

June 26, 2008

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Subject: **Ceramic Tile Testing Results**
Advanced Surface Systems
TEC Project No.: 08-0670
TEC Laboratory No.: 08-245

Dear Mr. Henry:

Testing, Engineering, and Consulting Services, Inc. (TEC Services) is pleased to present this final report on the completed ASTM testing authorized by Advanced Surface Systems. The products were tested at laboratory conditions ($73\pm 5^{\circ}\text{F}$). The testing procedures were in accordance with the ASTM guidelines. The tests conducted are presented below. The test criteria can be found in Table 1. The test results are found in Tables 2, 3, 4, & 5.

- *C 482-02 Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement Paste*
- *C 501-84 Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser (Reapproved 2002)*

Table 1 - Supplemental Specification for Detectable Warnings on Walking Surfaces, Requirements

Property	Standard
Wear Resistance	ASTM C 501
Adhesion/Bond Strength	ASTM C 482

Table 2 – Results of Completed ASTM C 482-02 Testing:

Sample Type & I.D. #	Width (inches)	Length (inches)	Area (in.2)	Type of Failure	Peak Load (lbf)	Peak Stress (psi)	Average Peak Stress (psi)
Red Tile - 1	3.99	3.70	14.76	Mortar Setting Bed*	9,653	650	696
Red Tile - 2	4.00	3.98	15.92	Mortar Setting Bed*	12,530	790	
Red Tile - 3	3.85	3.90	15.02	Mortar Setting Bed*	11,769	780	
Red Tile - 4	3.98	3.88	15.44	Mortar Setting Bed*	10,029	650	
Red Tile - 5	3.51	4.00	14.04	Mortar Setting Bed*	8,576	610	

*Note: Mortar Setting Bed failure. No failures were found in the ASSI Tiles.

Table 3 – Results of Completed ASTM C 501-84 Testing on Tile:

Sample Type & I.D. #	Start Weight (grams)	End Weight (grams)	Abrasive Wear Index by Weight	Average Abrasive Wear Index by Weight
Red Tile - 1	379.59	376.35	27.16	27.33
Red Tile - 2	371.66	368.56	28.39	
Red Tile - 3	374.50	371.15	26.37	
Red Tile - 4	367.44	364.24	27.50	

Table 5 – Results of ASTM C 501-84 Testing by Depth as Required by FDOT – Sec. 527:

Sample Type & I.D. #	Abrasive Wear Index by Depth (in.)	Average Abrasive Wear Index by Depth (in.)
Red Tile - 1	0.014	0.015*
Red Tile - 2	0.014	
Red Tile - 3	0.015	
Red Tile - 4	0.016	

***Note: The abrasion testing was performed on the flat surface of the tile and paver instead of the domed surface. ASTM C 501-84 can not be performed on domes due to the curved surface of the domes.**

We appreciate the opportunity to provide our services to you on this project. Should you have any questions or comments regarding this report, please feel free to contact us at your convenience.

Sincerely,

Testing, Engineering & Consulting Services, Inc.



Chip P. Sherwood Jr.
Lab Technician



James G. McCants III
Staff Chemist