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**SECTION 03 01 00**

**MAINTENANCE OF CONCRETE IN COLD STORAGE**

**(Pavemend SLQ)**

**PART 1 – GENERAL**

**1.01 RELATED DOCUMENTS**

A. Documents affecting work include, but are not limited to, drawings and general provisions including General and Supplementary Conditions and Division 01 Specifications.

B. Related Sections include the following:

1. 03 01 30 Maintenance of Cast-in-Place Concrete

2. 03 01 50 Maintenance of Cast Decks and Underlayments

3. 03 11 00 Concrete Forming

4. 03 20 00 Concrete Reinforcing

5. 03 30 00 Cast-In Place Concrete

6. 03 31 00 Structural Concrete

7. 03 31 23 High Performance Structural Concrete

8. 13 21 26 Cold Storage Rooms

9. 13 21 26.13 Walk-in Coolers

10. 13 21 26.16 Walk-in Freezers

C. Referenced Standards include the following:

1. ASTM C109 – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars

2. ASTM C78 – Standard Test Method for Flexural Strength of Concrete

3. ASTM C157 – Standard Test Method for Length Change of Hardened Cement Mortar and Concrete

4. ASTM C469 – Standard Test Method for Static Modulus of Elasticity and Poisson’s Ratio of Concrete in Compression

5. ASTM C496 – Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens

6. ASTM C666A – Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing (Procedure A)

7. ICRI Guideline 210.4R-2021 Guide for Nondestructive Evaluation (NDE) Methods for Condition Assessment, Repair, and Performance Monitoring of Concrete Structures

8. ICRI Guideline 310.2R-2013 Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair

9. ICRI Guideline 320-1R-2019 Guide for Selecting Application Methods for the Repair of Concrete Surfaces

10. ICRI Guideline 320.2R-2018 Guide for Selecting and Specifying Materials for Repair of Concrete Structures

11. ACI SPEC-301-16 Specifications for Structural Concrete

12. ACI 302.1R-15 Guide to Concrete Floor and Slab Construction

13. ACI 306R-16 Guide to Cold Weather Concreting

14. ACI 318-19(22) Building Code Requirements for Structural Concrete

15. ACI 318-89 Building Code Requirements for Reinforced Concrete

16. ACI 347R-14 Guide to Formwork for Concrete

17. ACI 546R-14 Guide to Concrete Repair

**1.02 SUMMARY**

A. This section specifies furnishing and applying a cement based, very rapid setting, semi self-leveling, structural repair mortar that is water-activated, and can be applied in below freezing temperatures as low as 0°F (-18°C).

B. Section includes Pavemend SLQ (Semi Self-Leveling, Extended, Very Rapid Repair Mortar for Warm or Cold Weather).

**1.03 SUBMITTALS**

A. Product Data: Submit Aquafin Technical Data Sheets and SDSs (Safety Data Sheets) for Pavemend SLQ and any accessory products used.

B. Applicator Qualifications: Submit proof of status as a Qualified Applicator via a letter or certificate from Aquafin.

**1.04 QUALITY ASSURANCE**

A. Applicator Qualifications: All applicators must be trained and possess adequate experience in the application of Pavemend SLQ and have successfully completed at least five projects of similar size, scope, and complexity.

B. Manufacturer Qualifications: Manufacturer must have at least ten years of experience manufacturing very rapid setting, semi self-leveling, structural repair mortar.

**1.05 WARRANTY**

A. Product must have a standard warranty of at least one year.

1. If an extended warranty is desired for Pavemend SLQ, a warranty request form may be obtained by contacting Aquafin Technical Department.

**1.06 DELIVERY, STORAGE AND HANDLING**

A. Deliver Pavemend SLQ in original, unopened containers with the manufacturer’s name, labels, product identification, and batch numbers.

B. Store Pavemend SLQ in original, unopened, undamaged, sealed pail out of direct sunlight in a cool, dry, indoor location.

**1.07 ENVIRONMENTAL REQUIREMENTS and JOBSITE CONDITIONS**

A. For cold storage applications [in ambient temperatures below 40°F (4°C)], condition Pavemend SLQ and any aggregate to approximately 70°F (21°C) and ensure that these temperatures are maintained for Pavemend SLQ and any aggregate. Use warm water for mixing. Refer to Section 3.03.

B. Comply with required substrate temperature range, and ambient temperature range for the length of time stated on Aquafin’s written instructions for Pavemend SLQ.

1. For walk-in coolers [in ambient temperatures as low as 33°F (0.5°C)], warming the concrete substrate using portable heat blowers aimed directly at the concrete slab will accelerate the curing process.

2. For walk-in freezers, it is recommended that the concrete substrate be warmed to temperatures above 32°F (0°C), prior to application to facilitate the rapid curing process.

C. Prepare application area, mixing stations, equipment, tools and crew so that everything is ready to go prior to mixing Pavemend SLQ.

1. Provide suitable area(s) for mixing materials and staging located as close as possible to each area that will receive repairs.

**PART 2 – PRODUCTS**

**2.01 MANUFACTURERS**

A.AQUAFIN, Inc. 505 Blue Ball Road, #160. Elkton, MD, 21921. Phone: 1-866-AQUAFIN or 410-392-2300, website: [www.aquafin.net](http://www.aquafin.net) e-mail: [technical@aquafin.net](mailto:technical@aquafin.net)

B. No substitutions allowed.

**2.02 MATERIALS**

A. Very Rapid Setting, Semi Self-Leveling, Structural Repair Mortar

B. Acceptable Products:

1. Pavemend SLQ (Semi Self-Leveling, Extended, Very Rapid Repair Mortar for Warm or Cold Weather).

C. Performance and Physical Properties: Meet or exceed the following values for material:

1. Material: cement based, structural repair mortar that is very rapid setting, semi self-leveling, and extended.

2. Compressive Strength: 3,000 psi @ 1 hour, > 4,000 psi @ 3 hours, > 4,500 psi @ 24 hours, > 5,000 psi @ 7 days, > 6,000 psi @ 28 days

3. Flexural Strength: > 500 psi @ 7 days, > 600 psi @ 28 days

4. Splitting Tensile Strength: > 150 @ 28 days, > 250 @ 28 days

5. Bond Strength: > 1,200 psi @ 24 hours, > 1,375 psi @ 7 days

6. Rapid Freeze Thaw Resistance (durability factor): 99.6% @ 300 cycles

7. Scaling Resistance: loss of 0 lbs/ft2 @ 50 cycles

8. Modulus of Elasticity: 1.93 EE6 @ 28 days

9. Coefficient of Thermal Expansion: 2.95 @ 28 days

10. Length Change:

a. Dry: -0.03% @ 28 days

**2.03 ACCESSORIES**

A. (Optional) Steel Reinforcement Anti-corrosion Coating. (Pavemend SLQ does not require the use of a bonding agent.)

1. REBAR PRIMER/BOND-CI (Cementitious corrosion protection and bonding agent)

**PART 3 – EXECUTION**

**3.01 EXAMINATION**

A. Verify that jobsite conditions are appropriate for the application of Pavemend SLQ.

B. Inspect concrete substrate in application area and verify that it is suitable to receive Pavemend SLQ.

C. Provide a written report with photos documenting and describing the conditions of the jobsite and the substrate. Include any areas of concern or uncertainty.

1. Concrete that shows signs of insufficient strength or poor quality should be reported to the Engineer.

2. Concrete that is discolored from oil or grease contamination should be reported to the Engineer.

3. Concrete cracks that are not noted on details, drawings, or specifications should be reported to the Engineer.

4. Exposed Steel Reinforcement with obvious signs of corrosion that is not noted for replacement on details, drawings, or specifications should be reported to the Engineer.

D. Do not proceed with the application of Pavemend SLQ until all areas of uncertainty have been clarified, all concerns have been addressed, and jobsite and substrate conditions have been corrected and made ready for the application.

**3.02 PREPARATION**

A. Concrete Surface Preparation:

1. Follow Aquafin’s written instructions for concrete surface preparation.

2. Mechanically prepare concrete to a CSP of 5 – 7. Reference ICRC (International Concrete Repair Institute) Guideline No. 310-2R-2013. Use a chipping hammer, chisel, steel shotblast, high pressure water blast (hydroblast) greater than 5,000 psi, or similar methods.

3. After mechanical preparation, clean the concrete substrate. All surfaces must be clean and free of previous coatings, loose or deteriorated concrete, cement laitance, sand, dirt, dust, oil, grease, sealers, water repellants, curing compounds, and other bond-inhibiting materials.

a. High pressure water blasting (hydroblasting) is the preferred method of cleaning. Pressure washing is also acceptable when hydro blasting methods are not possible.

b. All surfaces must be saturated surface dry (SSD) with no standing water immediately prior to application.

B. Exposed Steel Reinforcement:

1. Reference ICRI Guideline 310.1R-2008 Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion.

2. Refer to drawings and project specifications for reinforcement details and reinforcing replacements.

**3.03 MIXING**

A. Follow Aquafin’s written instructions for mixing Pavemend SLQ.

1. Carefully read all instructions prior to mixing Pavemend SLQ and precisely follow all mixing directions. Do not mix in a grout mixer or rotating drum concrete mixer. Do not hand mix Pavemend SLQ.

2. Mix Pavemend SLQ in bucket with a heavy duty drill & paddle.

3. Mix entire contents of one unit at a time.

4. In normal temperature conditions [60°F to 75°F (16°C to 24°C)], the water temperature for mixing Pavemend SLQ should be between 65°F to 75°F (18°C to 24°C).

a. Slightly adjust the temperature of the water so that the temperature of the conditioned dry

product and the water temperature average out to approximately 70°F (21°C). Examples: if the temperature of dry Pavemend SLQ is 65°F (18°C), the ideal mixing water temperature is 75°F (24°C); if the temperature of dry Pavemend SLQ is 60°F (16°C), the ideal mixing water temperature is 80°F (27°C);

5. Mix Pavemend SLQ, until the 82°F to 85°F (28°C to 29°C) CMT (critical mix temperature) is reached. Use an infrared thermometer to measure the temperature of mixed Pavemend SLQ.

B. Product should be mixed right next to the area of application and then placed immediately after mixing.

1. Place material immediately after the CMT has been reached.

C. Do not re-temper mixed product.

**3.04 APPLICATION**

A. Apply Pavemend SLQ in strict compliance with Aquafin’s written instructions.

1. Place material in horizontal applications or use traditional form & pour methods.

B. Apply Pavemend SLQ at minimum profile thickness of 1/4 inch (6 mm). There are no restrictions to the maximum depth of the repair profile.

C. For best results, place Pavemend SLQ in a single monolithic application instead of a multi-layered application.

D. When Pavemend SLQ in layers, material must be placed before final set has been reached in previous layer.

1. Maintain a minimum thickness of 1” if repair material must be layered.

E. Screed or trowel Pavemend SLQ to create a level surface.

**3.05 FINISHING**

A. Follow Aquafin’s written instructions for finishing Pavemend SLQ.

1. Finish material to desired texture upon initial set.

2. Pavemend SLQ can be saw-cut, drilled, sanded and/or polished upon final set.

3. Do not add water to the surface of Pavemend SLQ when finishing.

B. Refer to drawings and project specifications for finishing work and final texture(s).

**3.06 JOINTS**

A. Previously Existing Joints:

1. Follow Aquafin’s written instructions for re-establishing joints in Pavemend SLQ.

a. All previously existing joints must be re-established within 1 hour of final set.

B. Placement of Additional Joints:

1. Refer to details, drawings, and project specifications for additional (new) joint locations and joint details.

**3.07 FIELD QUALITY CONTROL**

A. Inspect concrete surfaces prior to repairs ensuring that they have been mechanically prepared to meet the CSP (concrete surface profile) requirements for Pavemend SLQ and are clean. Refer to Section 3.02.

B. Inspect completed application and verify that Pavemend SLQ has been finished according to project specifications.

**3.08 CURING**

A. Follow Aquafin’s written instructions for curing.

1. Do not water cure, damp cure or use curing agents.

2. Allow for extended curing times in cool/cold temperatures.

**3.09 PROTECTION**

A. Protect Pavemend SLQ application area(s) from freezing temperatures until sufficiently cured.

1. For walk-in freezers, do not expose Pavemend SLQ to freezing temperatures [at or below 32°F (0°C)] until product has reached at least 500 psi (3.45 MPa).

B. Protect Pavemend SLQ application area(s) from foot traffic, rubber wheel traffic, and damage by other trades until sufficiently cured.

1. For walk-in coolers [in ambient temperatures as low as 33°F (0.5°C) during application and curing], protect from foot traffic for at least 2 hours.

1. For walk-in freezers [in ambient temperatures as low as 0°F (-18°C) during application and curing], protect from foot traffic for at least 4 hours.

1. For walk-in coolers [in ambient temperatures as low as 33°F (0.5°C) during application and curing], protect from rubber wheeled traffic (forklifts) for at least 6 hours, or until product has reached at least 2,500 psi.

1. For walk-in freezers [in ambient temperatures as low as 0°F (-18°C) during application and curing], protect from rubber wheeled traffic (forklifts) for at least 12 hours, or until product has reached at least 2,500 psi.

**End of Section**