ACRYSOL™ DR-300

Designed Rheology Technology – Alternative to Cellulosic Thickeners

Description

ACRYSOL DR-300 associative thickener provides effective shear-thinning rheology in matt to semi-gloss coatings and is primarily designed for use in exterior coatings. The unique viscosity profile of this synthetic liquid thickener furnishes the sag resistance required for higher film build without sacrificing the improved flow expected of associative thickeners.

ACRYSOL DR-300 imparts good early water resistance to acrylic, styrene-acrylic and vinylacrylic coatings, even when applied to chalky and aged finishes. Like all Designed Rheology products, ACRYSOL DR-300 is easy to incorporate during paint manufacture.

Much of the appeal of ACRYSOL DR-300 derives from the fact that it provides performance benefits at lower formulation costs than conventional cellulosic thickeners due to better thickening efficiency.

Characteristics of the Product

- Good water resistance: Exterior durability
- Low-viscosity liquid: Easy to handle and incorporate during manufacturing
- Good flow/sag balance: Thicker films; good appearance
- Good paint consistency and stability: Thick, creamy "in-can" appearance with stable viscosity
- Synthetic: Resistant to microbial attack
- Excellent thickening efficiency, lower formulated cost

Typical Properties

These properties are typical but do not constitute specifications.

Appearance	Milky white liquid
Solids content %	17.5
Solvents	Water/Diethylene Glycol Monobutyl Ether (84/16)
pH (as supplied)	4.0-6.0
Brookfield Viscosity (as supplied)	2000-7500 mPa.s
Density at 25°C	1.04

Performance

ACRYSOL DR-300 thickener provides application and "feel" properties very similar to those of medium and high-molecular-weight cellulosic thickeners with better levelling, sag resistance, and resistance to roller spattering in most formulations.

A comparison of a high-molecular-weight cellulosic thickener and ACRYSOL DR-300 in a 48% PVC/30% VS all-acrylic exterior formulation based on PRIMAL™ SF-016 ER emulsion illustrates the similarity in the key rheology properties they provide **(Table 2)**.

Spattering is a critical issue

Rheology Property Comparison	0.5% Cellulosic Thickener, high Mw	1% ACRYSOL DR-300
Viscosities after production		
ICI	0,9	0,8
KU	107	108
Brookfield Sp 4/6 rpm	29700	27700
Viscosities after equilibrium (48 hrs)		
ICI	0,9	0,7
KU	110	110
Brookfield Sp 4/6 rpm	29300	29800
Viscosities after heat ageing (10 days at 60°C)		
ICI	0,8	0,5
KU	108	108
Brookfield Sp 4/6 rpm	23000	24800
Spatter resistance	Good	Excellent
Water resistance	Good	Excellent

Table 2: Rheology properties of an all-acrylic exterior formulation based on PRIMAL SF-016 ER

Apart from the achieved benefit of lower formulated cost, Figure 1 and 2 show the superior resistance to roller spattering and the enhanced water resistance of ACRYSOL DR-300. In general, traditional synthetic thickeners based on acrylate increase the water sensitivity and therefore decrease the scrub resistance.

The new technology generation provides superior scrub resistance compared to traditional synthetic thickeners.

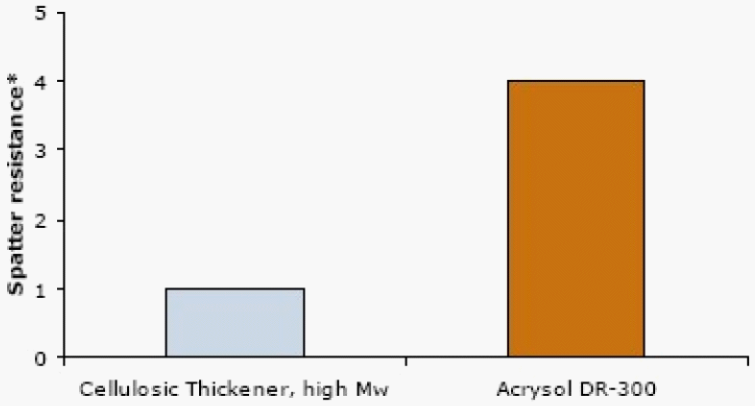


Figure 1: Spatter resistance of an all-acrylic exterior formulation based on PRIMAL SF-016 ER

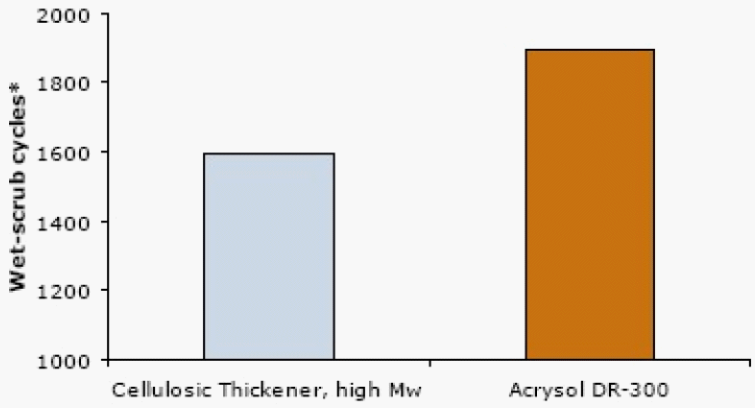
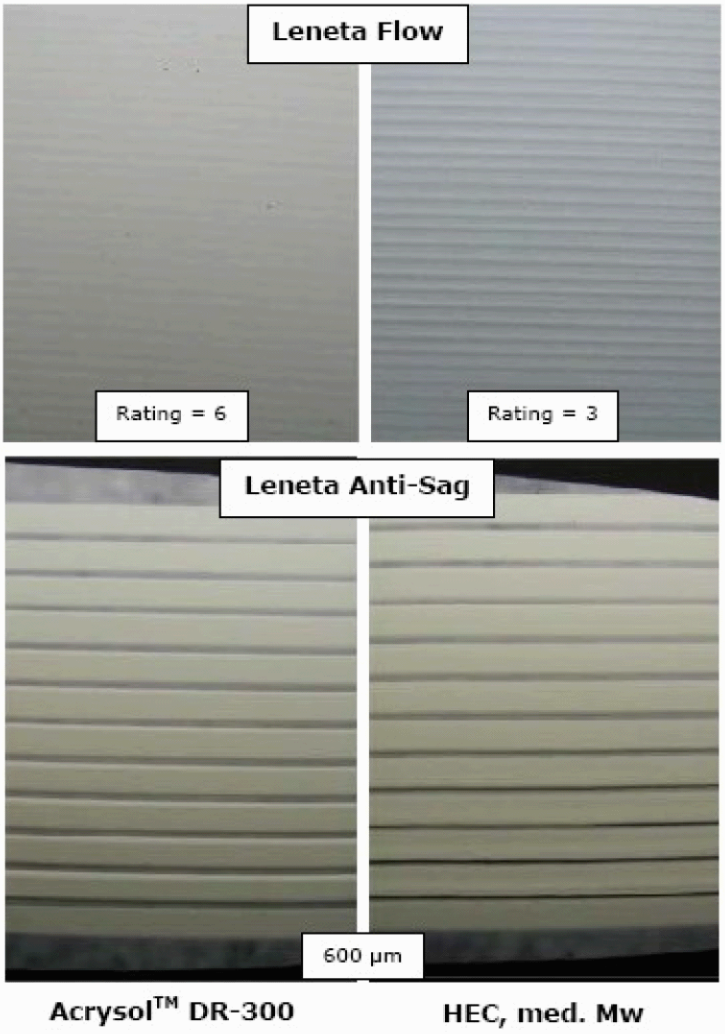


Figure 2: Water resistance of an all-acrylic exterior formulation based on PRIMAL SF-016 ER

*Rated qualitatively. Number of wet-scrub cycles when 50% of the paint was removed.

Flow – Sag Balance

The Leneta flow and sag resistance of two high quality acrylic satin-gloss formulations, one thickened with a medium-molecular-weight cellulose ether and one thickened with ACRYSOL DR-300, were compared. Photos below show the results. The paint thickened with ACRYSOL DR-300 provides superior flow, while maintaining sag resistance at 600 µm.



Exposure Properties

Exposure durability data, supported by accelerated in-lab testing, indicates that ACRYSOL DR-300 can offer exterior durability comparable to typical cellulosic thickeners, exhibiting good resistance to blistering, dirt and mildew. Excellent results have been noted over chalky acrylic, chalky alkyd, gloss alkyd and masonry substrates.

Evaluations of 16 months outdoor exposure exhibited no blistering in either the ACRYSOL DR-300 or the cellulose ether formulations. This absence of blisters is the typical result seen in exposure evaluations, whether in the lab or on test fences.

Formulating Guidelines

When substituting any synthetic associative thickener for a cellulosic agent, the proper choice of dispersant, co-solvent, and surfactant is critical to achieving maximum performance properties and cost savings. While pure polyacid dispersants like OROTAN™ N-4045 are showing excellent compatibility with the DR-Technology, the usage of a hydrophobic copolymer dispersant is recommended with ACRYSOL DR-300 because of the superior exterior durability.

Therefore OROTAN 731-A-ER, at a level of 0.80% solids on titanium dioxide/extender solids, has consistently promoted efficiency and general application performance. For optimum water resistance properties, the most suitable dispersant is OROTAN 165.

Safe Handling Information

The Dow Chemical Company Material Safety Data Sheets (MSDS) contain pertinent information that you may need to protect your employees and customers against any known health or safety hazards associated with our products. Under the OSHA Hazard Communication Standard, workers must have access to and understand MSDS on all hazardous substances to which they are exposed. Thus, it is important that you provide appropriate training and information to your employees and make sure they have available to them MSDS on any hazardous products in their workplace.

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