BUILDING TRUST

PRODUCT DATA SHEET

SikaGrout®-312 HP

HIGH PERFORMANCE, FIBRE REINFORCED, POURABLE ENGINEERING CEMENTITIOUS MORTAR FOR CONCRETE REPAIR WORKS, ANCHORING, PRECISION GROUTING AND BASE PLATING

CE

DESCRIPTION

SikaGrout®-312 HP is one component cementitious, pourable mortar (SCC technology) used for repairs, fillings, anchoring, section restoration/increasing, grouting and base plating, meeting the requirements of EN 1504-6 and EN 1504-3 (class R4).
SikaGrout®-312 HP is free flowing expansion compensated and extreme low shrinkage engineering grout.

USES

SikaGrout®-312 HP is a high performance shrinkage compensated, free flowing cementitious grout mortar for layer thickness of between 10 mm and 50 mm, suitable for:

- Precision grouting between foundations and supports, under base plates, seismic isolators or heavy machinery and equipment
- Anchoring applications such as bolts (anchor, lag, etc.) and metal structures for blocking bedplates, machinery, pile foundations, etc.
- Concrete restoration by recasting with mortar into formworks (beams, columns, bridge decks)
- Filling by simple pouring (or pumping) of cavities, cracks, gaps and recesses in concrete, masonry, rocks, etc.
- Bedding joints in pre-cast concrete sections
- Sealing around penetrations (e.g. pipes)
- Post fixings
- Restoration work (Principle 3, method 3.2 of EN 1504-9:2008). Repair of spalling and damaged concrete in buildings, bridges, infrastructure and superstructure works.
- Structural strengthening (Principle 4, method 4.2 of EN 1504-9). Installing bonded rebars in preformed or drilled holes in concrete.
- Structural strengthening (Principle 4, Method 4.4 of 1504-9:2008). Increasing the bearing capacity of the concrete structure by adding mortar.
- Preserving or restoring passivity (Principle 7, Method 7.1 & 7.2 of 1504-9:2008). Increasing cover with additional mortar or concrete or replacing contaminated or carbonated concrete.

CHARACTERISTICS / ADVANTAGES

- Easy to use, ready to mix powder; only add water (and aggregates if desired)
- Adjustable SCC consistency (Sika® ViscoCrete® technology), showing excellent flow properties, workability and stability
- No segregation or bleeding
- Remarkable shrinkage compensation (both in plastic and hardening stage)
- High effective bearing area (ASTM C1339)
- High mechanical strengths and excellent adhesion on concrete and steel
- Pourable and/or pumpable
- For application thickness of between 10 mm and 50 mm per layer (without aggregates addition)
- For application thickness up to 150 mm with special aggregates addition - SikaGrout® Quartz Sand
- In accordance with EN 1504-3 standard as repair mortar (Class R4)
- In accordance with EN 1504-6 standard as anchoring product
- A1 fire rating

APPROVALS / STANDARDS

In buildings and civil engineering works:

- Repair mortar CC for structural repair of concrete structures, Class R4 according to EN1504-3:2005. Principles 3, 4 & 7, Methods 3.2, 4.4, 7.1 & 7.2 according to EN1504-9:2008. Declaration of Performance 77120828, and provided with the CE-mark.
- Anchoring product for strengthening concrete by installing reinforcing steel (rebars) according to EN1504-6:2006. Principle 4, Method 4.2 according to EN1504-9:2008. Declaration of Performance 29146719, and provided with the CE-mark.

PRODUCT INFORMATION

Chemical base	Portland cement, selected aggregates and additives	
Packaging	25 kg bags	
Appearance / Colour	Grey powder with fibers	
Shelf life	12 months from the date of production	
Storage conditions	In original, unopened, sealed and undamaged packaging, in dry conditions, at temperatures between +5ºC and+35ºC. Protect from moisture.	
Density	Fresh mortar density: ~ 2.25 kg/lt	(EN 1015-6)
Maximum Grain Size	~ 2.5 mm	
Soluble Chloride Ion Content	≤ 0.05%	(EN 1015-17)

TECHNICAL INFORMATION

Compressive Strength	**1 day**	**7 days**	**28 days**	**Requir. (R4) @ 28 d**	(EN 12190)
	≥ 30 Mpa	≥ 55 Mpa	≥ 70 Mpa	≥ 45 Mpa	
Modulus of Elasticity in Compression	**Results**		**Requirements (R4)**		(EN 13412)
	~ 28.8 GPa		≥ 20 GPa		
Effective Bearing Area	> 85%				(ASTM C1339)
Tensile Strength in Flexure	**1 day**	**7 days**	**28 days**		(EN 196-1)
	≥ 5 Mpa	≥ 7 Mpa	≥ 9 Mpa		
Pull-Out Resistance	≤ 0.6 mm at load of 75 KN				(EN 1881)
Restrained Shrinkage / Expansion	≥ 2.0 Mpa				(EN 12617-4)
Tensile Adhesion Strength	**Results**		**Requirements (R4)**		(EN 1542)
	≥ 2.5 MPa		≥ 2.0 MPa		
Reaction to Fire	A1 Euroclass				
Freeze Thaw De-Icing Salt Resistance	≥ 2.0 MPa				(EN 13687-1)
Capillary Absorption	≤ 0.5 kg m^{-2} $h^{-0.5}$				(EN 13057)
Carbonation Resistance	dk ≤ control concrete (MC (0.45))				(EN 13295)

APPLICATION INFORMATION

Mixing ratio	3.4 - 3.9 lt of water per 25kg bag	
Consumption	~ 2.0 kg of powder per 1 mm thickness per m^2, depending on the substrate's roughness and fresh mortar´s density.	
Yield	25 kg of powder yields approximately 12.5 litres of mortar	
Layer Thickness	min. 10 mm - max. 50mm min. 15 mm - max. 150 mm with addition of Sikagrout® Quartz Sand	
Flowability	270-300 mm 70-85 cm ≥37 mm	Sika Internal Method EN12350-2 with Abrahms cone EN 13395-2 - Grout Flow through, with flow channel
Ambient Air Temperature	+5°C min. / +35°C max.	
Substrate Temperature	+5°C min. / +35°C max.	
Pot Life	~ 30 min (at +20^{0}C)	

APPLICATION INSTRUCTIONS

SUBSTRATE QUALITY / PRE-TREATMENT

Concrete:
The substrate must be structurally sound, thoroughly clean and free from dust, dirt, and loose material, surface contamination such as oil or grease, cement laitance which reduce bond, prevent suction or impair the grout flow. Delaminated, weak, damaged and deteriorated concrete and where necessary sound concrete - but not to the detriment of the structural integrity - shall be removed by suitable mechanical preparation techniques, such as high-pressure water cleaning or sandblasting. No vibration cleaning methods are preferable. Roughen concrete surface to expose aggregates to 2 mm depth, in accordance with EN 1766 or CSP 5 from ICRI Guidelines. The edges of the area affected by the intervention will have to be cut perpendicular (90 degrees) up to a minimum depth of 5 mm. The concrete's tensile strength (pull off) shall be > 1.5 MPa. Follow the directions given by the Supervising Officer or Qualified Engineer. In cases of base plating, concrete surfaces shall be generally level (within tolerances) and shall not be laid to a gradient, so grout flows to the lowest end.

Steel:
Steel reinforcement surface as for other steel parts (such as metal plates and/or metal bolts in base plating works) must be free from rust products, mill scale, mortar, concrete residues, oil, grease, dust and other loose materials which may reduce bond or may contribute to corrosion. In case of rust, clean uniformly the whole circumference of the steel bars (where applicable) by using abrasive blast cleaning techniques or high pressure waterblasting to Sa 2 in accordance with ISO 8501. Protect cleaned bars from further contamination, prior to application of the mortar.

Formwork:
Any formwork shall be capable of withstanding the load and forces imposed on it. Formwork shall be clean and placed in position after preparation of the substrate and reinforcement. Release agents such as Sika® Separol® series, shall be applied prior to placing the bars into position to avoid contact with prepared substrate.
Formwork shall be correctly designed in order to allow air and water bleed to escape, to support pouring technique, to provide a complete filling, to ensure free flowing, to prevent leakage of the product, e.t.c.
Please consult Sika Hellas' S.A. technical support for more specific directions.
Reference should also be made to EN1504-10 for specific requirements

MIXING

SikaGrout®-312 HP can be mixed with a low speed (~500 r.p.m.) electrical hand drill mixer with vertical axis for 1 to 2 bags taking care not to entrap air in the mix, or using a force action pan mixer for 2 to 3 bags - or more - at once, depending on the type and size of mixer.

Pour the water in the correct desired proportion into a suitable mixing container. While stirring slowly, add the powder gradually in the water and mix thoroughly at least for 3 minutes, adding additional water during the mixing time if necessary up to the maximum specified amount, until the required homogeneous and lump-free consistency is achieved. For larger mixes the mixing time could be extended (up to 5 minutes or as necessary) until the mortar is homogenously mixed with no lumps and no remaining dry powder. Mix full bags for best results.
25 kg of SikaGrout®-312 HP powder is mixed with 3.4 - 3.9 L of water depending on the required consistency.

APPLICATION

SikaGrout®-312 HP can be applied manually using traditional techniques by pouring into the cavities or the formworks. If necessary, it can be mechanically pumped by means of standard equipment (e.g. Turbosol, Putzmeister). For free flowing grout application, it is essential to provide a hydrostatic head of the grout. A feed hopper is recommended.

Pre-Wetting:
Concrete surfaces shall be saturated with clean water minimum 2 hours before application, ensuring that all pores and pits are adequately wet. The surface shall not be allowed to dry before application of the grout. Just before application, remove excess water and ensure there is no standing water on the surface. The surface shall achieve a dark matt appearance without glistening and surface pores and pits shall not contain water (saturated surface dry - SSD). Use pressurised air (oil free) to blow away excess water in difficult to reach areas (especially the underside of the base plate and formwork).

Pouring / Filling:
The product should be poured directly on the wet mat substrate or inside the formwork prepared for the casting. By using more than one mixer and with the proper organization, you can pour the fresh material reducing construction joints.
After mixing SikaGrout®-312 HP, leave the grout to stand for ~1-2 minutes; stir again with a trowel and then pour immediately into sealed, rigid - stable prepared formworks. Ensure air displaced by the mortar can easily escape; otherwise entrapped air will prevent full contact grouting. To make optimum use of the product's expansion properties apply the grout as quickly as possible (within max. 15 minutes). Pot life shall also be taken into consideration, adjusting for climatic conditions, when planning the work duration.
Pour the grout through the “mouth” of the formwork allowing the material to flow to the opposite end. Ensure that a continuous and sufficient head of pressure is maintained to keep the grout flowing to avoid air entrapment and prevent the material flow from coming to a stop before the operation is completed. Make sure air displaced by the material can easily escape.
Never make an application from two places as it will be difficult to determine if all air has been released, and the entire void has been filled.

- Always check the material after pumping
- Ensure formwork is strong enough to hold the fresh mortar and sealed to prevent leakage
- Cure exposed surfaces immediately with protective sheet or membrane. Shield the fresh mortar from direct sun, wind and frost
- Finish exposed surface as desired as soon as the mortar has started to stiffen. Do not add additional water on surface
- Avoid the free fall of the material to prevent segregation of the aggregate

Bonding primer / Reinforcement Corrosion Protection:
On a well prepared and roughened substrate, a bonding primer is generally not required.
Where a bonding primer and/or a reinforcement coating is required (eg. Sikadur®-32 EF, Sika MonoTop®-910 or SikaTop® Armatec®-110 EpoCem®) refer to the relevant Product Data Sheet for more detailed information.
In any case, the bonding primer / reinforcement corrosion protection shall be applied on a pre-wet substrate and subsequent application of SikaGrout®-312 HP shall be applied **wet on wet**. Open time of the bonding primer and/or the reinforcement corrosion protection shall be taken into account if it fulfills the application demands.

Increasing Maximum Layer Thickness:
For large volumes (> 20 lt) or thick applications (>50mm), increased maximum layer thickness can be achieved either by built up in layers or by adding aggregates.
Build Up in layers:
The first layer shall be hardened and exothermic reaction of the material shall be completed. The 1st layer shall be started to set
and be at ambient temperature before applying the second layer. Do not smooth the first layer before applying a second layer. The first layer shall be cleaned using low pressure water or compressed air before applying subsequent mortar layers.
Adding Additional Aggregates:
Pour the water in the correct proportion into a suitable mixing container. While stirring slowly, add SikaGrout®-312 HP to the water. Mix with low speed (<500 rpm) hand drill mixer to avoid entraining too much air. Mix thoroughly at least for 3 minutes until homogenous with no lumps. Afterwards, gradually add SikaGrout® Quartz Sand (one or two packages depending on the application demands) and mix slowly for 1-2 more minutes until homogeneous. Mix full bags for best results. Do not exceed maximum water mixing ratio.
SikaGrout® Quartz Sand are pre-weighted in 6.25 kg bags, rounded, no filler including, clean and well graded aggregates. Any other aggregate has to be evaluated prior any use.

System	Water	Layer Thickness
SikaGrout®-312 HP + 1 bag of SikaGrout® Quartz Sand	3.6-3.9 (Kg)	15-120 (mm)
SikaGrout®-312 HP + 2 bags of SikaGrout® QuartzSand	3.7-3.9 (Kg)	20-150 (mm)

Contact with Sika Hellas' S.A. technical support in order to provide more specific details and internal test reports concerning characteristics of SikaGrout®-312 HP with the addition of SikaGrout® Quartz Sand.

CURING TREATMENT

Protect the freshly applied mortar from early dehydration and/or premature drying by using the relevant curing methods (at least for 24 hours), e.g. curing compound such as Sika® Antisol® or Sikafloor® Proseal once surface water has evaporated. Use suitable curing covers such as jute and water, plastic sheets or other suitable membranes.

CLEANING OF TOOLS

Removal of fresh remnants from tools and application equipment can be carried out using water immediately after use. Hardened / cured material can only be mechanically removed.

FURTHER DOCUMENTS

For base plating works refer to the Sika Method of Statement for "Cementitious Grouting of Machine Bases and Base Plates" (Ref. 8502101) for more information regarding application, substrate and form work preparation, pouring techniques, e.t.c.

For concrete repair works refer to the Sika Method of Statement for "Restoring Concrete Structures by Recasting Using Sika® Ready to use Mortars" (Ref. 8503202) for more information regarding repair system application, substrate preparation and/or refer to the recommendations provided in EN 1504-10.

LIMITATIONS

- Do not add water over the recommended dosage.
- Do not add cement or other substances that could affect the properties of the mortar.
- Do not add water or fresh mortar to a mortar mix which has already started setting.
- Avoid application in direct sun and/or strong wind.
- Apply only to sound, prepared substrate.
- Protect freshly applied material from freezing and from rain.
- Avoid application under direct sunlight and/or strong wind.
- Do not add additional water during the surface finishing as this will cause discolouration and cracking.
- Record ambient and substrate temperatures before and during application.
- Mixing must always be performed with mechanical

means; hand mixing does not allow obtain the optimum workability.
- In case of floor casting, especially outdoors, avoid too rapid drying of the product in the early days of curing.
- Do not cast floors under bad weather conditions, which could affect in a negative way setting and hardening process of the product.
- Not to be used as an overlay in unconfined spaces
- Keep exposed surfaces to a minimum
- Do not vibrate

BASIS OF PRODUCT DATA

All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.

LOCAL RESTRICTIONS

Please note that as a result of specific local regulations the performance of this product may vary from country to country. Please consult the local Product Data Sheet for the exact description of the application fields.

ECOLOGY, HEALTH AND SAFETY

For information and advice on the safe handling, storage and disposal of chemical products, users shall refer to the most recent Safety Data Sheet (SDS) containing physical, ecological, toxicological and other safety-related data.

LEGAL NOTES

The information, and, in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the product's suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.

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