

# MAPEGROUT HI-FLOW SP

Shrinkage-compensated fibre-reinforced mortar for concrete repair



## WHERE TO USE

To repair structures where particular thicknesses and the state of deterioration require the use of a high flow mortar.

### Some application examples

- Structural reinstatement of reinforced concrete beams and pillars.
- Restoring the lower flanges of pre-stressed concrete beams of viaducts.
- Reinstatement of floor beams and slabs after scarification of deteriorated areas.
- Restoring concrete floors (industrial, road and airport).
- Grouting rigid joints between concrete elements.

## TECHNICAL CHARACTERISTICS

**Mapegrout Hi-Flow SP** is a ready-mixed powder composed of highly resistant cement, selected aggregates, special additives and synthetic fibres prepared according to a formula developed in MAPEI research laboratories.

**Mapegrout Hi-Flow SP**, once mixed with water, becomes a highly fluid mortar, suitable for pouring into formwork without separation of the aggregates even when forming great thicknesses.

**Mapegrout Hi-Flow SP**, once cured, has the following qualities:

- very high flexural and compressive strength;
- modulus of elasticity and coefficients of thermal expansion and permeability to water vapour similar to those of high quality concrete;
- waterproof;
- high adhesion to old concrete, providing it has been saturated with water beforehand, and to reinforcing rods especially if they have been treated with **Mapefer** or **Mapefer 1K**, two-component and one component;
- high resistance to wear due to abrasion.

**Mapegrout Hi-Flow SP** is recommended for voids up to 5 cm for single placing. For greater thicknesses, it is recommended to add suitable graded aggregates from 30 to 50% by weight of the product, only after consulting MAPEI Technical Assistance. In order to improve its flexural strength and shock resistance, **Mapegrout Hi-Flow SP** can be mixed with galvanised steel fibres 30-40 mm long in a ratio of 40-60 kg of fibres for every m<sup>3</sup> of mix.

**Mapegrout Hi-Flow SP** 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.

**Mapegrout Hi-Flow SP** meets the requirements of AS/NZS 4020:2005. (Eurofins | ams Report Reference No 1609356)

## RECOMMENDATIONS

- Do not use **Mapegrout Hi-Flow SP** on smooth concrete surfaces; roughen them well and insert reinforcing rods if needed.
- Do not use **Mapegrout Hi-Flow SP** for precision anchorages (use **Mapefill SP**).
- Do not use **Mapegrout Hi-Flow SP** for applications by spray or trowel (use **Mapegrout Thixotropic**).
- Do not add cement or additives to **Mapegrout Hi-Flow SP**.
- Do not add water after the mix has begun to set.
- Do not use **Mapegrout Hi-Flow SP** if its packing has been damaged or if it has been opened prior to use.

## APPLICATION PROCEDURE

### Preparing the substrate

- Remove degraded and loose concrete until the substrate is solid, resistant and rough. Any previous restoration work which is not soundly bonded should also be removed.
- Clean the concrete and reinforcing rods by sandblasting, to remove all dirt, rust, cement laitance, grease, oil and previously applied paints.
- Soak the substrate with water.
- Allow the excess water to evaporate before pouring in the mix; if necessary, use compressed air to facilitate the removal of the free water.

### Preparing the mortar

- Pour the quantity of water corresponding to the required consistency into the concrete mixer (see the table).
- Start the mixer and slowly and continuously pour in **Mapegrout Hi-Flow SP**.
- Mix for 1-2 minutes, scrape any unmixed powder off the sides of the mixer and remix for another 2-3 minutes until the mix is fluid and free from lumps.
- Depending on the quantity being prepared, a mortar mixer or drilling machine with a stirrer attachment can be used.
- Avoid stirring an excess of air into the mix.
- Only in exceptional circumstances should the slurry be mixed by hand. Only where it is absolutely necessary, 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 of **Mapegrout Hi-Flow SP** characteristics, such as mechanical strength, shrinkage, waterproofing, etc.
- The expansion of **Mapegrout Hi-Flow SP** has been calculated to compensate for the hygrometric shrinkage.
- In order to be effective, the forces of expansion must be countered with suitable reinforcement or formwork around the substrate.
- The expansion phase is completed during the first days of curing.

### Applying the mortar

- To facilitate the expulsion of air, pour Mapegrout Hi-Flow SP continuously into the moulds. Water from **Mapegrout Hi-Flow SP** must not be absorbed by the formwork, which should be pre-treated with a form-release oil (e.g. MAPEI's **DMA 1000 Form Release Agent**).
- The pour does not need to be vibrated. Make sure that all the parts to be repaired have been filled. If necessary, use sticks or rods to tamp the slurry into particularly difficult areas.
- The repair process is complete when a coat of **Elastocolor** is applied on the surfaces.

### Precautions to be observed during application and curing

- No special precautions need to be taken when the temperature is around +20°C.
- In hot weather, it is advisable to prevent the material from being exposed to the sun and to use cold water for preparing the mix.
- When the temperature is low, the water used for the mix should be around 20°C.
- Once poured, **Mapegrout Hi-Flow SP** must be cured very carefully. The surface of the mortar exposed to air must be protected against the rapid evaporation of water particularly in warm and windy environments, as this will cause surface cracks due to plastic shrinkage.
- Spray water onto the surface during the first 24 hours of curing or apply a suitable anti-evaporation product (**Mapecure SP**).

### Cleaning

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

## CONSUMPTION

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

## PACKAGING

25 kg bags.

## STORAGE

Store in a dry and sheltered place.

TECHNICAL DATA (typical values)

PRODUCT IDENTITY

Strength class according to EN 1504-3	R4		
Type:	CC		
Consistency:	powder		
Colour:	grey		
Maximum aggregate size (mm):	2.5		
Bulk density (kg/m <sup>3</sup> ):	1300		
Dry solid content (%):	100		
Chloride ions content: minimum requirement ≤ 0.05% according to EN 1015-17 (%):	≤ 0.05		
<b>PRODUCT APPLICATION DATA</b>			
Colour of mix:	grey		
Mixing ratio:	one 25 kg bag of <b>Mapegrout Hi-Flow SP</b> with 3.1-3.4 litres of water		
Consistency of mix:	fluid		
Density of mix (kg/m <sup>3</sup> ):	2300		
pH of the mix:	>12		
Application temperature range:	from +5°C to +40°C		
Pot life of mix:	60 minutes		
Maximum thickness per application (mm):	50		
<b>FINAL PERFORMANCES (13.5% OF WATER)</b>			
Performance characteristic	Test method	Requirements according to EN 1504-3 for R4 class mortar	Product performance
Compressive strength (MPa):	EN 12190	≥ 45 (after 28 days)	> 30 (after 1 day) > 60 (after 7 days) > 75 (after 28 days)
Flexural strength (MPa):	EN 196/1	not required	> 5 (after 1 day) > 9 (after 7 days) > 10 (after 28 days)
Modulus of elasticity in compression (GPa):	EN 13412	≥ 20 (after 28 days)	27 (after 28 days)
Bond strength to concrete (MC 0.40 type substrate water/cement ratio = 0.40) according to EN 1766 (MPa):	EN 1542	≥ 2 (after 28 days)	≥ 2 (after 28 days)
Resistance to accelerated carbonation:	EN 13295	depth of carbonation ≤ reference concrete (MC 0.45 type with water/cement ratio = 0.45)	test passed
capillary absorption (kg/m <sup>2</sup> · h <sup>0,5</sup> ):	EN 13057	≤ 0.5	< 0.5
Thermal compatibility measured as bonding according to EN 1542 (MPa): •Freeze-thaw cycles with deicing salts; •Thunder-shower cycles; •Dry thermal cycles	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

## SAFETY INTRUCTIONS FOR THE PREPARATION AND APPLICATION

**Mapegrout Hi Flow SP** contains cement that when in contact with sweat or other body fluids causes irritant alkaline reactions and allergic reactions to those predisposed. It can cause damage to eyes.

During use wear protective gloves and goggles and take the usual precautions for handling chemicals.

If the product comes in contact with the eyes or skin, wash immediately with plenty of water and seek medical attention. For further and complete information about the safe use of our product please refer to the latest version of our Material Safety Data Sheet.

PRODUCT FOR PROFESSIONAL USE.

## WARNING



**N.B.** - Although the technical details and recommendations contained in this product report 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 applications: 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.au](http://www.mapei.com.au)

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