

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)



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)



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.

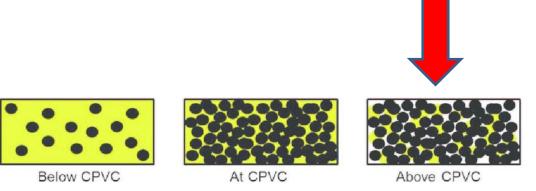
CPVC = 1/(1 + OAp/K)

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)







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.

Chalking:

Chalking may give the appearance of color fading





| 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





| | (itex) | ΔΕΛΤΙΟ ΠΟΙΟΤΙΚΟΥ ΕΛΕΓΧΟΥ ΠΡΟΪΟΝΤΩΝ ΝΕΡΟΥ | Σελίδα 1 |
|--|--------|--|----------|
|--|--------|--|----------|

| Viscosity (cP) - BROOKFIELD RV VISCOMETER (SPINDLE #S#) | проїон: | Organic F | hotocataly | ytic paint | | HM/NIA [| тоютікоў | /: 7/6/21 | | | |
|---|--|------------|--------------|----------------|--------------|----------------|-------------|-----------|-------|--------|-----------|
| RPM Sec. Apaiwon O% Viscosity 6 RPM Apaiwon % = Viscosity 6 RPM Viscosity 9 RPM | | | Viscos | ity (cP) - | BROOKFIE | ISCOMETE | R (SPINDI | LE #5#) | | | |
| STEPEA (% w/w) | RPM | sec-1 | | Αραίο | υση 0% | Viscosi | ty 6 RPM | Αραίωσ | η % | Viscos | ity 6 RPM |
| 1.254 100 4647 ΣΤΕΡΕΑ (% w/w) 1 ⁿ - 2 ⁿ - 3 ⁿ - μ.ο (αρχικό, 0% αραίωση): 109.7 (αρχικό, 0% αραίωση): 111.2 (αρχικό, 0% αραίωση): 1.472 (αρχικό, 0% αραίωση): 1.472 (αρχικό, 0% αραίωση): 1.479 (αρχικό, 0% αραίωση): 7.12 pH (% αραίωση): μετά από 30ημέρες: 1.479 (αρχικό, 0% αραίωση): 7.12 (αρχικό, 0% αραίωση): 7.12 (αρχικό, 0% αραίωση): 1.627 (αρχικό, 0% αραίωση): 96.56 ΟΡΑCITY_CR (αρχικό, 0% αραίωση): 96.56 ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM Ε313,120μm): 85.41 ΔΕΙΚΤΗΣ κτιρινίσματος (Yi ASTM Ε313,120μm): 1.40 ΧΡΩΜΑ (L*, a*,b* (| 6 | 0,1254 | 1000 | 17 | 667 | | | | | | |
| (αρχικό, 0% αραίωση): 109.7 | | | | | | | | | | | |
| STORMER VISCOSITY ,25°C, (KU) (% αραίωση): 111.2 μετά από 30ημέρες: 111.2 (αρχικό, 0% αραίωση): 1.472 μετά από 30ημέρες: 1.479 (αρχικό, 0% αραίωση): 7.12 μετά από 30 ημέρες: S.G (gr/ml) (% αραίωση): (αρχικό, 0% αραίωση): 1.627 (% αραίωση): 96.56 ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM E313,120μm): 85.41 ΔΕΙΚΤΗΣ κευρινίσματος (Yi ASTM E313,120μm): 1.40 ΧΡΩΜΑ (L*, a*,b* (0% αραίωση): 96.06 -0.32 0.68 ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ: Όχι ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΛΩΜΑ: Όχι ΑΙΚΑΙΙ RESISTANCE: Ο.Κ WATER SPOT RESISTANCE: Ο.Κ | ETEPEA (| % w/w) | | 1 ^η | - | 2 ^η | - | 31 | - | μ.ο. | - |
| μετά από 30ημέρες: 111.2 (αρχικό, 0% αραίωση): 1.472 (αρχικό, 0% αραίωση): 1.472 (% αραίωση): μετά από 30ημέρες: 1.479 (αρχικό, 0% αραίωση): 7.12 (% αραίωση): μετά από 30 ημέρες: (% αραίωση): μετά από 30 ημέρες: (% αραίωση): (% αρ | | | | (a | ρχικό, 0% αμ | οαίωση): | | | 109.7 | | |
| (αρχικό, 0% αραίωση): 1.472 1.479 1.627 1.6 | STORME | R VISCOSIT | ry ,25°C, (K | U) (| % ац | οαίωση): | | | | | |
| ICI C&P,25°C, (P) | | | | P | ετά από 30η | ημέρες: | | | 111.2 | | |
| μετά από 30ημέρες: 1.479 (αρχικό, 0% αραίωση): 7.12 (% αραίωση): (% αραίωση): (% αραίωση): (% αραίωση): (αρχικό, 0% αραίωση): (αρχικό, 0% αραίωση): (αρχικό, 0% αραίωση): (αρχικό, 0% αραίωση): 96.56 (% αραίωση): (αρχικό, 0% αραίωση): (αρχικό, | | | | (a | ρχικό, 0% αρ | οαίωση): | | | 1.472 | | |
| (αρχικό, 0% αραίωση): 7.12 (% αραίωση): | ICI C&P,2 | 25°C, (P) | | (| % ад | οαίωση): | | | | | |
| Ph | | | | P | ετά από 30η | ημέρες: | | | 1.479 | | |
| μετά από 30 ημέρες: 1.627 (αρχικό, 0% αραίωση): 1.627 (% αραίωση): (αρχικό, 0% αραίωση): 96.56 (% αραίωση): 96.56 (% αραίωση): 1.40 (% αραίωση): (ανχικότητας (Wi ASTM E313,120μm): 1.40 (ανχικότητας (Yi ASTM E313,120μm): (ανχικότητας (Yi ASTM E313, | | | | (a | ρχικό, 0% αρ | οαίωση): | | | 7.12 | | |
| S.G (gr/ml) (αρχικό, 0% αραίωση): 1.627 (% αραίωση): 96.56 ΟΡΑCΙΤΥ_CR (αρχικό, 0% αραίωση): 96.56 ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM E313,120μm): 85.41 ΔΕΙΚΤΗΣ κιτρινίσματος (Yi ASTM E313,120μm): 1.40 ΣΡΩΜΑ (L*, a*,b* (0% αραίωση): 96.06 -0.32 0.68 (% αραίωση): 96.06 -0.32 0.68 ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ: Όχι ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΑΩΜΑ: Όχι ΑΙΚΑΙΙ RESISTANCE: Ο.Κ | pH | | | (| % ац | οαίωση): | | | | | |
| (% αραίωση): OPACITY_CR (αρχικό, 0% αραίωση): (βαραίωση): ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM E313,120μm): ΔΕΙΚΤΗΣ κιτρινίσματος (Yi ASTM E313,120μm): 1.40 ΣΡΩΜΑ (L*, a*,b* (0% αραίωση): 96.06 -0.32 0.68 (% αραίωση): ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ: ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΑΩΜΑ: ΔΙΚΑΙΙ RESISTANCE: Ο.Κ WATER SPOT RESISTANCE: Ο.Κ | μετά αυτό 30 ημέρες: | | | | | | | | | | |
| ΟΡΑCITY_CR (αρχικό, 0% αραίωση): 96.56 ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM E313,120μm): 85.41 ΔΕΙΚΤΗΣ κιτρινίσματος (Yi ASTM E313,120μm): 1.40 ΧΡΩΜΑ (L*, a*,b* (0% αραίωση): 96.06 -0.32 0.68 ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ: Όχι ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΑΩΜΑ: Όχι ΑΙΚΑΙΙ RESISTANCE: Ο.Κ WATER SPOT RESISTANCE: Ο.Κ | S.G (gr/ml) (αρχικό, 0% αραίωση): | | | | | οαίωση): | | | 1.627 | | |
| ΟΡΑCITY_CR (% αραίωση): ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM Ε313,120μm): ΔΕΙΚΤΗΣ κιτρινίσματος (Yi ASTM Ε313,120μm): 1.40 ΣΡΩΜΑ (L*, a*,b* (0% αραίωση): 96.06 -0.32 0.68 (% αραίωση): ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ: Όχι ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΑΩΜΑ: Όχι ΑΙΚΑΙΙ RESISTANCE: Ο.Κ | (% αραίωση): | | | | | | | | | | |
| (% αραίωση): ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM E313,120μm): 85.41 ΔΕΙΚΤΗΣ κιτρινίσματος (Yi ASTM E313,120μm): 1.40 ΣΡΩΜΑ (L*, a*, b* (ο% αραίωση): 96.06 -0.32 0.68 (% αραίωση): 0ΣΜΗ ΣΤΟ ΔΟΧΕΙΟ: Οχι ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΑΩΜΑ: Οχι ΑΙΚΑΙΙ RESISTANCE: Ο.Κ WATER SPOT RESISTANCE: Ο.Κ | (αρχικό, 0% αραίωση): | | | | | | | | 96.56 | | |
| ΔΕΙΚΤΗΣ κιτρινίσματος (Υί ΑSΤΜ Ε313,120μm): L* a* b* L* a* b* (0% αραίωση): 96.06 -0.32 0.68 (% αραίωση): ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ: Όχι ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΑΩΜΑ: Όχι ΑΙΚΑΙΙ RESISTANCE: Ο.Κ WATER SPOT RESISTANCE: Ο.Κ | ΟΡΑCITY_CR (% αραίωση): | | | | | | | | | | |
| L* a* b* | ΔΕ | ΙΚΤΗΣ λευ | κότητας (V | Vi ASTM E | 313,120µn | n): | | | 85.41 | | |
| XPΩMA (L*, a*,b* | ΔΕΙ | ΚΤΗΣ κιτρι | ινίσματος (| Yi ASTM | Е313,120μι | m): | | | 1.40 | | |
| CIELAB 1976, 120μm) (% αραίωση): 95.06 -0.32 0.68 | | | | | | | L* | | a* | | b* |
| OΣMH ΣΤΟ ΔΟΧΕΙΟ: Όχι OΣMH ΚΑΤΑ ΤΟ ΑΠΛΩΜΑ: Όχι ALKALI RESISTANCE: O.K WATER SPOT RESISTANCE: O.K | | | n) | | (0% αρ | αίωση): | 96.06 -0.32 | | | | 0.68 |
| OEMH KATA TO ΑΠΛΩΜΑ: Όχι ALKALI RESISTANCE: O.K WATER SPOT RESISTANCE: O.K | | | | | - | αίωση): | | | | | |
| ALKALI RESISTANCE: O.K WATER SPOT RESISTANCE: O.K | | | | | | | | | | | |
| WATER SPOT RESISTANCE: O.K | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| MUD CRACKING RESISTANCE: N/T | | | SISTANCE: | | | | | | | | |
| SNAIL TRAIL: N/T | | | | | | | | | | | |
| | WET-SCRUB RESISTANCE: N/T (no chalking effect) | | | | | | | | | | |
| 3neen 65 : | | | | | | | | | | | |
| COMPARISON NO. | Companied in Production. | | | | | | | | | | |
| FOAMING DEFECTS: OXL TIAPATHPHIELE: Storage stability O.K. (06/07/2021) | | | | | | | | | | | |
| | | | | | | | | | | | |

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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





| (viii | - | | ΔΕΛΤ | ЮП | ОІОТІКОУ | EVELXOA | проїонт | ΩN NEP | OY | Σε | λίδα 1 |
|-------------------------------|----------------------------------|-----------------|---------|-----------------------|--------------------|-----------------------|--|----------|----------|-------|--|
| проїом: | photocata | aint | t | | HM/NI/ | А ПОІОТІКОУ | ': 20/ 7/2 | 1 | | | |
| | Viscosity (cP) - BROOKFIELD RV V | | | | | | | ER (SPIN | DLE #5#) | | |
| RPM | sec -1 | Accuracy +/- | Aj | ραίω | ση 0% | Viscosi | py Index= ty 6 RPM ty 60 RPM | A | ραίωση | Winne | opy Index sity 6 RPM sity 60 RPM |
| 6 | 0,1254 | 1000 | | 98 | 87 | 7 | .49 | | | | |
| | | | | | 20 | | | | | | |
| ΣΤΕΡΕΑ (% w/w) 1 ^η | | | | | - 2 ^η - | | - | 31 | - | μ.ο. | - |
| | | | | (αρ | χικό, 0% αρ | αίωση): | | | 70.4 | | |
| STORME | R VISCOSIT | Y ,25°C, (K | U) | | (% αραίωση): | | | | | | |
| | | | | μετά από 30ημέρες: | | | | | 71.1 | | |
| | | | | (αρχικό, 0% αραίωση): | | | | | 0.882 | | |
| ICI C&P,2 | 25°C, (P) | | | (% αραίωση): | | | | | | | |
| | | | | μετά από 30ημέρες: | | | 0.901 | | | | |
| | | | | | | (αρχικό, 0% αραίωση): | | | 11.75 | | |
| pH | | | | | (% αραίωση): | | | | | | |
| ⁻ | | | | με | τά από 30 ι | ημέρες: | | | 11.78 | | |
| S.G (gr/ml) | | | | (αρ) | χικό, 0% αρ | αίωση): | | | 1,4312 | | |
| | | | | | (% αραίω | ιση): | | | | | |
| on some | | | | | | αίωση): | | | 94.52 | | |
| OPACITY | _CR | | | | (% αραίωση): | | | | | | |
| ΔΕ | ΙΚΤΗΣ λευ | κότητας (V | Vi ASTI | M E3 | 313,120µm | 1): | 88.42 | | | | |
| ΔΕΙ | ΚΤΗΣ κιτρ | ινίσματος | Yi AST | ΜE | 313,120µr | m): | | | 0.58 | | |
| | | | | | | | | | | b* | |
| XPΩMA (| L*, a*,b* 976, 120μr | m) | | (| (0% αραίωση): | | | 96.43 | | | 0.47 |
| CILD I | это, 12ора | , | | | (% αραίωση): | | | | | | |
| ΟΣΜΗ ΣΤ | Ο ΔΟΧΕΙΟ | : | | TO | Σχι | | | | | | |
| ОΣМН КА | АТА ТО АП | ΛΩΜΑ: | | 10 | Όχι | | | | | | |
| ALKALI R | ESISTANCE | • | | O | O.K | | | | | | |
| WATER SPOT RESISTANCE: | | | | | O.K | | | | | | |
| | | | | | N/T | | | | | | |
| - | | | | | N/T | | | | | | |
| | | | | | Class 3 | | | | | | |
| SHEEN 85°: 0.7 | | | | | | | | | | | |
| | IBILITY PR | | | _ | Σχι | | | | | | |
| | G DEFECTS | | | |)χι | | | | | | |
| HAPATHP | nzeiz: Stori | age stability | O.K. (| 23/0 | a/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





| Note | (in | 9 | | ΔΕΛΤΙΟ | поютіко | EVELXOA | проїонт | ΩΝ ΝΕΡΟ | Y | Σeλ | ίδα 1 | |
|--|----------------------------------|--------------|---------------|----------------|--------------------------|----------------|----------|------------------|----------|--------|-----------|--|
| RPM sec-1 Accuracy Apatiwon 0% Thisotropy Index Viscosity a RPM Viscosit | проїом: | notocataly | : | | HM/NIA | ΠΟΙΟΤΙΚΟΣ | 21/06/2 | 21 | | | | |
| RPM Sec. Apaiwon 0% Viscosity's RPM Apaiwon 10,97% Viscosity's RPM Vis | Viscosity (cP) - BROOKFIELD RV V | | | | | | | ER (SPIND | LE #5#) | | | |
| 6 | RPM | sec-1 | | Аро | ιίωση 0% | Viscosi | ty 6 RPM | Αραίωσ | η 10,97% | Viscos | ity 6 RPM | |
| TITEPEA (9 w/w) 1° - 2° - 3° - μ.o. - 1 μ | 6 | 0,1254 | 1000 | 4 | 17067 | | _ | 15 | 133 | | | |
| (αρχικό, 0% αραίωση): Above limits | 60 | 1,254 | 100 | | - | | | 33 | 300 | | | |
| (10,97% αραίωση): | ΣΤΕΡΕΑ (S | % w/w) | | 1 ^η | - | 2 ⁿ | _ | 3 ⁿ - | | μ.ο. | - | |
| μετά από 30ημέρες: 97 (αρχικό, 0% αραίωση): 1,852 (10,97 % αραίωση): 0,778 μετά από 30ημέρες: 1.85 (αρχικό, 0% αραίωση): 7,88 (% αραίωση): 7,88 (% αραίωση): 7,88 (% αραίωση): 7,88 (% αραίωση): 7,88 ((% αραίωση): 7,85 (() () () () () () () () () | | | | - | (αρχικό, 0% αραίωση): | | | Above limits | | | | |
| (αρχικό, 0% αραίωση): 1,852 (10,97 % αραίωση): 0,778 μετά από 30ημέρες: 1.85 (αρχικό, 0% αραίωση): 7,88 (αρχικό, 0% αραίωση): 7,88 (αρχικό, 0% αραίωση): 7,85 (αρχικό, 0% αραίωση): 1,464 (10,97 % αραίωση): 1,464 (10,97 % αραίωση): 96,29 (10,97 % αραίωση): 93,19 ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM Ε313,120μm): 83,12 ΔΕΙΚΤΗΣ κιτρινίσματος (Yi ASTM Ε313,120μm): 1,71 ΧΡΩΜΑ (L*, a*,b* (0% αραίωση): 95,72 -0,57 1,13 (10,97 % αραίωση): 95,72 -0,57 1,13 (10,97 % αραίωση): 95,72 -0,46 0,94 ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ: Οχι | STORME | R VISCOSIT | Y ,25°C, (K | (U) | (10,97% αραίωση): | | | | 95 | | | |
| ICI C&P,25°C, (P) (20,97 % apaiwon): | l | | | _ | μετά από 30 | ημέρες: | | | 97 | | | |
| μετά από 30ημέρες: 1.85 (αρχικό, 0% αραίωση): 7,88 (% αραίωση): | | | | - | αρχικό, 0% αι | ραίωση): | | 1,852 | | | | |
| (αρχικό, 0% αραίωση): 7,88 (% αραίωση): | ICI C&P,2 | 5°C, (P) | | _ | (10,97 % apo | αίωση): | | | 0,778 | | | |
| PH (| | | | _ | μετά από 30ημέρες: | | | 1.85 | | | | |
| μετά από 30 ημέρες: 7.85 S.G (gr/ml) | | | | - | (αρχικό, 0% αραίωση): | | | 7,88 | | | | |
| S.G (gr/mi) | pH (| | | | 96 as | ραίωση): | | | | | | |
| (10,97 % αραίωση): 96,29 | _ | | | | μετά από 30 | ημέρες: | | | 7.85 | | | |
| (10,97 % αραίωση): OPACITY_CR (αρχικό, 0% αραίωση): 96,29 (10,97 % αραίωση): 93,19 ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM Ε313,120μm): 83,12 ΔΕΙΚΤΗΣ κιτρινίσματος (Yi ASTM Ε313,120μm): 1,71 ΧΡΩΜΑ (L*, a*,b* (0% αραίωση): 95,72 -0,57 1,13 (10,97 % αραίωση): 95,72 -0,46 0,94 ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ: Οχι ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΑΩΜΑ: Οχι ΑΙΚΑΙΙ RESISTANCE: Ο.Κ ΜΑΤΕΓ SPOT RESISTANCE: Ο.Κ ΜΟΣ CRACKING RESISTANCE: N/T SNAIL TRAIL: N/T WET-SCRUB RESISTANCE: Class 2 SHEEN 85°: 1.1 COMPATIBILITY PROBLEMS: Οχι FOAMING DEFECTS: Οχι | S.G (gr/ml) | | | | αρχικό, 0% αι | ραίωση): | | | 1,464 | | | |
| ΟΡΑCITY_CR (10,97 % αραίωση): 93,19 ΔΕΙΚΤΗΣ κευρινίσματος (Wi ASTM E313,120μm): 1,71 L* a* b* ΧΡΩΜΑ (L*, a*,b* (0% αραίωση): 95,72 | | | | _ | (10,97 % αρ | αίωση): | | | | | | |
| ΔΕΙΚΤΗΣ λευκότητας (Wi ASTM E313,120μm): 83,12 | | | | | αρχικό, 0% αι | ραίωση): | | | 96,29 | | | |
| ΔΕΙΚΤΗΣ κιτρινίσματος (Yi ASTM E313,120μm): L* a* b* (0% αραίωση): 95,72 -0,57 1,13 (10,97 % αραίωση): 95,42 -0,46 0,94 ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ: Οχι ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΛΩΜΑ: Οχι ΑΙΚΑΙΙ RESISTANCE: Ο.Κ WATER SPOT RESISTANCE: Ν/Τ SNAIL TRAIL: Ν/Τ WET-SCRUB RESISTANCE: Class 2 SHEEN 85°: 1.1 COMPATIBILITY PROBLEMS: Οχι FOAMING DEFECTS: Οχι | OPACITY | _CR | | _ | (10,97 % αραίωση): 93,19 | | | | | | | |
| L* a* b* | ΔΕ | ΙΚΤΗΣ λευ | κότητας (V | Vi ASTM | Ε313,120μπ | n): | | | 83,12 | | | |
| ΧΡΩΜΑ (L*, a*,b* (0% αραίωση): 95,72 -0,57 1,13 (10,97 % αραίωση): 95,42 -0,46 0,94 ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ: Οχι ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΛΩΜΑ: Οχι ΑΙΚΑΙΙ RESISTANCE: Ο.Κ WATER SPOT RESISTANCE: Ν/Τ SNAIL TRAIL: Ν/Τ WET-SCRUB RESISTANCE: Class 2 SHEEN 85%: 1.1 COMPATIBILITY PROBLEMS: ΓΟΧΙ FOAMING DEFECTS: Οχι | ΔΕΙ | ΚΤΗΣ κιτρι | νίσματος (| Yi ASTN | 1 E313,120µ | m): | | | 1,71 | | | |
| CIELAB 1976, 120μm) | | | | | | | | | | b* | | |
| (10,97 % αραίωση): 95,42 -0,46 0,94 ΟΣΜΗ ΣΤΟ ΔΟΧΕΙΟ: Όχι ΟΣΜΗ ΚΑΤΑ ΤΟ ΑΠΛΩΜΑ: Όχι ΑΙΚΑΙΙ RESISTANCE: Ο.Κ WATER SPOT RESISTANCE: Ν/Τ SNAIL TRAIL: Ν/Τ WET-SCRUB RESISTANCE: Class 2 SHEEN 85°: 1.1 COMPATIBILITY PROBLEMS: Όχι FOAMING DEFECTS: Όχι | | | -1 | _ | (0% ay | οαίωση): | 95,7 | 2 | -0,57 | | 1,13 | |
| OΣMH ΚΑΤΑ ΤΟ ΑΠΛΩΜΑ: ALKALI RESISTANCE: O.K WATER SPOT RESISTANCE: MUD CRACKING RESISTANCE: N/T SNAIL TRAIL: N/T WET-SCRUB RESISTANCE: Class 2 SHEEN 85°: 1.1 COMPATIBILITY PROBLEMS: Oχι FOAMING DEFECTS: Oχι | CIELAB IS | э/6, 120ш | , | _ | (10,97 % αραίωση): 95, | | | 12 | -0,46 | | 0,94 | |
| ALKALI RESISTANCE: WATER SPOT RESISTANCE: MUD CRACKING RESISTANCE: N/T SNAIL TRAIL: N/T WET-SCRUB RESISTANCE: Class 2 SHEEN 85°: 1.1 COMPATIBILITY PROBLEMS: Ox. FOAMING DEFECTS: OX. | ΟΣΜΗ ΣΤ | Ο ΔΟΧΕΙΟ | = | | Όχι | | | | | | | |
| 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: OXL FOAMING DEFECTS: OXL | ОЕМН КА | | | | | Όχι | | | | | | |
| MUD CRACKING RESISTANCE: N/T SNAIL TRAIL: N/T WET-SCRUB RESISTANCE: Class 2 SHEEN 85°: 1.1 COMPATIBILITY PROBLEMS: ÖXL FOAMING DEFECTS: ÖXL | ALKALI R | ESISTANCE | Ē: | | | | | | | | | |
| SNAIL TRAIL: N/T WET-SCRUB RESISTANCE: Class 2 SHEEN 85°: 1.1 COMPATIBILITY PROBLEMS: OXL FOAMING DEFECTS: OXL | WATER S | POT RESIS | TANCE: | | о.к | | | | | | | |
| WET-SCRUB RESISTANCE: Class 2 SHEEN 85°: 1.1 COMPATIBILITY PROBLEMS: OXL FOAMING DEFECTS: OXL | MUD CRA | ACKING RE | SISTANCE: | | N/T | | | | | | | |
| SHEEN 85°: COMPATIBILITY PROBLEMS: Oxt FOAMING DEFECTS: Dxt | SNAIL TR | AIL: | | | N/T | | | | | | | |
| COMPATIBILITY PROBLEMS: OXL FOAMING DEFECTS: OXL | WET-SCR | UB RESIST | ANCE: | | | | | | | | | |
| FOAMING DEFECTS: DXL | SHEEN 85 | 5°: | | | | | | | | | | |
| | COMPAT | IBILITY PR | OBLEMS: | | | | | | | | | |
| ΠΑΡΑΤΗΡΗΣΕΙΣ: Storage stability O.K. (20/07/2021) | | | | | | | | | | | | |
| | ПАРАТНР | HΣΕΙΣ: Store | age stability | O.K. (20 | 0/07/2021) | | | | | | | |

FQP.04.01_02 E:1 27.01.20



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°C, (KU) = 90±20 (to be normally mixed) ASTM D 562-81

ICI C&P,25°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° < 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°C

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



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.





| 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





| ΠΡΟΪΟΝ: φωτοκαταλυτικό οργανικό με 15% V20 | | | | | | | HM/NIA I | ΙΟΙΟΤΙΚΟΥ | r: 07/06/2 | 2021 | |
|--|-----------------------|-----------------|----------------|-----------------------|----------------|-----------|----------------|-----------|---|------|--|
| | | Viscos | ity (cP) - E | BROOKFIE | LD RV V | SCOMETE | R (SPINDI | E #5#) | | | |
| RPM | sec -1 | Accuracy +/- | Αραίω | υση 0% | Viscosit | py Index= | Αραίωση % | | Thixotropy Index $= \frac{Viscosity \ 6 \ RPM}{Viscosity \ 60 \ RPM}$ | | |
| 6 | 0,1254 | 1000 | 39 | 667 | | 70 | | | | | |
| 60 | 1,254 | 100 | 58 | 347 | 6, | ,78 | | | | | |
| ΣΤΕΡΕΑ (| % w/w) | Į. | 1 ^η | | 2 ⁿ | | 3 ^η | | μ.ο. | | |
| | | | (αμ | οχικό, 0% αρ | αίωση): | | | 108,0 | | | |
| STORME | R VISCOSIT | Y ,25°C, (K | (U) | % αρ | οαίωση): | | | | | | |
| | | | μ | ετά από 30η | ημέρες: | | | | | | |
| | | | (αμ | οχικό, 0% αρ | οαίωση): | | | 0,98 | | | |
| ICI C&P,2 | :5°C, (P) | | (| % αρ | οαίωση): | | | | | | |
| | | | μ | μετά από 30ημέρες: | | | | | | | |
| | | | (αμ | (αρχικό, 0% αραίωση): | | | - | | | | |
| рН | | | (| % αρ | οαίωση): | | | | | | |
| | | | με | ετά από 30 ι | ημέρες: | | | | | | |
| S.G (gr/ml) | | | | οχικό, 0% αρ | αίωση): | | | 1,401 | | | |
| | | | (| % αρ | οαίωση): | | | | | | |
| OPACITY_CR - | | | | οχικό, 0% αρ | οαίωση): | | | 92,61 | | | |
| OI ACITY | | | (| (% αραίωση): | | | | | | | |
| ΔΕ | ΙΚΤΗΣ λευ | κότητας (۷ | Vi ASTM E | 313,120µm | ո)։ | | | 89,34 | | | |
| ΔΕΙ | ΚΤΗΣ κιτρ | ινίσματος | Yi ASTM E | 313,120μr | n): | | | -0,08 | | | |
| ΧΡΩΜΑ (| l* a* h* | | | | | L* | | a* | | b* | |
| - | 276, 120μr | n) | | • | αίωση): | 95,9 | 0 | -0,29 | | 0,07 | |
| | | | (| - | αίωση): | | | | | | |
| | Ο ΔΟΧΕΙΟ ΑΤΑ ΤΟ ΑΠ | | | OXI OXI | | | | | | | |
| | ESISTANCE | | | D.K | | | | | | | |
| | POT RESIS | | | O.K | | | | | | | |
| | | SISTANCE: | | D.K | | | | | | | |
| SNAIL TRAIL: O.K | | | | | | | | | | | |
| WET-SCRUB RESISTANCE: Class 3 | | | | | | | | | | | |
| SHEEN 85 | 0.9GU | | | | | | | | | | |
| СОМРАТ | IBILITY PR | OBLEMS: | - (| OXI | | | | | | | |
| FOAMING | G DEFECTS | : | (| OXI | | | | | | | |
| ПАРАТНР | ΗΣΕΙΣ | | | | | | | | | | |
| | | | | | | | | | | | |





| 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





| проїом: | φωτοκατ | αλυτικό ο | ογανικό με | | | HM/NIA I | ΙΟΙΟΤΙΚΟ | r: 08/06/2 | 2021 | | | |
|--|--------------------------|-----------------|-----------------------|-----------------------|----------------|-----------------------------------|----------------|------------|---------|--|--|--|
| | | Viscos | ity (cP) - B | ROOKFIE | LD RV V | SCOMETE | ER (SPINDL | E #5#) | | | | |
| RPM | sec -1 | Accuracy +/- | Αραίω | ση 0% | Viscosit | py Index= cy 6 RPM y 60 RPM | Αραίωσ | η % | _ Visco | opy Index sity 6 RPM sity 60 RPM | | |
| 6 | 0,1254 | 1000 | 396 | 667 | | 70 | | | | | | |
| 60 | 1,254 | 100 | 58 | 47 | , b | ,78 | | | | | | |
| ΣΤΕΡΕΑ (| % w/w) | | 1 ^η | | 2 ⁿ | | 3 ^η | | μ.ο. | | | |
| | | | (αρ | (αρχικό, 0% αραίωση): | | | 104,0 | | | | | |
| STORME | R VISCOSIT | ry ,25°C, (K | (U) | % αμ | οαίωση): | | | | | | | |
| | | | με | τά από 30η | ημέρες: | | | | | | | |
| | | | (αρ | χικό, 0% αρ | ραίωση): | | | 0,96 | | | | |
| ICI C&P,2 | 25°C, (P) | | (| % αμ | οαίωση): | | | | | | | |
| | | | με | τά από 30ι | ημέρες: | | | | | | | |
| | | | (αρ | (αρχικό, 0% αραίωση): | | | | - | | | | |
| рН | | | (| (% αραίωση): | | | | | | | | |
| | | | με | τά από 30 ι | ημέρες: | | | | | | | |
| S.G (gr/ml) | | | | χικό, 0% αρ | οαίωση): | | | 1,3999 | | | | |
| _ | | | | % αμ | οαίωση): | | | | | | | |
| OBACITY | CB | | (αρ | χικό, 0% αρ | οαίωση): | | | 92,52 | | | | |
| OPACITY | _CK | | (| (% αραίωση): | | | | | | | | |
| ΔΕ | ΙΚΤΗΣ λευ | κότητας (۷ | Vi ASTM E3 | 313,120µn | ո)։ | | | 89,34 | | | | |
| ΔΕΙ | ΚΤΗΣ κιτρ | ινίσματος | (Yi ASTM E | 313,120µr | m): | | -0,08 | | | | | |
| | | | <u> </u> | | | L* | | a* | | b* | | |
| XPΩMA (CIELAB 19 | [L*, a*,b* 976, 120μr | n) | | 0% αρ | αίωση): | 95,90 - | | -0,29 | | 0,07 | | |
| | , , | , | (| % αρ | αίωση): | | | | | | | |
| | Ο ΔΟΧΕΙΟ | | | OXI | | | | | | | | |
| | АТА ТО АП | | | OXI | | | | | | | | |
| | ESISTANCE | | | D.K | | | | | | | | |
| | POT RESIS | | | O.K | | | | | | | | |
| MUD CRACKING RESISTANCE: O.K | | | | | | | | | | | | |
| SNAIL TRAIL: O.K WET-SCRUB RESISTANCE: Class 3 | | | | | | | | | | | | |
| | | ANCE: | | lass 3 | | | | | | | | |
| SHEEN 85 | | | | .9GU | | | | | | | | |
| | IBILITY PR | | | OXI | | | | | | | | |
| | G DEFECTS | | | ΣΧΙ | | | | | | | | |
| ПАРАТНР | H2EI2 | | | | | | | | | | | |
| | | | | | | | | | | | | |



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 | NCCPD and | VITEV code | % | | | |
|---------------|----------------|------------|---------|--------------|--|--|
| 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.





| 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





| ΠΡΟΪΟΝ: φωτοκαταλυτικό οργανικό με 20% V20 | | | | | | НМ/NIA ПОІОТІКОУ: 17/09/2021 | | | | | |
|---|--------------------------|-----------------|-----------------------|-----------------------------------|----------------|-------------------------------------|----------------|-------|------|---|--|
| Viscosity (cP) - BROOKFIELD RV VISCOMETER (SPINDLE #5#) | | | | | | | | | | | |
| RPM | sec -1 | Accuracy +/- | Αραίωση 0% | | Viscosii | py Index= y 6 RPM y 60 RPM | Αραίως | ωση % | | Thixotropy Index $= \frac{Viscosity \ 6 \ RPM}{Viscosity \ 60 \ RPM}$ | |
| 6 | 0,1254 | 1000 | 39 | 667 | | 70 | | | | | |
| 60 | 1,254 | 100 | 58 | 347 |] 6 | ,78 | | | | | |
| ΣΤΕΡΕΑ (| % w/w) | , | 1 ^η | | 2 ^ŋ | | 3 ⁿ | | μ.ο. | | |
| | | | (αμ | αρχικό, 0% αραίωση): 108,0 | | | | | | | |
| STORME | R VISCOSIT | ΓΥ ,25°C, (K | (U) | (% αραίωση): | | | | | | | |
| | | | μ | ετά από 30ι | ημέρες: | | | | | | |
| | | | (αμ | οχικό, 0% αμ | οαίωση): | | | 1.10 | | | |
| ICI C&P,2 | 25°C, (P) | | (| % α _ι | οαίωση): | | | | | | |
| | | | μ | ετά από 30ι | ημέρες: | | | | | | |
| | | | (αμ | οχικό, 0% αμ | οαίωση): | | | - | | | |
| рН | | | (| % α _ι | οαίωση): | | | | | | |
| | | | μ | ετά από 30 | ημέρες: | | | | | | |
| S.G (gr/n | nI) | | (αμ | (αρχικό, 0% αραίωση): | | | | 1,412 | | | |
| 0.0 (8.7 | , | | (| % αραίωση): | | | | | | | |
| | | | (αμ | αρχικό, 0% αραίωση): 93,52 | | | | | | | |
| OPACITY | _CR | | (| % α | % αραίωση): | | | | | | |
| ΔΕ | ΙΚΤΗΣ λευ | κότητας (۷ | vi ASTM E | 313,120μn | n): | | | 89,34 | | | |
| ΔΕΙ | ΚΤΗΣ κιτρ | ινίσματος | Yi ASTM I | 313,120μι | m): | -0,08 | | | | | |
| | | | • | | | L* a* | | b* | | | |
| XPΩMA (| [L*, a*,b* 976, 120μr | m) | | (0% αραίωση): | | 95,90 -0,29 | | | 0,07 | | |
| CILLAB I | 370, 120μi | ''', | | ′ % αρ | αίωση): | ση): | | | | | |
| ΟΣΜΗ ΣΤ | Ο ΔΟΧΕΙΟ |): | | OXI | | | | | | | |
| ОΣМН КА | АТА ТО АП | ΙΛΩΜΑ: | | IXC | | | | | | | |
| ALKALI RESISTANCE: | | | • | O.K | | | | | | | |
| WATER SPOT RESISTANCE: | | | • | O.K | | | | | | | |
| MUD CRACKING RESISTANCE: | | | | O.K | | | | | | | |
| SNAIL TR | SNAIL TRAIL: O.K | | | | | | | | | | |
| WET-SCRUB RESISTANCE: Class 3 | | | | | | | | | | | |
| SHEEN 85°: 0.7GU | | | | | | | | | | | |
| COMPATIBILITY PROBLEMS: | | | • | OXI | | | | | | | |
| FOAMING DEFECTS: | | | | IXC | | | | | | | |
| ПАРАТНР | ΗΣΕΙΣ | | | | | | | | | | |
| | | | | | | | | | | | |



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 | NCCPD ands | VITEV and a | % | | | |
|---------------|----------------|--------------------|---------|--------------|--|--|
| 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.





| Inorganic photocatalytic paint with 20% V20 | % W/W |
|---|---------------|
| PASTE | |
| WATER | 20.00 |
| ADDITIVES 1 | 1.05 |
| TiO2 (pigment) VISIONS 20 | 5.00 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





| ΠΡΟΪΟΝ: Silicate paint with 20% V20 3/11/21 | | | | | НМ/NIA ПОІОТІКОУ: 4/11/21 | | | | | |
|---|----------------------------|-----------------|----------------|-------------------------------------|--|-------------|----------------|---------|---|--|
| | | Viscos | ity (cP) - E | ROOKFIE | LD RV V | SCOMETE | R (SPINDI | _E #5#) | | |
| RPM | sec -1 | Accuracy +/- | Αραίω | ιση 0% | Thixotropy Index= Viscosity 6 RPM Viscosity 60 RPM | | Αραίωση % | | Thixotropy Index $= \frac{Viscosity \ 6 \ RPM}{Viscosity \ 60 \ RPM}$ | |
| 6 | 0,1254 | 1000 | 27 | 733 | | | | | | |
| 60 | 1,254 | 100 | 60 | 00 | 4 | .55 | | | 1 | |
| ΣΤΕΡΕΑ (% w/w) 1 ^η | | | 1 ^η | | 2 ^η | | 3 ^η | | μ.ο. | |
| | | | (αρ | χικό, 0% αμ | ραίωση): | 93.5 | | | | |
| STORME | R VISCOSIT | 7,25°C, (K | (U) | ′ % αραίωση): | | | | | | |
| | | | με | μετά από 30ημέρες: | | | | | | |
| | | | (αρ | χικό, 0% αμ | ραίωση): | | | 0.9 | | |
| ICI C&P,2 | 25°C, (P) | | (| % α _ι | οαίωση): | | | | | |
| | | | με | ετά από 30ι | ημέρες: | | | | | |
| | | | (αρ | χικό, 0% αμ | ραίωση): | | | 10.69 | | |
| рН | | | (| (% αραίωση): | | | | | | |
| | | | με | μετά από 30 ημέρες: | | | | | | |
| S.G (gr/n | nl) | | (αρ | αρχικό, 0% αραίωση): 1.53932 | | | | | | |
| | | | (| % αραίωση): | | | | | | |
| OPACITY | CB | | (αρ | ′αρχικό, 0% αραίωση): 933.83 | | | | | | |
| OF ACITY | | | (| % α | % αραίωση): | | | | | |
| ΔΕ | ΙΚΤΗΣ λευ | κότητας (۷ | Vi ASTM E | 313,120μn | n): | 85.49 | | | | |
| ΔΕΙ | ΚΤΗΣ κιτρ | ινίσματος | (Yi ASTM E | 313,120µı | m): | 1.21 | | | | |
| ΧΡΩΜΑ (| 'I* >* b* | | | | L* a* | | | b* | | |
| | , Ε΄, α΄, Β΄ 976, 120μr | n) | | (0% αραίωση): | | 95.79 -0.23 | | | 0.72 | |
| | | | <u>`</u> | (% αραίωση): | | | | | | |
| | ΤΟ ΔΟΧΕΙΟ ΑΤΑ ΤΟ ΑΠ | | | OXI | | | | | | |
| | ESISTANCE | | | O.K | | | | | | |
| WATER SPOT RESISTANCE: | | | | O.K | | | | | | |
| MUD CRACKING RESISTANCE: | | | | O.K | | | | | | |
| SNAIL TRAIL: | | | | O.K | | | | | | |
| | UB RESIST | ANCE: | | Class 3 | | | | | | |
| SHEEN 85°: 1.7 | | | | | | | | | | |
| COMPATIBILITY PROBLEMS: | | | OXI | | | | | | | |
| FOAMING DEFECTS: OX | | | OXI | | | | | | | |
| ПАРАТНР | ΗΣΕΙΣ : | | | | | | | | | |
| | | | | | | | | | | |



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 was in a | NCCDD anda | VITEV and a | % | | | |
|---------------|-----------------|---------------|---------|--------------|--|--|
| 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 proceed to another improved formulation by increasing the P.V.C of the paint formulation in order to achieve 20% NOx reduction in visible light



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 proceed 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.





Photos:





Disperser (used to produce paints)





Brookfield Viscosity









Solids % (W/W)





Stormer Viscosity (Krebs Units)







ICI Viscosity

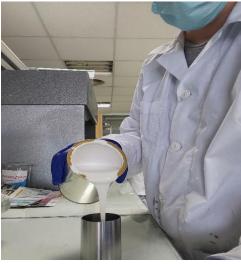




pH-meter







SG Density cup





Paint application







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





Gloss









Wet scrub resistance machine







THANK YOU