

# MAPEGROUT T60

Sulphate-resistant, fibre-reinforced shrinkage compensated thixotropic mortar for the repair of concrete



## WHERE TO USE

Repair of degraded concrete structures or reinforced concrete structures subject to sulphate attack.

### Some application examples

- Canal linings, hydraulic works, and tunnels that require resistance to sulphate attack.
- Repair and reconstruction of concrete coverings damaged by corroded reinforcing bars.
- Filling of rigid joints (e.g. between base and column, cracks in floors, joints between walls, etc.).
- Repair of precast structures.

## TECHNICAL CHARACTERISTICS

**Mapegrout T60** is a one-component pre-blended thixotropic cement-based mortar composed of sulphate-resistant hydraulic binders, synthetic polyacrylonitrile fibres, organic corrosion inhibitors, select aggregates and special water-retaining admixtures developed in the MAPEI Research Laboratories.

If **Mapegrout T60** 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, there is no guarantee that these conditions can be created on site.

Therefore, to guarantee that the expansive properties of **Mapegrout T60** take place when drying in the open air, 0.25% of **Mapecure SRA**, a special admixture 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 T60**, it may be considered a technologically advanced system, in that the admixture 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 admixture. This will obviously lead to a reduced risk of cracking phenomena.

**Mapegrout T60** may be used also without adding **Mapecure SRA**, when the environmental conditions permit optimal curing.

**Mapegrout T60** 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 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 T60** on smooth surfaces: roughen the surface thoroughly and add rebars if necessary.
- Do not add cement or admixtures to **Mapegrout T60**.
- Do not pour **Mapegrout T60** into forms for repairing works (use **Mapegrout Hi-Flow**).

- Do not use **Mapegrout T60** for anchoring (use **Mapefill** or **Mapefill R**).

## APPLICATION PROCEDURE

### TECHNICAL INFORMATION FOR APPLICATION

<b>Composition of the mix:</b>	100 kg of <b>Mapegrout T60</b> 16.5-17.5 kg of water 0.25 % <b>Mapecure SRA</b> (optional*)
<b>Coat thickness:</b>	from 10 to 100 mm. (Please refer to "Application of mortar" paragraph)
<b>Application temperature range:</b>	Substrate and surrounding temperature from +5°C to +35°C
<b>Pot life of mix:</b>	approx. 60 min. (at +20°C)
<b>Waiting time between coats:</b>	max. 1-2h

\*To allow expansion in air

### Preparation of the substrate

- Remove deteriorated and loose concrete down to the solid, strong and roughened part of the substrate. Any previous repair work that is no longer thoroughly bonded must also be removed through suitable means (mechanical demolition, hydroscarifying, etc).
- Clean concrete and reinforcing rods from residues of previous scarifying works, dust, cement laitance, rust, grease, oils, paint residues and any other contaminants, through sandblasting or high pressure water jets. Once prepared, the concrete surface to be repaired must be completely visible and have an uneven texture with at least 5 mm peak roughness, with inert fraction completely exposed and free from laitance, in order to grant correct adhesion of the mortar to the substrate.
- Saturate the substrate with water, then wait until the excess water has evaporated and the surface is dry before repairing with **Mapegrout T60**. To facilitate the elimination of free water, use compressed air if needed.

### Preparation of the mortar

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

Application	Litres of water per 25 kg bag
Trowel	approx. 4.1-4.3
Spray	approx. 4.2-4.4

- Start the mixer and slowly add **Mapegrout T60** to the water in a continuous flow.
- If improved open-air curing of the mortar is required, add **Mapecure SRA** to the mix phase at a dosage of 25% by weight of the mortar (0.25 kg every 100 kg of **Mapegrout T60**).
- Mix for 1 to 2 minutes, then check to make sure the mix is well blended. Scrape any unmixed powder from the bottom and the sides of the mixer. Mix again for another 2 to 3 minutes.
- Depending on the amount needed, a mortar mixer or a drill with an agitator attachment may also be used. Mix at low speed to avoid entraining air.
- 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.

Remember that mixing by hand requires a larger amount of water. This adversely affects several of the mortar's properties, including mechanical strength, shrinkage, watertightness, etc.

**Mapegrout T60** remains workable for approx. 1 hour at +20°C.

The expansion of **Mapegrout T60** is calculated to compensate for hygrometric shrinkage. For it to be effective, the expansion needs to be restrained by rebars or restraints inserted into the substrate.

Buildups of **Mapegrout T60** without restraints in thicknesses of more than 3 cm should be done only after inserting rebars and roughening the surface of the concrete, taking care to cover the reinforcement with a layer at least 2 cm thick. Lesser thicknesses can be applied without rebars as long as the substrate has been thoroughly roughened to counter the expansion. The expansion phase ends during the first days of hardening.

Instructions for the preparation of mortar samples for lab testing are reported in the TECHNICAL DATA section.

### Application of the mortar

**Mapegrout T60** may be applied with a spatula or trowel on vertical surfaces in layers up to 10 cm thick per coat, or on ceilings in layers up to 2 cm thick per coat, without the use of reinforcing rebars.

For application thickness between 10 and 50 mm repair can be carried out in one single coat. In case of repair thickness over 30 mm, the use of reinforcing rebars is required.

For application thickness between 50 and 100 mm repaired must be carried out in more coats (also consecutive), with application of reinforcing rebars and at least 2 cm covering. Apply approximately  $\frac{3}{4}$  of the total thickness in one coat until the rebar is completely covered, using a suitable tool to create a surface roughness between 5 and 10 mm (10 mm notched trowel). The second coat may be applied after 24 hours. Before application, scarify the first coat with high pressure water jets until a clean and laitance-free substrate with at least 5 mm roughness is obtained.

**Mapegrout T60** may also be applied using a suitable double-mixing piston or worm-screw type rendering machine. The product is not compatible with application through continuous mixing type rendering machine.

For repairing concrete faces (e.g. balconies, columns, beams, etc.) we recommend treating the rebars with **Mapefer** or **Mapefer 1K** after sanding them.

## PRECAUTIONS TO BE TAKEN DURING AND AFTER APPLICATION

- Only use bags of **Mapegrout T60** which have been stored on their original pallets.
  - In warm weather store the material in a cool place. Use cold water to prepare the mortar.
  - In cold weather, store the product in a place which is protected from frost and use lukewarm water to blend the mortar.
  - To optimise the product's performances it is advisable to carefully cure **Mapegrout T60**, specifically in hot and windy weather. Nebulise water on the substrate during pouring and immediately cover the surface with a waterproof sheet for at least 3 days.
- Surface anti-evaporant products may be used instead of wet curing; such products must be selected according to following works to be carried out.

### 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

18.5 kg/m<sup>2</sup> per cm of thickness if used pure and 14.5 kg/m<sup>2</sup> if used mixed with 30% of 3 to 6-8 mm aggregate.

## PACKAGING

25 kg bags.

## STORAGE

**Mapegrout T60** may be stored for up to 12 months in its original packaging.

The special 25 kg vacuum-packed polyethylene bag offers a better protection from accidental rain. Some characteristics of **Mapegrout T60** make it particularly sensitive to improper storage conditions; it is advisable to stock the product in a dry and covered place at a temperature between +5 and +35°C, in its original unopened packaging.

## 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

Class according to EN 1504-3:	R4
Type according to EN 1504-1:	CC
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 ≤ 0.05%)	≤ 0.05 %

### TECHNICAL INFORMATION FOR THE PREPARATION OF THE PRODUCT

Composition of the mix:	100 parts by weight of <b>Mapegrout T60</b> with 17% of 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 <sup>3</sup>

## FINAL PERFORMANCES according to curing times defined in test methods

Performance characteristic	Test method	Requirements EN 1504-3 R4	Product performance
<b>Compressive strength:</b> - 1 day - 7 days - 28 days	EN 12190	- - ≥ 45 MPa	20 MPa 45 MPa 60 MPa
<b>Flexural strength:</b> - 1 day - 7 days - 28 days	EN 196-1	Not required	4 MPa 7 MPa 8 MPa
<b>Compressive modulus of elasticity:</b>	EN 13412	≥ 20 GPa	27 GPa
<b>Direct tensile adhesion to concrete:</b>	EN 1542	≥ 2.0 MPa	> 2.0 MPa
<b>Shear adhesion to substrate:</b> - 7 days - 28 days	EN 12615 mod.	Not required	≥ 3.5 MPa ≥ 5.0 MPa
<b>Contrasted expansion (24h):</b>	UNI 8147 A method	Not required	400 µm/m
<b>Resistance to cracking:</b>	"O Ring Test"	Not required	No cracks after 180 days <sup>(1)</sup>
<b>Resistance to accelerated carbonation:</b>	EN 13295	Carbonation depth ≤ than reference concrete	Meets specifications
<b>Impermeability to water – penetration depth:</b>	EN 12390-8	Not required	< 5 mm
<b>Capillary absorption:</b>	EN 13057	≤ 0.5 kg/m <sup>2</sup> ·h <sup>0.5</sup>	< 0.25 kg/m <sup>2</sup> ·h <sup>0.5</sup>
<b>Pull-out strength of steel rebar – tension of adhesion:</b>	RILEM-CEB- FIP RC6-78	Not required	> 25 MPa
<b>Thermal compatibility</b> – freeze-thaw cycles using de-icing salts (50 cycles): - storm cycles (30 cycles) - dry thermal cycles (30 cycles):	EN 13687-1 EN 13687-2 EN 13687-4	≥ 2.0 MPa ≥ 2.0 MPa ≥ 2.0 MPa	> 2.0 MPa > 2.0 MPa > 2.0 MPa
<b>Resistance to freeze-thaw cycles in presence of salts – flaking:</b>	EN 12390-9	Not required	< than reference concrete (XF4) <sup>(2)</sup>
<b>Exposure class:</b>	/	Not required	X0 XC1, XC2, XC3, XC4 XD1, XD2, XD3 XS1, XS2, XS3 XF1, XF2, XF3, XF4 <sup>(2)</sup>
<b>Reaction to fire:</b>	EN 13501-1	Euroclass	XA1

### NOTES:

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

(1) Performance figures obtained by adding 0.25% of **Mapecure SRA**

(2) **Mapegrout T60** was tested according to EN 12390-9 and in comparison with reference concrete with a class XF4 mix design according to EN 206-1.

(3) The strength of **Mapegrout T60** with added 30% of gravel on the weight of the mortar is the same as for that of the same mortar as is (with the same amount of mixing water).

## 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

---

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

**ANY ALTERATION TO THE WORDING OR REQUIREMENTS CONTAINED OR DERIVED FROM THIS TDS EXCLUDES THE RESPONSIBILITY OF MAPEI.**

317-7-2022-en

Any reproduction of texts, photos and illustrations published here is prohibited and subject to prosecution

