

PRODUCT DATA SHEET

Sika MonoTop®-4012

High performing, R4 concrete repair mortar with sustainability benefits



PRODUCT DESCRIPTION

Sika MonoTop®-4012 is a 1-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 installation works to be carried out only by Sika Approved Contractors. Please observe information given by Product Data Sheets.

Sika MonoTop®-4012 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 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 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 6–120 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
- A1 fire rating
- Class R4 of EN 1504-3
- Resistant to sulphuric acid attack (meets the requirements of exposure class XWW3 according to EN 19573)

ENVIRONMENTAL INFORMATION

- Contributes towards satisfying Materials and Resources (MR) Credit: Building product disclosure and optimization — Environmental Product Declarations under LEED® v4 — 1 point
- Contributes towards satisfying Materials and Resources (MR) Credit: Building Product Disclosure and Optimization — Sourcing of Raw Materials under LEED® v4 — 1 point
- Contributes towards satisfying Materials and Resources (MR) Credit: Building Product Disclosure and Optimization — Material Ingredients under LEED® v4 — 1 point
- Specific Environmental Product Declaration (EPD) in accordance with EN 15804. EPD independently verified by BRE Global
- Bewertungsbestätigung, Sika MonoTop-4012, eco-bau
- eurofins VOC Emission Indoor Air Comfort Sika MonoTop-4012

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
- Klassifizierung / Classification Brandverhalten / Reaction to fire EN 13501-1
- Specific electrical resistivity DIN EN ISO 12696, Sika MonoTop®-4012, OST
- Tensile bond strength after vibrational stress DAFStb guideline, Sika MonoTop-4012, kiwa, Test report No. P 11864-1-E
- Sulphate Resistance ÖNORM B 3309-1, Sika MonoTop-4012, HARTL, No. 013108/2
- Sewage Network Test Report DIN 52108, LPM, No. A-49 492-6.1E
- Resistance to alkali aggregate reaction SIA 262/1, Sika MonoTop®-4012, TFB, Test Report No. 232336-01K
- Physical test of the frost deicing salt resistance BE II FT, VSS 40 464
- Adhesive tensile strength in overhead application

PRODUCT INFORMATION

Chemical Base	Sulphate-resistant cement, supplementary cement replacement, selected aggregates and additives		
Packaging	Standard bag	25 kg	
	Refer to the current price list for available packaging variations.		
Colour	Grey		
Shelf Life	Standard bag	12 months from date of production	
Storage Conditions	The Product must be stored in original, unopened and undamaged sealed packaging in dry conditions at temperatures between +5 °C and +35 °C. Protect the Product from direct sunlight. Always refer to the packaging. Refer to the current Safety Data Sheet for information on safe handling and storage.		
Maximum Grain Size	2 mm		
Soluble Chloride Ion Content	≤ 0,05 %		(EN 1015-17)
Colour	Powder		

TECHNICAL INFORMATION

Abrasion Resistance	Wear Resistance Böhme, wet procedure	< 12 cm ³ /50 cm ²	(DIN 52108)
Compressive Strength	Class R4		(EN 1504-3)
	Time	Compressive strength	(EN 12190)
	1 day	19 MPa	
	7 days	43 MPa	
	28 days	56 MPa	
Modulus of Elasticity in Compression	≥ 20 GPa		(EN 13412)

Flexural Strength	Time	Tensile strength in flexure	(EN 12190)
	1 day	4.4 MPa	
	7 days	7.0 MPa	
	28 days	8.0 MPa	
Shrinkage	+20 °C and 65 % relative humidity at 28 days	500 µm/m	(EN 12617-4)
Restrained Shrinkage / Expansion	≥ 2.0 MPa		(EN 12617-4)
Tensile adhesion strength	≥ 2.0 MPa		(EN 1542)
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	Class A1		(EN 13501-1)
Capillary Absorption	≤ 0.5 kg·m ⁻² ·h ^{-0.5}		(EN 13057)
Water Penetration under Pressure	10 mm		(EN 12390-8)
Chloride Ion Diffusion Resistance	Low < 2000 Coulombs		(ASTM C1202)
Carbonation Resistance	dk ≤ control concrete MC (0.45)		(EN 13295)
Electrical Resistivity	< 100 kΩ·cm		(ISO 12696)
Chloride Ion Diffusion Resistance	4.8 × 10 ⁻¹² m ² /s		(EN 12390-11)

APPLICATION INFORMATION

Mixing Ratio	3.75 to 3.9 L of water for a 25 kg bag		
Consumption	1.9 kg powder per m ² per mm Note: Consumption data is theoretical and does not allow for any additional material due to surface porosity, surface profile, variations in level, wastage or any other variations. Apply the Product to a test area to calculate the exact consumption for the specific substrate conditions and proposed application equipment.		
Yield	13.7 L of mortar per 25 kg bag Note: Consumption data is theoretical and does not allow for any additional material due to surface porosity, surface profile, variations in level, wastage or any other variations. Apply the Product to a test area to calculate the exact consumption for the specific substrate conditions and proposed application equipment.		
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)
Product Temperature	Maximum	+30 °C	
	Minimum	+5 °C	
Ambient Air Temperature	Maximum	+30 °C	
	Minimum	+5 °C	
Substrate Temperature	Maximum	+30 °C	
	Minimum	+5 °C	

Pot Life

At +20 °C

60 minutes

Pot life depends on temperature

Note: Pot life will be shorter at higher temperatures. Pot life will be longer at lower temperatures.

Fresh mortar density

2.1 kg/L

(EN 1015-6)

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
Optional: Levelling mortar	Normal use	Sika MonoTop®-3020
Optional: Levelling mortar	Demanding requirements	Sikagard®-720 EpoCem®

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

- Concrete repair site handbook
- Sika Method Statement 850 32 01 Concrete Repair

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 EQUIPMENT

- Mechanical hand-held tools for spot repairs
- High- or ultra-high-pressure water blasting equipment

STEEL REINFORCEMENT EQUIPMENT

- Abrasive blast cleaning equipment
- High-pressure water blasting equipment

MIXING EQUIPMENT

- Clean mixing containers
- Small quantities: low-speed electric single or double-

paddle mixer (< 500 rpm).

- Large quantities: forced action mixer

APPLICATION EQUIPMENT

- Hand-applied: plasterer's hawk, trowel
- Wet spray: All-in-one mixing and spraying machine, or separate spraying machine and all associated ancillary equipment to suit application volumes. Suitable machines include the PFT N2V, Putzmeister S 5, Wagner PC15, and Inotec inoBEAM F50.

FINISHING EQUIPMENT

- Trowel (PVC or wooden)
- Sponge

SUBSTRATE PREPARATION**CONCRETE**

1. Clean the substrate thoroughly so it is free from dust, loose material, surface contamination and material which reduces adhesion, prevents suction or wetting by the repair materials.
2. Remove delaminated, weak, damaged and deteriorated concrete and where necessary, sound concrete. Remove using mechanical hand-held tools, high or ultra-high-pressure water blasting equipment.
3. Remove sufficient concrete from around corroded reinforcement to allow cleaning, application of a corrosion protection coating (where required) and compaction of the concrete repair mortar.
4. Prepare repair surface areas in 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

1. Remove rust, scale, mortar, concrete, dust and other loose and deleterious material which reduces bond or contributes to corrosion.
2. Prepare surfaces to bright steel, Sa 2 (ISO 8501-1), using abrasive blast cleaning or high-pressure water

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blasting equipment.

MIXING

HAND APPLIED AND WET SPRAY APPLICATION

1. Pour the minimum amount of water into a suitable clean mixing container or equipment.
2. Gradually add the powder to the water while stirring slowly.
3. Mix thoroughly for at least for 3 minutes, add additional water if necessary. Note Do not add more water than the maximum specified amount.
4. Adjust to the required consistency to achieve a smooth consistent mix.
5. Check the consistency after every mix.

APPLICATION

IMPORTANT

Strictly follow installation procedures

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

IMPORTANT

Risk of cracking due to exposure to frost

1. Protect freshly applied material from freezing and frost.

IMPORTANT

Risk of cracking due to application in direct sun or strong winds

1. Do not apply the Product in direct sun, strong winds or both.

IMPORTANT

Risk of reduced strength gain and impaired physical properties in cold weather

Take the following measures in cold weather:

1. Store bags in a warm environment.
2. Use warm mixing water to assist with achieving strength gain and maintaining physical properties.

IMPORTANT

Risk of cracking and impaired physical properties in hot weather

Take the following measures in hot weather:

1. Store bags in a cool environment.
2. Use cold mixing water to assist with controlling the exothermic reaction to reduce cracking and to maintain physical properties.

REINFORCEMENT CORROSION PROTECTION COATING

1. Where a reinforcement coating is required, apply to the whole exposed circumference Sika MonoTop®-1010 or SikaTop® Armatec®-110 EpoCem®. Refer to the individual Product Data Sheets.

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 the individual Product Data Sheets.

REPAIR MORTAR – MANUAL APPLICATION

IMPORTANT

Poor Product performance due to insufficient substrate pre-wetting

Insufficient substrate saturation prior to application

will cause the mortar to not gain its full mechanical properties.

1. Only apply the Product to stable, prepared substrates.
2. Thoroughly pre-wet the prepared substrate for a minimum of 2 hours before application.
3. Keep the surface wet and do not allow to dry.
4. The final pre-wetted surface must achieve a dark matt appearance (saturated surface dry).

IMPORTANT

Sagging or slumping of built up layers

Allow each layer to slightly harden and remain wet before applying subsequent layers.

1. Remove excess water from within the surface pores and cavities with a clean sponge.
2. Make a scratch coat using the repair mortar Product.
3. Apply the scratch coat over the complete substrate surface to form a thin layer to fill surface pores or cavities.
4. Apply the repair mortar Product on to the scratch coat wet on wet, without forming voids, and observing the minimum and maximum layer thicknesses.

REPAIR MORTAR – SPRAYED APPLICATION – WET SPRAY

IMPORTANT

Poor Product performance due to insufficient substrate pre-wetting

Insufficient substrate saturation prior to application will cause the mortar to not gain its full mechanical properties.

1. Only apply the Product to stable, prepared substrates.
2. Thoroughly pre-wet the prepared substrate for a minimum of 2 hours before application.
3. Keep the surface wet and do not allow to dry.
4. The final pre-wetted surface must achieve a dark matt appearance (saturated surface dry).

IMPORTANT

Sagging or slumping of built up layers

Allow each layer to slightly harden and remain wet before applying subsequent layers.

1. Remove excess water from within the surface pores and cavities with a clean sponge.
2. Place the wet mixed repair mortar into the spraying equipment.
3. Spray the repair mortar onto the pre-wetted substrate between the minimum and maximum layer thicknesses without the formation of voids.

SURFACE FINISHING BY HAND

IMPORTANT

Risk of discolouration and cracking due to adding water during surface finishing

1. Do not add water during the surface finishing.

IMPORTANT

Surface cracking due to rapid moisture loss

In draughty areas, open spaces, at temperatures less than +10 °C or in very dry climates, early plastic shrinkage cracks may occur.

1. Confirm substrate moisture content, product, substrate and air temperatures prior to application.
1. Allow the mortar to surface harden.
2. Surface finish to the required surface texture using a stainless steel, steel, PVC or wooden float.

CURING TREATMENT

- Protect fresh mortar immediately from premature drying using an appropriate curing method, such as curing compound, moist geotextile membrane or polythene sheet.
- Do not use curing compounds if 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 removed mechanically.

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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