

# Mapegrout Hi-Flow

## 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 high flow slurries.

### 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** is a ready-mixed powder composed of highly resistant cements, selected aggregates, special additives and synthetic fibres prepared according to a formula developed in the MAPEI research laboratories.

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

- very high flexural and compressive strength;
- modulus of elasticity and coefficients of thermal expansions 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** is recommended for voids up to 2 cm thick. For greater thicknesses, it is recommended to add suitable graded aggregates from 30 to 50% by weight of the product, only after consulting Technical Assistance.

In order to improve its flexural strength and shock resistance, **Mapegrout Hi-Flow** 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.

### RECOMMENDATIONS

- Do not use **Mapegrout Hi-Flow** on smooth concrete surfaces; roughen them well and insert reinforcing rods if needed.
- Do not use **Mapegrout Hi-Flow** for precision anchorages (use **Mapefill** or **Mapefill R**).

# Mapegrout Hi-Flow



Pouring into a formwork



Removing wooden formwork

- Do not use **Mapegrout Hi-Flow** for applications by spray or trowel (use **Mapegrout Thixotropic**).
- Do not add cement or additives to **Mapegrout Hi-Flow**.
- Do not add water after the mix has begun to set.
- Do not use **Mapegrout Hi-Flow** at temperatures below +5°C (use **Mapefill R**).
- Do not use **Mapegrout Hi-Flow** 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 table). Start the mixer and slowly and continuously pour in the **Mapegrout Hi-Flow**. 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 a 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. Where it is absolutely necessary only 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 the **Mapegrout Hi-Flow** characteristics, such as mechanical strength, shrinkage, waterproofing, etc.

**Mapegrout Hi-Flow** has a pot life of 1 hour at +20°C.

The expansion of **Mapegrout Hi-Flow** has been calculated to compensate for hygrometric shrinkage.

In order to be effective, the forces of expansion must be countered with suitable reinforcement or formwork around the substrate.

Without formwork, **Mapegrout Hi-Flow** can only be applied in thicknesses greater than 2 cm on the condition that reinforcing rods have been fixed. The reinforcement cover must be at least 1 cm thick. Smaller thicknesses can be applied without reinforcement as long as the substrate is sufficiently rough to be able to counter the expansion.

The expansion phase is completed during the first days of curing.

### Applying the mortar

To facilitate the expulsion of air, pour **Mapegrout Hi-Flow** continuously into the moulds.

Water from **Mapegrout Hi-Flow** 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 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** 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 E**).

### 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.

### SAFETY INSTRUCTIONS FOR THE PREPARATION AND APPLICATION

It contains cement that when in contact with sweat or other bodily fluids produces an irritant alkaline reaction and allergic reactions

## TECHNICAL DATA (typical values)

### PRODUCT IDENTITY

Type:	powder
Colour:	grey
Maximum aggregate diameter (mm):	2.5
Specific gravity (kg/dm <sup>3</sup> ):	1.26
Dry solids content (%):	100
Storage:	12 months in original packaging in a dry place
Hazard classification according to EC 99/45:	irritant. Before using refer to the "Safety Instructions for the preparation and application" paragraph and the information on the packaging and safety data sheet
Custom class:	3824 50 90

### APPLICATION DATA

Colour of the mix:	grey
Mixing ratio:	one 25 kg bag of <b>Mapegrout Hi-Flow</b> with 3.75-4 l of water
Consistency of mix:	fluid-superfluid
Specific gravity of mix (kg/dm <sup>3</sup> ):	2.20
pH of mix:	> 12
Application temperature range:	from +5°C to +35°C
Pot life at +23°C and 50% R.H.:	60 minutes
Maximum thickness of application (mm):	20

### FINAL PERFORMANCES

<b>Mechanical characteristics:</b> (according to EN 196/1 - mixing water 15.5%) <b>Compressive strength (MPa):</b> - after 1 day: - after 7 days: - after 28 days:	  > 25 > 40 > 60
<b>Flexural strength (MPa):</b> - after 1 day: - after 7 days: - after 28 days:	 > 5 > 7 > 8
<b>Adherence to substrate (MPa)</b> (measured by pull-off test on damp concrete): - after 7 days (at +23°C and 50% R.H.): - after 21 days (7 days at +23°C and 50% R.H. + 21 days at +60°C): - after 28 days (7 days at +23°C and 50% R.H. + 21 days in water at +20°C):	 > 3 (concrete failure) > 3 (concrete failure) > 3 (concrete failure)
<b>Coefficient of elasticity in compression (MPa):</b>	25,000



Deteriorated concrete structure



Pouring Mapegrout Hi-Flow into metal formwork



Restored structure

