



March 24, 2008

CONSTRUCTION
TECHNOLOGY LABORATORIES
ENGINEERS & CONSTRUCTION
TECHNOLOGY CONSULTANTS

Colby DeHoff
Whitacre-Greer
1400 S Mahoning Ave
Alliance, OH 44601

www.CTLGroup.com

Phone: 800-947-2837 x233
E-mail: cdehoff@wgpaver.com

**ASTM C 1549 Solar Reflectance of Three Types of Whitacre-Greer Pavers
CTLGroup Project No. 314040**

Dear Colby,

As authorized by you on March 17, 2008, CTLGroup measured the solar reflectance of three types of Whitacre-Greer pavers in accordance with ASTM C 1549-04, *Standard Test Method for Determining Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer*.

The pavers, shown in Figure 1, were received at CTLGroup on March 20, 2008. Each set of three specimens were labeled by you as follows:

WG 52 01	WG 53 01	WG 54 01
WG 52 02	WG 53 02	WG 54 02
WG 52 03	WG 53 03	WG 54 03

The specimens are rectangular and measure approximately 8 × 4 in. and 2-1/4 in. high. The top surface of each specimen is flat and relatively smooth. The pavers were kept in a temperature- and relative humidity-controlled room (73°F and 50% RH) until they were tested on March 21, 2008.

The solar reflectance of the top surface of each paver was measured in three randomly selected locations, for a total of 9 measurements per set. The air mass on the solar spectrum reflectometer was set to 1.5, which approximates the length a beam of sunlight travels through the atmosphere over the conterminous United States. The measured solar reflectance, average, and standard deviation are reported in the attached data sheets in Appendix A. The measurements are summarized in Figure 2 and Table 1.

The solar reflectance *index* (SRI) was also calculated according to ASTM E 1980-01, *Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces*, assuming an emittance of 0.9, which is appropriate for concrete and brick. The SRI is also shown in Table 1.

If you have any questions, please do not hesitate to call.

Sincerely,



Medgar Marceau, PE (Illinois), CSI, LEED-AP
Building Science Engineer
Building Science and Sustainability

MMarceau@CTLGroup.com

Phone: (847) 972-3154



Figure 1. Pavers labeled WG 52 01 to 03 (left, top to bottom), WG 53 01 to 03 (center, top to bottom), and WG 54 01 to 03 (right, top to bottom).

Table 1. Average Solar Reflectance, Standard Deviation and Solar Reflectance Index (Rounded)

Paver label	Solar reflectance	Standard deviation	Solar reflectance index (SRI)*
WG 52	0.39	0.02	44
WG 53	0.32	0.003	34
WG 54	0.29	0.005	31

*Assuming an emittance of 0.9, which is appropriate for concrete.

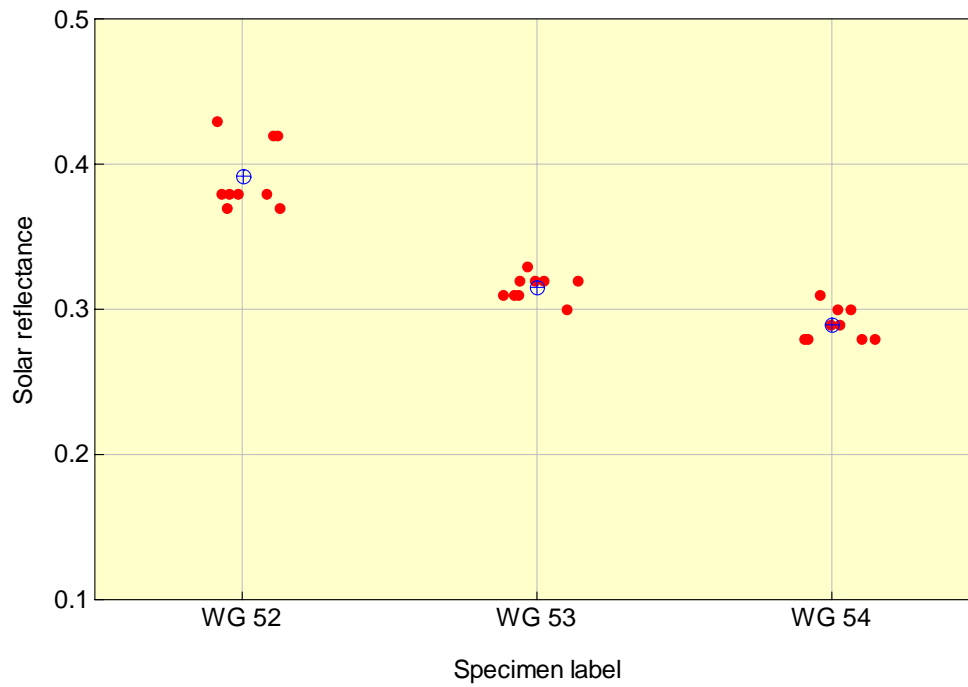


Figure 2. Solar reflectance of three types of Whitacre-Greer pavers was measured according to ASTM C 1549. The solid dot represents one of three measurements per paver, and the circle-and-cross represents the average of nine measurements per type.

APPENDIX A

ASTM C 1549, SOLAR REFLECTANCE NEAR AMBIENT TEMPERATURE USING A PORTABLE SOLAR REFLECTOMETER, DATA SHEETS

Client: Whitacre-Greer
Project: C1549 Whitacre-Greer Pavers
Contact: Colby DeHoff
800-947-2837 x233

CTLGroup project no.: 314040
CTLGroup project mgr.: M. Marceau
Analyst: M. Marceau
Approved: J. Shearer
Date tested: 2008 March 21

ASTM C 1549, Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer^{1,2}
WG 52

Specimen	Location	Location reflectance	Specimen reflectance
WG 52 01	1	0.38	0.38
	2	0.38	
	3	0.38	
WG 52 02	1	0.37	0.37
	2	0.37	
	3	0.38	
WG 52 03	1	0.43	0.42
	2	0.42	
	3	0.42	
Standard deviation			0.02
Overall average			0.39
Solar reflectance index (SRI)³ corresponding to convective coefficients of three wind conditions		Low wind	42
		Medium wind	44
		High wind	45

1. Tested in accordance with ASTM C 1549 - 04, *Standard Test Method for Determining Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer*.

2. Air mass index is 1.5.

3. Solar reflectance index calculated according to ASTM E 1980 - 01, *Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces* with an emittance for concrete or brick of 0.9.

Client: Whitacre-Greer
Project: C1549 Whitacre-Greer Pavers
Contact: Colby DeHoff
800-947-2837 x233

CTLGroup project no.: 314040
CTLGroup project mgr.: M. Marceau
Analyst: M. Marceau
Approved: J. Shearer
Date tested: 2008 March 21

ASTM C 1549, Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer^{1,2}
WG 53

Specimen	Location	Location reflectance	Specimen reflectance
WG 53 01	1	0.32	0.31
	2	0.31	
	3	0.31	
WG 53 02	1	0.32	0.32
	2	0.31	
	3	0.33	
WG 53 03	1	0.32	0.31
	2	0.32	
	3	0.30	
Standard deviation			0.003
Overall average			0.32
Solar reflectance index (SRI)³ corresponding to convective coefficients of three wind conditions		Low wind	33
		Medium wind	34
		High wind	36

1. Tested in accordance with ASTM C 1549 - 04, *Standard Test Method for Determining Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer*.

2. Air mass index is 1.5.

3. Solar reflectance index calculated according to ASTM E 1980 - 01, *Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces* with an emittance for concrete or brick of 0.9.

Client:	Whitacre-Greer	CTLGroup project no.:	314040
Project:	C1549 Whitacre-Greer Pavers	CTLGroup project mgr.:	M. Marceau
		Analyst:	M. Marceau
Contact:	Colby DeHoff	Approved:	J. Shearer
	800-947-2837 x233	Date tested:	2008 March 21

ASTM C 1549, Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer^{1,2}
WG 54

Specimen	Location	Location reflectance	Specimen reflectance
WG 54 01	1	0.29	0.30
	2	0.31	
	3	0.29	
WG 54 02	1	0.28	0.29
	2	0.30	
	3	0.28	
WG 54 03	1	0.28	0.29
	2	0.28	
	3	0.30	
Standard deviation			0.005
Overall average			0.29
Solar reflectance index (SRI)³		Low wind	29
corresponding to convective		Medium wind	31
coefficients of three wind conditions		High wind	32

1. Tested in accordance with ASTM C 1549 - 04, *Standard Test Method for Determining Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer*.

2. Air mass index is 1.5.

3. Solar reflectance index calculated according to ASTM E 1980 - 01, *Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces* with an emittance for concrete or brick of 0.9.