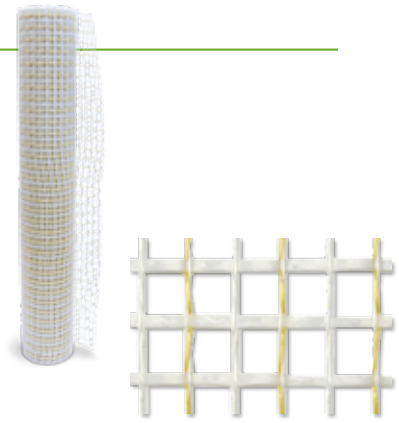
Rinforzo ARV 100



Bi-axial mesh made of alkali-resistant glass and aramid fibre, specific for strengthening, the improvement and the anti-seismic adaptation for low thickness in reinforced concrete buildings, with brick infill, and masonry structures.

Rinforzo ARV 100 is a mixed fibre mesh. When used in combination with Kerabuild Eco Fix or with GeoCalce® F Antisismico, it allows to create a low thickness structural strengthening conveniently connected to the structure by means of connectors obtained from the GeoSteel sheet or the Steel DryFix® stainless steel helical bars.

PRODUCT STRENGTHS

- Certified high resistance in an alkaline environment and to all potentially aggressive conditions
- High shear and tensile strength
- Double modulus of elasticity, when applied in the direction of the warp or in the weft
- Superior structural ductility
- Specifically intended for reinforcements in combination with Kerabuild Eco Fix or GeoCalce® F Antisismico or GeoCalce® Multiuso

STRENGTHENING SYSTEM RECOGNIZED by **INTERNATIONAL CODE COUNCIL®** - Evaluation Service - ICC ES **ESR-3944**

Certified in combination with GeoCalce® F Antisismico for masonry structures

ETA ITC EUROPEAN TECHNICAL ASSESSMENT **n° 19/0326**

Certified in combination with GeoCalce® F Antisismico for masonry structures

AREAS OF USE

Use

- Static or seismic upgrade/improvement of brick, natural stone and tuff structural masonry elements, by means of extra-thin, reversible reinforced plasters/renders that work with the structure thanks to special GeoSteel Hardwire™ steel fibre connectors or Steel DryFix® helical bars with Steel DryFix® Connection Cap
- Retrofitting of brick, natural stone, tuff and wattle-and-daub masonry arches, vaults and domes
- Combined compressive and bending, shear and confinement strengthening of brick, natural stone or tuff masonry walls
- Suitable when combined with the special single and double thread connectors created using the GeoSteel Hardwire™ range of sheets and Steel DryFix® helical bars with Steel DryFix® Connection Cap
- Anti-collapse protective systems for dividing and enclosing walls in reinforced concrete framework or brick buildings
- Protective systems for floor slabs subject to break-away of the bottom layer

INSTRUCTIONS FOR USE

Preparation

Rinforzo ARV 100 is ready-to-use. The mesh can be cut using normal shears. The sheet, even cut into thin strips, thanks to the particular weave of the mesh, ensures perfect stability without in any way compromising the workability of the sheet and its application.

Preparation of substrates

The substrate must be properly prepared and cleaned, always in accordance with the instructions dictated by the construction supervisor.

In the case of substrates that are not degraded, prepare the surfaces as indicated in the technical data sheet for GeoCalce® F Antisismico, Kerabuild Eco Fix or GeoCalce® Multiuso.

When the substrate is clearly degraded, uneven, or damaged by significant events, proceed as follows, always in accordance with the construction supervisor:

For brick, tuff and natural stone masonry substrates or wattle-and-daub:

- Completely remove residues from previous processes that could compromise adhesion, and any quantity of inconsistent rendering mortars from the stones;
- Saturation, spray, or brush application, if required, of certified natural stabilizing cortical consolidant with base of pure stabilised potassium silicate in aqueous solution such as Biocalce® Silicato Consolidante (do not use this stabilizing agent on gypsum substrate) or alternatively of eco-friendly stabilizing agent, such as Rasobuild® Eco Consolidante, dispersed in water, suitable for all substrates;
- Reconstruction, if necessary, of material continuity according to design instructions and the construction supervisor;
- Evening out previously consolidated surfaces with structural geo-mortar with a base of pure natural hydraulic lime NHL 3.5 and geo-binder such as GeoCalce® G Antisismico or GeoCalce® F Antisismico, depending on the thickness required;
- Make sure that the substrate is adequately dampened and with a roughness of at least 5 mm, equal to level 8 of the Test Kit for preparation of reinforced concrete and masonry substrates (follow the instructions on the GeoCalce® F Antisismico data sheet).

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INSTRUCTIONS FOR USE

Application

Execution of structural strengthening with an AR fibreglass and aramid fibre mesh, Fabric Reinforced Mortar (combination of the Rinforzo ARV 100 mesh with GeoCalce® F Antisismico, Kerabuild Eco Fix or GeoCalce® Multiuso), will be carried out with application of a first coat of the inorganic matrix, making sure there is sufficient material for the substrate (average thickness ≈ 3 to 5 mm) to even it out and to lay and embed the reinforcing mesh. Afterwards, working over the matrix while it is still wet, apply the AR fibreglass and aramid fibre mesh primed with alkali-resistant treatment Rinforzo ARV 100 by Kerakoll Spa, making sure that the mesh is perfectly embedded into the matrix by firmly pressing with a spreader or steel roller; carefully check that it comes out between the mesh to ensure optimum adhesion between the first and second layers of matrix and fully impregnates the fibre. In the points where the sides of two sheets of mesh join, and when additional lengths are added to a strip, the two layers of AR fibreglass and aramid fibre mesh must overlap by at least 20 cm. Finally proceed, wet-on-wet, with the protective final finishing (thickness 2 - 5 mm) in order to totally cover the strengthening grid and seal any possible voids. If there are additional layers after the first, proceed with laying of the second layer of steel fibre over the matrix while it is still wet, repeating the steps described above. Allow the surfaces to cure for at least 24 hrs.

If the reinforcing system is installed in especially aggressive environments, or you otherwise wish to ensure additional protection beyond that already provided by the matrix, we recommend applying GeoLite® Microsilicato on reinforcement systems with GeoCalce® F Antisismico, Kerabuild Eco Fix or GeoCalce® Multiuso.

If the works are in permanent or occasional contact with water, the cycles described above must be replaced with a polyurethane epoxy cycle or an osmotic cement depending on the needs of the worksite and the design specifications.

For technical specifications, application, and preparation of the matrix, as well as protective systems adequate for the matrix type, consult the relevant data sheets.

ABSTRACT

FRM-GeoCalce® F Antisismico & Rinforzo ARV 100

Execution of repair, structural strengthening, improvement or seismic upgrade of masonry, tuff, natural stone or wattle-type elements and structures using an FRM (Fabric Reinforced Mortar) inorganic matrix composite system, with European Technical Assessment (ETA) pursuant to art. 26 of EU Regulation No. 305/2011 and international certificate of proven validity, made with a bi-axial hybrid mesh of alkaline-resistant fibreglass and aramid – such as Rinforzo ARV 100 by Kerakoll Spa – with the following certified technical characteristics: tensile strength by unit of width ≈ 44 kN/m; elastic modulus ≈ 73 GPa; ultimate elongation ≈ 1.75%; equivalent thickness of mesh = 0.031 mm of the warp, 0.049 mm of the weft; mesh width 15x18 mm; weight of the primed mesh ≈ 250 g/m² ± 5%, impregnated with highly breathable and hygroscopic geo-mortar made of pure NHL 3.5 natural hydraulic lime and mineral geo-binder, inert siliceous sand and Dolomitic limestone materials with a granulometric curve of 0-1.4 mm – such GeoCalce® F Antisismico by Kerakoll Spa, to be applied directly on the structure requiring strengthening.

The procedure is conducted as follows:

1. *Any restoration of degraded, weakened, non-cohesive, or non-planar surfaces, using GeoCalce® G Antisismico or GeoCalce® F Antisismico by Kerakoll Spa and in any case as prescribed and approved by the construction supervisor;*
2. *Preparation of the substrate for application of the first layer of GeoCalce® F Antisismico, the substrate must be adequately roughened by sanding or mechanical scarification, taking care to guarantee a roughness of at least 5 mm (equal to level 8 of the Test Kit for preparation of reinforced concrete and masonry), clean and dampened;*
3. *Lay a first layer, an average of ≈ 3-5 mm thick of fine-grain, structural, geo-mortar with pure natural hydraulic lime NHL 3.5 and geo-binder base, such as GeoCalce® F Antisismico by Kerakoll Spa;*
4. *While the mortar is still wet, lay the AR fibreglass and aramid fibre mesh primed with alkali-resistant treatment Rinforzo ARV 100 by Kerakoll Spa; press firmly with a spreader or metal roller in order to make sure that the sheet is completely impregnated; avoid allowing any voids or air bubbles to form, as these can compromise the adhesion of the sheet to the matrix or to the substrate;*
5. *Working fresh on fresh, apply the second layer of structural geo-mortar, such as GeoCalce® F Antisismico by Kerakoll Spa, until the reinforcing mesh is incorporated and any underlying voids are filled, giving an overall reinforcement thickness of ≈ 5 – 8 mm;*
6. *Repeat steps (4) and (5) if necessary for all subsequent reinforcing layers called for by the design;*
7. *Any insertion of thread connectors made from unidirectional, extra-high strength galvanized steel fibre sheets, after: preparation of the entrance hole, with a size suited to the nature of the connector to be fitted, preparation of the steel connector by cutting, "teasing" and final rolling of the steel fibre sheet, locking it in place with a plastic tie, insertion of the pre-formed connector into the hole with final, low pressure injection of highly breathable and hygroscopic geo-mortar with excellent water retention and a hyperfluid consistency, based on pure natural hydraulic lime NHL 3.5 and mineral geo-binder, grading 0 – 100 µm, awarded the CE mark – such as GeoCalce® FL Antisismico by Kerakoll Spa.*

Delivery and installation of all the materials described above as well as everything else required to finish the job is included. The following are excluded: removal of any existing plaster/render, restoration of degraded areas and repair of the substrate; connectors, their injection and all the costs and charges required to create them; material acceptance tests; pre- and post-procedure testing, all aids required to perform the work.

The price is by unit of reinforcing surfaces actually laid, including overlaps.

Kerabuild Eco Fix & Rinforzo ARV 100

Execution of repair, structural strengthening, improvement or seismic upgrade of masonry, tuff, natural stone or wattle-type elements and structures using an inorganic matrix composite system, made with a bi-axial hybrid mesh of alkaline-resistant fibreglass and aramid – such as Rinforzo ARV 100 by Kerakoll Spa – with the following certified technical characteristics: tensile strength by unit of width ≈ 44 kN/m; elastic modulus > 73 GPa; ultimate elongation ≈ 1.75%; equivalent thickness of mesh = 0.031 mm of the warp, 0.049 mm of the weft; mesh width 15x18 mm; weight of the primed mesh ≈ 250 g/m² ± 5%, impregnated with an eco-friendly, high ductility, pozzolanic reactivity, single-component, mineral matrix such as Kerabuild Eco Fix by Kerakoll Spa, to be applied directly on the structure requiring strengthening.

The procedure is conducted as follows:

1. *Any restoration of degraded, weakened, non-cohesive, or non-planar surfaces as prescribed and approved by the construction supervisor;*

ABSTRACT

2. *Preparation of the substrate for application of the first layer of Kerabuild Eco Fix, the substrate must be adequately roughened by sanding or mechanical scarification, taking care to guarantee a roughness of at least 5 mm (equal to level 8 of the Test Kit for preparation of reinforced concrete and masonry substrates), clean and dampened;*
3. *Application of a first layer with an average thickness of ≈ 3-5 mm of the eco-friendly, high ductility, pozzolanic reactivity, single-component, mineral matrix Kerabuild Eco Fix by Kerakoll Spa*
4. *While the mortar is still wet, lay the AR fibreglass and aramid fibre mesh primed with alkali-resistant treatment Rinforzo ARV 100 by Kerakoll Spa; press firmly with a spreader or metal roller in order to make sure that the sheet is completely impregnated; avoid allowing any voids or air bubbles to form, as these can compromise the adhesion of the sheet to the matrix or to the substrate;*
5. *Working wet-on-wet, apply the second layer of the eco-friendly, high ductility, pozzolanic reactivity, single-component, mineral matrix Kerabuild Eco Fix by Kerakoll Spa, until the reinforcing mesh is fully embedded and any underlying voids are filled, giving an overall reinforcement thickness of ≈ 5-8 mm;*
6. *Repeat steps (4) and (5) if necessary for all subsequent reinforcing layers called for by the design;*
7. *Any insertion of thread connectors made from unidirectional, extra-high strength galvanized steel fibre sheets, after: preparation of the entrance hole, with a size suited to the nature of the connector to be fitted, preparation of the steel connector by cutting, "teasing" and final rolling of the steel fibre sheet, locking it in place with a plastic tie, insertion of the pre-formed connector into the hole with final, low pressure injection of highly breathable and hygroscopic geo-mortar with excellent water retention and a hyperfluid consistency, based on pure natural hydraulic lime NHL 3.5 and mineral geo-binder, grading 0 – 100 µm, awarded the CE mark – such as GeoCalce® FL Antisismico by Kerakoll Spa.*

Delivery and installation of all the materials described above as well as everything else required to finish the job is included. The following are excluded: removal of any existing plaster/render, restoration of degraded areas and repair of the substrate; connectors, their injection and all the costs and charges required to create them; material acceptance tests; pre- and post-procedure testing, all aids required to perform the work.

The price is by unit of reinforcing surfaces actually laid, including overlaps.

TECHNICAL DATA COMPLIANT WITH KERAKOLL QUALITY STANDARD

Dry fabric technical information	
Appearance	primed mesh with alkali-resistant primer
Nature of material	AR glass and aramid
Weight of primed mesh	≈ 250 g/m² ± 5%
Roll width	≈ 1 m
Roll length	≈ 25 m
Mesh width	≈ 15x18 mm
Shelf life	unlimited
Pack	25 m rolls

PERFORMANCE

Technical characteristics data for mesh	
equivalent thickness of mesh:	
- warp	0.031 mm
- weft	0.049 mm
Tensile strength by unit of width:	
- warp	≈ 43 kN/m
- weft	≈ 44 kN/m

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PERFORMANCE

GeoSteel FRM system – ETA n° 18/0314

FRM – GeoCalce® F Antisismico & Rinforzo ARV 100

Performance characteristic[1]	Test Method		GeoSteel FRM system performance on brick substrates	GeoSteel FRM system performance on tuff substrates
Conventional tension limit	LG FRCM (§§ 2.1 – 7.2)	$\sigma_{lim,conv}$	957.50 MPa	1022.30 MPa
Conventional deformation limit	LG FRCM (§§ 2.1 – 7.1)	$\varepsilon_{lim,conv}$	1.30 %	1.39 %
Elastic modulus of the sheet	LG FRCM (§§ 2.1 – 7.1.1)	E_f	73 GPa	
Mortar compressive resistance class (typical value)	EN 12190	$f_{c,mat}$	>15 MPa (28 days)	
Percentage of organic components by weight			<1%	
Permeability to water vapour	EN 1745	μ	from 15 to 35 (table value)	
INSTALLATION CONDITIONS				
Maximum temperature (air and substrate)	-	-	< +35 °C	
Minimum temperature (air and substrate)	-	-	> +5 °C	
Relative air humidity	-	-	irrelevant	
Moisture of the substrate (gluing surface)	-	-	saturated substrate with no excess water on the surface	
SERVICE CONDITIONS				
Maximum temperature (air and substrate)	-	-	< +80 °C	
Minimum temperature (air and substrate)	-	-	> -40 °C	
Relative air humidity	-	-	irrelevant	
Contact with water[2]	-	-	occasional	
Reaction to fire[3]	-	-	NPA	

In the presence of installation and working temperatures outside the limits indicated above, contact the Kerakoll technical department to provide for suitable protective systems for application and operation of the GeoSteel FRM reinforcement system.

[1] The performance characteristics of the GeoSteel FRM system are compliant with and calculated as foreseen by the Guideline for the identification, qualification and acceptance testing of fibre reinforced composite materials with an inorganic matrix (FRCM) , for use in the structural consolidation of existing buildings, published by the "Consiglio Superiore dei Lavori Pubblici" (Italian authority responsible for overseeing public works) in December 2018.

[2] In the event of permanent contact with liquids, contact the Kerakoll technical department to provide for the most suitable protective system.

[3] In case of exposure to fire load, or fire resistance, protect the GeoSteel FRM reinforcement system by means of an appropriate REI certified system.

WARNING

- **Product for professional use**
- abide by any standards and national regulations
- wear protective gloves
- when handling the sheet wear protective clothing and goggles, and follow the instructions regarding methods for applying the material
- storage on the work site: store under cover in a dry place, well away from substances that might damage it or its ability to adhere to the chosen matrix
- the product is an item according to the definitions of the EC Regulation No. 1907/2006 and therefore does not require a Safety Data Sheet
- for any other issues, contact the Kerakoll Worldwide Global Service +39 0536 811 516 - globalservice@kerakoll.com

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