TEC Services
Testing • Engineering • Consulting

September 15, 2011

Mr. Randall W. Brown Ph.D, P.E.
Uretek USA, Inc.
P.O. Box 1929t
Tomball, TX 77377

Phone: 281-351-7800
Email: DrRWBrown@uretekusa.com

Subject: **Report of Results for R-Value Testing**
Product Name: Uretek Chemical Grout
TEC Services Project No. TEC 10-0500
TEC Lab No. 11-359

Dear Mr. Brown:

Testing, Engineering and Consulting Services, Inc. (TEC Services), an AASHTO R18 and ISO 17025, independent testing laboratory, is pleased to present this final report of our results of testing performed at our Lawrenceville, GA facility in September of 2011. Our services were performed in accordance with the terms and conditions of our Service Agreement TEC PRO 11-0904. The test results presented only pertain to the samples tested.

The purpose for the testing was to determine the thermal conductivity/resistivity of a compacted soil sample, Uretek 486 (4lbs) chemical grout, a composite sample of soil & Uretek 486 chemical grout, and a hardened concrete sample. The samples were obtained from a test trial performed at TEC Services facility in which a compacted soil sub-base was injected with Uretek 486 (4lb) chemical grout. The concrete used for testing was representative of a concrete pavement mix design. The source of the sample for the sub-base material was Wade Sand & Gravel located in Alabama. All testing was performed at laboratory conditions of 73 ± 2 ºF and 50 ± 2% humidity and in accordance with ASTM D5334 - 08 *Standard Test Method for Determination of Thermal Conductivity of Soil and Soft Rock by Thermal Needle Probe Procedure.* Test results are reported in Table 1. Photos of the test samples are presented in Photo 1.

Testing, Engineering and Consulting Services, Inc. appreciates the opportunity to provide our professional services for this important project. If you have any questions regarding this report, or if we can be of further assistance please contact us at 770-995-8000.

Sincerely,

TESTING, ENGINEERING & CONSULTING SERVICES, INC.

James G. McCants III
Project Manager, Chemist

Shawn P. McCormick
Laboratory Manager

Attachments: Table 1, Photo 1

Table 1 – Thermal Resistivity/Conductivity & R-Values

Sample Type	Test Run #	Thermal Resistivity [ρ] (hr·ft℉/BTU)	Thermal Conductivity [K] (BTU/hr·ft°F)	R-Value Per Inch	R-Value (6" Thickness)
Uretek 486 (4lb) Chemical Grout	1	66.39	0.015	5.53	33.15
	2	59.86	0.017	4.98	29.89
	3	58.90	0.017	4.90	29.41
	4	62.60	0.016	5.21	31.26
	Average	**61.94**	**0.016**	**5.16**	**30.93**
Grouted Sample	1	1.93	0.519	0.16	0.96
	2	1.89	0.562	0.16	0.94
	3	1.87	0.536	0.16	0.93
	4	1.95	0.513	0.16	0.97
	Average	**1.91**	**0.532**	**0.16**	**0.95**
Compacted Sub-base	1	1.92	0.521	0.16	0.96
	2	1.96	0.511	0.16	0.98
	3	1.98	0.505	0.16	0.99
	4	1.90	0.526	0.16	0.95
	Average	**1.94**	**0.516**	**0.16**	**0.97**
Concrete	1	1.45	0.688	0.12	0.73
	2	1.44	0.511	0.12	0.72
	3	1.45	0.505	0.12	0.72
	4	1.45	0.692	0.12	0.72
	Average	**1.45**	**0.599**	**0.12**	**0.72**

Photo 1 – Soil, Uretek 486 Chemical Grout, and Composite Sample