

# Betocem Fibre HR

**THIXOTROPIC, FIBRE-REINFORCED, SHRINKAGE-COMPENSATED MINERAL MORTAR WITH A LOW MODULUS OF ELASTICITY AND HIGH MECHANICAL STRENGTH, FOR THE RESTORATION AND STRUCTURAL CONSOLIDATION OF DEGRADED CONCRETE STRUCTURES WITH GUARANTEED DURABILITY.**



**TECHNICAL DATA SHEET - REV. 01/2024**

## DESCRIPTION

BETOCEM FIBRE HR is a powder mortar, with compensated shrinkage, composed of high-strength hydraulic binders, siliceous aggregates, special additives and synthetic fibres. When mixed with water, it becomes a mortar of excellent workability with a thixotropic effect, which can be applied in great thicknesses, even vertically without the risk of dripping and without the need for formwork. BETOCEM FIBRE HR ensures high adhesion on concrete substrates, provided they have been previously moistened with water. Once hardened, BETOCEM FIBRE HR possesses high mechanical flexural and compressive strength, water impermeability and elastic modulus, thermal expansion coefficient and water vapour permeability coefficient similar to high-quality concrete. A 2 cm thickness of hardened product has a CO<sub>2</sub> diffusion resistance equal to a 20 cm thickness of a Class Rbk 350 concrete. Can be used in thicknesses between 10 and 40 mm, in a single coat.

**Complies with European Standard EN 1504-3 ("Non-structural structural repair") for Class R4 structural mortar (PCC) according to the CR (concrete repair) principle.**

## APPLICATION FIELDS

BETOCEM FIBRE HR is used for the restoration and consolidation of deteriorated structural concrete works, both horizontally and vertically, in interventions such as repairing damaged areas, beam and pillar edges, cornices, balcony pediments and parapets damaged by oxidation of reinforcing bars, increasing the load-bearing section of reinforced concrete structures, reconstructing deteriorated iron cover layers of reinforced concrete works and the restoration of motorway, road and railway viaducts. BETOCEM FIBRE HR can also be used for the regularisation of diaphragm walls or tunnels, for the regularisation of surface defects such as gravel nests or casting joints, and for the filling of rigid joints.

## SUPPORT PREPARATION

Substrates must be perfectly clean, solid, free of dust and greasy substances and suitably roughened. Remove all degraded or detached concrete by peening until the substrate is solid, consistent and rough. Previous restoration work, which is not perfectly consistent, must be removed. Carefully clean the concrete and reinforcement rods using mechanical means (hydro-blasting or brushing), until all oxidation on the rods, surface cement slurry and any other traces of dirt have been removed. If the section of the reinforcement rods is reduced, supplement them with additional rods. Apply BETOFER 1 K, single-component thixotropic mineral mortar or BETOFER 2 K, two-component thixotropic mineral mortar to the reinforcement rods by brush for active and passive protection of the reinforcement rods. As soon as the product has completely hardened, wet the area to be restored to saturation with water, eliminating any stagnation when work begins.

## APPLICATION

To prepare the mix, pour 4.5-5 litres of clean water per 25 kg bag of BETOCEM FIBRE HR into a container or concrete mixer and mix for about 5 minutes, taking care to remove the part of the powder that is not perfectly dispersed from the sides and bottom of the container, until a homogeneous, lump-free mix is obtained. Allow the resulting mixture to rest for 5-10 minutes, stirring it briefly before use. This mixture remains workable for approx. 1 hour at a temperature of +23 °C.

Apply BETOCEM FIBRE HR manually with trowel or spatula for reconstruction of edges, mouldings and localised interventions, also vertically without the need for formwork. The use of formwork can however be useful to speed up horizontal applications, for interventions such as reconstruction of beams and pillars. Perfect adhesion with the substrate is ensured by exerting good pressure and reworking the product with the trowel directly on the surface to be restored, wrapping any reinforcement rods, until the desired thickness is reached. BETOCEM FIBRE HR can also be applied by spraying with a suitable piston or auger plastering machine for large-scale cortical restoration work. If it is necessary to apply a second coat, do so before the previous one has set, but do not wait more than 4 hours between applications. The minimum applicable thickness per layer is approximately 10 mm and a maximum of 40 mm, depending on the application. It is advisable to always leave the last layer of BETOCEM FIBRE HR applied suitably roughened to ensure perfect adhesion of the subsequent protective skim coat. In addition to BETOCEM FIBRE HR, the complete renovation cycle includes a flexible skim coat to be applied with BETOCEM FINITURA and decorative protection to be applied with MANTOCOLOR anti-carbonating elastomeric water paint.

## YIELD

19 kg/m<sup>2</sup> per cm of thickness.

## RECOMMENDATIONS

- ◆ Do not use BETOCEM FIBRE HR on smooth concrete substrates, but strongly roughen the surface to be restored.
- ◆ Never remix the product once the setting process has begun, as it will lose all its chemical-physical properties.
- ◆ Cure BETOCEM FIBRE HR carefully, avoiding, especially on hot or very windy days, the rapid evaporation of the mixing water that could cause small surface cracks due to plastic shrinkage.
- ◆ Keep the surface moist during the first 24 hours after applying the mortar by spraying it with water or covering it with waterproof sheets.
- ◆ Protect from rain, frost or beating sun for the first 24 hours.
- ◆ Do not work at temperatures below +5 °C or above +35 °C.
- ◆ Wash all equipment used for preparation and application of the product with water before it hardens. After setting, the mortar may only be removed mechanically.

## PACKAGING

BETOCEM FIBRE HR is supplied in 25 kg polythene paper bags on 1500 kg pallets. Store the product in a dry place and in tightly closed original packaging. Under these conditions its stability is at least 12 months.

## SAFETY INSTRUCTIONS

The product contains cement, which on contact with body sweat produces an alkaline reaction irritating and sensitising to the skin. Wear suitable clothing, gloves and protective goggles.

For more information on the safe use of the product, see the relevant Material Safety Data Sheet.

## SPECIFICATIONS

Volumetric reconstruction and structural restoration of degraded concrete works by applying thixotropic, fibre-reinforced, mineral mortar with compensated shrinkage, low elastic modulus, high mechanical strength, composed of high-strength hydraulic binders, siliceous aggregates, special additives and synthetic fibres, such as **BETOCEM FIBRE HR** by COLMEF Srl. The product must comply with the minimum requirements of Standard EN 1504-3 for class R4 structural mortars.

The substrates must be clean, solid and compact, suitably roughened after removal of loose parts and cleaning of oxidised reinforcement rods, to be calculated separately. The mortar must be applied to the substrate wet to saturation with a trowel or spatula in thicknesses of between 10 and 40 mm per coat, with a consumption of approximately 19 kg/m<sup>2</sup> per cm of thickness.

## TECHNICAL DATA

<b>Conforms to Standard:</b>	<b>EN 1504-3</b>
<b>Class:</b>	<b>R4</b>
<b>Typology:</b>	<b>PCC</b>
Form:	powder
Colour:	grey
Apparent specific weight (kg/m <sup>3</sup> ):	1240
Mixing ratio:	4.5-5 litres of water per 25 kg of powder
Volume density of the mixture (kg/m <sup>3</sup> ):	2061
Colour of the mixture:	grey
Consistency of the mixture:	thixotropic
pH value:	12-13
Starting time for setting:	1,5 h
End of setting time:	4 h
Waiting time between coats:	max. 4 h
Waiting time for overcoating:	24-48 h
Permissible application temperature:	+5 °C to +35 °C

## FINAL PERFORMANCE according to EN 1504-3 Class R4-PCC

	<b>Requirements</b>	<b>Results</b>	<b>Text method</b>
Compressive strength after 28 days (MPa)	≥ 45	> 65,9	EN 12190
Flexural strength after 28 days (MPa):	not required	> 9,8	EN 12190
Chloride ion content (%):	≤ 0,05	< 0,005	EN 1015-17
Direct tensile adhesion (MPa):	≥ 2,0	> 2,0	EN 1542
Carbonation resistance:	dk ≤ control cls [MC(0.45)]	Passes	EN 13295
Elastic modulus in compression (GPa):	≥ 20	> 25,4	EN 13412
Thermal compatibility measured as adhesion according to EN 1542 - Bond strength after 50 cycles (MPa):			
- freeze-thaw cycles:	≥ 2,0	> 2,0	EN 13687-1
- thunderstorm cycles:	≥ 2,0	> 2,0	
- dry thermal cycles:	≥ 2,0	> 2,0	
Capillary absorption (kg/m <sup>2</sup> ·h <sup>0,5</sup> ):	≤ 0,5	< 0,19	EN 13057
Reaction to fire:	Euroclass	Class A1	EN 13501-1

DATA COLLECTION AT +23 °C - R.H. 50% AND NO VENTILATION

The above information and prescriptions are based on our best experience. However, we cannot accept any liability for the possible misuse of the products. We therefore advise those who intend to use them to assess whether or not they are suitable for the intended use and to carry out preliminary tests in any case. Always refer to the latest version of the technical data sheet, available at [www.colmef.com](http://www.colmef.com).

**FOR MORE INFORMATION OR PARTICULAR USES, PLEASE CONSULT THE COLMEF TECHNICAL SUPPORT SERVICE.**

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