

GeoCalce® Tenace



Composite, natural, mineral matrix, technical plaster/render made from pure natural NHL lime and geo-binder with TPI 3D technology texture, for breathable plastering/rendering with zero crack risk; applicable in thicknesses of up to 30 mm in a single coat. Class CS III and M5.

GeoCalce® Tenace (Tough) is a geo-mortar with double mark, compressive strength class CS III according to standard EN 998-1 and M5 according to standard EN 998-2. Specifically designed for guaranteed anti-crack plastering/rendering, it can be applied in thicknesses of up to 30 mm in a single coat. Thanks to its properties, it is specifically designed for the structural strengthening of buildings, for infill masonry as an anti-collapse and break-away protective system for brick and cement floor slabs. Ideal as plaster/render for high-thickness finish in certified structural strengthening, improvement and seismic adaptation systems, ideal in GreenBuilding and Historical Restoration.



GREENBUILDING RATING®

GeoCalce® Tenace
 - Category: Inorganic natural minerals
 - Repair and reinforcement of reinforced concrete and masonry

Highly effective (4/5)
 No development of bacteria or fungi
 Very low VOC emissions
 CO₂/kg emission 105 g
 Recycled mineral content 45.7%

PRODUCT STRENGTHS

- Natural and breathable, allows walls to breath
- Prevention and control of crack formation
- Absorption of stress due to thermal expansion or shrinkage
- Greater flexural and tensile strength, greater resistance to impact
- Greater resistance to atmospheric agents
- Better thixotropy to facilitate its application
- Can be applied by hand or machine

NATURAL INGREDIENTS

	Pure NHL 3.5 certified natural lime		Anti-crack fiber TPI 3D
	Mineral geo-binder		Selected Dolomitic Limestone (0-1.8 mm)
	Siliceous washed natural river sand (0.1-0.5 mm)		Pure Fine White Carrara Marble (0-0.2 mm)

AREAS OF USE

Use

Anti-cracking plaster/render

- GeoCalce® Tenace is designed for breathable plastering/rendering, it is guaranteed not to crack without using any mesh and can be applied in thicknesses of up to 30 mm in a single coat on dividing walls and load-bearing masonry in natural stone, bricks, tuff, concrete blocks.
- Particularly suitable for external applications thanks to its excellent water-repellence characteristics (W1), it is a dry plaster/render - therefore more durable over time - that maintains its breathability performance unaltered.

Anti-seismic plaster/render

- When used by itself without the addition of any mesh, GeoCalce® Tenace is suitable to create breathable plasters/renders to protect internal dividing walls and external stud walls by connection of the stud walls to beams and pillars around the perimeter for anti-collapse prevention in residential building, to repair damaged masonry facings and to prevent vulnerable collapse due to a seismic event in areas with a high and low seismic risk (area 1, 2, 3, 4).
- When used in combination with Geo Grid 120, GeoCalce® Tenace is suitable as a break-away protection system for brick and cement floor slabs.

Technical plaster/render

- GeoCalce® Tenace has been designed and tested for the high-thickness plastering/rendering of EPS or mineral fibre insulating panels for ETICS use, following application of galvanized plaster-reinforcing meshes with a maximum diameter of Ø 2, 5x5 cm mesh, overlapping by at least 10 cm; for proper positioning of the mesh, use Kerakoll's special Universal Spacers.
- When used in combination with Geo Grid 120, is suitable for the plastering/rendering of stringcourses whenever the formation of cracks near the floor is to be avoided.

Do not use
 On dirty, non-cohesive substrates, in the presence of interstitial salt deposits or moisture rising.

* ÉMISSION DANS L'AIR INTÉRIEUR Information sur le niveau d'émission de substances volatiles dans l'air intérieur, présentant un risque de toxicité par inhalation, sur une échelle de classe allant de A+ (très faibles émissions) à C (fortes émissions).

INSTRUCTIONS FOR USE

RENDERING

Preparation of substrates

Masonry structures must be clean and solid, free from loose debris, dust and mould. Old walls must be carefully cleaned and remaining traces of previous processes removed as well as any salt deposits which could impair adhesion. Remove inconsistent rendering mortars from between the stones. Use GeoCalce® Tenace and the fragment-filling and/or break-fill techniques to rebuild missing sections of the wall and restore an even surface. On new masonry, clean in order to eliminate dust or any substance that might compromise direct adhesion. Always wet substrates before plastering/rendering with GeoCalce® Tenace.

Preparation and application

GeoCalce® Tenace is easily applied with a trowel or a plastering machine like a traditional plaster/render. Prepare the substrate, filling in any fragments if necessary to create a flat, smooth surface. Then wet until it is fully saturated, leaving a saturated substrate with no excess water on the surface. GeoCalce® Tenace should be applied with precision, each coat being no more than 3 cm thick. Only apply patch layers on rough or previous coats when the lower has hardened. Allow the hardened product to cure and keep it moistened during the first 24 hours.

Manual application: to prepare GeoCalce® Tenace, mix one 25-kg bag using clean water, in the amount shown on the package, in a standard concrete mixer. Mix by pouring water into the clean cement mixer and then add the powder in one operation. Wait until the right consistency forms while mixing. In the first 1-2 minutes the product will seem dry; do not add water at this stage. Keep mixing for 4-5 minutes until a smooth, spongy and lump-free mortar forms. Use all of prepared mixture; do not reuse it in subsequent mixings. Store the product in places protected against the heat in summer months and against the cold during the winter. Use running water not subject to the influence of outside temperatures. Adding cement in any quantity would impair the quality of the mortar which is guaranteed by its all-natural origins.

Mechanized application: GeoCalce® Tenace can be applied with a plastering machine. Tests to prove the compliance of GeoCalce® Tenace were carried out using a PFT G4 plastering machine featuring the following accessories: mixer, stator/rotor D6-3, 25x37-mm flexible hoses, 10-20 m long and spray gun.

ANTI-COLLAPSE PREVENTION OF STUD WALLS

Preparation of substrates

Demolish and remove the existing plaster/render and all flaky or loose parts, making sure that dust is removed as well. Carry out the scarification of the concrete surfaces until achieving a roughness equivalent to level 8 of the Test kit for preparation of reinforced concrete and masonry substrates. Subsequent power washing to remove all residue from operations which could impair adhesion. On new masonry, clean in order to eliminate dust or any substance that might compromise direct adhesion. Always wet substrates before plastering/rendering with GeoCalce® Tenace.

Application

Once the old plaster/render has been removed, and the scarification of the concrete and subsequent cleaning have been carried out, lay GeoCalce® Tenace making sure to apply it to all the affected surfaces of the protective system with a thickness greater than or equal to 1.5 cm, to increase the ultimate limit state (ULS) with a considerable improvement of the in-plane and out-of-plane load-bearing capacity of the stud walls.

Once applied, allow the product to level then finish using a sponge float and leave the surface to cure for at least 24 hours. Apply a final protective finishing coat to level the surface of the opaque wall with Biocalce® Intonachino Fino. Once Biocalce® Intonachino Fino has completely dried, proceed with the decoration and final protection of the new surfaces.

FRCM – Fiber Reinforced Cementitious Matrix: in case a reinforced patching of the stud walls needs to be done, first apply an initial coat of GeoCalce® Tenace that is thick enough to ensure that the surfaces are corrected. Next, proceed by applying Geo Grid 120 on GeoCalce® Tenace while it is still fresh, making sure that the mesh is completely enveloped in the GeoCalce® Tenace layer by pressing gently with a flat spreader. Finally, apply a protective layer using GeoCalce® Tenace, making sure that the reinforcement mesh is completely covered. Once applied, allow the product to level then finish using a sponge float and leave the surface to cure for at least 24 hours. Apply a final protective finishing coat to level the surface of the opaque wall with Biocalce® Intonachino Fino. Once Biocalce® Intonachino Fino has completely dried, proceed with the decoration and final protection of the new surfaces.

REPAIR AND PREVENTION IN CASE OF BREAK-AWAY PROBLEMS

Preparation of substrates

Plasters/renders, paints and any portions of damaged or loose pieces of brick must be completely removed in advance; proceed with the restoration of the portions of concrete beams that have been damaged or deteriorated, reconstructing and reprofiling the beams sections with GeoLite®; in case, reinforce them with GeoSteel Hardwire™ sheets. After this, clean the substrate and eliminate any residual dust, grease, oil and any substance that might compromise direct adhesion using either compressed air or firmly polishing, in order to guarantee a cohesive substrate on the whole of the surface to be worked on.

Reconstruction of the floor slab intrados profile

The achievement of the level profile of the floor with filling of the damaged or removed pieces of brick, will be achieved by laying Klima Air EPS heat-insulating panels in suitable thicknesses, properly bonded to the brick work using Keraklima Eco Granello, taking care to thoroughly clean the substrate, ensuring a dry and solid surface, free from loose debris. For particular uses, and according to local current regulations, it is possible to replace the Klima Air panel with a non-combustible panel, such as rock wool, which can always be installed with Keraklima Eco Granello. The application must guarantee the filling of all cavities and the creation of a laying surface level with the intrados of the beams previously reconstructed with GeoLite®; in case, even up the surface with a thick first coat of Keraklima Eco Granello in a ratio of 15 mm maximum thickness per coat.

Application of the strengthening system

Once the laying of the EPS Klima Air panels has been completed, a coat of Keraklima Eco Granello will be applied on them with an 8 or 10 mm-thick toothed spreader, in order to create a hooking substrate for the creation of the structural strengthening system. Laying of the Geo Grid 120 mesh, applied in a widespread manner on the whole surface affected by break-away problems, must incorporate at least 2 end beams into the concerned area, so as to guarantee the anchoring of the mesh to the intrados of the beams, taking care to spill over of at least 10 cm from their profile. It is recommended to install Steel DryFix® 8 stainless steel helical bars along the perimeter of the surface to be worked on; their number and centre distance must be determined by a qualified technician.

INSTRUCTIONS FOR USE

Apply a first coat of GeoCalce® Tenace, ensuring on the substrate a sufficient quantity of material (average thickness 5 mm) to lay and incorporate the reinforcement mesh. Afterwards, working over the matrix while it is still fresh, apply the Geo Grid 120 basalt fibre mesh, making sure that the mesh is perfectly incorporated into the matrix by pressing firmly with a spreader, and checking that the mortar comes out between the mesh as to ensure optimum adhesion between the first and second layers of the matrix.

At longitudinal join points, overlap two layers of mesh by at least 20 cm. Before applying the second coat of GeoCalce® Tenace, proceed with the insertion of the Steel DryFix® 8 Insert on the bar head, by simple screwing. The application will be completed by applying a final protective finishing coat (total thickness of the reinforcement of 5-8 mm) using Biocalce® Intonachino Fino, in order to completely incorporate the reinforcement. The two coats of GeoCalce® Tenace must not create too high thicknesses; a maximum thickness of about 15 mm is recommended.

As an alternative to the Geo Grid 120 mesh, the designer may choose to use the Geosteel Grid 200 or Rinforzo ARV 100 meshes, according to his/her requirements.

Cleaning

GeoCalce® Tenace is a natural product and tools can be cleaned with water before the product hardens.

SPECIAL NOTES

When plastering old masonry, always check the consistency of the substrate.

In case, apply Geocalce Tenace in advance as a render to even out uneven sections and substrate absorbencies. Later, check to make sure it has adhered properly.

In external applications, provide for debonding from floors, walkways or horizontal surfaces in general, to avoid possible capillary draw phenomena.

ABSTRACT

Anti-cracking, anti-seismic, technical, conventional plastering/rendering will be done with a plaster/render with very high hygroscopicity and breathability for internal and external walls, with a base of pure natural NHL 3.5 lime, geo-binder, mineral fibres and inert siliceous sand and Dolomitic limestone with a grading curve of 0-1.8 mm, (such as GeoCalce® Tenace by Kerakoll Spa). The natural plaster must meet the requirements of standard EN 998-1 – GP/CS III, EN 998-2 – G/ M5. Reaction to fire class A1. The plaster/render will be no thicker than 30 mm per coat.

To be applied by hand or using a plastering machine. GeoCalce® Tenace coverage: ≈ 16 kg/m² per cm of thickness.

TECHNICAL DATA COMPLIANT WITH KERAKOLL QUALITY STANDARD

Appearance	powder	
Chemical nature of binder	pure Natural Hydraulic Lime NHL 3.5 EN 459-1	
Grading	0 – 1.8 mm	
Shelf life	≈ 12 months in the original packaging in dry environment	
Pack	25 kg bags	
Apparent density of powder	≈ 1.36 kg/dm ³	UEAtc
Mixing water	≈ 5 ℓ / 1 x 25 kg bag	
Consistency of wet mortar	≈ 178 mm	EN 1015-3
Apparent density of wet mortar	≈ 1.8 kg/dm ³	EN 1015-6
Density of dry, hardened mortar	≈ 1.6 kg/dm ³	EN 1015-10
Temperature range for application	from +5 °C to +35 °C	
Maximum thickness obtainable by coat	≈ 3 cm	
Coverage	≈ 16 kg/m ² per cm of thickness	

Values taken at +23 ± 2 °C, 50 ± 5% R.H. and no ventilation. Data may vary depending on specific conditions at the building site

PERFORMANCE

VOC INDOOR AIR QUALITY (IAQ) - VOLATILE ORGANIC COMPOUND EMISSIONS

Conformity EC 1 plus GEV-Emicode GEV certified 10704/11.01.02

ACTIVE INDOOR AIR QUALITY (IAQ) - DILUTION OF INDOOR POLLUTANTS *

	Flow	Dilution	
Toluene	277 µg m ² /h	+86%	JRC method
Pinene	143 µg m ² /h	+1%	JRC method
Formaldehyde	2528 µg m ² /h	test failed	JRC method
Carbon Dioxide (CO ₂)	298 mg m ² /h	+325%	JRC method
Humidity (Humid Air)	25 mg m ² /h	+16%	JRC method

BIOACTIVE INDOOR AIR QUALITY (IAQ) - BACTERIOSTATIC ACTION **

Enterococcus faecalis Class B+ no proliferation CSTB method

BIOACTIVE INDOOR AIR QUALITY (IAQ) - FUNGISTATIC ACTION **

Penicillium brevicompactum Class F+ no proliferation CSTB method

Cladosporium sphaerospermum Class F+ no proliferation CSTB method

Aspergillus niger Class F+ no proliferation CSTB method

HIGH-TECH EN 998-1

Compressive strength after 28 days	CS III resistance class	EN 998-1
Water vapour permeability coefficient (µ)	≤ 10	EN 1015-19
Water absorption through capillary action	W _c 1 category	EN 998-1
Porosity	≥ 40%	WTA 2-2-91/D
Reaction to fire	class A1	EN 13501-1
Adhesion to support (hollow clay block)	≥ 0.5 N/mm ² - FP: B	EN 1015-12
Thermal conductivity (λ _{-10, dry})	0.48 W/(m K) (measured value)	EN 1745
Durability (freeze/thaw)	evaluation based on regulations applicable to mortar in the country of use	EN 998-1

HIGH-TECH EN 998-2

Compressive strength	M5 resistance class	EN 998-2
Water vapour permeability coefficient (µ)	from 15 to 35 (table value)	EN 1745
Water capillary absorption	≈ 0.3 kg (m ² · min ^{0.5})	EN 1015-18
Initial shear strength	0.15 N/mm ² (table value)	EN 1052-3
Adhesion to the substrate after 28 days	≥ 0.5 N/mm ² - FP: B	EN 1015-12
Thermal conductivity (λ _{-10, dry})	0.48 W/(m K) (measured value)	EN 1745
Static modulus of elasticity	≈ 5.7 GPa	EN 13412

Values taken at +23 ± 2 °C, 50 ± 5% R.H. and no ventilation. Data may vary depending on specific conditions at the building site.

* Tests carried out according to JRC method - Joint Research Centre - European Commission, Ispra (Varese, Italy) - to measure the reduction of polluting substances in indoor environments (Indoortron Project). Flow and speed in proportion to a standard cement-based plaster/render (1.5 cm).

** Tests carried out according to CSTB method, bacterial and fungal contamination

WARNING

- **Product for professional use**
- abide by any standards and national regulations
- store the product in places protected against the heat in summer months and against the cold during the winter
- protect the surfaces from air currents
- if necessary, ask for the safety data sheet
- for any other issues, contact the Kerakoll Worldwide Global Service +39 0536 811 516 - globalservice@kerakoll.com

The Rating classifications refer to the GreenBuilding Rating® Manual 2013. This information was last updated in June 2020 (ref. GBR Data Report - 07/20); please note that additions and/or amendments may be made over time by KERAKOLL SpA; for the latest version, see 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 in your building yards 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.



KERAKOLL
The GreenBuilding Company

KERAKOLL S.p.a.
Via dell'Artigianato, 9 - 41049 Sassuolo (MO) Italy
Tel +39 0536 816 511 - Fax +39 0536 816 581
info@kerakoll.com - www.kerakoll.com