Bermocoll FLOW is a highly associative, ultra-low viscosity cellulose ether with exceptional flow properties suitable for airless spray applications.

Bermocoll Flow - A natural replacement for associative synthetic thickeners in decorative paint with excellent flow and outstanding sustainability profile

Key benefits:

- A new type of hydrophobically modified Bermocoll which exceptional flow which can replace associative synthetic thickeners
- Combines the flow and leveling properties of an associative synthetic thickener with the stability properties of a cellulosic thickener
- Can reduce cost and formulation complexity
- Performs particularly well in acrylic and vinyl acrylic formulations for interior and exterior use
- Especially suited for low-VOC formulations and airless spray applications
- Contribution from the thickener system to the carbon footprint of 1 ton of paint is 40 % lower for Bermocoll FLOW compared to a synthetic HEUR* thickener system.

**HEUR=hydrophobically modified polyurethane*

Nouryon

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About Nouryon
Nouryon is a global, specialty chemicals leader. Markets and consumers worldwide rely on our essential solutions to manufacture everyday products, such as personal care, cleaning goods, paints and coatings, agriculture and food, pharmaceuticals, and building products. Furthermore, the dedication of more than 7,900 employees with a shared commitment to our customers, business growth, safety, sustainability and innovation has resulted in a consistently strong financial performance. We operate in over 80 countries around the world with a portfolio of industry-leading brands. Visit our website and follow us @Nouryon and on LinkedIn.

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Case study

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Bermocoll® FLOW in all acrylic low VOC formulations for airless spray applications

Bermocoll®

Nouryon

Bermocoll® FLOW

Bermocoll FLOW offers exceptional flow properties and an optimized sag/leveling balance. It can replace associative synthetic thickeners in order to reduce cost and formulation complexity.

Case study: Bermocoll® FLOW in all acrylic low VOC formulations for airless spray applications

Bermocoll FLOW has a low carbon footprint* and is a preferred choice for low VOC formulations. It performs particularly well when combined with the Nouryon wetting agents and dispersants.

As an example, the hydrophobic character of the Alcosperse 787 dispersant will enhance the associative behavior of Bermocoll FLOW thereby improving the KU build, besides providing increased water resistance of the formulation. The viscosity and color acceptance can be fine-tuned with the Nouryon narrow-range alcohol ethoxylates, giving consistent batch-to-batch performance.

Four low VOC all acrylic formulations of different types (Table 4) were prepared using well-known latexes and commercially available dispersants along with Bermocoll FLOW and the Nouryon PCI portfolio. The paints were formulated to 100 KU and 0,8 – 0,9 ICI. Bermocoll FLOW was used as a sole thickener at 0,5 -0,6 % (w/w) addition (6-7 lbs/100 gallons).

All formulations showed excellent flow and leveling properties while retaining sag resistance, color acceptance, contrast ratio and gloss (table 1).

A weathering study of the exterior paint (table 2) showed that the paint properties are well retained. The exterior flat paint is formulated with a combination of Alcosperse 787, Ethylan 1008 and Bermocoll FLOW in a low-VOC, all acrylic binder.

Airless spray application

The exterior flat paint was tested in an airless spray study including two commercial alternatives and showed excellent ease of atomization and back rolling. Scores were high or excellent for flow and leveling, gloss difference and touch up properties (airless spray/back rolling), visible spray lines and sag lines (table 3). The interior flat paint performed equally well.

Table 1: General paint test results, all formulations.

Formula	Interior Flat	Interior Satin	Interior Semigloss	Exterior Flat
Latex	Rhoplex VSR-50	Rhoplex VSR-1049 LOE	Rhoplex VSR-1049LOE	Acronal EDGE 4247
Dispersant	Alcosperse 787	Tamol 165A	Tamol 165A	Alcosperse 787
Surfactant	Berol 185	Ethylan 1008	Ethylan 1008	Berol 185
Flow & Leveling				
Leneta, ASTM D4062	7	9	9	8
Subjective, Brushed	6	7	7	7
Subjective Rolled	7	8	8	7
Flow & Leveling - Average	6,7	8,0	8,0	7,3
Sag Resistance				
Sag Resistance, ASTM D4400	24+	12	10	24+
Spatter Resistance				
Spatter Resistance, ASTM D4707	7	7	7	7
Contrast ratio				
Contrast Ratio, 3 mils, ASTM D2805	0,980	0,984	0,979	0,979
Reflectance	92,9	93,7	92,7	91,6
Gloss, ASTM D523				
Gloss 20	0,9	3,2	24,0	0,9
Gloss 60	3,7	23,6	63,8	4,6
Sheen 85	2,7	34,4	85,8	2,5
Scrub Resistance				
Scrub Resistance, ASTM D2486				
Average 2 runs Failure	651	904,5	915,5	837
Color Acceptance				
Color Acceptance**	Pass	Pass	Pass	Pass
DE - Rubbed / Unrubbed	0,48	0,23	0,14	0,17

*) 40% lower than a synthetic HEUR thickener system according to LCA (Life Cycle Analysis) available upon request.
**) 3% (w/w) 808-9907 Lamp Black

Table 2: Weathering study of exterior paint

QUV Weathering ASTM D4587 1000 h	Exterior flat, untinted			Exterior flat,tinted*		
GLOSS	Initial Gloss	Gloss 1000 h	% retained	Initial Gloss	Gloss 1000 h	% retained
Gloss 60	4,9	3,8	78	4,0	3,1	78
Gloss 85	3	2,2	73	2,8	2,3	82
CIELAB	Initial	1000 h	Delta	CIELAB	1000 h	Delta
L*	95,49	95,32	-0,17	64,93	64,55	-0,38
a*	-1,15	-1,13	0,02	-1,43	-1,44	-0,01
b*	0,43	0,33	-0,1	-5,58	-5,7	-0,12
DE			0,20			0,40

No Chalk, Cracking or Checking according to ASTM methods
*) 3% (w/w) 808-9907 Lamp Black

Table 3: Airless spray study, results for exterior flat paint with Bermocoll FLOW vs two commercial paints.

Paint	Exterior Flat FLOW	Commercial (1)	Commercial (2)
Ease of Atomization	4	5	3
Ease of Back Rolling	4	4	4
Pinholes, Craters, Foam	4	4	5
Flow & Leveling, Airless Spray	5	5	5
Flow & Leveling, Back Rolled	3	4	4
Visible Spray Lines	3	3	3
Sag Lines Pass / Fail 12 - 16 Wet Mils	PASS	PASS	FAIL
Color Difference (DE) - Spray / Back Roll	0,3	0,13	0,29
Gloss Difference 85 Degr - Spray / Back Roll	0,1	0,5	0,4
Touch Up - Airless Spray / Brush DE	0,18	0,32	0,8
Subjective Rating	3	3	3
Touch Up - Back Rolled / Brush DE	0,34	0,23	0,63
Subjective Rating	5	5	4

Paints tinted to Wild Porcini 250E-3
Ratings Scale: 5: Excellent, 4: Very Good, 3: Good, 2: Fair, 1: Poor

Table 4: Complete formulations (g/1000 g)

Paint	Interior Flat PVC≈40 VS≈37 VOC ≈0			Interior Satin PVC≈37 VS≈36 VOC≈<50			Interior Semigloss PVC≈28 VS≈34 VOC≈<50			Exterior Flat PVC≈46 VS≈41 VOC≈<50		
Component/amount	g	lbs.	gallons	g	lbs.	gallons	g	lbs.	gallons	g	lbs.	gallons
Water	195	221	26,5	195	210	25,2	181	192	23,1	256	299	36
Bermocoll FLOW	6,2	7,0	0,63	5,6	6,0	0,54	6,6	7	0,63	5,5	6,5	0,59
Biocide	1,7	1,9	0,21	1,7	1,8	0,21	1,7	1,8	0,21	11,1	13	1,4
AMP 95/Ammonia	4,6	5,2	0,7	2,3	2,5	0,33	2,4	2,5	0,33	1,2	1,4	0,19
Defoamer	1,8	2,0	0,25	0,9	1,0	0,12	0,9	1	0,12	1,7	2	0,28
Alcosperse 787	10,1	11,5	1,2							12,3	14,4	1,5
Tamol 165A				8,5	9,10	1,0	8,6	9,10	1,0			
TiO2 R-706	176	200	6							192	225	6,75
TiO2 R-746 Slurry				294	316	16,2	318	336,8	17,25			
Minex 4/Minex 10	88,1	100	4,6	55,0	59,1	2,7	7,1	7,5	0,34	196	230	10,6
Optiwhite	88,1	100	4,5							3,4		
Attagel 50											4	0,2
Rhoplex VSR-50	419	475	54									
Rhoplex VSR-1049LOE				367	395	45	434	460	52			
Acronal EDGE 4247										311,5	365	41
Ropaque Ultra EF				54,1	58	6,8	22,2	24	2,8			
Coalescent	5,7	6,5	0,86	5,9	6,3	0,8	4,2	4,5	0,56	5,1	6	0,75
Defoamer	1,8	2,0	0,25	1,9	2	0,24	1,9	2	0,24	1,7	2	0,28
Propylene glycol				5,6	6	0,7	9,4	10	1,2			
Berol 185	2,6	3,0	0,35							2,6	3	0,35
Ethylan 1008				2,3	2,5	0,31	2,4	2,5	0,31			
TOTAL (g/lbs/gallons)	**1000**	**1135**	**100**	**1000**	**1075**	**100**	**1000**	**1060**	**100**	**1000**	**1172**	**100**

Table 5: Typical properties of Bermocoll FLOW

Physical data	
Appearance	yellowish powder
Particle size	98 % ≤ 500 µm
Water content	≤ 4 %
Salt content	≤ 4.5 %

Characteristics of aqueous solutions	
Solution appearance	opaque
pH (1 % solution)	4 - 7
Surface activity	weak
Viscosity at 20°C (Brookfield LV)	
2 % solution	500 - 1500 mPa.s