



DECORAL LAB - Centro di Ricerca e Sviluppo di DECORAL SYSTEM®

# REPORT 195-13

**OBJECT:** study of the behaviour of a coating product, cross-linked at different temperatures; evaluation of overcuring.

**REQUESTED BY:** **Decoral System**

# **OBJECT: study of the behaviour of a coating product, cross-linked at different temperatures; evaluation of overcuring.**

## **1. Purpose:**

The purpose of the test is to evaluate the behaviour of a coating product when cured at different temperatures.

## **2. Sample description:**

The data of the tested samples are reported in the table below:

<b>ID Lab.</b>	<b>Sample type</b>	<b>Coating Product</b>	<b>Thickness</b>
1	Aluminium panel	DS 733	83 $\mu\text{m}$
2	Aluminium panel	DS 733	88 $\mu\text{m}$
3	Aluminium panel	DS 733	88 $\mu\text{m}$

**Table 1: samples description**

## **Equipment for the test :**

All samples were prepared using the Decoral System laboratory's coating booth (image 1), the Decoral System laboratory's coating oven (image 2) and Thermometer probe for temperature monitoring (image 3).

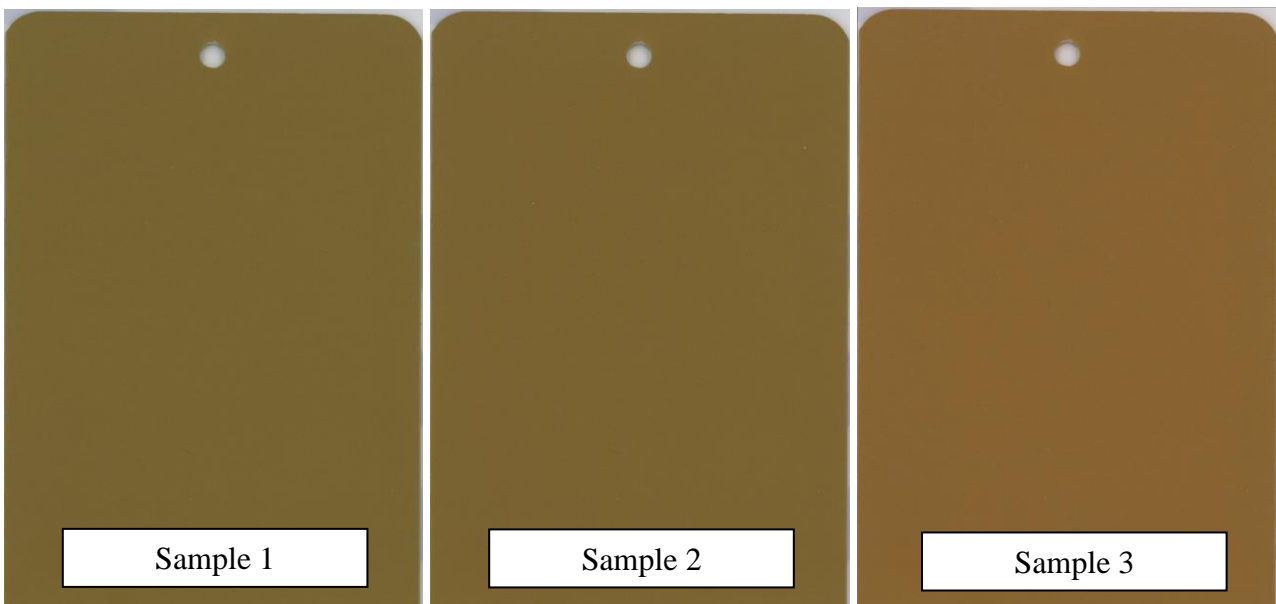


**Pictures 1-2-3 (from left to right): test equipment**

### 3. Performed tests:

The samples, prepared using the same coating product (DS 733), were cured at different temperatures (air temperature):

- 200°C for 30 minutes (air temperature) - approx. 20' at 200°C (metal temperature)
- 225°C for 30 minutes (air temperature) - approx. 20' at 225°C (metal temperature)
- 250°C for 30 minutes (air temperature) - approx. 20' at 250°C (metal temperature)



Picture 4: Test samples

Using the spectrophotometer (Konica Minolta Spectrophotometer, Reference Method: A CIE L\*a\*b SCI/100 - ISO 7724/3: 1984), colorimetric readings were taken to quantify the colour difference. In order to measure the colour difference ( $\Delta E$ ), a sheet prepared according to the specifications described in the paint product sheet (TDS: 20' @ 200°C, metal temperature) was taken as reference. The following table (Table 2) shows the values:

ID Lab.	Coating Product	Colour variation ( $\Delta E$ )	Curing conditions
1	DS 733	Target	20 minuti @ 200°C
2	DS 733	$\Delta E = 0,56$	20 minuti @ 225°C
3	DS 733	$\Delta E = 4,31$	20 minuti @ 250°C

Table 2: colorimetric values

#### **4. Conclusions:**

The samples prepared in the laboratory show how high temperatures, given a constant dwell time, alter the shade of the paint product. In fact, samples 2 and 3, cured at 225°C and 250°C respectively, show a different colour shade. This phenomenon, connected with the change of the chromophore power of the pigments, is called overbaking.

This kind of phenomenon can also be caused by excessive extension of the dwell time. This topic will be covered in a future report.

Compliance with the curing conditions (times and temperatures) specified in the tds is one of the key parameters for achieving a good result.

#### **5. Attachments:**

- Original samples (Lab archive)



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