Rev 4
09/26



GRAUTEK R

Sulphate-shrinkage-resistant compensated fiber-reinforced thixotropic rheoplasty mortar

DESCRIPTION

GRAUTEK R is a premixed fibre-reinforced cement-based mortar, single-component, to be mixed with water to obtain thixotropic mixtures with compensated shrinkage. GRAUTEK R develops high initial and final mechanical resistance, is waterproof, durable even in highly aggressive environments and guarantees high adhesion to steel and concrete. GRAUTEK R, due to its particular formulation, is particularly suitable for sulphate-based environments as it is sulphate-resistant.
GRAUTEK R contains no metal parts and is chloride-free.

The product is CAM certified.
It has no VOC emissions and is produced in compliance with the Minimum Environmental

UNI PdR 88:2020

In the product
SRA is already in place

ZERO SCAR
Maximum yield

FIELDS OF USE

GRAUTEK R is suitable for the structural restoration, maintenance and restoration of damaged concrete and reinforced concrete structures exposed to highly aggressive environments. GRAUTEK R is particularly suitable for:

- structural restoration of reinforced concrete pillars, beams, floors and walls, including prefabricated ones, subject to sulphate aggression;
- volumetric reconstruction and swelling of concrete products with thicknesses of up to 4 cm per coat;
- hydraulic works, infrastructures, viaducts and tunnels, including structures in contact with sea water;
- restoration of the cortical layer of concrete and repair of the detached concrete cover following the oxidation of the reinforcing rods;

TECHNICAL FEATURES

APPEARANCE	Powder
COLOR	concrete grey
AGGREGATE Dmax	2.0 mm
APPARENT DENSITY	1.2 kg/dm3
CHLORIDE ION CONTENT (⩽ 0.05%)	0,012%

Optimal performance is achieved at 20°C and 50% RH. Curing and installation times may vary during the winter period. Observe the indicated mixing ratio and do not use the contents of open or damaged bags. Store the product at room temperature for 24 hours prior to application.

APPLICATION SPECIFICATIONS

COLOR OF THE DOUGH	Grey
MIXING WATER	3.80 - 4.05 l/bag
DENSITY OF THE MIXTURE	2170 Kg/m3
pH DOUGH	> 12
FLOW DOUGH UNI EN 13395	35 ± 10 mm
APPLICATION TEMP.	5 - 35°C

DATA SHEET

DOUGH DURATION	≥ 30 minutes (20°C 50% RH) (later versions can be made on request)
TOTAL HARDENING	28 days (at 20°C)
WAITING TIME BETWEEN LAYERS	at least 30 min (23°C 50% RH)
APPLICATION THICKNESS	2 to 6 cm
CONSUMPTION	19 Kg/m2 per cm thickness (21.7 Kg/m2 per cm of thick fresh mortar)

ADVANTAGES

The characteristics of GRAUTEK R allow structural restoration works to be carried out on buildings subject to high chemical-physical and environmental aggression.
The intervention is highly reliable and long-lasting, significantly reducing maintenance costs.
The specific features of the product are:

- Resistance to sulphates and chemical agents: GRAUTEK R has a high compactness, low capillary porosity and high resistance to aggressive agents present in the environment such as chlorides and sulphates and lubricating oils, thanks to the particular composition of the constituent elements. It also has excellent resistance to freeze-thaw cycles.
- Absence of cracks and cracks due to plastic shrinkage: GRAUTEK R does not have cracks or cracks due to plastic shrinkage thanks to the use of special fibers that counteract the cracking phenomenon.
- Contrasted expansion in air: having the seasoning additive (SRA) inside, this allows the expansive phenomenon to take place even with maturation in air.
- Versatility of use: GRAUTEK R can be applied by trowel or spray, in thicknesses up to 4 cm in a single layer. GRAUTEK R can also be pumped over long distances, sprayed on site and can be subjected to stress after short curing.
- Impermeability to hydrocarbons in the event of accidental spills, while presenting surface chromatic alterations.

TECHNOLOGY

CONTRASTED EXPANSION

The addition of the mortar favours the development of the expansive phenomenon even in the absence of curing in a sufficiently humid environment, ensuring maximum performance even in real site conditions. The shrinkage control gives the mortar dimensional stability and absence of cracks, resulting in better adhesion of the mortar and monolithic adhesion with the substrate. Internal-curing (SRA) technology generally improves performance in hot climates.

HOW TO USE

CLEANING THE STAND

- Remove all coherent concrete parts from the area affected by restoration, including grout latch through mechanical chiseling or hydrowashing, taking care not to damage the structures.
- eliminate stains, efflorescence or impregnation of oil, grease, paint, lime, dust, dirt, etc.;
- remove any previous restoration work if irreparably damaged or deteriorated.

PREPARATION OF THE SUBSTRATE

- roughen the surface with mechanical means such as bush-hammering machines, chiseling machines, or hydrodemolition (the latter does not cause damage to the substrate and is recommended for large surfaces) reaching the healthy and compact concrete to facilitate adhesion between mortar and substrate. The surface must be roughened with roughness of at least 5 mm, while the edges that delimit the area of restoration must be scarified to a depth of at least 10 mm with a sharp-edged finish. The roughening of the surface layer is necessary both to facilitate the adhesion of the mortar and to ensure the correct development of the expansive phenomenon.

- wet the surface with pressurized water until saturated. This procedure avoids the absorption of the mixing water by the substrate, which could lead to cracking phenomena and decrease the adhesive capacity of the mortar. The operation also allows the removal of residues due to the roughening of the concrete substrate. The excess water must evaporate completely before carrying out the restoration.

PROTECTION OF REINFORCING RODS

Sandblast the reinforcing rods and remove any inconsistent parts such as rust flakes or material fragments that can trigger the corrosion process or affect adhesion. Scarifying the substrate by hydrodemolition also effectively cleans the rods, making sandblasting unnecessary.

- Protect the reinforcing rods by applying the re-alkalizing corrosion inhibitor treatment (PROTEK).

ADDITIONAL ARMOR

- For coatings thicker than 2 cm, it is recommended to place an electro-welded mesh equipped with spacers (at least 1 cm from the support) and provide a concrete cover of at least 1.5-2 cm.

PREPARATION OF THE MORTAR

The mixing of GRAUTEK R mortar is carried out in a concrete mixer on the construction site. Feed the mixing water into the concrete mixer according to the recommended mixing ratio: 3.80/4.05 litres of water for each 25 kg pack of GRAUTEK R.

Pour the product a little at a time without interruption, mixing for at least 4 ÷ 5 minutes until a homogeneous mixture free of lumps is obtained. Check that all the product has been mixed correctly and that there are no dust residues on the walls of the concrete mixer. A drill with a low-speed agitator can be used to prepare small quantities of product. A special additive added to the mixture acts as an internal seasoning agent, and promotes the development of the expansive/anti-shrinkage phenomenon in the air. The additive affects the curing of the mortar, which is why it is recommended to adjust the dosage according to the ambient temperature. In the presence of hot climates, the additive allows good maintenance of workability while in the case of temperatures between 5 and 10°C to avoid an excessive slowing down of setting times, it is possible to reduce the dosage.

CAUTION

It is recommended to always make test doughs before starting to use the product.

IN HOT CLIMATES

- Store GRAUTEK R in the shade;
- Follow the work in the early hours of the morning, interrupting it during the sunniest hours, it is better to start the work in the late afternoon hours, on condition that the structure has been subjected to continuous wetting for at least 6 hours before the start of the work;
- To obtain the maximum performance of GRAUTEK R, it is necessary to correct curing through the use of the additive applied by spray or brush.

IN COLD CLIMATES

- Store GRAUTEK R in a heated environment if possible;
- Do not install the product at temperatures below 0°C.;
- Start work in the late morning;
- Make sure that the holder is not frozen.
- Saturation of the substrate with water: carry out all the operations of preparation of the substrate and saturate the concrete or brick with water for at least 6 continuous hours before laying GRAUTEK R. The free water on the surfaces must be removed with compressed air or with rags.

APPLICATION

GRAUTEK R can be applied with a trowel or spray. The product must be applied to clean, roughened and water-saturated surfaces as indicated in the previous paragraph. Indicatively, the finishing time of GRAUTEK R is half an hour during the summer and about 1 hour during the cold season.

COATING UP TO 2 CM THICK

With such a low thickness, it is not possible to place an electro-welded mesh and therefore it is necessary to create an accentuated roughness in the substrate, such as to guarantee a valid contrast to the initial expansion of the mortar carried over. Simply sandblasting the substrate is not enough.

COATING WITH A THICKNESS OF MORE THAN 3 CM

Place an electro-welded mesh with spacers to keep it evenly detached from the substrate by at least 1 cm and provide a concrete cover of at least 1.5 - 2 cm.

SEASONING

The mortar already contains a special additive (SRA) that acts as a seasoning agent, regulates the evaporation of water, reducing shrinkage and cracking, promoting curing. The presence of SRA inside GRAUTEK R allows correct expansion in the air, reducing shrinkage phenomena by 20-50% compared to the product without additives. To ensure correct curing of the product even in the presence of dry climates or surfaces exposed to excessive wind or radiation, the use of the curing membrane (TEKNAPUR) is recommended.

SPECIFICATIONS

For structural restoration works, volumetric reconstructions and thick coatings in highly aggressive environments, a thixotropic fiber-reinforced mortar with compensated shrinkage, resistant to sulphates, type GRAUTEK R by TEKNA CHEM, compliant with UNI EN 1504-3, Class R4, will be used, to be applied in thicknesses up to 4 cm in one coat. The product must be characterized by high adhesion to the substrate and development of high initial and final mechanical resistance.

PACKAGING AND STORAGE

GRAUTEK R is packaged in 25 kg polythene bags. In the original packaging and correctly stored indoors in a dry place, the product retains its characteristics for one year.

WARNINGS

Being a cementitious product, it has the same recommendations as the use of cement. See the safety data sheet.

LEGAL NOTICE

The information contained in this technical data sheet, although representing the most advanced stage of knowledge, does not exempt the user from carrying out accurate preliminary tests in his or her own conditions of use and operation. Therefore, no liability is accepted for the improper use of the product.

DATA SHEET

Tariff B.009.220.02.a

Thixotropic fibre-reinforced premixed mortar with synthetic fibres

Supply and installation of contrasted expansion mortar with air curing, containing synthetic polyacrylonitril fibers and for the reconstruction of degraded concrete structures.

The application of the mortar must be carried out after adequate preparation of the substrate (to be calculated separately).

The product must meet the following performance characteristics:

- Compressive strength at 28 days = 55 MPa (UNI EN 12190)
- Compressive strength at 7 days = 40 MPa (UNI EN 12190)
- Flexural strength at 28 days = > 8 MPa (UNI EN 196/1)
- Flexural strength at 7 days = > 7 MPa (UNI EN 196/1)
- 28-day compressive modulus between 26 GPa ÷ 30 GPa (UNI EN 13412)
- Adhesion to concrete (UNI EN 1542) = 2 MPa
- Thermal compatibility measured as adhesion (UNI EN 1542) after 50 freeze-thaw cycles with de-icing salts (UNI EN 13687-1) = 2.1 MPa
- Capillary absorption (UNI EN 13057) = 0.1 kg/m2*h1/2
- Contrasted expansion with 1-day curing in air (UNI 8147) = > 400 µm/m
- Pull-out resistance (RILEM-CEB-FIP-C6-78) = ⩾ 30 MPa

The product must be CE marked in accordance with UNI EN 1504-3 with the Performance Assessment and Verification System 2+ among those of attestation provided for by EU Regulation 305/11.

CE

2857
TEKNA CHEM SPA
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2857 – CPR - 0028
EN 1504-3:2006

GRAUTEK R

Structural repair product for concrete by means of repair CC mortars (based on hydraulic cement)

Compressive strength class R 4
Chloride ion content: ≤ 0.05 %
Adhesion: ≥ 2.2 MPa
Carbonation Resistance: Pass
Elastic modulus: 26 GPa
Thermal compatibility part 1: ≥ 2.1 MPa
Capillary absorption:
≤ 0.08 kg × m^{-2} × $h^{-0,5}$
Hazardous substances:
in accordance with clause 5.4
Reaction to fire: Euroclass A1

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PERFORMANCE CHARACTERISTICS MIXING WATER 15.2%			
PERFORMANCE FEATURE	TEST METHOD	REQUIREMENTS IN ACCORDANCE WITH EN1504-3 FOR CLASS R4 MORTARS	PRODUCT PERFORMANCE
BLEEDING	UNI 8998		ABSENT
COMPRESSIVE STRENGTH (MPa)	EN 12190	≥ 45 (after 28 days)	>40 MPa at 1 day >50 MPa at 3 days >60 MPa at 7 days >80 MPa at 28 days
FLEXURAL STRENGTH (MPa)	EN 196/1	None	>5 MPa at 1g >6 MPa at 3 days >7 MPa at 7 days >8 MPa at 28 days
ELASTIC MODULUS OF COMPRESSION (GPa)	EN 13412	≥ 20 GPa (after 28 days)	>27 Gpa
ADHESION ON CONCRETE – ADHESION BOND – DIRECT TRACTION (MC type support 0.40 ratio a/c=0.40 according to EN 1766	EN 1542	≥ 2 MPa (after 28 days)	>2.2 Mpa
ADHESION ON CONCRETE – THERMAL COMPATIBILITY – FREEZE/THAW WITH DE-ICING SALTS (MC type support 0.40 a/c ratio = 0.40 according to EN 1766	EN 13687-1	≥ 2 MPa (Bond strength after 50 cycles)	>2.1 MPa
AIR CONTRAST EXPANSION (µm/m)	UNI 8147 method B	None	> 400 µm/m at 24h
AIR CONTRAST SHRINKAGE/EXPANSION (Mpa)	EN 12617-4	≥ 2 MPa	>2 MPa
RESISTANCE TO CRACKING	"O Ring Test"	No crack 180 days	Outdated Specification
HYGROMETRIC FREE EXPANSION IN AIR	Linear bar	Convex arching 24 hours	Outdated Specification
RESISTANCE TO ACCELERATED CARBONATION	EN 13295	Carbonation depth (dK) ≤ of concrete MC reference (0.45)	Outdated Specification
WATER RESISTANCE in PRESSURE (mm) –depth of water penetration-	EN 12390/8	None	None
CAPILLARY ABSORPTION (kg/m2*h1/2)	EN 13057	< 0.5	<0.08
CHLORIDE ION CONTENT	EN 1015-17	≤ 0.05%	<0.02%
REACTION TO FIRE	EN 13501-1	Euroclass A1	A1
RESISTANCE TO PULL-OUT	RILEM-CEB-FIP-C6-78	None	≥ 30 MPa

DATA SHEET