MAPEGROUT SV FIBER

Very high-performance, flowable, shrinkage-compensated, quick setting and hardening, high-ductility cementitious mortar, applied at temperatures as low as -5°C, with steel fibres, for repairing concrete





WHERE TO USE

Repairing concrete structures in general, particularly those subjected to dynamic stress, cyclical loads, impact loads and vibration, including at low temperatures.

Some application examples

- Repairing concrete floors in industrial environments, shopping centres and warehouses.
- Repairing concrete floor slabs.
- Rebuilding and levelling off the upper parts of pier-caps and bearing elements on motorway viaducts.
- Repairing the ends of floor slabs.
- Repairing concrete road surfaces in airports.
- Repairing hydraulic structures.
- Repairing motorway joints.

TECHNICAL CHARACTERISTICS

Mapegrout SV Fiber is a one-component, ready-mixed powdered mortar made from special hydraulic binders, high-strength cement, synthetic polyacrylonitrile fibres, rigid steel fibres, selected aggregates and special additives according to a formula developed in the MAPEI research laboratories. Thanks to its special composition, this product develops very high mechanical properties after short curing periods, including when applied at low temperatures.

When **Mapegrout SV Fiber** is mixed with water it has a fluid consistency, making it suitable for casting into sealed formwork in layers up to 5 cm thick without segregating.

When completely hardened, **Mapegrout SV Fiber** has the following properties:

- high flexural and compressive strength;
- modulus of elasticity, thermal expansion coefficient and permeability coefficient similar to high quality concrete;
- impermeability to water;

- excellent adhesion to both old concrete, if dampened with water before application, and to rebar, especially if treated beforehand with **Mapefer** or **Mapefer 1K;**
- high resistance to impact loads.

Thanks to its rapid hardening properties, the mortar sets to foot traffic and may be used by wheeled vehicles just a few hours after application at +20°C.

Mapegrout SV Fiber complies with the principles defined in 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 of EN 1504-3 ("*Structural and non-structural repairs*") for R4-class structural mortars.

Mapegrout SV Fiber is covered by Certificate of Technical Assessment (CVT) N° 319/2024 issued by the 2° Div. of the STC (Central Technical Service) of the CSLP (Italian Ministry of Public Works).

RECOMMENDATIONS

- Do not add cement to **Mapegrout SV Fiber.**
- Do not add admixtures to **Mapegrout SV Fiber.**
- Do not use **Mapegrout SV Fiber** if the packaging is damaged.
- Do not add water once the mix has started to set.
- Do not apply **Mapegrout SV Fiber** on asphalt or on surfaces treated with bitumen.
- Do not apply **Mapegrout SV Fiber** on smooth surfaces. Roughen the surface of the substrate (to at least 5 mm) and, if necessary, insert dolly rods.
- Do not use **Mapegrout SV Fiber** if the temperature is lower than -5°C or higher +35°C.
- **Mapegrout SV Fiber** hardens very quickly and it is recommended, therefore, to only mix quantities of mortar that will be applied within 10 minutes of adding the mixing water at +20°C.

APPLICATION PROCEDURE

TECHNICAL INFORMATION FOR PRODUCT PREPARATION			
Mix composition:	100 kg **Mapegrout SV Fiber** 13,5-14,5 kg of water		
Thickness applied:	10-50 mm *(For greater thicknesses, see the instructions in the 'Preparation of the mortar' paragraph)*		
Application temperature:	Surrounding and substrate temperature from -5°C to +35°C		
	+5°C	+10°C	+20°C
Pot life of mix:	60 min.	20 min.	10 min.
End of setting:	100 min.	60 min.	35 min.

Preparation of the substrate

- Remove all damaged and detached areas of concrete to form a sound, rough and strong substrate. Any areas previously restored which are not perfectly attached must also be removed.
- Remove all traces of paint, oil, dust and any other material or substance that could affect adhesion of **Mapegrout SV Fiber** to the substrate.
- Treat any exposed rebar with **Mapefer** or **Mapefer 1K** according to the procedure illustrated in the relative Technical Data Sheet for each product.
- Wait until the **Mapefer** or **Mapefer 1K** has dried.
- For **Mapegrout SV Fiber** repairs thicker than 5 cm, position reinforcement bars, taking care to create a concrete cover of at least 2 cm.

- Saturate the substrate with water.
- Before casting, wait until the excess water has evaporated. If necessary, this phase may be speeded up by using compressed air.

Preparation of the mortar

Pour 3.4 to 3.6 litres of clean water in the cement mixer (13.5-14.5%) according to the type of application. Then start mixing and add **Mapegrout SV Fiber** slowly and continuously.

Remove all traces of powder from the sides and bottom of the mixing drum and mix again for 2-3 minutes to form an even mix. At the end of the mixing process, the mix must be smooth (the fibres must be completely dispersed), fluid, and lump-free. Always mix the entire bags.

A mortar mixer or low-speed drill with a mixing attachment may also be used, depending on the amount of mortar required. Avoid entraining too much air while mixing.

If the areas to be integrated are thicker than 5 cm, mix **Mapegrout SV Fiber** with a maximum of 60% of dry **6-10 Alluvial Gravel** calculated on the weight of the powder (for example at 50%: four 25 kg bags of **Mapegrout SV Fiber** + two 25 kg bags of **6-10 Gravel**).

The instructions for the preparation of the mortar to be used for the creation of concrete samples for laboratory tests are reported in the "Technical Data" table.

Application of the mortar

Pour **Mapegrout SV Fiber** into the area prepared as specified and finish off the surface immediately with a trowel; a vibro-poker is not required to spread the mortar. If the product is used to fix manholes or manhole covers in place, and the area around the repair needs to be re-asphalted, it is recommended to form a layer at least 3 cm thick in that area to allow the layer of bitumen to bond firmly and to withstand the weight of vehicles without subsiding.

The mortar maintains its workability for around 10 minutes from when the mixing water is added at +20°C.

For further information on the equipment suitable for mixing and application, please contact our Technical Services – Building Department.



Preparation of the holes to insert the reinforcement rods (dowelling)



Removing dust with a vacuum cleaner



Fixing reinforcement rods for the dowelling in place using Adesilex PG1



Preparation of the Mapegrout SV Fiber mix



Consistency of the mix



Application of Mapegrout SV Fiber in the area under repair



Levelling off Mapegrout SV Fiber with a straight-edge



Tamping Mapegrout SV Fiber



Ready for use within a few hours of being applied

PRECAUTIONS TO BE TAKEN DURING AND AFTER APPLICATION

- To prepare the mortar, use only **Mapegrout SV Fiber** bags that have been stored on their original and sealed pallets.
- In hot weather, store the product in a cool area and use cold water to prepare the mix.
- In cold weather, store the product in an area protected from frost and use lukewarm water to prepare the mortar.
- Immediately after applying **Mapegrout SV Fiber** it is recommended to protect it by spraying the surface with water, particularly in hot or windy weather, to prevent the mixing water from evaporating off too quickly and causing surface cracks caused by plastic shrinkage.
- In the case of horizontal application, spray water on the surface while applying the product and cover it immediately with a waterproof sheet for at least 3 days. In the case of vertical application, spray water on the surface immediately after having stripped the formwork and cover the product with a waterproof sheet for at least 3 days. As an alternative to damp curing, anti-evaporation treatments can be applied to the surface, to be selected depending on the subsequent operations.

CLEANING

Remove wet mortar from tools used to prepare and apply the mortar with running water. Once hardened cleaning must be carried out mechanically.

CONSUMPTION

- Used net: approx. 20.5 kg/m² per cm of thickness.
- Used ad micro-concrete with 4 bags of **Mapegrout SV Fiber** and 2 bags of gravel, approximately 14.7 kg/m² per cm of thickness (approximately 7.4 kg/m² of **6-10 Gravel**).

COLOUR

Grey.

PACKAGING

Mapegrout SV Fiber is supplied in 25 kg bags.

STORAGE

Mapegrout SV Fiber may be stored for maximum 12 months in its original packaging.

The particular packaging, made of 25 kg polyethylene vacuum bags, offers greater protection of the product from accidental rain.

Some characteristics of the product are particularly sensitive to storage methods. Store the product in a dry, covered place at a temperature between +5°C and +35°C in its original, well sealed packaging.

SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

This product contains microplastics. The synthetic polymer microparticles supplied are subject to conditions laid down by entry 78 of Annex XVII to Regulation (EC) No 1907/2006 of the European Parliament and of the Council.

Avoid release to the environment. Collect spillage. Do not dispose of rinsing water into the environment. Dispose waste in accordance with the local rules.

Instructions for the safe use of our products can be found on the latest version of the SDS available from our website 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
CEMENT MATRIX	
Consistency:	powder
Colour:	grey
Maximum size of aggregate:	2.5 mm
Chloride ion content according to EN 1015- 17: (minimum requirements according to EN 1504 ≤ 0.05%)	≤ 0.05%
FIBRES	
Shape:	hooked
Aspect ratio:	80
Material:	steel
Material density - according to EN 14889-1:	7.85 g/cm^3
Length - according to EN 14889-1:	30 mm
Equivalent diameter - according to EN 14889-1:	0.38 mm
Tensile strength - according to EN 14889-1:	3,070 MPa
Modulus of elasticity - according to EN 14889-1:	200 GPa
Elongation at failure - according to EN 14889-1:	min. 0.7%

TECHNICAL INFORMATION FOR PRODUCT PREPARATION

Mix composition:	100 parts by weight of **Mapegrout SV Fiber** with 13.5 % of water
Preparation of mix:	according to internal procedure MGE 71-C

CHARACTERISTICS OF FRESH MIX (at +20°C - 50% R.H.)

Colour of mix:	grey
Consistency of mix:	semi-fluid
Density of mix:	2300 kg/m³
Density according to EN 12390-7:	2330 kg/m³

FINAL PERFORMANCE PROPERTIES

According to the seasoning defined in the test methods

Performance characteristic	Test method	Requirements EN 1504-3 (R4)	Performance of product		
			-5°C	0°C	+20°C
Compressive strength:					
- 2 hours:		-	> 10 MPa	> 15 MPa	> 25 MPa
- 4 hours:		-	> 15 MPa	> 20 MPa	> 35 MPa
- 8 hours:	EN 12190	-	> 20 MPa	> 30 MPa	> 40 MPa
- 1 day:			> 50 MPa	> 55 MPa	> 60 MPa
- 7 days:		-	> 65 MPa	> 65 MPa	> 70 MPa
- 28 days:		≥ 45 MPa	> 75 MPa	> 80 MPa	> 90 MPa
Flexural strength:					
- 1 day:	EN 196-1	not required			> 15 MPa
- 7 days:					> 18 MPa
- 28 days:					> 20 MPa
Compressive modulus of elasticity:	EN 13412	20 GPa	30 GPa		
Direct tensile adhesion to concrete:	EN 1542	≥ 2.0 MPa	> 2.0 MPa		
Resistance to accelerated carbonation:	EN 13295	depth of carbonation ≤ to reference concrete	meets specifications		
Capillary absorption:	EN 13057	≤ 0.5 kg/m²·h$^{0.5}$	< 0.1 kg/m²·h$^{0.5}$		
Thermal compatibility:					
- Freeze-thaw cycling with de-icing salt (50 cycles):	EN 13687-1	≥ 2.0 MPa	> 2.0 MPa		
- Thunder-shower cycling (30 cycles):	EN 13687-2	≥ 2.0 MPa	> 2.0 MPa		
- Dry-thermal cycling (30 cycles):	EN 13687-4	≥ 2.0 MPa	> 2.0 MPa		
Pull-out resistance of steel bars ϕ 8 mm (pull-out test) - tension of adhesion t_{dm}:	EN 10080 Annex D *(in accordance with RILEM recommendation RC 6)*	not required	> 25 MPa		
Impermeability to water					
- penetration depth	EN 12390-8	not required	< 5 mm		
Resistance to cracking:	"O Ring Test"	not required	no cracking after 180 days		
Average residual flexural strength: (1)	EN 14651	not required			
- CMOD 1 = 0.5 mm			f_{R1} 6.6 MPa		
- CMOD 2 = 1.5 mm			f_{R2} 7.7 MPa		
- CMOD 3 = 2.5 mm			f_{R3} 6.8 MPa		

- CMOD 4 = 3.5 mm			f_{R4} 5.7 MPa
Reaction to fire:	EN 13501-1	Euroclass	A1, $A1_{FL}$

NOTES:

Specimens preparation: pour the mortar into the molds filling them up to half. Compact the material with light strokes of the molds. Complete the fill.
The presence of structural metal fibres in the mixture requires particular care in the preparation of specimens intended for bending tests so that the fibres are distributed homogeneously and evenly. In case of inhomogeneity of the fibres in the specimen, the result shall not be considered valid and the test shall be repeated.
During the bending test it is noted that the specimen initially cracks but the load continues to rise due to the presence of the fibres. It is therefore necessary to continue the test until there is a reduction in load of at least 50%.

(1) For the mixing process and the specimen preparation, please make reference to the Installation and Preparation Manual. The product must be vibrated and compacted accordingly as per EN 12190 (§ 6).

Example of composition and characteristics of Mapegrout SV Fiber-based micro-concrete
Composition of mix: 65 parts of Mapegrout SV Fiber - 35 parts of 6-10 mm Gravel - 8.78 parts of water

Performance characteristic	Test method	Performance of product					
Density of mix:	EN 12350-6	2,400 kg/m³					
Compressive strength:	EN 12390-3	3 h > 30 MPa	4 h > 40 MPa	8 h > 50 MPa	1 g > 65 MPa	7 days > 70 MPa	28 days > 75 MPa

MECHANICAL and DURABILITY PROPERTIES according to CVT No. 319/2024

(13.5% of mixing water)

Property	Test method / Reference standard	Product performance (*)
Mechanical behaviour:	-	non-strain hardening
Compressive strength class:	NTC 2018 Tab. 4.1.I	C 55/67
Compressive modulus of elasticity:	NTC 2018 § 11.2.10.3	39.0 GPa *(calculated value)*
Residual strength class:	EN 14651	5.0 c
Limit of proportionality: - average value $f^{f}_{ct,L,m}$ - characteristic value $f^{f}_{ct,L,k}$	EN 14651	 5.7 MPa 4.4 MPa
Ratio $f_{R,1k}$ /$f^{f}_{ct,Lk}$:	EN 14651	1.21
Ratio $f_{R,3k}$ /$f_{R,1k}$:	EN 14651	1.04
Exposure class:	EN 206-1	X0 XC1, XC2, XC3, XC4 XD1, XD2, XD3 XS1, XS2, XS3 XF1, XF2, XF3, XF4 (**) XA1
Freeze-thaw resistance:	FRC Guidelines § 3.4.1	test passed

Notes:

(*) For the mixing process and specimen preparation, please make reference to the Application and Preparation Manual. The product must be vibrated and compacted in compliance with EN 12190 (§ 6).

(**) **Mapegrout SV Fiber** was tested according to the standard EN 12390-9 compared with reference concrete with composition in compliance with class XF4 according to EN 206-1.

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.

The values declared in the TECHNICAL DATA table (typical values) were obtained in compliance with test methods and curing cycles defined in the technical standards referenced therein. Therefore, please note that the use of test procedures or methods other than those indicated in the table could lead to different values and that, in such cases, any liability of our company is excluded.

Please refer to the current version of the Technical Data Sheet, available from our website www.mapei.com

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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.

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

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