

DSET LABORATORIES

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Corrected Report No.: 43445-1
Order No.: AE43445
Client Reference: CREDIT CARD
Date: April 30, 2024

**HEMISPHERICAL SPECTRAL REFLECTANCE AND
TOTAL EMITTANCE TEST REPORT**

prepared for:

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presented by:

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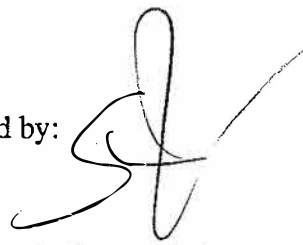
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This report contains 5 pages

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**HEMISPHERICAL SPECTRAL REFLECTANCE AND
TOTAL EMITTANCE TEST REPORT****1.0 INTRODUCTION**

This report presents results of spectral reflectance and total emittance measurements on the following three specimens coded:

**IPEWOOD (NEW)
IPEWOOD (WEATHERED)
PORCELAIN PAVER (HYALITE)**

2.0 TEST METHODS AND PROCEDURES**Reflectance**

Hemispherical spectral reflectance measurements were performed in accordance with ASTM Standard Test Method E903. The measurements were performed with a PerkinElmer Lambda 950 Spectrophotometer utilizing an integrating sphere (Fig X1.3 of E903). Total reflectance measurements were obtained in the solar spectrum from 2500nm to 250nm at an incident angle of 8°. The measurements employ a detector-baffled, wall-mounted integrating sphere that precludes the necessity of employing a reference standard except to define the instrument's 100% line. The measurements are properly denoted as being 'hemispherical spectral reflectance'.

Total solar reflectance was obtained by integrating the spectral data against Air Mass 1.5 (ASTM G173) solar spectrum. All spectral data are submitted herewith in the original.

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**HEMISPHERICAL SPECTRAL REFLECTANCE AND
TOTAL EMITTANCE TEST REPORT****2.0 TEST METHODS AND PROCEDURES (cont'd)****Emittance**

Near-normal hemispherical infrared reflectance measurements were performed in accordance with ASTM E408, Method A. An AZ Technology Portable Emissometer/Reflectometer model TEMP 2000A was utilized for the measurements. The TEMP 2000A calculates total thermal hemispherical reflectance measurements in a bandpass from less than 3 to greater than 35 micrometers. The optical system maintains optical alignment during the measurement and utilizes a patented ellipsoid collector that is designed to meet the ASTM E408 standard. The instrument is calibrated using high/low emittance standards prior to use.

Near-normal hemispherical emittance for the client's specimens was calculated from Kirchhoff's Relationship where;

$$\rho + \alpha + \tau = 1, \alpha = \varepsilon$$

Since these specimens are opaque and have no τ in the far IR, the preceding equation reduces to:

$$\rho + \varepsilon = 1 \text{ and } 1 - \rho = \varepsilon$$

SRI

The Solar Reflectance Index is calculated from ASTM E1980. The procedure defines a Solar Reflectance Index (SRI) that measures the relative "steady-state surface temperature" of a surface with respect to the standard white (SRI=100) and the standard black (SRI=0) under the standard solar and ambient conditions. The program used for the calculations was provided by AZ Technology in Alabama.



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3.0 OBSERVATIONS, DEVIATIONS, AND WAIVERS

All measurements were performed on the uncoded sides of the specimens.

The values reported for emittance represent the average of at least four measurements.

4/30/2024 Per Client instruction, a corrected report was issued by correcting sample coded PORCELAIN PAVER (HYALITE).

With all test methods, there typically is a level of uncertainty for the test data due to the acceptable operating tolerances of the instrumentation and variation caused by the test method. The estimated tolerances are expected to be less than plus or minus 2% for most materials tested to ASTM E903.

CAUTION: ASTM Test Method E903, paragraph 5.4 clearly states “this test method has been found practical...except for those materials that are inhomogeneous, patterned, or corrugated”. In that the measured specimens exhibit inhomogeneities, the client is cautioned when utilizing the reported measurement values.



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4.0 RESULTS

Reflectance and SRI Data:

Specimen Code	% Solar Reflectance	SRI		
		Low	Medium	High
IPEWOOD (NEW)	36.9	40	41	42
IPEWOOD (WEATHERED)	24.2	24	24	25
PORCELAIN PAVER (HYALITE)	32.8	34	35	36

Emittance Data:

Specimen Code	Reflectance (ρ) Measured	Hemispherical Emittance (ϵ) @300°K
IPEWOOD (NEW)	.11	.89
IPEWOOD (WEATHERED)	.11	.89
PORCELAIN PAVER (HYALITE)	.13	.87