February 19, 2014

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ASTM C1549 Solar Reflectance of One Sample Set— #38 Old Chicago
CTLGroup Project No. 315170

Dear Mr. Edwards:

As authorized, CTLGroup measured the solar reflectance of one sample set, which was submitted by you. Measurements were performed in general accordance with ASTM C1549–09, *Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer*.

The specimens, shown in Figure 1, were received at CTLGroup on February 12, 2014. The sample set was labeled by you as "#38 Old Chicago." The specimens were stored at room temperature until they were tested and were not cleaned prior to testing. The age of the specimens at the time of testing is unknown. The specimens were approximately 3-in. by 9-in. by 2¼-in. brick samples. The top surface of each specimen is slightly rough and textured.

On February 19, 2014, the solar reflectance of the top surface of each of the specimens was measured in three locations. The air mass on the solar spectrum reflectometer was set at 1.5, which approximates the length a beam of sunlight travels through the atmosphere over the conterminous United States. The measured solar reflectance, average solar reflectance, and standard deviation are reported in the attached data sheet in Appendix A. The measurements are summarized in Table 1.

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

Sample Label	Solar Reflectance	Standard Deviation	Solar Reflectance Index (SRI)*
#38 Old Chicago	0.29	0.01	31

*Assuming a convection coefficient of 12 W/m²·°C (for medium wind speed) and an emittance of 0.9, which is appropriate for non-metallic opaque building materials.

The solar reflectance *index* (SRI) was also calculated according to ASTM E1980-11, *Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces*, assuming a convection coefficient of 12 W/m²·°C (for medium wind speed) and an emittance of 0.9, which is appropriate for non-metallic opaque building materials.[1] The SRI is also shown in Table 1.

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

Sincerely,

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Figure 1 – Specimens (from left to right): "#38 Old Chicago A", "#38 Old Chicago B", and "#38 Old Chicago C"

[1] "*Table of Emissivity of Various Surfaces*." Downloaded August 8, 2013 http://www-eng.lbl.gov/~dw/projects/DW4229_LHC_detector_analysis/calculations/emissivity2.pdf

APPENDIX A

ASTM C1549, STANDARD TEST METHOD FOR DETERMINATION OF SOLAR REFLECTANCE NEAR AMBIENT TEMPERATURE USING A PORTABLE SOLAR REFLECTOMETER, DATA SHEETS

Client:	Whitacre Greer Co.	CTLGroup project no.:	315170
Project:	ASTM C1549 Evaluation	CTLGroup project mgr.:	J. Slater
		Analyst:	J. Slater
Contact:	Vince Edwards	Approved:	J. Gajda
Phone:	(330) 823-1610	Date tested:	Feb 19, 2014

ASTM C1549, Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer[1, 2]
Sample Set - #38 Old Chicago

Specimen	Location	Location reflectance	Specimen reflectance
#38 Old Chicago A	1	0.268	0.28
	2	0.273	
	3	0.312	
#38 Old Chicago B	1	0.304	0.30
	2	0.306	
	3	0.297	
#38 Old Chicago C	1	0.302	0.29
	2	0.290	
	3	0.292	
		Standard deviation	0.01
		Overall average	0.29
Solar reflectance index (SRI)[3] corresponding to convective coefficients of three wind conditions		**Low wind**	29
		Medium wind	31
		High wind	32

1. Tested in accordance with ASTM C1549-09, *Standard Test Method for Determination of 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 E1980-11, *Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces* with an emittance for non-metallic opaque building materials of 0.9. Low wind corresponds to a convection coefficient of 5 W/m²•˚C, medium wind corresponds to a convection coefficient of 12 W/m²•˚C, and high wind corresponds to a convection coefficient of 30 W/m²•˚C.