

PRODUCT DATA SHEET

SikaEmaco® S 485 FR

(formerly MEmaco S 485FR)

Cementitious, pourable, fibre-reinforced, mortar, class R4, for grouting, with contrasting expansion and high durability recommended for the repair of reinforced concrete structures from 10 to 50 mm without weld mesh.

DESCRIPTION

SikaEmaco® S 485 FR is a cementitious, pourable, an air-cured with restrained expansion mortar, resistant to aggressive environmental agents, with a combination of flexible and durable inorganic reinforcing fibers. In the absence of wet curing, a condition not always achievable on site, to enhance expansion during air curing of SikaEmaco® S 485 FR, component B (SikaEmaco® A 400) can be added. This additive makes it possible to reduce plastic and hygrometric shrinkage improving curing.

USES

SikaEmaco® S 485 FR is designed to repair and/or increasing the section of concrete structures. It may be applied by casting onto macroscopically roughened concrete (surface irregularity approx. 5 mm deep) for a thickness between 10 and 50 mm but without weld mesh.

Typical interventions include:

- repair of portions of degraded concrete structures and reconstruction of the cover layer;
- restoration of structural elements in concrete, including prestressed concrete, for civil and infrastructural works;
- structural restorations of elements subject to cyclic stresses, impacts and abrasions;
- structural restoration of hydraulic works, sewer conduits and tunnels.

FEATURES

SikaEmaco® S 485 FR, also has the following peculiarities:

- application without the electrowelded mesh: the flexible inorganic fibers, contained in SikaEmaco® S 485 FR, eliminate the need for weld mesh, making it

simpler to apply the product;

- restrained expansion with air curing (monolithicity with the substrate): the ability to provide restrained expansion with air curing of the mortar, in site conditions, allows SikaEmaco® S 485 FR to achieve monolithicity with the substrate.
- SikaEmaco® S 485 FR, subjected to the down/up warping test, already shows a up-warping (ρ) of the specimen after 24 hours, which demonstrates, the ability of the product to guarantee restrained expansion in air. Materials that instead show down-warping, lifting at the edges (U), would be unsuitable for repair works because they are characterized by shrinkage and therefore unable to guarantee monolithicity with the substrate;
- plastic phase cracking resistance: to combat plastic phase micro-cracking, SikaEmaco® S 485 FR is also enriched with polymer fibers;
- resistance to cracking at long term: this fundamental requirement for the durability of the repair works can be evaluated by means of the O Ring test. SikaEmaco® S 485 FR does not show any cracking even at long curing;
- resistance to environmental aggressives: SikaEmaco® S 485 FR, due to the very special chemistry and nature of its components, is absolutely impermeable to water, environmental aggressives such as chlorides and sulfates, resists freeze/thaw cycles (thermal compatibility) and is not subject to carbonation.

CERTIFICATES AND TEST REPORTS

In compliance with the European Regulation (EU No 305/2011 and EU No 574/2014), the product is found to have CE marking according to UNI EN 1504-3 and the corresponding DoP (Declaration of Performance).

PRODUCT INFORMATION

Composition	Cement mortar CC
Packaging	<ul style="list-style-type: none">▪ 25 kg bags▪ Eventual component B (SikaEmaco® A 400): 5 kg canister
Colour	Grey
Shelf life	12 month from the date of production
Storage conditions	Store in the undamaged, sealed original packaging in a cool, dry environment, protected from frost min. +5°C / max. +35°C
Grain size distribution	Max 2,5 mm
Total chloride ion content	<0,05% (EN 1015-17)

TECHNICAL INFORMATION

Abrasion resistance	CLASS 4 MARKING I Resistance to abrasion by rotating disc	(EN 1338)
Compressive strength	Class R4	(EN 1504-3)
	> 25 MPa	1 g (EN 12190)
	> 55 MPa	7 gg
	> 65 MPa	28 gg
Modulus of elasticity in compression	28000 ± 2000 MPa	(EN 13412)
Flexural-strength	> 6 MPa	1 gg (EN 196-1)
	> 8 MPa	7 gg
	> 10 MPa	28 gg
Pull-out resistance	≥ 25 MPa	(RILEM-CEB-FIP RC6-78)
Expansion	1 g > 0,04 % Arching test (n)	(UNI 8147 modified) Test verified
Tensile adhesion strength	≥ 2,0 MPa On support MC 0,40 secondo UNI EN 1766.	(EN 1542)
Freeze thaw de-icing salt resistance	≥ 2,0 MPa After cicle EN 13687-1 on support MC 0,40 by EN 1766	(EN 1542)
Capillary absorption	≤ 0,25 kg·m ⁻² ·h ^{-0,5}	(EN 13057)
Watertightness	Profondity of penetration < 5 mm	(EN 12390-8)
Carbonation resistance	Specification exceeded	(EN 13295)
Service temperature	Min. +5°C / max. +35°C	
Ring test	No cracks after 180 days	

APPLICATION INFORMATION

Mixing ratio	3,5-4,0 L per bag 25 kg (14-16%)
Consumption	~ 19,7 kg/m ² per cm Component B SikaEmaco® A 400 (eventually): minimum dosage 0.25% on powder weight
Layer thickness	Min. 10 mm - max. 50 mm
Pot Life	~ 80 min. a +20°C

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. Technical data according to UNI EN 1504-3 are obtained with the average water dosage, without the use of SikaEmaco® A 400

IMPORTANT CONSIDERATIONS

- Do not apply to gypsum substrates, painted substrates, friable substrates, mixed substrates without correct preparation. For more information consult Sika technical service.
- Do not add water beyond the recommended dosage.
- Do not add fresh mortar to the mixture after the curing process has begun.
- Protect newly applied material from dehydration, freezing and rain.
- SikaEmaco® S 485 FR can be applied when the ambient temperature is between +5 and +35°C. When the temperature is +5 / +10°C the development of mechanical strengths is slower, it is recommended to store the bags of SikaEmaco® S 485 FR in a heated environment, use heated mixing water (+30/+50°C), saturate the substrate with warm water, and apply the mortar in the middle hours of the morning. It is recommended not to apply at a temperature below +5°C, as, moreover. When the temperature is +30/+40°C, it is recommended to store the bags of SikaEmaco® S 485 FR in a cool place, use mixing water at a low temperature, and apply the mortar in the least hot hours.
- To increase the overall durability of restoration work, it is always recommended to apply an elastic protective system over the entire structure that is capable of achieving continuity of the exterior surfaces. Protection of the system is achieved with the application of Sikagard® protectives.

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.

APPLICATION INSTRUCTIONS

SUBSTRATE PREPARATION

Substrate

The thickness to be removed should be determined by the designer based on preliminary investigations to identify the state of preservation of the structure. Removal of inconsistent or contaminated concrete must be done by hydrodemolition or by mechanical chiseling performed with light air-powered breakers for a thickness determined by the designer on the basis of preliminary investigations aimed at identifying the state of preservation of the structure, taking all necessary precautions to avoid damage to the structures. The surface of the supporting concrete must be mac-

roscopically rough (roughness of about 5 mm in depth) in order to achieve maximum adhesion between the support and the restoration material. Macro-roughness is essential for the mechanism of counteracted expansion, which is the basis for the operation of expansive mixes in air, to be realized.

Reinforced steel bars

Inconsistent or contaminated concrete encasing reinforcing bars will have to be removed. Any exposed reinforcing bars will have to be cleaned of rust by mechanical brushing or sandblasting; where removal of degraded or contaminated concrete has been carried out by hydrodemolition this will generally also ensure suitable cleaning of the reinforcing bars.

Cleaning and saturation of the supporting concrete

Cleaning and saturation of the supporting concrete should be done with pressurized water (80 ÷ 100 atm and warm water in the winter period). This operation is essential to prevent the concrete substrate from drawing water from the mix. Inaccurate saturation results in loss of adhesion and cracking of the applied material. The use of pressurized water also ensures effective cleaning of surfaces to remove dust and small inconsistent parts, which may be present after concrete scarification. Cleaning and saturation of surfaces are essential to achieve high values of adhesion between substrate and applied material.

Placement of additional structural reinforcement

In the event that it is necessary for structural reasons to add reinforcement, the thickness of cover reinforcement in accordance with current regulations must still be guaranteed.

Formwork

SikaEmaco® S 485 FR may be applied by pouring. Formwork should be of suitable material and strength, sufficiently watertight to prevent water subtraction from the mix, firmly anchored, opposed and sealed to resist the pressure exerted by the mortar and prevent loss of material. Wood formwork must be saturated before pouring. Especially for "fair-faced" applications, it is recommended to apply release agents from the Sika line to the formwork.

MIXING

Mixing should be carried out in a concrete mixer or in the mixer of the plastering machine and protracted until a plastic, homogeneous and lump-free mixture is obtained; the duration of mixing depends on the effectiveness of the mixer used and should in no case be less than 6-7 minutes. A drill with a whisk can be used to mix small quantities. On the other hand, mixing by hand is not recommended. Each 25-kg bag of SikaEmaco® S 485 FR should be mixed with the amount of water given in the technical parameters. The use of component B (SikaEmaco® A 400, an additive that makes it possible to reduce shrinkage in the plastic and hygrometric phases by improving curing), with a minimum dosage of 0.25 percent, is indicated above all in the case of restorations with extensive surfaces exposed to the air and in the absence of

proper curing. It also allows greater maintenance of workability in summer weather. In the case of multi-layer applications, fresh over cured, SikaEmaco® A 400 should be added only in the final layer and not in the lower layers. Any additions of aggregate should be checked in advance on site with test mixes to test its performance

APPLICATION

SikaEmaco® S 485 FR should be applied to macroscopically roughened, consistent, clean and water-saturated surfaces. At the time of application, the substrate should be saturated to a dry surface and any free water that may be present should be removed.

SikaEmaco® S 485 FR should be set by pouring to a fluid or superfluid consistency. For applications at reduced thicknesses and/or in the presence of reinforcement, the utmost attention should be paid to the mixing and setting stage, consulting our Technical Service if necessary. It is always necessary to ensure perfect compaction of the material by providing slight vibration if necessary. In the case of pavements, the anti-slip finish (in the cases of, for example, road exits, industrial pavements, etc.) can be achieved by passing the material with a steel-bristle broom after pouring. Mechanized application can be done with screw or piston pumps, not continuous cycle, from specialized manufacturers (such as Turbosol, PFT, Putzmaister, Bunker, Imer, etc.). Please consult our Technical Service for further details.

CURING TREATMENT

It is always advisable to carry out proper wet curing of surfaces exposed to air. In the case of particularly adverse conditions marked by reduced relative humidity and high ventilation, both in hot climates but especially in cold climates, in the absence of wet curing, the use of suitable protections or anti-evaporating surface treatments from the Sika range is recommended

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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