The project has received funding from the LIFE Programme of the European Union under GA number LIFE19 ENV/GR/000100

1. Scope

The purpose of this report is to provide detailed information of the most important physicochemical properties of the optimized photocatalytic decorative wall paints. We produced 3 different types of paint:

1. Organic (with organic binder)
2. Inorganic silicate paint (with potassium silicate binder)
3. Hybrid (with silicon-acrylic binder)

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Pigment volume concentration

Pigment volume concentration (PVC) is simply defined as the fractional (or percentage) volume of pigment in the total volume solids content of the dry paint film:

PVC=Vp / Vp+Vb (where V_p = pigment volume and V_b = binder volume)

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Critical Pigment Volume Concentration (CPVC)

As the PVC increases, many properties of a coating change abruptly. These changes occur at the CPVC. CPVC can be defined as the point at which there is just sufficient binder to provide a completely absorbed layer on the pigment surface as well as all the interstitial spaces between the pigment particles in a close-packed system.
The CPVC for a pigment combination can be calculated from the oil absorption (OA) provided that the OA value is based on a non-flocculated dispersion. OA is expressed as grams of linseed oil per 100 grams of pigment.

CPVC = 1/(1+ OAp/K)
where:
•CPVC - Critical Pigment Volume Concentration
•OA - Oil Absorbtion
•p - specific gravity of the pigment
•K - 100 x specific gravity of binder (for linseed oil is 0.935)

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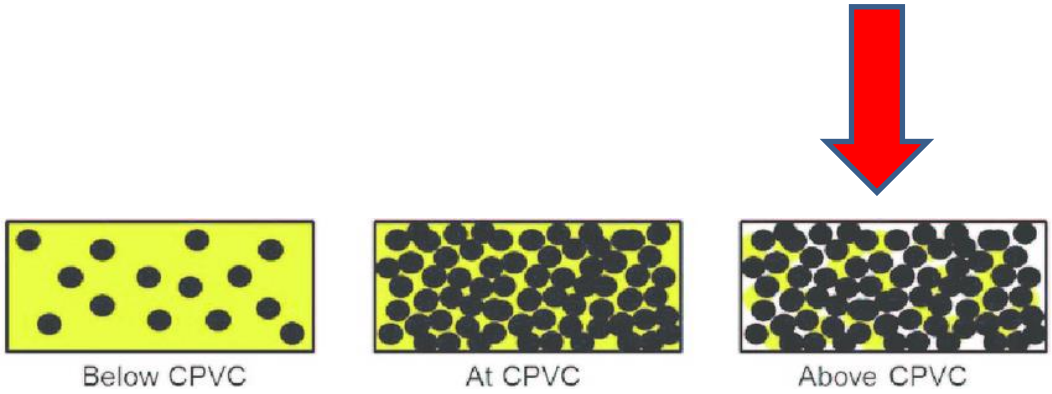

The concentration of the VISIONS 20 powder in these matrices in any case is between 5% to 20%, or even more. Formulations with organic binders have been designed with the intention of high surface porosity to help photo-paints action and the good all-around performance (appearance, gloss, easy of application, water scrub resistance etc). This means that the formulations are above the CPVC. The stability of the formulated paints in storage overtime will be checked in the lab using also accelerated methods (oven ~50o C, centrifuge, etc).

Note: If the PVC / CPVC ratio is low the wet scrub resistance is high, but not the porosity of course. If the PVC / CPVC ratio is very high, then chalking effect appears.

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LIFEVISIONS
InnoVative photocatalytic paintS
for healthy envirOnment and eNergy Saving

Organic photocatalytic paint	% W/W
PASTE	
WATER	23.00
ADDITIVES 1	1.28
TiO2 (pigment)	3.00
VISONS 20	5.00
FILLERS	49.20
(High speed disperse for 20')	
LET DOWN	
(Addition in low speed)	
ORGANIC BINDER (VA-VeoVA co-polymer 50% in water)	6.00
ADDITIVES 2	1.22
WATER	11.30
(Low speed disperse for 10')	
SUM	100.00

PVC = 0.87

CPVC = 0.66

PVC/CPVC = 1.32

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LIFEVISIONS
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	ΔΕΛΤΙΟ ΠΟΙΟΤΙΚΟΥ ΕΛΕΓΧΟΥ ΠΡΟΪΟΝΤΩΝ ΝΕΡΟΥ	Σελίδα 1

ΠΡΟΪΟΝ: Organic Photocatalytic paint	ΗΜ/ΝΙΑ ΠΟΙΟΤΙΚΟΥ: 7/6/21

Viscosity (cP) – BROOKFIELD RV VISCOMETER (SPINDLE #5#)

RPM	sec⁻¹	Accuracy +/-	Αραίωση 0%	Thixotropy Index= Viscosity 6 RPM / Viscosity 60 RPM	Αραίωση ... %	Thixotropy Index = Viscosity 6 RPM / Viscosity 60 RPM
6	0,1254	1000	17667	3.8		
60	1,254	100	4647			

ΣΤΕΡΕΑ (% w/w)	1η	-	2η	-	3η	-	μ.ο.	-

STORMER VISCOSITY ,25°C, (KU)	(αρχικό, 0% αραίωση):	109.7
	(% αραίωση):	
	μετά από 30ημέρες:	111.2
ICI C&P,25°C, (P)	(αρχικό, 0% αραίωση):	1.472
	(% αραίωση):	
	μετά από 30ημέρες:	1.479
pH	(αρχικό, 0% αραίωση):	7.12
	(% αραίωση):	
	μετά από 30 ημέρες:	
S.G (gr/ml)	(αρχικό, 0% αραίωση):	1.627
	(% αραίωση):	
OPACITY_CR	(αρχικό, 0% αραίωση):	96.56
	(% αραίωση):	
ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM E313,120μm):		85.41
ΔΕΙΚΤΗΣ κιτρινίσματος (Yi ASTM E313,120μm):		1.40

ΧΡΩΜΑ (L*, a*,b* CIELAB 1976, 120μm)	L*	a*	b*
(0% αραίωση):	96.06	-0.32	0.68
(% αραίωση):			

ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ:	Όχι
ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΛΩΜΑ:	Όχι
ALKALI RESISTANCE:	O.K
WATER SPOT RESISTANCE:	O.K
MUD CRACKING RESISTANCE:	N/T
SNAIL TRAIL:	N/T
WET-SCRUB RESISTANCE:	N/T (no chalking effect)
SHEEN 85°:	1.5
COMPATIBILITY PROBLEMS:	Όχι
FOAMING DEFECTS:	Όχι

ΠΑΡΑΤΗΡΗΣΕΙΣ: Storage stability O.K. (06/07/2021)

FQP.04.01_02 E:1 27.01.20

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LIFEVISIONS
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Inorganic photocatalytic paint	% W/W
PASTE	
WATER	20.00
ADDITIVES 1	1.05
TiO2 (pigment)	5.00
VISIONS 20	5.00
FILLERS	32.50
(High speed disperse for 20')	
LET DOWN	
(Addition in low speed)	
ORGANIC BINDER (Styrene Acrylic co-polymer 50% in water)*	5.00
SILICATE BINDER (Potasium Silicate 30% in water)	15.50
ADDITIVES 2	0.50
WATER	15.45
(Low speed disperse for 10')	
SUM	100.00

* Organic binder should not exceed 5% solids W/W

PVC (without calculating silicate binder) = 0.86

CPVC (without calculating silicone binder)= 0.61

PVC/CPVC (without calculating silicone binder)= 1.41

PVC (with calculating silicone binder) = 0.68

CPVC (with calculating silicone binder)= 0.61

PVC/CPVC (with calculating silicone binder)= 1.11

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LIFEVISIONS
InnoVative photocatalytIc paintS for healthy envirOnment and eNergy Saving

	ΔΕΛΤΙΟ ΠΟΙΟΤΙΚΟΥ ΕΛΕΓΧΟΥ ΠΡΟΪΟΝΤΩΝ ΝΕΡΟΥ	Σελίδα 1

ΠΡΟΪΟΝ: inorganic photocatalytic paint	ΗΜ/ΝΙΑ ΠΟΙΟΤΙΚΟΥ: 20/7/21

Viscosity (cP) - BROOKFIELD RV VISCOMETER (SPINDLE #5#)

RPM	sec^{-1}	Accuracy +/-	Αραίωση 0%	Thixotropy Index= Viscosity 6 RPM / Viscosity 60 RPM	Αραίωση	Thixotropy Index = Viscosity 6 RPM / Viscosity 60 RPM
6	0,1254	1000	9887	7.49		
60	1,254	100	1320			

ΣΤΕΡΕΑ (% w/w)	1η	-	2η	-	3η	-	μ.ο.	-

STORMER VISCOSITY ,25°C, (KU)	(αρχικό, 0% αραίωση):	70.4	
	(% αραίωση):		
	μετά από 30ημέρες:	71.1	
ICI C&P,25°C, (P)	(αρχικό, 0% αραίωση):	0.882	
	(% αραίωση):		
	μετά από 30ημέρες:	0.901	
pH	(αρχικό, 0% αραίωση):	11.75	
	(% αραίωση):		
	μετά από 30 ημέρες:	11.78	
S.G (gr/ml)	(αρχικό, 0% αραίωση):	1,4312	
	(% αραίωση):		
OPACITY_CR	(αρχικό, 0% αραίωση):	94.52	
	(% αραίωση):		
ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM E313,120μm):		88.42	
ΔΕΙΚΤΗΣ κιτρινίσματος (Yi ASTM E313,120μm):		0.58	

		L*	a*	b*
ΧΡΩΜΑ (L*, a*,b* CIELAB 1976, 120μm)	(0% αραίωση):	96.43	-0,41	0.47
	(% αραίωση):			

ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ:	Όχι
ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΛΩΜΑ:	Όχι
ALKALI RESISTANCE:	O.K
WATER SPOT RESISTANCE:	O.K
MUD CRACKING RESISTANCE:	N/T
SNAIL TRAIL:	N/T
WET-SCRUB RESISTANCE:	Class 3
SHEEN 85°:	0.7
COMPATIBILITY PROBLEMS:	Όχι
FOAMING DEFECTS:	Όχι
ΠΑΡΑΤΗΡΗΣΕΙΣ: Storage stability O.K. (23/08/2021)	

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Hybrid photocatalytic paint	% W/W
PASTE	
WATER	16.00
ADDITIVES 1	1.10
TiO2 (pigment)	13.50
VISIONS 20	5.00
FILLERS	24.60
(High speed disperse for 20')	
LET DOWN	
(Addition in low speed)	
ORGANIC BINDER (Acrylic co-polymer 50% in water)*	12.70
SILICONE BINDER	8.15
ADDITIVES 2	1.80
WATER	17.15
(Low speed disperse for 10')	
SUM	100.00

PVC (without calculating silicone binder) = 0.69
CPVC (without calculating silicone binder)= 0.60
PVC/CPVC (without calculating silicone binder)= 1.15

PVC (with calculating silicone binder) = 0.56
CPVC (with calculating silicone binder)= 0.60
PVC/CPVC (with calculating silicone binder)= 0.93

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LIFEVISIONS
InnoVative photocatalytic paintS for healthy envirOnment and eNergy Saving

	ΔΕΛΤΙΟ ΠΟΙΟΤΙΚΟΥ ΕΛΕΓΧΟΥ ΠΡΟΪΟΝΤΩΝ ΝΕΡΟΥ	Σελίδα 1

ΠΡΟΪΟΝ: Hybrid photocatalytic paint	ΗΜ/ΝΙΑ ΠΟΙΟΤΙΚΟΣ: 21/06/21

Viscosity (cP) - BROOKFIELD RV VISCOMETER (SPINDLE #S#)

RPM	sec⁻¹	Accuracy +/-	Αραίωση 0%	Thixotropy Index= Viscosity 6 RPM / Viscosity 60 RPM	Αραίωση 10,97%	Thixotropy Index = Viscosity 6 RPM / Viscosity 60 RPM
6	0,1254	1000	47067	-	15133	4,58
60	1,254	100	-		3300	

ΣΤΕΡΕΑ (% w/w)	1η	-	2η	-	3η	-	μ.ο.	-

STORMER VISCOSITY ,25°C, (KU)	(αρχικό, 0% αραίωση):	Above limits		
	(10,97% αραίωση):	95		
	μετά από 30ημέρες:	97		
ICI C&P,25°C, (P)	(αρχικό, 0% αραίωση):	1,852		
	(10,97 % αραίωση):	0,778		
	μετά από 30ημέρες:	1.85		
pH	(αρχικό, 0% αραίωση):	7,88		
	(% αραίωση):			
	μετά από 30 ημέρες:	7.85		
S.G (gr/ml)	(αρχικό, 0% αραίωση):	1,464		
	(10,97 % αραίωση):			
OPACITY_CR	(αρχικό, 0% αραίωση):	96,29		
	(10,97 % αραίωση):	93,19		
ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM E313,120μm):		83,12		
ΔΕΙΚΤΗΣ κιτρινίσματος (Yi ASTM E313,120μm):		1,71		
		L*	a*	b*
ΧΡΩΜΑ (L*, a*,b* CIELAB 1976, 120μm)	(0% αραίωση):	95,72	-0,57	1,13
	(10,97 % αραίωση):	95,42	-0,46	0,94

ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ:	Όχι
ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΛΩΜΑ:	Όχι
ALKALI RESISTANCE:	O.K
WATER SPOT RESISTANCE:	O.K
MUD CRACKING RESISTANCE:	N/T
SNAIL TRAIL:	N/T
WET-SCRUB RESISTANCE:	Class 2
SHEEN 85°:	1.1
COMPATIBILITY PROBLEMS:	Όχι
FOAMING DEFECTS:	Όχι

ΠΑΡΑΤΗΡΗΣΕΙΣ: Storage stability O.K. (20/07/2021)

FQP.04.01_02 E:1 27.01.20

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Suitability criteria for interior decorative wall paint

Density depending on the formulation type ASTM D 1475, ISO 2811/1.

Thixotropy Index > 3 (for enough thixotropy during storage and application) ASTM D 2196

STORMER VISCOSITY ,25^{0}C, (KU) = 90±20 (to be normally mixed) ASTM D 562-81

ICI C&P,25^{0}C, (P) = 0.7 – 2.0 (for easy roller application) ASTM D4287

pH depending on the formulation type ASTM E70, ISO 976

OPACITY_CR > 93 photometer measurement (to have good spreading rate and covering capacity)

Whiteness Index > 79 photometer measurement (to be white paint)

Yellowness Index < 3 photometer measurement (to be white paint)

L* value > 95 photometer measurement (to be white paint)

Odor: should be almost odorless (to be user friendly)

Gloss 85^0 < 12 (to be a matt wall paint and < 5 for dead matt) ASTM D 523, ISO 2813.

Visual problems: without compatibility and foaming defects

%W/W Solids depending on the formulation ASTM D 1640, ISO 3251.

Storage stability test: No defects, hard sedimentation, thickening or thinning, coagulations etc., after 1 month in oven @ 50^{o}C

If washability of the paint is desired, wet scrub resistance should be class 3 or better ISO 11998, ISO EN 13300

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RESULTS OF PHOTOCATALYTIC ACTIVITY FOR THE 3 FORMULATIOS

We send 4 samples of paints for NOx reduction measurements

Vitex 3 is a competitor product (Sto Climasan)

Vitex code 1_7/6/21 is the organic formulation

Vitex code Ac-Sil is the Hybrid formulation

Vitex code Silicate is the inorganic formulation

NCSRD code	VITEX code	%	
		UV LAMP	VISIBLE LAMP
VisionsPaint_1	Vitex_3	7,54	2,87
VisionsPaint_2	1_7/6/21	4,13	1,45
VisionsPaint_5	Ac-Sil	0,91	0,33
VisionsPaint_6	Silicate	0,71	0,21

None of the products has good photocatalytic activity, so new formulations needed. The competitive paint has also limited activity.

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Organic photocatalytic paint 15% V20	% W/W
PASTE	
WATER	23.00
ADDITIVES 1	1.28
TiO2 (pigment)	3.00
VISONS 20	15.00
FILLERS	39.20
(High speed disperse for 20')	
LET DOWN	
(Addition in low speed)	
ORGANIC BINDER (VA-VeoVA co-polymer 50% in water)	6.00
ADDITIVES 2	1.22
WATER	11.30
(Low speed disperse for 10')	
SUM	100.00

PVC = 0.87

CPVC = 0.66

PVC/CPVC = 1.32

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LIFEVISIONS
InnoVative photocatalytic paintS for healthy envirOnment and eNergy Saving

ΠΡΟΪΟΝ: φωτοκαταλυτικό οργανικό με 15% V20	ΗΜ/ΝΙΑ ΠΟΙΟΤΙΚΟΥ: 07/06/2021

Viscosity (cP) - BROOKFIELD RV VISCOMETER (SPINDLE #5#)

RPM	sec $^{-1}$	Accuracy +/-	Αραίωση 0%	Thixotropy Index= Viscosity 6 RPM / Viscosity 60 RPM	Αραίωση ... %	Thixotropy Index = Viscosity 6 RPM / Viscosity 60 RPM
6	**0,1254**	1000	39667	6,78		
60	**1,254**	100	5847			

ΣΤΕΡΕΑ (% w/w)	1η		2η		3η		**μ.ο.**	

STORMER VISCOSITY ,25^{o}C, (KU)	*(αρχικό, 0% αραίωση):*	**108,0**		
	(% αραίωση):			
	μετά από 30ημέρες:			
ICI C&P,25^{o}C, (P)	*(αρχικό, 0% αραίωση):*	**0,98**		
	(% αραίωση):			
	μετά από 30ημέρες:			
pH	*(αρχικό, 0% αραίωση):*	-		
	(% αραίωση):			
	μετά από 30 ημέρες:			
S.G (gr/ml)	*(αρχικό, 0% αραίωση):*	**1,401**		
	(% αραίωση):			
OPACITY_CR	*(αρχικό, 0% αραίωση):*	**92,61**		
	(% αραίωση):			
ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM E313,120μm):		**89,34**		
ΔΕΙΚΤΗΣ κιτρινίσματος (Yi ASTM E313,120μm):		**-0,08**		
ΧΡΩΜΑ (L*, a*,b* CIELAB 1976, 120μm)		**L***	**a***	**b***
	(0% αραίωση):	**95,90**	**-0,29**	**0,07**
	(% αραίωση):			

ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ:	OXI
ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΛΩΜΑ:	OXI
ALKALI RESISTANCE:	O.K
WATER SPOT RESISTANCE:	O.K
MUD CRACKING RESISTANCE:	O.K
SNAIL TRAIL:	O.K
WET-SCRUB RESISTANCE:	Class 3
SHEEN 85^{o}:	0.9GU
COMPATIBILITY PROBLEMS:	OXI
FOAMING DEFECTS:	OXI
ΠΑΡΑΤΗΡΗΣΕΙΣ	

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LIFEVISIONS
InnoVative photocatalytic paintS
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Organic photocatalytic paint 10% V20	% W/W
PASTE	
WATER	23.00
ADDITIVES 1	1.28
TiO2 (pigment)	3.00
VISONS 20	10.00
FILLERS	41.20
(High speed disperse for 20')	
LET DOWN	
(Addition in low speed)	
ORGANIC BINDER (VA-VeoVA co-polymer 50% in water)	6.00
ADDITIVES 2	1.22
WATER	11.30
(Low speed disperse for 10')	
SUM	100.00

PVC = 0.87

CPVC = 0.66

PVC/CPVC = 1.32

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LIFEVISIONS
InnoVative photocatalytic paintS for healthy envirOnment and eNergy Saving

ΠΡΟΪΟΝ: φωτοκαταλυτικό οργανικό με 10% V20	ΗΜ/ΝΙΑ ΠΟΙΟΤΙΚΟΥ: 08/06/2021

Viscosity (cP) - BROOKFIELD RV VISCOMETER (SPINDLE #5#)

RPM	sec $^{-1}$	Accuracy +/-	Αραίωση 0%	Thixotropy Index= $\frac{Viscosity\ 6\ RPM}{Viscosity\ 60\ RPM}$	Αραίωση ... %	Thixotropy Index = $\frac{Viscosity\ 6\ RPM}{Viscosity\ 60\ RPM}$
6	0,1254	1000	39667	6,78		
60	1,254	100	5847			

ΣΤΕΡΕΑ (% w/w)	1η		2η		3η		μ.ο.	
STORMER VISCOSITY ,25°C, (KU)	*(αρχικό, 0% αραίωση):*			104,0				
	(% αραίωση):							
	μετά από 30ημέρες:							
ICI C&P,25°C, (P)	*(αρχικό, 0% αραίωση):*			0,96				
	(% αραίωση):							
	μετά από 30ημέρες:							
pH	*(αρχικό, 0% αραίωση):*			-				
	(% αραίωση):							
	μετά από 30 ημέρες:							
S.G (gr/ml)	*(αρχικό, 0% αραίωση):*			1,3999				
	(% αραίωση):							
OPACITY_CR	*(αρχικό, 0% αραίωση):*			92,52				
	(% αραίωση):							
ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM E313,120μm):				89,34				
ΔΕΙΚΤΗΣ κιτρινίσματος (Yi ASTM E313,120μm):				-0,08				
ΧΡΩΜΑ (L*, a*,b* CIELAB 1976, 120μm)				L*	a*	b*		
	(0% αραίωση):			95,90	-0,29	0,07		
	(% αραίωση):							

ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ:	OXI
ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΛΩΜΑ:	OXI
ALKALI RESISTANCE:	O.K
WATER SPOT RESISTANCE:	O.K
MUD CRACKING RESISTANCE:	O.K
SNAIL TRAIL:	O.K
WET-SCRUB RESISTANCE:	Class 3
SHEEN 85°:	0.9GU
COMPATIBILITY PROBLEMS:	OXI
FOAMING DEFECTS:	OXI
ΠΑΡΑΤΗΡΗΣΕΙΣ	

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RESULTS OF PHOTOCATALYTIC ACTIVITY FOR THE 2 NEW ORGANIC FORMULATIOS

We send the 2 samples of organic paints for NOx reduction measurements

Vitex code 2_7/6/21 is the organic formulation with 15% V20

Vitex code 1_13/7/21 is the organic formulation with 10% V20

DATE received	NCSRD code	VITEX code	%	
			UV LAMP	VISIBLE LAMP
14/06/2021	VisionsPaint_3	2_7/6/21	61,0	13,1
16/07/2021	VisionsPaint_4	1_13/7/21	34,6	9,08

The photocatalytic activity, has been increased especially with 15% V20.

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LIFEVISIONS
InnoVative photocatalytic paintS for healthy envirOnment and eNergy Saving

Organic photocatalytic paint 20% V20	% W/W
PASTE	
WATER	23.00
ADDITIVES 1	1.28
TiO2 (pigment)	3.00
VISONS 20	20.00
FILLERS	21.20
(High speed disperse for 20')	
LET DOWN	
(Addition in low speed)	
ORGANIC BINDER (VA-VeoVA co-polymer 50% in water)	6.00
ADDITIVES 2	1.22
WATER	11.30
(Low speed disperse for 10')	
SUM	100.00

PVC = 0.87

CPVC = 0.66

PVC/CPVC = 1.32

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LIFEVISIONS
InnoVative photocatalytic paintS for healthy envirOnment and eNergy Saving

ΠΡΟΪΟΝ: φωτοκαταλυτικό οργανικό με 20% V20	ΗΜ/ΝΙΑ ΠΟΙΟΤΙΚΟΥ: 17/09/2021

Viscosity (cP) - BROOKFIELD RV VISCOMETER (SPINDLE #5#)											
RPM	sec $^{-1}$	Accuracy +/-	Αραίωση 0%		Thixotropy Index= $\frac{Viscosity\ 6\ RPM}{Viscosity\ 60\ RPM}$		Αραίωση ... %		Thixotropy Index $= \frac{Viscosity\ 6\ RPM}{Viscosity\ 60\ RPM}$	
6	0,1254	1000	39667		6,78					
60	1,254	100	5847							
ΣΤΕΡΕΑ (% w/w)			1η		2η		3η		μ.ο.	
STORMER VISCOSITY ,25°C, (KU)			(αρχικό, 0% αραίωση):		108,0					
			(% αραίωση):							
			μετά από 30ημέρες:							
ICI C&P,25°C, (P)			(αρχικό, 0% αραίωση):		1.10					
			(% αραίωση):							
			μετά από 30ημέρες:							
pH			(αρχικό, 0% αραίωση):		-					
			(% αραίωση):							
			μετά από 30 ημέρες:							
S.G (gr/ml)			(αρχικό, 0% αραίωση):		1,412					
			(% αραίωση):							
OPACITY_CR			(αρχικό, 0% αραίωση):		93,52					
			(% αραίωση):							
ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM E313,120μm):					89,34					
ΔΕΙΚΤΗΣ κιτρινίσματος (Yi ASTM E313,120μm):					-0,08					
ΧΡΩΜΑ (L*, a*,b* CIELAB 1976, 120μm)					L*		a*		b*	
			(0% αραίωση):		95,90		-0,29		0,07	
			(% αραίωση):							

ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ:	ΟΧΙ
ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΛΩΜΑ:	ΟΧΙ
ALKALI RESISTANCE:	Ο.Κ
WATER SPOT RESISTANCE:	Ο.Κ
MUD CRACKING RESISTANCE:	Ο.Κ
SNAIL TRAIL:	Ο.Κ
WET-SCRUB RESISTANCE:	Class 3
SHEEN 85°:	0.7GU
COMPATIBILITY PROBLEMS:	ΟΧΙ
FOAMING DEFECTS:	ΟΧΙ
ΠΑΡΑΤΗΡΗΣΕΙΣ	

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LIFEVISIONS
InnoVative photocatalytic paintS for healthy envirOnment and eNergy Saving

RESULTS OF PHOTOCATALYTIC ACTIVITY FOR THE 3rd NEW ORGANIC FORMULATION

We send the sample of organic paints for NOx reduction measurements

Vitex code 60 is the paint applied in 60μm wet film thickness

Vitex code 120 is the paint applied in 120μm wet film thickness

Vitex code Roller application is the paint applied with roller

DATE received	NCSRD code	VITEX code	%	
			UV LAMP	VISIBLE LAMP
23/09/2021	VisionsPaint_7	60	84,2	19,1
23/09/2021	VisionsPaint_8	120	84,9	18,8
23/09/2021	VisionsPaint_9	Roller application	83,5	21,5

The photocatalytic activity, is now important. The activity is not affected severely from the film thickness or the application method.
Note: All the previous samples were examined in a wet film thickness of 60μm only.

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LIFEVISIONS
InnoVative photocatalytic paintS for healthy envirOnment and eNergy Saving

Inorganic photocatalytic paint with 20% V20	% W/W
PASTE	
WATER	20.00
ADDITIVES 1	1.05
TiO2 (pigment)	5.00
VISIONS 20	20.00
FILLERS	17.50
(High speed disperse for 20')	
LET DOWN	
(Addition in low speed)	
ORGANIC BINDER (Styrene Acrylic co-polymer 50% in water)*	5.00
SILICATE BINDER (Potasium Silicate 30% in water)	15.50
ADDITIVES 2	0.50
WATER	15.45
(Low speed disperse for 10')	
SUM	100.00

* Organic binder should not exceed 5% solids W/W

PVC (without calculating silicate binder) = 0.86

CPVC (without calculating silicone binder)= 0.61

PVC/CPVC (without calculating silicone binder)= 1.41

PVC (with calculating silicone binder) = 0.68

CPVC (with calculating silicone binder)= 0.61

PVC/CPVC (with calculating silicone binder)= 1.11

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LIFEVISIONS
InnoVative photocatalytIc paintS for healthy envirOnment and eNergy Saving

ΠΡΟΪΟΝ: Silicate paint with 20% V20 3/11/21	ΗΜ/ΝΙΑ ΠΟΙΟΤΙΚΟΥ: 4/11/21

Viscosity (cP) - BROOKFIELD RV VISCOMETER (SPINDLE #5#)

RPM	sec $^{-1}$	Accuracy +/-	Αραίωση 0%	Thixotropy Index= $\frac{Viscosity\ 6\ RPM}{Viscosity\ 60\ RPM}$	Αραίωση ... %	Thixotropy Index $= \frac{Viscosity\ 6\ RPM}{Viscosity\ 60\ RPM}$
6	0,1254	1000	2733	4.55		
60	1,254	100	600			

ΣΤΕΡΕΑ (% w/w)	1η		2η		3η		μ.ο.	

STORMER VISCOSITY ,25°C, (KU)	(αρχικό, 0% αραίωση):	93.5		
	(% αραίωση):			
	μετά από 30ημέρες:			
ICI C&P,25°C, (P)	(αρχικό, 0% αραίωση):	0.9		
	(% αραίωση):			
	μετά από 30ημέρες:			
pH	(αρχικό, 0% αραίωση):	10.69		
	(% αραίωση):			
	μετά από 30 ημέρες:			
S.G (gr/ml)	(αρχικό, 0% αραίωση):	1.53932		
	(% αραίωση):			
OPACITY_CR	(αρχικό, 0% αραίωση):	933.83		
	(% αραίωση):			
ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM E313,120μm):		85.49		
ΔΕΙΚΤΗΣ κιτρινίσματος (Yi ASTM E313,120μm):		1.21		
		L*	a*	b*
ΧΡΩΜΑ (L*, a*,b* CIELAB 1976, 120μm)	(0% αραίωση):	95.79	-0.23	0.72
	(% αραίωση):			

ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ:	OXI
ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΛΩΜΑ:	OXI
ALKALI RESISTANCE:	O.K
WATER SPOT RESISTANCE:	O.K
MUD CRACKING RESISTANCE:	O.K
SNAIL TRAIL:	O.K
WET-SCRUB RESISTANCE:	Class 3
SHEEN 85°:	1.7
COMPATIBILITY PROBLEMS:	OXI
FOAMING DEFECTS:	OXI
ΠΑΡΑΤΗΡΗΣΕΙΣ :	

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RESULTS OF PHOTOCATALYTIC ACTIVITY FOR THE 2nd NEW INORGANIC FORMULATION

We send the sample of the new inorganic paint for NOx reduction measurements

Vitex code 90 inorganic is the paint applied in 90μm wet film thickness

Vitex code 120 inorganic is the paint applied in 120μm wet film thickness

DATE received	NCSRD code	VITEX code	%	
			UV LAMP	VISIBLE LAMP
30/11/2021	VisionsPaint_10	90 inorganic	64,5	11,4
30/11/2021	VisionsPaint_11	120 inorganic	66,4	11,9

The photocatalytic activity, is now important. The activity is not affected severely from the film thickness.
Note: We can procced to another improved formulation by increasing the P.V.C of the paint formulation in order to achieve 20% NOx reduction in visible light

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New formulations of the inorganic and hybrid paint.

Since last year, it was not possible to increase the V20 content in the hybrid paint. All the formulations with more than 5% V20 had storage stability product. V20 in high quantity is incompatible with the binders system . So, we couldn't procced with the hybrid technology. During 2023 that the pandemic has almost finished, we were able to travel to Germany and Spain and visit BASF and Wacker in Germany and Cromogenia in Spain. All these companies have intensive knowledge in the production and optimization of hybrid and inorganic binders. With their collaboration we try to make a stable photocatalytic hybrid paint.

At the other hand, the inorganic formulation even with 20% V20 was stable.

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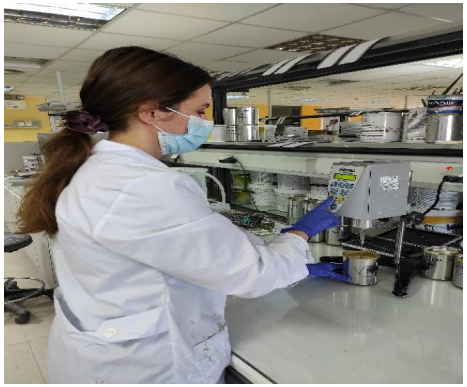
Photos:

Disperser (used to produce paints)



Brookfield Viscosity

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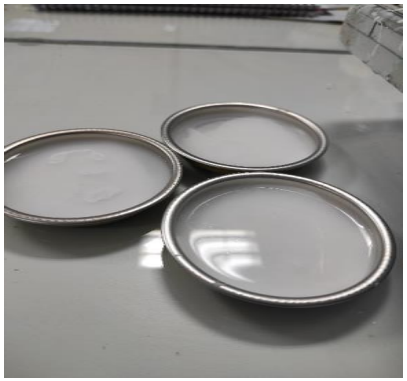
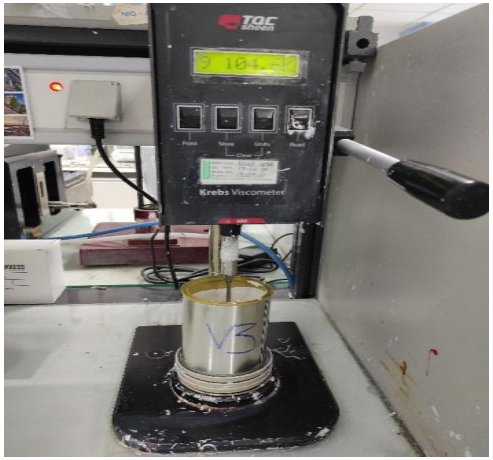


Solids % (W/W)



Stormer Viscosity (Krebs Units)

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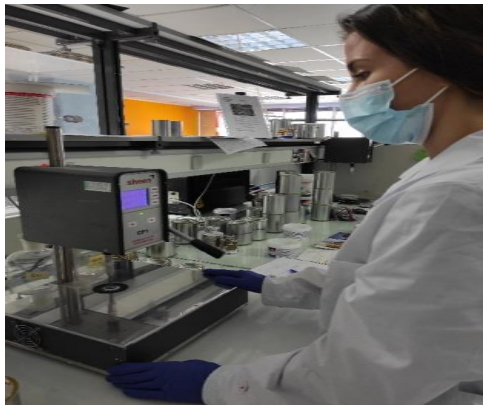
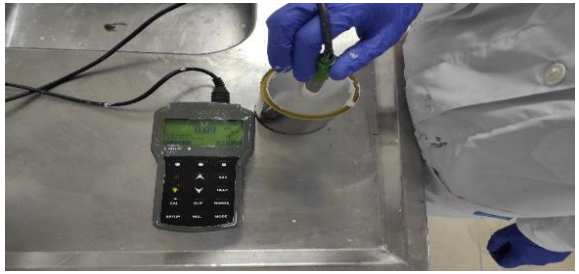


ICI Viscosity



pH-meter

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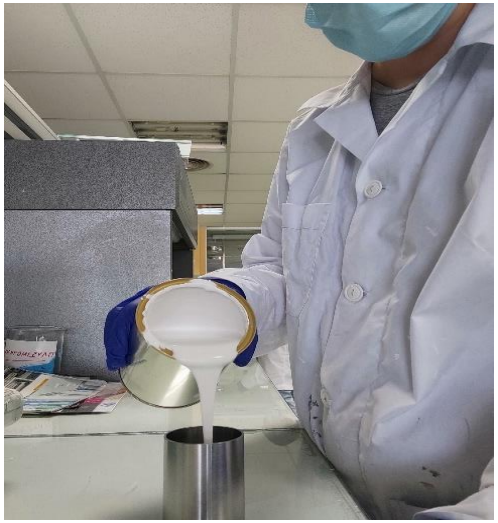
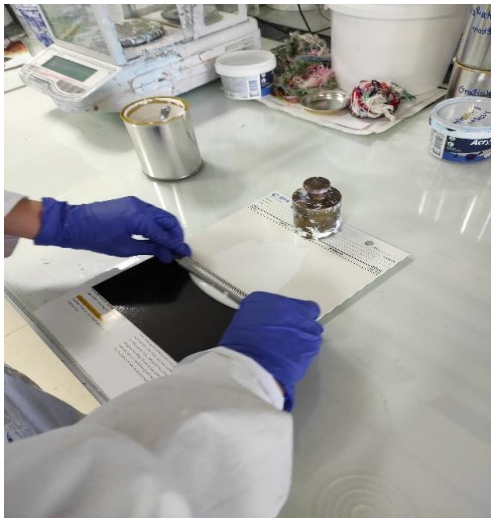
the European Union under GA number LIFE19 ENV/GR/000100



SG Density cup



Paint application

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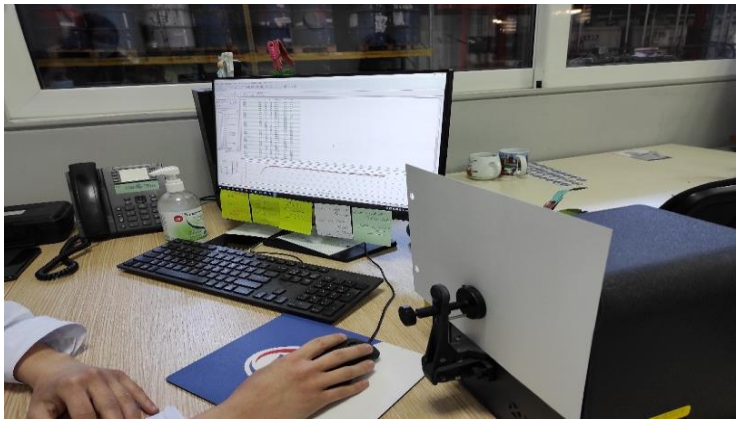

Photometer (OPACITY_CR/ Whiteness Index/ Yellowness Index/ Color)

Gloss

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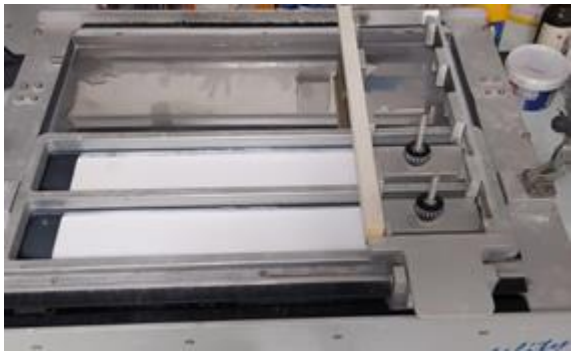

Wet scrub resistance machine

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THANK YOU