

REPORT No. 061665

CUSTOMER	INDUSTRIA ESPAÑOLA PARA EL DESARROLLO E INVESTIGACIÓN 2100, S.A. (IEdiSA)
APPLICANT	PATRICIA SILVA
ADDRESS	POL. IND. POLIVISO C/ HERREROS, 8 41520 EL VISO DEL ALCOR (SEVILLA)
PURPOSE	SRI INDEX IN ACCORDANCE WITH ASTM E1980-11
SAMPLE TESTED	WHITE COATING REF. «BIOSPHERE PREMIUM»
DATE OF RECEIPT	12/09/2016
TEST DATES	20/09/2016
DATE ISSUED	28/09/2016

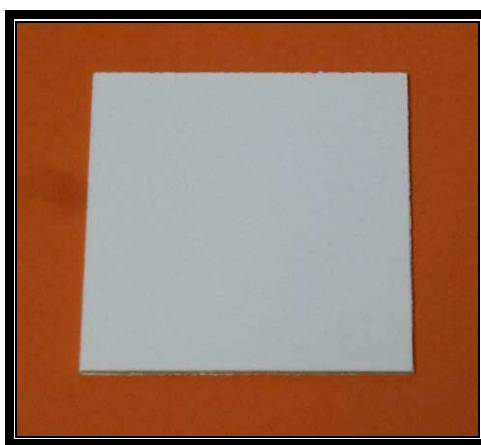
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CHARACTERISTICS OF THE SAMPLES

On 12th September 2016, TECNALIA received from the company INDUSTRIA ESPAÑOLA PARA EL DESARROLLO E INVESTIGACIÓN 2100, S.A. (IEdiSA), 6 test specimens of white coating measuring (100 x 100) mm and referred to as:

«BIOSPHERE PREMIUM»



The annex includes the technical data sheet for the product tested supplied by the customer.

CALCULATION REQUESTED

The calculation requested is the determination of the **SRI index** of the test specimen received in accordance with **ASTM E1980-11** «Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces».

Two tests must be done prior to the determination of the SRI index;

- Determination of the **solar reflectance** in accordance with **ASTM E903-12** «Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres».
- Determination of the **emissivity** in accordance with **ASTM C1371-15** «Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers».

TESTS CARRIED OUT

SOLAR REFLECTANCE

The determination of the reflectance between 280 and 2,500 nm was carried out using a Perkin-Elmer Spectrometer Lambda 900 UV/VIS/NIR spectrophotometer with an integrating sphere of 150 mm in diameter and white standard.

The test was carried out under laboratory conditions at (23 ± 2) °C and a relative humidity of under 70%. The test specimens were conditioned for 24 hours under the laboratory conditions described above.

The method used has the following characteristics:

- Wavelength interval: 5 nm
- Scan speed: 284.6 nm/min
- Slit UV/VIS:1
- Detector gain NIR:4

Six measurements were taken on one of the test specimen received and the average was calculated.

Based on the reflectance average value of the test specimen, solar reflectance has been calculated using the selected ordinate method set out in Section 8.3.4.. Ordinates have been selected from the values of direct normal solar irradiance specified in Table X2.3 of the ASTM E903-12 «50 Selected Ordinates for G173 Direct Normal Irradiance AM 1.5».

EMISSIVITY

The measuring equipment used was an emissometer model AE manufactured by Device & Services Company for low and high emissivity.

The test was carried out under laboratory conditions at (23 ± 2) °C and a relative humidity of under 70%. The test specimens and test device (Emissometer Model AE) were conditioned for 24 hours under the laboratory conditions described above.

Emissivity values are determined by comparing the minimum standard value estimated at 0.06 using a silver and copper alloy disc and the maximum standard value estimated at 0.88 using a black disc close to perfect black with a value of 1, made of galvanized aluminium and coated with Teflon. The values of these materials of reference are described in technical note 78-2 provided by the Device & Services Company, which explains how these standard emissivity values have been reached.

The values obtained have an estimated deviation of ± 0.02 .

Ten measurements were taken on the test specimens received and the average was calculated.

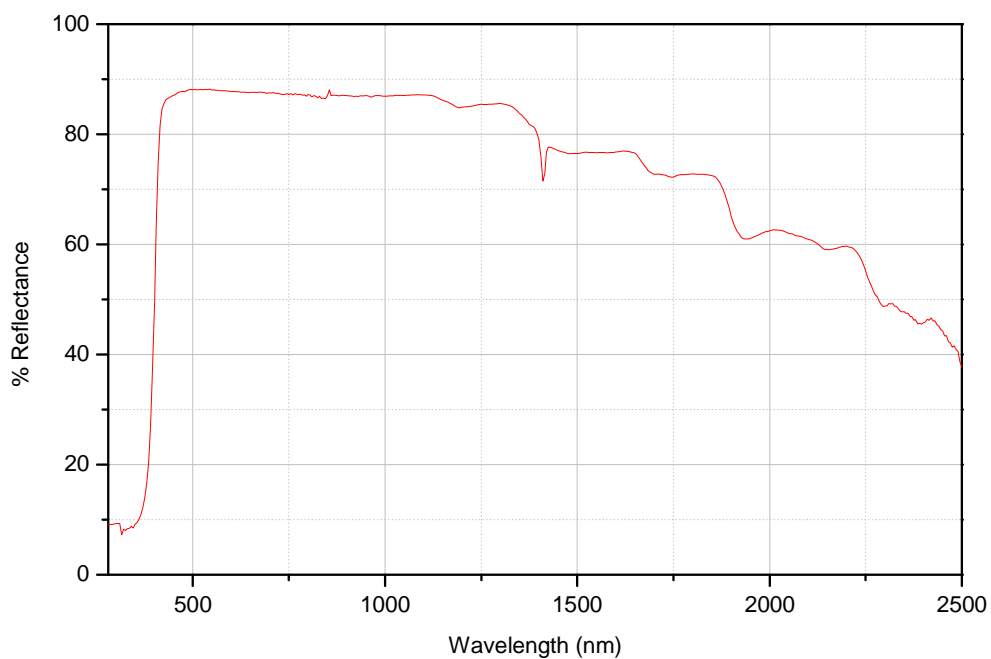
RESULTS

SOLAR REFLECTANCE

The result of solar reflectance of the test specimen referenced as «**BIOSPHERE PREMIUM**» is:

Solar reflectance (%)	82.2 ± 0.2
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The following graph shows the data of the spectral reflectance of the test specimen.



EMISSIVITY

The results of emissivity are:

Measurement	1	2	3	4	5	6	7	8	9	10
Emissivity	0.80	0.78	0.80	0.79	0.79	0.80	0.78	0.78	0.77	0.78

Therefore, the mean emissivity value of the test specimen referenced as «**BIOSPHERE PREMIUM**» is:

Emissivity	0.79 ± 0.03
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SRI

Using the solar reflectance and emissivity values obtained, the following **SRI index** and **surface temperature** values are obtained, in accordance with the ASTM E1980-11 Standard for different convection coefficients:

Convective coefficient	SRI	T _s (K)
Low (0-2 m/s)	100.0 ± 0.3	321,9
Medium(2-6 m/s)	100.8 ± 0.3	317,5
High (6-10 m/s)	101.5 ± 0.3	313,5

ANNEX

Technical Data Sheet & Application Guide

Biosphere Premium



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Date Revision: 02/24/2016



A natural and organic mineral coating, suitable for outdoors use, high covering rate, whiteness, and with high mechanical and chemical strength. Composed of low density graphene nano material, which provides toughness and robustness unlike the natural products from which it comes, as well as natural materials that control chemical pollutants.

Ideal for decorating facades, and to create healthy environments inside. We present an extensive and enjoyable color catalogue for exterior usage, with 100% natural pigments. Thanks to nanotechnology, the paint acts as an insurmountable barriers against atmospheric agents that deteriorate mortars and, at the same time, prevents condensation which can cause unhealthy fungi and molds, damaging the building and health of those living in it.



"This product has been awarded with **Cradle to Cradle Certified™ GOLD**, the highest product distinction worldwide." (For more information visit: <http://www.c2ccertified.org>)

Density	1.20 ± 0.05 g/cm ³ (10.01 ± 0.42 Lbs/gal)
pH	12 ± 0.5
Solids Content	65 ± 2%
Approximate application ratio	1L - 18 m ² (1 gal - 733 sqf) in 1 coat.
Packaging	4L, 12.50L and 15L.
Shelf life and storage	If temperature is continuously out of the range from +5°C (40°F) to +32°C (90°F) (stable environmental conditions), approximately 12 months with container unopened. Protect from freezing and high temperatures. Our containers are made from recycled polypropylene as part of the processing and manufacturing, which require much less energy to produce than the original containers the recycled ones are made of.
Components statement	Water, hydroxyethyl cellulose, alkoxyated diamines, alkaline phosphonates, calcium carbonate, talc, calcium hydroxide, styrene-acrylic dispersion (APEO & butyl glycol free) ≤ 3% - 5% of dry extract in accordance with the DIN 18363 standard, essential oils, surfactants, graphene fiber, stabilizers and specific dispersants.
Viscosity	Dense matte white liquid in the container, which can thicken over time without losing its properties (always stir before using to ensure uniformity of the product).
Finish	Matte
Where to use	For outdoor use

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Thinner	Water until improve application by brush, roller or spray. Add the same amount of water to all containers being used for the project.
Application - tools	Paint roller (medium pile), paintbrush and airless or other sprayer equipment.
Time between paint coats	8 - 10 hours (20°C (68°F) at 65% relative humidity). Let dry for 24 h (20°C (68°F) at 55-65% relative humidity) to be fully dry. Cure progressively (physically-chemically) for 30 days for good hardness and resistance.
Colors	Available colors include 12 references obtained from the 12 natural concentrated supermineral pigments added to the paint. Recommended to blend with white to obtain gradated colors. To obtain uniform characteristics, remove thoroughly by hand or with electric whisk. Custom made colors starting from 4 L or 15 L containers. Some minor differences in brightness and shade can appear when high concentration of pigments. If this is the case, look for a clear cut to start and end with painting.

Application preparation

- Surfaces must be dry, firm, well-bonded and free of any impurities such as mold, mildew, algae, lichen, salts or environmental contamination (grease, soot, or unknown substance stains, or anything resulting from visible or invisible contamination which prevents proper paint adhesion). It is also necessary to adequately prepare non-cohesive (sandy, dusty or deteriorated) surfaces with the right product, for example with a solution of at least 15% water and Graphenstone.
- If the surface is chipped, flaking, blistering or peeling, it is recommended to scrape the deteriorated areas and cover them with suggested materials such as Graphenstone Fullmasse.
- Protect glass and metal surfaces before applying paint or primer.
- The presence of mold, lichen, algae and bacteria in the walls is due to the presence of water, temperatures and nutrients. Therefore in order to obtain the best results possible over time, it is necessary to resolve the structural problems causing their presence and then clean them before painting.

Note: Drying time for recently applied plaster and stucco is calculated as 1 day per 1 mm (approx. 1/32") thickness at 20°C (68°F).

Application procedure

Surface type: Cement plaster, concrete, limestone mixtures, clay/loam.
Method of application: Remove dust and ensure the surface is cohesive and not gritty or sandy. Apply a mineral sealant and 2 or 3 paint coats.

Surface type: Gypsum plaster; projected, perlite plaster, manual.
Method of application: Remove dust and ensure the surface is still cohesive and does not has excess of water. Apply a mineral sealant or first layer diluted at 15% with sealant and 2 or 3 paint coats.

Surface type: Fillers and plastering for repairs and leveling.
Method of Application: Thoroughly clean sanding dust and ensure the surface is cohesive. Apply first layer of 5% paint over the plastered and filled patches and then 2 or 3 paint coats.

Surface type: Cardboard/ gypsum panels.
Method of Application: Remove dust if any. Apply Graphenstone primer for cardboard/gypsum panels and 2 or 3 paint coats.

Surface type: Cellulose / gypsum panels.
Method of Application: Remove dust if any. Apply 2 or 3 paint coats.

Surface type: panels and plaster molds
Method of application: remove dust and check for disintegration due to excess of water for finishing. Apply mineral sealant or paint diluted at 15% and then 2 or 3 paint coats.

Surface type: Aerated concrete.
Method of Application: Remove dust if any. Apply mineral sealant or paint diluted at 15% and then 2 or 3 paint coats.

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Application procedure	Surface type: Concrete. Method of application: Fill in holes and imperfections with Graphenstone Füllmasse if necessary prior to application. Apply mineral sealant or paint diluted at 15% and then 2 or 3 paint coats.
	Surface type: OSB panels. Method of application: seal surface with an anti stain / water proof product, to shield the stains that could arise due to tannins dissolution. Apply a bonding layer of quartz primer and then 2 or 3 coats of paint.
	Surface type: Emulsion paints (matte plastic paints). Method of application: Ensure they are well-bonded and apply 2 or 3 paint coats.
	Surface type: Satin emulsion paints, water-based acrylic enamels. Method of application: Ensure they are well-bonded, apply a bonding layer of quartz primer and then 2 or 3 paint coats.
	Surface type: Adhesive paint, limewash or any other mineral-based paints. Method of application: First cover the entire surface with mineral sealant or paint diluted at 15% and then apply 2 or 3 paint coats.
	Surface type : wood with previous sealing and fireproofing treatments. Method of application: Clean thoroughly dust and dirt. Apply mineral sealant and 2 or 3 paint coats.
Application temperature	Both ambient and surface temperatures between 7°C (45°F) minimum and 32°C (90°F) maximum.
Tool cleaning	Soap and water
Waste disposal method	According to local legal provisions
Theoretical yield	Depending on the number of paint coats applied, surface texture or absorption, material consumption may vary from the following guideline: With 1 gallon you could apply 2 coats of 375 sqf each. (1 Liter for 2 coats of 9 m ² each).
Certificates	<ul style="list-style-type: none"> * DIN 18363. Restriction of the use of organic materials according to the German Standard. (Meets the DIN 18363 Standard requirements, according to analysis, trials and Test Report No. 850028-001, 14.04.2015). * CE REPAIR MATERIAL LINE EN 1504-2:2005 (AIDICO) * ECOLABEL as decided by COMMISSION 13.08.2008 (TECNALIA Laboratories) * ZERO FUNGI GROWTH, AS PER ISO 946 METHOD A (TECNALIA Laboratories)
CO₂ Absorption	Due to its chemical composition based in calcium hydroxide, reacts with CO ₂ spontaneously during the curing chemical process, generating CaCO ₃ at a rate of 4.80 kg per each 15 L (10 LB 10 oz per each 4 gal) of product.
Graphene	Thanks to its graphene fiber-based formulation, the paint has high standards of quality, is environmentally flawless and improves the environment we live in. Graphene provides enormous resistance, flexibility and washability for being a mineral product. It extends the product's useful life, improving texture and appearance once applied.
Carbon footprint	Calculated as per PAS 2050 Regulation, this product absorbs more CO ₂ than the amount produced through its life cycle. Registered at Carbonpedia.

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Biosphere Premium



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Application and general observations

- If the surface shows signs of imperfections of a different nature such as rising damp, condensation, dampness due to filtration, biodeterioration and surface movement, etc. then we cannot guarantee permanence of the paint over time unless such issues have been resolved.
- Before placing self-adhesive stencil templates for decoration or other types of masking or painter's tape, wait for the paint to have cured 48 hours.
- Once starting to paint a wall, do not interrupt that section in order to avoid overlapping.
- Although harmful gas emissions are not produced while painting, it is recommended do so with good ventilation.
- Number of coats to achieve good cohesion: 2.
- Surfaces to be painted must be resistant to high alkalinity.
- To perform decorative glazing, 2 or 3 coats of paint should be applied in first instance. Let dry 36 hours at 20°C (68°F) at 55-65% relative humidity.
- When applied in smooth even surfaces, shades can appear if the work is not performed carefully.
- When plastering, the right material (silicate filler) should be used to avoid different absorptions and characteristics. Only use inorganic pigments to color the product.
- Do not apply in horizontal or inclined surfaces, like stools or shelves.
- Mist can temporarily delay the final hardening of this product.
- Surfaces with natural or artificial intense colors, like some stones, bricks or ancient mineral coatings can show some superficial pigmentation under certain circumstances.
- As a uniformity background, a couple of white coats can be applied and dried during 24 hours, before starting with the color coat.

Precautions for use

Non-flammable product.
See Material Safety Data Sheet: Biosphere Premium (Ecological Exterior Paint)

Regarding the paint, no special precautions necessary under normal usage by persons who are not afflicted by particular illnesses. Contains calcium hydroxide (alkaline binder), caustic, protect skin and eyes. Keep out of reach of children.

Recommended uses

Ideal for exterior applications to ensure bio habitability, as well as breathability, antistatic behaviour and wholesomeness of the building with excellent aging. Also suitable for rehabilitation or restoration of heritage and sustainable restoration of historic or vernacular buildings. Ecologically incomparable.



Original appearance of the original packaging. Actual container may vary in color, design and packaging.

*Removing old paint from any surface can generate exposure to lead dust. EXPOSURE TO LEAD DUST OR FUMES CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN AND PREGNANT WOMEN. Proper protective equipment, as NIOSH-approved respirator, and proper containers and cleaning procedures are required to control lead exposure. For more information, contact the U.S. EPA/Lead Information Hotline at 1-800-424-LEAD (5323), your local health authority or log on to <http://www2.epa.gov/lead>.

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