
MARINE AQUARIUM & ZOO TANKS

SECTION 071614

ACRYLIC MODIFIED (FLEXIBLE) CEMENTITIOUS WATERPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Furnish all labor, materials, tools and equipment as necessary to perform Acrylic Modified Cement Waterproofing in aquarium tanks, on new and existing structures as shown on drawings and as specified in this section.
- B. Related Sections:
 - 1. See section 03 30 00 - Cast-in-Place Concrete
 - 2. See section

1.3 REFERENCES

- A. ASTM C 109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars.
- B. ASTM C 348 - Standard Test Method for Flexural Strength of Hydraulic Cement Mortars.
- C. ASTM C-321 - Standard Test Method for Bond Strength of Chemical-Resistant Mortars.
- D. ASTM E-96 - Standard Test Method for Water Vapor Transmission of Materials.
- E. COE CRD-C 48 - Method of Test for Water Permeability of Concrete; U.S. Army Corps of Engineers.

1.4 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 literature and installation instructions for each product.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications:

1. Company specializing in marketing or manufacturing products specified in this Section with minimum 10 years documented experience.
 2. Manufacturer with documented experience on at least 10 projects of similar nature in past 5 years.
- 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.
- 1.6 DELIVERY, STORAGE AND HANDLING
- A. Deliver and store in a dry area between 40°F (5°C) and 90°F (32°C). Handle and protect from freezing and direct sun light 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 SYSTEM REQUIREMENTS
- A. Coordinate waterproofing installation with 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 at not less than 40°F (5°C). Apply only when temperatures are steady or rising.
 - B. Do not apply materials to frozen or frost-filled surfaces.
 - C. Exercise caution when temperatures exceed 90°F (32°C).
- 1.9 PRE-INSTALLATION CONFERENCE
- A. Conduct pre-installation conference in accordance with Section 01200.
 - B. Convene pre-installation conference prior to commencing work of this Section with the attendance of the Architect, Contractor, Applicator and Manufacturer's Representative.
- 1.10 WARRANTY
- A. Comply with provisions of Section 01700.
 - B. Manufacturer's Warranty: Manufacturer shall provide standard product warranty executed by authorized company official. Term of warranty shall be 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Approved Manufacturers: 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. Waterproofing/Tank Lining Material - Acrylic Modified Cement Waterproofing: Cementitious, two-component, acrylic emulsion based, highly flexible, crack bridging waterproof membrane barrier against positive water pressure, with the following characteristics:
 - 1. Product: AQUAFIN-2K/M
 - 2. Color: Gray (and/or powder blue)
 - 3. Dry Component-A: Precise blend of cementitious material
 - 4. Liquid Component-B: White acrylic emulsion and admixtures
 - 5. Working Time: Approximately 45 minutes
 - 6. Shore A Hardness: >90
 - 7. Bond/Adhesion: (ASTM C-321) 215 psi (1.5 MPa) @ 28 days
 - 8. Tear Resistance: 190 psi (1.3 MPa) at 68°F (20°C)
 - 9. Elongation: (%) 60 (gray); 40 (white) at 68°F (20°C)
 - 10. Elongation: (mils) 40 (1.0 mm) gray; 25 (0.6 mm) white
 - 11. Crack bridging capacity: 1/16" (1.5 mm)
 - 12. Vapor Permeability: (ASTM E-96) 1.2 perm
 - 13. Waterproofing:(CRD-C 48-92) Withstands 200 psi = 460 feet (14 bar = 140 m) hydrostatic pressure (positive side) at 3/32" (2.4 mm) thickness.

2.3 ACCESSORY MATERIALS

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Specifier, please choose applicable items (A, B., C., D, E, F, or none).

- A. Patching Compound: Pre-blended, cementitious waterproofing and repair mortar recommended by waterproofing manufacturer for honeycombs, tie holes, seal strips (coves, reglets), etc.
 - 1. Product: AQUAFIN MORTAR-LN
 - 2. Color: Gray
 - 3. Aggregate: Powder
 - 4. Compressive Strength: (ASTM C-109) 6000 psi (41 MPa) @ 28 days
 - 5. Flexural Strength: (ASTM C-348) 1160 psi (8 MPa) @ 28 days
- B. Sealing Tape for joints and cracks: Elastomeric, tear resistant, breathable waterproofing tape.
 - 1. Product: AQUAFIN JOINT SEALING TAPE-2000
 - 2. Width: 4.75" (120 mm) or 8" (200 mm)
 - 3. Elongation: 60%
 - 4. Tear Strength: 725 psi (5.0 MPa)
- C. Reinforcement Mesh: Polypropylene non woven fleece, reinforces tear resistance of waterproofing material, for zones posed to cracking.
 - 1. Product: AQUAFIN-2K-FABRIC
 - 2. Thickness: 8 mils (0.2 mm)
 - 3. Tear strength: longitudinal 18 lbs (8.2 kg)
diagonal 20 lbs (9.1 kg)
- D. Sealing Gasket for PVC pipe and other penetrations: Elastomeric, tear resistant, breathable waterproofing sealing gasket.

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| 1. | Product: | AQUAFIN-GASKET 18/18 |
| 2. | Thickness: | approx. 1/64" (0.4 mm) |
| 3. | Color: | White |
| 3. | Size: | approx. 18" x 18" (45 cm x 45 cm) |
- E. One-component Waterproofing Material: Cementitious waterproofing where negative side water pressure (i.e. ground water) is expected, in combination with two-component Waterproofing Material with the following characteristics:
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| 1. Product: | AQUAFIN-1K |
| 2. Color: | Gray |
| 3. Aggregate: | Powder |
| 4. Compressive Strength: (ASTM C-109) | 5000 psi (35 Mpa) @ 28 days |
| 5. Flexural Strength: (ASTM C-348) | 725 psi (5 Mpa) @ 28 days |
| 6. Bond/Adhesion: (ASTM C-321) | 220 psi (1.5 Mpa) @ 28 days |
| 7. Vapor Permeability: (US Perms) | 17 (ASTM E-96) |
- F. Decorative Protective Coating: One-component, solvent free, ready-to-use acrylic liquid as top coating over two-component Waterproofing Material, where a smoother or more decorative finish is required.
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| 1. Product: | ADICOR-SB04 |
| 2. Color: | Azure blue |
| 3. Aggregate: | Liquid |
| 4. Bond/Adhesion: (ASTM C-321) | >290 psi (2.0 MPa) @ 28 days |
| 5. Elongation: (%) | 40% at 68°F (20°C) |
| 6. Elongation: (mils) | >16 mils (>0.40 mm) |
| 7. Vapor Permeability: (ASTM E-96) | ~1.8 perm |

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine all construction substrates and conditions under which waterproofing materials are to be installed. Do not proceed with the waterproofing application until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Protect adjacent surfaces not designated to receive waterproofing.
- B. Substrate preparation:
1. Remove oil, grease, dirt, loose particles, remains of form oils, water repellents, rust or other coatings by wet or dry sand blasting, or other mechanical means to produce surfaces suitable for application of waterproofing.
 2. Follow manufacturer's instructions to clean and prepare surfaces and seal cracks and joints.
 3. Voids and bug holes in concrete substrates: 1/4-inch (6 mm) diameter and larger, pre-treat with patching compound. Less than 1/4-inch (6 mm) diameter can be filled with a scratch coat of one-component waterproofing material.
- C. Rinse surfaces to be waterproofed with clean water to saturated surface dry (SSD) condition, with no standing 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.

Specifier: choose articles depending on type of project, i.e. poured-in-place concrete or shotcrete tanks

Poured-in-place concrete tanks:

1. Cavity fill, honeycombs & formtie holes:
 - a. Fill voids at cleaned and prepared faulty construction joints, cracks, formtie holes, etc. with patching compound in mortar consistency flush to surface.
 - b. Laminate patching compound in 2 to 3 layers as per manufacturer's instructions for larger spalled or honeycombed areas.

2. Taping horizontal and vertical construction joints:

Install joint and crack sealing tape, embedded in waterproofing material as follows:

 - a. Apply two-component waterproofing material by brush in a six to seven inch (15–18 cm) wide strip coat centered over all joints, cracks, penetrations and changes of plane to be taped.
 - b. While this coat is still wet, unroll joint sealing tape into the coating and apply a coat of two-component waterproofing material over the tape, smoothing out wrinkles and fish mouths.

3. Sealing around PVC pipe penetrations (applies to all types of tanks):
 - a. Place sealing gasket over pipe and mark size of penetration, then cut out necessary opening (penetration).
 - b. Apply one prime coat two-component waterproofing material over concrete and exposed PVC pipe.
 - c. While this coat is still wet, place and firmly press sealing gasket into the coating and cover it with a top coat of two-component waterproofing material.

4. Alternative I: Horizontal and vertical surfaces with standard gray color:
 - a. Apply two-component waterproofing material in 2 (two) coats (standard gray) at 90 mils (2.4 mm) total thickness.

5. Alternative II: Horizontal and vertical surfaces with azure blue protective coating:

Specifier: call manufacturer for available special color variations in protective coating

- b. Apply base coat of waterproofing material (standard gray color) at 45 mils thickness (166 sq.ft/77 lb (15.6 m²/35 kg) unit).
- c. Apply top coat of waterproofing material (powder blue color) at 45 mils thickness (166 sq.ft/77 lb (15.6 m²/35 kg) unit).
- d. Apply one coat of protective coating (azure blue color) at 20 mils thickness (100 sq.ft/gal (400 ml/m²)) over powder blue waterproofing material.

Shotcrete tanks:

1. Apply two-component waterproofing material in 2 (two) coats at 90 mils (2.4 mm) total thickness.

Negative Side Waterproofing:

Specifier: include this article only if ground water is present or expected

Follow manufacturer's specifications and instructions for below grade structures where infiltration from ground water is expected:

1. Apply 1st (base) coat one-component waterproofing material at 50 mils (1.2 mm) thickness.
2. Apply 2nd (top) coat two-component waterproofing material at 60 mils (1.5 mils) as soon as base coat has reached initial set.

C. Application considerations:

1. Apply, using stainless steel trowel, tampico brush, short nap roller, or appropriate compressed-air spray equipment.
2. Apply only when surface and ambient temperatures are 40°F (5°C) and rising. At high temperatures (i.e. 86°F (30°C) and above) protect application from direct sun and wind to prevent premature surface drying and shrinkage cracks. Apply material in two coats minimum.
3. Application thickness should not exceed 1/8-inch (120 mils (3 mm)).
4. If needed, such as in zones posed to movement, the waterproofing material can be additionally reinforced with a reinforcing mesh (supplied by waterproofing manufacturer), embedded between two waterproofing layers.
5. Bridge static and dynamic cracks or joints with elastomeric joint sealing tape, as supplied by waterproofing manufacturer.
6. Prime and protect alkali sensitive metals such as copper, aluminum, galvanized or zinc treated metal first with a primer before over-coating with waterproofing material. Follow manufacturer's recommendations for primer material.
7. Do not apply in window rebates. Refer to window manufacturer's instructions.

D. Inspection:

Specifier: please insert number of site visits required. In general, on a full size aquarium 3 visits are standard. On a single tank 0 to 1 visit might be enough.

Include costs forvisits of the material manufacturer. (I.e. One pre-installation visit, one during the application, and one other at the discretion of the Architect.)

3.4 CURING

- A. Follow manufacturer's general instructions for curing and hardening of two-component waterproofing material. Do not use water for curing. Two-component waterproofing material is self-curing.

3.5 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 24 hours. Fill larger structures at a uniform rate not greater than 6.5 feet (2 m) in 24 hours. Should leakage occur after this period, drain tanks to perform repairs. Notify Owner prior to draining tanks.

3.6 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: (11/05)