BUILDING TRUST

PRODUCT DATA SHEET

Sika MonoTop®-4100 Protect

Cementitious R4 mortar for repairing protecting and waterproofing concrete structures

PRODUCT DESCRIPTION

Sika MonoTop®-4100 Protect is a 1-part, cementitious, fibre reinforced, low shrinkage concrete repair mortar. It is suitable to repair, protect and waterproof concrete structures.

USES

Sika MonoTop®-4100 Protect may only be used by experienced professionals.
Repairs, protects and waterproofs all types of reinforced concrete structures and components for:

- Buildings
- Civil engineering structures
- Marine structures
- Dams
- Structures requiring a Class R4, R3, R2, R1 mortar
- Interior and exterior use

CHARACTERISTICS / ADVANTAGES

- Layer thickness 4–60 mm.
- Sulphate resistant
- Hand and machine application (wet spray technique)
- Easy to apply
- Very low shrinkage behaviour
- Does not require a bonding primer
- Low permeability
- Suitable for contact with drinking water
- A1 fire rating
- Class R4 of EN 1504-3
- Restoration work (Principle 3, method 3.1 and 3.3 of EN 1504-9). Repair of spalling and damaged concrete in infrastructure and superstructure works.
- Structural strengthening (Principle 4, method 4.4 pf EN 1504-9). Increasing the bearing capacity of the concrete structure by adding mortar.
- 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
- Moisture control (Principle 2, method 2.3 of EN 1504-9)- Coating
- Increasing resistivity (Principle 8, method 8.3 of EN 1504-9)- Coating

APPROVALS / STANDARDS

- CE marking and Declaration of Performance to EN 1504-2 - Surface protection systems for concrete
- CE marking and Declaration of Performance to EN 1504-3 - Concrete repair product for structural repair
- CE marking and Declaration of Performance to EN 1504-7 - Reinforcement corrosion protection
- Migration Analysis UNE EN 14944-3, Sika MonoTop®-4100 Protect, OtecRiera, Test Report No. 1004125495

PRODUCT INFORMATION

Product Declaration	Complies with the general requirements of EN 1504-3: Class R4 Complies with the general requirements of EN 1504-2: Surface protection systems for concrete Complies with the general requirements of EN 1504-7: Reinforcement corrosion protection
Chemical Base	Sulphate resistant cement, fibres, additives and selected aggregates
Packaging	25 kg bag
Shelf Life	12 months from date of production
Storage Conditions	The product must be stored in original, unopened and undamaged packaging in dry conditions at temperatures between +5 °C and +35 °C. Always refer to packaging.
Appearance / Colour	Grey powder
Maximum Grain Size	D_{max}: 2.0 mm
Soluble Chloride Ion Content	≤ 0.05 % (EN 1015-17)

TECHNICAL INFORMATION

Compressive Strength (EN 12190)

Time	Strength
1 day	~15 MPa
7 days	~40 MPa
28 days	~50 MPa

Modulus of Elasticity in Compression	≥ 20 GPa	(EN 13412)

Flexural Strength (EN 12190)

Time	Strength
1 day	~4 MPa
7 days	~5 MPa
28 days	~6 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)
Capillary Absorption	≤ 0.1 $kg \cdot m^{-2} \cdot h^{-0.5}$	(EN 1062-3)
Water Penetration under Pressure	~ 10 mm	(EN 12390-8)
Water Penetration under Negative Pressure	No humidity in the surface	
Permeability to Water Vapour	S_D= 1 m, Class I	(EN ISO 7783)
Carbonation Resistance	dk ≤ control concrete MC (0.45)	(EN 13295)

Reaction to Fire	Euro class A1	(EN 1504-3 cl. 5.5)

APPLICATION INFORMATION

Mixing Ratio	4.40 to 4.5 litres of water for 25 kg bag
Fresh mortar density	~2.1 kg/l
Consumption	~1.8 kg/m²/mm Consumption depends on the roughness and absorbency of the substrate. This figure is theoretical and does not allow for any additional material due to surface porosity, surface profile, variations in level or wastage etc.
Yield	25 kg of powder yields ~14 litres of mortar
Layer Thickness	4 mm min. / 60 mm max.
Ambient Air Temperature	+5 °C minimum / +30 °C maximum
Substrate Temperature	+5 °C minimum / +30 °C maximum
Pot Life	~45 minutes at +20 °C

VALUE BASE

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

FURTHER DOCUMENTS

- Site Handbook 'Repair of Concrete Structures: Patch Repair and Spray Applications
- Sika Method Statement: Concrete Repair Using Sika MonoTop® System
- Recommendations provided in EN 1504-10

LIMITATIONS

- Avoid application in direct sun and/or strong winds.
- Do not add water over recommended dosage.
- Apply only to stable, prepared substrates.
- Do not add additional water during the surface finishing as this can cause discolouration and cracking.
- Protect freshly applied material from freezing.
- Do not feather edge

ECOLOGY, HEALTH AND SAFETY

Local safety regulations must be observed and it advisable to wear PPI when working with this product with particular attention paid to cutting and handling. Transportation Class: The product is not classified as hazardous good for transport. Disposal: The material is recyclable. Disposal must be according to local regulations. Please contact your local Sika sales organisation for more information.

APPLICATION INSTRUCTIONS

EQUIPMENT

Select the most appropriate equipment required for the project:

Substrate preparation

- Mechanical hand held tools
- High / ultra-high pressure water blasting equipment

Steel reinforcement

- Abrasive blast cleaning equipment
- High pressure water blasting equipment

Mixing

- Small quantities - low speed electric single or double paddle mixer (< 500 rpm). Mixing Container.
- Large quantities or machine application - suitable forced action mixer

Application

- Hand applied – Plasterers hawk, trowel
- Wet Spray - All in one mixing and spraying machine or separate spraying machine and all associated ancillary equipment to suit application volumes

Finishing

- Trowel (PVC or wooden),sponge

Also refer to Site Handbook 'Repair of Concrete Structures – Patch Repair and Spray Applications'

SUBSTRATE QUALITY / PRE-TREATMENT

Concrete

The substrate must be thoroughly clean, free from dust, loose material, surface contamination and material which reduce adhesion or prevent suction or wetting by repair materials. De-laminated, weak, damaged and deteriorated substrate and where necessary sound substrate must be removed by suitable preparation equipment. Ensure sufficient concrete is removed from around corroded reinforcement to allow cleaning, corrosion protection coating (where required) and compaction of the repair material. Repair surface areas must be prepared to provide simple square or rectangular layouts to avoid shrinkage stress concentrations and cracking while the repair material cures. This can also avoid structural stress concentrations from thermal movement and loading during the service life.

Steel reinforcement

Rust, scale, mortar, concrete, dust and other loose and deleterious material which reduces bond or contributes to corrosion must be removed. Surfaces must be

prepared to Sa 2 (ISO 8501-1) using suitable preparation equipment.

MIXING

Hand applied and wet spray application
Pour the minimum recommended clean water quantity into a suitable mixing container / equipment. While stirring slowly, add the powder to the water and mix thoroughly for at least for 3 minutes adding additional water if necessary to the maximum specified amount and adjust to the required consistency to achieve a smooth consistent mix. The consistency must be checked after every mix.

APPLICATION

Strictly follow installation procedures as defined in method statements, application manuals and working instructions which must always be adjusted to the actual site conditions.

Reinforcement corrosion protection coating
Where a reinforcement coating is required, apply to the whole exposed circumference Sika MonoTop®-910 S or SikaTop® Armatec® 110 EpoCem® (Refer to Product Data Sheet(s)).

Bonding primer
On a well prepared and roughened substrate or for a sprayed application, a bonding primer is generally not required. When a bonding primer is required to achieve the required adhesion values, use Sika MonoTop®-910 S or SikaTop® Armatec® 110 EpoCem® (Refer to respective Product Data Sheet(s)). Apply repair mortar onto bonding primer “wet on wet”.

Repair Mortar
Hand application
Thoroughly pre-wet the prepared substrate (2 hours recommended) before application. Keep the surface wet and do not allow to dry. Before application remove excess water, e.g. with a clean sponge. The surface must appear a dark matt appearance without shining and surface pores and cavities must not contain water.
When manually applying by hand, first make a scratch coat by firmly scraping the repair mortar over the substrate surface to form a thin layer and fill any pores or cavities in the surface. Ensure the whole surface to be repaired is covered by the scratch coat. The repair mortar must be applied onto the wet scratch coat between the minimum and maximum layer thicknesses without the formation of voids. Where layers are to be built up, to prevent sagging or slumping, each layer should be allowed to harden before applying subsequent layers “wet on wet”.

Sprayed application - Wet Spray
The wet mixed Sika MonoTop®-4100 Protect must be placed into the spraying equipment and applied onto the pre-wetted substrate (pre-wet procedure as hand application) between the minimum and maximum layer thicknesses without the formation of voids. Where layers are to be built up, to prevent sagging or slumping, each layer must be allowed to harden before applying subsequent layers “wet on wet”.

Surface finishing
Finishing for all types of application must be carried out to the required surface texture using suitable finishing tools as soon as the mortar has started to harden.

Cold weather working
Consider storing bags in a warm environment and using warm water to assist with achieving strength gain and maintaining physical properties.

Hot weather working
Consider storing bags in a cool environment and using cold water to assist with controlling the exothermic reaction to reduce cracking and maintaining physical properties.

CURING TREATMENT

Protect fresh mortar immediately from premature drying using an appropriate curing method, e.g. curing compound, moist geotextile membrane, polythene sheet, etc.
Curing compounds must not be used when they could adversely affect subsequently applied products and systems.

CLEANING OF TOOLS

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

LOCAL RESTRICTIONS

Note that as a result of specific local regulations the declared data and recommended uses for this product may vary from country to country. Consult the local Product Data Sheet for the exact product data and uses.

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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