BUILDING TRUST

PRODUCT DATA SHEET

Sika MonoTop®-412 Eco

R4 CONCRETE REPAIR MORTAR WITH REDUCED CARBON FOOTPRINT

DESCRIPTION

Sika MonoTop®-412 Eco is a 1-component, fibre reinforced, low shrinkage repair mortar containing recycled waste materials to reduce the carbon footprint, meeting the requirement of class R4 of EN 1504-3.

USES

- Suitable for restoration work (Principle 3, method 3.1 & 3.3 of EN 1504-9). Repair of spalling and damaged concrete in buildings, bridges, infrastructure and superstructure works.
- Suitable for structural strengthening (Principle 4, method 4.4 of EN 1504-9). Increasing the bearing capacity of the concrete structure by adding mortar.
- Suitable for preserving or restoring passivity (Principle 7, method 7.1. and 7.2 of EN 1504-9). Increasing cover with additional mortar and replacing contaminated or carbonated concrete.

CHARACTERISTICS / ADVANTAGES

- Reduced carbon footprint
- Class R4 of EN 1504-3
- Sulphate resistant
- For hand and machine application
- Easy to apply
- Application up to 120 mm in 1 layer
- Very low shrinkage behaviour
- Does not require a bonding primer even when manually applied
- Low permeability
- A1 fire rating

SUSTAINABILITY

- Covered by the Model EPD "Modified mineral mortars, group 1" (Declaration number: EPD-FEI-20160017-IBG1-EN)
- LEED v4 MR credit 2 option 1 Building product disclosure and optimization, Environmental product declaration

APPROVALS / STANDARDS

- Test report measurement of electrical resistivity, Hochschule für Technik Rapperswil, Switzerland, September 29, 2016

PRODUCT INFORMATION

Chemical base	Sulphate resistant cement and replacement cement, selected aggregates and additives
Packaging	25 kg bags
Appearance / Colour	Grey powder
Shelf life	12 months
Storage conditions	Store properly in undamaged original sealed packaging, in dry cool conditions.
Density	Fresh mortar density: ~2.1 kg/l

Maximum Grain Size	D_{max}: 2 mm	
Soluble Chloride Ion Content	≤ 0.05%	(EN 1015-17)

TECHNICAL INFORMATION

Compressive Strength	Class R4			
	1 day	**7 days**	**28 days**	(EN 12190)
	~19 MPa	~43 MPa	~56 MPa	
Modulus of Elasticity in Compression	≥ 20 GPa			(EN 13412)
Tensile Strength in Flexure	**1 day**	**7 days**	**28 days**	(EN 12190)
	~4.4 MPa	~7.0 MPa	~8.0 MPa	
Tensile Adhesion Strength	≥ 2.0 MPa			(EN 1542)
Shrinkage	~500 µm/m (20 °C / 65 % relative humidity at 28 days)			(EN 12617-4)
Restrained Shrinkage / Expansion	≥ 2.0 MPa			(EN 12617-4)
Thermal Compatibility	≥ 2.0 MPa (Part 1 - Freeze-Thaw)			(EN 13687-1)
Coefficient of Thermal Expansion	~16 × 10^{-6} 1/K			(EN 1770)
Reaction to Fire	Euro class A1			(EN 1504-3 cl. 5.5)
Capillary Absorption	≤ 0.5 kg/(m^2·$h^{0.5}$)			(EN 13057)
Chloride Ion Diffusion Resistance	Low - < 2000 coulombs			(ASTM C 1202)
Carbonation Resistance	d_k ≤ control concrete MC(0.45)			(EN 13295)
Electrical Resistivity	< 100 kΩ·cm			(EN 12696)

SYSTEMS

System Structure

Sika MonoTop®-412 Eco is part of the range of Sika mortars complying with the relevant part of European Standard EN 1504 and comprising of:

Bonding Primer/ Reinforcement Corrosion Protection	
Sika MonoTop®-910 N	Normal use
SikaTop® Armatec®-110 EpoCem®	Demanding requirements
Repair Mortar	
Sika MonoTop®-412 Eco	Class R4 concrete repair hand and machine applied with low carbon footprint
Levelling Mortar	
Sika MonoTop®-910 N	Normal use
Sikagard®-720 EpoCem®	Demanding requirements

APPLICATION INFORMATION

Mixing Ratio	3.75 to 3.9 litres of water for 25 kg powder
Consumption	This depends on the substrate roughness and thickness of layer applied. As a guide, ~19 kg of powder per cm thick per m^2
Yield	25 kg of powder yields approximately 13.7 litres of mortar
Layer Thickness	6 mm minimum / 120 mm maximum For vertical patch repair applications, the maximum layer thickness recommended is 85 mm.
Ambient Air Temperature	+5 °C minimum / +30 °C maximum

Substrate Temperature	+5 °C minimum / +30 °C maximum
Pot Life	~60 minutes at +20 °C

APPLICATION INSTRUCTIONS

SUBSTRATE QUALITY / PRE-TREATMENT

Concrete
The concrete shall be thoroughly clean, free from dust, loose material, surface contamination and materials which reduce bond or prevent suction or wetting by repair materials. De-laminated, weak, damaged and deteriorated concrete and where necessary sound concrete shall be removed by suitable means.
Steel reinforcement
Rust, scale, mortar, concrete, dust and other loose and deleterious material which reduces bond or contributes to corrosion shall be removed. Surfaces shall be prepared using abrasive blast cleaning techniques or high pressure water-blasting to Sa 2 (ISO 8501-1). Reference shall be made to EN 1504-10 for specific requirements.

MIXING

Sika MonoTop®-412 Eco can be mixed with a low speed (<500 rpm) hand drill mixer or, for machine application, using a force action mixer for 2 to 3 bags or more at once depending on the type and size of mixer. In small quantity, Sika MonoTop®-412 Eco can also be manually mixed.
Pour the recommended water in a suitable mixing container. While stirring slowly, add the powder to the water and mix thoroughly at least for 3 minutes adding additional water during the mixing time if necessary to the maximum specified amount and adjust to the required consistency.

APPLICATION

Bonding Primer
On a well prepared and roughened substrate a bonding primer is generally not required for this product. When a bonding primer is required, refer to the **System Information** above for compatible Sika products and refer to the relevant Product Data Sheet for instructions. A small amount of Sika MonoTop®-412 Eco can also be mixed slightly wetter than normal and used as a scratch coat to promote adhesion of the repair mortar to the substrate. Any bonding primer shall be applied on a pre-wet substrate and subsequent application of the repair mortar shall be applied wet on wet with the bonding primer.
Reinforcement Corrosion Protection
Where a reinforcement coating is required the application of a repair mortar shall be applied wet on dry with the reinforcement corrosion protection. Refer to the **System Information** above for compatible Sika products and refer to the relevant Product Data Sheet for more detailed information about the reinforcement corrosion product.
Sika MonoTop®-412 Eco can be applied either manually using traditional techniques or mechanically using wet spray equipment. Thoroughly pre-wet the prepared substrate a recommended 2 hours before application. Keep the surface wet and do not allow drying. Before application remove excess water e.g. with a clean sponge. The surface shall appear dark matt appearance without glistening and surface pores and pits shall not contain water.
When manually applying first make a scratch coat by firmly scrapping the repair mortar over the substrate surface to form a thin layer and fill any pores or pits in the surface. Ensure the whole surface to be repaired is covered by the scratch coat. Build up layers from bottom to top by pressing mortar well into the repair area. The surface can be finished according to the requirements using a float while wet or with a relevant rough-cast tool as soon as the mortar has started to stiffen.

CURING TREATMENT

Protect the fresh mortar immediately from premature drying using an appropriate curing method e.g. curing compound, moist geotextile membrane, polythene sheet, etc.

CLEANING OF TOOLS

Clean all tools and application equipment with water immediately after use. Hardened material can only be mechanically removed.

LIMITATIONS

- Refer to the Method Statement for Concrete Repair using Sika MonoTop® system for more information regarding substrate preparation or refer to the recommendations provided in EN 1504-10
- Avoid application in direct sun and /or strong wind
- Do not add water over recommended dosage
- Apply only to sound, prepared substrate
- Do not add additional water during the surface finishing as this will cause discolouration and cracking
- Protect freshly applied material from freezing

BASIS OF PRODUCT DATA

All technical data stated in this 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 declared data and recommended uses for this product may vary from country to country. Please consult the local Product Data Sheet for the exact product data and uses.

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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