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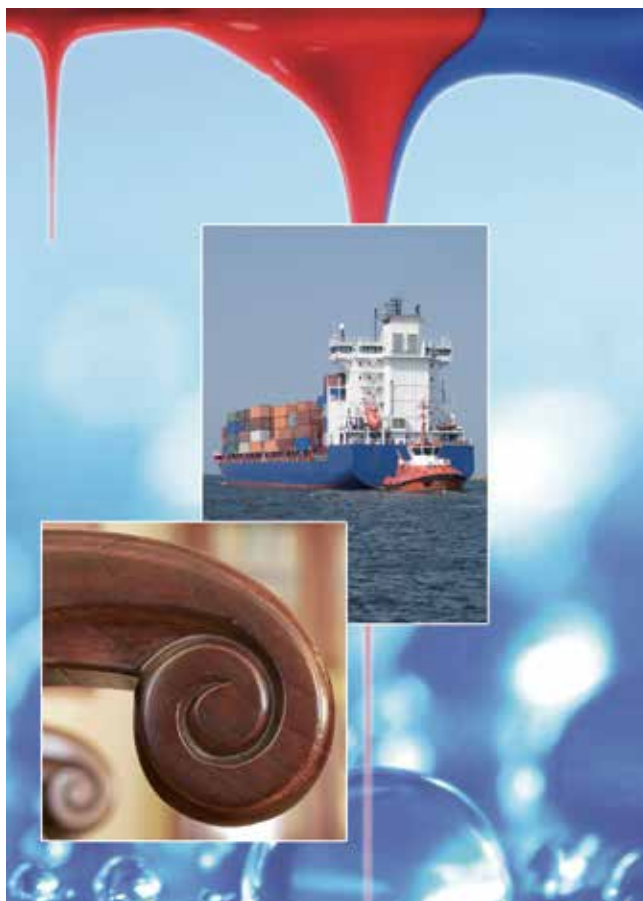
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Application Leaflet
January 2014

RHEOLATE[®] 299

*Highly Efficient and Strongly Shear
Thinning Associative Thickener*



Innovation • Compliance • High Performance



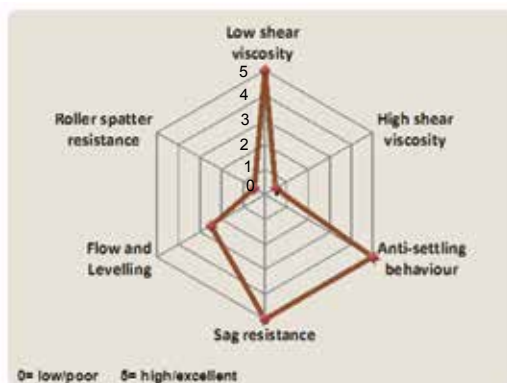
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Introduction

RHEOLATE® 299 is a highly efficient, 25% active, polyether polyurethane associative viscosity builder for the low- to mid-shear rate range.

It provides strongly shear-thinning flow behaviour which makes it ideal for spray applications including sprayed latex emulsions, dispersions, water reducible clear-coats and high gloss pigmented systems.

Properties



- * Thickening mechanism is pH independent
- * APE- and organotin-free
- * Highly efficient
- * Imparts strongly shear thinning flow behaviour
- * Excellent sag resistance and anti-settling behaviour
- * Good flow and levelling
- * Limited influence on water sensitivity and corrosion resistance
- * Excellent optical properties in the final coating system

Chemical and Physical Data

Composition	polyether polyurethane dispersion in a mixture of water and diethylene glycol monobutyl ether
Colour / Form	white liquid
Density	1.04 g / cm ³
Viscosity	less than 5000 mPa·s, 10 rpm, Sp.3, Brookfield RVT
Non-volatile	25% active by weight
Volatile	75% (57% water/18% diethylene glycol monobutyl ether)

Incorporation & Levels of Use

RHEOLATE® 299 is a pourable liquid and can be incorporated at any point in the formulation of most systems. Liquid associative thickeners are usually post-added for convenience.

RHEOLATE® 299 is a highly efficient thickener and it is recommended to add the product slowly to the formulation and to allow adequate mixing time.

The typical level of use of RHEOLATE® 299 is between 0.1 and 1.5% (as delivered) by weight of the total formulation.

Practical Examples

RHEOLATE® 299 provides a very strong shear thinning flow behaviour and a high low-shear viscosity to a waterborne coating.

Formulating this associative thickener into a waterborne clear coat or industrial topcoat will improve sag resistance and application behaviour as shown in the following examples.

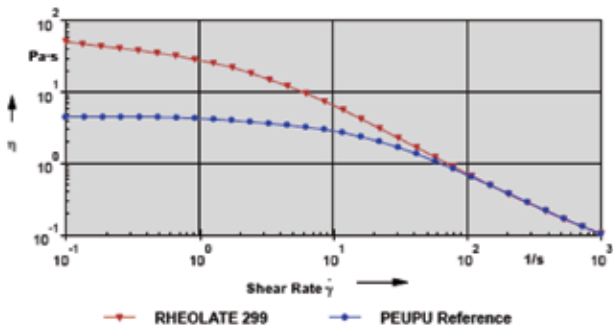
Waterborne clear coat

RHEOLATE® 299 requires a similar loading level to the standard shear thinning associative thickener to achieve a comparable mid-shear viscosity in this waterborne clear-coat. Brookfield viscosities however are markedly higher with RHEOLATE® 299 than with the reference thickener.

Additive		RHEOLATE® 299	PEUPU Reference
Loading	[%]	0.35	0.33
Brookfield viscosity			
10 rpm	[mPa · s]	14560	4120
20 rpm		8460	3720
50 rpm		3672	2608
100 rpm		1996	1760
ICI Viscosity	[P]	0.4	0.4

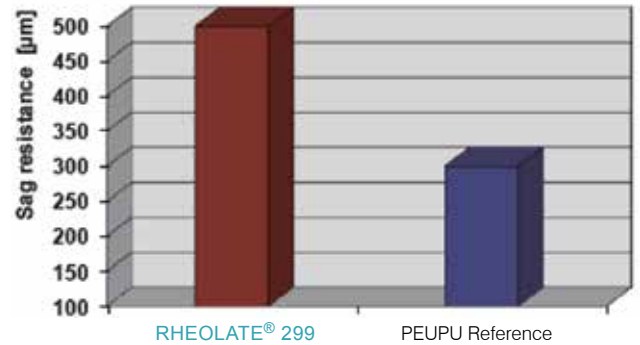
Table 1: Test results at equal mid-shear viscosity (KU 100)

RHEOLATE® 299 provides much higher low shear viscosity and a stronger shear thinning flow behaviour than the reference associative thickener. Viscosities at higher shear rates are comparable with both samples.



Graph 1: Flow behaviour of the waterborne clear-coat

The higher low shear viscosity development with RHEOLATE® 299 results in markedly better sag resistance compared to the sample made with the reference thickener.



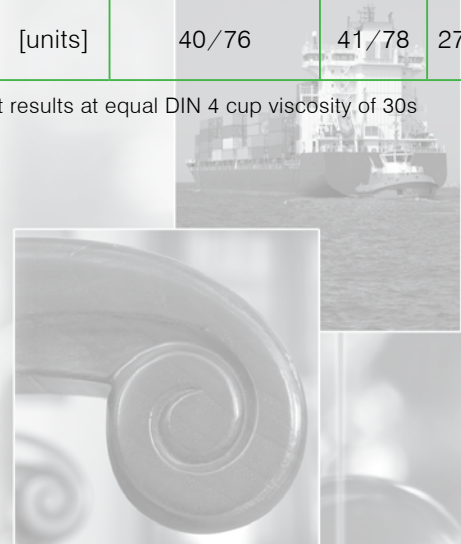
Graph 2: Sag resistance of the waterborne clear coat

Industrial waterborne topcoat

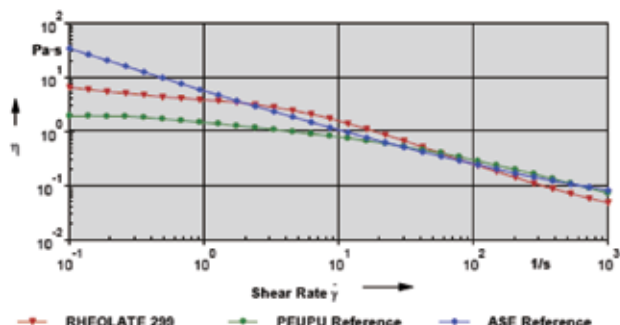
RHEOLATE® 299 shows excellent efficiency compared to a shear thinning polyurethane thickener (PEUPU) and a standard acrylic thickener (ASE) in this waterborne industrial topcoat. Gloss development with RHEOLATE® 299 is similar to that with the reference polyurethane thickener and much better compared to the acrylic thickener.

Additive		RHEOLATE® 299	PEUPU	ASE
Loading	[%]	0.16	0.19	1.25
Brookfield viscosity				
10 rpm	[mPa · s]	2740	920	2060
20 rpm		1880	800	1210
50 rpm		1012	604	692
100 rpm		576	472	462
Gloss 20°/ 60°	[units]	40/76	41/78	27/71

Table 2: Test results at equal DIN 4 cup viscosity of 30s

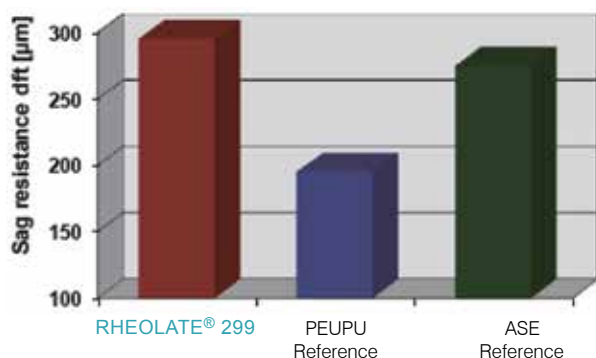


RHEOLATE® 299 gives strongly shear-thinning flow behaviour and a low high-shear viscosity. Low-shear viscosity is less than with the acrylic thickener.



Graph 3: Flow behaviour of the waterborne top coat

Sag resistance on spray applied panels is much better with RHEOLATE® 299 compared to that with the reference polyurethane thickener or the acrylic thickener at equal flow-cup viscosity.



Graph 4: Sag resistance of the waterborne topcoat

Conclusion

RHEOLATE® 299 efficiently provides strongly shear thinning flow behaviour to both pigmented and clear waterborne coating systems. This results in excellent application properties, sag resistance and storage stability.

The associative thickener has limited influence on the water sensitivity and corrosion resistance of a coating. RHEOLATE® 299 is the product of choice for applications like:

- Industrial wood and wood joinery
- Industrial metal coatings

HSE statement

As with any new chemical substance, it is recommended that the Material Safety Data Sheet be reviewed prior to use.



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