

## PRODUCT DATA SHEET

# Sika MonoTop®-4200 Multi Use

One-Part, Class R4, Multi-Purpose, Cementitious Concrete Repair Mortar

### PRODUCT DESCRIPTION

Sika MonoTop®-4200 Multi Use is a cementitious, one-part, Class R4, multi-consistency (controlled by water addition), hand applied, pourable or machine applied, structural, sulphate resistant concrete repair mortar with high initial and final strengths. Suitable for repairing all types of reinforced concrete buildings, civil engineering and marine structures in all orientations (i.e. horizontal, vertical and overhead). Layer thickness up to 80 mm (pourable up to 60 mm).

### USES

Sika MonoTop®-4200 Multi Use may only be used by experienced professionals.

- Repair of spalling and damaged concrete in infrastructure and superstructure works. Restoration work (Principle 3, method 3.1, 3.2 and 3.3 of EN 1504-9).
- Increasing the bearing capacity of the concrete structure by adding mortar. Structural strengthening (Principle 4, method 4.4 of EN 1504-9).
- Increasing cover with additional mortar and replacing contaminated or carbonated concrete. Preserving or restoring passivity (Principle 7, method 7.1 and 7.2 of EN 1504-9).
- Repairs to reinforced concrete structures requiring a Class R4, R3, R2, R1 mortar.
- Horizontal, vertical and overhead repairs.

### CHARACTERISTICS / ADVANTAGES

- High early and final compressive strengths.
- Sulphate resistant.
- Good adhesion to concrete, mortar, stone and brick substrates.
- Good abrasion resistance.
- Very low shrinkage.
- Good surface finishing.
- Ready to mix with water.
- Excellent workability.
- Applied manually or mechanically (wet spray).
- High pH passivates steel reinforcement.
- Contains very low chlorides and is devoid of other corrosion promoting additives.
- Can be used for all orientations, removing the need for multiple products.

### ENVIRONMENTAL INFORMATION

- Conformity with LEED v4 MRc 2 (Option 1): Building Product Disclosure and Optimization - Environmental Product Declarations.
- Conformity with LEED v4 MRc 3 (Option 2): Building Product Disclosure and Optimization - Sourcing of Raw Materials.
- Conformity with LEED v4 MRc 4 (Option 2): Building Product Disclosure and Optimization - Material Ingredients.

### APPROVALS / STANDARDS

CE Marking and Declaration of Performance to EN 1504-3 - Concrete repair product for structural repair.

### PRODUCT INFORMATION

<b>Product Declaration</b>	Complies with the general requirements of EN 1504-3: Class R4.
<b>Chemical Base</b>	Sulphate resistant cement, fibres, additives and selected aggregates.
<b>Packaging</b>	25 kg bag

<b>Shelf Life</b>	12 months from the date of production				
<b>Storage Conditions</b>	Product must be stored in original, unopened and undamaged sealed packaging in dry conditions at temperatures between +5 °C and +35 °C. Always refer to packaging.				
<b>Appearance / Colour</b>	Grey powder				
<b>Maximum Grain Size</b>	D <sub>max</sub> : 2.0 mm				
<b>Soluble Chloride Ion Content</b>	≤0.05 %			(EN 1015-17)	
<b>Compressive Strength</b>		<b>1 Day</b>	<b>7 Days</b>	<b>28 Days</b>	(EN 12190-3)
	Hand Applied and Wet Spray	~30 N/mm <sup>2</sup>	~50 N/mm <sup>2</sup>	~60 N/mm <sup>2</sup>	
	Pourable	~25 N/mm <sup>2</sup>	~45 N/mm <sup>2</sup>	~50 N/mm <sup>2</sup>	
<b>Modulus of Elasticity in Compression</b>	≥20,000 N/mm <sup>2</sup>			(EN 13412)	
<b>Flexural Strength</b>		<b>1 Day</b>	<b>7 Days</b>	<b>28 Days</b>	(EN 12190)
	Hand Applied and Wet Spray	~7 N/mm <sup>2</sup>	~10 N/mm <sup>2</sup>	~11 N/mm <sup>2</sup>	
	Pourable	~5 N/mm <sup>2</sup>	~7 N/mm <sup>2</sup>	~9 N/mm <sup>2</sup>	
<b>Tensile adhesion strength</b>	≥2.0 N/mm <sup>2</sup>			(EN 1542)	
<b>Restrained Shrinkage / Expansion</b>	≥2.0 N/mm <sup>2</sup>			(EN 12617-4)	
<b>Capillary Absorption</b>	≤0.5 kg·m <sup>-2</sup> ·h <sup>-0.5</sup>			(EN 13057)	
<b>Chloride Ion Ingress</b>	<0.05 %			(EN 1015)	
<b>Carbonation Resistance</b>	Pass: dk ≤ control concrete MC (0.45)			(EN 13295)	
<b>Reaction to Fire</b>	EuroClass A1			(EN 13501-1)	

## SYSTEM INFORMATION

<b>System Structure</b>	<b>Reinforcement Corrosion Protection / Bonding Primer</b>	
	Sika® MonoTop®-1010	Normal Use
	SikaTop® Armatec®-110 EpoCem®	Demanding Requirements
	<b>Concrete Repair Mortar</b>	
	Sika MonoTop®-4200 Multi Use	
	<b>Smoothing Coat / Levelling Mortar</b>	
	Sika® MonoTop®-3020	Normal Use
	Sikagard®-720 EpoCem®	Demanding Requirements

## APPLICATION INFORMATION

<b>Mixing Ratio</b>	Hand applied and wet spray: 3.5 to 3.7 litres of water for 25 kg powder. Pourable: 4.4 to 4.6 litres of water for 25 kg powder.
<b>Fresh mortar density</b>	~2.1 kg/l
<b>Consumption</b>	~1.8 kg/m <sup>2</sup> /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.
<b>Yield</b>	Hand applied and wet spray: 25 kg of powder yields ~13.5 litres of mortar. Pourable: 25 kg of powder yields ~14 litres of mortar.

Layer Thickness	Consistency	Minimum Layer Thickness	Maximum Layer Thickness
	Hand applied and wet spray	5 mm	80 mm
	Pourable	5 mm	60 mm
<b>Consistency</b>	Hand applied and wet spray	w/c: ~14 %	
	Pourable	w/c: ~17.5 %	
<b>Ambient Air Temperature</b>	+5 °C minimum / +30 °C maximum		
<b>Substrate Temperature</b>	+5 °C minimum / +30 °C maximum		
<b>Pot Life</b>	~30 to 45 minutes at +20 °C		

## VALUE BASE

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.

## USES

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

## FURTHER DOCUMENTS

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

## ECOLOGY, HEALTH AND SAFETY

User must read the most recent corresponding Safety Data Sheets (SDS) before using any products. The SDS provides information and advice on the safe handling, storage and disposal of chemical products and contains physical, ecological, toxicological and other safety-related data.

## APPLICATION INSTRUCTIONS

### EQUIPMENT

Select the most appropriate equipment required for the project:

#### Substrate Preparation

- Mechanical handheld tools
- High / ultra-high pressure water blasting system

#### Steel Reinforcement

- Abrasive blast cleaning system
- High pressure water blasting system

#### Mixing

- Small quantities - low speed (<500 rpm) electric hand drill mixer and 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
- Pourable: Shuttering / formwork

#### Finishing

- Trowel (PVC or wooden) and sponge
- Also refer to Site Handbook 'Repair of Concrete Structures – Patch Repair and Spray Applications'

## SUBSTRATE QUALITY

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

### Shuttering / Formwork

Where formwork is to be used for pourable repairs, all formwork must be of adequate strength, treated with release agent and sealed to prevent leakage. Ensure formwork includes outlets for extraction of the pre-soaking water.

## MIXING

### Hand Applied, Pourable or Wet Spray Application

Pour the minimum recommended clean water quantity into a suitable mixing container. While stirring slowly, add the powder to the water and mix thoroughly for at least for 3 minutes adding additional water if necessary up 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. Refer to the Method Statement for Concrete Repair using Sika® MonoTop® Systems for more information, or refer to recommendations provided in EN 1504-10.

## 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®-1010 or SikaTop® Armatec®-110 EpoCem® (refer to the 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®-1010 or SikaTop® Armatec®-110 EpoCem® (refer to respective Product Data Sheet(s)). Alternatively, a slurry made of Sika MonoTop®-4200 Multi Use can be used as bonding primer. Application must be done with a hard brush. Apply repair mortar onto bonding primer 'wet on wet'.

### Pourable Repair - Substrate Pre-soaking

The concrete substrate must be pre-soaked with clean potable water continuously for 2 to 6 hours before application of the repair mortar. The surface must not be allowed to dry within this time. Before application of the repair mortar, all water must be removed from within formwork, cavities or pockets and the final surface must achieve a dark matt appearance (saturated surface dry) without glistening.

### Repair Mortar

#### Hand Application

Thoroughly pre-wet the prepared substrate (at least 2 hours is 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 stiffen before applying subsequent layers 'wet on wet'.

### Sprayed Application - Wet Spray

The wet mixed Sika MonoTop®-4200 Multi Use must be placed into the spraying equipment and applied onto the pre-wetted substrate (pre-wet procedure as per 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 should be allowed to stiffen before applying subsequent layers 'wet on wet'.

### Pourable Application

Pour the mixed Sika MonoTop®-4200 Multi Use into the prepared repair area directly, as soon as it has been mixed. Ensure continuous mortar flow during the complete pouring operation to avoid trapping air.

### 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 stiffen.

### 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

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.

## 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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