SECTION 07 16 16

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 RELATED SECTIONS

A. Section 03 06 30 - Cast-In Place Concrete: Installation and curing requirements according to ACI 302.

1.3 REFERENCES

A. ARMY C-E - Standard Practice for Unified Facilities Criteria and Unified Facilities Guide Specifications.

B. American Society for Testing and Materials (ASTM) C 109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens).

C. International Concrete Repair Institute (ICRI) Guideline No. 03732, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. 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 NB-1, manufactured by KOSTER American Corp., Virginia Beach, Virginia. Bonding agent shall be KOSTER SB Bonding Agent, primer shall be Polysil TG500.

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 American 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 in excess of 90º F (32º C) or below 40º F (4º 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 40º F (4º 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: KOSTER American Corporation, 2585 Aviator Drive, Virginia Beach, VA 23453; Tel: 757-425-1206

Email: info@kosterusa.com
Web: www.kosterusa.com

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

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: NB 1 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 200 psi (1,379 kPa) (462 feet (140.5 m) of water head).
      b. Negative Side Waterproofing: no sign of leakage up to 200 psi (1,379 kPa) (462 feet (140.5 m) of water head).
      c. Compressive strength (ASTM C109, 28 days): 3,330 psi (23 MPa) average.
      d. Abrasion Resistance (ASTM D 4060, 28 days): 2.7 x 10^{-4} gram per cycle/47 cycles per mil.

2.3 SYSTEM - ACTIVE LEAKS

A. Product: KOSTER KD 2 System
   1. System package for the negative side waterproofing of cementitious 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 if compliance with NSF/ANSI 61 for drinking water contact 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 and 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 joint, control Joints, and open surface honeycombs.
   1. Use SB Bonding Emulsion with manufacturer approved concrete repair materials. (Such as the KOSTER Water Stop or Repair Mortar. Comply with requirements listed in manufacturer's technical data information. No exceptions.
   2. Moving joints and cracks shall be treated and detailed as expansion joints. The shoulders are coated with NB-1 and an elastic sealant in accordance with sealant manufacturer's instructions.

F. Honeycombed areas, cavities, recesses and chipped out areas where form ties have been cut, etc., 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 NB 1 Grey at the rate of 2.25 lbs per sq. yd (100 square feet per bag). After it has reached an initial set, dampen if dry and apply a second coat of the 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 1 inch to give sufficient depth and clean off thoroughly. Apply KB Flex. Flush up the cavity with KOSTER Fix 5.

J. Cant Strips and Coves between Horizontal and Vertical Areas: Where cant strips 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 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 SB Bonding Emulsion with 3 parts water. Mix the liquid with the NB 1 Grey to a thick slurry consistency.
   3. In hot weather with temperatures exceed 90 º F or when dry winds prevail prepare a mixing liquid of at least 1 part SB Bonding Emulsion to 5 parts water for the mixing liquid. Mix the liquid with the NB 1 Grey to a thick slurry consistency.

D. Application - General:
   1. Moisture presence 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 one coat. Work in such a way as to leave no areas void and no pin holes. Back brush if spray applied except on smooth concrete surfaces.

E. Application - Brush:
   1. The NB 1 Grey is applied at a rate of 2.25 lbs per square yard (100 square feet per bag) per coat. Brush application on surfaces other than formed concrete (positive side) is a minimum of 4.5 lb per square yard (2.4 kg/sq. m) 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 second coat when first coat cannot be mechanically damaged. Wet the first coat with water prior to application of second coat, allowing excess water to run off first.
   4. The 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 Polysil TG500.
   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 1/8 inch (3 mm) nozzle and 1 inch (25 mm) delivery hose.
   4. If material is sprayed, only one coat at a rate of 4.5 lb per square yard (2.4 kg/sq. m) is required on rough surfaces and 2.25 lb per square yard (1.2 kg/sq. m) on formed concrete for positive side applications. Alternatively, the material can be spray applied at a rate of 3.5 lbs per sq. Yd. using an 8mm nozzle, keeping the nozzle at a distance of 2 feet from the surface. Back-broom the first coat. Apply the second coat with a 4mm nozzle. Apply the material at 1 lb. per sq. ft.
   5. Work in alternating coats from vertical to horizontal if brush applied on rough surfaces
   6. Allow the first coat to dry to the touch with no transfer of material or apply

second coat when first coat cannot be mechanically damaged. Wet the first coat with water prior to application of second coat, allowing excess water to run off first.

7. 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 leak by forcefully hand-rubbing 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 in temperatures below 40º F.

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 a subjected to traffic the area must be covered by concrete, cement, tile or other protective screed after 48 hours.

G. Cured NB 1 membrane may be painted. Do not use lime-based paints.

H. Protect the treated area from temperatures below 40º F during application and for 24 hours after application.

I. Use potable water for mixing and cleaning.

END OF SECTION