

The product guide for

Bermocoll[®] in latex paint



Nouryon

Committed to sustainability and innovation

Growth driven by innovation

We invest significantly in R&D to drive growth through innovation, create more profitable, safer, and more sustainable products and processes, develop our own capabilities, and improve the way we work. We believe that being open to the ideas and enthusiasm of outside collaborators will help our company achieve its maximum potential and lead the way to a more sustainable chemical industry.

Sustainability is a cornerstone of our overall strategy to achieve long term success

We have long been an industry leader in sustainability and our commitment to sustainability remains unchanged going forward. We take pride in improving our environmental impact and maximizing our positive societal impact.

On a daily basis we strive to do more with less, reducing carbon emissions through a combination of improved energy efficiency, increased use of renewable energy, and higher use of bio-based raw materials in production.

Downstream, we focus on expanding our portfolio of eco-premium products, which have a significant sustainability benefit over common alternatives.

We see sustainability not just as the right thing to do, but as a true business opportunity that delivers value to everyone involved.

Backed up by our commitment to Product Stewardship we believe that supplying the right chemistry goes beyond just selling products. Our efforts have been rewarded. The ISO 9001 and ISO 14001 certification awarded for innovation, purchasing, operations, marketing and distribution of Bermocoll® are only the first steps on the road to fulfilling our ambitions - to meet customers' request for competitive, environmentally sound, and profitable products today and tomorrow.

Bermocoll® is a registered trademark in many countries.

Our Bermocoll portfolio

Bermocoll® cellulose ethers are manufactured by a unique, solvent-free process, ensuring you a reliable product with a low carbon footprint.

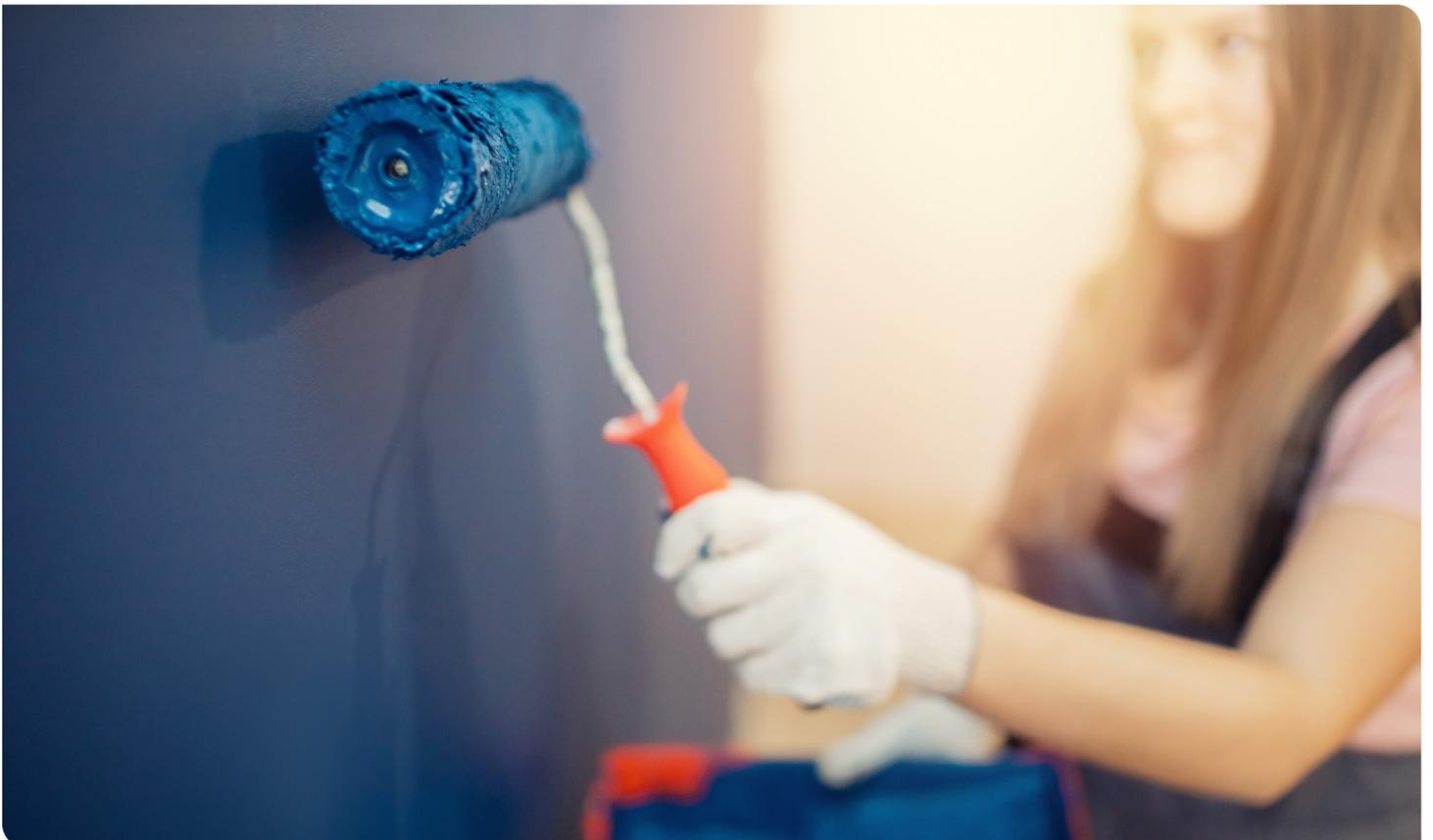
Bermocoll makes a difference with reliable rheology

We at Nouryon have been serving the paint industry around the world for more than 75 years with our brand Bermocoll®, a range of non-ionic cellulose ethers. Bermocoll® is used as a rheology modifier, stabilizer and water retaining agent for water-based decorative paints.

Bermocoll® cellulose ethers are manufactured by a unique, solvent-free process, ensuring our customers a low carbon footprint. They are available in all required viscosities and a range of modifications to ensure we meet every customers' needs.

Rheology of coatings

Rheology is the science of deformation and flow of materials. Every material is influenced by external forces. For paint, these forces can range from gravitational forces, which influence phenomena such as sedimentation, leveling and sagging, to the very high shear forces that act on the paint when it is brushed, rolled or sprayed. Viscosity is a measure of a material's resistance to flow.



Reliable rheology solutions

Bermocoll® Prime – high performance grades

We know that a high application viscosity is essential for good film build and hiding power. That's why our Bermocoll Prime contributes to the medium and high shear viscosity to a much greater extent than regular cellulose ethers.

Prime grades	Viscosity (mPa.s) in 1% water solution
Bermocoll Prime 1000	500 – 900
Bermocoll Prime 1500	900 – 1500
Bermocoll Prime 2500	2200 – 3200
Bermocoll Prime 3500	3000 – 4000

Bermocoll Prime has been developed as the next generation of cellulose ethers. It can be used in all types of latex paints ranging from low to high PVC. This new product is suitable for all types of interior and exterior paints and the advantages are most apparent in flat to semigloss finishes.

Performance advantages

- Advanced color compatibility and rheology control to enhance touch up properties
- Optimal rheology profile
- Versatile

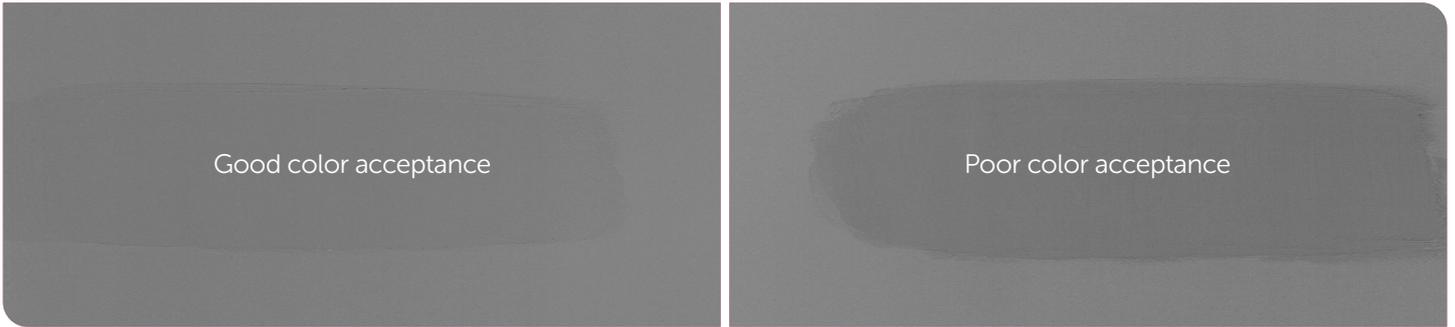
Superior color stability and excellent color development

Excellent color stability is achieved with Bermocoll Prime within a wide range of colorants and latex binders. Bermocoll Prime is designed with particular attention to color acceptance and color development and offers reliable color performance. This means that the color appears in a uniform homogenous manner and at the expected color strength. Color acceptance is related to the compatibility, distribution and stability of the colorant in the base paint.

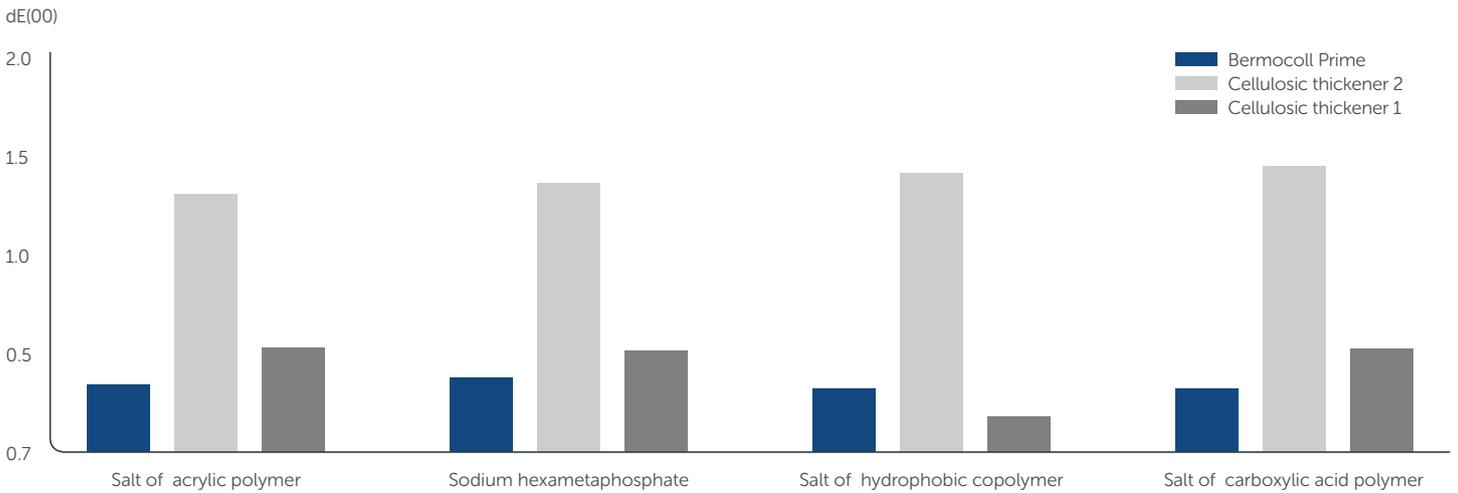
Efficient thickening and good stability at low addition rate

Paints formulated with Bermocoll Prime show very stable and constant viscosity even when stored at elevated temperatures and are very versatile with respect to compatibility with different kinds of binders.

Superior color stability and excellent color development



Color acceptance, violet 3% – typical dispersing agents



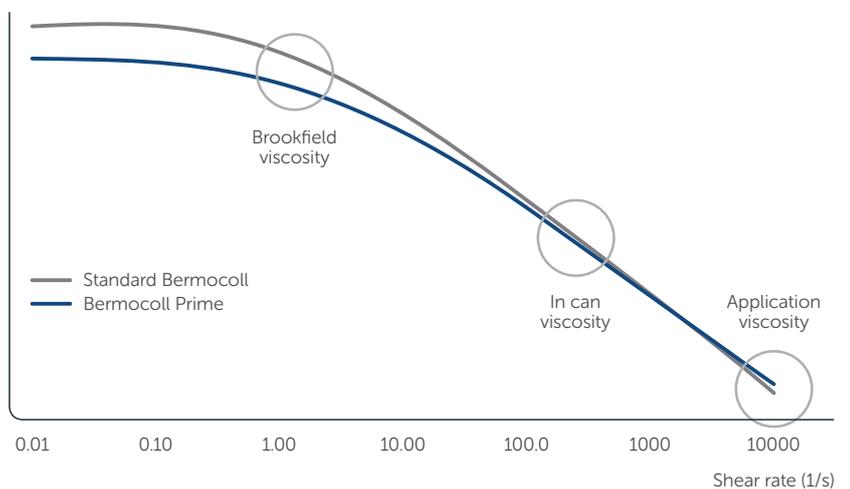
Flat paint formulation

Bermocoll Prime was tested in a system known to be sensitive with respect to color acceptance. The tinters used were of different color shades that are known to be problematic. A range of different dispersants were tested.

Optimal rheology profile

Bermocoll Prime is less shear thinning than Bermocoll Standard. With a comparable viscosity in paint Bermocoll Prime has lower Brookfield viscosity in water solution.

Viscosity in water solution (Pa.s)



It's a matter of spatter

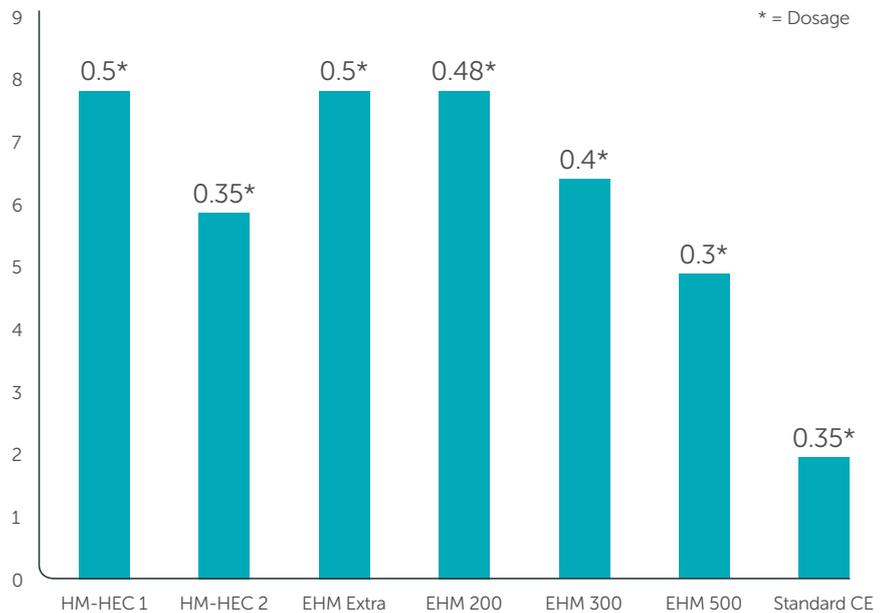


Bermocoll® EHM – associative grades

Bermocoll® EHM is a non-ionic associative cellulose-based polymer with enhanced enzymatic resistance. We developed it in order to improve the rheological properties in latex paints. Bermocoll® EHM combines the performance of low viscosity cellulose with high thickening efficiency.

EHM grades	Viscosity (mPa.s) in 1% water solution
Bermocoll EHM 200	350 – 700
Bermocoll EHM 300	1700 – 3000
Bermocoll EHM 500	7000 – 10 000
Bermocoll EHM Extra	250 – 450

Spatter resistance



Performance advantages

- Combines advantages of cellulose ethers with rheological properties of synthetic associative thickeners
- Low spatter
- Good leveling
- Enhanced brushing viscosity

Below, from left to right, spatter from:

EHM Extra

EHM 200

EHM 300

EHM 500

Standard



Bermocoll® EHM Extra

– high performing associative grade

Bermocoll EHM Extra is specially developed to meet the demand for high-quality paint and next generation cellulose derivatives. It maintains all of the advantages of existing hydrophobically modified products, while boosting additional properties such as higher application (ICI) viscosity, color acceptance, reduced color float and enhanced storage stability.

Performance advantages

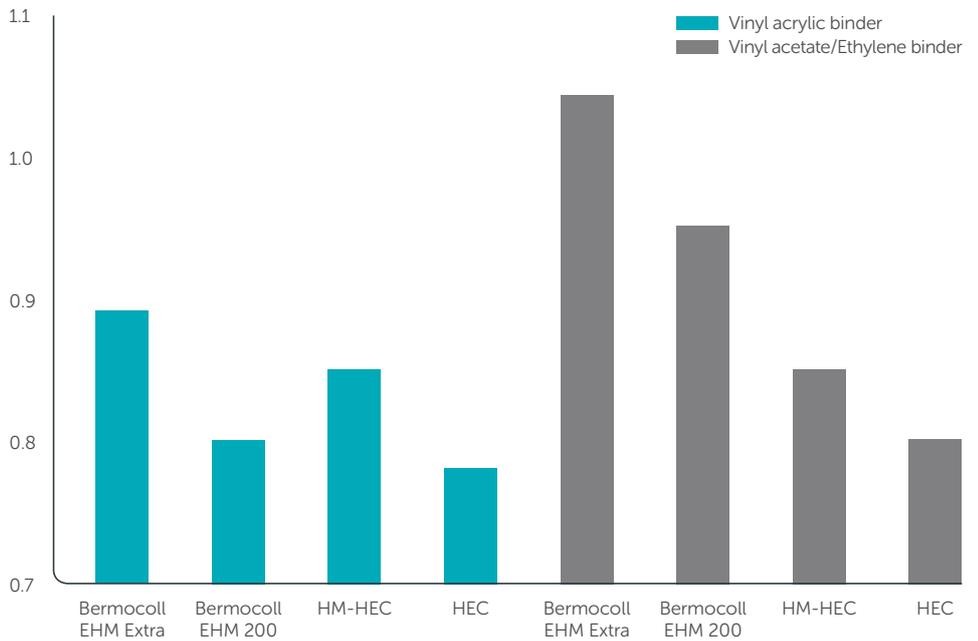
- Excellent application properties for outstanding coverage and film build
- Superior storage stability with minimal syneresis
- Extremely good application properties, such as spatter and sag resistance

Paint rheology, higher ICI viscosity

With equal dosage and Stormer viscosity (KU), Bermocoll EHM Extra achieves higher ICI viscosity than competitor products – demonstrating the robust and reproducible thickening character of our product. The higher ICI viscosity contributes to an improved film build and thus better coverage.

Application (ICI) viscosity

ICI viscosity (P)

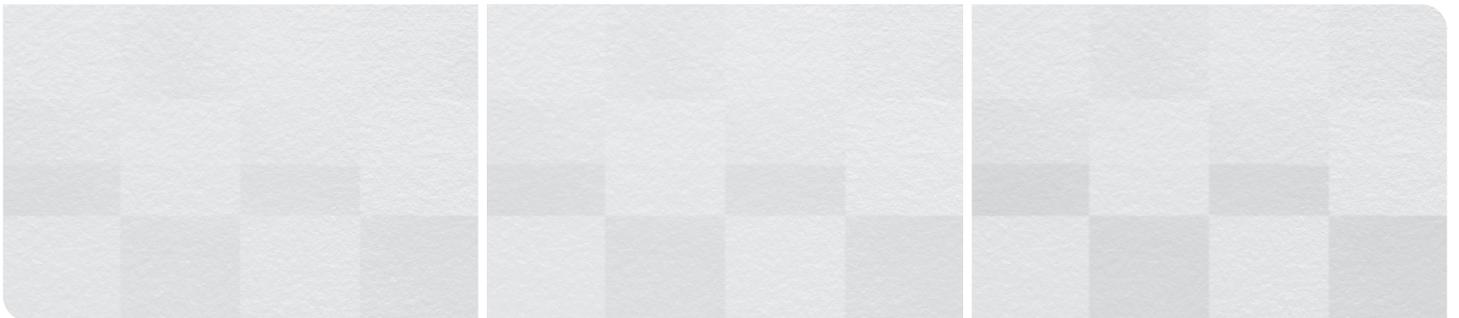


Hiding power

EHM Extra

EHM 500

EBS 481 FQ



Biostable and well-proven

Bermocoll® E, EBS and EM – standard grades

When choosing the viscosity type of Bermocoll you should consider its influences on a number of properties in the paint. Leveling, hiding power and spatter will be better when using medium and low viscosity grades due to their more Newtonian character. On the other hand the higher viscosity grades offer improved cost efficiency and water resistance because of lower addition levels.

Performance advantages cellulose ethers versus synthetics

- Water retention - Bermocoll helps to retain the water within the paint film and also to delay it from penetrating into the substrate or evaporating. This gives an increased open time.
- Contribute to dispersion by improving flow during grinding.
- Contribute to stabilization (prevent flocculation) of pigments.
- Robust/Stable viscosity and creamy texture.
- Natural renewable polymer with chief component wood pulp or cotton linters.

Performance advantages: Low viscous

- Maximum open time/water retention
- Leveling
- High application (ICI) viscosity

Performance advantages: High viscous

- Efficiency
- Texture
- Economic

Standard grades

Viscosity (mPa.s) in water solution

	1%	2%
Bermocoll E 230 FQ		260 – 360
Bermocoll E 320 FQ		1850 – 2650
Bermocoll EBS 351 FQ		5000 – 6000
Bermocoll EBS 451 FQ	3000 – 4000	
Bermocoll EBS 481 FQ	4000 – 6000	
Bermocoll EM 7000 FQ	6000 – 8000	

Open time



Storage stability (50° C, 2 weeks)



Color floating (50° C, 2 weeks)



High efficiency and excellent stability



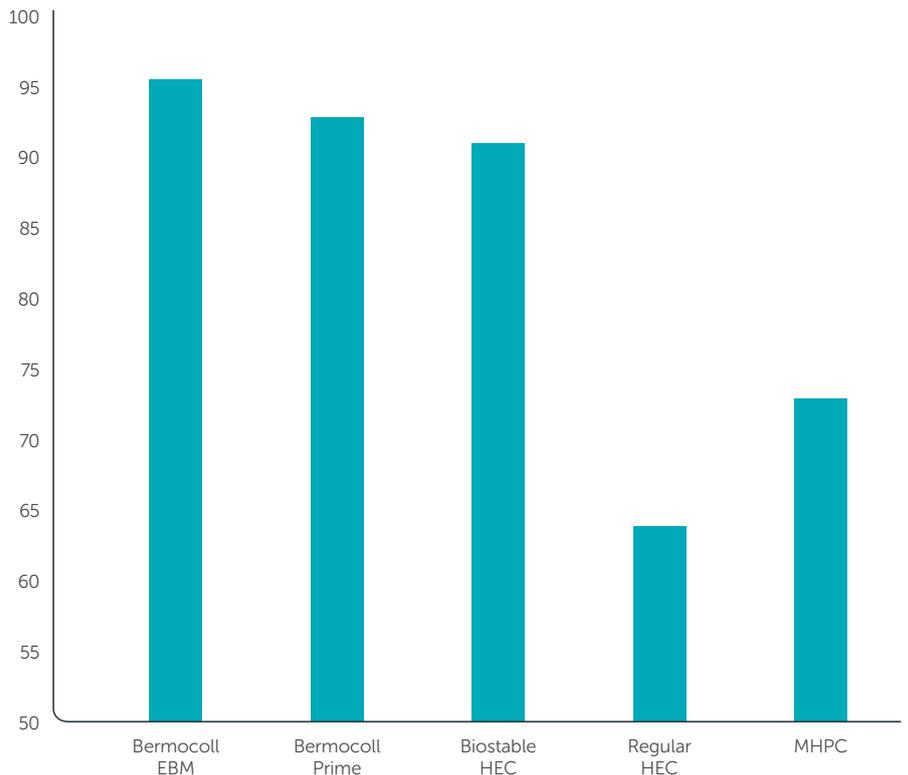
Bermocoll® EBM – high viscosity grades

High viscosity products with enhanced stability. Our EBM grades are especially appreciated in high PVC formulations like joint compounds, distempers and putties because of their good compatibility with fillers. Bermocoll EBM is suitable for both paint and building applications.

Unique enzyme resistance

Bermocoll® EBM 10 000 is specially developed to meet the demand for a high viscous thickener with an excellent stability against enzymatic attack.

EBM grades	Viscosity (mPa.s) in 1% water solution	Enzyme resistance Retained viscosity in %
Bermocoll EBM 5500	5000 – 6500	95
Bermocoll EBM 8000	7000 – 9000	92
Bermocoll EBM 10 000	10 000 – 15 000	91



Performance advantages

- High viscosity grades hence highly efficient
- Outstanding enzyme stability
- Especially appreciated in high PVC formulations
- Excellent storage stability and color acceptance



Causes and cures

Guidance for latex paint formulation with Bermocoll®

Problem	Cause	Cure
Manufacturing		
Lump formation during dissolving of Bermocoll	<ul style="list-style-type: none"> • Wrong type of Bermocoll used • pH of water too high • pH of solution too high 	<ul style="list-style-type: none"> • Use only Bermocoll paint grades • Add acetic acid • Add Bermocoll directly after adding water – then add alkaline ingredients, e.g. pigment dispersant
Too slow dissolving	<ul style="list-style-type: none"> • Neutral or acidic water • Temperature too low 	<ul style="list-style-type: none"> • Increase pH
Too fast dissolving	<ul style="list-style-type: none"> • pH too high • Hard water/high pH • Temperature too high 	<ul style="list-style-type: none"> • Decrease pH
Foam development during grinding	<ul style="list-style-type: none"> • Surface active products (Bermocoll, surfactants, pigment dispersant) 	<ul style="list-style-type: none"> • Add the right foam suppressor before Bermocoll and other surface active products
Final viscosity too low	<ul style="list-style-type: none"> • Inadequate amount of Bermocoll 	<ul style="list-style-type: none"> • Post addition of slurry of Bermocoll or polyurethane thickener
Final viscosity too high	<ul style="list-style-type: none"> • Incorrect amount or type of Bermocoll 	<ul style="list-style-type: none"> • Use lower addition level • Use lower viscosity grade
Application		
Spatter from roller	<ul style="list-style-type: none"> • Too elastic thickener 	<ul style="list-style-type: none"> • Use Bermocoll low viscosity grade or EHM grade • Use polyurethane thickener in combination with Bermocoll
Brush resistance too low	<ul style="list-style-type: none"> • Low application viscosity 	<ul style="list-style-type: none"> • Use Bermocoll low viscosity grade or EHM grade
Poor open time	<ul style="list-style-type: none"> • Insufficient water retention 	<ul style="list-style-type: none"> • Increase Bermocoll addition level • Add glycol
Poor hiding power	<ul style="list-style-type: none"> • Low application viscosity 	<ul style="list-style-type: none"> • Use Bermocoll low viscosity grade or use EHM grade
Dried film		
Poor gloss	<ul style="list-style-type: none"> • Cellulose ethers not suitable in high gloss paints 	<ul style="list-style-type: none"> • Use polyurethane thickener
Poor leveling	<ul style="list-style-type: none"> • Rheological character of the paint 	<ul style="list-style-type: none"> • Use Bermocoll low viscosity grade or EHM grade • Use polyurethane thickener in combination with Bermocoll
Inadequate wet scrub resistance	<ul style="list-style-type: none"> • Water sensitivity of film 	<ul style="list-style-type: none"> • Reduce surface active ingredients
Storage		
Drop in viscosity	<ul style="list-style-type: none"> • Enzymatic degradation • Bacterial contamination 	<ul style="list-style-type: none"> • Use enzyme stable Bermocoll grades • Clean production equipment • Change bactericide
Increase in viscosity	<ul style="list-style-type: none"> • Insufficient amount of dispersant • Interaction Bermocoll/Latex 	<ul style="list-style-type: none"> • Increase pigment dispersant • Use non-ionic surfactants • Use new generation Bermocoll
Separation	<ul style="list-style-type: none"> • Low shear viscosity too low 	<ul style="list-style-type: none"> • Increase Bermocoll addition or use higher viscosity grade
Syneresis	<ul style="list-style-type: none"> • Insufficient colloidal stabilization 	<ul style="list-style-type: none"> • Add non-ionic surfactants • Use new generation Bermocoll

Incorporating Bermocoll

The method of choice for incorporating Bermocoll is yours. We will make sure you will get the high quality you deserve.

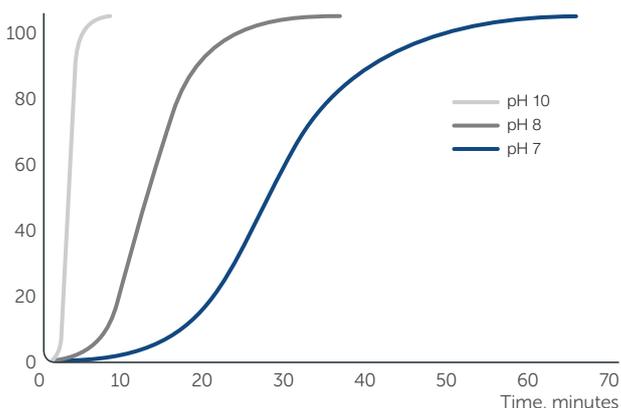
Bermocoll cellulose ethers can be incorporated into the paint in different ways and at several stages during the manufacturing process. We recommend the following three main addition methods to be considered: as a dry powder (“batch in one”), as a slurry, and as a stock solution. All three methods have their pros and cons. Your choice of method will mainly be dependent upon the type of equipment and process you use.

As a dry powder

Bermocoll paint grades can be added as a dry powder directly to the batch of water in the pigment grind. When added, the water should be neutral or slightly acid. Alkaline ingredients are added after thorough dispersion of the cellulose ether. We have seen that with this method, the dispersion power of Bermocoll is utilized during the subsequent grinding.

Bermocoll paint grade, influence of pH at 20°C.

Relative viscosity in %



As a slurry

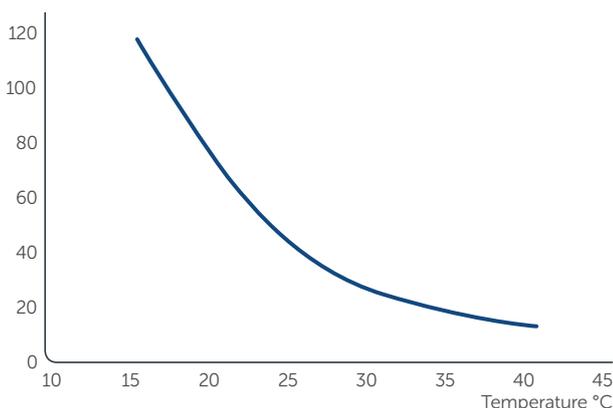
Slurries containing up to 15–20% Bermocoll are readily made by dispersing a Bermocoll paint grade either in water or in a suitable organic solvent. Such slurries are generally usable within half an hour after preparation. When working with aqueous slurries of Bermocoll paint grades, the pH must be 7 or less.

As a stock solution

Stock solutions are made by adding Bermocoll powder to water and stirring until the thickener is dissolved. We recommend a concentration of 2–5% depending on the Bermocoll type. When using a Bermocoll paint grade, the water should be neutral or slightly acid. If it is alkaline when adding Bermocoll paint, the thickener will dissolve too quickly, forming an insoluble gel instead of a solution. If you’re planning to store stock solutions for a prolonged length of time, we recommend that stock solutions should be protected from micro-organisms by using a suitable preservative.

Bermocoll paint grade, influence of temperature at pH 7.

Dissolving time, minutes



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Bermocoll is also suitable
for use in eductors where
the slurry concentration can
be even higher, up to 30%.
—



Who we are and what we do

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.

Your partner in essential solutions for a sustainable future

Paints and Coatings, one of the Nouryon business lines, have a unique technology base and profound experience of high quality cellulose ethers as well as surfactants.

Reliable rheology solutions

Bermocoll[®], our well-known range of non-ionic cellulose ethers, are used as rheology modifiers, stabilizers and water retaining agents for water-based decorative paints and coatings.

Our research and product development has always been guided by our customers and their requirements. We strive to be the most reliable and dedicated supplier of cellulose ethers to the water-based paint industry.

Bermocoll locations:

Service center

Bridgewater (NJ), USA

Surfactants for improved paint performance

We provide the paints and coatings industry with a wide range of surfactants for improved wetting, pigment dispersing, paint compatibility and much more.

Our surfactants brand names are: Berol, Ethylan, Phospholan, Alcosperse, Amadol among others.

**Research and development/
Business and service center**

Stenungsund/Gothenburg, Sweden

Production site

Örnsköldsvik, Sweden

Business and service center

Shanghai, P.R. China

Business and service center

Dubai, UAE

Business and service center

Singapore

Production site

Ningbo, P.R. China



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Bermocoll® is a registered trademark in many countries.

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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