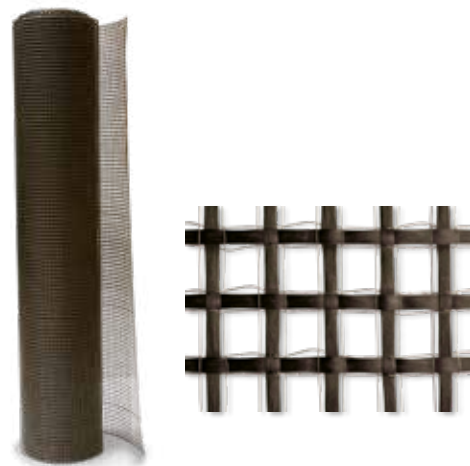


# Geosteel Grid 400

Balanced bi-axial mesh made of special basalt fibre and AISI 304 stainless steel micro-threads, welded and protected with alkali-resistant treatment, guarantees stability and performance in both directions. Easy to apply, specific for perfect meshing with Geocalce F Antisismico.

GeoSteel Grid 400 is very easy to handle, easy to work and install, combines optimal mechanical properties with high durability, thanks to the excellent characteristics of the basalt filaments and stainless steel used. The special alkali-resistant treatment improves adhesion to the mineral matrix and the overall performance of the reinforcement system.



1. Excellent durability thanks to the use of AISI 304 stainless steel and high alkali-resistant basalt fibre
2. High shear strength, impact and abrasion resistance
3. Excellent mechanical performance is guaranteed by the special water-based resin treatment that prevents sliding between mesh and matrix
4. Certified for use in structural strengthening in combination with Geocalce F Antisismico mineral matrix on masonry substrates

## Areas of application

### → Intended use

- Static and seismic upgrade or improvement of structural elements in brick, natural stone and tuff masonry, creating reversible, ultra-thin reinforced plasters/renders that work together with the structure thanks special Geosteel steel-fibre connectors or Steel Dryfast helical bars with the special Steel Dryfast insert
- 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 range of sheets and Steel Dryfast helical bars with the special Steel Dryfast insert

## Instructions for use

### → Preparation

Geosteel Grid 400 basalt fibre and AISI 304 stainless steel mesh 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 case of non-deteriorated substrate proceed with preparation of the surfaces following the Geocalce F Antisismico technical data sheet. When the substrate is clearly deteriorated, 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 technical data sheet).

### → Application

The execution of the structural strengthening with basalt-fibre and stainless steel mesh, Fabric Reinforced Mortar (combination of Geosteel Grid 400 mesh with Geocalce F Antisismico), will be carried out applying a first coat of geo-mortar, ensuring on the substrate a sufficient quantity of material (average thickness 3-5 mm) to regularize it and to lay and embed the reinforcing mesh. Then apply the Geosteel Grid 400 basalt-fibre and stainless steel mesh to the still wet matrix. Take care that the mesh is perfectly embedded in the matrix layer, applying firm pressure with a steel spreader or roller. Make sure that the netting protrudes from the mesh, in order to ensure excellent adhesion between the first and second matrix layers and good impregnation of the fibre. Where two meshes are placed side-by-side, and in the case of the longitudinal extension of a strip, overlap two layers of basalt-fibre mesh by at least 30 cm.

## Instructions for use

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.

Carry out any plastering/rendering using Geocalce Tenace technical composite plaster/render.

If the strengthening system is installed in especially aggressive environments, or you otherwise wish to ensure additional protection beyond that already provided by the matrix, it is recommended to apply Kerakover Silox Pittura on Geocalce F Antisismico matrix.

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 & Geosteel Grid 400

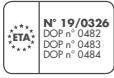
*Execution of repair, structural strengthening, improvement or seismic upgrade of masonry, tuff, natural stone or wattle-type elements and structures using an inorganic matrix composite system FRM (Fabric Reinforced Mortar), CE-marked, with European Technical Assessment (ETA) pursuant to art. 26 of EU Regulation No. 305/2011 and international certificate of proven validity. FRM composed of balanced bi-axial sheet made of basalt fibre and AISI 304 stainless steel, with special alkali-resistant protective treatment with solvent-free, water-based resin – such as Geosteel Grid 400 by Kerakoll Spa – with the following certified technical characteristics: AISI 304 stainless steel: wire tensile strength > 750 MPa, modulus of elasticity  $E > 200$  GPa; basalt fibre: tensile strength  $\geq 3000$  MPa, modulus of elasticity  $E \geq 87$  GPa; mesh size  $15 \times 15$  mm, equivalent thickness  $t_f (0^\circ-90^\circ) = 0.064$  mm, total mass including welding and protective coating  $\approx 400$  g/m. Geosteel Grid 400 impregnated with Geocalce F Antisismico by Kerakoll Spa, 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. To be applied directly to 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  $\approx 3-5$  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 uncured, lay the GeoSteel Grid 400 mesh in AISI 304 stainless steel and basalt fibre by Kerakoll Spa, and by pressing firmly with a smooth spreader or metal roller, make sure that the mesh is completely impregnated and avoid allowing any gaps or air bubbles to form, because these can compromise the adhesion of the mesh 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  $\approx 5 - 8$  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  $\mu\text{m}$ , 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.*

# Certificates and marks



CE-marked in combination  
with Geocalce F  
Antisismico for masonry  
structures



## Technical Data compliant with Kerakoll Quality Standard

### Dry fabric technical information

Appearance	mesh impregnated with protective alkali-resistant treatment
Nature of material	basalt and AISI 304 stainless steel
Total mass (including welding and protective coating)	≈ 400 g/m <sup>2</sup>
Roll width	≈ 1 m
Roll length	≈ 25 m
Mesh width	≈ 15x15 mm
Shelf life	unlimited
Pack	25 m rolls
Weight of roll	≈ 11 kg (1 roll)

## Performance

### Dry fabric technical properties

#### Basalt:

- characteristic tensile stress	$\sigma_{\text{wire}}$	≥ 3000 MPa
- elastic modulus	$E_{\text{wire}}$	≥ 87 GPa

#### AISI 304 stainless steel:

- characteristic tensile stress	$\sigma_{\text{wire}}$	≥ 750 MPa
- elastic modulus	$E_{\text{wire}}$	≥ 200 GPa

### Mesh technical characteristics (0° - 90°)

- equivalent thickness of mesh	$t_f$	0.064 mm
- tensile load by unit of width	$F_f$	≈ 80 kN/m

<b>Performance</b>					
<b>GeoSteel FRM system – ETA n° 18/0314</b>					
<b>FRM – Geocalce F Antisismico &amp; Geosteel Grid 400</b>					
<b>Performance characteristic<sup>1</sup></b>	<b>Test Method</b>		<b>Geosteel FRM system performance on brick substrates</b>	<b>Geosteel FRM system performance on tuff substrates</b>	<b>Geosteel FRM system performance on stone substrates</b>
Conventional tension limit	LG FRCM (§§ 2.1 – 7.2)	$\sigma_{lim,conv}$	854 MPa	1071 MPa	670 MPa
Conventional deformation limit	LG FRCM (§§ 2.1 – 7.1)	$\varepsilon_{lim,conv}$	1.27%	1.59%	0.99%
Elastic modulus of the sheet	LG FRCM (§§ 2.1 – 7.1.1)	$E_f$	67 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	$\mu$	from 15 to 35 (table value)		
<b>Installation conditions</b>					
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		
<b>Service conditions</b>					
Maximum temperature (air and substrate)	-	-	< +80 °C		
Minimum temperature (air and substrate)	-	-	> -40 °C		
Relative air humidity	-	-	irrelevant		
Contact with water <sup>2</sup>	-	-	occasional		
Fire reaction <sup>3</sup>	-	-	class A1		

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.

<sup>1</sup> 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.

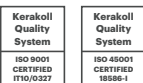
<sup>2</sup> In the event of permanent contact with liquids, contact the Kerakoll technical department to provide for the most suitable protective system.

<sup>3</sup> In case of exposure to fire load, or fire resistance, protect the Geosteel FRM reinforcement system by means of an appropriate REI certified system.

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## Warning

- Abide by any standards and national regulations
- when handling the mesh, wear protective clothing and goggles, and follow the instructions on how to apply the material
- store in a dry place and away from substances that may compromise the integrity and adhesion with 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, please contact the Kerakoll Worldwide Global Service +39 0536 811 516



The Rating classifications refer to the GreenBuilding Rating Manual 2012. This information was last updated in January 2025; please note that additions and/or amendments may be made over time by KERAKOLL SpA; for the latest version, see [www.kerakoll.com](http://www.kerakoll.com). KERAKOLL SpA shall therefore be liable for the validity, accuracy and updating of information provided only when taken directly from its institutional website. The technical data sheet given here is based on our technical and practical knowledge. As it is not possible for us to directly check the conditions of your building site and the execution of the work, this information represents general indications that do not bind Kerakoll in any way. Therefore, it is advisable to perform a preliminary test to verify the suitability of the product for your purposes.