SOLAR TESTING LABORATORIES, INC.

Geotechnical and Environmental Engineering, Materials Testing, and Construction Inspection

1125 Valley Belt Road, Brooklyn Heights, Ohio 44131
Phone (216) 741-7007 • Fax (216) 741-7011
www.solartestinglabs.com

PROJECT:	ENGINEERING PROPERTIES OF DELTATOP 404	**FILE NO.:**	A08023X02
CLIENT:	THE EUCLID CHEMICAL COMPANY	**REPORT NO.:**	0006
	CLEVELAND, OHIO	**DATE(S):**	1/8/08 – 2/12/08
DESCRIPTION:	PERFORMANCE TESTING OF DELTATOP 404		
TECHNICIANS:	ROBERT SPELLACY AND DOUG MCCLUGGAGE		

The following tests were conducted on DeltaTop 404, an extremely high strength floor topping material containing iron aggregate, to determine compliance to the protocols of various ASTM procedures. All test specimens were moist-cured until tested.

The applicable ASTM standards follow:

Laboratory Temperature..... 72°F/22°C
Relative Humidity, % 50

ASTM C-1437	Standard Test Method for Flow of Hydraulic Cement Mortar
ASTM C-143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C-39	Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C-109	Test Method for Compressive Strength of Hydraulic Cement Mortars (using 2-in or 50-mm Cube Specimens)
ASTM C-157	Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
ASTM C-157 (modified)	Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete (Modification: One day of curing)
ASTM C-348	Test Method for Flexural Strength of Hydraulic-Cement Mortars
ASTM C-469	Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression
ASTM C-642	Standard Test Method for Density, Absorption, and Voids in Hardened Concrete
ASTM C-496	Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
ASTM C-666	Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C-672	Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals
ASTM C-1202	Test Method for Electrical Indication for Concrete's Ability to Resist Chloride Ion Penetration
ASTM C-779	Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces
Chaplin Abrasion	Standard Method for Measuring the Wear Resistance of Floors Using the Chaplin Abrasion Tester
Chemical Testing	In-House Method for Determining the Compressive Strength Loss of Mortar Submerged in Chemical Solutions

The results of testing follow. All numbers are reported in averages.

Mix Water, % 7.75
Unit Weight, lb/cu ft 169.37

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ASTM C-1437

Flow, % 132

ASTM C-143

Slump, in 10

ASTM C-39 (4- by 8-inch Cylinders), Compressive Strength, psi

1 Day 8882
3 Days 10763
7 Days 12916
28 Days 15545
90 Days 16893

ASTM C-109, Compressive Strength, psi

1 Day 10110
3 Days 13349
7 Days 15999
28 Days 20655
90 Days 20720

ASTM C-157 (28 days of curing in lime water prior to the start of testing), Length Change, %

Duration	Air Cure	Water Cure
3 Days	-0.009	+0.003
7 Days	-0.019	+0.003
14 Days	-0.026	+0.003
28 Days	-0.029	+0.003
90 Days	-0.035	+0.005
6 Months	-0.033	+0.009
1 Year	-0.046	+0.017

ASTM C-157 Modified (1 day of curing in the mold and then exposed to air and water) Length Change, %

7 Days	-0.068	+0.012
14 Days	-0.081	+0.009
21 Days	-0.085	+0.009
28 Days	-0.090	+0.008
90 Days	-0.092	+0.008
6 Months	-0.093	+0.014
1 Year	-0.100	+0.014

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ASTM C-348, Flexural Strength, psi

7 Days	1726
28 Days	2358
90 Days	2419

ASTM C-469, Modulus of Elasticity, psi

7 Days	7.7×10^6
28 Days	8.1×10^6

ASTM C-642, Absorption, %

7 Days	2.14
90 Days	1.90

ASTM C-496, Splitting Tensile Strength, psi

7 Days	935
28 Days	1095

ASTM C-666, Procedure A, Relative Dynamic Modulus of Elasticity, %

301 Cycles	104

ASTM C-672, Salt Scaling

Rating at 50 Cycles	0 Scaling

ASTM C-779, Revolving Disk Method, Abrasion Loss, in, 7 Days

30-minute loss	-0.008
60 minute loss	-0.019

ASTM C-1202, Rapid Chloride Permeability, coulombs

7 Days	1788-Low
28 Days	314-Very Low

Chaplin Abrasion, Abrasion Loss, in

7 Days	15 minute loss	-0.008
	30 minute loss	-0.024
28 Days	15 minute loss	-0.002
	30 minute loss	-0.006

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Chemical Testing, Compressive Strength, psi

All specimens had 3 days of moist curing prior to being submerged into solution. The reference specimens were cured in the moist room:

28 Days

Reference	19373
Coke	18917
Orange Juice	18483
Whole Milk	19555
5% Salt Water Solution	19380
10% Caustic Soda	20008
Beer	19908
V-8 Juice	19861
Energy Drink	19784
Windex with Ammonia	18734
DI Water	20228

1 Year

Reference	22776
Coke	25342
Orange Juice	23185
Whole Milk	24425
5% Salt Water Solution	24222
10% Caustic Soda	21297
Beer	23361
V-8 Juice	24096
Energy Drink	25315
Windex with Ammonia	22710
DI Water	24392

STATE OF OHIO GEORGE J. ATA E-47469 REGISTERED PROFESSIONAL ENGINEER

SOLAR TESTING LABORATORIES, INC.

George J. Ata, P.E., President

slh 3/23/09