BUILDING TRUST

PRODUCT DATA SHEET

# SikaEmaco® S 5440 RS

(formerly MEmaco S 5440RS)

Rapid setting, high-strength, shrinkage compensated, fibre reinforced, tixotropic, structural concrete repair mortar with integrated corrosion inhibitor

## PRODUCT DESCRIPTION

SikaEmaco® S 5440 RS is a one component, rapid setting, high strength, high modulus, shrinkage compensated concrete repair mortar that meets the class R4 requirements of EN 1504-3.
SikaEmaco® S 5440 RS is a ready-to-use material that contains special hydraulic binders, well graded sands, specifically selected polymer fibres and an integrated corrosion inhibitor.
When mixed with water, SikaEmaco® S 5440 RS forms a fast-setting and highly tixotropic mortar that can easily be hand-applied in 5 to 50 mm thickness.

## USES

SikaEmaco® S 5440 RS is suitable for exposure classes XC 1-4, XF 1-4, XD 1-3, XS 1-3, XA 1-3 and XM1 as described in EN 206. It can be used for fast structural repair of concrete elements such as:

- Columns, piers and cross beams.
- Structures in industrial environments where a fast return to service is required.
- Preparation of surfaces in water treatment and sewerage facilities.
- Tunnels, pipes, outfalls and all below ground construction especially in harsh ground conditions.
- Marine structures, especially if repair needs to follow tidal timing.

## CHARACTERISTICS / ADVANTAGES

- Fast-setting, allows quick return to service.
- Low temperature curing, can be used down to 0° C – prolongs the construction season in autumn and spring.
- Universal use: can be applied inside and outside, on vertical and overhead surfaces, in dry and wet environments.
- Highly tixotropic - can be applied up to 50 mm without the need of secondary reinforcement.
- High early and ultimate strengths.
- Excellent workability for easy placing and finishing.
- High modulus and excellent adhesion to host concrete ensuring load transfer.
- Weatherproof: proven freeze/thaw and carbonation resistance.
- Sulphate resistant.
- Meets requirements of exposure class XWW3 according to DIN 19573 (Mortar for construction and rehabilitation of drains and sewers outside buildings).
- Very low permeability to water and chlorides.
- Protection of repaired concrete by integrated corrosion inhibitor.

## APPROVALS / STANDARDS

- CE-Certification according to EN 1504-3, Class R4
- Chlorideindrigung nach BAW-Merkblatt
- Werksbescheinigung Expositionsklasse XM1

## PRODUCT INFORMATION

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| **Packaging** | SikaEmaco® S 5440 RS is available in 25 kg paper bags. |
| **Shelf Life** | 12 months after date of production if stored at below mentioned storage conditions. |

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| **Storage Conditions** | Store at ambient temperatures, out of direct sunlight, in cool, dry warehouse conditions and clear of the ground on pallets protected from rainfall prior to application. No permanent storage over +30 °C. | |
| **Appearance / Colour** | Grey powder | |
| **Maximum Grain Size** | 1.2 mm | |
| **Total Chloride Ion Content** | ≤ 0.02 % | (EN 1015-17) |

## TECHNICAL INFORMATION

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| **Abrasion Resistance** | Abrasion according to Böhme | Class A12 | (EN 13892-3) |
| **Compressive Strength** | 2h | ≥ 20 N/mm² | (EN 12190) |
| | 3h | ≥ 25 N/mm² | |
| | 4h | ≥ 30 N/mm² | |
| | 1 day | ≥ 40 N/mm² | |
| | 7 days | ≥ 60 N/mm² | |
| | 28 days | ≥ 70 N/mm² | |
| | Data determined at +23 °C | | |
| | **Low temperature performance:** | | |
| | 1 day | ≥ 30 N/mm² | (EN 12190) |
| | 28 days | ≥ 60 N/mm² | |
| | Data determined at +1 °C | | |
| **Modulus of Elasticity in Compression** | ≥ 30.000 N/mm² | | (EN 13412) |
| **Flexural Strength** | 28 days | ≥ 8 N/mm² | (EN 12190) |
| **Pull-Out Resistance** | Adhesion to Concrete after 28 days | ≥ 2.0 N/mm² | (EN 1542) |
| | Adhesion to Concrete after Freeze-Thaw (50 cycles with salt) | ≥ 3.0 N/mm² | (EN 13687-1) |
| **Service Temperature** | -30 °C to + 80 °C | | |
| **Capillary Absorption** | ≤ 0.5 $kg \cdot m^{-2} \cdot h^{-0.5}$ | | (EN 13057) |
| **Chloride Ion Diffusion Resistance** | $0.3 \cdot 10^{-12}$ $m^2/s$ | | (BAW Merkblatt Chlorideindringung) |
| **Chloride Ion Diffusion Resistance** | Dimensional change after 120 days of storage in 10% NaCl-solution | < 0.2 mm/m | (internal measurement based on Wittekindt method) |
| **Chemical Resistance** | Depth of deterioration at pH 4 after 4000 h | 0.73 mm | (DIN 19573) |
| **Sulfate Resistance** | Dimensional change after 120 days of storage in 10% $Na_2SO_4$-solution | < 0.2 mm/m | |
| | (Wittekindt method) | | |
| **Freeze Thaw De-Icing Salt Resistance** | CDF Testing | 37 g/m² | (CEN/TS 12390-9) |
| **Carbonation Resistance** | dk ≤ reference concrete (after 28 days) | | (EN 13295) |
| **Reaction to Fire** | Class A1 | | (EN 13501-1) |

## APPLICATION INFORMATION

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| **Fresh mortar density** | approx. 2.1 kg/l |
| **Consumption** | Approx. 1,900 kg powder is needed to prepare 1 m³ of fresh mortar. One 25 kg bag will yield approximately 13 litres of mortar. |
| **Layer Thickness** | 5 to 50 mm |
| **Product Temperature** | +5 °C to +30 °C |
| **Ambient Air Temperature** | 0 °C to +30 °C |
| **Mixing Ratio** | 3.3 to 3.5 l water per 25kg bag. |
| **Substrate Temperature** | 0 °C to +30 °C |
| **Pot Life** | 15 to 20 minutes at 21±2 °C and 60±10 % relative humidity. Higher temperatures will reduce this time and lower temperature will extend it. |
| **Setting time** | Approx. 30 to 40 minutes at 21±2 °C and 60±10 % relative humidity. Higher temperatures will reduce these times and lower temperature will extend them. |
| **Waiting Time / Overcoating** | SikaEmaco® S 5440 RS can be overcoated with vapour-open coatings after 2 hours at 21±2 °C and 60±10 % relative humidity. Higher temperatures will reduce this time and lower temperature will extend it. |

## 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.

## LIMITATIONS

- Do not apply SikaEmaco® S 5440 RS at temperatures below 0 °C nor above +30 °C.
- Mix only that amount of SikaEmaco® S 5440 RS that can be used within its pot life.
- Do not add cement, sand or other substances that could affect the properties of SikaEmaco® S 5440 RS.
- Never add water or fresh mortar to a mortar mix which has already begun to set.
- Keep the mixing water ratio between the recommended limits.

## ECOLOGY, HEALTH AND SAFETY

REGULATION (EC) NO 1907/2006 - REACH: This product is an article as defined in article 3 of regulation (EC) No 1907/2006 (REACH). It contains no substances which are intended to be released from the article under normal or reasonably foreseeable conditions of use. A safety data sheet following article 31 of the same regulation is not needed to bring the product to the market, to transport or to use it. For safe use follow the instructions given in this product data sheet. Based on our current knowledge, this product does not contain SVHC (substances of very high concern) as listed in Annex XIV of the REACH regulation or on the candidate list published by the European Chemicals Agency in concentrations above 0.1 % (w/w).

## APPLICATION INSTRUCTIONS

### SUBSTRATE PREPARATION

Concrete must be fully cured, clean and sound to ensure good adhesion. All loose traces of concrete or mortar, dust, grease oil, etc. must be removed. Concrete must have a minimum direct tensile strength of 1.5 N/mm².
Damaged or contaminated concrete must be removed to obtain a keyed surface. Non-impact/vibrating cleaning methods, e.g. shot blasting, sandblasting or high-pressure water jetting are recommended. Aggregate should be clearly visible on the surface of the concrete structure after surface preparation.
Cut the edges of the repair vertically to a minimum depth of 5 mm.
If reinforcing steel is visible, clean to a minimum grade of SA 2 according to ISO 8501-1 / ISO 12944-4. Ensure back of rebar is also clean. In case of chloride contamination of the concrete or when depth of cover is less than 10 mm, the reinforcement should be protected by using SikaEmaco® P 5000 AP.
The prepared substrate should be saturated with water, preferably for 12 hours, but at least 2 hours before applying SikaEmaco® S 5440 RS. Before starting the application, the surface must be mat-damp, but without standing water.

### MIXING

Open the bags a short time before the mixing is started. Damaged or opened sacks should not be used. Pour the minimum amount of mixing water into a clean vessel. Mixing water needed: 3.3 to 3.5 litres per 25 kg bag depending upon consistency required. Only use clean, uncontaminated water. Add the SikaEmaco® S 5440 RS powder rapidly and continuously and mix with a suitable paddle attached to a powerful, slow speed electric drill (max. 400 rpm) for 3 minutes until plastic consistency is achieved without any lump in the mortar.
Allow the mortar to rest for 2 - 3 minutes and then remix briefly, adjusting the consistency when required.
**Note**: Add water if necessary but never exceed the maximum water demand!

### APPLICATION

Temperatures during application and for the next 12 hours have to be between 0 °C and +30 °C.
First apply a thin scrape coat or contact layer to the prepared damp substrate. Then apply SikaEmaco® S 5440 RS using a screeding beam, trowel or wooden board in the desired thickness between 5 to 50 mm directly onto the primed surface.
Smoothing with a trowel or finishing by float or sponge can be done as soon as the mortar has begun to stiffen (typically after around 30 to 45 minutes at +20 °C). At lower temperatures and/or higher humidity these times will be extended.

### CLEANING OF TOOLS

Tools and mixer must be cleaned immediately after use with water. Cured 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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