

# Mapegrout Easy Flow

**One-component sulphate-resistant, fibre-reinforced, shrinkage-compensated, thixotropic mortar especially suitable for repairing concrete structures by using a spray rendering machine**



## WHERE TO USE

Repair of deteriorated concrete structures by using a spray rendering machine. The product is especially suitable when easy pumping is required even over long distances and under constant high heads.

### Some application examples

- Repair of highway viaduct pillars by using a spray rendering machine.
- Repair of hydraulic works such as canals, dams, spillways, basins, etc.
- Repair of road and railway tunnels.
- Repair of precast concrete structures.
- Structural repair of concrete structures which have been deteriorated by sulphate salts in the water or ground.
- Repair of concrete structures damaged by corroded reinforcing bars.

## TECHNICAL CHARACTERISTICS

**Mapegrout Easy Flow** is a one-component pre-blended packed thixotropic cement based mortar composed of sulphate-resistant hydraulic binders, synthetic polyacrylonitrile fibres, organic corrosion inhibitors, special water-retainers, expansive admixtures and selected aggregates prepared according to a formula developed in MAPEI Research & Development laboratories. Thanks to its composition, **Mapegrout Easy Flow** is especially suitable for repairing, by spraying, concrete structures where the technical characteristics (considerable heights that need to be repaired, e.g.

viaduct pillars, cooling towers, etc), the job-site logistics (e.g. lack of available space for mixing and pumping equipment near the structure to be repaired) and the organisational needs require easy pumping over long distances and constant high head.

Once mixed with water, **Mapegrout Easy Flow** acquires a thixotropic consistency and extended workability. The mortar does not harden in the pump's pipes. Thanks to this property, it is possible to safely repair even extended vertical surfaces.

After hardening, **Mapegrout Easy Flow** resists sulphate salt attack, is watertight and adheres perfectly to concrete surfaces provided they have been adequately prepared.

To have a correct and complete development of the expansive properties, **Mapegrout Easy Flow**, prepared by adding only water, must cure in a moist environment, a difficult condition to guarantee on site.

In order for the expansive properties to develop in open air, **Mapegrout Easy Flow** can be admixed with **Mapecure SRA**.

**Mapegrout Easy Flow's** performances greatly improve if admixed with 0.25% **Mapecure SRA**, a special admixture that can reduce both plastic and hydraulic shrinkage.

**Mapecure SRA** in fact, carries out a very important function ensuring an improved curing of the mortar.

**Mapegrout Easy Flow** mixed with **Mapecure SRA** can be considered as a technologically advanced system because the admixture can reduce the rapid evaporation of the mixing water and helps the development of the hydration reactions.

**Mapecure SRA** acts as an interior curing agent and,

thanks to the interaction with several main cement components, final shrinkage from 20 to 50% less with respect to standard values of the product that has not been admixed can be obtained. The risk of cracking also is reduced.

**Mapegrout Easy Flow** meets all the main requirements of EN 1504-9 Standards (*"Products and systems for the protection and repair of concrete structures: definitions, requirements, quality control and conformity assessment. General principles for the use of products and systems"*) and the minimum requirements for EN 1504-3 Standards (*"Structural and non-structural repairs"*) for class R4 structural mortar. If the surrounding weather conditions are such as to guarantee good curing, this product may also be used without adding **Mapecure SRA**.

## RECOMMENDATIONS

- Do not apply **Mapegrout Easy Flow** on smooth surfaces. Roughen the surface well and add reinforcing for thicknesses greater than 3 cm.
- Do not use **Mapegrout Easy Flow** to repair by pouring into formworks (use **Mapegrout Hi-Flow**).
- Do not use **Mapegrout Easy Flow** for anchoring (use **Mapecfill** or **Mapecfill R**).
- Do not use **Mapegrout Easy Flow** at temperatures lower than +2°C or if the temperature could drop below 0°C immediately after its application.
- Do not add cement or admixtures to **Mapegrout Easy Flow**.
- Do not mix **Mapegrout Easy Flow** with other mortars from the **Mapegrout** range. Refer to MAPEI Technical Services Department.

## APPLICATION PROCEDURE

### Preparation of the substrate

- Remove deteriorated and loose concrete until the substrate is sound, strong and rough. Any previous restoration work which is not soundly bonded should be removed.
- Once ready, the concrete surface that needs repair should be rough and with irregularities of maximum 5 mm.
- Clean the concrete and reinforcing rods until free of dust, rust, cement laitance, grease, oils and previously applied paints by sandblasting.
- Treat the reinforcing rods with **Mapecfer** or **Mapecfer 1K** following the application procedure described on the relevant Technical Data Sheets.
- Wait until **Mapecfer** or **Mapecfer 1K** has dried.
- Saturate the substrate with water.
- Wait for the excess water to evaporate before applying **Mapegrout Easy Flow**. If it is necessary to facilitate the elimination of free water, use compressed air.

### Preparation of the mortar

- Pour into the mixer 90% of the amount of water required for the application:

| APPLICATION METHOD | LITRES OF WATER PER 25 KG BAG |
|--------------------|-------------------------------|
| Trowel             | approx. 4.1-4.3               |
| Spray              | approx. 4.2-4.4               |

- Start the concrete mixer and slowly add **Mapegrout Easy Flow** to the water in a continuous flow.
- If improved curing of the mortar in open air is required, add **Mapecure SRA** 0.25% by weight of the mortar (0.25 kg per 100 kg of **Mapegrout Easy Flow**).
- Mix for 1-2 minutes, then make sure the mix is well blended. Scrape any unblended powder from the bottom and the sides of the mixer. Add an additional amount of water until the mix has reached the desired consistency. Mix again for another 2-3 minutes.
- Depending on the amount needed, a mortar mixer or a drill fitted with a paddle may also be used. Mix at a low speed to avoid entraining air.

**Mapegrout Easy Flow** remains workable for approximately 1 hour at +20°C.

The expansion of **Mapegrout Easy Flow** is calculated to compensate the hydraulic shrinkage. In order to be effective, the substrate needs to be adequately reinforced with rebars and/or roughened.

Layers of **Mapegrout Easy Flow** in thicknesses of more than 3 cm, should be carried out only after reinforcing and roughening the concrete surface making sure the reinforcement is covered with concrete at least 2 cm thick. Lower thicknesses can be applied without reinforcing, provided that the substrate has been substantially roughened to restrain the expansion. The expansion phase is completed during the first days of curing.

## Application of the mortar

Application is usually carried out by spraying using a piston or worm screw rendering machine for example Turbosol, Putzmeister, except continuous mixing machines.

**Mapegrout Easy Flow** can also be applied with a trowel without formwork even on vertical surfaces. The recommended maximum thickness per layer is approximately 100 mm.

If more layers of **Mapegrout Easy Flow** are necessary, it is recommended to leave the surface of the prior hardened layer rough and wet the substrate with water.

## PRECAUTIONS TO BE TAKEN DURING AND AFTER THE APPLICATION

- To prepare the mix, only use **Mapegrout Easy Flow** bags stored in the original packaging.
- In warm weather, store the product in a cool place and use cold water to prepare the mortar.
- In cold weather, store the product protected from frost at +20°C and use lukewarm water to prepare the mortar.
- After application, **Mapegrout Easy Flow** must be carefully cured. To prevent the mix water from evaporating too quickly, (particularly in warm weather and on windy

## TECHNICAL DATA (typical values)

### PRODUCT IDENTITY

|  |             |
|--|-------------|
| 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> ):   | 1,350       |
| Dry solids content (%):  | 100         |
| Chloride ions content:<br>– minimum requirement $\leq 0.05\%$ according to EN 1015-17 (%): | $\leq 0.05$ |

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

|  |   |
|--|---|
| Colour of the mix:                         | grey  |
| Mixing ratio:                              | 100 parts of <b>Mapegrout Easy Flow</b> with 16.5-17.5 parts of water (approx. 4.1-4.4 litres of water per 25 kg bag) and 0.25% of <b>Mapecure SRA</b> (1 x 0.25 kg canister every 4 bags of <b>Mapegrout Easy Flow</b> ) |
| Consistency of the mix:                    | thixotropic   |
| Density of the mix (kg/m <sup>3</sup> ):   | 2,200   |
| pH of the mix:                             | > 12.5  |
| Recommended application temperature range: | from +5°C to +35°C  |
| Pot life of the mix:                       | approx. 1 hour  |
| Waiting time between each layer:           | max 1-2 hours   |

### FINAL PERFORMANCE (with 17% mixing water - mixing and compaction according to EN 196-1)

| Performance characteristic  | Test method                            | Requirements according to EN 1504-3 Standards for R4 class mortar  | Performance of product   |
|---|--|--|--|
| Compressive strength (MPa):   | EN 12190                               | > 45 (after 28 days)   | > 20 (after 1 day)<br>> 50 (after 7 days)<br>> 60 (after 28 days)                            |
| Flexural strength (MPa):  | EN 196/1                               | not required   | > 4 (after 1 day)<br>> 7 (after 7 days)<br>> 8 (after 28 days)                               |
| Compressive modulus of elasticity (GPa):  | EN 13412                               | $\geq 20$ (after 28 days)  | 27 (after 28 days)   |
| Adhesion to concrete (MC 0.40 type substrate - water/cement ratio = 0.40) according to EN 1766 (MPa):   | EN 1542                                | $\geq 2$ (after 28 days)   | > 2 (after 28 days)  |
| Impeded expansion ( $\mu\text{m}/\text{m}$ ):   | UNI 8147 mod.                          | not required   | > 400 after 1 day (*)  |
| Warp test:  | //                                     | not required   | convex (*)   |
| Crack resistance:   | “O Ring Test”                          | not required   | no cracks after 180 days (*)   |
| Resistance to accelerated carbonation:  | EN 13295                               | depth of carbonation $\leq$ to reference concrete (MC 0.45 type - water/cement ratio = 0.45) according to UNI 1766 Standards | test passed  |
| Water impermeability - depth of penetration - (mm):   | EN 12390/8                             | not required   | < 5  |
| Capillary absorption (kg/m <sup>2</sup> ·h <sup>0.5</sup> ):  | EN 13057                               | < 0.5  | < 0.25   |
| Resistance of reinforcement rods to slipping - adhesion stress (MPa):   | RILEM-CEB-FIP RC6-78                   | not required   | > 25   |
| Thermal compatibility measured as bonding according to EN 1542 (MPa):<br>– freeze-thaw cycles with deicing salts:<br>– storm cycle:<br>– dry thermal cycle: | EN 13687/1<br>EN 13687/2<br>EN 13687/4 | $\geq 2$ (after 50 cycles)<br>$\geq 2$ (after 30 cycles)<br>$\geq 2$ (after 30 cycles)                                       | > 2<br>> 2<br>> 2  |
| Resistance to freeze- thaw cycles in the presence of salts - flaking (g/m <sup>2</sup> ):   | EN 12390/9                             | not required   | < reference concrete (XF4) (**)  |
| Exposure class:   | EN 206/1                               | not required   | X0<br>XC1, XC2, XC3, XC4<br>XD1, XD2, XD3<br>XS1, XS2, XS3<br>XF1, XF2, XF3, XF4 (**)<br>XA1 |
| Reaction to fire:   | EN 13501-1                             | Euroclass  | A1   |

If 30% in weight of gravel is added to **Mapegrout Easy Flow**, the strength value is the same compared with mortar prepared as is (as long as the amount of mixing water used is the same).

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

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



# Mapegrout Easy Flow



days, which can cause surface cracks due to plastic shrinkage), nebulize water on the surface 8-12 hours after the application of the grout and repeat every 3-4 hours, for at least the first 48 hours. Alternately, after the grout has been floated, apply **Mapecure E**, an anti-evaporation compound in water emulsion using a low pressure pump or **Mapecure S**, solvent film-forming curing compound for mortars and concrete or **Elastocolor Primer**, solvent-based fixing primer with high penetration properties for porous substrates and curing agent for repair mortars. Like all the best products of their kind on the market, **Mapecure E** and **Mapecure S** prevent the adhesion of the following coverings.

If smoothing or painting is required, **Mapecure E** and **Mapecure S** must be completely removed by sandblasting. If **Elastocolor Primer** is used as an anti-vapour agent, **Elastocolor Paint** or **Elastocolor Rasante** can be applied as a final protection directly over the treated surface with no need of removal.

## Cleaning

While still wet, the grout can be cleaned from tools with water. After setting, cleaning can only be carried out 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 mixed with 30% aggregate from 3 to 6-8 mm.

## PACKAGING

25 kg bags. 1000 kg big-bags.

## STORAGE

**Mapegrout Easy Flow** may be stored up to 12 months in its original packaging. The special packaging, made from 25 kg vacuum-packed polyethylene bags, allows the product to be stored outside for the entire duration of the site. Rain has no effect on its characteristics.

## 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.

## 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)

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