Application Leaflet

RHEOLATE® 175

HASE based thickener for decorative paint systems

ELEMENTIS

Unique chemistry, sustainable solutions

Key Benefits

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

Chemical and physical data

Composition	Acrylic emulsion in water
Appearance	Milky white liquid
Active content [%]	28.5% - 31.5%
pH value	ca. 2.3
Solvent	Water
Specific gravity [g/cm³]	Ca. 1.05

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

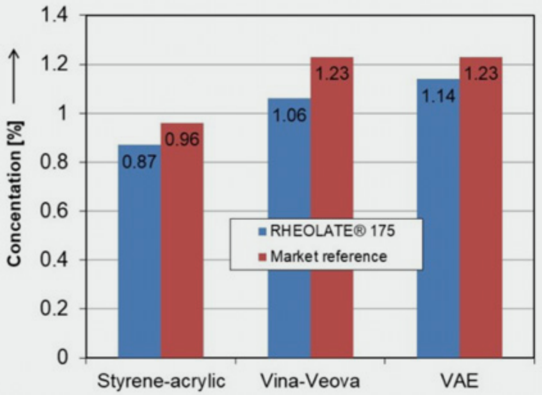
- Effective for low cost mid to high pvc latex paint systems
- Efficient low to mid shear viscosity builder
- Good balance of flow and levelling
- Easy to handle and formulate
- Potential alternative to HEC

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.

FIGURE 1: Efficiency/latex particle size



Latex particle size [μm]	0.1	0.1 - 0.6	0.1 - 0.45

RESULT TABLE 1: Viscosity comparison

	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-Ethylene (VAE)				
RHEOLATE® 175	1.14	102	1.0	8000
Market reference	1.23	100	1.0	7500

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 **FIGURE 1**.

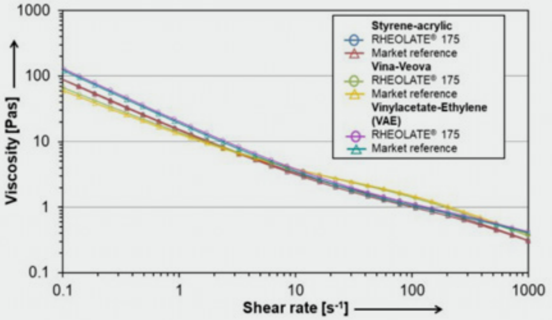
In all tested binder chemistries RHEOLATE® 175 shows higher efficiency than the market reference.

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.

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

FIGURE 2: Rheograms test paint



RESULT TABLE 2: Performance comparison

	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

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

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.

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

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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For more details please contact:

North America
Elementis
469 Old Trenton Road
East Windsor,
NJ 08512, USA
Tel: +1 609 443 2500

Europe
Elementis UK Ltd c/o
Porto Business Plaza
Santos Pousada Street, 290
4300-189, Porto, Portugal

Asia
Deuchem (Shanghai) Chemical Co., Ltd.
99, Lianyang Road
Songjiang Industrial Zone
Shanghai, China 201613
Tel: +86 21 577 40348

elementis.com