BUILDING TRUST

PRODUCT DATA SHEET

# Sika MonoTop®-4200 Multi Flow

CEMENTITIOUS MULTI-PURPOSE APPLIED CONCRETE REPAIR MORTAR

## DESCRIPTION

Sika MonoTop®-4200 Multi Flow is a cementitious,1-part, hand, flowable 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. Layer thickness up to 80 mm. Flowable up to 60 mm.

## USES

Sika MonoTop®-4200 Multi Flow 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 pf 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
- Does not contain chlorides or other corrosion promoting additives

## SUSTAINABILITY

- 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 / CERTIFICATES

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

## PRODUCT INFORMATION

| | | |
|---|---|---|
| **Composition** | Sulphate resistant cement, fibres, additives and selected aggregates. | |
| **Packaging** | 25 kg bag | |
| **Appearance / Colour** | Grey powder | |
| **Shelf life** | 12 months from date of production | |
| **Storage conditions** | 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 | |
| **Maximum Grain Size** | $D_{max}$: 2,0 mm | |
| **Soluble Chloride Ion Content** | ≤ 0,05 % | (EN 1015-17) |
| **Product Declaration** | Complies with the general requirements of EN 1504-3: Class R4 | |

## TECHNICAL INFORMATION

**Compressive Strength** (EN 12190-3)

| | 1 day | 7 days | 28 days |
|---|---|---|---|
| Hand and wet spray | ~30 Mpa | ~50 Mpa | ~60 MPa |
| Flowable | ~25 Mpa | ~45 Mpa | ~50 MPa |

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

**Tensile Strength in Flexure** (EN 12190)

| | 1 day | 7 days | 28 days |
|---|---|---|---|
| Hand and wet spray | ~7 Mpa | ~10 Mpa | ~11 MPa |
| Flowable | ~5 Mpa | ~7 Mpa | ~9 MPa |

| | | |
|---|---|---|
| **Tensile Adhesion Strength** | ≥ 2,0 MPa | (EN 1542) |
| **Restrained Shrinkage / Expansion** | ≥ 2,0 MPa | (EN 12617-4) |
| **Reaction to Fire** | Class A1 | (EN 13501-1) |
| **Capillary Absorption** | ≤ 0,5 $kg \cdot m^{-2} \cdot h^{-0,5}$ | (EN 13057) |
| **Chloride Ion Ingress** | < 0,05 % | (EN 1015) |
| **Carbonation Resistance** | Pass dk ≤ control concrete MC (0,45) | (EN 13295) |

## SYSTEMS

**System Structure**

| **Reinforcement Corrosion Protection/ Bonding Primer** | |
|---|---|
| Sika MonoTop®-910 N<br>Sika MonoTop®-910 S<br>Sika MonoTop®-910 Eco | Normal Use |
| SikaTop® Armatec®-110 EpoCem® | Demanding requirements |

**Concrete Repair Mortar**
- Sika MonoTop®-4200 Multi Flow

**Smoothing Coat / Levelling Mortar**
- Sika MonoTop®-620
- Sika MonoTop®-723 N

## APPLICATION INFORMATION

| | | |
|---|---|---|
| **Mixing Ratio** | Hand and wet spray: 3,5–3,7 L of water for 25 kg powder.<br>Flowable: 4,4–4.6 L of water for 25 kg powder. | |
| **Fresh Mortar Density** | ~2,1 kg/l | |
| **Consumption** | ~2,1 kg/m²/mm<br>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** | Hand and wet spray: 25 kg of powder yields ~13,5 L of mortar.<br>Flowable: 25 kg of powder yields ~14 L of mortar. | |
| **Layer Thickness** | Hand and wet spray | 5 mm min. / 80 mm max. |
| | Flowable | 5 mm min. / 60 mm max. |
| **Consistency** | Hand and wet spray | w/c: ~14 % |
| | Flowable | w/c: ~17,5 % |
| **Ambient Air Temperature** | +5 °C min. / +30 °C max. | |
| **Substrate Temperature** | +5 °C min. / +30 °C max. | |
| **Pot Life** | ~30–45 minutes at +20 °C | |

## APPLICATION INSTRUCTIONS

### EQUIPMENT

Select the most appropriate equipment required for the project:

**Substrate preparation**
- Mechanical hand held 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. 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
- Flowable – Shuttering / formwork

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

**Shuttering / Formwork**
Where formwork is to be used for flowable 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, flowable or wet spray application**
Pour the minimum recommended clean water quantity in 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 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®-910 N/ S/ Eco 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 N / S / Eco or SikaTop® Armatec®-110 EpoCem® (Refer to respective Product Data Sheets). Also a slurry made of Sika MonoTop®-4200 Multi Flow can be used as bonding primer. Application must be done with a hard brush. Apply repair mortar onto bonding primer “wet on wet”.

**Flowable repair substrate pre-soaking**

The concrete substrate must be pre-soaked with clean potable water continuously for 2–6 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 (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 stiffen before applying subsequent layers “wet on wet”.

**Sprayed application - Wet Spray**

The wet mixed Sika MonoTop®-4200 Multi Flow 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 should be allowed to stiffen before applying subsequent layers “wet on wet”.

**Flowable application**
Pour the mixed $v (name) 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 EQUIPMENT

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

## FURTHER INFORMATION

- 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

## IMPORTANT CONSIDERATIONS

- Avoid application in direct sun and/or strong winds.
- Do not add water over recommended dosage.
- Apply only to sound, prepared substrates.
- Do not add additional water during the surface finishing as this can 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

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.

## 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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