

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

Ljubljana, 17<sup>th</sup> April 2014

## REPORT

**No. P099/14-440-2**

On the testing of anticorrosion protection  
coating "MCU-Miozinc 140  $\mu\text{m}$  + MCU-  
Topcoat 80  $\mu\text{m}$ " according to a standard EN  
ISO 12944-6:1998 for C5-I/H and C5-M/H

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**Orderer:** CHEMCOLOR Sevnica d.o.o., Dolnje Brezovo 35, 8290 Sevnica

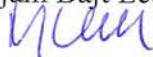
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**Order:** No. 14-020-000044 on January 27<sup>th</sup> 2014

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**Responsible investigator:**

Dr. Mirjam Bajt Leban



**Head of the Laboratory:**

Dr. Tadeja Kosec



**Director:**

Assoc. Prof. Dr. Andraž Legat



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The results of the tests refer only to the tested specimens. This report may only be reproduced as a whole. Complaints will be considered only if received within 15 days from the date of issue of this report. Total number of pages: 9 ; total number of annexes: 1.

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## 1.0 Introduction

Company CHEMCOLOR Sevnica ordered estimation of anticorrosion painting "MCU-Miozinc 140  $\mu\text{m}$  + MCU-Topcoat 80  $\mu\text{m}$ " 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 [ $\mu\text{m}$ ]
1 <sup>st</sup> coat	MCU – Miozinc	Moisture Cured poliurea	140
2 <sup>nd</sup> coat	MCU – Miotopcoat	Moisture Cured poliurea	80
<b>Total:</b>			<b>220</b>

#### 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  $\mu\text{m}$  – 11,0  $\mu\text{m}$ ,
- Rz = 52,9  $\mu\text{m}$  - 56,6  $\mu\text{m}$ ,
- Rt = 91  $\mu\text{m}$  – 101  $\mu\text{m}$ .

#### 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 16<sup>th</sup> and 20<sup>th</sup>, 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 14<sup>th</sup>, 2014.

#### e) Drying of paint system

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



### f) ZAG identification of paint system samples

To the tested surfaces of paint system "MCU-Miozinc 140  $\mu\text{m}$  + MCU-Topcoat 80  $\mu\text{m}$ " 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<sub>2</sub> 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 [ $\mu\text{m}$ ]	215 $\pm$ 17	238 $\pm$ 16	229 $\pm$ 26	
Assesment before test:				
- ISO 2409:13 (class):	0	0	-	0
- ISO 4624:02 [MPa]		7,2 $\pm$ 1,3* <sup>1</sup>	6,7 $\pm$ 1,3* <sup>1</sup>	>5Mpa or no adh. break to substrate
<b>Test 1: Neutral Salt Spray - ISO 9227:2012</b> Scratch: Tool Sikens, 0,5 mm Exposure time: 1440 h	<b>SK2-1</b>	<b>SK2-2</b>	<b>SK2-3</b>	
Measured DFT [ $\mu\text{m}$ ]	221 $\pm$ 16	219 $\pm$ 8	215 $\pm$ 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. around 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 $\pm$ 0,7* <sup>1</sup>	5,2 $\pm$ 0,6* <sup>1</sup>	>5Mpa or no adh. break to substrate

\*<sup>1</sup> –break adhesive/topcoat



Test 2: Continuous condensation - ISO 6270-1:1998 Exposure time: 720 h	Panel			Requirements
	VK2-1	VK2-2	VK2-3	
Measured DFT [ $\mu\text{m}$ ]	228 $\pm$ 18	212 $\pm$ 22	223 $\pm$ 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 $\pm$ 1,1* <sup>1</sup>	7,0 $\pm$ 1,2* <sup>1</sup>	>5Mpa or no adh. break to substrate

Test 3: SO <sub>2</sub> 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 [ $\mu\text{m}$ ]	221 $\pm$ 14	216 $\pm$ 20	211 $\pm$ 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 $\pm$ 0,9* <sup>1</sup>	7,5 $\pm$ 1,1* <sup>1</sup>	>5 Mpa or no adh. break to substrate

\*<sup>1</sup> –break adhesive/topcoat

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





#### 4.0 Conclusion

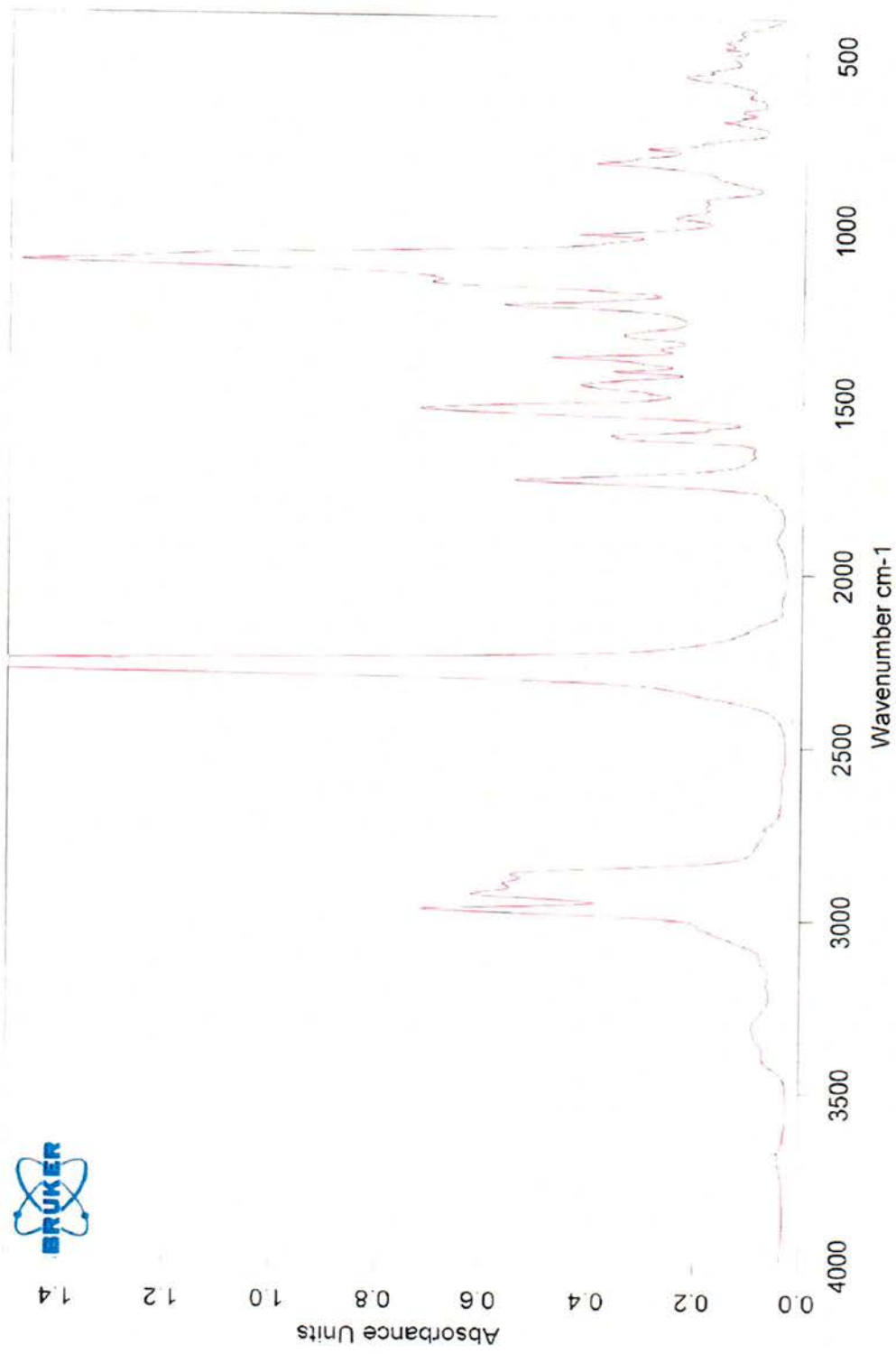
Tested paint system “MCU-Miozinc 140  $\mu\text{m}$  + MCU-Topcoat 80  $\mu\text{m}$ ” meets the requirements of the standard EN ISO 12944-6:1998 for atmospheres C5-I/H and C5-M/H.

Report prepared by:

Dr. Mirjam Bajt Leban

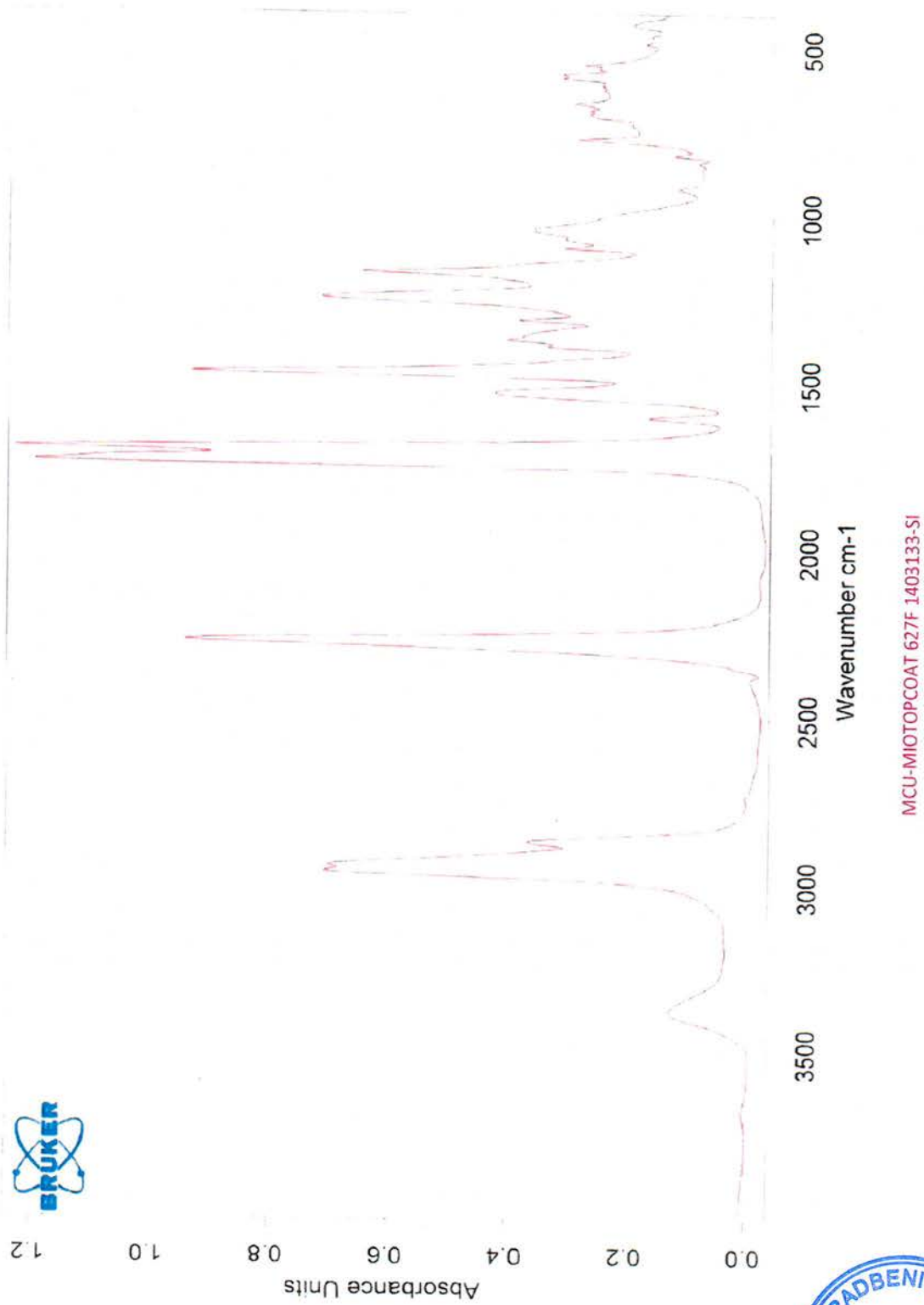
Martin Virant





MCU - MIOZINC GREEN 8520 0511131-SI





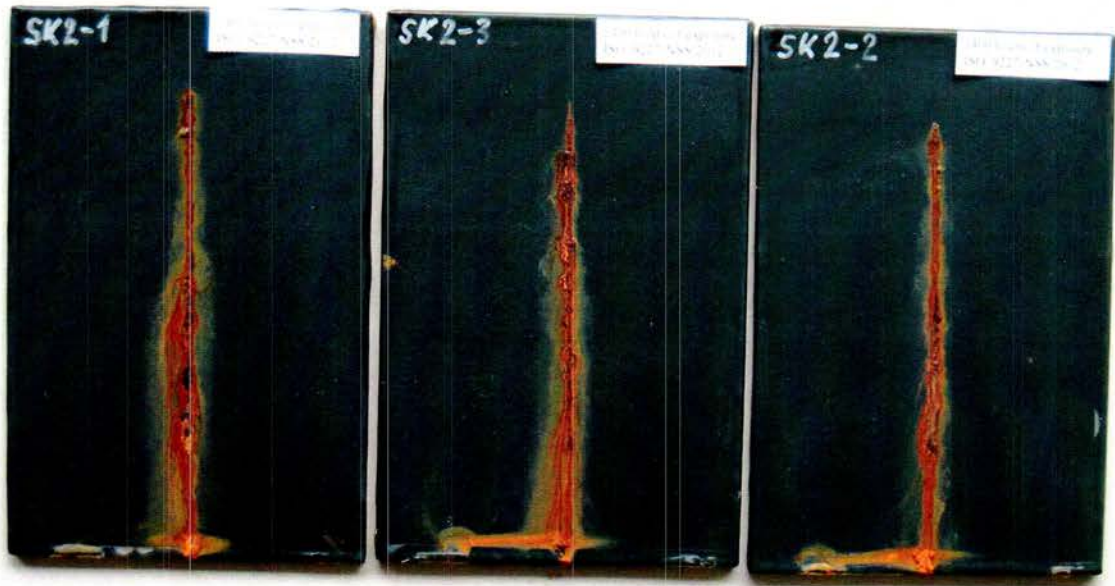


Figure No. 1 (27941d-15)



Figure No. 2 (27822d-07)





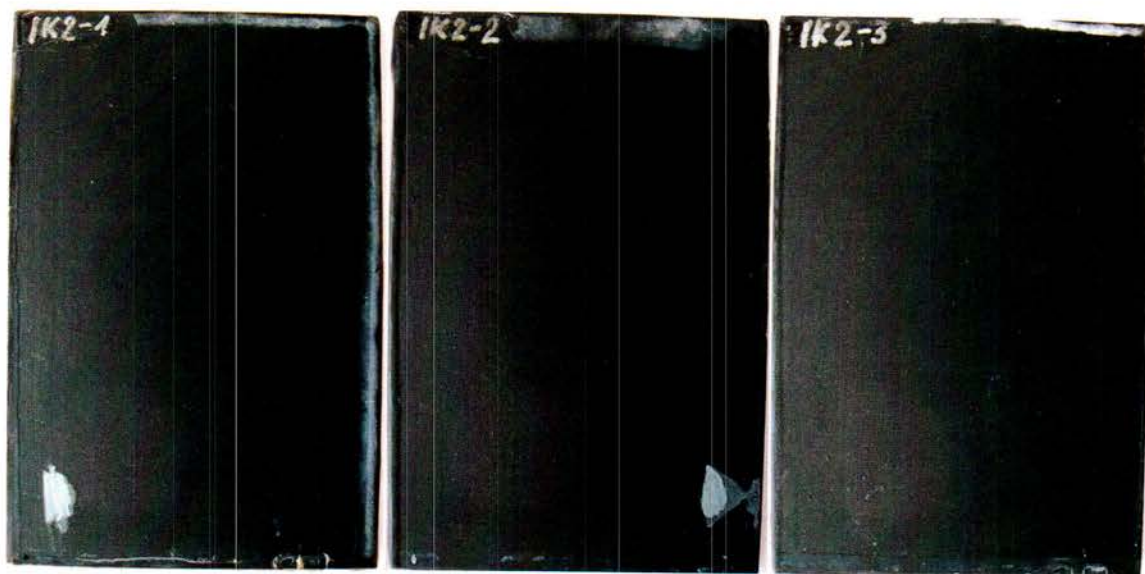


Figure No. 3 (27880d-18)

