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**TESTS REPORT n. 220.I.1705.311.EN.02**

**ON THE REQUEST OF**

**COMPANY:** INDÚSTRIAS QUÍMICAS IRIS, S.A.  
**PERSON IN CHARGE:** FRANCISCO MONTERO  
**ADDRESS:** PG. PICASSENT, BUZÓN 60, C/3 - 6  
**TOWN:** 46220 PICASSENT (VALENCIA)  
**TELEPHONE:** 96.1240711  
**V.A.T.:** A-46.276.838

**CONCERNING:**

**CUSTOMER** SKLEJBUD  
**SAMPLE:** WHITE FINISHING SYSTEM  
**TESTS:** PENCIL HARDNESS AND LIGHT FASTNESS

**DATE OF THE RECEPTION OF SAMPLES:** 28/04/2017  
**STARTING DATE** 28/04/2017  
**FINISHING DATE:** 04/05/2017

*This report cancels and replaces the test report number: 220.I.1705.311.EN.01*

**Document digitally signed by legal electronic signature.**

**THIS REPORT CONSISTS OF 6 PAGES NUMBERED ACCORDINGLY.**

The test samples will remain at AIDIMME over a period of three months from the date of issuing this report. That period having expired, it will be destroyed, so any claim on it must be made within these limits.

## 1. DESCRIPTION AND IDENTIFICATION OF THE TESTED OBJECT. EXAMINATION PRIOR TO TESTING.

One white UV cured finishing system applied on a particle board. According to the customer's information the finishing system consist of the following products:

- Hotmelt glue, 18-20 gr/m<sup>2</sup>
- IRIPOL IR-5145 UV FONDO R (CF), 50-60 gr/m<sup>2</sup>
- Sanding
- IRIPOL IR-7008 UV BRILLO WHITE R (CF) 40-45 gr/m<sup>2</sup>

## 2. ORIGIN OF THE SAMPLE

Sample supplied by the customer.

## 3. TESTS REQUIRED

- ✓ Pencil hardness
- ✓ Light fastness

## 4. ADAPTATION OF THE TEST, METHOD OR PROCEDURE TO STANDARD

Test methods are carried out according to the standards:

- Resistance to scratching UNE-EN ISO 15184
- Light fastness UNE 56868 / UNE 56875 / UNE EN ISO 4892-2

UNE EN ISO 15184:2013. Paints and varnishes - Determination of film hardness by pencil test (ISO 15184:2012).

UNE 56875:2014V2: Kitchen furniture. Specifications, requirements, and test methods.

UNE 56868: Bathroom furniture. Physical test methods.

UNE EN ISO 4892-2:2013. Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps (ISO 4892-2:2013)

## 5. DESCRIPTION OF THE TEST METHOD

### Film hardness by pencil test.

#### Standard definition:

PENCIL HARDNESS: resistance of a coating surface to be marked, or present any other defect, as a result of the action of a lead pencil of known hardness, when it is dragged over the surface.

#### Defects that are considered:

- a) Plastic deformation: permanent indentation in the coating surface without cohesive fracture.
- b) Cohesive fracture: visible mark or breakage of the surface with coating detachment.
- c) Combination of the previous defects.

#### Test Method.

To carry out the test pencils with different hardness lead are used:

9B < 8B < 7B < 6B < 5B < 4B < 3B < 2B < B < HB < F < H < 2H < 3H < 4H < 5H < 6H < 7H < 8H < 9H

The coated sample is placed on a firm horizontal surface. A pencil with a specific hardness is selected to start the test. Pencil's lead is prepared according to the standard indications and then it is placed in the test device specified in the standard, Image 1, which exerts a force of 7.5 N on the surface. The assembly is drawn forward on the surface of the specimen to be tested.

If no mark is produced, the test is repeated with a pencil of higher hardness on the scale until a mark is obtained for a distance of at least 3 mm.

As a result of pencil hardness the hardness of the hardest pencil that does not leave a mark on the coating is given.



Image 1. Test device according to the standard to carried out the test.

**Lightfastness**

This test determines the resistance to change colour of the tested sample under the action of light from a xenon lamp under the following conditions:

- Solar radiation filter according to method A of the standard EN ISO 4892-2
- Black panel temperature:  $(55 \pm 3)^\circ\text{C}$
- Irradiance (300-400nm):  $60\text{W/m}^2$
- Test duration for bathroom furniture: when the contrast between the exposed and unexposed portions of the blue wool reference 6 is equal to grade 4/5 on the grey scale (ISO 105-A02), for that the sample is tested simultaneously with a set of blue wool references.
- Test duration for kitchen furniture: when the contrast between the exposed and unexposed portions of the blue wool reference 6 is equal to grade 4 on the grey scale (ISO 105-A02), for that the sample is tested simultaneously with a set of blue wool references.

The assessments have been carried out both as total colour difference,  $\Delta E$ , calculated from the measurements of the chromaticity coordinates before and after the test as well as visual assessment of the contrast between the exposed area and the unexposed, taking as a reference a standard grey scale (the approximate description of the scale values is described in the following table).

Grey scale rating:

| Rating | Meaning   |
|--------|-----------|
| 5      | EXCELLENT |
| 4      | GOOD      |
| 3      | FAIR      |
| 2      | LOW       |
| 1      | VERY POOR |

Color has been measured according to the standard ISO 7724-2. CIE 1976, using color space  $L^*, a^*, b^*$ , for the standard illuminant D65 and standard observer  $10^\circ$ :

- $L^*$  : indicates lightness (0 black -100 white).
- $a^*$  : chromatic coordinate (red (+ $a^*$ ) or green (- $a^*$ )).
- $b^*$  : chromatic coordinate (yellow ( + $b^*$ ) or blue (- $b^*$ )).

Three measures in different points of the sample received have been done, before and after the exposure to the xenon lamp. Total difference of color,  $\Delta E$ , is calculated according to the following formula:

$$\Delta E = \sqrt{\left( (L_2 - L_1)^2 + (a_2 - a_1)^2 + (b_2 - b_1)^2 \right)}$$

## 6. OBTAINED RESULTS

### ➤ Pencil hardness.

| TEST  | METHOD TEST      | RESULTS    |
|---|------------------|------------|
| <b>Pencil Hardness</b> <ul style="list-style-type: none"> <li>- Cohesive fracture</li> <li>- Plastic deformation</li> </ul> | UNE EN ISO 15484 | > 9H<br>2H |

### ➤ Light fastness.

#### a) Assessment immediately after the exposure period.

| TEST   | METHOD TEST                    | RESULTS                    |
|--|--------------------------------|----------------------------|
| <b>Light fastness (bathroom furniture)</b> <ul style="list-style-type: none"> <li>- Grey scale grade</li> <li>- <math>\Delta E</math></li> </ul> | UNE 56868<br>UNE EN ISO 4892-2 | 4/5 <sup>(*)</sup><br>1,21 |
| <b>Light fastness (kitchen furniture)</b> <ul style="list-style-type: none"> <li>- Grey scale grade</li> <li>- <math>\Delta E</math></li> </ul>  | UNE 56868<br>UNE EN ISO 4892-2 | 4 <sup>(*)</sup><br>1,68   |

<sup>(\*)</sup> Requirement according to UNE 56868  $\geq 4$

<sup>(\*)</sup> Requirement according to UNE 56875  $\geq 4$

#### b) Assessment after 24h of the exposure period.

| TEST   | METHOD TEST                    | RESULTS                    |
|--|--------------------------------|----------------------------|
| <b>Light fastness (bathroom furniture)</b> <ul style="list-style-type: none"> <li>- Grey scale grade</li> <li>- <math>\Delta E</math></li> </ul> | UNE 56868<br>UNE EN ISO 4892-2 | 4/5 <sup>(*)</sup><br>0,91 |
| <b>Light fastness (kitchen furniture)</b> <ul style="list-style-type: none"> <li>- Grey scale grade</li> <li>- <math>\Delta E</math></li> </ul>  | UNE 56868<br>UNE EN ISO 4892-2 | 4/5 <sup>(*)</sup><br>1,27 |

The result of the test/s only concerns to the tested object.

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Dra. Rosa Mª Pérez Campos  
Head of Materials Laboratory  
AIDIMME



Nuria Domínguez Mascarell  
Technician of Materials Laboratory  
AIDIMME