.25 kg tank of component B liquid.
Carefully mix the blend for several minutes then remove any powder which has stuck to the sides and bottom of the container.
If better open-air curing of the mortar is required, including in severe climatic conditions, add 0.25% in weight of **Mapecure SRA** immediately after mixing (one 0.25 kg canister every 100 kg of **Mapegrout LM2K**).
Keep mixing until all the ingredients are well blended and until there are no lumps. After mixing, mortar with a plastic consistency is formed.
Mapegrout LM2K remains workable for approximately 1 hour at +20°C.
To make it easier to form a smooth, even paste, use an immersion mixer or a low-speed drill with a spiral mixing attachment to avoid dragging air into the mix. Avoid mixing the product manually. If manual mixing is unavoidable, use a trowel and press the mortar against the sides of the container to break down all the lumps.

N.B. *In high temperatures, add water at a rate of 1% of the weight of the powder (0.25 kg every 25 kg bag of component A).*

Application of the mortar
Apply the mortar by trowel and without formwork in layers from 3 to 20 mm.
Mapegrout LM2K may be applied by spray with a suitable worm-screw or piston-type spray rendering machine, such as a Turbosol or a Putzmeister. Do not use a continuous-feed type rendering machine.
Apply the **Mapegrout LM2K** after treating the steel reinforcement with **Mapefer** or **Mapefer 1K**.
According to the weather conditions, tamp the surface with a sponge float as soon as the mortar starts to set. This operation is necessary to avoid the formation of micro-cracking due to plastic shrinkage.

If a finer finish is required, smooth over the surface immediately after completing the repair work with one of the following products according to specific requirements: **Monofinish**, **Mapefinish**, **Planitop 200** or **Planitop 207**. If the structure to be repaired is subject to high dynamic stress, it may be advantageous to apply a flexible smoothing and levelling compound, such as **Mapelastic**, **Mapelastic Guard** or **Mapelastic Smart**. The final protective coat may be formed using the coloured finishing product **Elastocolor Paint**.

PRECAUTIONS TO BE TAKEN DURING AND AFTER APPLICATION
- Only use bags of **Mapegrout LM2K** which have been stored on their original pallets to prepare the mortar.
- No special precautions need to be taken if the temperature is around +20°C. In hot weather, do not expose the material to the sun and protect it by storing it in a cool area. In cold weather, we recommend storing the product in a heated area.
- After applying and tamping the mortar, to achieve the best performance we recommend that the curing of the **Mapegrout LM2K** is carried out correctly by applying **Mapecure E** anti-evaporation agent in watery emulsion with a low pressure pump, **Mapecure S** film-forming solvent curing agent for mortar and concrete or **Elastocolor Primer**, high-penetration solvent fixing agent for absorbent surfaces and curing agent for repair mortar.
As with all the best products in this category available on the market, **Mapecure E** and **Mapecure S** impede the bond of successive coating layers. Therefore, if smoothing and levelling compound or paint are to be applied, they must be completely removed by sandblasting. If **Elastocolor Primer** is used to block evaporation, the final protective layer of **Elastocolor Paint** may be applied directly on the surface without removing it.

Cleaning
Mortar which has not yet hardened may be washed from tools using water. Once hardened, cleaning is much more difficult, and it must be removed mechanically.

CONSUMPTION
Approximately 21 kg/m² per cm of thickness.

PACKAGING
25 kg bags (component A) and 5.25 kg canisters (component B).

STORAGE
Mapegrout LM2K component A may be stored for up to 12 months in its original packaging.
The product complies with the conditions of Annex XVII to Regulation (EC) N° 1907/2006 (REACH), item 47.
The product is available in special 25 kg vacuum-packed polyethylene sacks which may be stored outside for the entire construction phase of the site. Rain has no effect on its characteristics.

Mapegrout LM2K: *two-component, thixotropic, fibre-reinforced cementitious mortar with organic-based corrosion inhibitor and low modulus of elasticity for repairing and smoothing concrete in conformity with EN 1504-3 class R3*

TECHNICAL DATA (typical values)

PRODUCT IDENTITY

Class according to EN 1504-3:	R3	
Type:	PCC	

	component A	component B
Consistency:	powder	fluid liquid
Colour:	grey	white
Maximum size of aggregate (mm):	1.6	–
Bulk density (g/cm³):	1.2	–
Density (g/cm³):	–	1.0
Dry solids content (%):	100	7.7
Chloride ions content **– minimum requirement ≤ 0.05%:** **according to EN 1015-17 (%):**	≤ 0.02	≤ 0.02

APPLICATION DATA OF PRODUCT (at 20°C – 50% R.H.)

Colour of mix:	grey
Mixing ratio:	100 parts of **Mapegrout LM2K** component A with 21 parts of **Mapegrout LM2K** component B
Consistency of mix:	plastic-thixotropic
Density of the mix (kg/m³):	2,080
Application temperature range:	from +5°C to +35°C
Pot life of mix:	approx. 1 hour

FINAL PERFORMANCES

Performance characteristic	Test method	Requirements according to EN 1504-3 for R3-class mortar	Performance of product
Compressive strength (MPa):	EN 12190	≥ 25 (after 28 days)	≥ 10 (after 1 day) ≥ 20 (after 3 days) ≥ 27 (after 7 days) ≥ 38 (after 28 days)
Flexural strength (MPa):	EN 196/1	not required	≥ 2.0 (after 1 day) ≥ 3.5 (after 3 days) ≥ 5.0 (after 7 days) ≥ 7.0 (after 28 days)
Compressive modulus of elasticity (GPa):	EN 13412	≥ 15 (after 28 days)	17 (after 28 days)
Bond strength to concrete (MC 0.40 type substrate - water/cement ratio = 0.40) according to EN 1766 (MPa):	EN 1542	≥ 1.5 (after 28 days)	≥ 2 (after 28 days)
Bond strength to substrate measured through shear (MPa):	EN 12615 mod.	not required	≥ 5.0 (after 28 days)
Resistance to accelerated carbonation:	EN 13295	Depth of carbonation ≤ that of reference concrete (MC 0.45 water/cement ratio = 0.45) according to UNI 1766	passed
Thermal compatibility measured as bond strength according to EN 1542 (MPa): **– freeze-thaw cycles with de-icing salts:** **– storm cycles:** **– dry thermal cycles:**	EN 13687/1 EN 13687/2 EN 13687/4	≥ 1.5 (after 50 cycles) ≥ 1.5 (after 30 cycles) ≥ 1.5 (after 30 cycles)	≥ 2 ≥ 2 ≥ 2
Resistance to de-icing salts Δm after 30 cycles (mg/mm²):	SIA 262/1	not required	< 0.6
Capillary absorption (kg/m²·h⁰·⁵):	EN 13057	≤ 0.5	< 0.5
Impermeability to water - penetration depth - (mm):	EN 12390/8	not required	< 15
Reaction to fire:	EN 13501-1	Euroclass	E

Mapegrout LM2K component B may be stored for up to 24 months.
Store both components at a temperature of at least +5°C.

SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

Mapegrout LM2K component A is irritant, it contains cement that when in contact with sweat or other body fluids causes irritant alkaline reaction and allergic reactions to those predisposed. It can cause damage to eyes. In case of contact with eyes or skin wash immediately with plenty of water and seek medical attention.

Mapegrout LM2K component B is not considered dangerous according to the European regulation regarding the classification of mixtures. It is recommended to wear gloves and goggles and to take the usual precautions taken for the handling of chemicals.

For further and complete information about the safe use of our product please refer to the latest version of our Material Safety Data Sheet.

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

All relevant references for the product are available upon request and from www.mapei.com

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