

The product guide for

# Bermocoll<sup>®</sup> in latex paint



# Committed to sustainability and innovation

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## 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.

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

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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, ISO 14001 and OHSAS 18001 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

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

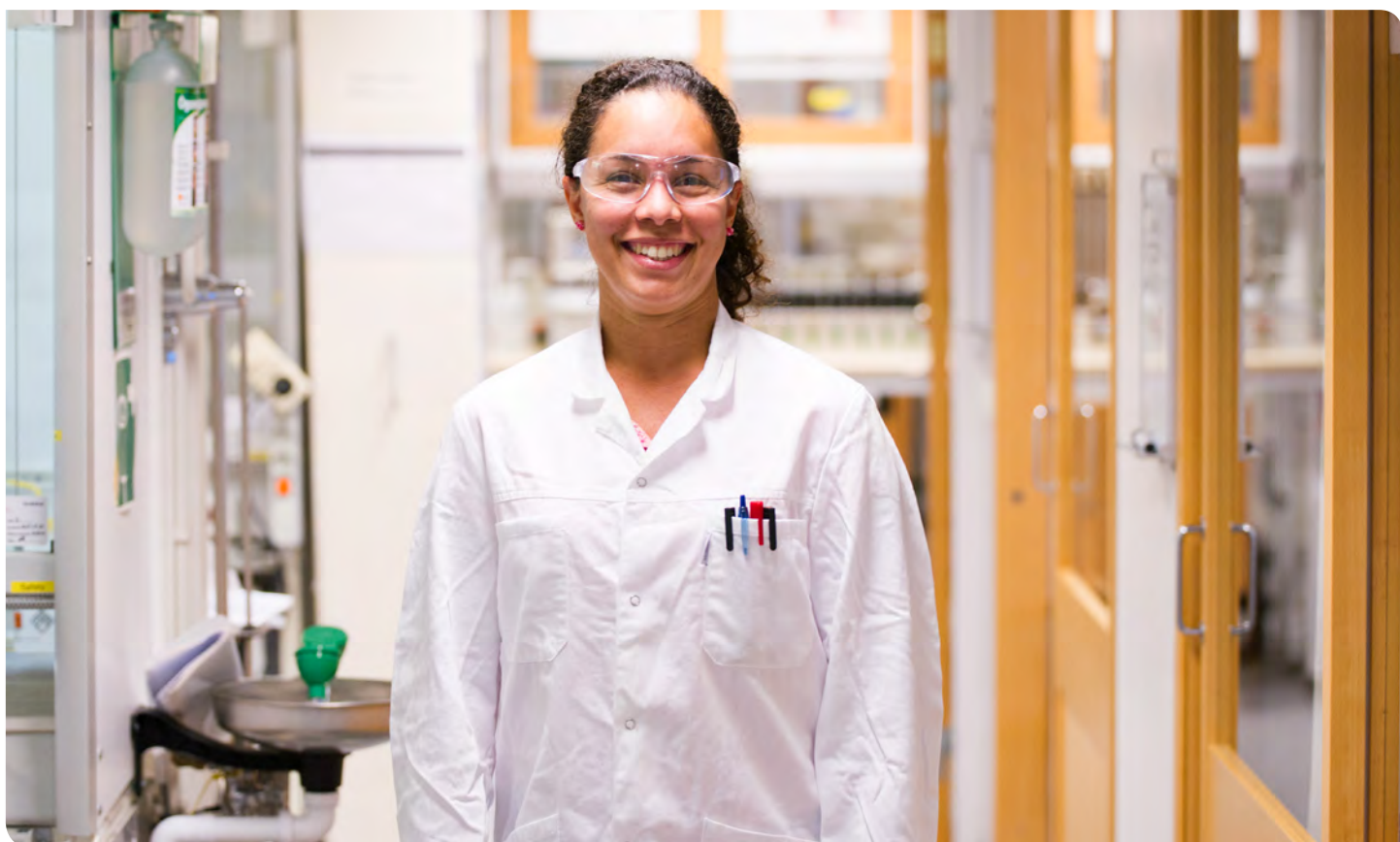
## **Bermocoll makes a difference with reliable rheology**

We at Nouryon have been serving the paint industry around the world for more than 50 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 customer's 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 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

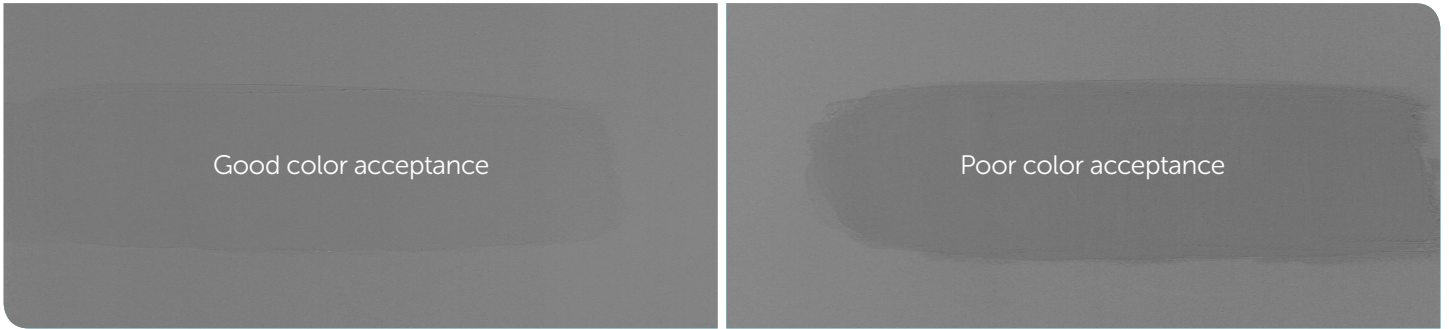
### Superior color stability and excellent color development

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.

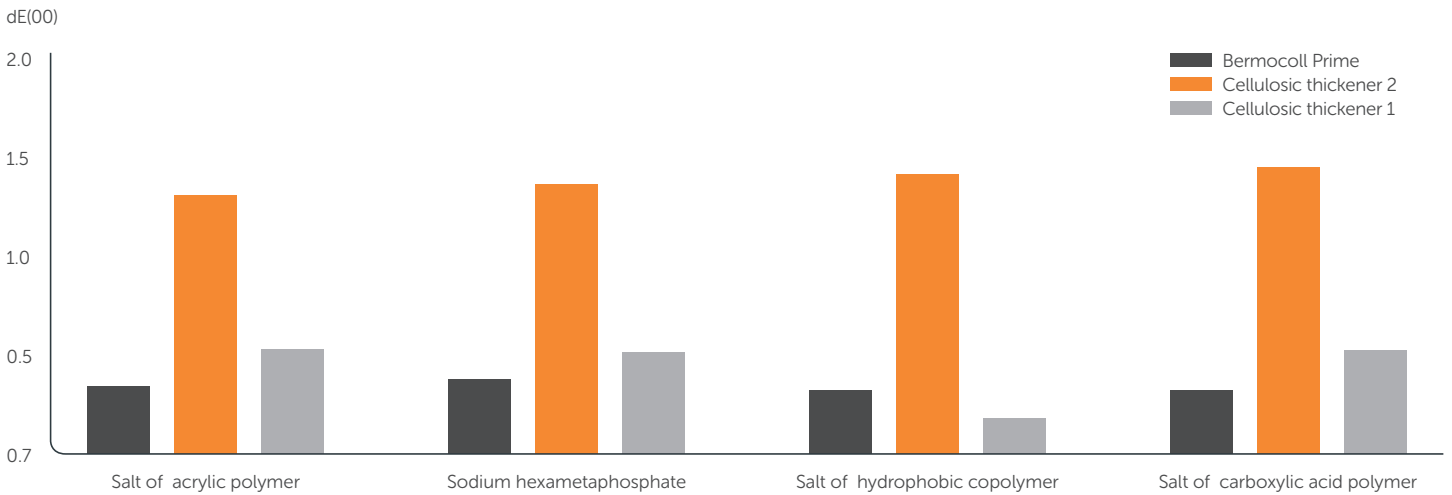
### Efficient thickening and good stability at low addition rate

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**



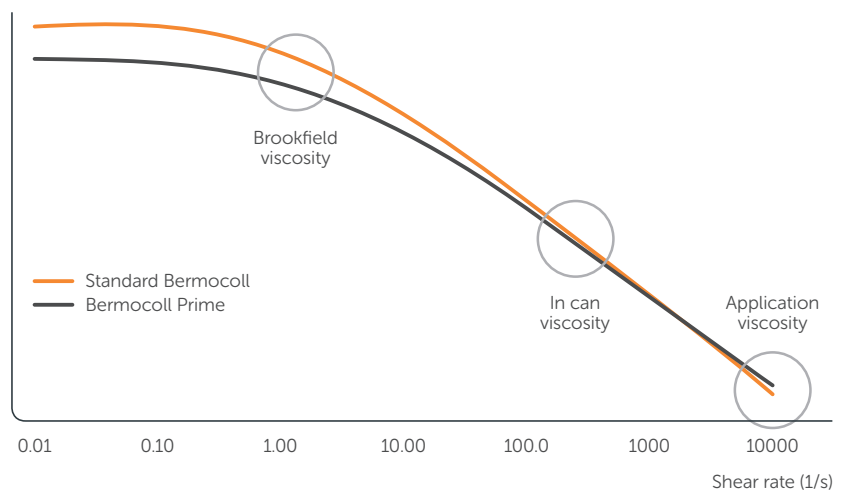
**Flat paint formulation**

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

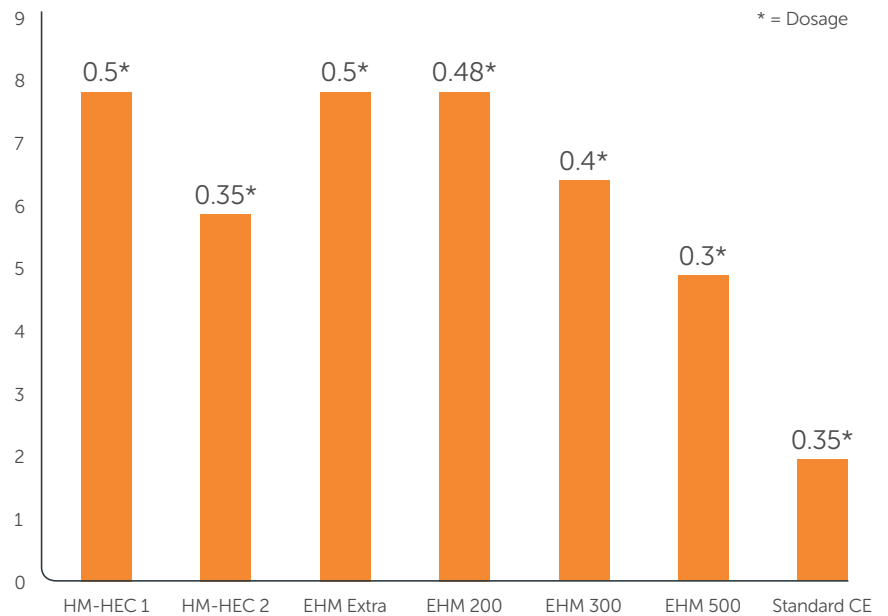
Bermocoll® EHM is a non-ionic associative cellulose-based polymer with enhanced enzymatic resistance. We developed it in order to improve the rheological properties in latex paints. Bermocoll® EHM combines the performance of low viscosity cellulose with high thickening efficiency.

EHM grades	Viscosity 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

### Performance advantages

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

### Spatter resistance



Below, from left to right, spatter from:

EHM Extra

EHM 200

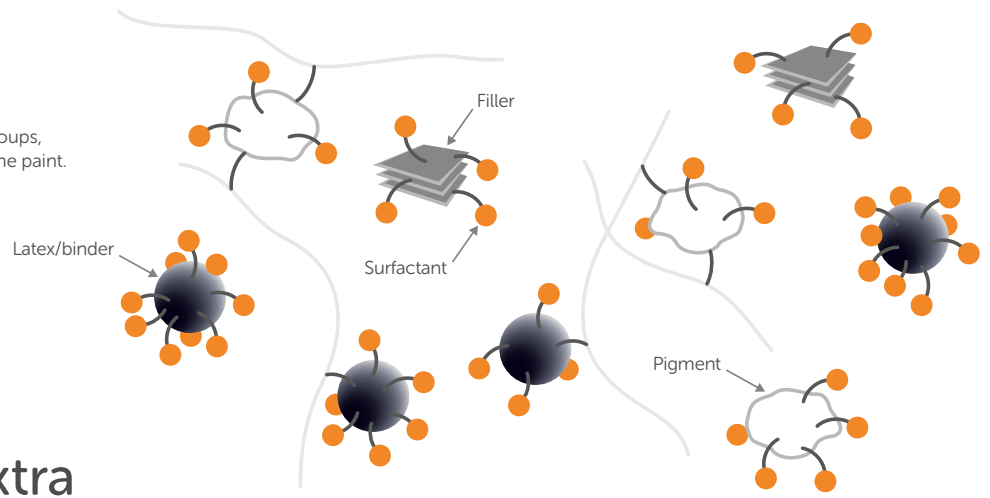
EHM 300

EHM 500

Standard



The Bermocoll EHM molecule contains hydrophobic groups, which can associate with hydrophobic surfaces within the paint.



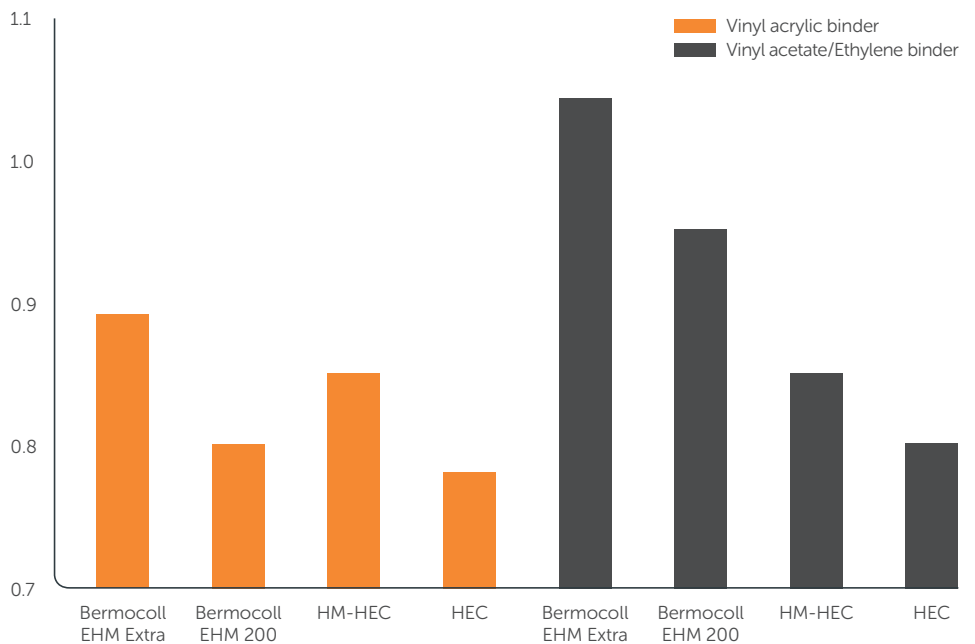
## Bermocoll® EHM Extra – high performing associative grade

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.

### 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)



### Performance advantages

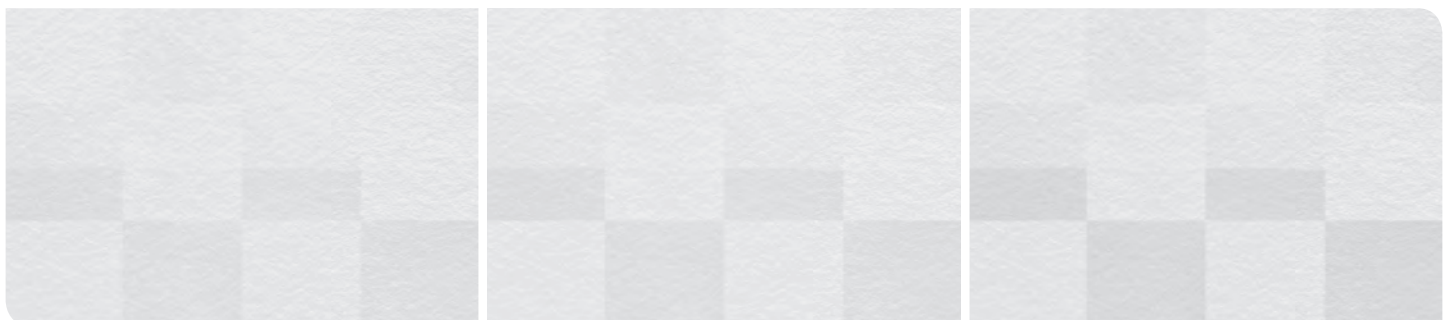
- Excellent application properties for outstanding coverage and film build
- Superior storage stability with minimal syneresis
- Extremely good application properties, such as spatter and sag resistance

### 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

Bermocoll E 230 FQ  
 Bermocoll E 320 FQ  
 Bermocoll EBS 351 FQ  
 Bermocoll EBS 451 FQ  
 Bermocoll EBS 481 FQ  
 Bermocoll EM 7000 FQ

#### Viscosity 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	

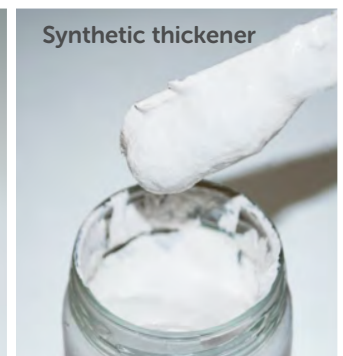


Open time

Storage stability (50° C, 2 weeks)

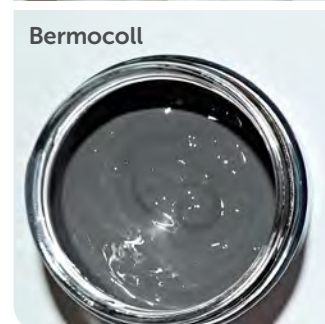


Bermocoll

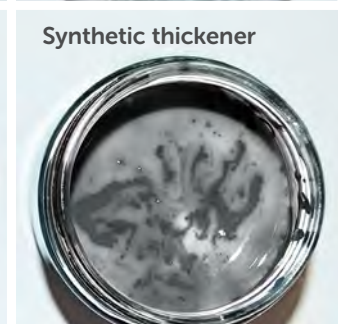


Synthetic thickener

Color floating (50° C, 2 weeks)



Bermocoll



Synthetic thickener



# High efficiency and excellent stability

## Bermocoll® EBM – high viscosity grades

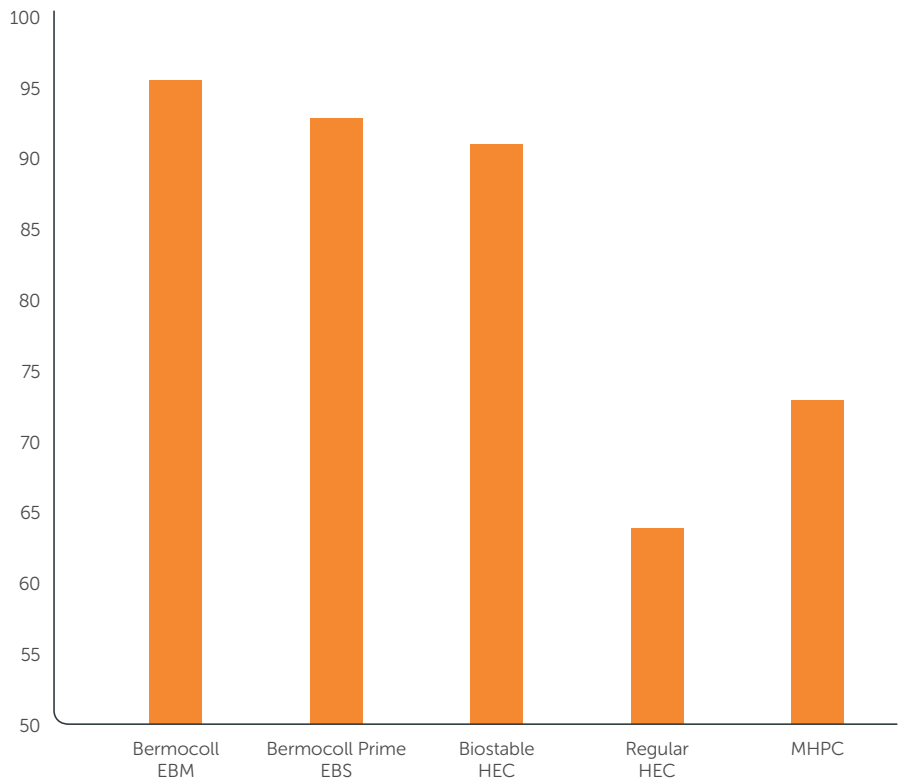
High viscosity products with enhanced stability. Our EBM grades are especially appreciated in high PVC formulations like joint compounds, distempers and putties because of their good compatibility with fillers. Bermocoll EBM is suitable for both paint and building applications.



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

# Incorporating Bermocoll

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

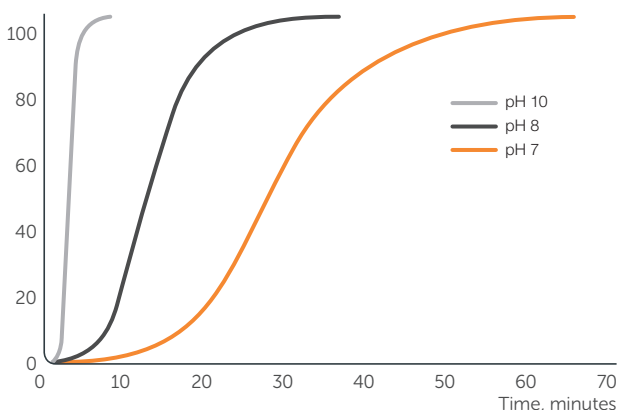
Bermocoll cellulose ethers can be incorporated into the paint in different ways and at several stages during the manufacturing process. We recommend the following three main addition methods to be considered: as a dry powder (“batch in one”), as a slurry, and as a stock solution. All three methods have 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

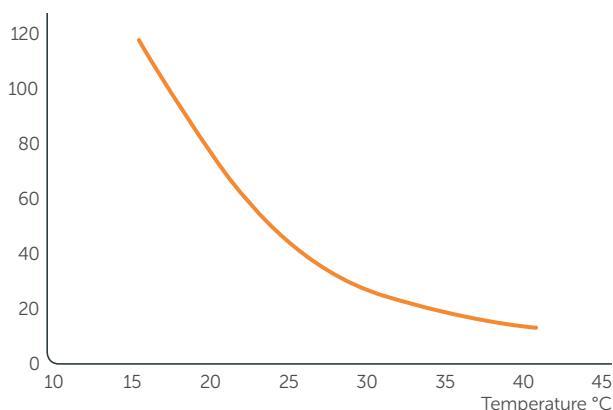
Slurries containing up to 15–20% Bermocoll are readily made by dispersing a Bermocoll paint grade either in water or in a suitable organic solvent. Such slurries are generally usable within half an hour after preparation. When working with aqueous slurries of Bermocoll paint grades, the pH must be 7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

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Nouryon is a global specialty chemicals leader. Industries worldwide rely on our essential chemistry in the manufacture of everyday products such as paper, plastics, building materials, and personal care items. We have about 10,000 employees and operate in over 80 countries around the world.

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## Your partner in essential chemistry for a sustainable future

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Performance Additives is one of the businesses within the global company Nouryon. We have a unique technology base and profound experience in the production of high quality cellulose ethers, with more than 50 years of development, manufacturing and sales of Bermocoll®.

### 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:

### Business and service center

Brewster, USA



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

Stenungsund, Sweden

**Production site**

Örnsköldsvik, Sweden

**Business and service center**

Shanghai, P.R. China

**Business and service center**

Singapore

**Production site**

Ningbo, P.R. China



Nouryon  
444 85 Stenungsund  
Sweden

[bermocoll.com](http://bermocoll.com)

Bermocoll® is a registered trademark in many countries.

# Nouryon

We are a global specialty chemicals leader. Industries worldwide rely on our essential chemistry in the manufacture of everyday products such as paper, plastics, building materials, food, pharmaceuticals, and personal care items. Building on our nearly 400-year history, the dedication of our 10,000 employees, and our shared commitment to business growth, strong financial performance, safety, sustainability, and innovation, we have established a world-class business and built strong partnerships with our customers. We operate in over 80 countries around the world and our portfolio of industry-leading brands includes Eka, Dissolvine, Trigonox, and Berol.

[nouryon.com](http://nouryon.com)