



PRODUCT DESCRIPTION

FIBRO HFR is a three-component casting with reinforcement diffused with high-strength steel fibres and high carbon index, with high residual tensile strength (firmness) and high mechanical performance.



PRODUCT APPLICATION

- Structural reinforcement and seismic upgrade of highly stressed elements and with high ductility performance requirements
- Structural reinforcement and seismic upgrade of reinforced concrete, brick-cement, corrugated sheets, wood and mixed brick-steel beam floors
- Reinforcement, restoration and casing of structures such as beams, even prestressed, pillars, curbs, floors, slabs, etc...
- Reinforcement of reinforced concrete structures, even subjected to hydraulic pressure, particularly suitable for thin "RE-LINING" in combination with the AMPHIBIA waterproof membrane

ADVANTAGES

- The presence of the steel fibre gives it its firm behaviour
- Applicable in thicknesses between 1 and 10 cm
- Total resistance to carbonation phenomena
- Very high mechanical compression and flexural strength
- Increases the load-bearing capacity of the structure and improves its ductility
- Reinforcement of the structure with diffused internal reinforcement without additional mesh up to 40 mm thick

PREPARATION AND APPLICATION Preparing the surfaces

Perfect adhesion of FIBRO HFR to the surface depends on the quality of the surface preparation that the bentonite will be applied to.

Structures to be subjected to reinforcement, restoration, casing and/or seismic upgrade

- Remove the loose or deteriorated concrete for the predefined thickness and, in any case, at least until the solid concrete is reached, the surface of which must be roughened for at least 5 mm
- Clean each exposed reinforcement bar from rust with mechanical brushing or sanding and subsequent passivation with SANOFER
- Where required, set-up the insertion of connectors, anchor rods, plugs, nails and any reinforcement meshes
- Position any formworks in case of beams, columns or structures that require casting containment taking care to plaster any cracks between the formwork in contact.



FIBRO HFR - HIGH FRACTURE RESISTANCE

- Thoroughly clean and soak the surfaces with pressurised water, keeping them damp from when the application process begins
- Remove all pooled water, if necessary also using compressed air

Horizontal structures to be subjected to reinforcement and/or seismic upgrade such as reinforced concrete, brick-cement (see Annex 2), corrugated sheets, wood (see Annex 3) and mixed brick-steel beam floors (see Annex 4)

- Remove all loose materials up to the original flooring or floor hood and thoroughly clean
- In case of wooden floors, protect the surface with PLASTIVO (see relative technical data sheet) as a containment layer during casing, after plastering any large cracks on the flooring
- Where provided, engage the connecting bars to the perimeter wall and anchor them with BI FIX (see relative technical data sheet)
- Insert connectors or anchor bars along the beam axis, respecting the predefined centre distance calculation and fix them with BI FIX chemical anchor, where intended
- In case of reinforced concrete or hollow brick concrete slabs, if no connectors/rebars are foreseen with the screeding, the substrate surface must be scratched to get a roughness of at least 5 mm
- In case of cement-based surfaces, thoroughly clean and soak the surfaces with pressure water, keeping them damp from when the application process begins
- Remove all pooled water, if necessary also using compressed air

Re-tanking of structures even subjected to hydraulic pressure

The “relining” system is suitable for waterproofing existing masonry and/or reinforced concrete slabs with a thickness of ≥ 15 cm, even cracked.

- Clean the surface from every trace of dirt and remove any incoherent parts
- Seal any localised water flows with TAP/I-PLUG rapid-setting hydraulic mortar
- Apply AMPHIBIA 3000 GRIP on horizontal and vertical surfaces (see relative technical data sheet)
- Install the electro-welded mesh on the bottom and fix the special STEEL CONNECTORS 38 with the BI FIX chemical anchoring system (see relative technical data sheets) inside the square mesh, respecting the predefined calculation spacing. Seal the connection between the connector and the AMPHIBIA membrane with AKTI-VO 201 mastic. Then insert suitable spacers in order to allow the correct positioning of the welded mesh to ensure an iron covering of 12 mm of mortar
- Fix the STEEL CONNECTORS 38 on the wall with BI FIX chemical anchor according to the predefined inter-axis calculation, sealing the connection between connector and AMPHIBIA membrane with AKTI-VO 201 mastic. The REVOMAT fibreglass mesh (see relevant technical data sheet) can be inserted by fixing it to the connectors and supporting it with suitable spacers.

Position the containment formworks taking care to fill any cracks between the formworks in contact. Contact Volteco Technical Service for additional information on the FIBRO HFR bentonite.

Preparing the mixture

It is always advisable to mix the entire contents of each pack (component A+B+fibres).

Mix using a mixer or three-phase planetary mixing machine.

Pour half of the pot of liquid component B into the glass/mixer and slowly add two 25 kg bags of powder component A one by one with the machine running.

In the same way, pour the second half of the liquid component and add another 2 bags of powder.

Mix until a fluid consistency is achieved, then insert 5 kg of FIBRO STEEL into the glass/mixer, wearing adequate high-protection gloves and taking care to disperse it evenly in the mixture.

Complete mixing until a plastic, homogeneous and lump-free mixture is achieved. In the three phases, mixing must not last less than 6 minutes.

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The preparation method described may undergo variations in case of single-phase mixers or those not capable of making the mixture consistent in the aforementioned times and methods.

Application

Pour FIBRO HFR into the formworks or on the horizontal surface continuously without interruption and make sure that the mixture is perfectly compacted, possibly with slight vibration.

The mixture can be horizontally spread using a SQUEEGEE.

Machine application

The product can be pumped and made available on the application surface with a specific plastering machine that requires the product to be mixed separately.

The type of machine must be chosen according to the manufacturer's instructions, following any preventive test aimed at obtaining the expected result (for more information contact the Volteco Technical Service).

Finishing



Finish the surface with a spatula or straight edge.

We recommend carefully curing FIBRO HFR by spraying water on its surface and protect with a nylon sheet, especially in hot seasons and on windy days, for at least 3-4 days.

In the presence of formworks, wait at least 24 hours before their removal.

Before applying any coatings, let it cure for at least 7 days after casting.



References available at www.volteco.com

CONSUMPTION AND YIELD

25 kg/m² (A+B+C components) for each centimetre of thickness.

Powder Component A: 21.01 kg / m² per cm of thickness.

Liquid Component B: 2.94 kg / m² per cm of thickness.

Steel fibers Component C: 1.05 kg / m² per cm of thickness.

PACKAGING AND STORAGE

100 Kg FIBRO HFR powder component in bags of 25 kg each.

14 kg pot FIBRO HFR liquid component B.

5 kg box FIBRO STEEL

An open powder package is sensitive to humidity.

The products must be stored in a dry area protected from sunlight, humidity and from temperatures below 5 °C.

FIBRO HFR in the original packaging has a storage time of 18 months

WARNINGS - IMPORTANT NOTES

Do not add water.

The sizing of the FIBRO HFR bentonite, the position of the connectors and the definition of all the elements making up the reinforcement work, must be defined by the Works Manager/Designer.

It is not allowed to mix the product with equipment other than the provided concrete mixer or vertical axis mixer.

It is not allowed to pump the product with pneumatic equipment.

In case of prolonged use of the machinery, provide for their cleaning / washing at regular intervals.

In case the casting is forcibly interrupted on structures also subjected to hydraulic thrust, apply an AKTIVO 201 bead on the joint (see relative technical data sheet) before resuming casting.

Protect the applied product from exposure to wind or sun.

Significant condensation may occur in environments with poor ventilation or high humidity.

Contact the Volteco Technical Service before intervening on open expansion joints.

The preparation and installation data refer to normal environmental conditions (temperature +20 °C; relative humidity 60%).

PHYSICAL AND TECHNICAL SPECIFICATIONS

Specification	Values
Appearance	Component A: grey powder Component B: transparent liquid Component C: metallic fibres
Mixture consistency	Fluid
Application temperature	from +5 °C to +35 °C
Workability time at +20 °C	20'
Maximum aggregate size	2.40 mm
Mixture ratio	100 parts powder 14 parts liquid 5 parts fibres

Specification	Test method	Performance requirements UNI EN 1504-3 Class R4	Declared performance	Certified performance (**)



FIBRO HFR - HIGH FRACTURE RESISTANCE

Mixture bulk density	-	-	> 2.5 kg/l	-
Shrinkage	-	-	controlled	-
Flexural strength after 1 day	UNI EN 196-1	-	> 10 Mpa	-
after 7 days	UNI EN 196-1	-	> 15 Mpa	-
after 28 days	UNI EN 12190	-	> 18 Mpa	-
Compressive strength after 28 days	UNI EN 12190	≥ 45 MPa	> 110 MPa	134.5 MPa
Chloride ions content	UNI EN 1015-17	≤ 0.05%	-	0.01%
Adhesion to the concrete	UNI EN 1542	≥ 2.0 MPa	> 3,0 Mpa	4.41 MPa
Compressive modulus of elasticity after 28 days	UNI EN 13412	> 20 GPa	-	35.7 GPa
Resistance to carbonation	UNI EN 13295	dk < control concrete (0.45 MC)	-	fulfilled requisite
Capillary absorption coefficient	UNI EN 13057	≤ 0.5 kg*m ⁻² *h ^{-0.5}	< 0.4 kg*m ⁻² *h ^{-0.5}	0.14 kg*m ⁻² *h ^{-0.5}
Thermal compatibility Part 1 (adhesion after 50 un/freezing cycles)	UNI EN 13687-1	≥ 2.0 MPa	-	4.36 MPa
Average residual flexural strength CMOD ₁ : 0.500 mm CMOD ₂ : 1.500 mm CMOD ₃ : 2.500 mm CMOD ₄ : 3.500 mm	UNI EN 14651	-	-	f _{R1} : 15.2 MPa f _{R2} : 14.0 MPa f _{R3} : 12.4 MPa f _{R4} : 11.1 MPa
Residual operational tensile strength	UNI EN 14651	-	-	f _{Fls} : 13.58 MPa
Residual ultimate tensile strength	UNI EN 14651	-	-	f _{Flu} : 10.86 MPa
Reaction to fire	UNI EN 13501-1	Classification	-	Euroclass A1
Specification	Certifying body	Test method	Certified performance (**)	
Pressurised impermeability	IMM SA (Switzerland)	UNI EN 12390-8	8 Bar: no passage	

The quoted data are obtained in a laboratory at +20°C and 60% RH.

SAFETY

This is a non-toxic alkaline product.
It is recommended to use a mask and gloves while working.
Accidental contact with eyes, rinse thoroughly with water and seek medical advice.

CE	VOLTECO S.p.a Via delle Industrie, 47 - 31050 Ponzano Veneto (I)
20 DOP 0033 EN 1504-3:2006 1370-CPR-1299 FIBRO HFR Structural and non-structural repairs: CC repair mortar for the restoration of concrete, structural strengthening and the preservation or restoration of passivity	
Reaction to fire: Class A1 Compressive strength: Class R4 ≥ 45 MPa Chloride ions content: ≤ 0.05% Adhesion: ≥ 2.0 MPa Resistance to carbonation: dk ≤ concrete ref. (MC 0.45) Modulus of elasticity: ≥ 20 GPa Thermal compatibility: • Part 1: Un/freezing cycles: ≥ 2.0 Mpa Slip resistance: Not relevant Capillary absorption: ≤ 0.5 kg*m ⁻² *h ^{-0.5} Hindered shrinkage/expansion: Not relevant Coefficient of thermal expansion: Not relevant Hazardous substances: See SDS	

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FIBRO HFR - HIGH FRACTURE RESISTANCE

LEGAL NOTES

Note for buyer/installer:

This document prepared by Volteco S.p.A. is provided as an aid and guideline for the buyer/installer.

This does not take into consideration the details of each single operational context, for which Volteco S.p.A. will not be held liable.

This does not change and does not extend the obligations of Volteco S.p.A.

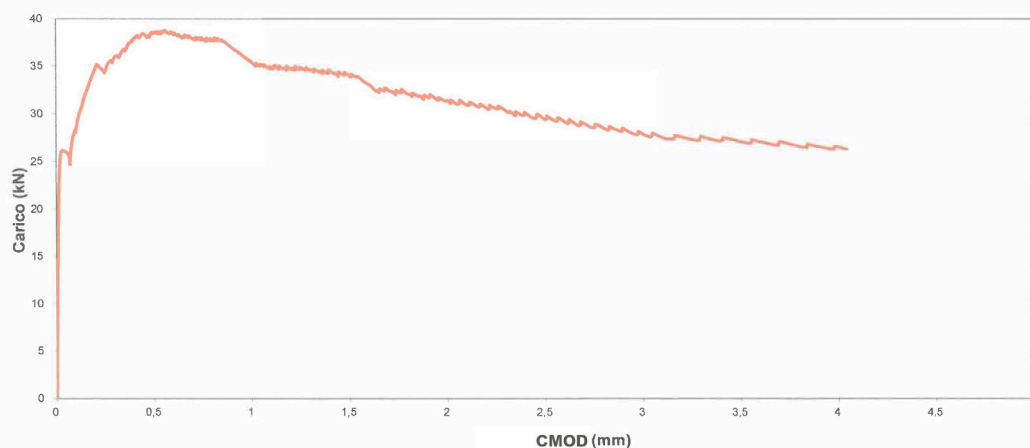
It may vary and the installer is therefore required to update his/her information prior to each application by referring to www.volteco.com.

The before-after sales technical/trade information of the sales network have the same validity as this document.

ANNEXES

ALLEGATO 1

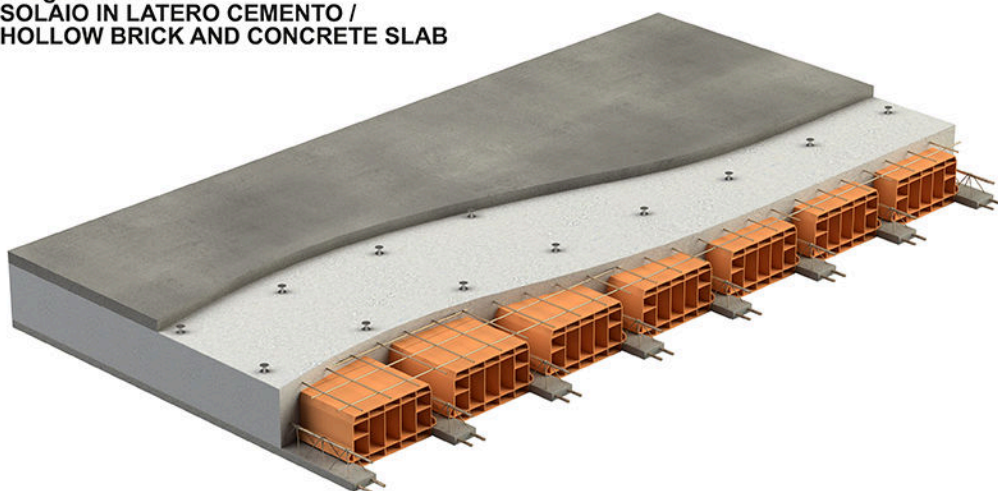
UNI EN 14651 RESISTENZA A FLESSIONE RESIDUA MEDIA
UNI EN 14651 AVERAGE RESIDUAL FLEXURAL STRENGTH





FIBRO HFR - HIGH FRACTURE RESISTANCE

Allegato / Annex 2
SOLAIO IN LATERO CEMENTO /
HOLLOW BRICK AND CONCRETE SLAB



Allegato / Annex 3
SOLAIO IN LEGNO /
TIMBER FLOOR SLAB



Allegato / Annex 4
SOLAIO MISTO LATERIZIO-ACCIAIO /
STEEL BEAM COMPOSITE SLAB

