

SECTION 07 16 16**CRYSTALLINE WATERPROOFING****PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Furnishing of all labor, materials, services and equipment necessary for the supply and installation of cementitious crystalline waterproofing on concrete structures and surfaces as shown on drawings and as specified in this section.
- B. Related Sections:
 - 1. See Section 03300 - Cast-in-Place Concrete
 - 2. See Section 07900 – Joint Sealers
 - 2. See Section 09900 - Paints and Coatings

1.2 REFERENCES

- A. ASTM C 109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars.
- B. ASTM C 321 - Standard Test Method for Bond Strength of Chemical-Resistant Mortars.
- C. ASTM C 348 - Standard Test Method for Flexural Strength of Hydraulic Cement Mortars.
- D. ASTM C 596 - Standard Test Method for Drying Shrinkage of Mortar Containing Hydraulic Cement.
- E. COE CRD-C 48-92 - Method of Test for Water Permeability of Concrete; U.S. Army Corps of Engineers.
- F. NSF/ANSI Standard 61 - Drinking Water System Components – Health Effects (for use of waterproofing material on structures holding potable water).

1.3 SUBMITTALS

- A. General:
Submit manufacturer's 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.
- B. Product Data:
 - 1. Submit manufacturer's descriptive literature and product specifications for each product.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Company specializing in manufacturing and/or marketing Products specified in this Section with minimum 10 years documented experience.
- B. Installer Qualifications:
 - 1. 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.

1.5 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 Safety Data Sheets for each product.
- C. Take necessary precautions to keep products clean, dry and free of damage.

1.6 WARRANTY

- A. Warrant installed waterproofing to be free of leaks and defects for (*specify term*)_____ year(s) from date of acceptance, with the exception of structural cracks in the waterproofed concrete which are 0.02" (0.4 mm) or wider or any size dynamic cracks..

1.7 SYSTEM REQUIREMENTS

- A. Coordinate waterproofing work with work of other trades.
- B. Provide materials and accessories in timely manner so as not to delay Work.

1.8 PROJECT CONDITIONS

- A. Maintain surfaces to be waterproofed and surrounding air temperature as well as concrete temperature at not less than 40 deg F (5 deg C) for at least 48 hours before, during and after application of waterproofing.
- B. Do not apply materials to frozen or frost-filled surfaces.
- C. Exercise caution when temperatures exceed 90 deg F (32 deg C). It may be necessary to apply waterproofing during times when the sun is not at its strongest (i.e. early morning, evening or night).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Provide products of AQUAFIN, Inc. 505 Blue Ball Road, #160. Elkton, MD, 21921. Phone (800) 394-1410, or (410) 392-2300, Fax (410) 392-2324; e-mail info@aquafin.net.
- B. Requests for substitutions will be considered only if submitted to the architect/engineer in writing and must include substantiation of product performance, 10 days prior to the original bid date.

2.2 MATERIALS

- A. Crystalline Waterproofing: Blend of rapid-hardening Portland cement, specially treated quartz sand and a compound of active proprietary chemicals with the following characteristics:

1. Product:	AQUAFIN-IC
2. Color:	Cement gray or white (please specify)
3. Aggregate:	Powder
4. Potable water: (NSF/ANSI Standard 61)	Certification for potable water structures
5. Permeability: (CRD-C 48-92)	No measurable leakage through waterproofed concrete, when tested at 460 feet (140 m) head or 200 psi (14 bar), positive or negative water pressure.
- B. Water: Clean, clear, non alkaline and free of salts and other harmful elements; potable.

2.3 ACCESSORY MATERIALS

- A. Fast setting Patching Compound: Ready-mixed cementitious waterproofing and repair mortar recommended by waterproofing manufacturer for honeycombs, tie holes, seal strips (fillets/coves, reglets), etc.

1. Product:	AQUAFIN MORTAR-IC
2. Compressive Strength: (ASTM C-109)	4000 psi (27 MPa) at 28 days

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| 3. | Flexural Strength:(ASTM C-348) | 800 psi (5.7 MPa) at 28 days |
| 4. | Shrinkage: (ASTM C-596) | 0.04% |
| 5. | Potable water: (NSF/ANSI 61) | Certification for potable water structures |
- B. Slower setting Structural Patching Compound: Pre-blended, cementitious waterproofing and repair mortar recommended by waterproofing manufacturer for larger repair areas.
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| 1. | Product: | AQUAFIN MORTAR-LN |
| 2. | Compressive Strength: (ASTM C-109) | 6000 psi (41 MPa) at 28 days |
| 3. | Flexural Strength: (ASTM C-348) | 1160 psi (8 MPa) at 28 days |
| 4. | Shrinkage: (ASTM C-596) | 0.023% |
| 5. | Adhesion/Bond: (ASTM C-321) | >225 psi (>1.5 Mpa) at 28 days |
| 6. | Potable water: (NSF/ANSI 61) | Certification for potable water structures |
- C. Plugging Compound for Active Water Penetrations: Crystalline technology enhanced accelerating agent for capillary/crystalline waterproofing products.
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| 1. | Product: | AQUAFIN PLUG-IC |
| 2. | Compressive Strength:(ASTM C-109) | 2800 psi (19.3 MPa) at 24 hrs |
| 3. | Flexural Strength:(ASTM C-348) | 320 psi (2.2 MPa) at 24 hrs |
| 4. | Potable water: (NSF/ANSI 61) | Certification for potable water as per NSF 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 capillary/crystalline 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. Substrate preparation:
1. Remove remaining concrete fins and projections, and general surface dirt.
 2. 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 ("tooth and suction") for application of waterproofing, minimum ICRI CSP 3 profile. Do not apply to smooth slabs.
 3. Follow manufacturer's instructions to clean and prepare surfaces and seal cracks and joints.
 4. Rout out faulty construction joints and visible cracks not subject to movement, exceeding 0.02" (0.4 mm) in width to approx. 3/4" (20 mm) width and minimum 1" (25 mm) depth.
 5. Remove all protrusions, work back to sound concrete and chisel out any spalled or honeycombed areas.
 6. Roughen formtie holes.
 7. Stop active water leakages as per manufacturers plugging specifications.
- C. 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 quantities as per manufacturer's specifications and recommendations.
- C. Cavity Fill:
 - 1. Prime cavities at cleaned and prepared faulty construction joints, cracks, formtie 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 as per manufacturer's instructions for larger spalled or honeycombed areas.

Specifier: SELECT AND SPECIFY SEAL STRIPS/REGLETS IN ARTICLE BELOW IN CASE OF NO WATERSTOPS PRESENT, OR IN ADDITION TO WATERSTOPS. DELETE IF NOT REQUIRED.

- C. Horizontal and Vertical Construction Joints:
 - 1. Prime seal strips/reglets in pre-formed 1" x 1" (25 x 25 mm) cavities with waterproofing material and fill flush to surface with patching compound in mortar consistency.

Specifier: INCLUDE ANY OF THE FOLLOWING METHODS THAT ARE APPLICABLE TO THE PROJECT. USE DRY-SPRINKLE METHOD FOR SLABS EXPOSED TO MECHANICAL WEAR OR ABRASION, SUCH AS IN PARKING GARAGES, POTABLE OR WASTE WATER TANKS, ETC.)

- D. Horizontal surfaces:
 - 1. Dry-sprinkle waterproofing material to freshly poured slabs at 2.0 lb/sq.yd. (1.0 kg/sq.m) and power or hand trowel.
 - 2. Dry distribute to pre-watered mud slab or existing slab to receive another topping at 2.25 lb/sq.yd. (1.2 kg/sq.m) immediately prior to casting the structural slab or new topping. Alternatively apply in slurry form. Contact manufacturer for guidance.
 - 3. Brush or spray apply waterproofing material in slurry consistency, in one coat on existing slabs.
 - a. For standard applications, apply at rate of 2.0 lb/sq.yd. (1.0 kg/sq.m).
 - b. For applications in contact with salt or waste water, apply at rate of 2.5 - 2.8 lb/sq.yd. (1.4 to 1.5 kg/sq.m).
 - c. Spread material evenly and work it well into the surface.

- F. Vertical Surfaces:
 - 1. Apply base coat of waterproofing material in slurry consistency at uniform rate of 1.25 - 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 material at 1.25 - 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. Use light pre-watering between coats when rapid drying conditions occur.

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.

Specifier: INCLUDE THE PARAGRAPH BELOW IF WATERPROOFING IS TO BE OVERCOATED WITH PAINT, EPOXY OR TILE MORTAR.

3.5 PREPARATION FOR DECORATION, COATING AND TILING

- A. All surfaces treated with Capillary/Crystalline Waterproofing which are to be coated or painted shall be left to cure for 4 weeks. At the end of the curing period, the surfaces shall be saturated with water and neutralized with a 1:8 solution of muriatic acid. Rinse waterproofed areas thoroughly with clean water.

Specifier: THE FOLLOWING ARTICLE APPLIES ONLY TO WATER TANKS, RESERVOIRS, ETC.

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 1 week. As a guide, a relatively small tank should be filled over a period of three days. Fill larger structures at a uniform rate not greater than 6.5 feet (2 m) in 24 hours. Should leakage occur after this period due to initial loading forces or thermal stress (i.e. cold water contacting warmer concrete), drain tanks to perform repairs. Notify Owner prior to draining tanks.
- B. Stop leakage due to curing and shrinkage cracks in concrete, which can develop during this period by installing plugs, seal-strips and additional surface treatment at no additional cost to the Owner. Following all required repairs, re-test by refilling tank and allow to stand not less than 1 week. Follow this procedure until all leakage is eliminated.
- C. Thoroughly rinse all tanks and reservoirs with water and with 100 ppm chlorine water solution if this is included in the waterproofing contract.

3.7 ACCEPTANCE

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

END OF SECTION

Project: (04/17)