

PRODUCT DATA SHEET

Sika MonoTop®-412 IN

Single component, fibre reinforced, low shrinkage structural repair mortar conforming to class R4 of EN 1504-3



DESCRIPTION

Sika MonoTop®-412 IN is 1-component, fibre reinforced, shrinkage compensated, thixotropic cement based repair mortar with very high resistance to hydraulic abrasion for hand and spray application and meeting the requirement of class R-4 of EN 1504-3.

USES

The Product is used to repair all types of reinforced concrete structures and components for:

- Buildings
- Civil engineering structures
- Dams
- Marine structures
- Suitable for interior or exterior applications
- Sewage and waste water treatment plants

The product 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

Please note:

- The Product may only be used by experienced professionals.

PRODUCT INFORMATION

Product declaration	EN 1504-3: R4 mortar
Chemical base	Sulphate resistant cement, selected aggregates and additives
Packaging	25 kg bag

CHARACTERISTICS / ADVANTAGES

- Class R4 of EN 1504-3
- Sulphate resistant
- For hand or machine application
- Easy to apply
- Application up to 50 mm in 1 layer on vertical surface and in 2 layers on overhead surface
- Very low shrinkage behaviour
- Does not require a bonding primer even when manually applied
- Low permeability
- A1 fire rating

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

Shelf life	6 months from the 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 +30 °C. Protect the Product from direct sunlight.	
Appearance / Colour	Grey powder	
Maximum grain size	D _{max} : 2.36 mm	
Soluble chloride ion content	≤ 0.05 %	(EN 1015-17)

TECHNICAL INFORMATION

Compressive strength	1 day	≥ 20 MPa	(EN 12190)
	3 days	≥ 40 MPa	
	7 days	≥ 45 MPa	
	28 days	≥ 60 MPa	
Modulus of elasticity in compression	≥ 20 GPa		(EN 13412)
Flexural strength	1 day	≥ 4 MPa	(EN 196-1)
	7 days	≥ 6 MPa	
	28 days	≥ 8 MPa	
Tensile adhesion strength	≥ 2.0 MPa		(EN 1542)
Shrinkage	~500 µm/m Above values at +20 °C & 65 % relative humidity at 28 days		(EN 12617-4)
Restrained Shrinkage / Expansion	Bond strength after test ≥ 2.0 MPa		(EN 12617-4)
Carbonation resistance	d _k ≤ control concrete [MC (0.45)]		(EN 13295)

SYSTEM INFORMATION

System structure	Sika MonoTop®-412 IN is the part of range of Sika mortars complying with the relevant parts of European Standard EN 1504 and comprising of:	
	Application	Product
	Bonding primer / Reinforcement corrosion protection	Sika MonoTop®-1010 IN or SikaTop® Armatec®-110 EpoCem®
	Repair mortar	Sika MonoTop®-412 IN
	Levelling mortar	Sikagard®-720 EpoCem® IN

APPLICATION INFORMATION

Mixing ratio	water / powder = 0.14–0.16 3.5–4.0 litres of water for 25 kg powder
Fresh mortar density	~2.1±0.1 kg/L
Consumption	~1.9 kg of powder per mm thickness per m ² 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 product to a test area to calculate the exact consumption for the specific substrate conditions and proposed application equipment.
Yield	25 kg of powder yields approximately 13.80 litres of mortar at water / powder ratio of 0.16

Layer thickness	Minimum	10 mm
	Maximum	50 mm (single layer on horizontal / vertical surface and in 2 layers on overhead)
Ambient air temperature	+5 °C min. / +35 °C max.	
Substrate temperature	+5 °C min. / +35 °C max.	
Pot life	~45 minutes at +30 °C	

BASIS OF PRODUCT DATA

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

- 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

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 EQUIPMENT

- Mechanical hand-held tools
- 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: 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 EQUIPMENT

- 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.
- Remove de-laminated, weak, damaged and deteriorated concrete and where necessary, sound concrete. Remove using mechanical hand-held tools or high / ultra-high-pressure water blasting equipment.
- Make sure sufficient concrete is removed from around corroded reinforcement to allow cleaning, corrosion protection coating (where required) and compaction of the concrete repair mortar.
- 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

- Remove rust, scale, mortar, concrete, dust and other loose and deleterious material which reduces bond or contributes to corrosion.
- Prepare surfaces to bright steel using abrasive blast cleaning or high-pressure water 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.
4. Add additional water if necessary while mixing to adjust to the required consistency to achieve a smooth consistent mix. Note: Do not add more water than the maximum specified amount.
5. Check the consistency after every mix.

APPLICATION

IMPORTANT

Protect from frost

Protect freshly applied material from freezing and frost to prevent cracking.

IMPORTANT

Application in the direct sun or strong winds

Avoid application in direct sun, strong winds or both to reduce the risk of the Product cracking.

REINFORCEMENT CORROSION PROTECTION COATING

1. Where a reinforcement coating is required, apply to the whole exposed circumference Sika MonoTop®-

1010 IN 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 IN or SikaTop® Armatec®-110 EpoCem®. Refer to the individual Product Data Sheets.

REPAIR MORTAR MANUAL APPLICATION

IMPORTANT

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.
3. Apply the scratch coat over the complete substrate surface to form a thin layer to fill surface pores or cavities.
4. **IMPORTANT** Do not apply as a "feather edge". Apply the repair mortar onto the scratch coat 'wet on wet' between the minimum and maximum layer thicknesses without the formation of voids.

REPAIR MORTAR SPRAYED APPLICATION - WET SPRAY

IMPORTANT

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

IMPORTANT

Adding water during surface finishing

Do not add water during the surface finishing as this can cause discolouration and cracking.

1. Allow mortar to surface harden.
2. Surface finish to the required surface texture using a stainless steel, steel, PVC or wooden float.

COLD WEATHER WORKING

Store bags in a warm environment and using warm water to assist with achieving strength gain and maintaining physical properties.

HOT WEATHER WORKING

Store 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, such as curing compound, moist geotextile membrane or polyethylene sheet.
- 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 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.

Sika India Pvt. Ltd.

620, Diamond Harbour Road
Commercial Complex II
Kolkata - 700 034
West Bengal, India

Contact:

Phone: +91 33 2447 2448
Fax: +91 33 2397 8688
info.india@in.sika.com
www.sika.in



SikaMonoTop-412IN-en-IN-(10-2023)-4-1.pdf

Product Data Sheet

Sika MonoTop®-412 IN
October 2023, Version 04.01
020302040030000433