

# MAPEGROUT THIXOTROPIC

Shrinkage-compensated fibre-reinforced mortar for concrete repair



## WHERE TO USE

Surface repair of deteriorated concrete structures on both vertical and horizontal surfaces.

### Some application examples

- Repairing deteriorated areas of concrete, corners of pillars and beams, edges of balconies damaged by the oxidation of reinforcing steel.
- Reconstruction of reinforcing rod covers in reinforced concrete structures.
- Smoothing surface defects, such as gravel nests, new casting joints, holes created by formwork spacers, exposed rods, etc.
- Filling of rigid joints.
- Repair of surfaces subjected to heavy abrasion (canals, industrial floors, ramps, etc.).
- Smoothing of diaphragm walls and tunnels.
- Repairing viaducts for highways, roads and railways.

## TECHNICAL CHARACTERISTICS

**Mapegrout Thixotropico** is a ready-mixed powdered mortar composed of high-strength cements, selected aggregates, special additives and synthetic fibres prepared according to a formula developed in the MAPEI Research & Development laboratories.

When mixed with water, **Mapegrout Thixotropico** becomes an easily workable mortar with high thixotropic properties that can be applied on vertical surfaces without sagging even in great thicknesses and with no need for formwork.

If **Mapegrout Thixotropico** is prepared by only adding water, it must be cured under damp conditions in order to guarantee that the product expansive properties develop completely and correctly. Unfortunately, it is not easy to guarantee that these conditions are created on site.

However, to guarantee that the expansive properties of **Mapegrout Thixotropico** are carried out 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 to the mix.

**Mapecure SRA** has a very important role to play, in guaranteeing better curing of mortar. Also, when mixed with **Mapegrout Thixotropico**, 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.

Basically, **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.

Once hardened, **Mapegrout Thixotropico** has the following properties:

- very high flexural and compressive strength;
- modulus of elasticity, coefficient of thermal expansion and permeability to water vapour similar to those of high quality concrete;
- waterproof;
- high adhesion to old concrete, provided it has been soaked with water beforehand, and also to reinforcing rods, especially if they have been treated with **Mapefer** or **Mapefer 1K**;
- high resistance to abrasion.

**Mapegrout Thixotropic** 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 use **Mapegrout Thixotropic** on smooth concrete surfaces: roughen them well, and if necessary add reinforcing rods.
- Do not use **Mapegrout Thixotropic** for anchors (use **Mapefill**).
- Do not use **Mapegrout Thixotropic** to repair structures by pouring into formwork (use **Mapegrout Hi-Flow**).
- Do not add cement, aggregates or additives to **Mapegrout Thixotropic**.
- Do not add water after the mix has started to set.
- Do not apply **Mapegrout Thixotropic** at temperatures below +5°C.
- Do not use **Mapegrout Thixotropic** if the packing has been damaged or if it has been opened beforehand.

## APPLICATION PROCEDURE

### Preparing the substrate

- Remove deteriorated and loose concrete until the substrate is solid, strong and rough. Any previous restoration work which is not soundly bonded should also be removed.
- Clean the concrete and reinforcing rods until free of dust, rust, cement laitance, grease, oils and previously applied paints by sand-blasting.
- Soak the substrate with water.

Before repairing with **Mapegrout Thixotropic** allow the excess water to evaporate. If necessary, use compressed air to facilitate the removal of water.

### Preparing the mortar

- Pour into the mixer the amount of water corresponding to the consistency required for the application (15.5-16.5% of the powder).
- Start the concrete mixer and slowly and continuously pour **Mapegrout Thixotropic** into the water.
- If improved open-air curing of the mortar is required, add **Mapecure SRA** to the final mix at a dosage of 0.25% by weight of the mortar (0.25 kg every 100 kg of **Mapegrout Thixotropic**).
- Mix for 1-2 minutes, checking the homogeneity of the mix while scraping any unmixed powder off the sides of the mixer; remix for another 2-3 minutes.
- Depending on the quantity being prepared, a mortar mixer or a drilling machine with a stirrer attachment can be used. The mixing must be carried out at low speed to avoid entraining an excess of air into the mix.
- Only in exceptional circumstances should the mortar be mixed by hand. In this case prepare small quantities and mix for at least 5-6 minutes until the slurry is completely smooth and even.

It should be remembered that manual preparation requires greater quantities of water which are detrimental to some characteristics of **Mapegrout Thixotropic**, such as mechanical strength, shrinkage, waterproofing, etc.

**Mapegrout Thixotropic** has a pot life of about 1 hour at +20°C.

The expansion of **Mapegrout Thixotropic** has been calculated to compensate for hygrometric shrinkage.

In order to be effective, the expansion must be countered with suitable reinforcement or formwork around the structure. Without formwork, **Mapegrout Thixotropic** can only be applied in thicknesses greater than 3 cm if the surface has been roughened and reinforcing rods have been placed, taking care to apply at least 2 cm of cover to the reinforcement. Smaller thicknesses can be applied without reinforcing rods as long as the substrate is sufficiently rough to be able to counter the expansion. This expansion phase is completed during the first days of curing.

### Applying the mortar

The mix can be applied with a flat or gauging trowel with no need for formwork even on vertical surfaces or ceilings; the maximum thickness allowed is 50 mm per coat.

**Mapegrout Thixotropic** can also be sprayed with a suitable piston or worm screw type rendering machine (Turbosol - Putzmeister), excluding continuous mixing machines.

Apply **Mapegrout Thixotropic** after treating the reinforcing rods with **Mapefer** or with **Mapefer 1K**.

When a further coat of **Mapegrout Thixotropic** is necessary, it must be applied before the previous one has completely set (not more than 4 hours at +23°C).

The repair process is complete when a smoothing coat of **Mapefinish** and a coat of **Elastocolor Paint** have been applied.



Application with trowel



Finishing with a sponge float

## PRECAUTIONS TO BE TAKEN DURING AND AFTER APPLICATION

- Only use bags of **Mapegrout Thixotropic** which have been stored on their original pallets.
- In hot weather, store the product in a cool place and use only cold water to blend the mortar.
- In cold weather, store the product in a place which is protected from frost at a temperature of +20°C, and use tepid water to blend the mortar.
- After laying **Mapegrout Thixotropic**, we recommend that it is cured carefully, especially in hot or windy weather, to avoid the water evaporating off too quickly and causing the formation of surface cracks due to plastic shrinkage. Spray water on the surface after 8-12 hours of laying the mortar, and repeat the operation every 3-4 hours for at least the first 48 hours. As an alternative, after tamping the mortar, spread on a layer of **Mapecure E** anti-evaporation treatment in watery emulsion with a low-pressure pump, **Mapecure S** solvent-based curing film for mortar and concrete, or **Elastocolor Primer** solvent-based, high-penetration primer for absorbent substrates and curing agent for repair mortar. **Mapecure E** and **Mapecure S**, as with all the best quality products in the same category which are currently available on the market, impede bonding of successive dressing layers. Therefore, if a smoothing layer or paint is to be applied later, they must be completely removed by sandblasting. If **Elastocolor Primer** is used as an anti-evaporation treatment, on the other hand, a final protective layer of **Elastocolor Paint** or **Elastocolor Rasante** may be applied directly on the treated surface without having to remove it.

## CLEANING

Before hardening, the mortar can be cleaned from tools with water.  
After setting, cleaning is very difficult and the mortar can only be removed mechanically.

## COVERAGE

19 kg/m<sup>2</sup> per cm of thickness.

## PACKAGING

25 kg bags.

## STORAGE

**Mapegrout Thixotropic** 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 bags which may be stored outside for the entire construction phase of the site. Rain has no effect on its characteristics.

## SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

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](http://www.mapei.com).

PRODUCT FOR PROFESSIONAL USE.

TECHNICAL DATA (typical values)			
PRODUCT IDENTITY			
Strength class according to EN 1504-3:	R4		
Type:	PCC		
Consistency:	powder		
Colour:	grey		
Maximum aggregate size (mm):	2.5		
Bulk density (kg/m <sup>3</sup> ):	1,250		
Dry solids content (%):	100		
Chloride ions content: - minimum requirements ≤ 0.05% - according to EN 1015-17 (%):	≤ 0.05		
PRODUCT APPLICATION DATA (at +20°C - 50% R.H.)			
Colour of mix:	grey		
Mixing ratio:	100 parts of <b>Mapegrout Thixotropic</b> with 15.5-16.5 parts water (approx. 3.8-4.1 l per 25 kg bag)		
Consistency of mix:	thixotropic		
Density of the mix (kg/m <sup>3</sup> ):	2,200		
pH of the mix:	> 12.5		
Application temperature range:	from +5°C to +35°C		
Pot life of the mix:	approx. 1 h		
FINAL PERFORMANCE (16% mixing water - 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)	> 20 (after 1 day) > 45 (after 7 days) > 60 (after 28 days)
Flexural strength (MPa):	EN 196/1	not required	> 4.5 (after 1 day) > 7.0 (after 7 days) > 8.5 (after 28 days)
Modulus of elasticity in compression (GPa):	EN 13412	≥ 20 (after 28 days)	26 (after 28 days)
Bond strength to concrete (MC 0.40 type substrate) according to EN 1766 (MPa):	EN 1542	≥ 2 (after 28 days)	> 2 (after 28 days)
Resistance to accelerated carbonatation:	EN 13295	depth of carbonatation ≤ reference concrete (MC 0.45 type with water/cement ratio = 0.45) according to UNI 1766	test passed

Capillary absorption (kg/m <sup>2</sup> ·h <sup>0.5</sup> ):	EN 13057	≤ 0.5	< 0.20
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
Reaction to fire:	EN 13501-1	Euroclass	A1

## 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](http://www.mapei.com)

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