

# 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 Zero**.

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 Thixotropic Zero** 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 Zero**).
- 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 Zero** or **Mapefill R**).
- Do not pour **Mapegrout T40** for pumping into formwork (use **Mapegrout Hi-Flow Zero**).
- 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.

## HOW TO USE

### 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 unless absolutely necessary. If so, mix small amounts at a time for at least 5 to 6 minutes until a completely homogeneous paste is obtained.

Keep in mind that mixing by hand requires a larger amount of water. This adversely affects several of the mortar's characteristics, including mechanical strength, shrinkage, impermeability, etc.

**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 **Mapefer** or **Mapefer 1K Zero** 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**, **Mapefinish Zero**, **Planitop 200** or with an elastic skimming product such as **Mapelastc Zero** or **Mapelastc Guard Zero**.

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/m<sup>2</sup> 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](http://www.mapei.com).

PRODUCT FOR PROFESSIONAL USE.

## TECHNICAL DATA (typical values)

### PRODUCT IDENTITY

Class according to EN 1504-3:

R3

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 |

#### APPLICATION DATA (at +20°C - 50% R.H.)

|  |   |
|--|---|
| Colour of mix:                           | grey  |
| Mixing ratio:                            | 100 parts of <b>Mapegrout T40</b> with 15.5-16.5 parts water (approx. 3.8-4.1 l per 25 kg sack) |
| Consistency of the 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:                     | about 1 hour  |

#### FINAL PERFORMANCE (16% blending water)

| Performance characteristic   | Test method | Minimum requirements according to EN 1504-3 for R3 class mortar | Product performance  |
|--|-------------|---|--|
| Compressive strength (MPa):  | EN 12190    | ≥ 25 (after 28 gg)  | > 8 (after 1 day)<br>> 30 (after 7 days)<br>> 40 (after 28 days)     |
| Flexural strength (MPa):   | EN 196/1    | not required  | > 2.0 (after 1 day)<br>> 5.5 (after 7 days)<br>> 7.0 (after 28 days) |
| Compressive modulus of elasticity (GPa):   | EN 13412    | ≥ 15 (after 28 days)  | 25 (after 28 days)   |
| Bond strength to concrete (MC 0.40 type substrate water/concrete ratio = 0.40) according to EN 1766 (MPa): | EN 1542     | ≥ 1.5 (after 28 days)   | > 2 (after 28 days)  |
| 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:   | EN 13687/1  | ≥ 1.5 (after 50 cycles)   | > 1.5  |
| – storm cycle:   | EN 13687/2  | ≥ 1.5 (after 30 cycles)   | > 1.5  |
| – dry thermal cycle:   | EN 13687/4  | ≥ 1.5 (after 30 cycles)   | > 1.5  |
| Reaction to fire:  | EN 13501-1  | Euroclass   | AI   |

## 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)

## LEGAL NOTICE

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