Crown Flex Testing
ADHESION

Color Crown Corporation – 928 Sligh Ave – Seffner Florida 33584 – Telephone 800-282-1599 – Fax 813-655-8830

Crown Flex Testing: Certificate of Test No. 2618. Adhesion Pull-off Test

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Sample Preparation:

Concrete samples were prepared as follows:

Sample A: 1 coat Crown Flex Primer/ 1 coat Crown Flex w/o aggregate, with pigmentation.
Sample B: 1 coat Crown Flex Primer/ 2 coats Crown Flex w/o aggregate, with pigmentation
Sample C: 1 coat Azcoseal Primer/ 2 coats Crown Flex standard
Sample D: 1 coat Crown Flex Primer/ 2 coats Ultra Tuff standard.

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Adhesion-Pull off Test: **(ASTMD4541-95 / AS1580.408.5)**

Tests externally performed by NATA accredited laboratory using Elcometer direct tension pull-off tester. Model 106, in accordance with AS1580.408.5 – 1994, Adhesion-Pull-Off Test and ASTM D4541-95, Standard Method for Pull- Off Strength of Coatings Using Portable Adhesion Testers. Test dollies attached using "Araldite Super Strength" epoxy resin adhesive, allowed to cure for 24 hours prior to test.

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Mean Results Of 19 Tests:

Adhesion Strength			
(kg/cm3)	(MPa)	PSI	Mode of Failure
7	0.7	100	90% cohesive (concrete substrate)
			10% primer/concrete substrate interface

Sample A:

Adhesion Strength			
(kg/cm3)	(MPa)	PSI	Mode of Failure
8	0.8	110	95% cohesive (concrete substrate)
			5% primer/concrete substrate interface

Sample B:

Adhesion Strength			
(kg/cm3)	(MPa)	PSI	Mode of Failure
7	0.7	100	92% cohesive (concrete substrate)
			8% primer/concrete substrate interface

Sample C:

Adhesion Strength			
(kg/cm3)	(MPa)	PSI	Mode of Failure
7	0.7	100	91% cohesive (concrete substrate)
			9% primer/concrete substrate interface

Sample D:

Adhesion Strength			
(kg/cm3)	(MPa)	PSI	Mode of Failure
6	0.6	90	100% cohesive (concrete substrate)

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The results show that around 100 PSI of force is required to dislodge the coating from the concrete substrate. In most cases the concrete broke away before the coating failed. The results show that a very significant amount of pulling force is required to dislodge the coating and in most cases, the concrete broke off before the coating failed.

Test A: (5 trials) Crown Flex w/o aggregate applied with 1 coat of Crown Flex primer performed the best with a mean of 110 PSI being requires to break off the concrete. In essence, this combination performed far better than the concrete substrate.

Test B: (5 trials) Crown Flex w/o aggregate and 2 coats of Crown Flex primer required 100PSI to break off the concrete. Again, the concrete gave way before the coating.

Test C: (5 trials) One coat of Azcoseal and 2 coats of Crown Flex standard (w/aggregate) required 100 PSI to break off the concrete. Again, the concrete broke away before the coating.

Test D: (4 trials) One coat of Crown Flex primer and 2 coats of standard (w/aggregate) Crown Flex required 90 PSI to break off the concrete. In this series of tests there was a 100% failure of the concrete at a mean of 90 PSI. Obviously, the coating can withstand a higher PSI.

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Singapore Government Productivity and Standards Board

Pull-off Adhesion Test

Client: Color Crown Corporation
928 Sligh Avenue
Seffner, FL 33584

Sample Submission Date: 12th December, 1998

Description of Sample: Three specimens of concrete slab (30x30x5mm) coated with two coats of Crown Flex polyurethane non-slip coating. Samples labeled as A, B, C.

Method of Test: ASTM D4541-95

"Pull-Off Strength of Coating Using Portable Adhesion Testers" (using fixed-alignment adhesion tester type 11)

Test Conditions: 25°C / 60% humidity

Type of Adhesive Used: Ciba-Geigy Araldite

Result Interpretation:

C : cohesive failure of coating
C/S : adhesive failure between coating and substrate
S : cohesive failure of substrate

Results:

1	**2**	**3**	**4**	**5**	**6**
	A1	10	0	100	0
A	A2	20	0	100	0
	A3	13	70	30	0
	B1	15	5	95	0
B	B2	10	50	50	0
	B3	10	5	95	0
	C1	15	0	100	0
C	C2	13	0	100	0
	C3	18	20	80	0

1 = Specimen Code
2 = Test Cycle
3 = Pull-Off Strength Kg/cm
4 = S
5 = C/S
6 = C

BFGoodrich

Certificate of Analysis

Send To:	**Ship To:**
COLOR CROWN CORPORATION 928 SLIGH AVENUE SEFFNER, FL 33584 **W/ Ship:** QUALITY CONTROL MANAGER	COLOR CROWN CORPORATION 928 SLIGH AVENUE SEFFNER, FL 33584

TYPICAL TEST RESULTS

SCALE: 5 – No permanent effect 0 – Severe Effect

PROPERTIES

Solids	53% (ww) and 45%
pH	9
Viscosity	100-110 KU
Density	1.06 – 1.1

RESISTANCE
(After recovery)

Fuel		4
Diesel		4
Oils	Hydraulic	5
	20W50	5
	Skydrol	0
	Used	5
Acids		
	Sulfuric	5
(10% Solution)		
	Acetic	5
Alkaline		
	Sod. Hyd.	5
	Detergent	
Anti-Freeze		
	Motor	3
	Window	2
Various		
	Water	5
	Ethanol	5
	190 proof alcohol	5
	Ammonia	5
	Vinegar	5

WEARING DATA

18,000 passes	95%
36,000 passes	88%
54,000 passes	83%
72,000 passes	69%

Wearing results are based on gloss loss at 60 degrees as a percentage of 100.

MAR-SCUFF RESISTANCE
(Wt. in grams)

One Day	9080
Seven Days	9080

Mar-Scuff tests are based on a BYK-Gardner Mar Tester with plastic stylus. Maximum value 9080 gm.

TAYWOOD ENGINEERING LIMITED
CONSULTANTS IN MATERIALS TECHNOLOGY

May 12, 2001

Coefficient of Friction test was performed in accordance with ASTM standards.

ASTM Test Results:

Coefficient of Friction:

(ASTM D 1894 93) Dry	Static	0.91	Dynamic	0.89
(ASTM D 1894 93) Wet	Static	1.29	Dynamic	1.18