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management for  
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## REPORT

Various tests on lacquered 'red' aluminium panels

Haarlem, 2 April 2014

**Civil projects**  
**Corrosionprotection**  
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## CONTENTS

1	INTRODUCTION .....	3
1.1	Order.....	3
1.2	General information.....	3
2	PROCEDURE .....	3
2.1	Dry film thickness.....	3
2.2	QUV.....	3
2.3	Neutral salt spray .....	4
3	RESULTS .....	4
4	CONCLUSION.....	5

ANNEX: Photographs

## 1 INTRODUCTION

### 1.1 Order

By order of UC Europe BV in Amsterdam, The Netherlands, the Centrum voor Onderzoek en Technisch advies (COT bv) in Haarlem, The Netherlands, has performed several test on 6 lacquered, red edged aluminium panels.

The tests involved were neutral salt spray testing in accordance with ISO 9227, QUV testing in accordance with ISO 11507, and the measuring of specular gloss in accordance with ISO 2813.

The tests have been offered in the quotation with reference LAB14-0070-BRF.

### 1.2 General information

Table 1: Samples

COT sample number	Samples	Received
27-01-14/0050	Lacquered red edged aluminium panels - 3 panels size 150 x 75 x 1 mm, and 3 panels size 100 x 200 x 1 mm	27 January 2014

The lacquered panels were supplied by UC Europe.

## 2 PROCEDURE

### 2.1 Dry film thickness

Before starting the tests the dry film thickness of the coating system has been measured according to ISO 19840 with a magnetic dry film thickness meter (COT E004). On each panel five measurements have been carried out. The minimum, the maximum, the average and the standard deviation have been reported.

### 2.2 QUV

Three panels were subjected to QUV testing for a period of 1000 hours in accordance with ISO 11507 with a QUV Accelerated Weathering Tester (COT Q102). An interim assessment has been carried after 500 hours of exposure.

#### General data

Type of lamp used	: Type II – UVA-340
Cyclus	: 4 hour lighting (dry), black panel temperature $60 \pm 3$ °C 4 hour condensation, black panel temperature $50 \pm 3$ °C
Starting fase	: Dry
Test duration	: 1000 hours
Test start	: 4 February 2014
Interim assessment	: 25 February 2014
Test end	: 18 March 2014

Prior to the start of the test the specular gloss values of the panels have been measured in accordance with ISO 2813 with the use of a microgloss 60° (COT G012). On each panel 3 horizontal and 3 vertical measurements have been performed, the average and standard deviation have been reported.

Specular gloss measurement has been repeated after 500 hours of exposure, and again after the ending of the test.

### 2.3 Neutral salt spray

Resistance to neutral salt spray has been tested in accordance with ISO 9227 NSS. Three test panels have been tested for 1000 hours, with an intermediate inspection after 500 hours. An Andreas cross has been made on the lower half of the panels, through the lacquer till the substrate using a sharp knife according to ISO 2409.

#### General data

Apparatus number	: COT S006
Type of water	: Demineralised water (< 1 µS)
Salt	: Sodium chloride (NaCl) p.a.
Test temperature	: 35 °C
Collected salt solution	: 1.0 – 2.0 ml/hour/80 cm <sup>2</sup>
pH of the collected salt solution	: 6.5 – 7.2
Salt concentration of the collected solution	: 50 ± 5 g/l
Exposition angle	: ca. 20 ° from the vertical
Start of test	: February 4 <sup>th</sup> , 2014
End of test	: March 18 <sup>th</sup> , 2014

Immediately after the test the panels have been examined for defects according to ISO 4628.

### 3 RESULTS

Table 2: Results of specular gloss measurements after QUV exposure

Exposure: QUV ISO 11507, 1000 hours		COT sample number 27-01-14/0050		
		Panel 4	Panel 5	Panel 6
DFT (µm)	Min. – Max.	12 – 13	10 – 17	9 – 21
ISO 19840	Mean, sd	12 ± 1	13 ± 3	15 ± 5
Gloss (GU)	Start	> 100	> 100	> 100
ISO 2813	500 hours QUV	> 100	> 100	> 100
	1000 hours QUV	> 100	> 100	> 100

Table 3: Results of the assessment of the panels after exposure to neutral salt spray

Exposure: Neutral salt spray ISO 9227, 1000 hours		COT sample number 27-01-14/0050		
		Panel 1	Panel 2	Panel 3
DFT (µm)	Min. – max.	10 – 14	12 – 17	9 – 15
	Mean, sd	12 ± 2	15 ± 2	12 ± 2
Blistering	ISO 4628-2	0 (S0)	0 (S0)	0 (S0)
Cracking	ISO 4628-4	0 (S0)	0 (S0)	0 (S0)
Flaking	ISO 4628-5	0 (S0)	0 (S0)	0 (S0)
Filiform corrosion	ISO 4628-10	L0/M0	L0/M0	L0/M0

#### 4 CONCLUSION

When tested for specular gloss in accordance with ISO 2813, the lacquered, red edged aluminium panels (COT sample number 27-01-14/0050) showed a specular gloss value of > 100 GU, 100 GU being the maximum specular gloss value achievable with a 60° gloss meter and black glass reference standard. Measurements range from 90-115 GU, and remain consistent after exposure to QUV testing, indicating that there is no deterioration of the test panels as far as gloss is concerned.

After being exposed to 1000 hours of neutral salt spray testing in accordance with ISO 9227, the panels showed no defects.

CENTRUM VOOR ONDERZOEK  
EN TECHNISCH ADVIES (COT)

A blue ink signature of K. Coppoolse, written in a cursive style.

K. Coppoolse  
Laboratory Technician

A blue ink signature of Dr. B.P. Alblas, written in a cursive style.

Dr. B.P. Alblas  
Manager Laboratory

**ANNEX**

**PHOTOGRAPHS**



Photo 1: Panels after 1000 hours of QUV testing



Photo 2: Panels after 1000 hours of neutral salt spray testing