

# Cementitious crystallizing Waterproofing



## PART 1 GENERAL

### 1.1 SECTION INCLUDES

- A. Cementitious crystallizing waterproofing for interior/exterior walls and floor slabs with non-active leaks.
- B. Cementitious crystallizing waterproofing for interior/exterior walls and floor slabs with active leaks.

### 1.2 REFERENCES

- A. CE / EN1504-3:2005 Product for structural and non structural repair for concrete) EN 1504-3: ZA. 1a
- B. German Technical Approval P-5101/838/14 MPA BS by the MPA Braunschweig Mineral Waterproofing Slurry for Waterproofing of Constructions according to Building Regulation List (Bauregelliste) A, Part 2, No. 2.49
- C. Test Certificate Bautest GmbH, Dresden, Germany
- D. Official test certificate, Institute for Hygiene, Gelsenkirchen, Germany – Tank and tank-lining, according to the regulations of the DVGW, Tech. regulations for potable water
- E. Worksheet W 270, December 1990, about the reproduction of micro-organisms on materials for use in drinking water environments
- F. International Concrete Repair Institute (ICRI) Guideline No. 03732, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays.

### 1.3 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.



## 1.5 PERFORMANCE REQUIREMENTS

- A. The waterproofing system shall be a cement based mix containing chemicals which penetrate with moisture into the capillary tracts and activate to form crystals which close the capillaries to produce the waterproofing effect. The cementitious waterproofing system shall become a permanent, integral part of the structure and shall be non-toxic, inorganic, free of calcium chloride and sodium based compounds. The cementitious waterproofing system shall be KOSTER NB1 Grey, manufactured by KOSTER Bauchemie AG, Aurich, Germany. Bonding agent shall be KOSTER SB Bonding Emulsion and primer shall be KOSTER Polysil TG 500.

## 1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Manufacturer shall have no less than five years experience in manufacturing crystallizing cementitious waterproofing systems. The system shall be specifically formulated and marketed for waterproofing. System design shall not have changed for a minimum of five consecutive years prior to start of the work.

B. Installer Qualifications:

1. Applicator shall be approved by the manufacturer, experienced in surface preparation and application of the material and shall be subject to inspection and control by the manufacturer.
2. Installer shall have no less than three years experience installing the specified waterproofing systems, or have been factory certified and trained in the KOSTER Training Program.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the job site in their original unopened containers, clearly labeled with the manufacturer's name and brand designation.
- B. Store products in an approved ventilated dry area; protect from contact with soil, dampness, freezing and direct sunlight.
- C. Handle products in a manner that will prevent breakage of containers and damage to products.
- D. Liquids should not be stored in areas with temperatures over than + 30 °C or below + 5°C.

## 1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
1. Do not apply cementitious waterproofing to unprotected surfaces in wet weather or to surfaces on which ice, frost or water is visible.



2. Do not apply cementitious waterproofing when the temperature is lower than + 5 °C or expected to fall below this temperature within 24 hours from time of application.
  3. Do not apply cementitious waterproofing in rain, snow, fog or mist.
- B. Protection: Protect cementitious waterproofing to prevent damage from active rain for a minimum period of 24 hours from time of application.

## 1.9 WARRANTY

- A. Installer of waterproofing system shall provide standard installation warranty for workmanship.

## PART 2 PRODUCTS

### 2.1 MANUFACTURER

- A. Acceptable Manufacturer: KÖSTER BAUCHEMIE AG • Dieselstraße 1-10 • D-26607 Aurich • Tel. 04941/9709-0 • Fax -40 • info@koester.eu • www.koester.eu
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions section.
- D. Provide the materials of one manufacturer throughout the project as specified.

### 2.2 SYSTEM - NON-ACTIVE LEAKS

- A. Waterproofing: Cementitious, crystallizing cement-based mix containing chemicals which penetrate with moisture into the capillary tracts and activate to form crystals which close the capillaries to produce a cementitious waterproofing system that becomes a permanent, integral part of the structure and is non-toxic, inorganic and free of added chlorides and added sodium-based compounds.

1. Product: KOSTER NB1 Grey

- a. Approved for use in drinking water environments in compliance with NSF /ANSI 61

2. Physical Properties:

- a. Positive Side Waterproofing: No signs of leakage, softening or discoloration up to 13,8 bar (200 psi) / (140,5 m) of water head.
- b. Negative Side Waterproofing: no sign of leakage up to 13,8 bar (200 psi) / (140,5 m) of water head.
- c. Compressive strength (ASTM C109, 28 days): 3,330 psi average.
- d. Abrasion Resistance (ASTM D 4060, 28 days): 2.7 x 10 gram per cycle/47 cycles per mil.
- e. Compressive strength (EN 12190, 28 days): > 35 N/mm<sup>2</sup>
- f. Flexural tensile strength (28 days): > 10 N / mm<sup>2</sup>
- g. Adhesive tensile strength: > 1.5 N / mm<sup>2</sup>
- h. Coefficient of water vapor diffusion resistance ( $\mu$ ): 60



## 2.3 SYSTEM - ACTIVE LEAKS

### A. Product: KOSTER KD 2 System

1. System package for the negative side waterproofing of mineral surfaces against pressurized water such as internal basement waterproofing.

## 2.4 ADDITIONAL PRODUCTS

- A. KOSTER SB Bonding Emulsion. Use where recommended by manufacturer to increase elasticity, flexibility, reduce water absorption, and improve bonding to steel. Do not use in case of drinking water contact where certification is required.
- B. KOSTER NB 1 Fast. Fast setting, cementitious coating containing crystallizing and capillary-plugging agents. May be used for waterproofing below grade against pressurized and non-pressurized water in combination with KOSTER Polysil TG 500

## PART 3. EXECUTION

### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation. All concrete surfaces must be solid, sound, and free of all laitance, oils, grease, curing agents, or other foreign materials.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Clean surfaces to receive cementitious waterproofing, chip or abrasive blast to a CSP-3 (ICRI Guideline 3102R13) profile to remove defective materials and foreign matter such as paint, dirt, grease, curing agents, form release agents, and mineral salts.
- D. If concrete surface has been previously treated with other agents, notify manufacturer before proceeding.
- E. Repair cracks, expansion joints, control joints, and open surface honeycombs.
  1. Use KOSTER SB Bonding Emulsion with manufacturer approved concrete repair materials. (Such as the KOSTER Water Stop or KOSTER Repair Mortar). Comply with requirements listed in manufacturer's technical data information. No exceptions.
  2. Moving joints and cracks are treated and detailed as expansion joints. Install an elastic sealant and corresponding primer in accordance with sealant manufacturer's instructions.
- F. Honeycombed areas, cavities, recesses and chipped out areas where form ties have been cut or removed must be routed/bush hammered to sound base and repaired according to manufacturer's instructions and patched flush with Repair Mortar.



- G. Uneven brick or block work must be first rendered flush with Repair Mortar.
- H. Construction Joints: Construction joints should be thoroughly cleaned and dampened. Apply one slurry coat of KOSTER NB 1 Grey at the rate 1.5 kg/m<sup>2</sup>. After it has reached an initial set, dampen if dry and apply a second coat of the KOSTER NB 1 Grey at the same rate. Pour concrete while the second coat is still less than 6 hours old to assist in bonding and to form an uninterrupted membrane.
- I. Piping Preparation: Cut back around pipes at least 2.5 cm to give sufficient depth and clean thoroughly. Apply KOSTER KB Flex 200. Flush up the cavity with KOSTER KB-Fix 5.
- J. Fillets and Coves between Horizontal and Vertical Areas: Where fillets or coves are specified it is desirable that the cementitious waterproofing be applied behind the cove strip. Repair Mortar should be used.

### 3.3 INSTALLATION - NON ACTIVE LEAKS

- A. Install in accordance with manufacturer's instructions.
- B. For areas with active leaks, provide active leak materials and installation per manufacturer's requirements before applying non-active leak system.
- C. Mixing:
  - 1. For positive side applications prepare a mixing liquid of at least 1 part KOSTER SB Bonding Emulsion to 7 parts clean water in a separate container. Mix the liquid with the NB 1 Grey to a thick slurry consistency.
  - 2. For negative side applications prepare a mixing liquid of at least one part KOSTER SB Bonding Emulsion with 3 parts water. Mix the liquid with the KOSTER NB 1 Grey to a thick slurry consistency.
  - 3. In hot weather where temperatures exceed + 30 °C or when dry winds prevail, prepare a mixing liquid of at least 1 part KOSTER SB Bonding Emulsion to 3 parts water for the mixing liquid. Mix the liquid with the KOSTER NB 1 Grey to a thick slurry consistency.
- D. Application - General:
  - 1. Moisture must be present in the surface is necessary to begin the crystallization process.
  - 2. Wet the dry surfaces thoroughly with clean water immediately prior to applying the slurry, making sure that no running or ponding water is present at time of application.
  - 3. Apply the slurry with a cement brush in two coats or spray apply in two coats. Work in such a way as to leave no areas void and no pin holes. Back brush the first coat if spray applied.
- E. Application - Brush:
  - 1. Apply the KOSTER NB 1 Grey at a rate of min. 1.5 kg/m<sup>2</sup> per coat. Brush application on surfaces other than formed concrete (positive side) is a minimum of 3 kg/m<sup>2</sup> in two coats, allowing excess water to run off first.
  - 2. Work in alternating coats from vertical to horizontal if brush applied on rough surfaces
  - 3. Allow the first coat to dry to the touch with no transfer of material or apply the second coat when first coat will not be mechanically damaged through the installation of the second. Wet the first coat with water prior to application of second coat, allowing excess water to run off first.



4. The KÖSTER NB 1 Grey is self-curing. Do not apply any additional curing methods. Do not cover for 12 hours.
- F. Application - Spray:
1. Dampen surfaces with clean water just prior to spraying or prime with KÖSTER Polysil TG 500.
  2. Surface should be damp to the touch with no standing or running water.
  3. Use conventional spray machine suitable for spraying cementitious material, operating with air pressure between 70-80 psi, a 4 - 8 mm nozzle and 25 mm delivery hose.
  4. If the material is spray applied, two coats at a minimum rate of 2.0 kg/m<sup>2</sup> per coat is required. The material can be spray applied using a 4 - 8 mm nozzle, keeping the nozzle at a distance of 30 cm from the surface. Back-brush the first coat. Apply the second coat with a 4 – 8 mm nozzle, consumption 2.0 kg/m<sup>2</sup>.
  5. Work in alternating coats from vertical to horizontal if brush applied.
  6. Allow the first coat to dry to the touch with no transfer of material or apply second coat when first coat will not be mechanically damaged through the installation of the second. Wet the first coat with water prior to application of second coat, allowing excess water to run off first.
  7. KÖSTER NB 1 Grey is self-curing. Do not apply any additional curing methods. Do not cover for 12 hours.
- G. For broadcast and trowel application consult manufacturer for installation requirements and application techniques.

### 3.4 INSTALLATION - ACTIVE LEAKS

- A. Install in accordance with manufacturer's instructions.
- B. Procedure:
1. Do not allow more than 3 minutes to elapse between steps. Treat small areas of surface to completion before proceeding to next area.
  2. Stop active leaks by forcefully hand-rubbing KÖSTER KD 2 Blitz Powder into the leak until leakage has stopped completely.
  3. Remove excess powder with dry brush.
  4. Apply non-active leak system as a top coating after active leak system has cured.

### 3.5 PROTECTION

- A. Protect cementitious waterproofing from contact with acid (below pH 7) and sulfates in concentrations exceeding limits for Portland Cement Type I/II.
- B. Touch-up, repair or replace damaged products before Substantial Completion.
- C. Do not apply the cementitious waterproofing at temperatures below + 5 °C.
- D. Do not use curing compounds or water to bring mixture back to brushable consistency.
- E. The treated area must be kept clear for at least 48 hours before backfilling or applying any concrete screed or other topping.
- F. Unless broadcast and trowel application is used, the cementitious waterproofing is not designed to be a wearing surface. When waterproofing a horizontal surface that will be subjected to traffic the area must be covered by concrete, cement, tile or other protective screed after 48 hours.



- G. Cured KÖSTER NB 1 coating may be painted. Do not use lime-based paints. Any paint used must be breathable.
- H. Protect the treated area from temperatures below + 5 °C during application and for 24 hours after application.
- I. Use potable water for mixing and cleaning.
- J. All salt burdened substrates must be primed with KÖSTER Polysil TG 500.