COT bv
Independent advice, research and management for construction and industry

Consultancy
Laboratory

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CERTIFICATE

The Centrum voor Onderzoek & Technisch Advies in Haarlem, The Netherlands, hereby declares that:	The coating system: Ferrogalvanic 2K, 80 µm Weleflex 2K, 80 µm Sulacover 2K, 80 µm
from manufacturer/supplier:	Welesgard LLC Konoplianska Str. 12 04074, Kiev Ukraine
meets the requirements of:	ISO 12944-6
Corrosivity/Immersion category:	C4
Durability range:	Very High
Test regime :	2
This certificate is based upon the results of report:	LAB21-0345-REP
Date:	October 21st, 2021
For COT	For Welesgard LLC

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REPORT

Testing coated samples with COT sample number 12-7-21/0312
according to ISO 12944-6 C4 Very High, test regime 2

Haarlem, October 21st, 2021

Client	:	Welesgard LLC Konoplianska Str. 12 04074, Kiev Ukraine Contact person: Mrs. J. Yepishyna
Specified system	:	Ferrogalvanic 2K : 80 µm Weleflex 2K : 80 µm Sulacover 2K : 80 µm Total nominal dry film thickness (nDFT) : 240 µm
Project number	:	20210205
Report number	:	LAB21-0345-REP
Handled by	:	B. van der Oordt

Conclusion
The coated samples with COT sample number 12-7-21/0312 meet the requirements of ISO 12944-6 C4 very High, test regime 2.

CONTENTS

1 INTRODUCTION

1.1 Order

By order of Welesgard LLC in Kiev, Ukraine, the Centrum voor Onderzoek en Technisch advies (COT bv) in Haarlem, The Netherlands, has tested the samples with COT sample number 12-7-21/0312 according to ISO 12944-6 C4 Very High, test regime 2.

The order was confirmed by the email dated 13-7-2021 12:27.

Tests marked with 'Q' are under accreditation according to ISO/IEC 17025 with registration number L535.

1.2 General information

Table 1: Received samples

COT sample number	Sample		Received
12-7-21/0312	6	White coated steel panels, dimensions 75 x 150 x 5 mm, numbered* 1-6	12-7-2021

*) numbered by the client.

The coating system has been applied to the test panels by the client.

1.3 Information received from the client

Substrate
Mild steel.

Surface preparation
Blasted to Sa 2.5 grade cleanliness according to ISO 8501-1.
Surface roughness Medium (G) according to ISO 8503-1.

Coating system build up and specified dry film thickness

Ferrogalvanic 2K	:	80 µm
Weleflex 2K	:	80 µm
Sulacover 2K	:	80 µm
Total nominal dry film thickness (nDFT)	:	240 µm

Test specification	: ISO 12944-6
Corrosivity category	: C4
Durability range	: Very High
Test regime	: 2

2 PROCEDURE

2.1 Determination of the dry film thickness using a magnetic induction gauge, ISO 17025 Scope number 1 (Q)

Before starting the tests the total dry film thickness of the coating system has been measured according to ISO 2808:2019-7B2, COT Instruction 30.01.12-2 with a magnetic induction dry film thickness meter (COT_E004) and corrected for surface roughness (C = correction value) according to ISO 19840. On each panel 5 measurements have been carried out.

2.2 Adhesion

Before adhesion testing the panels have been conditioned for 7 days at 23 ± 2 °C and 50 ± 5% R.H., the test has been performed under the same conditions. All individual values have been reported.

Depending on the uncorrected mean DFT of the coating system, the following methods are used:

If lower or equal to 250 micrometers; crosscut method according to ISO 2409,
If higher than 250 micrometers; pull-off method B according to ISO 4624.

2.2.1 Crosscut test assessing the resistance of paint coatings to separation from substrates when a right-angle lattice pattern is cut into the coating, penetrating through to the substrate, according to ISO 2409, ISO 17025 Scope number 3 (Q)

The adhesion of the coating system has been determined according to ISO 2409, COT Instruction 30.01.20-1 by cross-cut test using a single blade cutting tool.

Distance between incisions is determined by the nDFT of the coating system;
- <60 µm: 1 mm,
- 60-120 µm: 2 mm,
- 120-250 µm: 3 mm,
- >250 µm: method unsuitable.

Loose paint will be removed using ISO 2409 method A1 (brushing).

On each panel three trials have been performed, with three extra when the variation of results was greater than 1 unit.

2.3 Cyclic Ageing test

Three test panels have exposed to the cyclic ageing test according to ISO 12944-6 Annex B for 1680 hours. The fully cured coating system has been scribed horizontal down to the steel substrate, the scribe line being 2 mm wide and 50 mm long.

General data QUV

Apparatus number	:	COT_ Q105
Type of water	:	Demineralised water (< 1 µS) (COT_D108)

General data Freezer

Apparatus number	:	COT_V100

Controlled externally by LC74 Pt100 probe temperature switch.

The panels have been exposed to the following cycle according to ISO 20340 Annex A:

72 hours	QUV test cabinet with UV-A 340 nm lamps in accordance with ISO 16474-3 Method A, cycle 1 (4 hours UV-light at 60 ± 3 °C / 4 hours condensation at 50 ± 3 °C)
72 hours	Salt Spray test according to ISO 9227 5.2 NSS
24 hours	Exposure to low temperature (-20 ± 2 °C)

Immediately after exposure the panels were evaluated for visual surface defects according to ISO 4628-2, -3, -4 and -5.

The corrosion at the scribe has been determined within 8 hours after the end of the exposure.
The corrosion at the scribe is calculated from the equation: M=(C-W)/2, where

M = corrosion creep (mm)
C = average of the nine measurements (mm)
W = the original width of the scribe (mm)

3 REQUIREMENTS

Only one of the three panels shall be allowed not to comply with the requirements.

3.1 Reference adhesion before tests

Table 2: Adhesion before tests

Adhesion ISO 2409 (ISO 17025 Scope number 3)		**Requirements**
ISO 2409	Individual values	Class 0-2

3.2 Assessment after Cyclic Ageing test

Table 3: Assessment after Cyclic Ageing test

Cyclic Ageing ISO 12944-6 Annex B, 1680 hours		**Requirements**
ISO 4628-2	Blistering	0(S0)
ISO 4628-3	Rusting	Ri 0
ISO 4628-4	Cracking	0(S0)
ISO 4628-5	Flaking	0(S0)
Corrosion from scribe		≤ 3.0 mm
ISO 2409	Individual values	Class 0-2

4 RESULTS

4.1 Dry film thickness

Table 2: Dry film thickness test panels (ISO 17025 Scope number 1)
Test date: 22-7-2021

Q	Dry film thickness ISO 19840 (C = 0 µm)	COT sample number 12-7-21/0312				
		Panel 1	**Panel 2**	**Panel 3**	**Panel 4**	**Panel 5**
	Readings (n=5)	214 220 240 222 209	254 245 250 245 264	240 245 261 249 253	252 243 255 270 253	244 244 282 236 244
	Min. - Max. (µm) Average, SD (µm)	209 - 240 221 ± 12	245 - 264 252 ± 8	240 - 261 250 ± 8	243 - 270 255 ± 10	236 - 282 250 ± 18
		Panel 6				
	Readings (n=5)	229 240 272 250 280				
	Min. - Max. (µm) Average, SD (µm)	229 - 280 254 ± 21				

4.2 Assessment before tests

Table 3: Reference assessment of coating adhesion (ISO 17025 Scope No. 3)
Test date: 23-07-2021

Q	Reference Adhesion ISO 4624 Pull-off test ISO 2409 cross-cut test		COT sample number 12-7-21/0312		
			Panel 2	**Panel 1**	**Panel 3**
Q	ISO 2409 Adhesion	Classification	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0

4.3 Assessment after Cyclic Ageing test

Table 4: Assessment after Cyclic Ageing test
Test date: 23-07-2021 till 1-10-2021, adhesion 8-10-2021

	Cyclic Ageing test ISO 12944-6 - Annex B Exposure 1680 hours		COT sample number 12-7-21/0312		
			Panel 4	**Panel 5**	**Panel 6**
Q	ISO 4624-2	Blistering	0(S0)	0(S0)	0(S0)
Q	ISO 4624-3	Rusting	Ri 0	Ri 0	Ri 0
Q	ISO 4624-4	Cracking	0(S0)	0(S0)	0(S0)
Q	ISO 4624-5	Flaking	0(S0)	0(S0)	0(S0)
	Corrosion from scribe (mm)		2.2	2.4	2.9
Q	ISO 2409 Adhesion	Classification	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0

5 SUMMARY

Table 5: Summary of the test results of samples with COT sample number 12-7-21/0312

Test method	Test duration	Pass / Fail
Reference adhesion (ISO 17025 Scope number 3)	N.A.	Pass
Cyclic Ageing ISO 12944-6 Annex II	1680 hours	Pass

6 CONCLUSION

The coated samples with COT sample number 12-7-21/0312 meet the requirements of ISO 12944-6 C4 Very High, test regime 2.

CENTRUM VOOR ONDERZOEK
EN TECHNISCH ADVIES (COT bv)

Mr. B. van der Oordt
Laboratory Technician

Mr. D.W. Zant
Laboratory Manager

ANNEX

Photographs

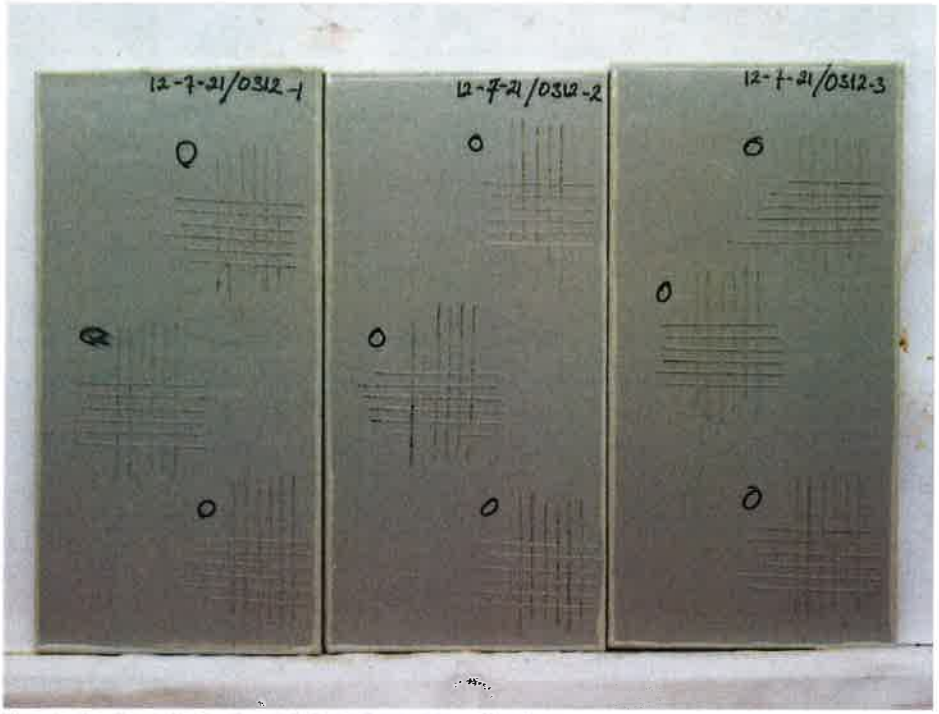

Photo 1: Panels 1, 2 and 3 Reference adhesion

Photo 2: Panels 4, 5 and 6 after 1680 hours Cyclic Ageing test