



BMI Technical Center

TECHNICAL NOTE

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Title: SRI values for BMI Iberia Clay Roof Tiles

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Objective

BMI Iberia asked for SRI values of various clay roof tiles between 2016 & 2018. This document records those SRI values for BMI Iberia tiles produced at Outeiro, Almansa and Villaluenga. A range of different clay roof tile coatings are included in the results.

Main Findings

SRI of selected BMI Iberia clay roof tiles;

Date	Sample No.	Material	Fabricante	Product Name	Colour	SRI value
May 2015	M32151	Clay Tile	BMI	Lógica Plana Red	Red	45
Jul 2015	M32708	Clay Tile	BMI	Lógica Plana Glaciar	Matt White-grey	70
Sept 2015	M32985	Clay Tile	BMI	Duna Red	Red	54
Sept 2015	M32984	Clay Tile	BMI	Duna Medievo	Sand/White/Red /Dark powder	53
Abr 2016	M34767	Clay Tile	BMI	Lógica Plana Magma	Red Rustic	35
Ene 2018	M39141	Clay Tile	BMI	Klinker Virtus Red	Red	49
Ene 2018	M39142	Clay Tile	BMI	Curva Collado Red	Red	62



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1. SRI - Solar Reflectance Index

1.1. Definition

SRI stands for Solar Reflectance Index. It is a method to consider the radiative properties of (roofing) materials. The SRI is defined by the ASTM standard E1980-01. The SRI is calculated from the solar reflectance and thermal emittance of a material.

The SRI is the relative steady state surface temperature with respect to a standard white surface (SRI 100) and standard black surface (SRI 0) under standard solar and ambient conditions.

SRI combines both the TSR reflectivity value and emissivity value as a measure of the ability of a surface to reject solar heat.

1.2 Calculation

An easy-to use calculator is available provided by LEED (Leadership in Energy and Environmental Design) according to ASTM E 1980. The calculation requires only the total solar reflectance (TSR) and the emissivity of a (roofing) material. The SRI value is automatically calculated when the reflectivity and emissivity values are inserted into the spread sheet:

To compute solar reflectance index (SRI) based on solar and thermal emittance (E) using ASTM standard E 1980:

1. Input R and E in blue and green cells.
2. Click on the red button to compute SRI.

Test surface properties

Solar reflectance (0-1) R	0.28
Thermal emittance (0-1) E	0.9

Click to update SRI **SRI= 29**

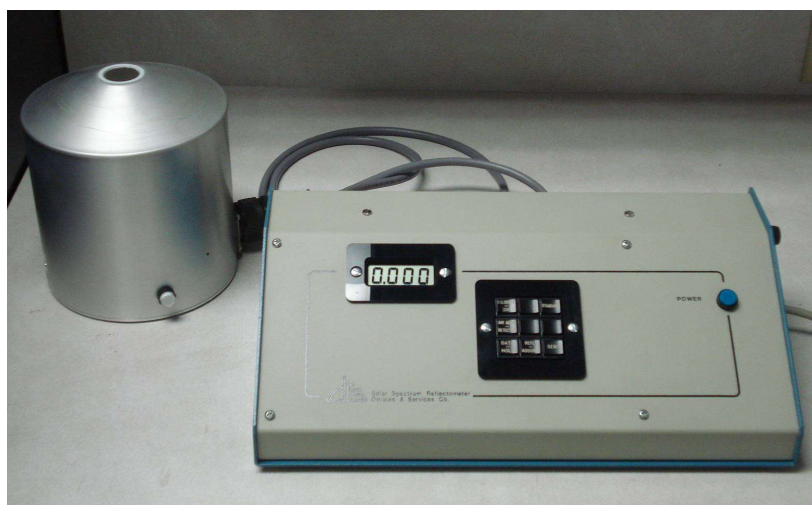


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2. Measurement

2.1 TSR – Total Solar Reflectance Measurement

BMI TC use a Solar Spectrum Reflectometer SSR-ER provided by Devices & Services Co. The sample is illuminated diffusely with a tungsten lamp source and the reflected radiation is detected. TSR is the percentage of the energy which is reflected away from the tile surface.



2.2 Emissivity Measurement

BMI TC use an emissometer Model AE provided by Devices & Services Co. The detector portion of the device is heated to 82 °C so that the sample to be measured does not have to be heated. The detector is designed to have a voltage output that is linear to the emittance. The emittance of a (roof tile) sample is measured after the detector has been calibrated with a standard of known emittance, which is maintained at the same temperature as the unknown. Emissivity is the ability of the tile to radiate some of its heat away from the surface.





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2.3 Tile measurement

To ensure good quality representative SRI data, a number of individual readings are required.

TSR - For monocolour tiles a minimum of 3 tiles and 15 individual TSR readings were recorded for each tile surface. For multi-coloured ("antique") tiles a minimum of 5 tiles and 30 individual TSR readings were recorded.

Emissivity - This value is dominated by the tile body, and for the tiles measured was in the range 0.91-0.92. Three measurements were made for each tile type.