High Performance Bio-based Functional Coatings for Wood and Decorative Applications

Results on end-use applications

Webinar 5

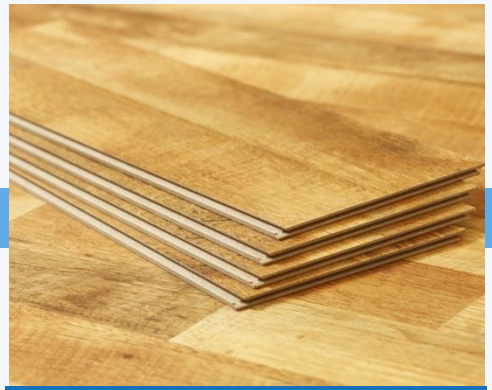
27 August 2024

This project receives funding from the Bio-based Industries Joint Undertaking (JU) under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101022370. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Bio-based Industries Consortium.

Results on end-use applications

Content

Test results in water-based wall and trim paints



Test results in UV curable wood coatings

Testing of basic properties in architectural coatings

Bio-based fillers: Assessment of the basic properties within an architectural coating formulation
Key properties: Decorative aspect / White color / Mechanical resistance

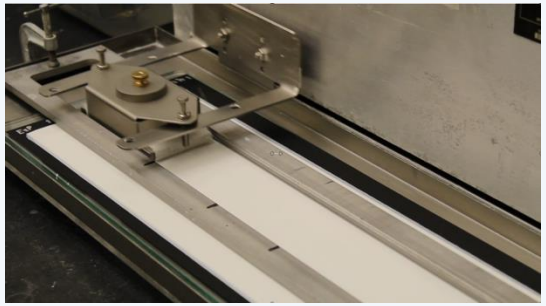
Test formulation: PVC 80 wall paint

Matt wall paint	Amount [g]
Water	42,76
TEGO® Dispers 711W	0,25
TEGO® Foamex 18	0,25
CALGON® N	0,05
NATROSOL™ 250BR	0,60
KRONOS® 2190	6,70
SOCAL® P3	12,56
LUZENAC® OOC	5,02
OMYACARB® 5 GU	23,44
ACRONAL® S790	8,37
TOTAL	100,00

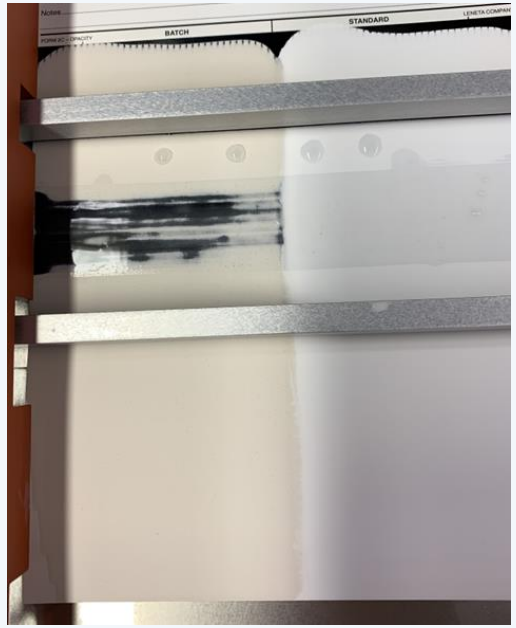
High filler content of 41%

Test equipment

Wet scrub tester



Test result



Color change and lower abrasion resistance of the prototype bio-based filler (left side) compared to the standard (right side)

Testing of basic properties in architectural coatings

Micro fibrillated cellulose (MFC) for Architectural Coatings

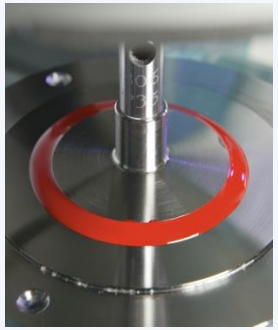
Evaluation of the effect of bio-based fibers (EXILVA®) on rheology and cracking resistance in architectural coatings

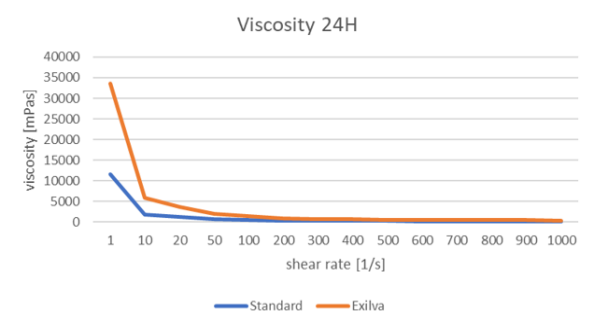
Test formulation: PVC 45 wall paint

Component	Standard	EXILVA®
Water	27.6	24,4
CALGON® N	0.1	0.1
Defoamer	0.3	0.3
TEGO® Dispers 715 W	0.3	0.3
TYLOSE® MH 30.000 YP 4	0.4	0
Ammonium hydroxide sol.(25 %)	0.1	0
EXILVA® F01 V, 10% a.m.	0	3.6
TIOXIDE® R-TC 90	9.0	9.0
OMYACARB® 10 GU	8.0	8.0
OMYACARB® 2 GU	8.0	8.0
OMYACARB® Extra CL	5.0	5.0
LUZENAC® OOC	2.0	2.0
SOCAL® P3	5.0	5.0
Dissolver 30 min.		
ACRONAL® S 790	32.0	32.0
Texanol	2.0	2.0
ACTICIDE® MBS	0.2	0.2
Associative thickener		1.7
Total	100.0	100.0

Test equipment & result rheology

Use of bio-based MFC allows to adjust the rheological profile in the desired way





Test result

Favourable cracking resistance of thick films

Standard formulation (TYLOSE®)
300 - 1500 µm 50°C

Formulation with Exilva
300 - 1500 µm 50°C

Testing of basic properties in architectural coatings

Bio-based pigments in water-based architectural coatings – architectural paints are often white but end consumers also want to be able to obtain various colors

Test formulation for a water-based pigment preparation

Component	Amount [g]
Demin. Water	44.4
ZETASPERSE® 3800	22.5
TEGO® Foamex 810	1.0
AMP-90	2.0
Pigment	30.0
Parmetol K6	0.1
Total	100.0
Additive solids on pigments [%]	30

Test equipment

Ultrasonic dispersion method established for small quantity bio-based pigment samples

Test result

Bio-based pigments NATU.RED® and SUSTAINLY.RED® provide quite intensive colors

Tinted base paint

Tinted clearcoat

Challenge:
Stability of color after long-term storage

Testing of Xylan materials in architectural coatings

Xylan (and modification) were tested as a co-binder in a 50:50 blend with the standard binder in water-based architectural coatings – film formation but also chemical and mechanical resistances are key properties that a binder needs to fulfill.

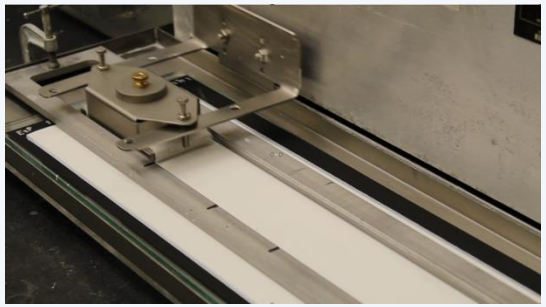
Test formulation for a water-based wall paint

Component	Amount [g]
Water	110,0
Dispersant	4,5
Defoamer	3,0
Associative thickener	7,0
Kronos 2310	200,0
Kaolin	50,0
Binder: Orgal P 838W (s.c. 46%)	476,7
DPnB	7,2
DPM	7,2
Wetting agent	0,1
TEGO® Foamex 1488	1,0
Water	127,8
Associative thickener : water: PG (1:1:1)	5,6
Total	**1000,0**

Test equipment

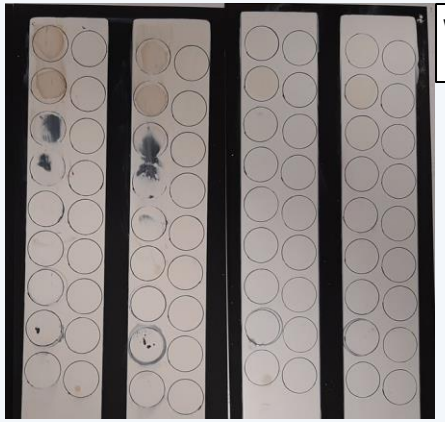
Chemical resistance

Wet scrub resistance tester



Test result

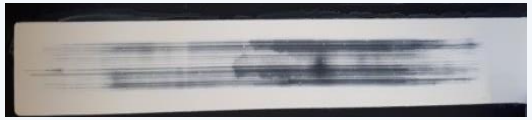
WB Binder + Xylan (50:50)



WB Binder (std)

WB Binder + Xylan (50:50)

20 cycles



WB Binder (std)

200 cycles

Challenge:
To extend the abrasion resistance

Thank you for your attention !