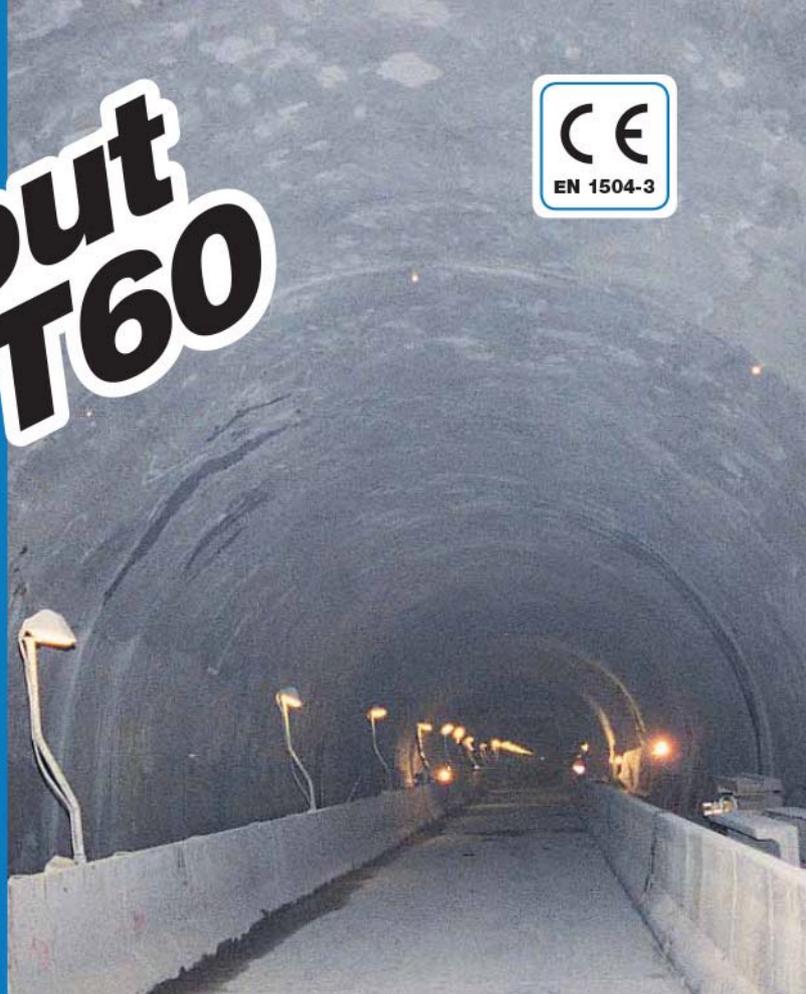




Mapegrout T60

One component sulphate-resistant, fibre-reinforced shrinkage-controlled thixotropic grout 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 additives 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, it is not very easy to guarantee that these conditions are 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 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 T60**, 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 lower incidence of cracking phenomena.

Mapegrout T60 may be used also without adding **Mapecure SRA**, in case 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 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 T60** on smooth surfaces: roughen the surface thoroughly and add rebars if necessary.
- Do not use cement or admixtures with **Mapegrout T60**.
- Do not pour **Mapegrout T60** into forms (use **Mapegrout Hi-Flow**).

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

APPLICATION PROCEDURE

Substrate preparation

- Remove degraded and loose concrete down to the solid, resistant and roughened part of the substrate. Any previous repair work that is no longer thoroughly bonded must also be removed.
- Once prepared, the concrete surface to be repaired must have an uneven texture with at least 5 mm peak roughness.
- 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 T60**, wait until the excess water has evaporated. To facilitate the elimination of free water, use compressed air if needed.

Preparing the grout

- 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	4.1-4.3
Spray	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** at the end of the mixing phase at a dosage of 25% in 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.

Keep in mind 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 2 cm should be done only after inserting rebars and roughening the surface of the concrete, take 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.

Application procedure

Mapegrout T60 may be applied with a putty knife or trowel on vertical surfaces in layers up to 4 cm thick, or on ceilings in layers up to 2 cm thick, without the use of form-work. It may also be applied using a suitable piston or worm-screw type rendering machine, such as a **Turbosol** or **Putzmeister**. Do not use a continuous mixing type rendering machine.

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

When further coats of **Mapegrout T60** are needed, leave the previous coat rough and wet the surface with water.

Precautions to be taken during and after application

- Only use sacks of **Mapegrout T60** which have been stored on their original pallets and covered and stored in a dry place.
- In warm weather do not expose the material to direct sunlight. Use cold water to prepare the mix. Store in a cool place.
- At low temperatures, prepare the mix with water heated to approx. +20°C.

After applying **Mapegrout T60**, 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.

Mapegrout T60: sulphate-resistant, compensated-shrinkage cementitious mortar reinforced with polyacrylonitrile fibres for repairing concrete, CE approved according to CPD 89/106 in compliance with the requirements of EN 1504-3 R4

TECHNICAL DATA (typical values)

PRODUCT IDENTITY

Class according to EN 1504-3:	R4
Type:	CC
Consistency:	powder
Colour:	grey
Maximum size of aggregate (mm):	2.5
Bulk density (kg/m ³):	1350
Dry solids content (%):	100
Chloride ions content – minimum requirement ≤ 0.05% - according to EN 1015-17 (%):	≤ 0.05
Hazard classification according to EC 1999/45:	irritant. Before using refer to the "Safety instructions for preparation and application" paragraph and the information on the packaging and Safety Data Sheet

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

Colour of mix:	grey
Mixing ratio:	100 parts of Mapegrout T60 with 16.5-17.5 parts of water (approximately 4.1-4.4 litres of water per 25 kg sack) and 0.25% of Mapecure SRA (1 0.25 kg canister every 4 sacks of Mapegrout T60)
Consistency of mix:	thixotropic
Density of mix (kg/m ³):	2200
pH of mix:	> 12.5
Application temperature range:	from +5°C to +35°C
Pot life of mix:	approximately 1 hour
Waiting time between each layer:	max 1-2 hours

FINAL PERFORMANCE (17% mixing water)

Performance characteristic	Test method	Requirements according to EN 1504-3 for R4-class mortar	Performance of product
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	none	4 (after 1 day) 7 (after 7 days) 8 (after 28 days)
Compressive modulus of elasticity (GPa):	EN 13412	≥ 20 (after 28 days)	27 (after 28 days)
Bond strength on concrete (substrate in MC 0.40 - water/cement ratio = 0.40) according to EN 1766 (MPa):	EN 1542	≥ 2 (after 28 days)	> 2 (after 28 days)
Bond strength to substrates determined by shear (MPa):	EN 12615 mod.	not required	≥ 3.5 (after 7 days) ≥ 5.0 (after 28 days)
Contrasted expansion (µm/m):	UNI 8147 method A	none	400 (after 1 day)
Crack resistance:	"O-Ring" test	none	no cracks after 180 days
Resistance to accelerated carbonatation:	EN 13295	Depth of carbonatation ≤ reference concrete (type MC 0.45, water/cement ratio = 0.45) according to UNI 1766	meets specifications
Impermeability to water – penetration depth - (mm):	EN 12390/8	none	< 5
Capillary absorption (kg/m ² .h ^{0.5}):	EN 13057	≤ 0.5	< 0.25
Slip-resistance of steel reinforcement rods – bonding stress (MPa):	EN 15184	none	≥ 25
Thermal compatibility measured as bond strength according to EN 1542 (MPa):			
– freeze-thaw cycles with de-icing salts:	EN 13687/1	≥ 2 (after 50 cycles)	> 2
– storm cycles:	EN 13687/2	≥ 2 (after 30 cycles)	> 2
– dry thermal cycles:	EN 13687/4	≥ 2 (after 30 cycles)	> 2
Reaction to fire:	EN 13501-1	Euroclass	A1

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).

Mapegrout T60



Cleaning

Grout 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/m² per cm of thickness if used pure and 14.5 kg/m² if used mixed with 30% of 3 to 6-8 mm aggregate.

PACKAGING

25 kg bags and 1500 kg "Big Bags".

STORAGE

12 months if stored in its original packaging. 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.

The product complies with the conditions of Annex XVII to Regulation (EC) N° 1907/2006 (REACH), item 47.

SAFETY INSTRUCTIONS FOR PREPARATION AND INSTALLATION

Mapegrout T60 contains cement that, when in contact with sweat or other bodily fluids, produces an irritant alkaline reaction and allergic reactions in those predisposed. It is highly recommended to wear protective clothing, gloves and eye/face protection.

For further and complete information about the safe use of our product please refer to our latest version of the 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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