PLANITOP HPC FLOOR

Fibre-reinforced, shrinkage-compensated, high-strength, high-ductility, highly-fluid cementitious mortar





WHERE TO USE

Repairing and strengthening of reinforced concrete and horizontal structures where high-performance, free-flowing mortar is required to integrate thick layers or fill complex areas. It is particularly suitable for strengthening the extrados of floor beams.

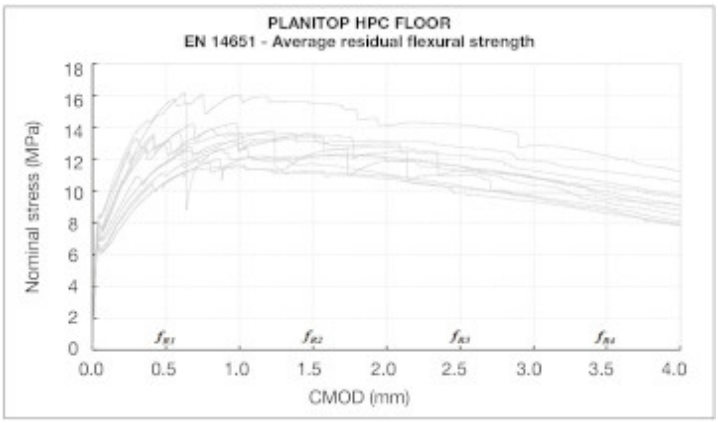
Some application examples

· Seismic upgrading of elements subjected to high stresses where high ductility is required.
· Structural strengthening by casting a thin layer on the external faces of floor beams in reinforced concrete, brick-cement wood or mixed brick-steel beam.
· Repairs to concrete surfaces (industrial floors, roads, airports).
· Reconstructing and levelling off the upper parts of pulvinoes and bearing elements of piles for motorway viaducts.
· Reinstalling floor beams after removing damaged areas by scarifying.

TECHNICAL CHARACTERISTICS

Planitop HPC Floor is a ready-mixed powdered mortar made from high-strength cement, selected aggregates, special admixtures and stiff steel fibres according to a formula developed in the MAPEI Research & Development laboratories. When **Planitop HPC Floor** is mixed with water, it forms a fluid mortar suitable for casting into formwork in layers from 1 to 4 cm thick without segregating, 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 mixed with water and cured in a damp environment. To allow expansion in the open air, **Planitop HPC Floor** may also include 0.25% of **Mapecure SRA**, a special admixture which has the capacity to reduce 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 may be considered a highly advanced technological system, in that the admixture has the capacity of stopping the water evaporating too quickly and encourages the development of the 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 admix, which means there is also a lower risk of cracking.
The use of **Mapecure SRA** may reduce mechanical performance characteristics slightly by 5-6%.
The product may 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;
· impermeable to water;
· excellent adhesion to old concrete, if dampened with water before application, and to reinforcement rods, especially if treated beforehand with **Mapefer** or **Mapefer 1K**;
· 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 protecting and repairing concrete structures: definitions, requirements, quality control and conformity assessment. General principles for the use and application of systems"*), and the minimum requirements of EN 1504-3 *("Structural and non-structural repairs")* for R4-class structural mortars and EN 1504-6 *("Anchoring rebar")*.
Planitop HPC Floor is covered by the Certificate of Technical Assessment (CVT) n° 264/2020 released by 2^ Div. II of STC - CSLP.



Graph of residual flexural strength in compliace with EN 14651 standard

RECOMMENDATIONS

· Do not use **Planitop HPC Floor** on smooth concrete substrates.
· Do not use **Planitop HPC Floor** for anchoring elements accurately in place (use **Mapefill** or **Mapefill R**).
· Do not apply **Planitop HPC Floor** by spray or with a trowel (use **Planitop HPC Tixo** applied 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

Preparation of the substrate

· Remove all deteriorated concrete and any concrete that is loose or detached down to the level of the substrate. The substrate must be solid and strong with a surface roughness of at least 5 mm. Any areas previously repaired and which are not perfectly adhered must be removed.
· Remove all dust, rust, cement laitance, grease, oil and old paint from the concrete and reinforcement rods by sandblasting.
· If consolidation of the substrate is needed, it is possible to apply **Primer 3296** diluted 1:1 with water at least 4 hours prior to applying **Planitop HPC Floor**. When casting the mortar in formwork, on the other hand, proceed as follows:
  · saturate the substrate with water;
  · before casting, wait until excess surface water has evaporated off. Use compressed air to accelerate this process if required.

Preparation of the mortar

Pour **Planitop HPC Floor** in the mixer and add 3.0 litres of water per each bag of product used.
Mixing time of the product depends on the efficiency of the employed mixer. For example, with a forced-action mixer, mixing requires approximately 5 minutes.
If a traditional cement mixer is used, mixing requires approximately 12 minutes.
Stir until fibres are completely dispersed and a homogeneous, fluid and lump-free mix is obtained. Mixing water may vary slightly (2.9-3.1 litres) to cope with different types of mixers used and weather conditions on site.
It is recommended to apply the product within 30 minutes of mixing.

Application of the mortar on floor slabs

Pour **Planitop HPC Floor** onto the surface and, if necessary, help the mortar spread over the surface with a rake.

Application of the mortar into formwork

Pour **Planitop HPC Floor** into the formwork in a continuous flow from one side only, and make sure all the air is expelled. The formwork must not absorb any of the water from **Planitop HPC Floor**, so we recommend treating the formwork beforehand with a form-release agent (such as **DMA 1000**).
Make sure all the elements to be reinforced are completely filled. To help the mortar flow into the more difficult areas, use wooden rods or round bars or vibrate slightly.

PRECAUTIONS TO BE TAKEN DURING AND AFTER APPLICATION

· Only use bags of **Planitop HPC Floor** which have been stored on their original, covered 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 a closed area at a temperature of +20°C and protect from frost. Use lukewarm water to prepare the mortar.
· After stripping the formwork, we recommend curing **Planitop HPC Floor** carefully to prevent the mixing water evaporating off too quickly, especially in hot or windy weather, otherwise surface cracks may appear. While pouring the mix, spray water on the mortar and then repeat this operation at regular intervals (every 3-4 hours) for at least the first 48 hours. Then cover the surface with waterproof sheets and keep covered for at least 5 days.

CLEANING

Wash the mortar from tools before it hardens using water. Once hardened, cleaning is much more difficult and it must be removed mechanically.

CONSUMPTION

Approximately 21 kg/m² per cm of thickness.

PACKAGING

Planitop HPC Floor is supplied in 25 kg paper bags.

STORAGE

12 months in a dry, covered area in its original packaging.

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:	R4
Type::	CC
CEMENTITIOUS MATRIX	
Consistency:	powder
Colour:	grey
Bulk density (kg/m³):	1,400
Maximum size of aggregate (mm):	1.0
Dry solids content (%):	100
Ion chloride content – minimum requirement ≤ 0.05% - according to EN 1015-17 (%):	≤ 0.05
FIBRES	

Shape:	hooked
Material:	steel
Density of material according to EN 14889-1 (g/cm³):	7.85
Length according to EN 14889-1 (mm):	30
Diameter according to EN 14889-1 (mm):	0.38
Tensile strength according to EN 14889-1 (MPa):	3,070
Modulus of elasticity according to EN 14889-1 (GPa):	200
Elongation at failure according to EN 14889-1 (%):	min. 0.70
APPLICATION DATA (at +20°C - 50% R.H.)	
Colour of mix:	grey
Mixing ratio:	100 parts of **Planitop HPC Floor** with 11.5-12.5 parts of water (2.9-3.1 l water per 25 kg bag)
Consistency class according to EN 12350-8:	SF3
Viscosity class - t_{500}:	VS2
Density according to EN 12390-7 (kg/m³):	2,390
pH of mix:	> 12.5
Application temperature range:	+5°C to +35°C
Pot life of mix:	approx. 45 minutes (at +20°C)
Set to light foot traffic:	24 h (at +20°C)
Set to heavy foot traffic:	72 h (at +20°C)

FINAL PERFORMANCE (12% mixing water - Mixing *)				
Performance characteristic	**Test method**	**Requirements according to EN 1504-3 for R4 class mortars**	**Requirements according to EN 1504-6**	**Performance of product**
Compressive strength (MPa):	EN 12190	≥ 45 (after 28 days)	>80% of value declared by manufacturer (after 28 days)	120 (after 28 days)
Compressive modulus of elasticity (GPa):	EN 13412	≥ 20 (after 28 days)	none	38 (after 28 days)
Shear strength and slip resistance (τ-bond) concrete substrate with roughened surface (MPa):	experimental method (**)	none	none	≥ 3.5

Adhesion to concrete (MC 0.40 substrate type - w/c ratio = 0.40) according to EN 1766 (MPa):	EN 1542	≥ 2 (after 28 days)	none	≥ 3 (after 28 days)
Accelerated carbonatation resistance:	EN 13295	Depth of carbonatation ≤ than reference concrete (MC 0.45 type w/c ratio = 0.45) according to UNI 1766	none	Test passed
Capillary absorption ($kg/m^2 \cdot h^{0.5}$):	EN 13057	≤ 0.5	None	< 0.5
Impermeability to water – penetration depth (mm):	EN 12390-8	none	none	< 2
Thermal compatibility measured as bond strength according to EN 1542 (MPa): – freeze-thaw cycles with de-icing salts:	EN 13687-1	≥ 2 (after 50 cycles)	none	> 2
Resistance to freeze-thaw cycles in presence of salts- flaking (g/m^2):	EN 12390-9	none	none	< 100 (after 56 cycles)
Slip resistance of steel reinforcing bars - movement under a load of 75 KN (mm):	EN 1881	none	< 0.6	< 0.6
Residual flexural strength (MPa): **– CMOD 1 = 500 µm:** **– CMOD 2 = 1,500 µm:** **– CMOD 3 = 2,500 µm:** **– CMOD 4 = 3,500 µm**	EN 14651	none	none	f_{R1} 12.5 f_{R2} 12.7 f_{R3} 11.4 f_{R4} 9,9
Reaction to fire:	EN 13501-1	Euroclass		A1, $A1_{FL}$

(*) Mixing: see paragraph "Preparation of the mortar".
For this type of product, the preparation of test samples (cubes and beams) requires compaction with a concrete vibrator (in compliance with § 3.3 EN 12390-2).
(**) Experimental method. Test report available on request (contact Technical Services).

MECHANICAL PROPERTIES and DURABILITY according to CVT n° 264/2020 (mixing water 12%)		
Properties	**Test method / norm reference**	**Performance of product**
Compressive strength Class:	NTC 2018 Tab. 4.1.I	C 80/95
Compressive modulus of elasticity (GPa):	NTC 2018 § 11.2.10.3	44.4 (charted value)
Toughness class:	EN 14651	8.0 c
Tensile strength at limit of proportionality: **– average value $f^f_{ct,L,m}$ (MPa):** **– typical value $f^f_{ct,L,k}$ (MPa):**	EN 14651	 7.3 6.1
Exposure class:	EN 206-1	X0 XC1, XC2, XC3, XC4 XD1, XD2, XD3 XS1, XS2, XS3 XF1, XF2, XF3, XF4 (***) XA1
Resistance to freeze-thaw cycles:	FRC Guidelines (January 2019) § 3.4.1	test passed

*(***) **Planitop HPC Floor** has been tested according to EN 12390-9 by comparing it with reference concrete with a composition specified for class XF4 according to EN 206-1 standards.*

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

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