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Akzo Nobel Decorative Coatings AB
205 17 MALMÖ

Stain test

(1 appendix)

Commission

Comparing stain test according to SS-EN ISO 2812-4:2017 of 5 different products from 5 different manufactures. Six types of stains were evaluated according to SS-EN ISO 4628-1:2016 table 3 and then ranked.

Specimen

5 applicated Lenetha folies 150x430 mm in duplicates of each product and one uncoated Lenetha folie as a zero sample for film thickness measurement, were received 8th of July, 2022. They were marked A to E and marked by RISE according to table 1.

Table 1 Samples

Mark	Manufacturer	Product
A1	A	A
A2	A	-“-
B1	B	B
B2	B	-“-
C1	C	C
C2	C	-“-
D1	D	D
D2	D	-“-
E1	E	Nordsjö Professional Rezisto Easy Clean 5
E2	E	-“-
Uncoated Zero sample		

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Test procedure

Stain test was performed according to SS-EN ISO 2812-4:2017 on 5 different paint products, A to E.

The samples were conditioned at 23°C and 50% RH for 4 weeks before the stain test.

The film thickness on each film was measured with a thickness meter, inv.no 901339, through the film difference between coated samples and one uncoated sample. See appendix table 6.

Each sample got cut into six pieces, one for each type of stain according to table 2. Each stain were tested in duplicate. Each type of stain was tested in separate order and repeated one more time, so the last sample got tested first in the second round. 500 µl of each type of stain were applied by an automatic pipette, inv. no BX52380, except from butter, which was applied with a spot of a size of 2 cm² by a gloved finger. See picture 6 in appendix 1. The liquid stains, except from olive oil, were covered by petri dishes and then leaved for 15 min. See pictures 1 and 2 in appendix 1. After 15 min the stains were dried off with Kleenex paper and then directly washed off under running deionized water and then dried off with Kleenex paper again. Then the stains were evaluated according to SS-EN ISO 4628-1:2016 table 3 and then ranked according to falling rate, directly and after 24 hours. See pictures 3, 4, 5 and 7 in appendix 1.

The summary of the estimated grades for each sample regarding intensity and rank was noted and the products were then ranked from 1 to 5 regarding stain resistance.

Table 2 *Type of stains*

Stain no	Type of stain	Description
1	Olive oil	
2	Red wine	
3	Ketchup	
4	Tea	Lipton Yellow Label
5	Coffee	Löfbergs Lila
6	Butter	Normal salted

Table 3 *Rating scheme for designating the intensity of changes according to SS-EN ISO 4628 table 3*

Rating	Intensity of change
0	Unchanged, i.e. no perceptible change
1	Very slight, i.e. just perceptible change
2	Slight, i.e. clearly perceptible change
3	Moderate, i.e. very clearly perceptible change
4	Considerable, i.e. pronounced change
5	Very marked change

Test Results

The stain test was performed 22nd of August and 24th of August, 2022.

Table 4 Results

Evaluation	A	B	C	D	E
Olive oil	A1-1	B1-1	C1-1	D1-1	E1-1
Intensity directly	1	1	1	0	0
Ranking	2	2	2	1	1
After 24 h	1	1	0	0	0
Ranking	2	2	1	1	1
Olive oil	A2-1	B2-1	C2-1	D2-1	E2-1
Intensity directly	1	1	1	0	0
Ranking	2	2	2	1	1
After 24 h	1	1	0	0	0
Ranking	2	2	1	1	1
Red wine	A1-2	B1-2	C1-2	D1-2	E1-2
Intensity directly	3	3	3	3	3
Ranking	3	2	3	3	1
After 24 h	3	3	3	3	3
Ranking	1	1	1	1	1
Red wine	A2-2	B2-2	C2-2	D2-2	E2-2
Intensity directly	3	3	3	3	3
Ranking	4	2	3	4	1
After 24 h	3	3	3	3	3
Ranking	1	1	1	1	1
Ketchup	A1-3	B1-3	C1-3	D1-3	E1-3
Intensity directly	0	0	0	0	0
Ranking	1	1	1	1	1
After 24 h	0	0	0	0	0
Ranking	1	1	1	1	1
Ketchup	A2-3	B2-3	C2-3	D2-3	E2-3
Intensity directly	0	0	0	0	0
Ranking	1	1	1	1	1
After 24 h	0	0	0	0	0
Ranking	1	1	1	1	1

Table 4 continue

Evaluation	A	B	C	D	E
Tea	A1-4	B1-4	C1-4	D1-4	E1-4
Intensity directly	3	3	3	3	3
Ranking	2	2	1	2	1
After 24 h	3	3	3	3	3
Ranking	2	2	1	2	1
Tea	A2-4	B2-4	C2-4	D2-4	E2-4
Intensity directly	3	3	2	3	2
Ranking	2	2	1	2	1
After 24 h	3	3	3	3	3
Ranking	2	2	1	2	1
Coffee	A1-5	B1-5	C1-5	D1-5	E1-5
Intensity directly	3	3	3	3	3
Ranking	2	2	1	2	1
After 24 h	3	3	3	3	3
Ranking	1	1	1	1	1
Coffee	A2-5	B2-5	C2-5	D2-5	E2-5
Intensity directly	3	3	3	3	3
Ranking	3	3	1	3	2
After 24 h	3	3	3	3	3
Ranking	2	2	1	2	2
Butter	A1-6	B1-6	C1-6	D1-6	E1-6
Intensity directly	1	1	1	1	0
Ranking	4	3	3	2	1
After 24 h	0	0	0	0	0
Ranking	1	1	1	1	1
Butter	A2-6	B2-6	C2-6	D2-6	E2-6
Intensity directly	1	1	1	1	0
Ranking	4	3	3	2	1
After 24 h	0	0	0	0	0
Ranking	1	1	1	1	1
Total points	89	84	73	77	61

Summary

The paint product with the lowest overall ranking is Nordsjö Professional Rezisto Easy Clean 5. See table 5 for overall ranking of the different manufacturers.

Table 5 Falling rank of stain resistance

Total Rank	Total points	Manufacturer	Product
1	61	E Nordsjö	Nordsjö Professional Rezisto Easy Clean 5
2	73	C	C
3	77	D	D
4	84	B	B
5	89	A	A

RISE Research Institutes of Sweden AB Department Corrosion, RISE AB - Product Durability

Performed by

Examined by

Beatrice Heale

Martina Thomasson

Appendix

Appendix 1

Film thickness measurement

The result of film thickness is given as a mean value of 10 measurements for each sample.

The measurement was made 18th of August 2022.

Table 6 Results of the thickness measurements

Measurement	Thickness of the uncoated sample (µm)	Sample A1 (µm)	Sample A2 (µm)	Sample B1 (µm)	Sample B2 (µm)
:1	257	318	316	311	320
:2	253	316	325	311	313
:3	253	313	325	310	315
:4	251	313	316	311	318
:5	253	313	317	312	316
:6	254	317	318	314	317
:7	252	316	313	308	322
:8	256	318	318	311	322
:9	253	325	317	309	319
:10	258	320	321	313	320
Mean value	254	317	319	311	318
Film thickness	0	63	65	57	64
Measurement		Sample C1 (µm)	Sample C2 (µm)	Sample D1 (µm)	Sample D2 (µm)
:1		320	317	312	317
:2		314	314	312	318
:3		314	314	314	321
:4		321	314	311	314
:5		314	315	312	313
:6		318	339	318	324
:7		314	313	315	319
:8		313	315	312	323
:9		312	324	314	319
:10		317	313	315	320
Mean value		316	318	314	319
Film thickness		62	64	60	65

Appendix 1

Table 6 continue

Measurement	Sample E1	Sample E2
	(μm)	(μm)
:1	332	320
:2	322	319
:3	324	317
:4	320	312
:5	318	315
:6	318	319
:7	325	316
:8	322	321
:9	320	320
:10	320	321
Mean value	322	318
Film thickness	68	64

Pictures regarding the stain test

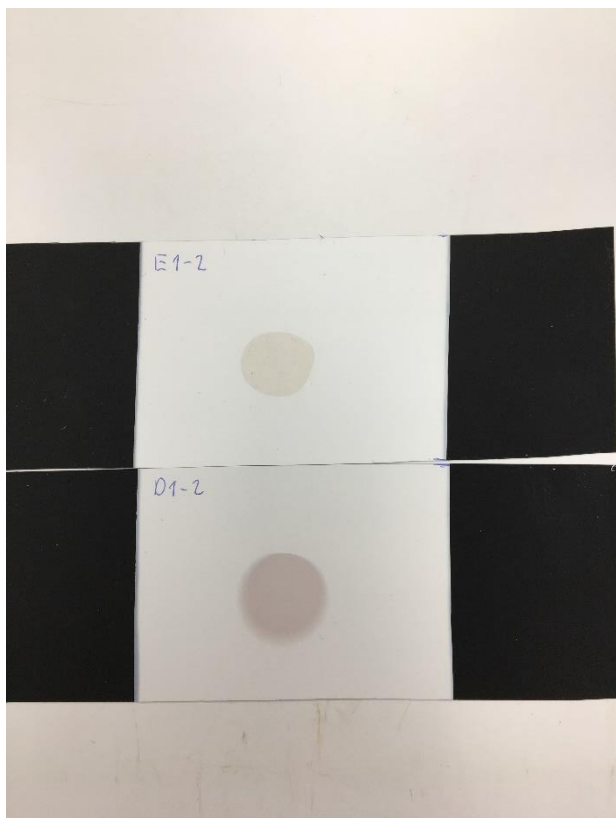


Pic 1 Test against Olive oil

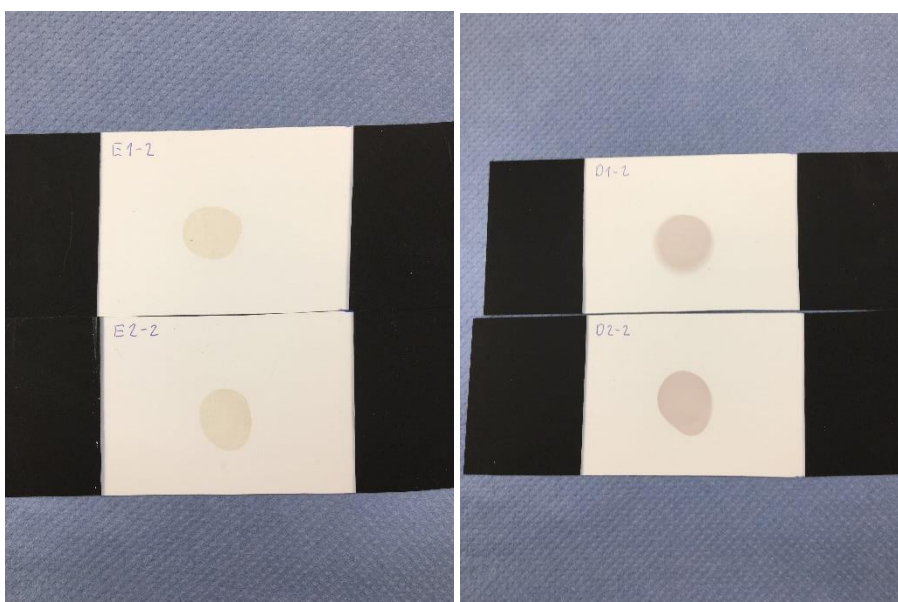


Pic 2 Test against wine

Appendix 1



Pic 3 Sample E compared with sample D directly after test against red wine

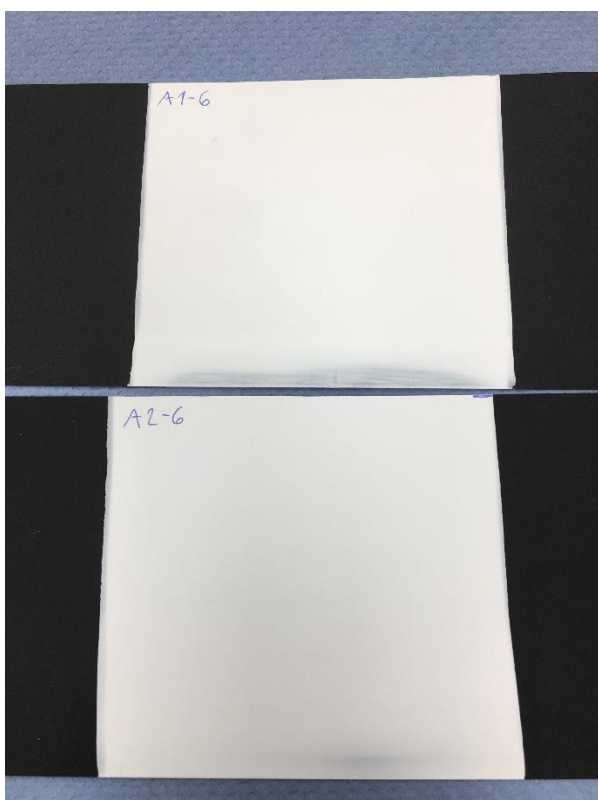


Pic 4 and 5 Sample E compared with sample D, 24 hours after test against red wine.

Appendix 1



Pic 6 Test against butter



Pic 7 Sample A directly after test against butter

Verifikat

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Dokument

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