Application Leaflet

Additives for aqueous alkyd paints

Performance optimisation of high gloss PU/alkyd emulsion paints

ELEMENTIS

Unique chemistry, sustainable solutions

Key Benefits

- NUOSPERSE® wetting & dispersing agents
- RHEOLATE® NiSAT grades
- DAPRO® defoamers

Introduction

Waterborne alkyd emulsion paints are a very important part of the decorative coatings market. They require a very careful and distinctive selection of functional additives to improve the storage stability, anti-settling properties and application behavior of the paint.

An optimized performance of the alkyd emulsion paint is achieved with the wetting and dispersing agents NUOSPERSE® FX 610 & NUOSPERSE® FN 265 in combination with the rheological additives RHEOLATE® 666 & RHEOLATE® 212 IF and the defoamer DAPRO® DF 52.

Dispersants

NUOSPERSE® FX 610
- VOC-free polymeric dispersant
- Efficient with organic and inorganic pigments
- Strong reduction of millbase viscosity
- Improves pigment suspension and gloss

NUOSPERSE® FN 265
- Nonionic polyglycol ether based wetting agent
- For organic and inorganic pigments
- Free from VOC
- HLB value of 13.5

FIGURE 1: Rheology provided by RHEOLATE® grades

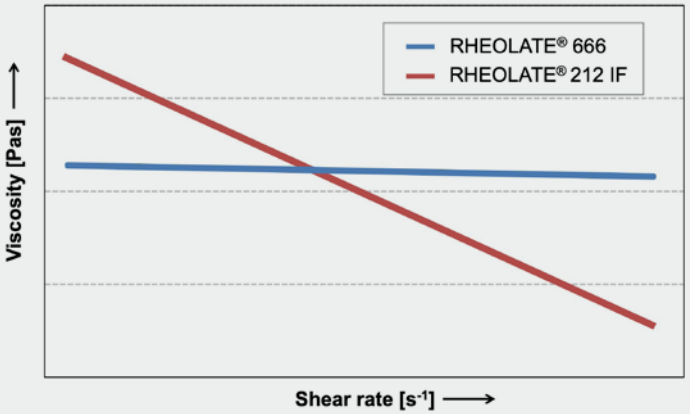


TABLE 1: Application properties

Wetting & Dispersing agent		0.93% NUOSPERSE® FX 610 0.47% NUOSPERSE® FN 265
Rheological additive		0.43% RHEOLATE® 666 1.33% RHEOLATE® 212
KU viscosity	[units]	122
ICI viscosity	[P]	3.0
Brookfield viscosity 10 rpm 20 rpm 50 rpm 100 rpm	[mPa.s]	 12600 10500 7240 5170
Gloss 20°	[units]	73
Brush-out levelling	visually	excellent
Sag resistance	[µm]	350
Storage stability after 2 weeks 40°C storage		no separation and no pigment settling

Rheology modifiers

RHEOLATE® 666
- Imparts shear thinning flow character
- Improves sag control and storage stability
- Improves pigment suspension and gloss

RHEOLATE® 212 IF
- VOC free NiSAT thickener
- Imparts Newtonian flow
- Enhances hiding power and brush drag
- Optimizes flow and levelling

Technical results

All mentioned additives have been tested in a aqueous, polyurethane modified alkyd paint. The application data can be found in result **TABLE 1**. Result table 1: Application properties. The aqueous alkyd paint based made with the NUOSPERSE® and RHEOLATE® additives displays superior balance between sag resistance and brush-out levelling. Gloss development has been also excellent

The high shear associative thickener give an alkyd like application behaviour with improved brush drag and hiding power.

The paint showes an excellent storage stability without syneresis or separation after storage for 2 weeks at 40°C.

FIGURE 2: Rheological characteristics grades

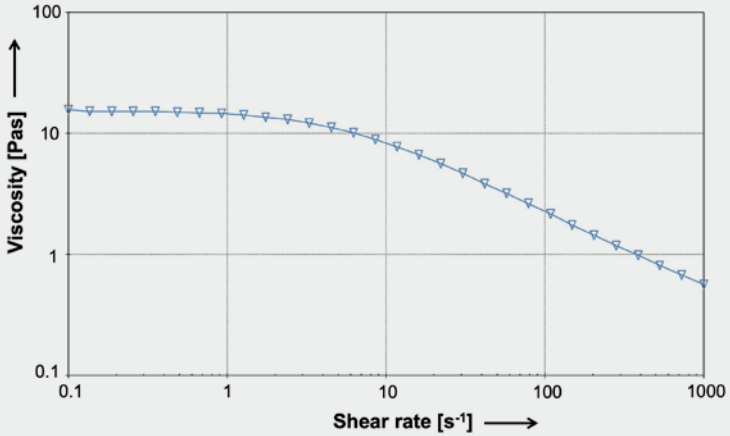


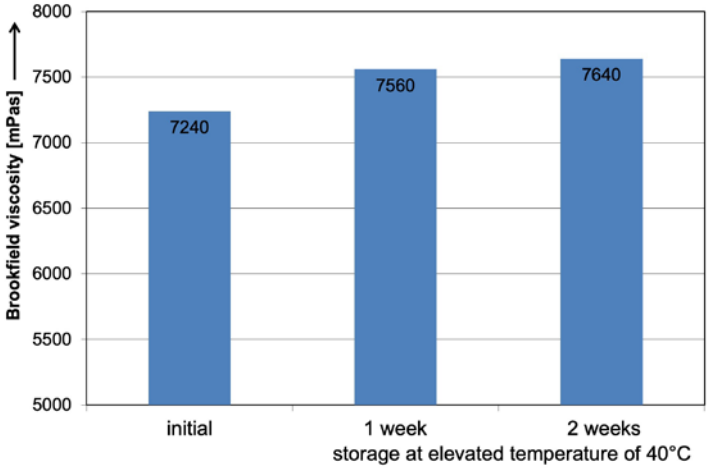
FIGURE 3: Levelling behaviour

The combination of the low shear thickener RHEOLATE® 666 and the high shear thickener RHEOLATE® 212 provides balanced flow behaviour which is required to achieve the superior flow and levelling properties of a decorative alkyd emulsion paint.

As visualized in **FIGURE 3**, the paint showes a perfect brush-out performance with no brush marks. The paint film is also free from cissing.

The paint demonstrates excellent storage stability. Only a very slight increase of the Brookfield viscosity (50 rpm) has been after 2 weeks storage at 40°C **FIGURE 4**.

FIGURE 4: Viscosity stability on storage



Conclusion

Aqueous PU/alkyd emulsion paint formulated with combinations of

- NUOSPERSE® FX 610 & NUOSPERSE® FN 265
- RHEOLATE® 666 and RHEOLATE® 212 IF

shows excellent application performance and storage stability.
This additive combination provides excellent compatibility between the different chemistries and fits perfectly into the formulation of modern VOC compliant aqueous alkyd emulsion paint.

TABLE 2: Formulation

Raw material	Concentration [%]
Demineralized water	10.6 - X
Defoamer	0.2
Dispersing agent	X
Titanium dioxide	21.7
Alkyd/PU binder emulsion	60.7
Rheology modifier	X
Siccative	0.3
Levelling agent	0.9
Coalescing agent	1.1
Total	100.0

APPENDIX

Test methods

High-shear/ICI viscosity
Indicates the viscosity at high shear rates of 10000 s-1 measured by a cone/plate equipped ICI viscometer.

Rheology data
Determined using the Anton-Paar MCR 301 rheometer, equipped with PP 50 measuring geometry at a gap width of 1 mm, at a temperature of 23°C.

KU viscosity
KU describes the Krebs-Stormer viscosity. Typically the mid-shear in-can viscosity is represented.

Gloss
Gloss determined using the Byk Gardner Haze/Gloss tester at a measuring angle of 20°.

Brush-out levelling
Brush-out leveling was testes by brushing out 25 g of paint equally on leneta chart and judged visually.

Sag control
Sag was tested using a test blade with applicable ayer thicknesses of 100 - 500 µm.

NOTE:

The information herein is currently believed to be accurate. We do not guarantee its accuracy. Purchasers shall not rely on statements herein when purchasing any products. Purchasers should make their own investigations to determine if such products are suitable for a particular use. The products discussed are sold without warranty, express or implied, including a warranty of merchantability and fitness for use. Purchasers will be subject to a separate agreement which will not incorporate this document.

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