EXILVA THE NATURAL PERFORMANCE ENHANCER

APPLICATION BULLETIN

EXILVA MICROFIBRILLATED CELLULOSE (MFC)

HOW EXILVA CAN DEAL WITH YOUR SYNERESIS PROBLEMS

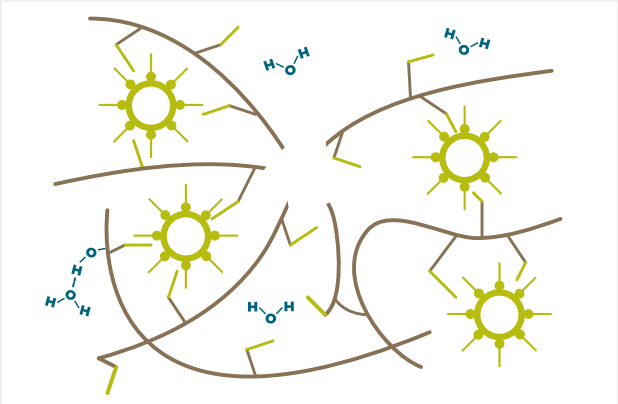
THE BIG SHIFT: FROM WATERSOLUBLE ASSOSIATIVE THICKENERS TO **ADVANCED NON-SOLUBLE** PERFORMANCE ADDITIVES

Syneresis can be a big headache for producers for paints and coatings. The release of water from the unstable paint system creates first and foremost a visually bad impression for the users of the paint. The use of associative thickeners have improved the issues with syneresis, but could we improve the paint & coating systems even further?

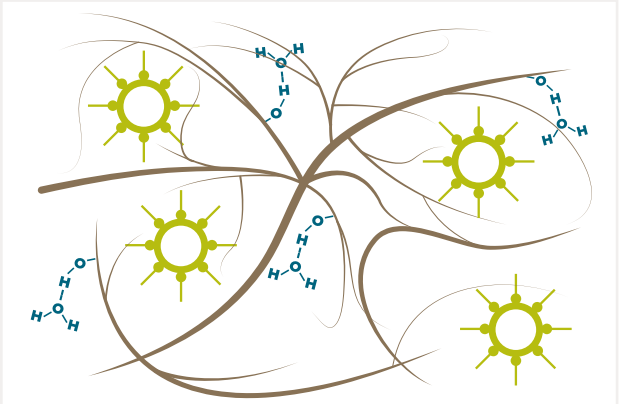
Non-ionic associative thickeners, such as hydrophobically modified ethylenoxide urethane rheology modifier (HEUR) and hydrophobically modified hydroxyethyl cellulose (HMHEC), thickens the paint or coating through a three-dimensional associative network. The hydrophobic groups of the polymer (green on the figure left below) interact with each other and with the latex particles in the formulation, leading into a three-dimensional network that thickens the formulation. Water on the other hand interacts with the hydrophilic parts of the polymer.

WHY EXILVA CAN HELP YOU: **WATER RETENTION**

By forming a non-soluble three-dimensional network, Exilva stabilize the latex particles physically inside this network (figure on the right below). The high hydrophilicity of Exilva ensures that water is bound strongly to the fibers, therefore preventing efficiently issues with syneresis. Since the network of Exilva is highly robust and stable under wide range of different conditions (temperature, pH and shear) it enables you to create stable paint for use in a high variety of geographical markets.



With HMHEC.



With Exilva.

Bio-based Industries Consortium
BIO-BASED INDUSTRIES Public-Private Partnership

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A product by Borregaard

INTERIOR ACRYLIC PAINT FORMULATION

The reference formulation used in the study is based on vinyl acrylic as a binder and HMHEC as a rheology modifier. HEUR was used as an additional thickener for both formulations, while Exilva was dosed significantly lower (approximately 2,5 times lower) than the HMHEC in the reference formulation. The two formulations were compared in terms of tinted viscosity, settling, sag resistance and syneresis.

	With HMHEC (0.46%)		With Exilva (0.18%)	
Material	Amount, lbs.	%	Amount, lbs.	%
Water	249.9	20.86 %	249.9	20.88 %
HMHEC	5.5	0.46 %	-	-
Exilva (10.5%)	-	-	20	1.67 %
AMP 95	2	0.17 %	2	0.17 %
Tamol 1124	6	0.50 %	6	0.50 %
Foamex 8030	2	0.17 %	2	0.17 %
Carbowet DC 01	2	0.17 %	2	0.17 %
Water	48.2	4.02 %	32.4	2.71 %
TiPure R-706	225	18.78 %	225	18.80 %
#1 White	112.5	9.39 %	112.5	9.40 %
Minex 3	112.5	9.39 %	112.5	9.40 %
Diafil 525	50	4.17 %	50	4.18 %
Kathon LX (1.5%)	1.3	0.11 %	1.3	0.11 %
Grind				
Water	19.7	1.64 %	19.7	1.65 %
Encor 310	342.1	28.55 %	342.1	28.58 %
Foamex 8030	2	0.17 %	2	0.17 %
Acrysol RM 2020NPR	17.4	1.45 %	17.4	1.45 %
TOTAL	1198.1	100 %	1196.8	100 %

EVALUATION

The viscosity loss on tinting was low in case of both polymers as well as settling after two weeks heat stability test at 49°C / 120°F. Exilva also showed very minimal syneresis whereas HMHEC it was moderate.

	With HMHEC	With Exilva
General Appearance/Smoothness, 3 Mils	Smooth	Smooth
Viscosity, KU, ASTM D562	100	97
Viscosity, ICI, ASTM D4287	1.4	1
Tinted Viscosity, KU, ASTM D562 (1)	98	91
Difference	-2	-6
Heat Stability, 2 Weeks 49°C / 120°F		
Viscosity, KU	95	88
Difference	-2	-6
Syneresis	Moderate	Very Minimal
Settling	None	None
Sag Resistance		
4 - 24 Mils, ASTM D4400	20	16
Gloss / Sheen, ASTM D523		
60 Degrees	2.6	2.3
85 Degrees	1.1	1.5
Surface Defects	None	None