

AQUAFIN®-IC ADMIX

Liquid and powder crystalline waterproofing admixtures for 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.

Product Description:

AQUAFIN-IC ADMIX is a state-of-the-art crystalline waterproofing admixture available in liquid and powder form. The chemistry within the AQUAFIN-IC ADMIX reacts with moisture and free lime in the concrete, creating millions of insoluble crystalline fibers, which fill the pores, capillary tracts and minor shrinkage cracks within the concrete. Passage of water through the concrete, either from the positive or negative water pressure side is permanently blocked and the reinforcement protected from corrosion. AQUAFIN-IC ADMIX can be added to the concrete mix at the time of batching or at the job site to a ready mix truck with full mixing capabilities. AQUAFIN-IC ADMIX is designed for concrete mix designs where normal to mild retarded set times are desired. When extended set-times are required use AQUAFIN-IC ADMIX (ES) and for mixes with accelerated to normal set times use AQUAFIN-IC ADMIX (NR). Consult with Aquafin to determine which version of IC ADMIX best meets project specific parameters, and conduct trial mixes under project conditions.

Working Principle:

- During concrete hardening AQUAFIN-IC ADMIX forms millions of fine crystalline fibers inside the capillary pores.
- Crystalline fibers reduce the pore diameter, thus blocking the flow of water through the capillary voids.
- The treated concrete is permanently watertight.

The AQUAFIN-IC ADMIX chemicals remain an integral part of the concrete for the life of the structure, always re-activating whenever exposed to moisture. AQUAFIN-IC ADMIX can seal static cracks up to 1/64" (0.4 mm), which occur months or years after the concrete has cured and hardened. AQUAFIN-IC ADMIX waterproofing chemicals start reacting immediately. However, it may require up to several weeks to reach its maximum waterproofing capability. Environmental factors such as ambient temperature, density of concrete, moisture and weather conditions all can affect the timing of the sealing process. Concrete treated with AQUAFIN-IC ADMIX protects against rebar corrosion, spalling, freeze/thaw cycles and weather related damage.

Typical Applications:

Any concrete mix requiring waterproofing (water impermeable) capabilities, such as:

- Tunnels and subway systems
- Foundations
- Precast structures
- Parking structures

- Water and waste water treatments plants
- Reservoirs and underground vaults
- Secondary containment structures

Advantages:

- NSF/ANSI/CAN 61 certified for potable water applications
- Resists extreme hydrostatic pressure, positive (active) or negative (passive) water pressure side
- Can self-seal static hairline cracks up to 1/64" (0.4 mm)
- Permanent - becomes an integral part of the concrete
- Not a vapor barrier - allows concrete to breathe
- Negligible interference with water reducers & plasticizers
- Negligible effect/influence on slump and air entrainment
- Impervious to physical damage and deterioration
- Non toxic, inorganic, zero VOC (0%)
- Contains no chlorides
- Less costly than traditional methods of waterproofing such as coatings and sheet applied goods.

Note: For the best dispersion characteristics, use IC ADMIX-Liquid.

Packaging:

IC ADMIX-Liquid: 5 gallon pails and 240 gallon totes
IC ADMIX-Powder: 5 lb. (2.25 kg) and 40 lb (18.1 kg) bags and pails
Contact Aquafin for availability of custom sized packaging.

Dosage Rates:

IC ADMIX-Liquid: Use 2% - 3% of IC ADMIX-Liquid based on the weight of the Portland cement content contained in one cubic yard (yd³) of concrete according to the mix design.

NOTE: At least 1.25 gal of IC ADMIX-Liquid must be used for each yd³ of concrete.

IC ADMIX-Powder: Use 0.8% - 1.0% by weight of IC ADMIX-Powder based on the weight of Portland cement content contained in one cubic yard (yd³) of concrete according to the mix design.

Consult Aquafin Technical Department for guidance in determining appropriate dosage rates and relating to any specific project requirements which may need to be met.

Batching:

AQUAFIN-IC ADMIX can be added to the concrete mixture at any time prior to placement of the concrete. It is generally recommended to add admixture materials at the ready-mix concrete plant during batching; however, AQUAFIN-IC ADMIX can be added at the job site. Crystalline waterproofing admixtures must be mixed with concrete for a minimum of five (5) minutes at maximum mixing speed, depending on the mixer type, to ensure complete dispersion and uniformity.

The following mixing recommendations are guidelines only:

- The concrete mix should be minimum 40°F (4°C) when incorporating AQUAFIN-IC ADMIX.

AQUAFIN® IC ADMIX

- Trial mixes under project conditions to determine setting time, slump, air content and compressive strength of concrete are highly recommended.
- Aggregates conforming to a well graded sieve curve are necessary to assure water tightness.
- AQUAFIN-IC ADMIX can retard the initial and final setting time of portland cement type I/II concrete mixes. Adjust or remove any retarding admixtures accordingly.
- AQUAFIN-IC ADMIX can accelerate the initial and final setting time of portland cement type III/V concrete mixes. Adjust or remove any accelerating admixtures accordingly.
- Depending on weather conditions, the use of water reducers, superplasticizers, retarders and/or accelerating admixtures may be necessary to maintain desired workability.
- Add other admixtures independently from AQUAFIN-IC ADMIX addition.

NOTE: Precise combinations of ingredients in concrete can have a profound effect on the performance and characteristics of the concrete. For this reason, Aquafin highly recommends thorough and complete testing of sample batches of the concrete mix design with Aquafin-IC ADMIX, prior to the actual jobsite pour. The use of qualified and experienced professionals in evaluating samples and confirming acceptable properties for each specific project is also highly recommended. When used properly, and placed in a concrete mix of sufficient workability, the AQUAFIN-IC ADMIX will not adversely alter the compressive or flexural strength of concrete or shotcrete.

IC ADMIX-Liquid

A. Ready Mix Plant

1. Stir AQUAFIN-IC ADMIX liquid prior to use, to assure that the mixture is homogeneous.
2. Reduce mixing water by approx. amount of AQUAFIN-IC ADMIX added.
3. Drop the concrete mix into the ready-mix truck.
4. Mix at least 5 minutes to assure homogenous distribution of the AQUAFIN-IC ADMIX in the concrete.

B. Ready Mix Truck - Job Site Mixing

1. Mix AQUAFIN-IC ADMIX liquid prior to use, to assure that the mixture is homogeneous. Take into account the amount of water already placed in the ready-mix truck.
2. Pour the required amount of mixed AQUAFIN-IC ADMIX into the drum of the ready-mix truck, containing the wet concrete mix.
3. Mix at least 5 minutes to assure homogenous distribution of the AQUAFIN-IC ADMIX in the concrete.
4. Immediately place concrete.

Note: Use a retarder for mix designs containing Type II/V or Type III portland cement. Call Aquafin Technical Department for acceptable products.

AQUAFIN-IC ADMIX-Powder

A. Ready Mix Plant

1. Mix AQUAFIN-IC ADMIX Powder with clean, potable water to a thin slurry consistency. i.e. 50 lb (22.7 kg) AQUAFIN-IC ADMIX with 4 gallons (15 L) water.
2. Pour the required amount of mixed AQUAFIN-IC ADMIX into the drum of the ready-mix truck.
3. Produce the cement, aggregate and additives as per concrete mix design in the batching plant. Take into account the amount of water already placed in the ready-mix truck (item A.1)
4. Drop the concrete mix into the ready-mix truck.
5. Mix at least 5 minutes to assure homogenous distribution of the AQUAFIN-IC ADMIX in the concrete.

B. Ready Mix Truck - Job Site Mixing

1. Mix AQUAFIN-IC ADMIX Powder with clean, potable water to a thin slurry consistency. i.e. 50 lb (22.7 kg) AQUAFIN-IC ADMIX with 4 gallons (15 L) water. Take into account the amount of water already placed in the ready-mix truck.
2. Pour the required amount of mixed AQUAFIN-IC ADMIX into the drum of the ready-mix truck, containing the wet concrete mix.
3. Mix at least 5 minutes to assure homogenous distribution of the AQUAFIN-IC ADMIX in the concrete.

NOTE: Do not add bulk (>50 lbs.) dry AQUAFIN-IC ADMIX Powder to wet concrete mix. This may cause clumping and uniform dispersion cannot be guaranteed. Mix with water first, before adding to wet concrete.

Placing:

Concrete containing AQUAFIN-IC ADMIX should be placed the same way as normal concrete.

Joints and Pipe Penetrations:

Cold joints and pipe penetrations must be designed using AQUAFIN-Waterstop. AQUAFIN-IC ADMIX does not prevent defects in concrete. Consult Aquafin on particular applications. Through penetrations must be securely sealed to maintain watertightness. AQUAFIN-IC ADMIX is designed to waterproof rigid concrete structures only and will not reliably seal cracks and joints which are subjected to variable loading or repeated movement. Contact the Aquafin Technical Department for project specific recommendations.

Curing:

Cure as per relevant ACI guidelines.

Durability:

Concrete treated with AQUAFIN-IC ADMIX is more durable than equivalent plain concrete due to its reduced permeability.

Non-Chloride, Non-Corrosive:

AQUAFIN-IC ADMIX will not initiate or promote corrosion of reinforcing steel embedded in concrete. Neither sodium chloride, calcium chloride nor any chloride-based ingredients are used in the manufacture of AQUAFIN-IC ADMIX.

Finishes:

If coatings, paint or other treatments are to be used on the negative side of AQUAFIN-IC ADMIX concrete, thorough surface preparation is required to remove waterproofing crystals from the surface (i.e. minimum 5000 psi high pressure water blasting).

Storage and Shelf Life:

AQUAFIN-IC ADMIX-Liquid

Store in room above 50°F (10°C). Note: Settlement or crystallization may occur below 50°F (10°C). If this happens, store in room above 70°F (21°C) for 24 hours and re-stir. Protect from freezing. If frozen or crystallized, thaw gradually and stir to homogeneous mixture. Shelf life in unopened original containers is twelve months when stored at 70°F (21°C).

AQUAFIN-IC ADMIX-Powder

Store in a dry enclosed area off the ground. Shelf life is twelve months when stored under proper conditions.

Note: Proper application is the responsibility of the user. Field visits by AQUAFIN personnel are for the purpose of making technical recommendations and not for supervising or providing quality control on-site.

General Information:

All details in particular to the suggestions for the processing and use of the product is based on our present knowledge and experiences at the time of printing.

Safety:

Refer to MSDS. KEEP OUT OF REACH OF CHILDREN. This product contains Portland cement and sand (crystalline silica) and is highly alkaline (corrosive) which may cause significant skin and eye irritation. Dust may cause respiratory tract irritation. Avoid breathing dust. Avoid contact with skin and eyes. Wear rubber gloves and safety goggles during mixing and application. After contact with skin, wash with plenty of water. In case of eye contact, rinse immediately with plenty of water for 15 minutes and seek medical advice.

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 do not guarantee compatibility of Aquafin products with other brands. For this reason, we strongly recommend application of a sample area at the jobsite to help determine suitability with other products. 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.

For Professional Use Only.

AQUAFIN-IC ADMIX Dosage Rates		
Dosage Guideline:	at w/c ratio < 0.45 = 2% *	at w/c ratio < 0.45 = 3% *
AQUAFIN-IC ADMIX	Dosage Rate of Cement:	
	2% *	3% *
1 gal (3.785 liter) per:	487 lb (221 kg)	325 lb (148 kg)
Cement	Dosage Rate of AQUAFIN-IC ADMIX:	
	per 1 sack (94 lb) of cement:	
	by weight	1.88 lb (0.85 kg)
by volume	25 fl. oz (0.75 liter)	37 fl. oz (1.1 liter)
per 6 sacks (564 lb) of cement:	1.25 gal (4.50 liter)	1.75 gal (6.6 liter)
Note: * % AQUAFIN-IC ADMIX by weight of cement. Minimum 1.25 gal/yd ³ (6.0 L/m ³)		

IC ADMIX TECHNICAL DATA:

IC ADMIX-Powder Test Data based on a 4000 psi (27.8 MPa) concrete mix				
I. Concrete Mix designs	Treated Mix		Control Mix	
	Lbs/y ³	Kg/m ³	Lbs/y ³	Kg/m ³
As per ACI-211-1				
Materials:				
Portland Cement, Type I/II	564	256	564	256
Sand, ASTM C-33	1350	614	1320	600
Aggregate, ASTM C-33	1750	795	1750	795
IC ADMIX-Powder, 0.8%	4.51	2.05	0.0	0.0
Water	264	120	301	137
Air Entraining Agent, oz	4.3	127 ml	4.3	127 ml
Superplasticizer, oz	56.4	1668 ml	56.4	1668 ml
Slump, inches (**)	3.0/7.0	76/178 mm	3.0/7.0	76/178 mm
Air content, %	6.0	6.0	6.0	6.0
Water/Cement Ratio	0.48	0.48	0.53	0.53
Plastic Unit Weight, lb/ft ³	145.4	2.35	145.7	2.35
Initial Set time:	1 hr 50'	1 hr 50'	2 hrs 25'	2 hrs 25'
Final Set Time:	3 hrs 15'	3 hrs 15'	3 hrs 50'	3 hrs 50'
II. TEST RESULTS	Treated Mix		Control Mix	
	Psi	MPa	Psi	MPa
1. Compressive Strength				
3 days (ASTM C-39)	2830	19.5	2210	15.3
7 days	3980	27.5	3280	22.6
28 days	5540	38.2	4750	32.7
2. Tensile Strength				
3 days (ASTM C-496)	407	2.8	330	2.3
7 days	710	4.9	560	3.8
28 days	940	6.5	740	5.1
3. Water Permeability				
3 days (ASTM D-5084)	7.8 x 10 ⁹		4.95 x 10 ⁷	
7 days	1.4 x 10 ⁹		1.05 x 10 ⁷	
28 days	5.6 x 10 ¹⁰		2.5 x 10 ⁸	
Note: All tests carried out by Independent Laboratory.				

Physical Data	IC ADMIX-Liquid	IC ADMIX-Powder
Aggregate State:	Liquid	Powder
Color:	Transparent Blue	Concrete Gray
Bulk Density @ 68°F (20°C)	9.58 lb./gal. (1.15 kg/L)	~62 lbs./ft ³ (~2.0 kg/dm ³)
Viscosity: Brookfield	4-7 (LV#61/100)	N/A
VOC	0	0
Working Temperature	>46°F (8°C)	N/A
Potable Water NSF/ANSI 61	Certified by WQA (see www.wqa.org)	Certified by WQA (see www.wqa.org)
Permeability: (CRD-C 48-92)	No leakage up to 460 ft. (140 m) or 200 psi (14 bar) head pressure	No leakage up to 460 ft. (140 m) or 200 psi (14 bar) head pressure



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NSF/ANSI /CAN 61**

see www.wqa.org for use restrictions