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.

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 MANUFACTURERS

A. Acceptable Manufacturer: KOSTER American Corporation, which is located at: 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 I gray and NB II white as manufactured by KOSTER American Corporation.
   2. Physical Properties: Results of Law Engineering Testing Compo No. 5820472101.
      a. Permeability (ARMY C-E, 28 days): 200 psi (1379 kPa) (461.1 feet of water head)
      b. Positive Side (CRO C -48-73): No signs of leakage, softening or discoloration.
      c. Negative Side (CRO C-48-73 modified, 28 days): 200 psi (1379 kPa) (461.1 feet (140.5 m) of water head) no sign of leakage.
      d. Tensile strength (ASTM C*I90, 28 days): 340 psi (2344 kPa) average.
      e. Compressive strength (ASTM C*109, 28 days): 3.330 psi (23 kPa) (average.
      f. Abrasion Resistance (ASTM 0-4060, 28 days): 2.7 x 10(4th power) gram per cycle/47 cycles per mil.

2.3 SYSTEM - ACTIVE LEAKS

A. Active Leak Waterproofing: The system is a four-step system consisting of the following materials: KOSTER KD 1 Base, KOSTER KD 2 Blitz Powder, and KOSTER KD 3 Sealer
   1. Products as manufactured by KOSTER American Corporation.
   2. Use of this method shall be confined to active leaking areas only. Under no circumstances shall this method be used over areas with non-active leaks.

2.4 MATERIALS

A. KOSTER KD 1 Base as manufactured by KOSTER American Corporation:

   1. Fast curing cementitious sealing slurry with excellent resistance to aggressive ground water and high water pressure.

B. KOSTER KD 2 Blitz Powder as manufactured by KOSTER American Corporation:

1. Highly reactive fast setting cementitious product. With application of the dry powder, active water leaks are sealed within a few seconds.

C. KOSTER KD 3 Sealer as manufactured by KOSTER American Corporation:
1. Silicate-water based liquid. The active ingredients penetrate deeply into the substrate and react to form an insoluble compound. The pores are permanently sealed through the crystallization process.

D. Water: Potable.

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 No. 03732) 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 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 a 3:1 mix of sharp sand and Portland cement gauged with a solution of 1 part bonding agent to 5 parts water.

G. Uneven brick or block work must be first rendered flush with a 3:1 mix of sharp sand and Portland cement mixed with a solution of 1 part bonding agent to 5 parts water to a minimum thickness of 1/4 inch (6 mm) If lime mortar was used in setting, rake out the joints prior to rendering flush.

H. Construction Joints: Construction joints should be thoroughly cleaned and dampened. Apply one slurry coat of cementitious waterproofing at the rate of 2.25 lbs per sq. yd. After it has reached an initial set, dampen if dry and apply a second

coat of the cementitious waterproofing 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 to pipe a key coat of bonding agent mixed 1:1 with water and gauged with a 1:1 sand to cement mix and leave for 24 hours. Next dampen the area and apply 2 coats of the cementitious waterproofing at the rate of 4.5 lbs per sq. yd. Flush up the cavity with mortar (3:1 sand to cement mixed with a 1:3 solution of bonding agent and water).

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. Mortar (1:3 cement to sand mixture mixed with a solution of 1:5 bonding agent to water should be used for making coves and cants to insure adequate bonding to the surface areas).

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 Bonding Emulsion to 7 parts clean water in a separate container. Mix the liquid with the Waterproofing to a thick slurry consistency.
2. For negative side applications prepare a mixing liquid of at least one part Bonding Emulsion with 3 parts water. Mix the liquid with the Waterproofing 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 Bonding Emulsion to 5 parts water for the mixing liquid. Mix the liquid with the Waterproofing 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 applied 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 cementitious waterproofing material is applied at a rate of 2.25 lb per square yard (1.2 kg/sq. m) 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 for a minimum of 12 hours before applying second coat. Wet the first coat with water prior to application of second coat, allowing excess water to run off first.
4. The cementitious waterproofing material is self-curing. Do not apply any

additional curing methods. Do not cover for 12 hours.

F. Application - Spray:
1. Wet dry surfaces with clean water just prior to spraying.
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 35-55 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 for a minimum of 12 hours before applying second coat. Wet the first coat with water prior to application of second coat, allowing excess water to run off first.
7. The cementitious waterproofing material is self-curing. Do not apply any additional curing methods. Do not cover for 12 hours.

G. For broadcast and trowel application consult with 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 the dry sealer powder into the leak until leakage has stopped completely.
3. Remove excess powder with dry paint brush and apply a saturating coat of liquid sealer, enough as can be absorbed by the previous application of powder sealer. Apply liquid sealer with a paint brush or use low pressure, airless spray equipment. Do not allow liquid sealer to run down vertical surfaces ahead of this three-step application.
4. Immediately following the application of the liquid sealer, repeat Step 1 by applying (hand-rub) another coat of powder sealer onto the wet application of liquid sealer, enough until no liquid sealer is visible and a dry surface has been achieved.
5. 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 cured materials or try to add water to bring back mixture 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, therefore when waterproofing a horizontal surface that will be a subjected to traffic the area must be covered by a concrete, cement, tile or other protective screed after 48 hours.

G. The membrane may be painted if desired however lime-based paints cannot be used.

H. The treated area must be protected from temperatures below 40º F during application and for 24 hours after application.

I. Always use clean potable water for mixing and cleaning.

END OF SECTION