

## SECTION 07162

### CRYSTALLINE WATERPROOFING

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Crystalline waterproofing on:
  - 1. Surfaces indicated on drawings.
  - 2. Elevator pits, negative pressure side (inside).
  - 3. Footings and foundation walls, negative pressure side (inside).
  - 4. Footings and foundation walls, positive pressure side (outside).
  - 5. Between mud slab and finish slab.
  - 6. Potable water tanks, positive pressure side (inside).
  - 7. Waste water tanks and flumes, positive pressure side (inside).
  - 8. Salt water storage tanks, positive pressure side (inside).

##### 1.2 RELATED SECTIONS

- A. Section 03300 - Cast-in-Place Concrete: Placement of mud slab and finish slab.

##### 1.3 REFERENCES

- A. AASHTO T-259 - Resistance of Concrete to Chloride Ion Penetration; American Association of State Highway Officials.
- B. ASTM C 109/C 109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50 mm) Cube Specimens).
- C. ASTM C 321 - Standard Test Method for Bond Strength of Chemical-Resistant Mortars.
- D. ASTM C 348 - Standard Test Method for Flexural Strength of Hydraulic Cement Mortars.
- E. ASTM C 596 - Standard Test Method for Drying Shrinkage of Mortar Containing Portland Cement.
- F. ASTM C 944 - Standard Test Method for Abrasion Resistance of Concrete or Mortar Surfaces by the Rotating-Cutter Method.

- G. COE CRD-C 48 - Method of Test for Water Permeability of Concrete; U. S. Army Corps of Engineers.
- H. NSF 61 - Drinking Water Systems - Health Effects; NSF International, Inc.

#### 1.4 SUBMITTALS

- A. Product Data: Manufacturer's descriptive literature and product specifications for each product, include:
  - 1. Laboratory tests or data that validate product compliance with the performance criteria specified.
  - 2. Copy of test report with magnified photos demonstrating crystalline growth within the concrete.
  - 3. Manufacturer's literature showing product's capability to post-seal cracks up to 0.012 inch (0.3 mm) which appear after the application.
  - 4. Copy of NSF certification for applications in connection with potable water.
- B. Certification: Manufacturer's written certification that proposed materials, details and systems as indicated and specified fully comply with manufacturer's details and specifications. If any portion of Contract Documents do not conform to manufacturer's standard recommendations, submit notification of portions of design that are at variance with manufacturer's specifications.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this Section with minimum 20 years documented experience.
  - 1. ISO 9001 certified; submit copy of certificate.
- B. Installer Qualifications: Acceptable to manufacturer with documented experience on at least 5 projects of similar nature in past 5 years and/or training provided by the product manufacturer.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store off the ground and covered, handle and protect products from moisture in accordance with manufacturer's instructions.
- B. Deliver materials in manufacturer's unopened containers, fully identified with brand, type, grade, class and all

other qualifying information. Provide Material Safety Data Sheets for each product.

- C. Take necessary precautions to keep products clean, dry and free of damage.

#### 1.7 PROJECT CONDITIONS

- A. Conduct a pre-installation meeting one week prior to commencing work to familiarize installers with project conditions and others with precautions to be taken after installation of waterproofing.
- B. Coordinate waterproofing work with work of other trades.
- C. Provide materials and accessories in timely manner so as not to delay work.
- D. Maintain surfaces to be waterproofed and surrounding air temperature at not less than 40 degF (5 degC) for at least 48 hours before, during and after application of waterproofing.
- E. Do not apply materials to frozen or frost-filled surfaces.
- F. Exercise caution when temperatures exceed 90 degF (32 degC). It may be necessary to apply waterproofing during times when the sun is not at its strongest (i.e. early morning, evening or night).

#### 1.8 WARRANTY

- A. Warrant installed waterproofing to be free of leaks and defects for \_\_\_\_\_ years from date of acceptance, with the exception of structural cracks in the waterproofed concrete which are 0.012 inch (0.3 mm) or wider.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Provide products of Vandex Sales & Services, Inc., Columbia, MD 21044-0440. ASD. Tel: (410) 964-1410; Fax: (410) 964-1526; e-mail: info@vandexus.com.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01600; include substantiation of product performance.

C. Substitutions: Not permitted.

## 2.2 MATERIALS

- A. Crystalline Waterproofing: Blend of rapid-hardening portland cement, specially treated quartz sand and a compound of active chemicals, with the following characteristics:
1. Product: VANDEX SUPER.
  2. Color: Cement gray.
  3. Aggregate: Powder.
  4. Potable Water Certification: NSF (NSF Standard 61).
  5. Permeability in accordance with CRD-C 48: 0.00 cm/sec permeability at 210 psi (1.5 MPa) or 484 feet (148 m) over 20 days testing period on negative side.
  6. Compressive Strength when measured in accordance with ASTM C 109: 10,200 psi (70.3 MPa) at 28 days.
  7. Flexural Strength when measured in accordance with ASTM C 348: 730 psi (5.0 MPa) at 28 days.
  8. Bond Strength when measured in accordance with ASTM C 321: 690 psi (4.7 MPa) at 14 days.
  9. Abrasion resistance when measured in accordance with ASTM C 944: 1.28 g (10 kg/sq ft on 4000 psi concrete at 28 days).
  10. Sulfate Resistance when measured in accordance with ASTM C 452: 0.0012 percent (28 days).
  11. Chloride Ion Penetration when measured in accordance with AASHTO T-259: 99.99 percent resistant at 1/4 inch (6 mm), 100 percent at 1 inch (25 mm) depth.
  12. Bond of Reinforcement when measured in accordance with ASTM C 321: No loss of bond due to waterproofing material.
- B. Water: Clean, clear, non-alkaline and free of salts and other harmful elements; potable.

## 2.3 ACCESSORY MATERIALS

- A. Patching Compound: Ready-mixed cementitious waterproofing and repair mortar recommended by waterproofing manufacturer for honeycombs, tie holes, seal strips (fillets/coves, reglets), etc., with the following characteristics:
1. Product: VANDEX UNI MORTAR 1 Z.
  2. Compressive Strength when measured in accordance with ASTM C 109: 7600 psi (52.4 MPa) at 28 days.

3. Flexural Strength when measured in accordance with ASTM C 348: 700 psi (4.8 MPa) at 28 days.
  4. Shrinkage when measured in accordance with ASTM C 596: Minus 0.093 percent at 28 days; plus 0.073 percent at 120 days.
- B. Patching Compound for Seal Strips in Contact with Potable Water: Ready-mixed cementitious waterproofing and repair mortar recommended by waterproofing manufacturer for honeycombs, tie holes, seal strips (fillets/coves, reglets), etc., with the following characteristics:
1. Product: VANDEX MORTAR.
  2. Compressive Strength when measured in accordance with ASTM C 109: 6900 psi (47.6 MPa) at 28 days.
  3. Potable water certification: NSF (NSF Standard 61).
- C. Plugging Compound for Active Water Penetrations: Accelerating agent for capillary waterproofing products or pulverized rapid-setting cement.
1. Product: VANDEX QUICKBINDER or VANDEX PLUG.
  2. Potable water certification: NSF (NSF Standard 61).

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and adjoining construction, and conditions under which work is to be installed. Do not proceed with work until unsatisfactory conditions are corrected.
- B. Verify the following substrate conditions before application of waterproofing:
1. That substrate condition is satisfactory and in accordance with manufacturer's instructions.
  2. That concrete surfaces have open pores and wood float finish on horizontal surfaces.
  3. That concrete surfaces are free of voids, spalled areas, loose aggregate and sharp protrusions, and with no coarse aggregate visible.
  4. That curing compounds or surface hardeners incompatible with waterproofing have not been used on concrete.

### 3.2 PREPARATION

- A. Protect adjacent surfaces not designated to receive waterproofing.
- B. Remove concrete fins and projections and general surface dirt.
- C. Remove grease, oil and other contaminants. Use steam cleaning, high-pressure water blasting, wet or dry sand blasting, wire brush or other methods recommended by waterproofing manufacturer to produce surfaces suitable for application of waterproofing.
- D. Follow manufacturer's instructions to clean and prepare surfaces and seal cracks and joints.
- E. Rout out faulty construction joints and visible cracks not subject to movement that exceed 0.012 inch (0.3 mm) in width to approximately 3/4 inch (19 mm) width and minimum 3/4 inch (19 mm) depth.
  - 1. Remove all protrusions, work back to sound concrete and chisel out any spalled or honeycombed areas.
  - 2. Roughen form tie holes.
  - 3. Stop water leakages according to manufacturer's plugging specifications.
- F. Rinse surfaces to be waterproofed several times so that the concrete is thoroughly saturated. Surfaces shall be moist but not wet when waterproofing system is applied. Remove any surface water on horizontal surfaces.

### 3.3 INSTALLATION

- A. Mix waterproofing material in proportions recommended by manufacturer.
- B. Apply waterproofing material in accordance with manufacturer's specifications and recommendations.
- C. Cavity Fill:
  - 1. Prime cavities at cleaned and prepared faulty construction joints, cracks, form tie holes, etc. with waterproofing material and fill flush to surface with patching compound in mortar consistency.
  - 2. Laminate patching compound in 2 to 3 layers in accordance with manufacturer's instructions for larger spalled or honeycombed areas.

- D. Horizontal and Vertical Construction Joints: Prime seal strips/reglets in pre-formed 1 x 1 inch (25 x 25 mm) cavities with waterproofing material and fill flush to surface with patching compound in mortar consistency.
- E. Freshly Poured Slabs: Dry-sprinkle waterproofing material to freshly poured slabs at 2.0 lb/sq yd (1 kg/sq m) and power trowel.
- F. Over Mud Slab/Under Finish Slab: Dry distribute to prewatered mud slab at 2.25 lb/sq yd (1.2 kg/sq m) immediately prior to casting the structural slab.
- G. Existing Slabs: Brush or spray apply waterproofing material in slurry consistency, in one coat on existing slabs.
  - 1. For standard applications, apply at rate of 2.0 lb/sq yd (1 kg/sq m).
  - 2. For applications in contact with salt or waste water, apply at rate of 2.5 to 2.8 lb/sq yd (1.4 to 1.5 kg/sq m).
  - 3. Spread material evenly and work it well into the surface.
- H. Vertical Surfaces:
  - 1. Apply base coat of waterproofing material in slurry consistency at uniform rate of 1.25 to 1.4 lb/sq yd (0.7 to 0.75 kg/sq m). Apply using appropriate compressed-air spray equipment, stiff masonry brush or stiff broom.
  - 2. After base coat has reached initial set but is still "green" (tacky), apply finish slurry coat of waterproofing mixture at 1.25 to 1.4 lb/sq yd (0.7 to 0.75 kg/sq m). Apply so that final brush or broom strokes leave parallel, uniform texture.

### 3.4 CURING

- A. Follow manufacturer's general instructions for curing and hardening of waterproofing material.

- B. Protect surfaces from rain, frost and drying out.

### 3.5 PREPARATION FOR DECORATION, COATING AND TILING

- A. Cure surfaces treated with crystalline waterproofing that are to be coated, painted or tiled for 4 weeks.

1. At the end of the curing period, saturate surfaces with water and neutralize with a 1:8 solution of muriatic acid.
2. Rinse waterproofed areas thoroughly with water.

### 3.6 ADJUSTING

- A. Following application and completion of related work, as required, but well prior to completion of entire project, fill tanks to capacity and allow to stand not less than 2 weeks.
- B. If any leaks appear during this period, drain tanks. Notify Owner prior to draining tanks.
- C. Stop leakage due to curing and shrinkage cracks by installing plugs, seal-strips and additional surface treatment at no additional cost to the Owner.
  1. Following all required repairs, re-test by refilling tank and allow to stand not less than 1 week.
  2. Follow this procedure until all leakage is eliminated.
- D. Thoroughly rinse all tanks and reservoirs with water and with 100 ppm chlorine water solution.

### 3.7 CLEANING

- A. Remove materials left over and any foreign material resulting from the work from the site.
- B. Clean adjacent surfaces and materials.

END OF SECTION