



# CONSTRUCTION MATERIALS TECHNOLOGIES

## LABORATORY TEST REPORT

**Report for:** BEMO do Brasil Sistemas Metálicos Ltda. **Date:** October 12, 2009  
 Av. Prestes Maia, 539 - Bloco VI  
 Centro Cep: 09930-270 - Diadema/SP

**Attention:** Mauro Sansoni

<b>Product Name:</b>	Coated Steel Panels	<b>Manufacturer:</b>	BEMO do Brasil
<b>Date Received:</b>	September 30, 2009	<b>Source:</b>	BEMO do Brasil
<b>PRI Report No.:</b>	BDB-001-02-01REV	<b>Test Dates:</b>	October 7, 2009

**Purpose:** The purpose of this testing was to determine the solar reflectance, thermal emittance, and solar reflectance index value of coated metal panels supplied by BEMO do Brasil.

**Materials:** The samples for testing were received from BEMO do Brasil on September 30, 2009. The samples were labeled as indicated in the data table in the results section of this report. The samples were approximately 120 x 120 mm in size.

**Test Methods:** The test methods used included ASTM C 1549-04: *Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Reflectometer* and ASTM C 1371-04a: *Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers* and . Both of these methods are Cool Roof Rating Council (CRRC) and U. S. Green Building Council: Leadership In Energy and Environmental Design (LEED) approved methods for determining radiative properties.

The solar reflectance index (SRI) was calculated in compliance with ASTM E 1980-01: *Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces*. This is the LEED approved practice for calculating SRI.

**Results of Testing:** All measurements were conducted at controlled laboratory conditions of  $22 \pm 2^\circ\text{C}$  and  $50 \pm 5\%$  relative humidity. The testing was conducted on October 7, 2009.

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PRI Accreditations: IAS-ES TL-189; State of Florida TST 5878; Miami-Dade 06-1116.02; CRRC

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**Reflectance**

Material ID Specimen Designation	ASTM Test Method	Result, Solar Reflectance (r), Air Mass = 1.5			
		1	2	3	Avg.
A-1	C 1549	0.877	0.875	0.878	0.88
A-2	C 1549	0.884	0.881	0.880	0.88
B-1	C 1549	0.757	0.759	0.758	0.76
B-2	C 1549	0.747	0.749	0.750	0.75
C-1	C 1549	0.708	0.710	0.711	0.71
C-2	C 1549	0.712	0.712	0.713	0.71

*Note: Reflectance measurements were conducted using a Devices and Services SSR-ER Version 5.0 reflectometer calibrated with Devices and Services Reference Standard: 0.807.*

**Emittance**

Material ID Specimen No.	ASTM Test Method	Emittance, ε			
		1	2	3	Avg.
A-1	C 1371	0.89	0.89	0.90	0.89
A-2	C 1371	0.90	0.90	0.90	0.90
B-1	C 1371	0.90	0.90	0.90	0.90
B-2	C 1371	0.91	0.91	0.91	0.91
C-1	C 1371	0.84	0.84	0.84	0.84
C-2	C 1371	0.84	0.84	0.84	0.84

*Note: Emittance measurements were conducted using a Devices and Services Emissometer Model AE calibrated with Devices and Services Reference Standards: High Emittance: 0.90 and Low Emittance: 0.06.*

**Solar Reflectance Index**

**Metal Panel A**  
 Reflectance (a) 0.88  
 Emittance (ε) 0.90  
 Absorptance (α) 0.12

Low-Wind Condition	
$h_c =$	5 W/m <sup>2</sup> ·K
$C_{low-wind}$	0.096
<b>SRI<sub>low-wind</sub></b>	<b>111</b>

Medium-Wind Condition	
$h_c =$	12 W/m <sup>2</sup> ·K
$C_{medium-wind}$	0.095
<b>SRI<sub>medium-wind</sub></b>	<b>111</b>

High-Wind Condition	
$h_c =$	30 W/m <sup>2</sup> ·K
$C_{high-wind}$	0.095
<b>SRI<sub>high-wind</sub></b>	<b>111</b>

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**Metal Panel B**  
 Reflectance (a) 0.75  
 Emittance (ε) 0.91  
 Absorptance (α) 0.25

<u>Low-Wind Condition</u>	
$h_c = 5 \text{ W/m}^2\cdot\text{K}$	
$C_{\text{low-wind}}$	0.223
<b>SRI<sub>low-wind</sub></b>	<b>93</b>

<u>Medium-Wind Condition</u>	
$h_c = 12 \text{ W/m}^2\cdot\text{K}$	
$C_{\text{medium-wind}}$	0.222
<b>SRI<sub>medium-wind</sub></b>	<b>93</b>

<u>High-Wind Condition</u>	
$h_c = 30 \text{ W/m}^2\cdot\text{K}$	
$C_{\text{high-wind}}$	0.221
<b>SRI<sub>high-wind</sub></b>	<b>93</b>

**Metal Panel C**  
 Reflectance (a) 0.71  
 Emittance (ε) 0.84  
 Absorptance (α) 0.29

<u>Low-Wind Condition</u>	
$h_c = 5 \text{ W/m}^2\cdot\text{K}$	
$C_{\text{low-wind}}$	0.281
<b>SRI<sub>low-wind</sub></b>	<b>85</b>

<u>Medium-Wind Condition</u>	
$h_c = 12 \text{ W/m}^2\cdot\text{K}$	
$C_{\text{medium-wind}}$	0.275
<b>SRI<sub>medium-wind</sub></b>	<b>86</b>

<u>High-Wind Condition</u>	
$h_c = 30 \text{ W/m}^2\cdot\text{K}$	
$C_{\text{high-wind}}$	0.270
<b>SRI<sub>high-wind</sub></b>	<b>86</b>

**Note:** SRI is dependent on ambient conditions and the reflectance and emittance of the material. The SRI is calculated using three conditions: low, medium and high wind using the appropriate convective coefficient ( $h_c$ ).

Signed: Heath Coulombe  
 Heath Coulombe  
 Laboratory Technician

Signed: Donald C. Portfolio  
 Donald C. Portfolio  
 President

Date: October 9, 2009

Date: October 12, 2009

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