Repair of Concrete Structures
- Patch Repair and Spray Applications

A simple step by step guide to preparing and applying Sika Concrete Repair Systems
SikaTop® Armatec® - reinforcement corrosion protection
Sika Top® - repair and profiling mortar
Sika Top® pore sealer and smoothing mortar
Sikagard® - protective coating layer
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Health and Safety

Work Safely!
Useful Documents

Method Statement
- Sika® Top Systems
- Detailed step by step guide to concrete repair

Product Data Sheet
- Product uses
- Substrate quality
- Substrate preparation
- Mixing Ratio
- Application conditions & tools
- Pot life
- Curing treatment

Material Safety Data Sheet
- Hazards
- First Aid
- Emergency
- Ecology
Bag Layout

Example: Sika® Top-122

Storage Details

Safety Label

Main Description

Application Information

Product Characteristics
Climate Conditions

Storage

Product storage:
- Dry, cool conditions
- Undamaged original packaging

Application

Protect area from:
- Direct sunlight
- Wind
- Rain
- Frost

Temperature

Check acceptable limits:
- Ambient temperature
- Substrate temperature
Equipment

Hand tools

- Mixing tools
- Mixing bowel
- Application tools
- Sponge
- Brushes

for machine applications see page 23
Do and Do Not!

**DO**

- Use only clean potable water
- Make sure tools are clean and well maintained
- Remove only concrete as instructed by supervising officer or qualified engineer
- Consult product data sheet before starting

**DO NOT**

- Do not contaminate mixture with other chemicals
- Do not mix powders from different products
- Do not add more water than recommended
- Do not mix and apply the product in direct sunlight
1. Substrate Preparation

Surface Preparation
- Mark defective concrete

Concrete Removal
- Using high pressure water jet, 1100 bar (large area)

or
- With hammer drill (medium area)

or
- Hammer and chisel (small patch repairs)

⚠️ Remove tire wires, nails etc.
- Remove only defective concrete as instructed.
  Do not reduce structural integrity.
2. Substrate Preparation

Extent of Concrete Removal

- Remove concrete minimum 15 mm behind main bars

Correct Substrate Preparation

- Roughen surface (2 mm minimum)
- Cut sides minimum 90° to avoid undercutting and maximum 135° to reduce debonding around edges
- Substrate shall be sound with no loose material

Inform supervisor immediately if there are any cracks in the substrate
3. Preparing Reinforcement

Cleaning Reinforcement

Remove all:
- Tie wires
- Mortar / Concrete
- Rust
- Other loose material

Removal Techniques

- Use steel wire brush
- Abrasive blast cleaning techniques
- High pressure water jetting (1100 bar minimum)

Inform supervisor immediately of any badly damaged reinforcement
4. Reinforcement Corrosion Protection

**Application of Corrosion Protection (if specified)**
- Apply two 1 mm thick layers (total 2 mm minimum)

- Allow time for the 1st coat to harden before applying 2nd coat.
- Allow application to dry before applying repair mortar.

**Application Techniques**
- Hopper spray for large applications

- Or
- Brush for small applications
- Inspect bars after to ensure full coverage

- Use two brushes simultaneously to ensure full application behind bars
5. Bonding Primer

Apply bonding primer (if specified)

- Wet the substrate

- Wipe away excess water
  - small area: with sponge
  - large area: with air pressure

Application Technique

- For small patches brush firmly onto surface

- For large areas spray on with hopper gun

Point gun at different angles on the surface to ensure even application behind the bars
6a Repair Application by hand

Surface Preparation
(if bonding primer not applied)

- Wet the substrate

- Wipe away excess water
  
  small area: with sponge
  
  large area: with air pressure

Application Technique

- Press firmly the repair mortar into the repair area using a trowel

  Apply 2\textsuperscript{nd} layer when 1\textsuperscript{st} layer is dry if application depth exceeds product’s max. layer thickness

- Profile surface and finish with trowel

  Finish surface with wooden or PVC trowel for best results. Do not spray additional water over the surface!
6b Wet Spray Application

Surface Preparation

- Wet the substrate

- Wipe away excess water
  
  small area: with sponge
  
  large area: with air pressure

Application Technique

- Point nozzle 200 mm to 500 mm from surface

- Finish with PVC or wooden trowel

Make sure voids are filled behind bars.
Point spray nozzle at different angles to the surface.
If 2nd layer is required surface shall not be too smooth.
7. Smoothing Mortar

Surface Preparation

- Wet and clean surface with water (180 bar)

Smoothing or Levelling Mortar

- Apply vertically using toothed trowel
- Apply with trowel approx. 45° to surface

⚠️ Use different size toothed trowel for required layer thickness

- When the 1st layer is hard, apply 2nd layer

- Smooth surface using wooden trowel after product has set

0.25 - 4 hrs.
8. After Application

**Curing Protection**

Protect application from:
- Frost
- Wind
- Rain
- Sun

**Curing Methods**

- Plastic sheeting
- Jute and water
- Other membranes

- If no subsequent coating is to be applied on surface an approved curing agent could be used
**Additional Information**

### Cleaning Tools
- Clean with water

Hardened material can only be removed mechanically

### Environment
- Dispose of waste responsibly
- Separate recycling materials

### Accidents
- Seek immediate medical attention in the event of an injury
Mixing

One component System
(e.g. Sika® MonoTop®)
■ Add powder to water and mix for 3 minutes

Two component System
(e.g. Sika Top®)
■ Shake component A thoroughly and pour into clean container
■ Add in powder component C and mix for 3 minutes

 Do not add extra water.

Three component System
(e.g. Sika® EpoCem®)
■ Shake component A + B separately
■ Mix components A + B together

■ Add (A + B) to powder component C and mix for 3 minutes

Adjust consistency to suit conditions using powder-component C.
Refer to Product Data Sheet for more information.
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<td>Sika® Crack Seal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Hints and Advice - Overhead Application

- Apply mortar tightly behind reinforcement until bars are covered.

- Press firmly to ensure pores in concrete substrate are filled.

- From same end apply second layer in same direction as first.
  - Repeat layers until void is filled

- Smooth surface using wooden trowel
Hints and Advice - Wet Spray Equipment

Hopper Gun

- Hopper content: 6 ltr
- Weight (empty): 1.5 kg
- Air requirement: 220 l/min
- Required air pressure: 2 to 3 bar
- Adjustable aperture

Mortar Pump for “Wet” Spray Application, e.g. Putzmeister S5 EVTM with Mixer TM 100

- Process: Wet spray application
- Conveying volume: 0.4 – 2.4 m³/h
- Conveying distance: horizontal up to 70 m
- Pump pressure: max. 25 bar
- Dimensions: L×W×H (mm): 2290×680×1150
- Motor: 400 V/50 Hz
- Capacity of the vessel: 100 ltr
- Weight: 400 kg (incl. Mixer)
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