Skovgaard & Frydensberg
Att: Dir. Dirch Madsen
Gadestævnet 6
2650 Hvidovre

30. november 2021
Sagsnr. 0395

Afprøvning af linoliemaling jf. EN 927-3:2019 Naturlig eksponering

Overfladeteknik har for Dem afprøvet:
"Skovgaard & Frydensbergs Linoliemaling, Hvid" Batch nr. 654134
med tilhørende Grundingsolie "Skovgaard & Frydensbergs Grundolie" Batch nr. 649133,
begge varer til udendørs brug på træ.

Afprøvningen er foretaget efter EN 927-3:2019. Malingsystemet – 1 gang Grundolie fulgt af 3 gange Linoliemaling – påføres med pensel på 4 emner i høvlet fyr (Pinus silvestris) med dimensionerne 80 mm x 375 mm x 20 mm. Malingen påføres på emnets forside og de to smalle langsider. Enderne forsegles efterfølgende, og bagsiden står ubehandlet. Det ene emne tjener som ueksponeret reference, mens de tre øvrige opsættes på sydvendte eksponeringsstativer, som

hælder 45 grader. Panelerne er eksponeret 12 måneder på vores eksponeringsareal i Odsherred. Som sammenligningsprodukt (WRM – Weathering Reference Material) er her benyttet "Skovgaard & Frydensbergs Linoliemaling, Dyrehaverød" Batch nr. 654135. Fire tilsvarende paneler behandles med WRM og eksponeres på samme måde som det afprøvede system. WRM tjener som sammenligning internt for producenten. Før og efter eksponering måles og vurderes en række egenskaber, således som det fremgår af det efterfølgende. Resultaterne kan sammenholdes med kravene i EN 927-2 Specifications:

I dette tilfælde lever det afprøvede malingsystem op til kravene til "Stable components" dvs. f.eks. vinduer og døre.

Også den valgte WRM lever op til de nævnte krav.

Testing of linseed oil paint "Linolemaling, white" from Skovgaard & Frydensberg according to EN 927-3:2019 Natural Exposure

Coating Consultancy Copenhagen has tested the above paint system consisting of primer "Grundolie" (Batch No. 649133) plus three coats of "Linoliemaling, white" (Batch No. 654134). The system is intended for exterior use on wood.

The coating system has been brush applied on 4 panels of machined pine (Pinus silvestris) measuring 80 mm x 375 mm x 20 mm. The front side and the two long edges are coated. Afterwards the ends are sealed. The rear side is left uncoated. One panel serves as unexposed reference whereas the three others are exposed on south-facing exposure racks inclining 45 degrees at our exposure site in Odsherred, West Zealand, Denmark for a period of 12 months.

For comparison a similar set of panels has been coated with a "Weathering Reference Material – WRM" and exposed in parallel with the test system. The WRM in this case is a coating system consisting of the same primer as in the test system but with a red linseed oil coating instead of the white. The coating is "Linoliemaling, Dyrehaverød (Batch No. 654135) also from Skovgaard & Frydensberg.

Before and after exposure a series of properties are measured or assessed as presented in the following forms. The results can be compared with the limit values in EN 927-2 Specifications:

In this case the test system complies with the demands to "Stable components" e.g., windows and doors.

The selected WRM also complies with the demands mentioned.

Test report for test system					
Test system and substrate: 1 x Grundolie + 3 x Linoliemaling, White from Skovgaard & Frydensberg brush applied on Pine.					
Classification in accordance with EN 927-1: High build, opaque, semi-gloss					
Assignment: Job No. 0395 (2020-2021)					
Tested for: Skovgaard & Frydensberg, Gadestævnet 6, DK-2650 Hvidovre, Denmark					
Tested by: Coating Consultancy Copenhagen. Akacievej 2A, 2640 Hedehusene, Denmark					
Exposure site: Odsherred, Denmark					
Starting date: 2020-11-27			Ending date: 2021-11-27		
Coat No.	Manufacturer	Trade name	Description	Appl. meth. and date	Amount applied g/m^2
1	Skovgaard & Frydensberg	Grundolie	Primer, fungicidal	Brush 2020-11-05	69
2		Linolie-maling	Paint	Brush 2020-11-06	103
3		Linolie-maling	Paint	Brush 2020-11-09	98
4		Linolie-maling	Paint	Brush 2020-11-12	79
Dry film thickness	142 µm				

Test report for WRM (Weathering Reference Material)					
Test system and substrate: 1 x Grundolie + 3 x Linoliemaling, Red from Skovgaard & Frydensberg brush applied on Pine.					
Classification in accordance with EN 927-1: High build, opaque, semi-gloss					
Assignment: Job No. 0395 (2020-2021)					
Tested for: Skovgaard & Frydensberg, Gadestævnet 6, DK-2650 Hvidovre, Denmark					
Tested by: Coating Consultancy Copenhagen. Akacievej 2A, 2640 Hedehusene, Denmark					
Exposure site: Odsherred, Denmark					
Starting date: 2020-11-27			Ending date: 2021-11-27		
Coat No.	Manufacturer	Trade name	Description	Appl. meth. and date	Amount applied g/m^2
1	Skovgaard & Frydensberg	Grundolie	Primer, fungicidal	Brush 2020-11-05	76
2		Linolie-maling	Paint	Brush 2020-11-06	83
3		Linolie-maling	Paint	Brush 2020-11-09	106
4		Linolie-maling	Paint	Brush 2020-11-12	73
Dry film thickness	122 µm				

Result Test coating system	Exposure panels			Reference
	1	2	3	4
Before exposure				
Spreading rate, paint total g/m^2	266	292	276	286
Coating thickness µm EN ISO 2808 Meth. 6A				142
Gloss EN ISO 2813	28,6	44,0	31,2	40,9
Colour L EN ISO 18314-1 (45/0)	94,59	94,49	94,54	94,55
a	-0,96	-1,00	-0,99	-0,97
b	6,52	6,57	6,59	6,62
After exposure				
Blistering * EN ISO 4628-2	0	0	0	0
General appearance EN ISO 4628-1	1	1	1	0
Flaking * EN ISO 4628-5	0	0	0	0
Cracking * EN ISO 4628 -4	0	0	0	0
Chalking EN ISO 4628-6	3	3	3	0
Microorganisms EN 16492	1-1-1	1-1-1	1-1-1	0-0-0
After exposure and washing				
General appearance	1	1	1	0
Microorganisms	1-1-1	1-1-1	1-1-1	0-0-0
Gloss	9,2	10,1	9,5	8,2
Loss of gloss	19,4	33,9	21,7	32,7
Colour, L	89,56	88,37	87,70	94,94
a	-0,34	-0,36	-0,23	-0,82
b	4,58	4,68	4,93	3,92
Colour change ΔE	5,4	6,4	7,1	2,7
Adhesion * EN 927-3:2019 Annex A	0	1	0	0

*) Blistering, flaking, cracking and adhesion are mandatory properties to conform with the limit values of EN 927-2 Specifications.
For assessments according to EN ISO 4628 and EN 16492 a scale 0 – 5 is applied where “0” is flawless.
The 3 assessments of “Microorganisms” represent: intensity-quantity-percentage

Result WRM – Weathering Reference Material	Exposure panels			Reference
	5	6	7	8
Before exposure				
Spreading rate, paint total g/m^2	266	256	277	251
Coating thickness µm EN ISO 2808 Meth. 6A				122
Gloss EN ISO 2813	20,1	20,8	21,0	24,5
Colour L EN ISO 18314-1 (45/0)	28,72	28,90	28,72	28,82
a	34,38	34,24	34,64	34,58
b	32,26	32,16	33,26	32,58
After exposure				
Blistering * EN ISO 4628-2	0	0	0	0
General appearance EN ISO 4628-1	1	1	1	0
Flaking * EN ISO 4628-5	0	0	0	0
Cracking * EN ISO 4628 -4	0	0	0	0
Chalking EN ISO 4628-6	1	1	1	0
Microorganisms EN 16492	1-1-1	1-1-1	1-1-1	0-0-0
After exposure and washing				
General appearance	1	1	1	0
Microorganisms	1-1-1	1-1-1	1-1-1	0-0-0
Gloss	2,9	2,9	2,8	11,5
Loss of gloss	17,2	17,9	18,2	13
Colour, L	34,58	34,88	34,65	29,84
a	23,85	23,88	23,87	34,21
b	16,35	16,46	16,46	32,38
Colour change ΔE	20,0	19,7	20,8	1,1
Adhesion * EN 927-3:2019 Annex A	0	1	0	0

Additional data

Applied amounts of primer and paint (g) on panels.
Coated area 375 mm x (80 mm + 20 mm + 20 mm) = 0,045 m^2

		05-11-2020	06-11-2020	09-11-2020	12-11-2020
	Panel	Primer	Paint	Paint	Paint
Test system	1	3,05	4,12	4,81	3,02
	2	3,87	4,34	5,03	3,78
	3	2,85	5,15	4,00	3,25
	4	2,65	4,88	3,84	4,15
WRM	5	2,96	3,84	4,98	3,15
	6	3,60	3,74	4,67	3,10
	7	3,57	3,91	5,02	3,52
	8	3,59	3,46	4,48	3,37

Measurements of paint film thickness on 3 chips from each unexposed panel

Sample	ex1	ex2	ex3	wrm1	wrm2	wrm3
Individual	131	161	125	138	150	87
measurements	144	155	133	176	130	112
µm	138	161	133	153	114	121
	133	169	141	139	103	99
	122	171		104	112	98
	122			127		103
	122					108
	122					
Mean	129	163	133	140	122	104
Mean total		142			122	

Venlig hilsen
Overfladeteknik

Peter Svane
Civilingeniør

Mob. 20216049