

MAPEGROUT T40

Medium strength (40 MPa), shrinkage-compensated, fibre-reinforced, thixotropic mortar for repairing concrete



WHERE TO USE

Repair of degraded vertical or horizontal concrete surfaces with mortar possessing medium mechanical performance characteristics.

Some application examples

- Repair of degraded concrete surfaces, corners of pillars and beams, balconies damaged by rusted reinforcing bars.
- Repairs to diaphragms and tunnels.
- Concrete linings for canals and hydraulic projects.
- Reconstruction of concrete coverings of reinforcing bars.
- Repair of surface irregularities including exposed aggregate, joints between new and old concrete, holes in formwork concrete, protruding steel, etc.
- Filling of rigid joints.

TECHNICAL CHARACTERISTICS

Mapegrout T40 is a premixed powdered mortar composed of cement, graded aggregates and special additives manufactured from a formula developed in the MAPEI Research Laboratories.

When mixed with water **Mapegrout T40** forms an easy to apply thixotropic mortar that can be applied without slumping even in substantial thicknesses on vertical surfaces without formwork.

When fully cured, **Mapegrout T40**:

- has moderate flexural and compressive strength;
- has a modulus of elasticity, thermal expansion coefficient and permeability coefficient similar to that of medium quality concrete;
- is waterproof;
- has excellent adhesion to existing concrete surfaces provided they are saturated with water and reinforcing bars are first treated with **Mapefer** or **Mapefer 1K**.

If **Mapegrout T40** is prepared by only adding water, it must be cured under damp conditions in order to guarantee that the product's expansive properties develop completely and correctly. However, it is not very easy to guarantee that these conditions are created on site.

Therefore, to guarantee that the expansive properties of **Mapegrout T40** 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 by adding it to the mix.

Mapecure SRA has a very important role to play, in guaranteeing better curing of mortar. Also, when mixed with **Mapegrout T40**, 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.

Mapegrout T40 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 R3.

RECOMMENDATIONS

- Do not use **Mapegrout T40** to repair structures subject to high compressive loads, high impact or abrasion: use **Mapegrout Tissotropico** or **Mapegrout T60** instead.
- Do not use **Mapegrout T40** when the material has to be pumped over long distances or in the case of large pumping heads (use **Mapegrout Easy Flow**).
- Do not use **Mapegrout T40** on smooth concrete surfaces. Roughen the surface thoroughly and add reinforcing if necessary.
- Do not use **Mapegrout T40** for anchoring (use **Mapefill** or **Mapefill R**).
- Do not pour **Mapegrout T40** for pumping into formwork (use **Mapegrout Colabile**).
- Do not add cement or admixtures to **Mapegrout T40**.
- Do not add water once the mix has begun to set.
- Do not use **Mapegrout T40** at temperatures lower than +5°C.
- Do not use **Mapegrout T40** if the bag has been damaged or already opened.

APPLICATION PROCEDURE

TECHNICAL INFORMATION FOR APPLICATION

Composition of mix:	100 kg of Mapegrout T40 15.5-16.5 kg of water
Coat thickness:	10 – 40 mm
Application temperature range:	surrounding temperature and substrate temperature from +5°C to +35°C
Pot life of mix:	approx. 60 min. (at +20°C)

Substrate preparation

- Remove degraded and loose concrete until the substrate is solid, resistant and rough. Any previous repair work that is no longer thoroughly bonded must also 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 T40**, wait until the excess water has evaporated. To facilitate the elimination of free water, use compressed air if needed.

Preparing the mortar

- Pour into the mixer the amount of water needed to obtain the consistency required for the application.

APPLICATION	LITRES
per 25-kg bag	OF WATER
Trowel	from 3.8 to 4.0
Spray	from 3.9 to 4.1



- Start the mixer and slowly add the **MapegROUT T40** to the water in a continuous flow.
- 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 kg every 100 kg of **MapegROUT T40**).
- Mix for 1 to 2 minutes, then make sure the mix is well blended. Scrape any unblended powder from the bottom and the sides of the mixer. Mix again for another 2 to 3 minutes.
- Either a cement mixer or a drill equipped with a mixing attachment may be used, according to the amount of material to be prepared. Mixing must be carried out at low speeds, to avoid air being entrained into the mix.
- Avoid mixing manually
- Instructions for the preparation of mortar for Lab testing samples can be found in the TECHNICAL DATA section.

MapegROUT T40 remains workable for approximately 1 hour at +20°C.

The expansion of **MapegROUT T40** is calculated to compensate for plastic shrinkage. For it to be effective, the substrate needs to be adequately reinforced with rebars or forms.

Applying **MapegROUT T40** without formwork in thicknesses of more than 2 cm should be done only after reinforcing and roughening the surface of the concrete, taking care to cover the reinforcement with a layer at least 20 mm thick.

Lower thicknesses can be applied without reinforcing as long as the substrate has been substantially roughened to counter the expansion.

The expansion phase ends during the first days of curing.

Application procedure

The mortar can be applied with a trowel or gauging trowel without formwork even on vertical surfaces or ceilings in maximum thicknesses of 40 mm per layer.

MapegROUT T40 can also be spray applied, using Turbosol or Putzmeister type equipment, excluding continuous mixing machines.

Reinforcing bars must be previously treated with **Mapecer** or **Mapecer 1K** before applying the **MapegROUT T40**.

Where necessary, apply a second layer of **MapegROUT T40** before the previous layer has finished setting (within 4 hours at +23°C).

After completing repair work, the surfaces may be skimmed with **Monofinish**, **Mapecfinish**, **Planitop 200** or with an elastic skimming product such as **Mapelastic** or **Mapelastic Guard**.

Coloured **Elastocolor Paint** may then be applied to create a protective finish.



Degraded building façade in need of repair



Spray application of MapegROUT T40



Finishing of MapegROUT T40



Repairing a balcony with Mapegrout T40

PRECAUTIONS TO BE TAKEN DURING AND AFTER APPLICATION

- Only use bags of **Mapegrout T40** which have been stored on their original pallets.
- In warm weather store the material in a cool place. Use cold water to prepare the mix.
- 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 applying **Mapegrout T40**, we recommend that it is cured carefully, especially in hot or windy weather, to avoid the water evaporating too quickly and causing the formation of surface cracks due to plastic shrinkage. Spray water on the surface 8-12 hours after applying 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 either

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

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

CONSUMPTION

Approx. 18.5 kg/m² per cm of thickness.

PACKAGING

25 kg bags.

STORAGE

Mapegrout T40 may be stored for up to 12 months in its original packaging.

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 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.

TECHNICAL DATA (typical values)

PRODUCT IDENTITY

Class according to EN 1504-3:	R3
Type according to EN 1504-1:	PCC
Consistency:	powder
Colour:	grey
Maximum size of aggregate:	2.5 mm
Ion-chloride content according to EN 1015-17: (minimum requirement according to EN 1504 $\leq 0.05\%$)	$\leq 0.05\%$

TECHNICAL INFORMATION FOR THE PREPARATION OF PRODUCT

Composition of mix:	100 parts by weight of Mapegrout T40 with 16 % water
Preparation of mix:	mixing of product according to EN 196-1

CHARACTERISTICS OF FRESH MIX (at +20°C - 50% R.H.)

Colour of mix:	grey
Consistency of mix:	tixotropic
Density of mix:	2200 kg/m ³

FINAL PERFORMANCE

According to curing defined in test methods

Performance characteristic	Test method	Requirements EN 1504-3 R3	Product performance
Compressive strength:			
- 1 day	EN 12190	-	> 8 MPa
- 7 days		-	> 30 MPa
- 28 days		≥ 25 MPa	> 40 MPa
Flexural strength:			
- 1 day	EN 196-1	Not required	> 2.0 MPa
- 7 days			> 5.5 MPa
- 28 days			> 7.0 MPa
Compressive modulus of elasticity:	EN 13412	≥ 15 GPa	25 GPa
Bond strength by pull-off:	EN 1542	≥ 1.5 MPa	> 2.0 MPa
Capillary absorption:	EN 13057	≤ 0.5 kg/(m ² ·h ^{0.5})	< 0.5 kg/(m ² ·h ^{0.5})
Thermal compatibility			
- freeze-thaw cycles using de-icing salts (50 cycles):	EN 13687-1	≥ 1.5 MPa	> 1.5 MPa
- Storm cycles (30 cycles):	EN 13687-2	≥ 1.5 MPa	> 1.5 MPa
- Dry thermal cycles (30 cycles):	EN 13687-4	≥ 1.5 MPa	> 1.5 MPa
Reaction to fire:	EN 13501-1	Euroclass	A1

NOTES: Preparation of samples: compaction according to EN 196-1.

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.

The values declared in the TECHNICAL DATA table (typical values) were obtained in compliance with test methods and curing cycles defined in the technical standards referenced therein. Therefore, please note that the use of test procedures or methods other than those indicated in the table could lead to different values and that, in such cases, any liability of our company is excluded.

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

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The contents of this Technical Data Sheet ("TDS") may be copied into another project-related document, but the resulting document shall not supplement or replace requirements per the TDS in force at the time of the MAPEI product installation.

The most up-to-date TDS can be downloaded from our website www.mapei.com.

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