BUILDING TRUST

PRODUCT DATA SHEET

Sika MonoTop®-4012 BE

High performing, R4 concrete repair mortar with sustainability benefits

PRODUCT DESCRIPTION

Sika MonoTop®-4012 BE is a one-part, fibre-reinforced, low shrinkage, cementitious repair mortar. It contains recycled supplementary cementitious materials and can therefore contribute to reducing the carbon footprint of the application.

USES

Sika MonoTop®-4012 BE is used to repair all types of reinforced concrete structures and components for:
- Buildings
- Civil engineering structures
- Dams
- Marine structures
- Domestic and municipal sewage treatment plants including wastewater

Sika MonoTop®-4012 BE is used for:
- 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.
- Concrete exposure classes XC 1-4, XF 1-4, XD 1-3, XS 1-3 and XA 1-3 as described in EN 206.

Sika MonoTop®-4012 BE is used for interior and exterior applications.

Please note:
- The Product may only be used by experienced professionals.

CHARACTERISTICS / ADVANTAGES

- Uses recycled raw materials.
- Layer thickness 6 to 120 mm.
- Sulphate-resistant.
- Hand and machine application (wet spray technique).
- Easy to apply.
- Very low shrinkage.
- Dust-reduced.
- Good resistance to sea water.
- Does not require a bonding primer.
- Low permeability.
- Euroclass A1 fire rating.
- Class R4 of EN 1504-3.

ENVIRONMENTAL INFORMATION

- IBU Environmental Product Declaration (EPD).

APPROVALS / STANDARDS

- CE marking and declaration of performance based on EN 1504-3:2005 Products and systems for the protection and repair of concrete structures — Structural and non-structural repair.

PRODUCT INFORMATION

Chemical Base	Sulphate resistant and replacement cement, selected aggregates and additives
Packaging	25 kg bag
Appearance / Colour	Grey powder
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.
Maximum Grain Size	D_{max}: 2 mm
Soluble Chloride Ion Content	≤ 0,05 % (EN 1015-17)

TECHNICAL INFORMATION

Compressive Strength (EN 12190)

Class R4

Time	Compressive Strength
1 day	~ 18 N/mm²
7 days	~ 40 N/mm²
28 days	~ 55 N/mm²

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

Tensile Strength (EN 12190)

Time	Tensile Strength in Flexure
1 day	~ 4.4 N/mm²
7 days	~ 7.0 N/mm²
28 days	~ 8.0 N/mm²

Tensile adhesion strength	≥ 2,0 N/mm²	(EN 1542)
Thermal Compatibility	≥ 2,0 N/mm² (Part 1 - Freeze-Thaw)	(EN 13687-1)
Resistance to fire	Euroclass A1	(EN 1504-3 cl. 5.5)
Capillary Absorption	≤ 0,5 kg·m^{-2}·h$^{-0,5}$	(EN 13057)
Carbonation Resistance	dk ≤ control concrete MC (0,45)	(EN 13295)
Skid / Slip Resistance	SRT 69	(EN 13036-4)

APPLICATION INFORMATION

Mixing Ratio	3.50 to 3.75 L of water per 25 kg bag
Consumption	~ 1,90 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 ~13,2 L of mortar

Layer Thickness

Orientation	Minimum	Maximum
Horizontal	6 mm	120 mm
Vertical	6 mm	85 mm (120 mm in localised areas)
Overhead	6 mm	30 mm (50 mm in localised areas)

Ambient Air Temperature	+5 °C minimum / +30 °C maximum

Substrate Temperature	+5 °C minimum / +30 °C maximum
Pot Life	~ 60 minutes (at +20 °C) **NOTE:** Colder temperatures will extend the pot life, whereas higher temperatures will reduce the pot life.
Fresh mortar density	~2.2 kg/L

SYSTEM INFORMATION

System Structure

Layer	Function	Product
Optional: Bonding Primer / Reinforcement Corrosion Protection	Normal use	Sika MonoTop®-1010
Optional: Bonding Primer / Reinforcement Corrosion Protection	Demanding requirements	SikaTop® Armatec®-110 EpoCem®
Concrete Repair Mortar	High strength requirements	Sika MonoTop®-4012 BE
Optional: Levelling Mortar	Normal use	Sika MonoTop®-3020
Optional: Levelling Mortar	Demanding requirements	Sikagard®-720 EpoCem®

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.

FURTHER DOCUMENTS

- Sika® Method Statement 850-32-01 Concrete Repair.
- 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

NOTES ON INSTALLATION

- 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.

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 – Plasterer's hawk, trowel.
- Wet Spray - Suitable all-in-one mixing and spraying machine, or separate spraying machine and all associated ancillary equipment to suit application volumes. Always complete a small-scale trial before project use to ensure efficacy.

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 any materials which reduce adhesion or prevent suction or wetting by repair materials. Delaminated, 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 re-

quired) 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, potable water quantity into a suitable mixing container or 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®-1010 or SikaTop® Armatec® 110 EpoCem® (refer to Product Data Sheet(s)).

Bonding primer

On well prepared and roughened substrates, 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 Sheets). Apply repair mortar onto bonding primer 'wet-on-wet'.

Repair Mortar

Hand application

Thoroughly pre-wet the prepared substrate (at least two 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 dark matt in 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®-4012 BE 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 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

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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