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Technical Datasheet

FIREROK™

Pre-extended, HIGH TEMPERATURE REPAIR CONCRETE

CSI Div. 03

03 31 23 High Performance Structural Concrete

LEED Points

MR Credit 5.1, Regional Materials.....Up to 2 Points
 IEQ Credit 4.2, Low-Emitting Materials Paints and Coatings...1 Point
 Using this AQUAFIN product can help contribute to LEED certification of projects in the categories shown above.

General Characteristics:

FIREROK is a high early strength, heat resistant pozzolan cement structural repair concrete. FIREROK's™ **unique chemistry withstands exposures to intermittent high temperature environments** (see section 7 for In-Service chart). It is a single component powder that is water activated. FIREROK packaged units have 30 to 45 minutes of working time and reach compressive strengths of >2,500 psi (17.2 MPa) in 4 hours.

RECOMMENDED USES:

FIREROK has been designed for areas which are exposed to high temperatures either from an intermittent or a continuous heat source. This would include runway areas exposed to jet blast or APU exhaust, HPU's, and oven and metal casting areas.

Site Preparation:

- Substrates must be of load bearing capacity, and free from all potential bond breakers such as dirt, dust, grease, oil, sealers, curing compounds, laitance, loose or deteriorated concrete and any bond-inhibiting foreign substances.
- Mechanically prepare surfaces to achieve a surface profile equal to CSP 5 - 7. Concrete Surface Profile as per ICRI Guideline No. 310.2-1997 (Formerly Guideline No. 03732)
- All surfaces to be repaired should be saturated surface dry (SSD) but have no standing water. Hot surfaces should be cooled and shaded while cold surfaces should be heated and sheltered. Mechanically remove all loose materials by suitable means such as chipping hammer, chisel, sandblast, high pressure water blast (>5000 psi), or similar methods.

Mixing Instructions:

Standard Mixing Procedures (Rotating Drum Concrete Mixer).

Mix minimum 2 units at a time.

1. Pre-wet cement mixer with water then drain all water from mixer (away from repair area).
2. Start mixer and add 50% of total required mix water to concrete mixer (FIREROK requires 2 quarts (1.9 L) of water per 53.5 lb (24.3 kg) unit, therefore 2 units require 4 quarts (3.8 L), etc.)
3. Add pre-determined units of FIREROK, mix for 1 minute.
4. Add in remaining 50% of mix water.
5. Mix for 6 additional minutes/ 7 minutes total.
6. Pour all contents into repair area.
7. Clean mixer or repeat process for next batch.

Physical and Technical Data	
Compressive Strengths, psi (MPa) ASTM C 39	> 2,500 psi (17.2 MPa) @ 4 hrs > 4,000 psi (27.6 MPa) @ 1 d > 6,000 psi (41.4 MPa) @ 7 d > 7,500 psi (51.7 MPa) @ 28 d
Flexural Strength, psi ASTM C 78	> 400 psi (2.7 MPa) @ 1 d > 800 psi (5.5 MPa) @ 7 d > 1,000 psi (6.9 MPa) @ 28 d
Splitting Tensile Strength, psi ASTM C 496	> 500 psi (3.5 MPa) @ 28 d
Bond Strength, psi ASTM C 882	> 2,200 psi (15.2 MPa) @ 1 d > 2,500 psi (17.2 MPa) @ 7 d
Rapid Freeze Thaw Resistance (Durability Factor - Retained percentage of Dynamic Modulus) ASTM C 666A	100% @ 300 cycles
Scaling Resistance, lbs/ft ² ASTM C 672	0 @ 50 cycles
Modulus of Elasticity, msi ASTM C 469	4.7 X 10 ⁶ @ 28 d
Length Change, % of total length ASTM C 157	-0.052/0.040 @ 28 d soak/dry
Abrasion Resistance, mm of wear ASTM C 944 (2005)	0.17 @ 28 d
Results provided by licensed engineering test laboratory and represent typical results from production materials. Actual results may vary from third party testing results; however, Pavemend materials meet and/or exceed ASTM C928, and exceed established internal quality control standards, (available upon request). All samples were air cured.	

Additional Physical Properties

Set Times at 72°F/22°C Initial set: 30 - 50 minutes Final set: 50 - 80 minutes	Unit Weight (water, sand and aggregate): approximately 152 lb/ft ³ (2,435 kg/m ³)
Volume Yield per 53.5 lb (24.3 kg) Unit	0.40 ft ³ (0.011 m ³) #8 - 3/8" (9.5 mm) fractured stone included

NOTES:

- In ambient temperatures, < 40°F / 4°C:
use warm water (70°F/22°C to 90°F/32°C).
- In ambient temperatures > 85°F / 29°C:
use cooler water (50°F / 10°C to 60°F/16°C).
- Working times will vary when mix water temperature's are outside of these recommendations.
- Do not re-temper. The addition of water to the surface of the repair will negatively affect the materials final properties.

Application & Finish:

- Do not place FIREROK in temps below 40°F/4°C and above 120°F/49°C. Working times are influenced by surface temperature and repair profile. In ambient temperatures above 85°F (29°C), utilize ACI hot weather concrete practices.
- Working times based on ambient temperature, type of aggregate and total amount of water. Working times are influenced by surface temperature and repair profile. Working time can be extended by adding Aquafin's Set Retarder Admixture to mix water. (See Set Retardant product data sheet for more information).
- Minimum product placement thickness is 1.25" (3.2 cm). There are no restrictions to the depth of the product thickness.
- For best results, Aquafin recommends monolithic placement of repair materials. Maintain a minimum thickness of 1" (25.4 mm) if repair material must be layered. Material must also be layered before final set has been reached.
- Upon initial set, a broom finish can be applied. Upon final set, the material can be saw-cut, drilled, sanded and/or polished.
- All previously existing joints must be re-established within 2-3 hours of final set.
- General loading in 2 hours for wheeled traffic and 1 hour for foot traffic after addition of water. Add 30 minutes for every 10°F (6°C) drop in temperature.
- Self-curing, do not water cure.

Curing times based on In-Service Temperatures:

High Temperature Return-to-Service Chart	
Service Temperature	Return-to-Service Time
Up to 250°F (121°C)	24 - 72 Hours
251°F - 399°F (121°C - 204°C)	3 - 6 Days
400°F - 600°F (204°C - 315°C)	7 Days
601°F - 1000°F (315°C - 538°C)	14 Days
Above 1000°F (538°C)	Contact Technical Support

Contact Aquafin Technical Support for additional information on elevated temperature Return-to-Service curing process.

Clean-up:

Clean tools and equipment with water immediately after use. Cured material can only be removed mechanically.

Packaging & Shelf Life:

- PACKAGING
53.5 lb (24.3 kg) Bag GSA P/N: C1100
- SHELF LIFE & STORAGE: 1 year when stored in original unopened packaging out of direct sunlight, in dry, cool location.

Note:

Installer is responsible for proper product application. Site visits by Aquafin personnel or representatives are solely for the purpose of making technical recommendations, not for providing supervision or quality control.

Safety:

Refer to Safety Data Sheet (SDS). The use of a dust mask, safety goggles and gloves is recommended. This document does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this document to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use. Dispose of water and materials in accordance with Federal, State and Local regulations. Keep out of the reach of children.

LIMITED WARRANTY: AQUAFIN, INC. warrants this product for a period of one year from the date of installation to be manufactured free of defects and to be consistent with its technical properties as stated in our current Technical Data Sheet. This product must be used as directed and within its stated shelf life. AQUAFIN INC. will replace or at our discretion refund the purchase price of any product, excluding cost of labor, which is proven to be defective. Our product recommendations are based on industry standards and testing procedures. It is the buyer's obligation to test the suitability of the product for an intended use prior to using it. We assume no warranties written, expressed or implied as to any specific methods of application or use of the product. AQUAFIN INC. MAKES NO WARRANTY AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. AQUAFIN, INC. shall not be liable for damages of any sort including remote or consequential damages, down time, or delay. Any claim for a defective product must be filed within 30 days of discovery of a problem, and must be submitted with written proof of purchase.

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