MAIN LABORATORY SASSUOLO

Testing, Experimentation and Quality Control Laboratory

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TEST REPORT n. 0240/2026/I

DETERMINATION OF THE SOLAR REFLECTANCE INDEX ACCORDING TO THE STANDARD ASTM E1980 - 24

Date of report:	15/01/2026
Customer:	**CERAMICA DEL CONCA S.p.A.** Via Croce, 8 47832 SAN CLEMENTE (RN)
Requested on:	19/12/2025
Our ref.number:	41564
Execution place of tests:	qualified external laboratory
Description of the sample:	"Ceramic tiles 20x20 cm marked: HAV 205"
Sampling:	carried out by the customer
Receipt date of samples:	23/12/2025
Execution date of tests:	start: 12/01/2026 end: 12/01/2026
Test specification:	ASTM E1980 - 24 Determination of the Solar Reflectance Index of tiles according to ASTM E1980-24
Warnings:	*This test report may not be reproduced in part without our written approval.* *The results reported only refer to the samples tested, as received, and are only valid under the conditions in which the work was carried out.* *The information enclosed in inverted commas was provided by the customer and the laboratory accepts no liability for it.*

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Normative references

ASTM E1980 - 24	- Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces
ASTM C1371 - 15 (2022)	- Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers
ASTM E903 - 20	- Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres
ASTM G173 - 23	- Standard Tables for Reference Solar Spectral Irradiance: Direct Normal and Hemispherical on 37° Tilted Surface
Technical Note 79-17**	- Emissivity measurements for in-place surface and for materials with low thermal conductivity

(**) document issued by Devices & Services Company.

Modality

Measurement of solar reflection factor and calculation of solar absorption factor

The spectral reflectance factors of each sample were measured using a spectrophotometer in the 300–2500 nm band.
The reflection spectrum was measured at an incidence angle of 8°, using Lucideon's 'Matt White' diffuse reflection sample as a reference.
The solar reflection factor (SR) "ρ_e"of each sample was calculated by integrating the respective spectral factors according to ASTM E903, using the distribution of total solar radiation per 1,5 air mass reported in ASTM G173. The solar absorption factor "α_e" was determined using the relationship: $\alpha_e = 1 - \rho_e$. The average solar reflection factor "re" was then determined.

Emissivity measurement

The emissivity of the object surface was measured using the emissimeter according to ASTM C1371 . This instrument, after calibration against two known emissivity standards (s/n 1759 with $\varepsilon = 0{,}87$ and s/n 1730 with $\varepsilon = 0{,}06$ supplied by Devices & Services Company), provides a voltage signal directly proportional to the emissivity of the surface under test. The average emissivity has been calculated.
The measurement of emissivity was carried out using the procedure defined in the document "Technical Note 79-17".

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Calculation of solar reflectance index "SRI" and surface temperature

The stationary surface temperature "T_s" and the solar reflectance index "SRI" were determined according to ASTM E1980 - 24 (Approach 1) at three values for the convective heat transfer coefficient "h_c":
- h_c = 5 W/(m² · K) which corresponds to a low air speed (0 to 2 m/s);
- h_c = 12 W/(m² · K) which corresponds to an average air speed (2 to 6 m/s);
- h_c = 30 W/(m² · K) which corresponds to a high air speed (6 to 10 m/s);

and under standard environmental and solar conditions defined by:
- solar flux = 1000 W/m²;
- ambient air temperature = 310 K (equal to 37 °C);
- temperature of the sky = 300 K (equal to 27 °C).

The standard surfaces are defined as follows:
- standard white - solar reflectance factor of 0,80 and emissivity of 0,9;
- standard black - solar reflectance factor of 0,05 and emissivity of 0,9.

The solar reflectance index 'SRI' was determined according to the following formula in ASTM E1980 - 24 paragraph 4:

$$SRI = 100\frac{T_b - T_s}{T_b - T_w}$$

where: T_w = stationary temperature of the standard white surface, expressed in K;
T_b = stationary temperature of the standard black surface, expressed in K;
T_s = stationary surface temperature, expressed in K;

The solar reflectance index "SRI" thus represents the stationary temperature of a surface "T_s", depending on the solar reflectance factor, the thermal emissivity and the convective heat transfer coefficient, evaluated with respect to that of standard white (re = 0,80, e = 0,9, SRI = 100) and standard black (re = 0,05, e = 0,9, SRI = 0) under standard environmental and solar conditions.
The 'SRI' values determined for each sample for the same convective heat transfer coefficient were arithmetically averaged.

Environmental conditions

Temperature:	(20 ± 1) °C
Relative humidity:	(40 ± 5) %

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Test results

N of samples tested: 3

Sample	Solar reflection factor (SR) "ρ_e"	Solar absorption factor "α_e"	Thermal emissivity "ε"
1	0,333	0,667	0,912
2	0,322	0,678	0,918
3	0,337	0,663	0,913
Average value:	**0,33**	**0,67**	**0,91**

	Stationary white standard surface temperature "T_w" [K]		
	h_c = 5 W/(m^2 · K)	h_c = 12 W/(m^2 · K)	h_c = 30 W/(m^2 · K)
	322,2	318,0	313,9
	Stationary black standard surface temperature "T_b" [K]		
	h_c = 5 W/(m^2 · K)	h_c = 12 W/(m^2 · K)	h_c = 30 W/(m^2 · K)
	376,2	355,4	334,3
Sample	Stationary surface temperature "T_s" [K]		
	h_c = 5 W/(m^2 · K)	h_c = 12 W/(m^2 · K)	h_c = 30 W/(m^2 · K)
1	356,4	341,4	326,6
2	357,0	341,9	326,9
3	356,1	341,2	326,5

Sample	Solar reflectance index "SRI"		
	h_c = 5 W/(m^2 · K)	h_c = 12 W/(m^2 · K)	h_c = 30 W/(m^2 · K)
1	36,8	37,4	37,6
2	35,7	36,1	36,2
3	37,3	37,9	38,2
Average value:	37	37	37

Note: The test was carried out externally in a qualified laboratory, as agreed with the customer.

The Director
Giulia Gaido