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REPORT

Testing of the Powder coating system
EPOXY PHENOLIC / POLYESTER (DFT 80 / 80 µm)
on blasted steel panels, according to ISO 12944-6 C4 High

Haarlem, 2 August 2013

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1 INTRODUCTION

1.1 Order

By order of Univercol Paints Ltd. in Israel, the Centrum voor Onderzoek en Technisch advies (COT bv) in Haarlem, The Netherlands has tested the Powder coating system Epoxy Phenolic / Polyester, applied on blasted steel panels, according to ISO 12944-6 C4 High.

The order has been given in the email message of March 3rd, 2013.

1.2 General information

Table 1: Samples

COT sample number	Description	Received
27-03-13/0120	10 Coated steel panels with Powder coating system Epoxy Phenolic / Polyester, dimensions 100 x 150 x 5 mm	27 March 2013

2 PAINT APPLICATION

The powder coating system has been applied by Univercol Paints Ltd. on Sa 2½ blasted steel panels.

Specified Dry Film Thickness : Epoxy Phenolic : 80 µm
Polyester : 80 µm

Required durability : ISO 12944-6 C4 High

3 PROCECURE

3.1 Dry film thickness

Before starting the tests the dry film thickness of the coating system has been measured according to ISO 2178 with a magnetic dry film thickness meter (COT E004). On each panel ten measurements have been carried out and the values have been corrected with a correction value of 25 micrometer according to ISO 19840. The minimum, the maximum, the average and the standard deviation have been reported.

3.2 Adhesion

The adhesion of the coating system has been determined by the cross-cut test with the use of a single blade cutting tool in accordance with ISO 2409. The test has been performed on the unexposed reference panels and on the panels which have been exposed in the various artificial ageing tests.

3.3 Neutral Salt Spray

Resistance to neutral salt spray has been tested in accordance with ISO 9227 NSS.
Three test panels have been tested during 720 hours and in the panels a vertical scribe mark has been made through the coating 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^2
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	:	May 7th, 2013
End of test	:	June 6th, 2013

Immediately after the test the panels have been examined for defects according to ISO 4628 and the corrosion creep from the scribe has been determined according to Annex A of ISO 12944-6. The adhesion has been determined according to ISO 2409 after a 24 hours recovery period.

3.4 Water Condensation Test

Resistance to water condensation has been tested in accordance to ISO 6270-1. Three test panels have been tested during 480 hours.

General data

Apparatus	:	Cleveland condensation tester
Temperature of the air space	:	38 ± 2 °C
Temperature environment	:	23 ± 2 °C
Exposition angle	:	ca. 60 ° to the horizontal
Start of test	:	May 7th, 2013
End of test	:	May 27th, 2013

Immediately after the test the panels have been examined for defects according to ISO 4628. The adhesion has been determined according to ISO 2409 after a 24 hours recovery period.

4 RESULTS

4.1 Assessment before tests

Table 2: Adhesion before tests

Cross-cut test ISO 2409 (3 mm)	**COT sample number 27-03-13/0120**		**Requirements**
	Panel 5	**Panel 6**	
Min. – max. DFT (µm)	150 - 205	147 – 239	
Average DFT (µm)	177 ± 19	188 ± 25	Maximum 192 µm
ISO 2409 Classification	0	0	0 or 1

4.2 Assessment after Neutral Salt Spray test

Table 3: Assessment after neutral salt spray test

720 hours ISO 9227 NSS	**COT Sample number 27-03-13/0120**			**Requirements**
	Panel 3	**Panel 9**	**Panel 10**	
Min. – max. DFT (µm)	184 – 205	142 – 183	166 - 197	
Average DFT (µm)	192 ± 6	161 ± 15	186 ± 10	Maximum 192 µm
ISO 4628-2 (blistering)	0(S0)	0(S0)	0(S0)	0(S0)
ISO 4628-3 (rusting)	Ri0	Ri0	Ri0	Ri0
ISO 4628-4 (cracking)	0(S0)	0(S0)	0(S0)	0(S0)
ISO 4628-5 (flaking)	0(S0)	0(S0)	0(S0)	0(S0)
Annex A (corrosion of the substrate from the scribe) (mm)	0	0	0	Not exceed 1 mm
ISO 2409 Classification	0	0	0	0 or 1

4.3 Assessment after Water Condensation test

Table 4: Assessment after condensation test

480 hours ISO 6270-1	**COT Sample number 27-03-13/0120**			**Requirements**
	Panel 2	**Panel 7**	**Panel 8**	
Min. – max. DFT (µm)	165 - 210	166 – 221	135 – 193	
Average DFT (µm)	189 ± 13	187 ± 15	169 ± 19	Maximum 192 µm
ISO 4628-2 (blistering)	0(S0)	0(S0)	0(S0)	0(S0)
ISO 4628-3 (rusting)	Ri0	Ri0	Ri0	Ri0
ISO 4628-4 (cracking)	0(S0)	0(S0)	0(S0)	0(S0)
ISO 4628-5 (flaking)	0(S0)	0(S0)	0(S0)	0(S0)
ISO 2409 Classification	0	0	0	0 or 1

5 CONCLUSION

The Powder coating system Epoxy Phenolic / Polyester applied on blasted steel panels, dry film thickness 80/80 µm (COT sample number 27-03-13/0120) meets the requirements of ISO 12944-6 C4 High.

CENTRUM VOOR ONDERZOEK
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