SURFACE OPTICS CORPORATION

11555 Rancho Bernardo Road, San Diego, CA 92127 • TEL: (858) 675-7404 • FAX: (858) 675-2028
E-mail: soc@surfaceoptics.com • www.surfaceoptics.com

LABORATORY TEST RESULTS

JOB # 5916-MP
Date: August 31st, 2018

Prepared For: Coverall Stone

Subject: SRI Calculation

Purpose
Solar Reflectance is the fraction of incident solar radiation upon a surface that is reflected from the surface. This report presents the Solar Reflectance Index (SRI) measured for Sample **#GT1693** described in the attached document.

Test Methods
The samples were tested as per procedures described in ASTM C1549: *Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer* and ASTM C1371: *Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.*

Measurement was made in standard ambient temperature and humidity lab conditions. Sample was measured in an **as received** condition. The sample was not cleaned prior to measurement. For the description of the sample, please refer to measurement matrix. The air mass used to calculate values is 1.5.

The solar reflectance index was calculated in compliance with ASTM E 1980: *Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces*. Measurement approach II outlined in ASTM E1980-11 valid for SRI values greater than 0.1, and excluding collector surfaces (surface with high solar absorptance and low thermal emittance, that is, a greater than 0.8 and ´ less than 0.2), Eq 4 estimates SRI with an average error of 0.9 and maximum error of 2. This test method is used to measure the solar reflectance of a flat opaque surface with a slope smaller than 9.5 degrees from horizontal under standard solar and ambient conditions.

The SRI of a test surface depends on two material properties and four environmental conditions. The variables are Solar reflectance, thermal emissivity, solar flux, convection coefficient, air temperature, and sky temperature. SRI accuracy is +/- 1% for solar reflectance for non-metal materials with high emissivity yielding a maximum error of +/- 1.4 in SRI. For non-metal surfaces, SRI is insensitive to changes in convection coefficient. Metallic surfaces characterized with low thermal emissivity varies significantly with convection coefficient.

SURFACE OPTICS CORPORATION

11555 Rancho Bernardo Road, San Diego, CA 92127 • TEL: (858) 675-7404 • FAX: (858) 675-2028
E-mail: soc@surfaceoptics.com • www.surfaceoptics.com

Results:

GT1693 – Rolled Marble

Calculated Solar Absorbance = 0.346

Calculated Solar Reflectance = 0.654

Calculated Thermal emissivity (arithmetic average): 0.923

Convection Coefficient*	SRI value**
5	79.80
12	79.81
30	79.82

* The convection coefficient is the rate of heat transfer from the surface to air induced by the air movement, expressed in watts per square meter per degree kelvin. 5, 12, 30 $W/(Km^2)$ correspond to low, medium and high wind conditions, respectively.

** Disclaimer: Samples that are non-isotropic and/or non-homogenous in color, flatness, or composition may be subject to increased measurement error over standard instrument error margins. Every effort is made to reduce error by finding the most ideal locations on a sample and taking multiple data points to increase confidence in report values. The effect of beam scatter/oblique measurement due to sample flatness and spot size in measuring samples that have varying composition in relation to measurement error is not well defined nor quantified. SRI will be reported in these instances on a best effort basis.

*** Measurements were performed on provided rocks and the average Absorbance and Emissivity was used for the SRI calculation.