

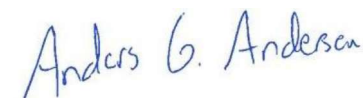
Report ID.	Norner project no	Date	Classification
NO250625	10412481	16.09.2025	Confidential
Customer / Contact / Reference			Customer Responsible
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Title

Testing of protective coatings – TEKNOZINC 90 SE / TEKNODUR COMBI 3560-09 – in accordance with ISO 12944-6:2018 – Corrosivity category C5 High, Test regime 1.

Author(s)

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Test Responsible

Approved by

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Background

On behalf of Teknos Oy, Norner AS has performed testing of one protective coating system in accordance with ISO 12944-6:2018 – Corrosivity category C5 High, Test regime 1.

Conclusions

Tested coating system – TEKNOZINC 90 SE / TEKNODUR COMBI 3560-09 – is in accordance with the requirements given in ISO 12944-6:2018 - Corrosivity category C5 High, Test regime 1.

Accredited test (ISO 17025)

The test was executed under accreditation granted by Norwegian Accreditation with registration number TEST 308. The test standards included in the accreditation scope are ISO 12944-6, ISO 12944-9, ISO 9227, ISO 16474-3, ISO 4624, ISO 4628-2, -3, -4, -5, -6, ISO 9227, ISO 2812-1, -2, ISO 15711, ISO 6270-1 and ISO 2409. The sample preparation and DFT measurements are not a part of the accreditation scope. The results relate only to the items tested. The test report certificate shall not be reproduced except in full, without written approval by the laboratory.

Attachments

- Photos of exposed samples

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1. Introduction

On behalf of Teknos Oy
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HELSINKI, Finland

Norner AS has performed testing of one protective coating system according to the following test program:

ISO 12944-6:2018 – Corrosivity category C5 High.

Test regime 1:

Water Condensation ISO 6270-1 720 h.

Neutral Salt Spray ISO 9227 1440 h.

The condensation testing was performed between 18.06.2025 and 18.07.2025. The NSS testing was performed between 26.06.2025 and 26.08.2025 with 1 additional day of exposure to account for downtime. Adhesion testing was performed on 29.07.2025 and 04.09.2025.

The application was performed by Teknos Oy.

Tested coating system:

1 st Layer	TEKNOZINC 90 SE	DFT: 60 µm
2 nd Layer	TEKNODUR COMBI 3560-09	DFT: 140 µm

Customer reference: System C5

2. Application

The surface preparation, paint application and DFT measurements were performed by Teknos Oy.

Table 1 DFT measurements from customer

Coating Layer	Panel ID	System Applied	Mean (µm)
1	C5.1	TEKNOZINC 90 SE	88
2		TEKNODUR COMBI 3560-09	236
1	C5.2	TEKNOZINC 90 SE	82
2		TEKNODUR COMBI 3560-09	213
1	C5.3	TEKNOZINC 90 SE	75
2		TEKNODUR COMBI 3560-09	187
1	C5.5	TEKNOZINC 90 SE	69
2		TEKNODUR COMBI 3560-09	232
1	C5.6	TEKNOZINC 90 SE	61
2		TEKNODUR COMBI 3560-09	202
1	C5.7	TEKNOZINC 90 SE	60
2		TEKNODUR COMBI 3560-09	191
1	C5.10	TEKNOZINC 90 SE	60
2		TEKNODUR COMBI 3560-09	191

Note: DFT values are adjusted with 25 µm due to compensation of blast profile.

3. Test Program

Testing was performed according to ISO 12944-6:2018 – Corrosivity category C5 High, Test regime 1. Test standards are given below in Table 2.

Table 2 Test program

Test	Applicable Standard
Neutral Salt Spray	ISO 9227:2022
Water Condensation	ISO 6270-1:2017
Adhesion test	ISO 4624:2023 – Method B
Blistering	ISO 4628-2:2016
Rusting	ISO 4628-3:2024 – Method 1
Cracking	ISO 4628-4:2016
Flaking	ISO 4628-5:2022

The evaluation requirements after finished testing can be found in Table 3. No visual defects shall be present, as listed in Table 4.

Test Regime	Corrosion from Scribe (mm)	Adhesion (MPa)
Neutral Salt Spray (NSS)	≤ 1.5	≥ 2.5 and ≥ 5.0 for A/B-fractures
Condensation		≥ 2.5 and ≥ 5.0 for A/B-fractures

4. Test Results

The test results can be found in Table 4-6.

Table 4 Visual Assessments

Test	Panel ID	Blistering Density (size)		Rusting			Cracking Density (size)		Flaking Density(size)	
				(Ri)		(WRi)				
		Req.	Res.	Req.	Res.	Res.	Req.	Res.	Req.	Res.
NSS	C5.1	0(0)	0	0	0	0	0(0)	0	0(0)	0
	C5.2	0(0)	0	0	0	0	0(0)	0	0(0)	0
	C5.7	0(0)	0	0	0	0	0(0)	0	0(0)	0
Condensation	C5.5	0(0)	0	0	0	0	0(0)	0	0(0)	0
	C5.6	0(0)	0	0	0	0	0(0)	0	0(0)	0
	C5.10	0(0)	0	0	0	0	0(0)	0	0(0)	0

Table 5 Corrosion from scribe

Test Regime	Panel ID	Measured Corrosion including scribe (mm)										Average (mm)	Corrosion from scribe (mm)
NSS	C5.1	4.4	4.5	3.4	3.8	3.4	3.5	3.4	3.5	2.9	3.6	0.8	
	C5.2	3.6	3.6	4.0	3.7	3.6	3.3	3.7	3.7	4.1	3.7	0.9	
	C5.7	3.4	3.8	4.1	4.1	4.0	3.9	4.2	4.0	3.8	3.9	1.0	

Test Parameter	Panel ID	Result (MPa)	Average (MPa)	Type of fracture
NSS	C5.1	11.9	11.8	100%B
		11.1		100%B
		12.3		100%B
	C5.2	10.1	11.0	100%B
		10.6		100%B
		12.4		100%B
	C5.7	12.6	12.6	100%B
		13.3		100%B
		12.0		100%B
Condensation	C5.5	10.8	10.8	100%B
		10.7		100%B
		10.8		100%B
	C5.6	11.8	11.7	100%B
		11.5		100%B
		11.9		100%B
	C5.10	10.9	11.1	100%B
		11.2		100%B
		11.3		100%B
Adhesion Unexposed	C5.3	12.6	12.5	90%B 10%C/Y
		12.4		100%B
		12.6		100%B

5. Conclusion

Tested coating system – TEKNOZINC 90 SE / TEKNODUR COMBI 3560-09 – is in accordance with the requirements given in ISO 12944-6:2018 - Corrosivity category C5 High, Test regime 1.

NSS

Scribe line, 2 mm x 50 mm, was made mechanically on each sample.

Corrosion from scribe M has been calculated from the formula: $M=(C-W)/2$

Where C = average of nine width measurements and W is the width of applied scribe (2 mm).

Panel size: 100 mm x 150 mm x 5 mm

Adhesion test

Three test panels were used for all exposure tests. Evaluation of adhesion was done after minimum 7 days of conditioning.

Table 7 Equipment used in project

Application	Equipment	Manufacture
NSS	Salt fog chamber	Ascott and Q-Lab
Condensation	Condensation cabinet	Cromocol
Assessment	Adhesion tester PosiTest AT-A	DeFelsko
	Calipers CD-15APX	Mitutoyo
	True Color TC-60	Cromocol
Control	High surface tension Hydrometer	VWR
	FiveGo pH Meter	Mettler Toledo

All the equipment used is regularly calibrated and controlled. The pH and density of the seawater are controlled weekly.

Expanded uncertainty is estimated to be 0.35 mm for scribe measurements and 0.13 MPa for adhesion measurements. Decision rule applied in accordance with Simple Acceptance Rule ($w=0$) in accordance with ILAC G8. Uncertainty is considered as part of the conformance probability (Shared Risk / 50% PFA).



Figure 1: NSS – 1440 hours

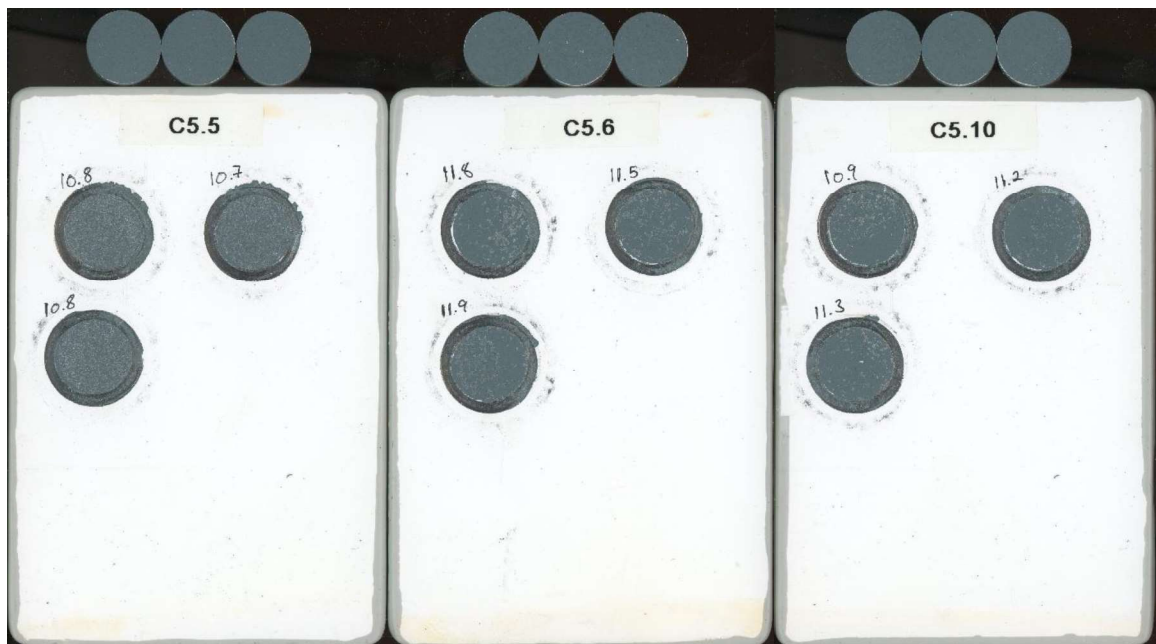


Figure 2: Condensation – 720 hours

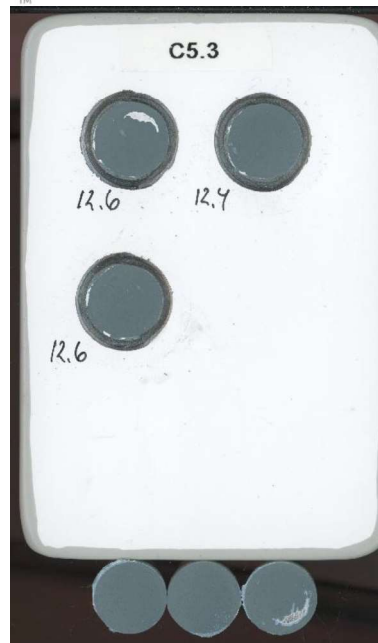


Figure 3: Adhesion Unexposed

End of report