guarantee for quality

COT
Independent advice, research and management for construction and industry

REPORT

Testing of Zingametall system
Zinga 2x 60 micrometer
according to NORSOK Standard M-501, Rev. 5
for System 7

LABORATORIUM
Zijlweg 340, Haarlem
Postbus 98
2050 AB Overveen
T 023-5319544
F 023-5277229
E info@cot-nl.com
I www.cot-nl.com

Haarlem, 29 March 2007
RB/MH

Client : Zingametall bvba
Industriepark Rozenstraat 4
9810 EKE Belgium
Mrs S. Dhondt

Project number : 20060103

Report number : COT07-0684-REP

guarantee for quality

CONTENTS

guarantee for quality

1. INTRODUCTION

By order of Zingametall bvba in Eke, Belgium, The Centrum voor Onderzoek en Technisch Advies (COT BV) has tested the system Zinga 2 X 60 µm according to Norsok M-501, Rev. 5.

The order has been given in the letter dated 18-08-2006 with reference Testen/Algemeen/COT/2/1-SD.

2. GENERAL DATA

Samples :

	Batch number	COT sample number
Testpanels,		
applied with the system: Zinga, 2x 60 µm	--	22-08-06/667
test panels, size : 150 x 75 x 5 mm 150 x 300 x 5 mm		
Wet product:		
Alufer N	66485/0906	23-03-07/274

COT project number : 20060103

3. PAINT APPLICATION AND CURING

The coating system was applied on the test panels by SigmaKalon.

Dry film thickness: Zinga: 2x 60 µm

After curing the dry film thickness of the paint system has been measured on each panel, after which the tests have been started.

guarantee for quality

4. PERFORMANCE TESTS

4.1 Seawater immersion

The fully cured coating system has been mechanically scribed horizontal down to bare metal. The scratch line is 2 mm wide and 50 mm long. The system has been immersed in synthetic seawater (according to ISO 15711) at 40°C during 4200 hours according to ISO 2812-2.

4.2 Cyclic test

The fully cured coating system has been mechanically scribed horizontal down to bare metal. The scratch line is 2 mm wide and 50 mm long. The system has been exposed to the following cycle according to ISO 20340 Annex A:

72 hours	UV-A 340 nm weatherometer in accordance with ISO 11507 method A (4 hours UV-light at 60°C / 4 hours condensation at 50°C)
72 hours	Salt Spray Test, according to ISO 7253 with synthetic seawater in accordance with ASTM D 1141
24 hours	Exposure to low temperature (-20°C).

The total exposure time is 4200 hours.

4.3 Cathodic disbonding

Cathodic disbonding has been determined according to ISO 20340 (ISO 15711). After 6 months exposure time the maximum disbonding is measured.

4.4 Adhesion test

The adhesion before and after the cyclic test has been determined by a pneumatic adhesion tester in accordance with ISO 4624. The coating surface and the dolly have been sanded lightly and a epoxy adhesive has been applied. After curing of the adhesive and prior to testing, the coating has been scratched around the dolly down to the bare metal. Three trials have been done and the average value has been reported.

4.5 Overcoatable without mechanical treatment

After 4200 hours of cyclic testing the system has been coated with Alufer N without mechanical treatment.
After 7 days the adhesion has been determined according to ISO 4624.

guarantee for quality

5. REQUIREMENTS

5.1 Immersion and cyclic test

After exposure to the specified time, the test panels shall comply with the following requirements:

Method		Requirements
--	Corrosion creep from scribe*	< 3.0 millimetres
ISO 4628-2	Blistering	0
ISO 4628-3	Rusting	0
ISO 4628-4	Cracking	0
ISO 4628-5	Flaking	0
ISO 4624	Adhesion	min. 5.0 MPa, max 50% reduction from original value
ISO 4624	Overcoatable without mechanical treatment	min. adhesion of 5 MPa

* The corrosion creep is calculated from the equation: M=(C-W)/2, where
M = corrosion creep
C = average of the nine measurements
W = the original width of the scribe.

5.2 Cathodic disbonding

After exposure to the specified time, the test panels shall show no disbonding around the holiday with an equivalent diameter >20 mm.

6. RESULTS

6.1 Original adhesion value

The original Adhesion value is 4.7±0.1 MPa

6.2 Seawater immersion

Exposure Time: 4200 hours

Table 1. Results Immersion test

	Panel 1	Panel 2	Panel 3
Dry film thickness (µm)	146±9	174±8	149±14
Corrosion creep from scribe (mm)	0	0	0
ISO 4628-2 Blistering	0	0	0
ISO 4628-3 Rusting	0	0	0
ISO 4628-4 Cracking	0	0	0
ISO 4628-5 Flaking	0	0	0
ISO 4624 Adhesion (MPa)	4.7±0.1	5.1±0.1	5.0±0.0

6.3 Cyclic Test

Exposure Time: 4200 hours

Table 3. Results Cyclic test

	Panel 1	Panel 2	Panel 3
Dry film thickness (µm)	154±7	138±9	163±11
Corrosion creep from scribe (mm)	0	0	0
ISO 4628-2 Blistering	0	0	0
ISO 4628-3 Rusting	0	0	0
ISO 4628-4 Cracking	0	0	0
ISO 4628-5 Flaking	0	0	0
ISO 4624 Adhesion (MPa)	7.5±0.0	6.6±0.6	7.2±0.0
ISO 4624 Overcoatable without mechanical treatment (MPa)	8.3±0.1	8.1±0.5	7.0±0.2

guarantee for quality

6.4 Cathodic Disbonding Test (6 months)

Maximum disbonding ECD panel 1: 0 mm
Maximum disbonding ECD panel 2: 0 mm
Maximum disbonding ECD panel 3: 0 mm

7. CONCLUSION

The system Zinga, dry film thickness 60/60 µm, meets the evaluated requirements of Norsok M-501 Rev. 5 system 7.

CENTRUM VOOR ONDERZOEK
EN TECHNISCH ADVIES (COT)

Ing. M. Walrave
Manager Laboratory

J.R.S. Brakenhoff
Projectmanager Coatings