

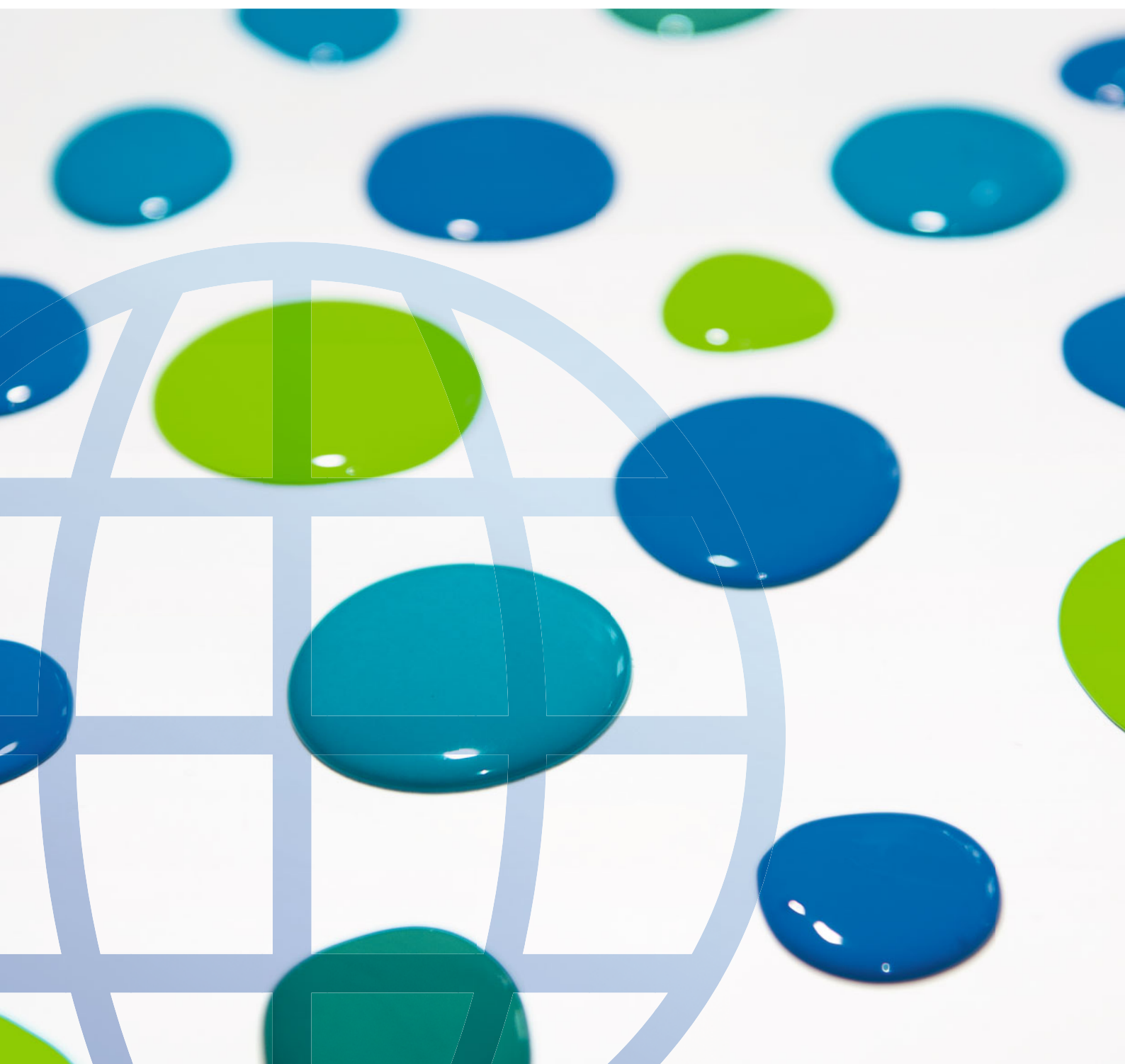
Bermocoll EHM Extra

Serving the paint industry throughout the world



AkzoNobel

Tomorrow's Answers Today





Bermocoll makes a difference

We at AkzoNobel 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 additive, stabilizer and water-retaining agent for water-based decorative paints. Bermocoll is manufactured through a unique, solvent free process, offering industries the lowest carbon footprint.

Bermocoll is available in a wide range of viscosities, and a variety of modified grades. Cellulose is a natural polymer and the main component is wood pulp or cotton linters. When we manufacture Bermocoll, the cellulose reacts with a combination of different substituents such as methyl, ethyl, hydroxyethyl, and hydrophobic groups. This process, called etherification, makes Bermocoll water soluble.

Avoiding human and animal health hazards and protecting the environment is part of our daily work.





A non-ionic associative cellulose ether

Bermocoll EHM Extra is a non-ionic associative cellulose-based polymer with enhanced enzymatic resistance. Bermocoll EHM Extra combines the performance of low-viscosity ethyl hydroxyethyl cellulose with the rheological properties of synthetic associative thickeners. In addition to ethyl, methyl and hydroxyethyl substituents, the Bermocoll EHM Extra molecule also contains hydrophobic groups, which can associate with hydrophobic surfaces within the paint.

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.

Bermocoll EHM Extra can be used as a rheological additive in all types of latex paints – both interior and exterior – and is compatible with a wide range of latex binders. Bermocoll EHM Extra is specifically designed to provide improved application properties in decorative paints.

Bermocoll EHM Extra provides the following key benefits:

- **Higher ICI viscosity with equal thickener dosage, which can be seen as improved coverage and film building**
- **Outstanding compatibility with both organic and inorganic colorants – for example, excellent color acceptance, reduced viscosity loss upon tinting and minimal color float**
- **Extremely good application properties, such as spatter and sag resistance**
- **Excellent storage stability with minimal syneresis**



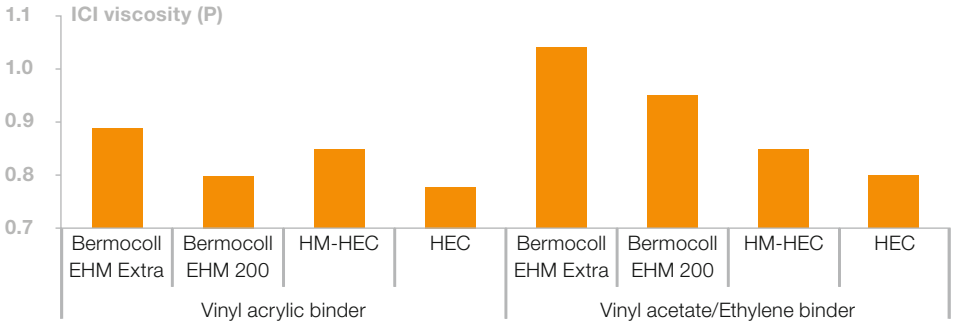


Paint rheology

Higher ICI viscosity

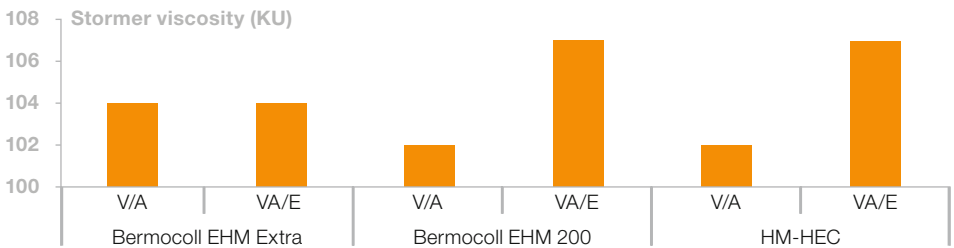
With equal dosage and Stormer viscosity (KU), Bermocoll EHM Extra achieves higher ICI viscosity than competitor products – demonstrating the robust and reproducible thickening character of our product. The higher ICI viscosity contributes to an improved film build and thus better coverage.

Application (ICI) viscosity



The highest ICI viscosity is achieved when Bermocoll EHM Extra is used. The reference, HEC, has a viscosity of approximately 3000 cP, 1% solution.

Stormer viscosity, addition level 0.6%



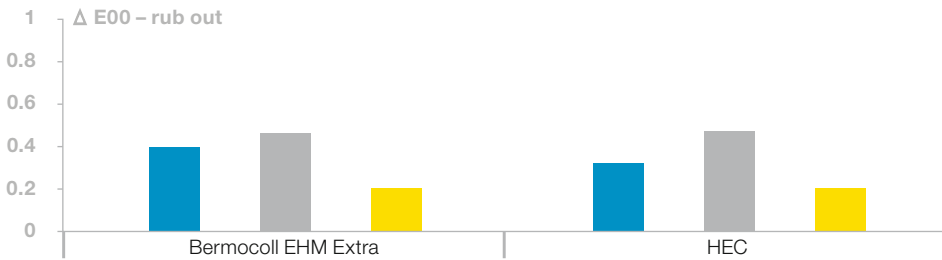
Higher consistency in Stormer viscosity is observed when Bermocoll EHM Extra is used.

Influence of colorants

Color acceptance

Excellent color acceptance is achieved with Bermocoll EHM Extra within a wide range of colorants and latex binders. Bermocoll EHM Extra is designed with particular attention to color acceptance and color development and offers reliable color performance. Good color acceptance 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.

Color acceptance – rub out



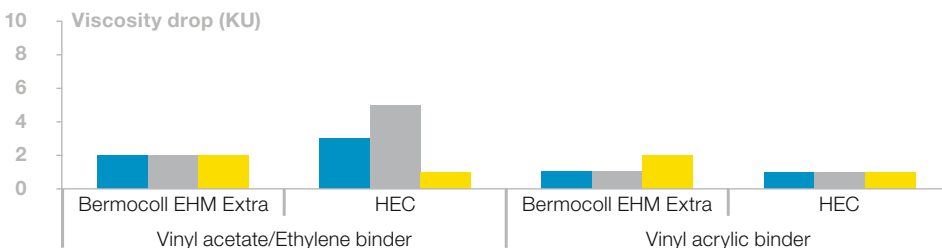
■ Phthalo blue
■ Lamp black
■ Yellow iron oxide

The same outstanding color acceptance (low ΔE_{00}) is achieved with Bermocoll EHM Extra compared to a non-associative HEC of viscosity class 3000 cP, even with colorants that are known to be problematic.

Increased resistance to viscosity loss on tinting

Bermocoll EHM Extra provides improved resistance to viscosity loss through the addition of colorants. Depending on the binder, EHM Extra is often less susceptible to viscosity loss than competing hydrophobically modified thickeners.

Viscosity drop upon tinting



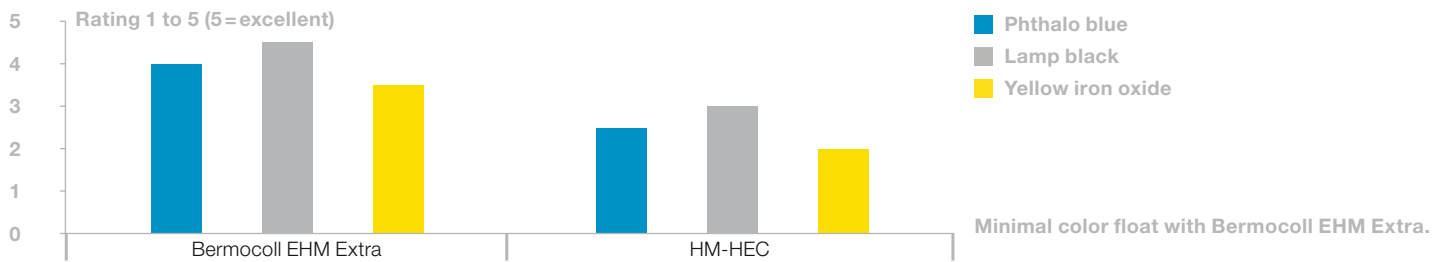
■ Phthalo blue
■ Lamp black
■ Yellow iron oxide

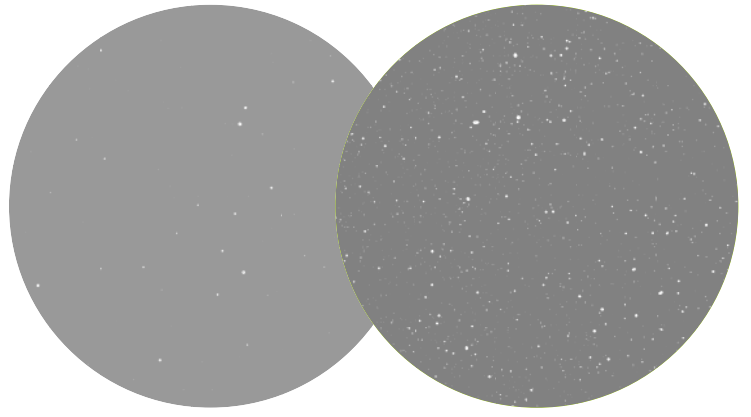
Viscosity loss compared to non-associative HEC of viscosity class 3000 cP.

Less color float

Color float is an undesirable phenomenon that can occur after tinting with certain colorants. Paints containing Bermocoll EHM Extra show hardly any color float, whereas those made with many other associative thickeners can lead to problems with color separation. The excellent colorant compatibility of Bermocoll EHM Extra is also apparent when looking at color float of stored, tinted paints.

Color float



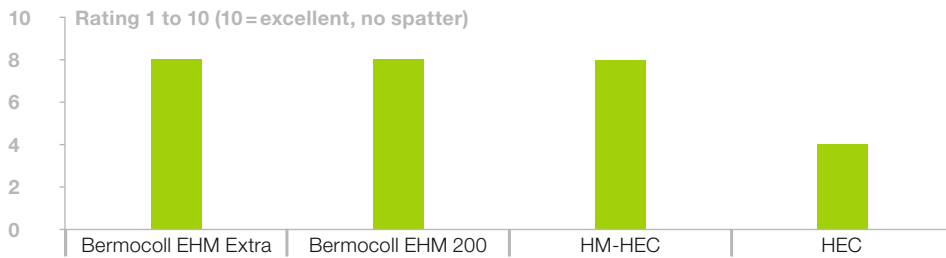


Application properties

Outstanding spatter resistance

Paints produced with our new product generate virtually no spatter. Bermocoll EHM Extra provides outstanding spatter resistance compared to non-associative thickeners of comparable viscosity. The graph shows the best performing products on the market compared to HEC, with respect to spatter.

Spatter resistance

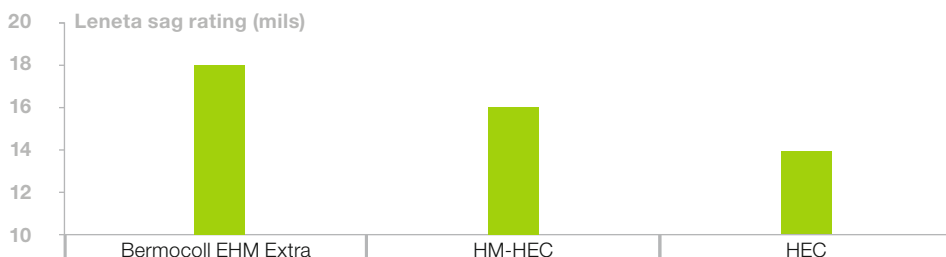


The reference, HEC, has a viscosity of approximately 3000 cP, 1% solution.

Improved sag control

In addition to its other advanced properties, Bermocoll EHM Extra offers improved sag control, delivering excellent flow and leveling. At either PVC level, Bermocoll EHM Extra offers significantly better sag control.

Sagging



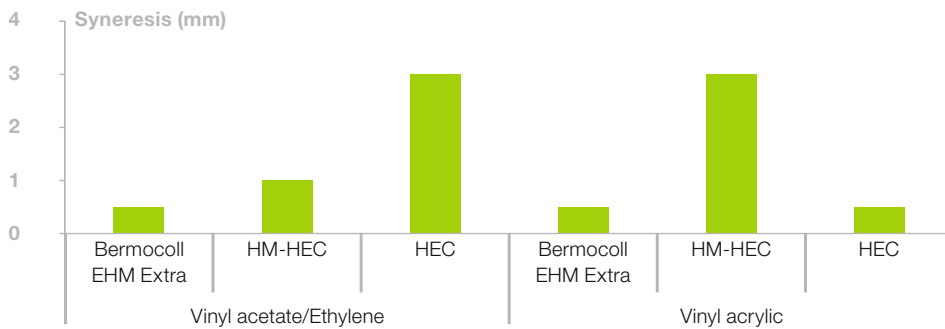
Bermocoll EHM Extra offers improved sag control. The reference, HEC, has a viscosity of approximately 3000 cP, 1% solution.



Better storage stability

Paints formulated with **Bermocoll EHM Extra** exhibit minimal viscosity loss or phase separation, even when stored at elevated temperatures. Syneresis is minimized in paints using **Bermocoll EHM Extra**.

Syneresis after 6 weeks, 40°C



Bermocoll EHM Extra exhibits outstanding storage stability with minimal syneresis tendency. The reference, HEC, has a viscosity of approx 3000 cP (1%)

Semi-gloss paint formulation PVC 30

Ingredients	Weight	
Water	254	255
Associative thickener	6	
Non-associative thickener		5
Byk 022	2	2
Tamol 1124	9	9
Mergal 174	1	1
Camel Fine	110	110
TiPure R-706	180	180
Byk 022	3	3
Propylene glycol	5	5
Ucar 309 or EcoVAE 405 (Arkema/Celanese)	430	430
Total	1000	1000

Typical properties **Bermocoll EHM Extra**

Appearance	off white powder
Particle size	98% < 500 µm
Water content	max 4%
Salt content	max 6%
Viscosity at 20°C, 1% solution (Brookfield LV)	200 – 450 mPa·s

About us

We are a part of AkzoNobel Functional Chemicals, one of the business units within AkzoNobel. We have a unique technology base and experience of cellulose derivatives, with more than 50 years of development, manufacturing and sales of these products. Today, we serve our customers in more than 80 countries.

A dedicated unit with multinational resources

The combination of a multinational group's large resources and a dedicated unit's focus on its customers gives us a unique position. Our research and product development has always been guided by our customers and their requirements. We want you to look upon us as a responsive and responsible business partner, and to regard us as your preferred supplier of cellulosic specialties.

Tomorrow's Answers Today

At AkzoNobel, we believe the future belongs to those smart enough to challenge it. We believe that real progress belongs to those who not only think with courage, but also have the courage to deliver on the thought. Tomorrow's answers, delivered today. We are driven by the knowledge that what is good enough for our customers today may not necessarily be good enough for them tomorrow.

For a sustainable future

Another integral part of our daily work involves the protection of human and animal health and of the environment by ensuring that our products can be safely used throughout their entire lifecycle. Backed up by our commitment to Product Stewardship, Responsible Care® and Reach, we believe that supplying the right chemistry goes beyond just selling products. Our efforts have been rewarded. The ISO 9001 and the ISO 14001 certification awarded for R&D, production, marketing and distribution of Bermocoll are only the first steps on the road to fulfilling our ambitions – to meet customers' requests for competitive, environmentally sound, and profitable products today and tomorrow. Bermocoll® is a registered trademark in many countries.

Headquarter

Amersfoort, The Netherlands

Research and development

Stenungsund, Sweden

Business and service centers

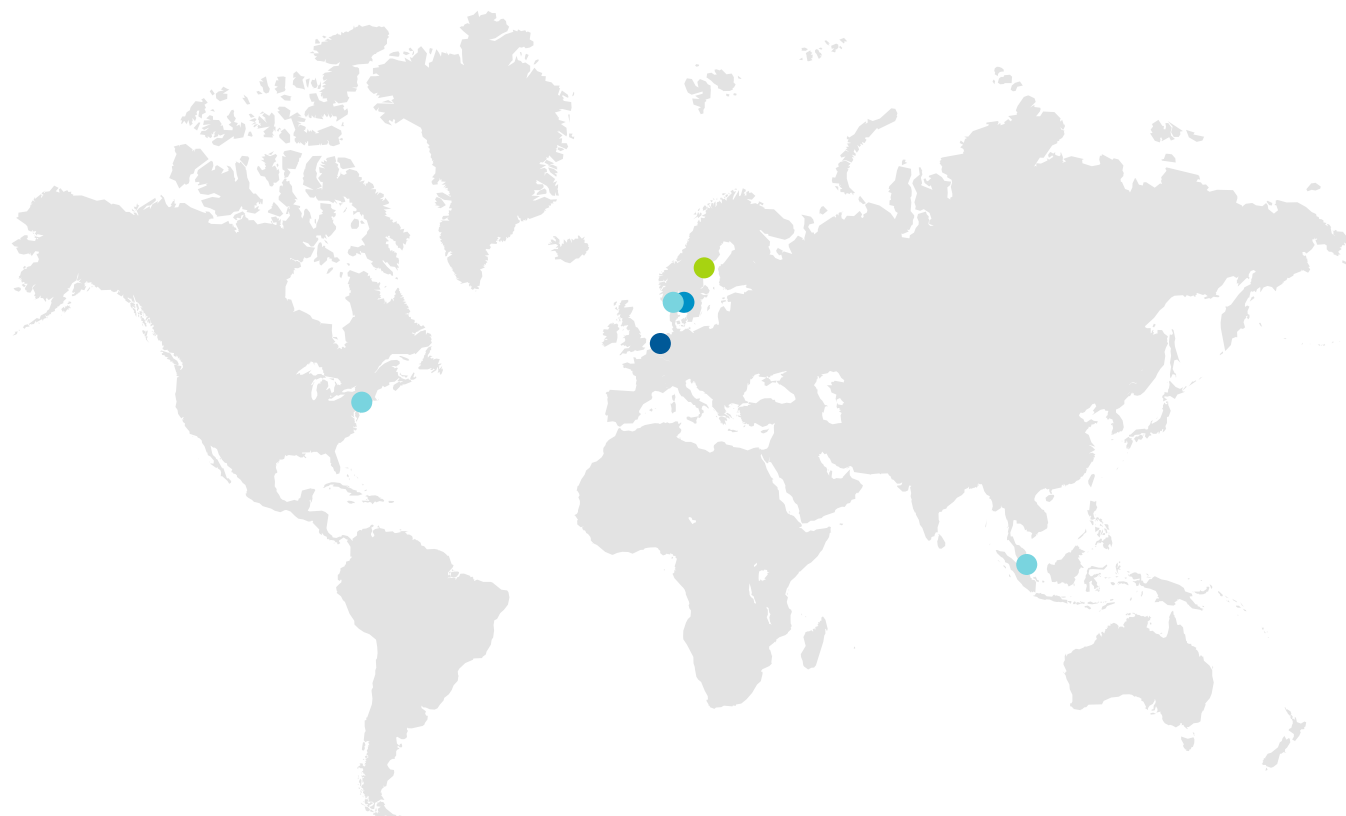
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AkzoNobel is the largest global paints and coatings company and a major producer of specialty chemicals. We supply industries and consumers worldwide with innovative products and are passionate about developing sustainable answers for our customers. Our portfolio includes well known brands such as Dulux, Sikkens, International and Eka. Headquartered in Amsterdam, the Netherlands, we are a Global Fortune 500 company and are consistently ranked as one of the leaders on the Dow Jones Sustainability Indexes. With operations in more than 80 countries, our 55,000 people around the world are committed to excellence and delivering Tomorrow's Answers Today™.

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