A global specialty chemicals company

RHEOLATE® 175

Application Leaflet

HASE based thickener for decorative paint systems

Key Benefits

- Effective for low cost mid to high pvc paint systems
- Efficient low-mid shear viscosity builder
- Reduced spattering tendency during roller application

Introduction

Our newly developed rheological additive RHEOLATE® 175 is a **H**ydrophobically **M**odified **A**lkali **S**wellable (abbreviation HASE) designed to give efficient mid-to-high shear viscosity build. It is particularly aimed for low cost mid-to-high PVC latex paints and is solvent-, VOC- and APEO-free.

The use of RHEOLATE® 175 provides excellent film build, levelling and roller spatter resistance in interior matt and satin finishes. The RHEOLATE® 175 meets the performance of leading market reference HASE thickeners.

Benefits and Features

- Effective for low cost mid to high pvc latex paint systems
- Efficient low to mid shear viscosity builder
- Good balance of flow and levelling
- Easy to handle and formulate
- Potential alternative to HEC

Chemical and physical data

Composition	Acrylic emulsion in water
Appearance	Milky white liquid
Active content [%]	30%
pH value	ca. 2.5
Solvent	Water
Specific gravity [g/cm³]	ca. 1.05

Incorporation and handling

RHEOLATE® 175 is an alkali swellable thickener and requires proper pH adjustment with an alkali (like ammonium hydroxide or amino methyl propanol) for complete activation. In a typical latex paint, a pH of 8 - 9 is usually recommended.

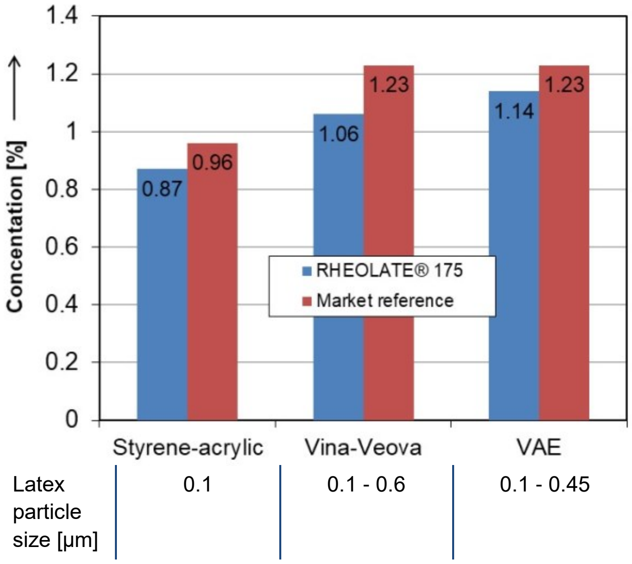
Addition is normally made in the let-down or towards the end of the formulation process. At this stage RHEOLATE® 175 can be added slowly to the formulation under good mixing without dilution. Under slow speed mixing conditions, dilution with water (RHEOLATE® 175: water ratio 1:1 to 1:5 by weight) is recommended to ensure efficient activation of the additive and to avoid shock.

RHEOLATE® 175 can also be used alone or together with other rheological additives to achieve ideal performance properties.

Technical evaluation

RHEOLATE® 175 has been evaluated versus a leading Market reference competitive HASE thickener in a pvc 50 paint equipped with various binder technologies in relation to the individual latex particle size.

The efficiency of the rheological additives in terms of achieving a Krebs-Stormer viscosity of approximately 100 units can be found in the below *Result table 1*.



Result table 1: Efficiency/latex particle size

In all tested binder chemistries RHEOLATE® 175 shows higher efficiency than the market reference.

Both HASE grades show a dependency of the efficiency related to the latex particle size of the latex. As a consequence, in the styrene-acrylic the highest effectivity has been detected. In case of the Vinyl-acetate (VAE) based binder with very similar particle sizes, the effectivity only shows marginal differences.

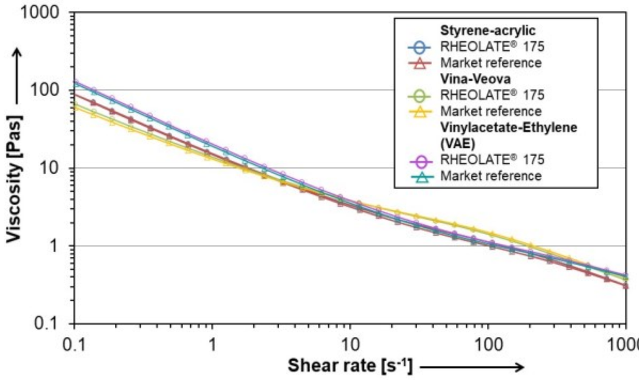
In the following *Result table 1*, the effect of both tested thickeners on the Brookfield and the High-shear/ICI viscosity is visualized.

	Concentration [%]	KU viscosity [Units]	High-shear/ICI viscosity [P]	Brookfield viscosity [mPas]
Styrene-acrylic				
RHEOLATE® 175	0.87	97	0.80	4900
Market reference	0.96	98	0.80	5000
Vina-Veova				
RHEOLATE® 175	1.06	101	0.9	6450
Market reference	1.23	100	1.0	5850
Vinylacetate-Etylene (VAE)				
RHEOLATE® 175	1.14	102	1.0	8000
Market reference	1.23	100	1.0	7500

Result table 1: Viscosity comparison

At equally adjusted Krebs-Stormer (KU) viscosity, only minor variations of the Brookfield and the high shear viscosity can be detected.

The rheograms of the paints with RHEOLATE® 175 and the market refernce thickener in the test paint equipped with the various binder emulsions are shown in *Figure 2*.



Result table 2: Rheograms test paint

It can be seen that RHEOLATE® 175 and the market reference HASE grade act equally in the test paint systems equipped with different binders.

As visualized in *Result table 2*, these rheological findings can also be translated to the practical and application conditions of the individual systems. In this result table also a general performance comparison is shown.

	Efficiency	Low shear viscosity	High-shear viscosity	Levelling/ flow	Roller Spatter
	0 = poor; 5 = excellent				
Styrene-acrylic based test paint					
RHEOLATE® 175	4	2	4	2.5	3
Market reference	3	2	4	2.5	3
Vina-Veova based test paint					
RHEOLATE® 175	5	2	4	2.5	3
Market reference	3	2	4	2.5	3
Vinylacetate-Ethylene based test paint					
RHEOLATE® 175	4	2	4	2	4
Market reference	3	2	4	2	4

improved equal remains behind

Result tabe 2: Performance comparison

RHEOLATE® 175 acts more effectively than the tested market reference in relation to the in-can viscosity in all three test systems. This fact can mean a cost benefit for the formulator.

In all other tested properties, RHEOLATE® 175 performs equally in comparison to the market reference product.

Conclusion

The use of RHEOLATE® 175 provides excellent paint application properties:

- Superb thickening efficiency, especially for mid to high PVC latex paints, based on commonly used binder technologies
- Reduced roller spattering
- Excellently balanced flow and levelling

RHEOLATE® 175 provides remarkably higher effectivity than a market reference which can be translated to a cost benefit in three binder technologies. All other relevant technical properties in these cases can be matched by RHEOLATE® 175.

Appendix

Test formulation:

Raw material	Concentration [%]	Function	Supplier
Millbase stage			
Tapwater	14.90	Diluent	
Add under stirring in the denoted order			
Sodium polyphosphate	0.10	Softener	ICL
NUOSPERSE® FX 504	0.10	Wetting agent	Elementis
DAPRO® DF 17	0.30	Defoamer	Elementis
Titanium dioxide	5.80	Pigment	Kronos
Calcium carbonate, various particle size	30.9	Extender	Omya
MICROTALC® IT Extra	3.40	Extender	Elementis
Aluminium silicate	1.50	Extender	Evonik
Grind for 15 min. at 10 m/s. Add and stir for further 10 minutes at low speed			
DAPRO® FX 511	0.80	Coalescing agent	Elementis
Binder emulsion, either Styrene acrylic, Vina-Veova or VAE	32.10	Binder	BASF
DAPRO® DF 17	0.10	Defoamer	Elementis
Tapwater	9.70-X	Diluent	
Add and stir slightly for 10 min.			
Rheological additive(s)	X	Rheological additive	
Ammonia Solution w=25%	0.20	pH adjustment	
Preservative	0.10	In can preservative	Schülke&Mayr
	100.00		

Test methods:

KU viscosity

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

High-shear/ICI viscosity

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

Rheology measurements

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.

Sag control

Sag stability tested using test blade 500 – 50µm; the larger the bar, the better the result.

Levelling (blade)

Determined using test blade 419. The characteristics were judged visually on a scale from 0 to 5.

Roller spatter behaviour

40g of paint rolled on vertical wall (10 times up & down); Spatters collected on black chart underneath and judged visually

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