



Applied Testing, Inc.

Materials Testing and Inspections

Report No: 502-014L1 Aquafin Permeability Testing

Report Date: 8/09/2002

REPORT OF CONCRETE PERMEABILITY TESTING

Client: Aquafin

Laboratory Staff: Richard King / Craig Joss

Concrete Materials Supplied by: DePaul Concrete Company

Testing Program: Complete testing of AQUAFIN-IC (IntegraCoat) using Corps of Engineers CRD C 48-92, December 1, 1992 "Standard Test Method for Water Permeability of Concrete."

AQUAFIN-IC (IntegraCoat) Testing Program Phase I

Untreated Control Sample. Prepare one (1) control sample (Nominal compressive strength to be 3000 psi), twelve (12) inches long by six (6) inch diameter, and set up in test equipment. Complete permeability testing according to CRD-C 48-92.

Treated Sample. Prepare one (1) treated sample, one (1) coat, application rate 2.0 lb/yd² (1.0 kg/m²) and test with positive side pressure according to CRD-C 48-92. Coating application to be completed by AQUAFIN representative.

Concrete Specifications

Class / Amount Concrete: 3000 psi (1 bar = 14.5 psi)	Admixture: n/a
Type of Forms: Plastic standard cylinder mold 6" x 12". 25 tamps of 1" rod per 4" lift.	Type of Mixer: Batch
Date Placed: 4/8/2002 Weather: Sunny 80°	Concrete Temperature: 75°
Slump: 4.0	

Concrete Mix: Cement 490 lbs.

Natural Sand: 1390 lbs.

Coarse Agg. #1: 1850 lbs

Total Water 260.7 lbs

Additional water added at Added at Laboratory to achieve slump.

Percent Air Entrainment: 5 %

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Concrete Strength Testing:

Testing Date: 5/6/2002 Compressive strength testing was completed in accordance with ASTM C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens. Average 28-day compressive strength was 3517 psi (1 bar = 14.5 psi).

TEST # 1 Control Test

Coating Material: None
 Date Test Started: May 26, 2002
 Method of Test: Permeability test performed in accordance with CRDC-48-92
 Ambient Temperature: 74°F

Test: Positive (water) side.
 Water Pressure During Test: 200 psi (1 bar = 14.5 psi) applied with regulated air pressure.
 Test Duration: 21 days. Concrete and test cylinder prepared as provided for on CRDC 48-92.

RESULT:

Test Result: Water flow through test specimen monitored over 21-day period. Permeability calculated from change in head data and elapsed time during test for final five days of testing. The calculated permeability was 1.1E10-9cm/sec.

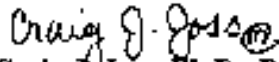
TEST # 1 AQUAFIN-IC (IntegraCoat)

Coating Material: AQUAFIN-IC (IntegraCoat) applied at rate of 2.0 lbs/yd² (1.0 kg/m²).
 Date Test Started: June 26, 2002
 Method of Test: Permeability test performed in accordance with CRDC-48-92
 Ambient Temperature: 74°F

Test: Positive side (through coating towards concrete).
 Water Pressure During Test: 200 psi (1 bar = 14.5 psi) applied with regulated air pressure.
 Test Duration: 21 day period. Concrete and test cylinder prepared as provided for on CRDC 48-92.

RESULT:

Test Result: Head measurements were monitored in the permeameter sight glass throughout the 21-day test period. In addition, water flow from the outflow valve at the base of the cylinder test cell was also recorded. No liquid water was observed during the last five days of the test period. The sight glass readings during the last three days showed no movement, indicating zero flow through the test specimen. Calculated permeability from change in head data and elapsed time during test for final five days of testing was 2.0E10-10 cm/sec. This inferred permeability results from migration of water vapor from test specimen.

Respectfully submitted,
 Applied Testing, Inc.

 Craig J. Joss, Ph.D., P.E.
 Technical Manager

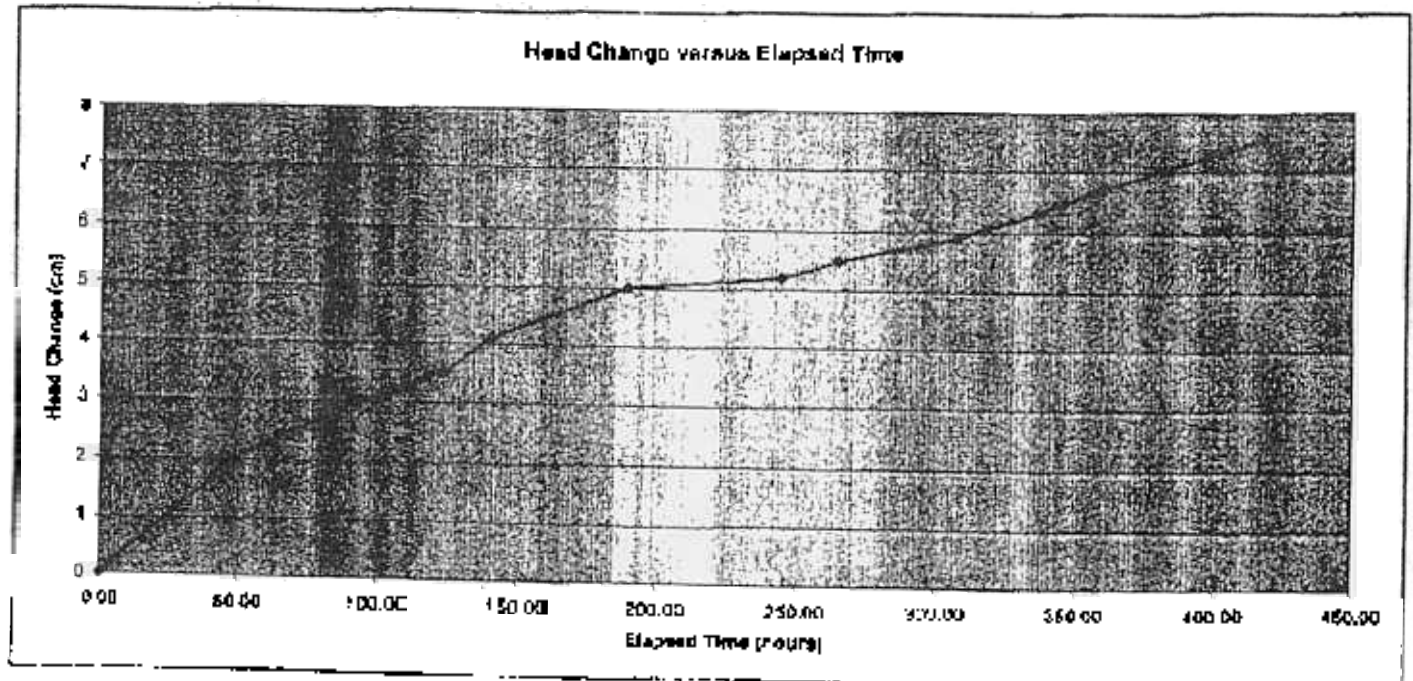
TEST CONTROL FOR AQUAFIN-IC (IntegraCoat): Crystalline Waterproofing

	Initial Units					Final Units
M = Flow Rate	cm ³ /hour	0.3284	60	60	9.12242E-05	M cm ³ /sec
A = Area of Permeable Material	Inches ²	28.27433	2.54	2.54	182.4148925	A cm ²
H = Hydraulic Head	psi	200	0.70309	100	14061.8	H cm
L = Length of Flow Path	Inches	12	2.54		30.48	L cm

K = Hydraulic Conductivity **K=K(A/H*L)** **1.041E-09 K** **cm/sec**

Date	Time	Time Date and Hours	Total Elapsed Time Hours	Differential Elapsed Time Hours	Head	Head Change	Cumulative Head Change	Actual Flow	Actual Flow Rate Per Hour (M) (M)
Date	Hours	Date and Hours	Hours	Hours	cm	cm	cm	cm ³	cm ³ /hr
5/26/2002	11:00:00 AM	5/26/02 11:00	37402.46						
5/30/2002	11:00:00 AM	5/30/02 11:00	0.00	0.00	0	0	0	0	0
6/1/2002	11:25:00 AM	6/1/02 11:25	48.42	48.42	2	2	2	47.61904762	0.983528
6/3/2002	9:05:00 AM	6/3/02 9:05	84.08	46.67	3	1	3	23.80952381	0.521376
6/4/2002	3:30:00 PM	6/4/02 15:30	124.50	26.17	3.5	0.5	3.5	11.9047619	0.454959
6/5/2002	8:10:00 AM	6/5/02 8:10	141.17	16.67	4.1	0.6	4.1	14.28571429	0.857143
6/7/2002	8:45:00 AM	6/7/02 8:45	169.75	48.58	5	0.9	5	21.42857143	0.441068
6/9/2002	3:25:00 PM	6/9/02 15:25	244.42	54.67	5.2	0.2	5.2	4.761904762	0.087108
6/10/2002	11:58:00 AM	6/10/02 11:58	264.97	20.55	5.5	0.3	5.5	7.142857143	0.347584
6/12/2002	8:05:00 AM	6/12/02 8:05	307.06	42.12	5.9	0.4	5.9	9.523809524	0.226129
6/13/2002	10:30:00 AM	6/13/02 10:30	335.50	28.42	6.3	0.4	6.3	9.523809524	0.335149
6/14/2002	10:30:00 AM	6/14/02 10:30	359.50	24.00	6.7	0.4	6.7	9.523809524	0.306825
6/15/2002	7:35:00 AM	6/15/02 7:35	380.58	21.08	7	0.3	7	7.142857143	0.338792
6/16/2002	8:30:00 PM	6/16/02 20:30	417.50	36.92	7.5	0.5	7.5	11.9047619	0.322477

Concrete Cylinder \emptyset inch Diameter: 12 inch length Tite used for permeability calculation
 Area A 28.27 sq inches
 Flow Path Length (L) 12.00 inches
 Flow Scale Factor 23.81 cm³/cm From permeability calibration



TEST AQUAFIN-IC (IntegraCoat): Crystalline Waterproofing

Initial Units				Final Units			
M = Flow Rate	cm ³ /hour	0.0800	60	60	1.667E-05	M	cm ³ /sec
A = Area of Permeable Material	inches ²	28.27	2.54	2.54	182.41489	A	cm ²
H = Hydraulic Head	psi	200.00	0.70309	100	14061.8	H	cm
L = Length of Flow Path	inches	12.00	2.54		30.48	L	cm
K = Hydraulic Conductivity		K=M/(A(h/L))		1.981E-10		K	cm/sec

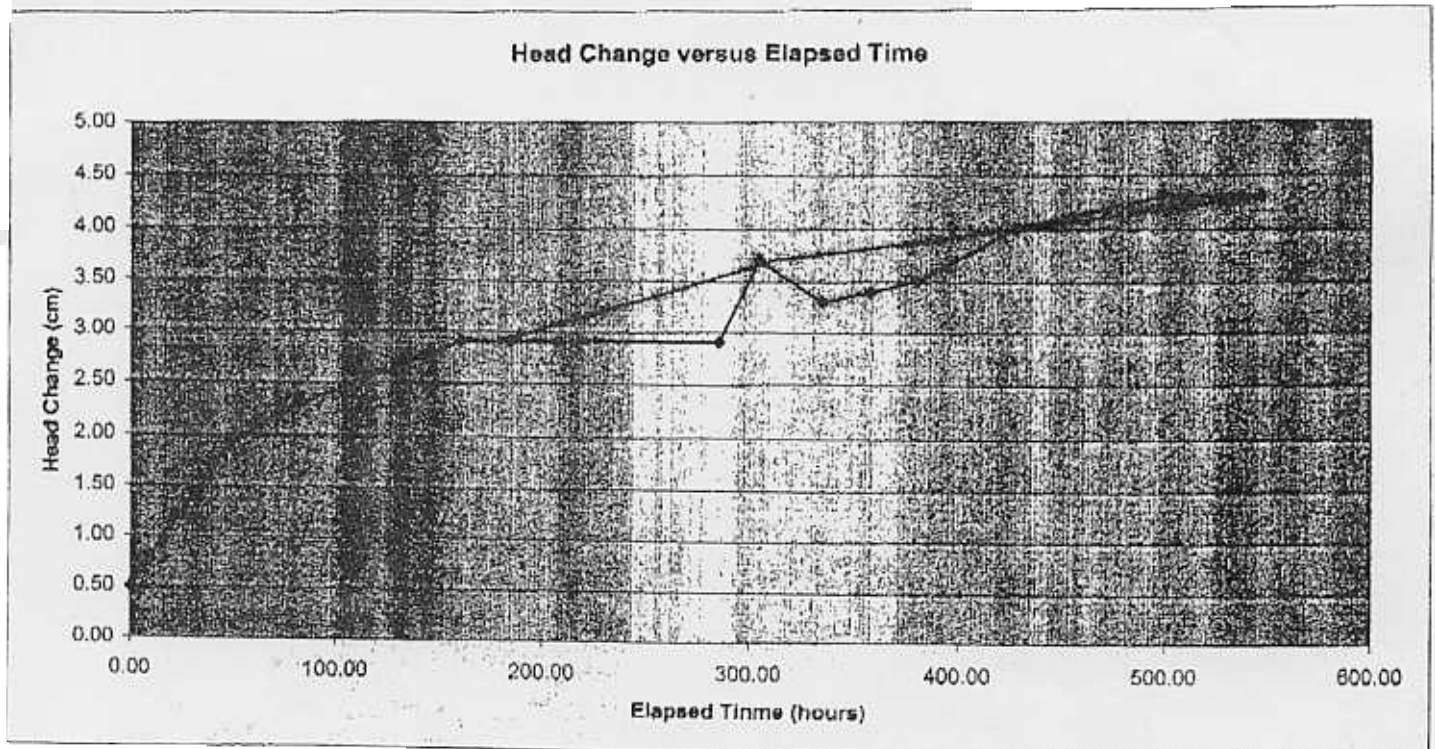
Date	Time	Time Date and Hours	Total Elapsed Time Hours	Differential Elapsed Time Hours	Head	Head Change	Cumulative Head Change	Actual Flow	Actual Flow Rate Per Hour
Date	Hours	Date and Hours	Hours	Hours	cm	cm	cm	cm ³	cm ³ /hr
6/24/02	17:00	6/24/02 17:00	0.00	0.00	0.50	0.00	0.00	0.0000	
6/25/02	17:00	6/25/02 17:00	24.00	24.00	1.20	0.70	0.70	16.8667	0.6944
6/26/02	17:00	6/26/02 17:00	48.00	24.00	1.90	0.70	1.40	16.8667	0.6944
6/27/02	8:30	6/27/02 8:30	63.50	15.50	2.10	0.20	1.60	4.7818	0.3072
6/27/02	17:00	6/27/02 17:00	72.00	8.50	2.20	0.10	1.70	2.3810	0.2801
7/1/02	9:30	7/1/02 9:30	160.50	88.50	2.90	0.70	2.40	16.8667	0.1863
7/2/02	9:15	7/2/02 9:15	184.25	23.75	2.90	0.00	2.40	0.0000	0.0000
7/3/02	8:15	7/3/02 8:15	207.25	23.00	2.90	0.00	2.40	0.0000	0.0000
7/6/02	14:00	7/6/02 14:00	285.00	77.75	2.90	0.00	2.40	0.0000	0.0000
7/7/02	9:30	7/7/02 9:30	304.50	19.50	3.70	0.80	3.20	19.0476	0.9768
7/8/02	15:30	7/8/02 15:30	334.50	30.00	3.30	-0.40	2.80	-9.5238	-0.3175
7/9/02	15:00	7/9/02 15:00	358.00	23.00	3.40	0.20	2.90	4.7619	0.2070
7/10/02	13:00	7/10/02 13:00	380.00	22.00	3.50	0.10	3.00	2.3810	0.1082
7/12/02	12:00	7/12/02 12:00	427.00	47.00	4.00	0.50	3.50	11.8048	0.2533
7/15/02	11:00	7/15/02 11:00	498.00	71.00	4.30	0.30	3.80	7.1429	0.1006
7/17/02	11:00	7/17/02 11:00	546.00	48.00	4.30	0.00	3.80	0.0000	0.0000

Concrete Cylinder 6 inch Diameter 12 inch length Data Used for permeability calculation

Area A 28.27 sq Inches

Flow Path Length (L) 12.00 inches

Flow Scale Factor 23.81 cm³/cm From permeameter calibration



APPLIED TESTING, Inc.

Concrete Permeameter Test Apparatus

Method:	CRDC-C 48-92	Engineer:	
Project No.:	602-014	Checked:	
Date:	5/21/2002	Start Time:	Finish Time:
Temperature:	Temperature:		

Applied Pressure (PSI)	Scale Reading Centimeters	Displaced Water (cm ³)	Total Displaced Water (cm ³)	Scale Factor (cm ³ per cm)	Comment
200	3.2	0			
200	24.2	500	500	23.80952381	
200	45.2	500	1000	23.80952381	
200	66.2	500	1500	23.80952381	
202	87.2	500	2000	23.80952381	

