



COT bv  
Independent advice,  
research and  
management for  
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industry



## REPORT

Testing of ZINGA 2 x 60 µm  
dry film thickness  
according to ISO 12944-6

Haarlem, 6 September 2010

Civil projects  
Corrosionprotection  
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## CONTENTS

1	INTRODUCTION .....	3
1.1	Order .....	3
1.2	Samples .....	3
2	PAINT APPLICATION .....	3
3	RESULTS .....	4
3.1	Assessment before tests .....	4
3.2	Assessment after Water Condensation test .....	4
3.3	Assessment after Neutral Salt Spray test .....	4
3.4	Assessment after Chemical Resistance test .....	5
3.5	Assessment after Water Immersion test .....	5
4	CONCLUSION .....	6



## **1 INTRODUCTION**

### **1.1 Order**

By order of Zingametall bvba in Eke, Belgium, the Centrum voor Onderzoek en Technisch advies (COT bv) in Haarlem, The Netherlands, has tested Zinga 2 x 60 µm dry film thickness according to ISO 12944-6.

The order has been given by signing the COT quotation LAB10-0234-OFF on 24 February 2010.

### **1.2 Samples**

Samples : 45 coated steel test panels with 2 layers Zinga (2 x 60 µm DFT)

COT sample number : 22-02-10/0175 A

Received : 19 February 2010

## **2 PAINT APPLICATION**

The Zinga system has been applied at Zingametall bvba.

Specified Dry Film Thickness : 2 layers, 60 µm dry film thickness per layer

Required durability : ISO 12944-6 C5-I  
ISO 12944-6 C5-M  
ISO 12944-6 Im3

### **Test times:**

Water Condensation test	: Start 16-03-2010	End 15-04-2010
Neutral Salt Spray test	: Start 16-03-2010	End 15-04-2010
Chemical Resistance test	: Start 08-03-2010	End 20-04-2010
Water Immersion test	: Start 01-04-2010	End 24-06-2010



### 3 RESULTS

#### 3.1 Assessment before tests

<b>Cross-cut test ISO 2409</b>	<b>Panel 16</b>	<b>Panel 17</b>	<b>Requirement</b>
Minimum - maximum DFT ( $\mu\text{m}$ )	115 - 145	89 - 145	
Average DFT ( $\mu\text{m}$ )	129 $\pm$ 10	116 $\pm$ 18	
Classification	0	0	0 or 1

#### 3.2 Assessment after Water Condensation test

<b>720 hours ISO 6270</b>	<b>Panel 13</b>	<b>Panel 14</b>	<b>Panel 15</b>	<b>Requirements</b>
Minimum - maximum DFT ( $\mu\text{m}$ )	109 - 137	109 - 139	103 - 155	
Average DFT ( $\mu\text{m}$ )	124 $\pm$ 8	119 $\pm$ 8	124 $\pm$ 17	
ISO 4628-2 (blistering)	0(S0)	0(S0)	0(S0)	0(S0)
ISO 4628-3 (rusting)	Ri 0	Ri 0	Ri 0	Ri 0
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 Cross-cut test (Classification)	0	0	0	0 or 1

#### 3.3 Assessment after Neutral Salt Spray test

<b>720 hours ISO 9227 NSS</b>	<b>Panel 6</b>	<b>Panel 9</b>	<b>Panel 10</b>	<b>Requirements</b>
Minimum - maximum DFT ( $\mu\text{m}$ )	165 - 181	121 - 147	113 - 153	
Average DFT ( $\mu\text{m}$ )	173 $\pm$ 6	132 $\pm$ 7	131 $\pm$ 12	
ISO 4628-2 (blistering)	0(S0)	0(S0)	0(S0)	0(S0)
ISO 4628-3 (rusting)	Ri 0	Ri 0	Ri 0	Ri 0
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)	<0.5	<0.5	<0.5	Not exceed 1 mm
ISO 2409 Cross-cut test (Classification)	0	0	0	0 or 1



### 3.4 Assessment after Chemical Resistance test

Instead of immersion, in accordance with ISO 2812-1, the system has been tested according to ISO 3231 with 0.2 L SO<sub>2</sub> during 30 cycles.

<b>30 cycles ISO 3231</b>	<b>Panel 1</b>	<b>Panel 2</b>	<b>Panel 3</b>	<b>Requirements</b>
Minimum - maximum DFT (µm)	165 - 187	117 - 155	169 - 187	
Average DFT (µm)	178 ± 9	135 ± 12	180 ± 7	
ISO 4628-2 (blistering)	0(S0)	0(S0)	0(S0)	0(S0)
ISO 4628-3 (rusting)	Ri 0	Ri 0	Ri 0	Ri 0
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 Cross-cut test (Classification)	0	0	0	0 or 1

### 3.5 Assessment after Water Immersion test

<b>2000 hours ISO 2812-2 (5% m/m sodium chloride)</b>	<b>Panel 18</b>	<b>Panel 19</b>	<b>Panel 20</b>	<b>Requirements</b>
Minimum - maximum DFT (µm)	101 - 143	117 - 163	119 - 141	
Average DFT (µm)	116 ± 13	136 ± 12	134 ± 7	
ISO 4628-2 (blistering)	0(S0)	0(S0)	0(S0)	0(S0)
ISO 4628-3 (rusting)	Ri 0	Ri 0	Ri 0	Ri 0
ISO 4628-4 (cracking)	0(S0)	0(S0)	0(S0)	0(S0)
ISO 4628-5 (flaking)	0(S0)	0(S0)	0(S0)	0(S0)
Cross-cut (Classification)	0	0	0	0 or 1



#### 4 CONCLUSION

The system 2 layers Zinga, dry film thickness 60  $\mu\text{m}$  per layer (COT sample number 22-02-10/0175 A), meets the requirements of the following corrosivity categories of ISO 12944-6:

C4-High

C5-I-Medium and C5-M-Medium

Im2-Medium and Im3-Medium.

CENTRUM VOOR ONDERZOEK  
EN TECHNISCH ADVIES (COT bv)

A handwritten signature in blue ink, appearing to read 'B.P. Alblas', with a large, sweeping flourish underneath.

Dr. B.P. Alblas  
Manager Laboratory

A handwritten signature in blue ink, appearing to read 'N. Blokker', with a large, sweeping flourish underneath.

N. Blokker  
Laboratory Technician