PLANITOP HPC FLOOR

One-component, fibre-reinforced with steel fibre, shrinkage-compensated, high-ductility, highly fluid cementitious mortar with extremely high mechanical performances

WHERE TO USE

Repairing and strengthening reinforced concrete and horizontal structures where the thickness and shape of areas to be repaired require the use of high-strength, high-flow mortar. Particularly recommended for reinforcement from the top of floor slabs.

Some application examples

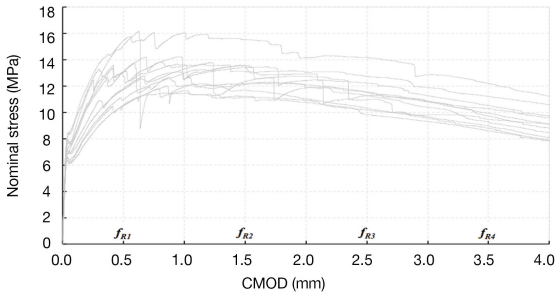
- Seismic retrofitting of elements subject to high stresses and where high ductility is required.
- Structural strengthening by casting a thin layer on the external faces of floor slabs in reinforced concrete, brick-cement wood or mixed brick-steel beam.
- Repairs to concrete floors (industrial, roads, airports).
- Rebuilding and levelling off the upper parts of piers caps and bearings on motorway viaducts.
- Reparation of floor slabs after removal of damaged areas by scarifying;

TECHNICAL CHARACTERISTICS

Mapegrout HPC Floor is a pre-blended powder mortar composed of high strength cement, selected graded aggregates, special additives, rigid steel fibres formulated by MAPEI Research & Development laboratories. When **Planitop HPC Floor** is mixed with water, it forms a fluid mortar suitable also for casting into formwork without segregating in layers from 1 to 4 cm thick, and without the need for electro-welded reinforcing mesh. To allow the product's expansive properties to develop fully and correctly, **Planitop HPC Floor** must be cured in a damp environment. To allow expansion in the open air, **Planitop HPC Floor** can also be admixed with 0.25% of **Mapecure SRA**, a special admixture that reduces plastic and hydraulic shrinkage.
Mapecure SRA carries out an extremely important role and guarantees better curing of the mortar. When mixed with **Planitop HPC Floor**, it can be considered a technologically advanced system, as it is able to reduce the rapid evaporation of water and promote the development of hydration reactions.
Mapecure SRA acts basically as an internal curing agent and, thanks to its interaction with some of the main components in the cement, reduces final shrinkage by 20% to 50% compared with the same product without the admixture, which means there is also a lower risk of cracking.
The use of **Mapecure SRA** could slightly reduce mechanical performance characteristics by 5-6%.
The product can also be used without adding **Mapecure SRA** when climatic conditions allow a favourable curing cycle to be carried out.
Once hardened, **Planitop HPC Floor** has the following characteristics:

- very high flexural and compressive strength.
- High ductility.
- High resistance to cyclical loads.
- Impermeability to water.
- Excellent adhesion to both old concrete (if soaked with water or consolidated with **Primer 3296** before application) and rebars, especially if treated beforehand with **Mapefer** or **Mapefer 1K Zero**;
- high resistance to wear due to abrasion or impact.

Planitop HPC Floor 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 the use of products and systems*"), and the minimum requirements of EN 1504-3 ("*Structural and non-structural repair*") for R4-class structural mortars and with the requirements of EN 1504-6 ("*Anchoring of reinforcing steel bars*").
Planitop HPC Floor is covered by the Certificate of Technical Assessment (CVT) No. 264/2020 issued by the 2nd Division of the STC (Italian Central Technical Service) of the CSLP (Italian High Council for Public Works).



Graph of residual flexural strength according to EN 14651

RECOMMENDATIONS

- Do not apply **Planitop HPC Floor** on smooth concrete substrates.
- Do not use **Planitop HPC Floor** for precision anchoring (use **Mapefill Zero** or **Mapefill R**).
- Do not apply **Planitop HPC Floor** by spray or with a trowel (use **Planitop HPC Tixo** for application by trowel).
- Do not add cement or admixtures to **Planitop HPC Floor**.
- Do not add water once the mix has started to set.
- Do not use **Planitop HPC Floor** if the bag is damaged or if it has been opened previously.

APPLICATION PROCEDURE

TECHNICAL INFORMATION FOR PRODUCT PREPARATION	
Mix composition:	100 kg of **Planitop HPC Floor** 11.5-12.5 kg of water
Thickness applied:	up to 40 mm (without additional reinforcement mesh).
Application temperature:	Surrounding and substrate temperature from +5°C to +35°C
Pot life of mix:	approx. 45 minutes (at +20°C)
Set to light traffic:	24 h at +20°C
Set to heavy traffic:	72 h at +20°C

Preparation of the substrate

- Remove all damaged and detached areas of concrete to form a sound, highly rough (roughness of at least 5 mm) and strong substrate. Any areas previously restored which are not perfectly attached must also be removed.
- Remove all dust, rust, cement laitance, grease, oil and old paint from the concrete and reinforcing bars by sandblasting.
- If it is necessary to consolidate the substrate, apply at least 4 hours before the application of **Planitop HPC Floor Primer 3296** diluted 1:1 with water. In the case of pouring the mortar into a formwork, proceed with the following steps:
  - soak the substrate with water
  - before pouring, wait until any excess water has evaporated off. If necessary, this operation can be speeded up by using compressed air.

Preparation of the mortar

Pour **Planitop HPC Floor** into the mixer and add 3.0 litres of water per bag of product.
The mixing time depends on the efficiency of the mixer.
For example, with a forced-action mixer, mixing requires approximately 5 minutes.
If a traditional cement mixer is used, mix for approx. 12 minutes.
At the end of the mixing process, the mix must be smooth (the fibres must be completely dispersed), fluid, and lump-free.
Small variations in the quantity of mixing water (2.9-3.1 l) are allowed depending on the mixing equipment and the climate conditions.
It is recommended to apply the product within 30 minutes of mixing.
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 on floor slabs

Pour **Planitop HPC Floor** on the surface: if necessary, use a rake to spread the product.

Application of the mortar into a formwork

Pour **Planitop HPC Floor** into the formwork in a continuous flow from one side only, making sure all the air is expelled.
The formwork must not absorb any of the water from **Planitop HPC Floor**. It is recommended to treat the formwork beforehand with a form release agent (such as **Mapeform DMA 1000**).
Make sure that all the members to be strengthened are completely filled. To help the mortar flow into the more difficult areas, use wooden rods, round iron bars, or vibrate lightly.

PRECAUTIONS TO BE TAKEN DURING AND AFTER APPLICATION

- To prepare the mortar, use only **Planitop HPC Floor** bags that have been stored on their original pallets, in a covered area.
- 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 at a temperature of +20°C and use lukewarm water to prepare the mortar.
- After applying **Planitop HPC Floor**, it is recommended to cure it very carefully, particularly in hot or windy weather, to prevent the mixing water from evaporating off too quickly and causing surface cracks. To prevent such problems, it is recommended to spray the surface with water, repeating this operation every 3-4 hours for at least 48 hours. Then cover the surface with a waterproof sheet for at least 5 days.

CLEANING

Wash mortar from tools with water before it hardens. Once hardened, cleaning is much more difficult and must be carried out only mechanically.

CONSUMPTION

Approx. 21 kg/m² per cm of thickness.

PACKAGING

Planitop HPC Floor is supplied in 25 kg bags.

STORAGE

12 months in its original packaging, in a dry sealed covered place.

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.
PRODUCT FOR PROFESSIONAL USE.

TECHNICAL DATA (typical values)

PRODUCT IDENTITY	
Class according to EN 1504-3:	class R4
Type according to EN 1504-1:	CC
Cement matrix	
Consistency:	powder
Colour:	grey
Maximum size of theaggregate:	1.0 millimeters
Chloride ion content according to EN 1015- 17: (minimum requirements according to EN 1015 ≤ 0.05%)	≤ 0.05 %
Fibres	
Shape:	hooked
Aspetratio:	80
Material:	Steel
Material density - according to EN 14889-1:	7.85 g/cm³
Length - according to EN 14889-1:	30 millimeters
Equivalent diameter - according to EN 14889-1:	0.38 millimeters
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. 0.70 %

TECHNICAL INFORMATION FOR PRODUCT PREPARATION

Mix composition:	100 parts by weight of **Planitop HPC Floor** with 12% of water
Preparation of the mix:	according to the internal procedure MGE 71-C or Application and Preparation Manual

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

Colour of mix:	grey
Slump flow according to EN 12350- 8:	class SF3 according to EN 206
Density according to EN 12390-7:	2390 kg/m³

FINAL PERFORMANCE
According to the curing times defined in the test methods

Performance characteristic	Test method	Requirements according to EN 1504-3 R4	Requirements according to EN 1504-6	Performance of product
Compressive strength: 28 days	EN 12190	≥ 45 MPa	not required	**Meets specifications**
Compressive modulus of elasticity:	EN 13412	≥ 20 GPa	not required	**38 GPa**
Shear strength and slip resistance (τ-bond) concrete substrate with roughened surface:	Experimental method (1)	not required	not required	**≥ 3.5 MPa**
Bond strength to concrete by pull-off:	EN 1542	≥ 2.0 MPa	not required	**≥ 3.0 MPa**
Resistance to accelerated carbonation:	EN 13295	depth of carbonation ≤ to reference concrete	not required	**Meets specifications**
Water impermeability – depth of penetration:	EN 12390-8	not required	not required	**< 2 mm**
Capillary absorption:	EN 13057	≤ 0.5 kg/m²·h$^{0.5}$	not required	**< 0.5 kg/m²·h$^{0.5}$**
Thermal compatibility – freeze-thaw cycling with de-icing salt (50 cycles):	EN 13687-1	≥ 2.0 MPa	not required	**> 2.0 MPa**
Freeze-thaw resistance with de-icing salts - scaling (after 56 cycles):	EN 12390-9	not required	not required	**< 100 g/m²**
Pull-out strength of steel rebar – displacement at load of 75 kN:	EN 1881	not required	≤ 0.6 mm	**< 0.6 mm**
Average residual flexural strength: (2)				
CMOD 1 = 0.5 mm	EN 14651	not required	not required	f_{R1} 12.5 MPa
CMOD 2 = 1.5 mm				f_{R2} 12.7 MPa
CMOD 3 = 2.5 mm				f_{R3} 11.4 MPa
CMOD 4 = 3.5 mm				f_{R4} 9.9 MPa
Reaction to fire:	EN 13501-1	Euroclass	Euroclass	**A1, A1$_{FL}$**

NOTES:
Specimens preparation 40x40x160 mm: pour the mortar into the moulds, filling them up to half. Compact the mortar manually. Complete the fill. Compact the mortar manually and strike off the excess.
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. If the fibres in the specimen are not evenly distributed, the test result is not valid. In such cases, the test must be repeated.
During the bending test, 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 the maximum load of at least 50%.
(1) Experimental method. Test report available upon request (contact Mapei Technical Service).
(2) 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).

MECHANICAL and DURABILITY PROPERTIES according to CVT No. 264/2020 (12% of mixing water)

Properties	Test method / Reference standard	Performance of product (*)
Mechanical behaviour:	-	**non-strain hardening**
Compressive strength class:	NTC 2018 Tab. 4.1.I	**C 80/95**
Compressive modulus of elasticity:	NTC 2018 § 11.2.10.3	**44.4 GPa (calculated value)**
Residual strength class:	EN 14651	**8.0 c**
Limit of proportionality:		
average value $f^{f}_{ct,L,m}$	EN 14651	**7.3 MPa**
characteristic value $f^{f}_{ct,L,k}$		**6.1 MPa**
Ratio $f_{R,1k}$ /f $^{f}_{ct,\,Lk}$:	EN 14651	**1.59**
Ratio $f_{R,3k}$ /$f_{R,1k}$:	EN 14651	**0.96**
Exposure class:	EN 206 – Table F.1	**X0 XC1, XC2, XC3, XC4 XD1, XD2, XD3 XS1, XS2, XS3 XF1, XF2, XF3, XF4 (**) XA1**
Freeze-Thaw resistance:	Guidelines FRC § 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).
(**) **Planitop HPC Floor** 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.

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 www.mapei.com

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