ZAG

ZAVOD ZA GRADBENIŠTVO SLOVENIJE

SLOVENIAN NATIONAL BUILDING AND CIVIL ENGINEERING INSTITUTE

REPORT

No. P099/14-440-2

On the testing of anticorrosion protection coating "MCU-Miozinc 140 µm + MCU-Topcoat 80 µm " acorrding to a standard EN ISO 12944-6:1998 for C5-I/H and C5-M/H

Department for materials
Laboratory for Metals, Corrosion and Anti-Corrosion Protection

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Ljubljana, 17th April2014

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On the testing of anticorrosion protection coating "MCU-Miozinc 140 µm + MCU-Topcoat 80 µm " acorrding to a standard EN ISO 12944-6:1998 for C5-I/H and C5-M/H

Orderer:	CHEMCOLOR Sevnica d.o.o., Dolnje Brezovo 35, 8290 Sevnica
Order:	No. 14-020-000044 on January 27th2014

Responsible investigator:

Dr. Mirjam Bajt Leban

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Head of the Laboratory:

Dr. Tadeja Kosec

Director:

Assoc. Prof. Dr. Andraž Legat

1.0 Introduction

Company CHEMCOLOR Sevnica ordered estimation of anticorrosion painting "MCU-Miozinc 140 µm + MCU-Topcoat 80 µm" according to standard EN ISO 12944-6:1998 for C5-I/H and C5-M/H.

Description of the tested samples

a) Paint system

Coat	Trade name	Generic type	NDFT [µm]
1st coat	MCU – Miozinc	Moisture Cured poliurea	140
2nd coat	MCU – Miotopcoat	Moisture Cured poliurea	80
			Total: 220

b) Substrate

Mild steel panels from construction steel S235 according EN 10025, thickness 4 mm, blast cleaned to surface preparation grade Sa 2 ½.

Roughness of blast cleaned surfaces, according to ISO 4287:

- Ra = 10,6 µm – 11,0 µm,
- Rz =52,9 µm - 56,6 µm,
- Rt = 91 µm – 101 µm.

c) Paint

Paint	Colour	Cast number	FTIR specter
MCU – Miozinc green	Green	0511131-SI/05.11.2013	Annex 1
MCU – Miotopcoat 627F	Black	1403133-SI/14.03.2013	Annex 2

d) Implementation of a paint system

Application of the paint system was carried out in a company Chemcolor d.o.o. Sevnica between December 16th and 20th, 2013 on 12 steel panels of the dimensions 150×100×4 mm.

Remark: after the application small, localized, closed bubbles appeared.

Steel panels with applied paint were delivered at ZAG on January 14th, 2014.

e) Drying of paint system

Before the beginning of test, steel panels with applied paint were dryed 14 days at the temperature 23±2°C and relative humidity 50±5%.

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f) ZAG identification of paint system samples

To the tested surfaces of paint system "MCU-Miozinc 140 µm + MCU-Topcoat 80 µm" was given ZAG internal number Z/51/14 and following labels:

- R2-1, R2-2, R2-3 (reference panel),
- SK2-1, SK2-2, SK2-3 (panels for the Neutral Salt Spray - ISO 9227:2012),
- VK2-1, VK2-2, V2-3 (panels for the Continous condensation - ISO 6270-1:1998),
- IK2-1, IK2-2, IK2-3 (panels for the SO_2 with condensation of moisture - ISO 6988:1985).

3.0 Results of tests performed in accordance to EN ISO 12944-6:1998, tasks 6.3 and 6.4

Tests	Panel			*Requirements*
	R2-1	**R2-2**	**R2-3**	
Measured DFT [µm]	215±17	238±16	229±26	
Assesment before test: - ISO 2409:13 (class): - ISO 4624:02 [MPa]	0	0 7,2±1,3*[1]	- 6,7±1,3*[1]	*0* *>5Mpa or no adh. break to substrate*
Test 1: Neutral Salt Spray - ISO 9227:2012 Scratch: Tool Sikens, 0,5 mm Exposure time: **1440 h**	**SK2-1**	**SK2-2**	**SK2-3**	
Measured DFT [µm]	221±16	219±8	215±24	
Assessment after finished exposure: (Picture No.1 – Annex 3)				
ISO 4628-2:03 (blistering)	0(S0)	0(S0)	0(S0)	*0(S0)*
ISO 4628-3:03 (rusting)	Ri 0	Ri 0	Ri 0	*Ri 0*
ISO 4628-4:03 (cracking)	0	0	0	*0*
ISO 4628-5:03 (flaking)	0	0	0	*0*
ISO 4628-8:05 (corr. aound a scribe)	< 0,3 mm	<0,3 mm	<0,3 mm	*< 1 mm*
ISO 2409:13-1a/A.1 (class):	0	-	-	*0 or 1*
ISO 4624:02 [MPa]	-	5,7±0,7*[1]	5,2±0,6*[1]	*>5Mpa or no adh. break to substrate*

*[1] –break adhesive/topcoat

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Test 2: Continuous condensation - ISO 6270-1:1998 Exposure time: **720 h**	Panel			***Requirements***
	VK2-1	**VK2-2**	**VK2-3**	
Measured DFT [µm]	228±18	212±22	223±20	
Assessment after testing: (Picture No.2 – Annex 3)				
ISO 4628-2:03 (blistering)	0(S0)	0(S0)	0(S0)	*0(S0)*
ISO 4628-3:03 (rusting)	Ri 0	Ri 0	Ri 0	*Ri 0*
ISO 4628-4:03 (cracking)	0	0	0	*0*
ISO 4628-5:03 (flaking)	0	0	0	*0*
ISO 2409:13-1a/A.1 (class):	0	-	-	*0 or 1*
ISO 4624:02 [MPa]	-	6,8±1,1*[1]	7,0±1,2*[1]	*>5Mpa or no adh. break to substrate*

Test 3: SO_2 test with condensation of moisture - ISO 6270-1:1998 **ISO 6988:1985** Exposure time: **30 cycles**	Panel			***Requirements***
	IK2-1	**IK2-2**	**IK2-3**	
Measured DFT [µm]	221±14	216±20	211±8	
Assessment after testing: (Picture No.3 – Annex 3)				
ISO 4628-2:03 (blistering)	0(S0)	0 (S0)	0(S0)	*0(S0)*
ISO 4628-3:03 (rusting)	Ri 0	Ri 0	Ri 0	*Ri 0*
ISO 4628-4:03 (cracking)	0	0	0	*0*
ISO 4628-5:03 (flaking)	0	0	0	*0*
ISO 2409:13 (class):	0	-	-	*0 or 1*
ISO 4624:02 [MPa]	-	7,2±0,9*[1]	7,5±1,1*[1]	*>5 Mpa or no adh. break to substrate*

*[1] –break adhesive/topcoat

Remark: tests performed according to standards ISO 9227, ISO 4628/1-8 part and ISO 2409 accredited at SA

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4.0 Conclusion

Tested paint system "MCU-Miozinc 140 µm + MCU-Topcoat 80 µm" meets the requirements of the standard EN ISO 12944-6:1998 for atmospheres C5-I/H and C5-M/H.

Report prepared by:

Dr. Mirjam Bajt Leban

Martin Virant

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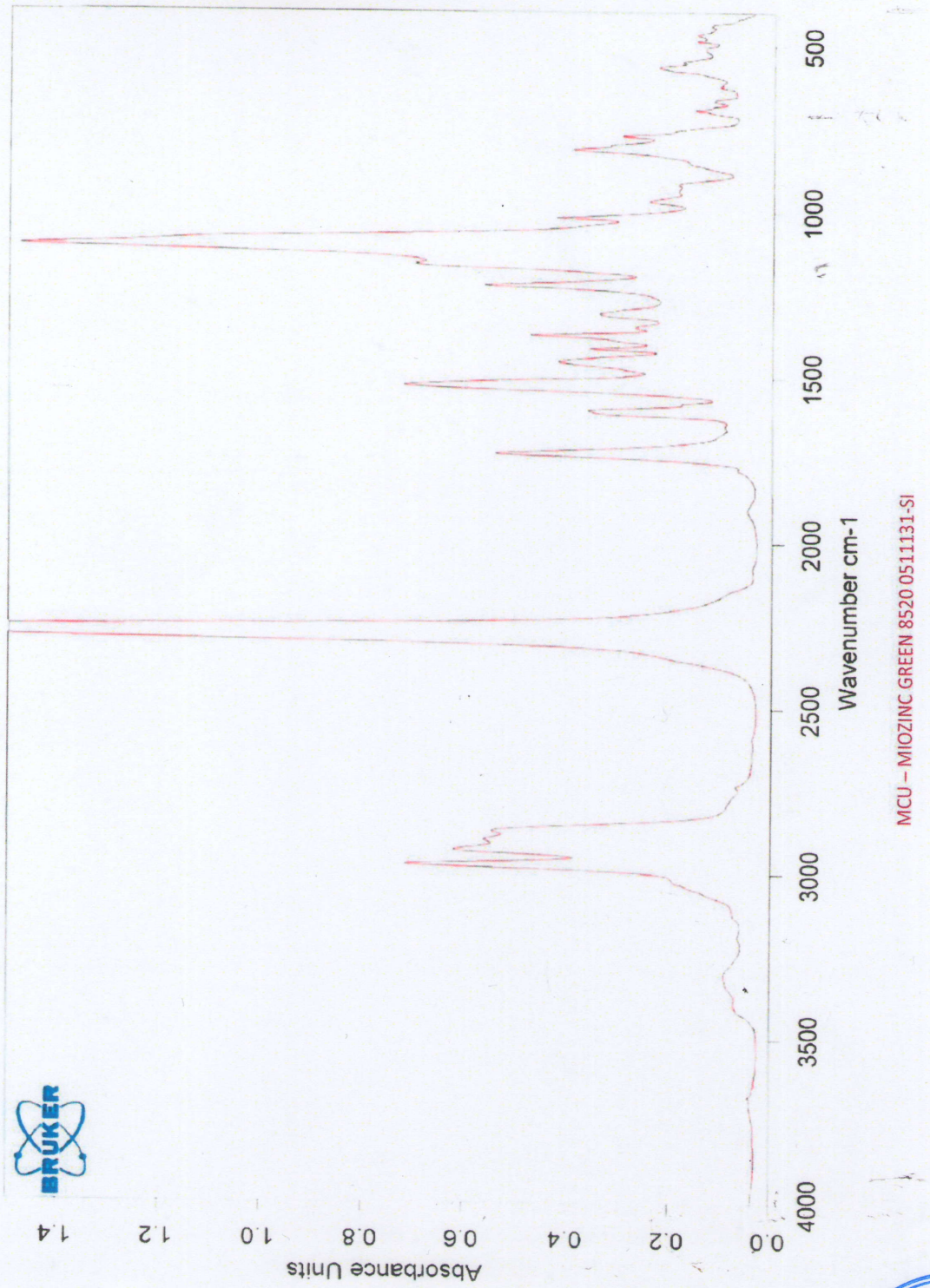
Annex 1



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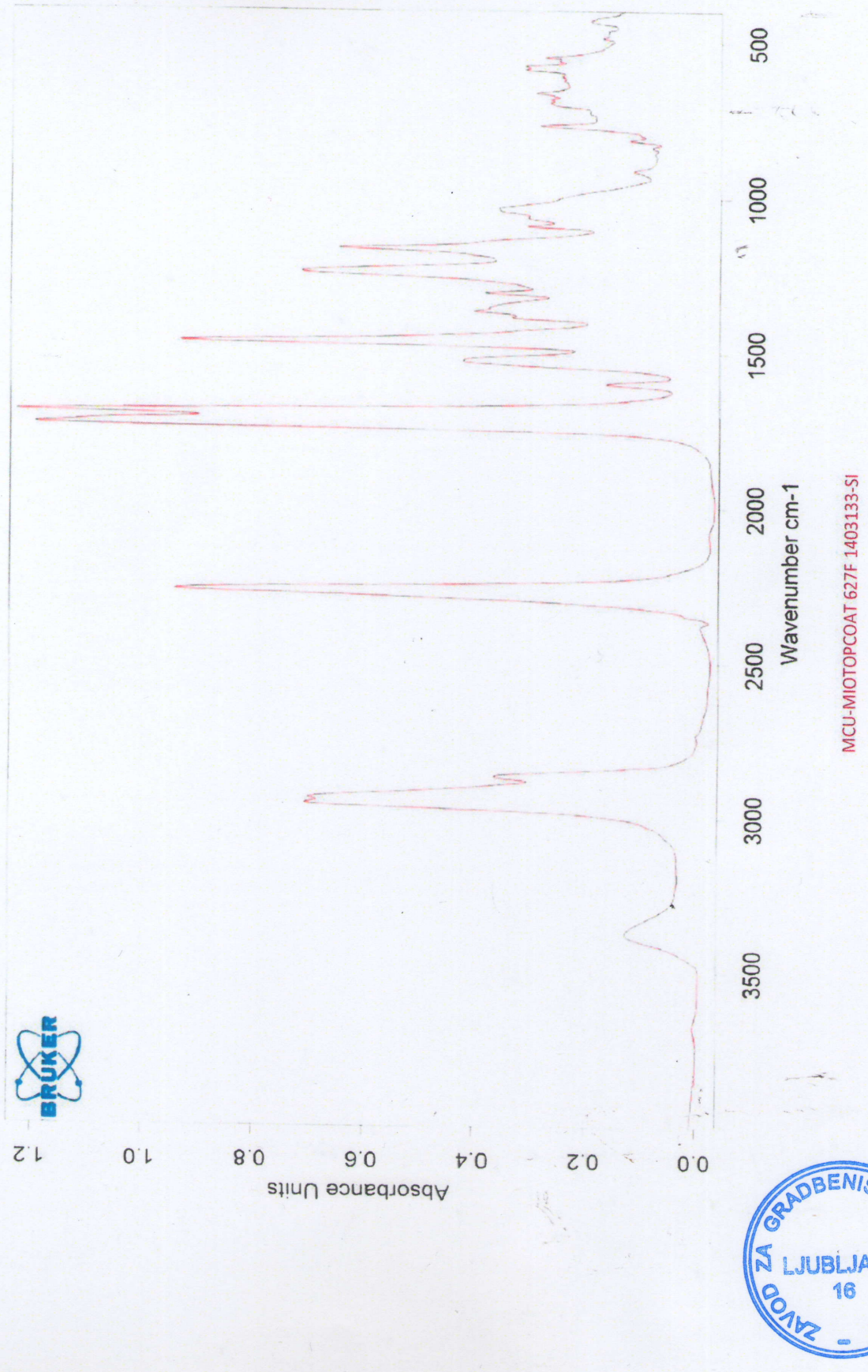
Annex 2



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Annex 3

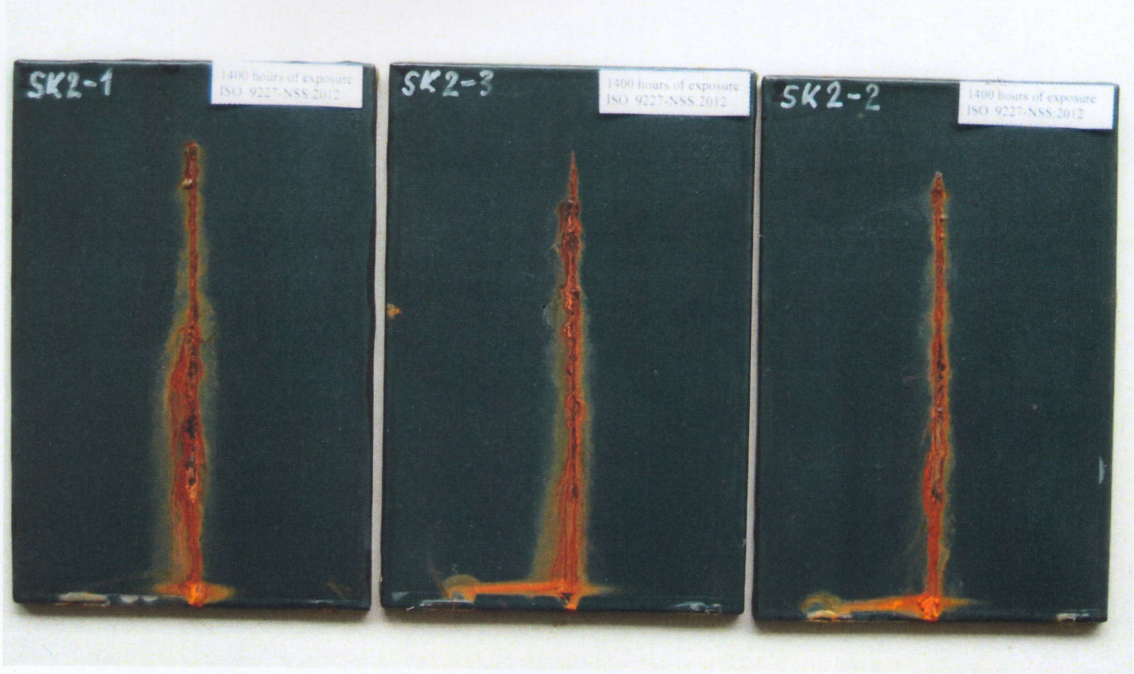

Figure No. 1 (27941d-15)

Figure No. 2 (27822d-07)

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Annex 3

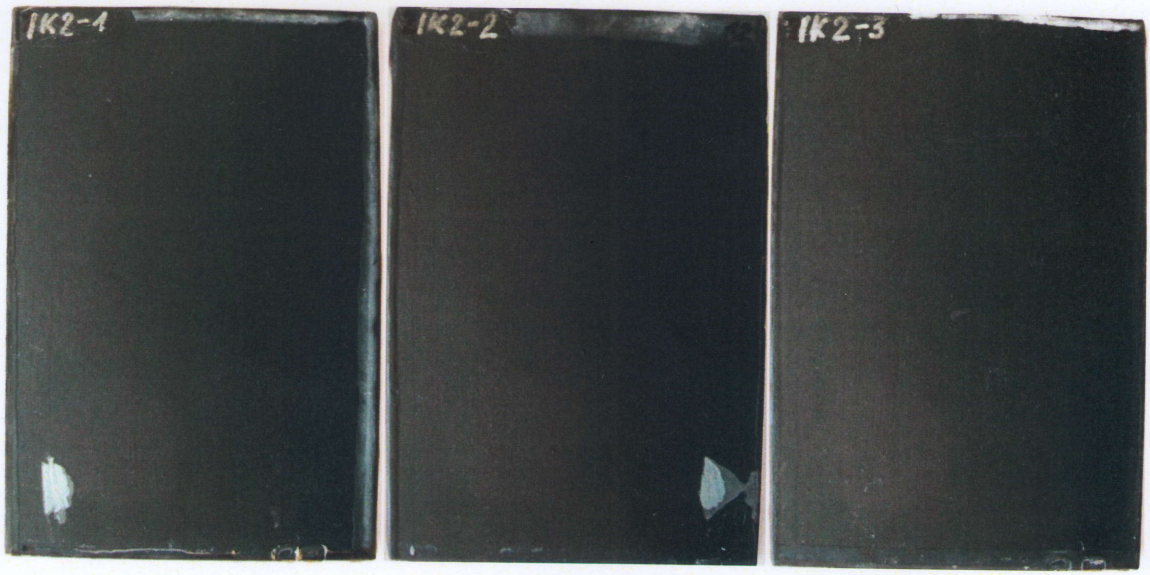

Figure No. 3 (27880d-18)

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