



APPLICATION INFORMATION

ADDITIVES FOR FORMULATING PAPER COATINGS



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Introduction

Paper coatings can impart certain properties to the paper surface to deliver an enhancement in performance over the uncoated base paper.

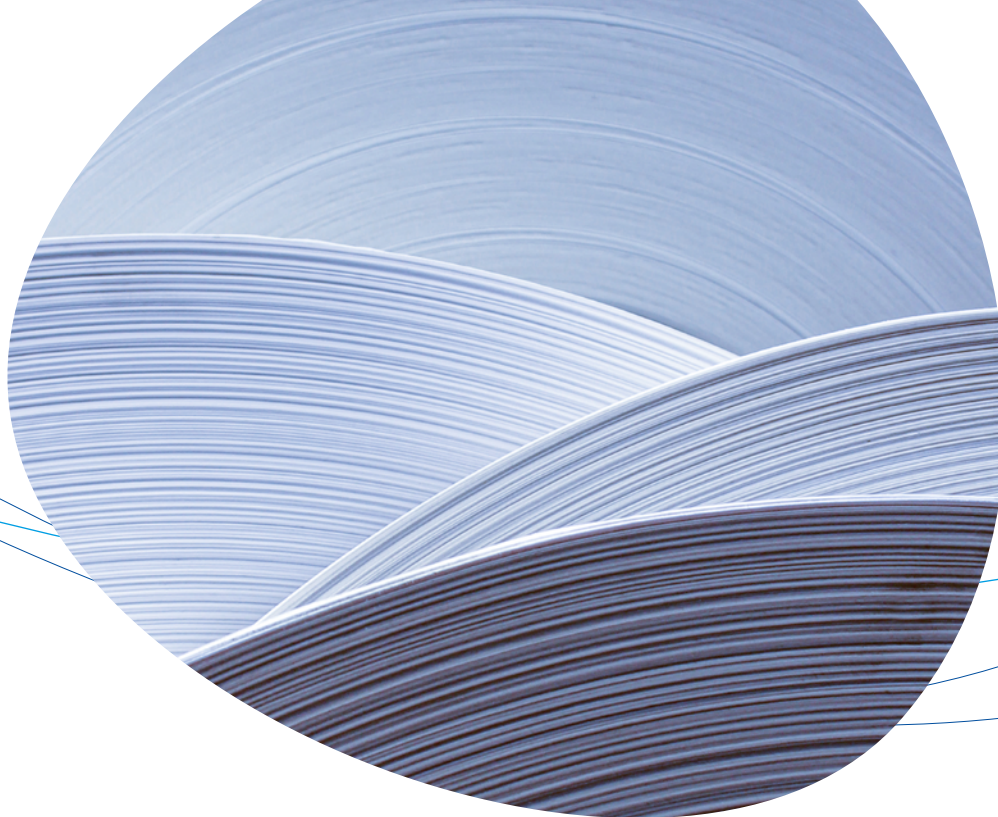
The inclusion of additives and functional reagents into coating formulations provides tailored performance of an optimized paper surface.

BYK's wide range of additives can be incorporated into the formulation to:

- Assist in the preparation of a **homogeneous** coating color
- Aid in the coating process to provide the coating with a **high-quality finish**
- Improve the **paper performance** when compared to the uncoated base papers
- Provide **specialized functional** performance

Note

To ensure the best appearance and full functionality, please open in Adobe Acrobat.



Range of BYK additives for paper coatings

	Coating color preparation	Improved coating process	Paper surface improvement	Functional paper surfaces
Wetting and dispersing	●			
Defoamers	●	●		
Rheology control	●	●		
Surface active agents		●	●	
Wax and polymer additives			●	●
Functional clay additives				●

Wetting and dispersing additives

Paper coatings contain a number of pigments which require sufficient wetting to allow the dispersion to remain stable and prevent agglomeration occurring (G.01).

Effective dispersion within the coating color is essential to providing the best performance, as poor dispersion may:

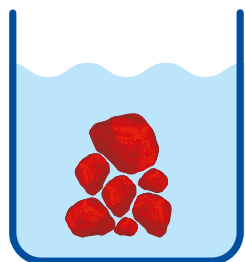
- Lead to uneven coating
- Reduce performance
- Damage coating equipment

One method of evaluating efficiency of wetting is using viscosity. A lower viscosity indicates a better performance. As shown in G.02, different additives work better for different pigments:

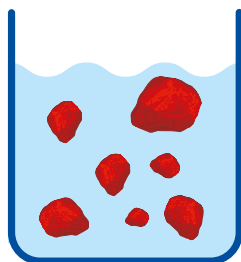
- **DISPERBYK-199** is optimum for kaolin
- **DISPERBYK-190** is ideal for CaCO_3
- If the pigments are an acid clay or anatase titanium dioxide, **BYK-154** is preferred
- **DISPERBYK-102** or **DISPERBYK-180** are recommended for rutile TiO_2

Wetting of pigments to form a stabilized dispersion

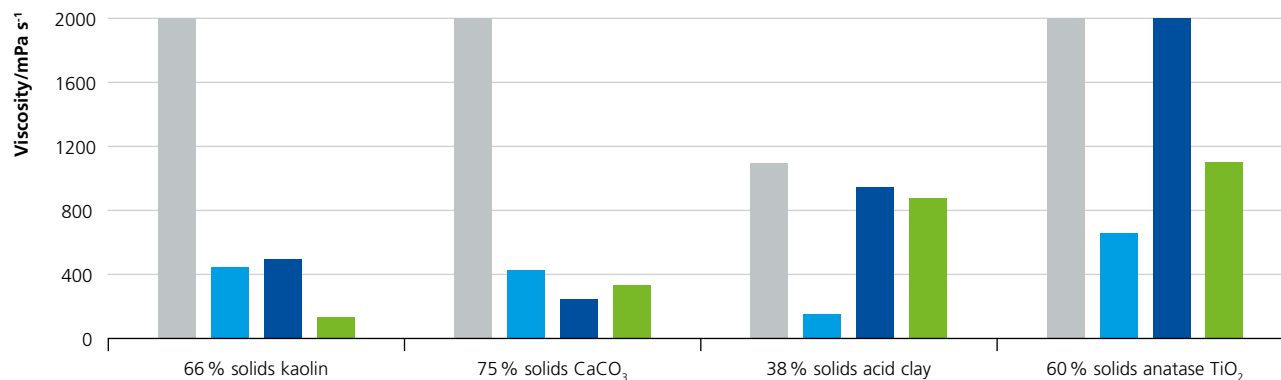
Agglomerated pigments



Ideal dispersion



BROOKFIELD-RV viscosity measurements for various pigment slurries used in paper coatings



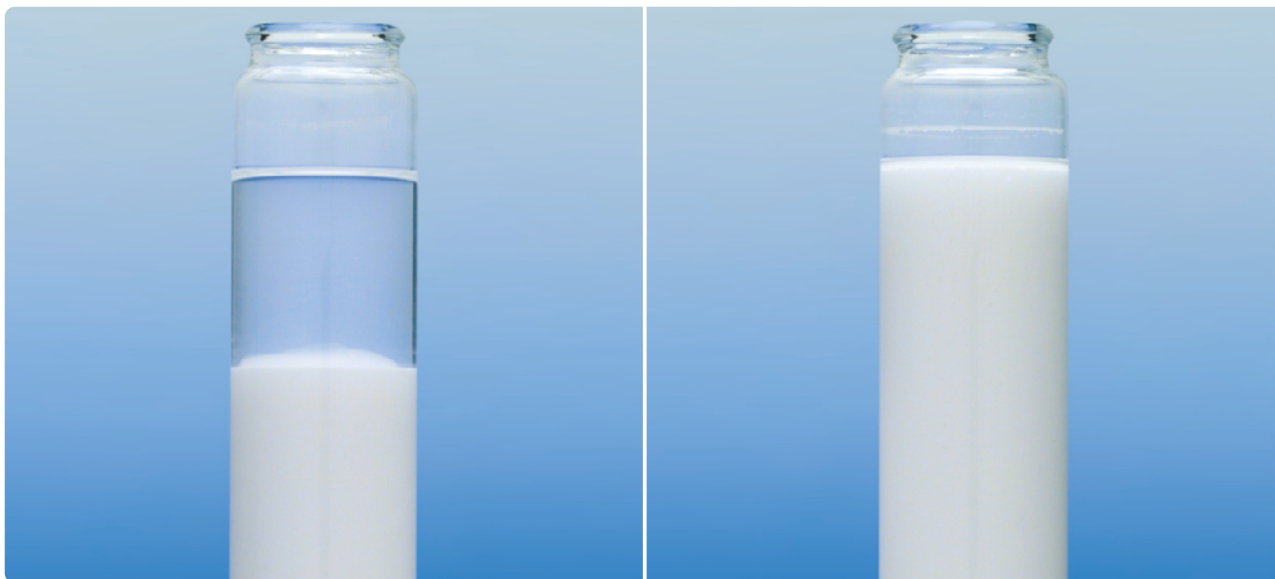
Anti-settling additives

If anti-settling properties are required, the recommended product is **OPTIGEL-WX**. Designed to improve storage stability in aqueous systems, **OPTIGEL-WX** is a powder rheology additive. When 0.50 % is added to a TiO_2 dispersion, previous sedimentation is no longer observed (G.03).

Anti-settling effect in TiO_2 dispersion

No additive

With OPTIGEL-WX



Defoamers and anti-foam additives

Foam is unwanted in coatings as it can cause problems when filling systems/containers and result in surface defects during coating application. This not only is unsightly (G.04), but can affect the functional performance. As a result, removing or preventing foam is integral to a coating color.

The choice of defoamer is dependent on the formulation. BYK offers a range of defoamer technologies for a wide array of paper coating formulations and regulatory requirements.

Silicone-free defoamers

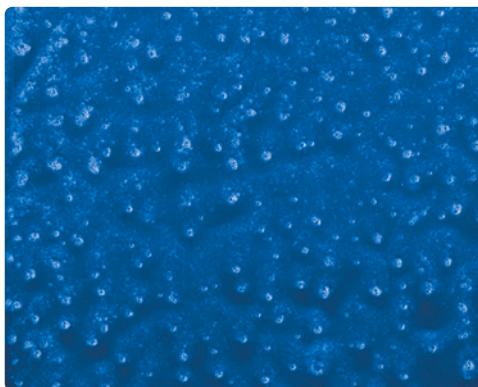
BYK-012, **BYK-1640** and **BYK-1745** are defoamers designed for aqueous coatings that are VOC-free and silicone-free. All three reduce foam efficiently from dosages as low as 0.10 %.

High-efficiency defoamers

BYK-022 is a VOC-free, silicone-containing defoamer for aqueous coatings that is also effective against microfoam. Due to its high incompatibility, the defoamer must be incorporated at high shear to ensure good dispersion. It is particularly suited to kaolin-containing coating colors.

Effect of defoamer in coating color

Coating color with no additive

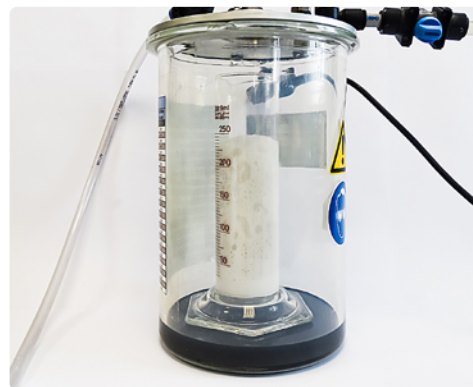


Coating color with 0.2 % BYK-016

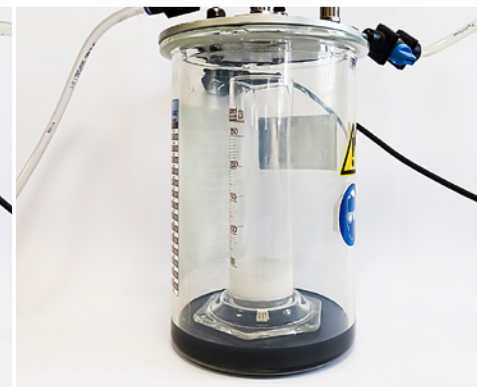


Testing of foam formation in coating colors

No additive



With BYK defoamer



Surface additives

BYK-DYNWET 800 is BYK's first recommendation for improving the levelling properties of paper coatings (G.06).

BYK-DYNWET 800 is a silicone-free substrate wetting agent for aqueous coatings. It reduces the dynamic surface tension of the coating color and the surface free energy of the coated paper. **BYK-DYNWET 800** along with **BYK-3410** are especially suitable for machines with a fast operating speed.

BYK-3410

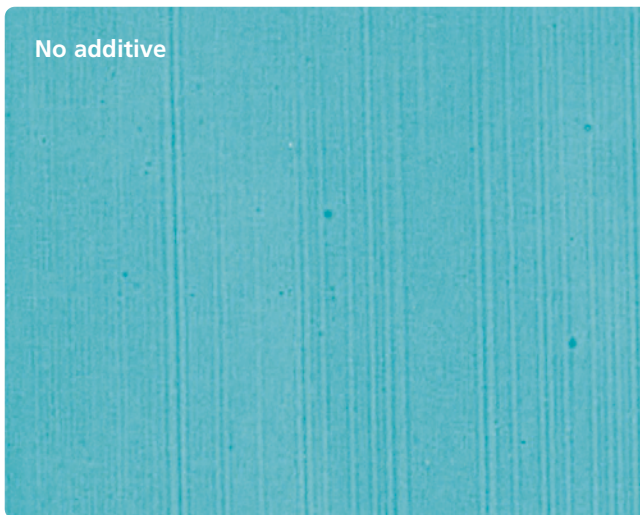
- Silicone-free
- Approved for food contact
- Reduces "egging"
- Improves substrate wetting
- Minimal impact on final coating properties

BYK-DYNWET 800

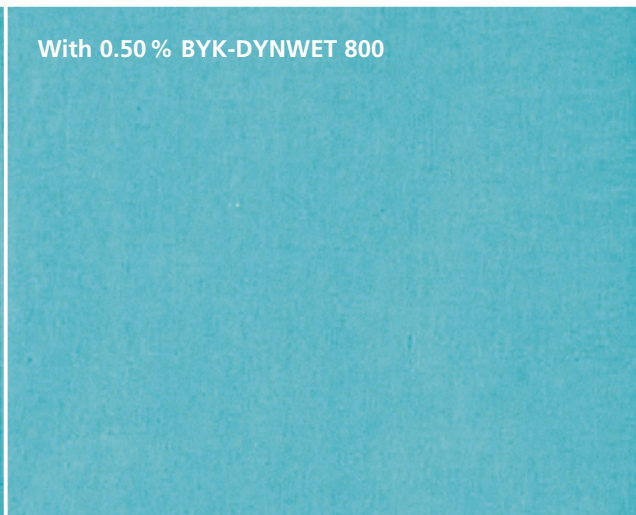
- Silicone-free
- Improves substrate wetting
- Improves in coating levelling
- Low foam stabilization
- Minimal impact on final coating properties

Impact of BYK-DYNWET 800 on levelling coating surface

No additive



With 0.50 % BYK-DYNWET 800



Rheology additives

During the coating process, a coating color will be subjected to a wide range of shear conditions:

- Preparation (usually high shear)
- Storage (typically low shear)
- Pumping through the system (varied)
- Coating head application (method dependent)
- Paper contact (rapid shear change)

To ensure the coating color remains stable, BYK offers a wide range of additives to assist with rheological control.

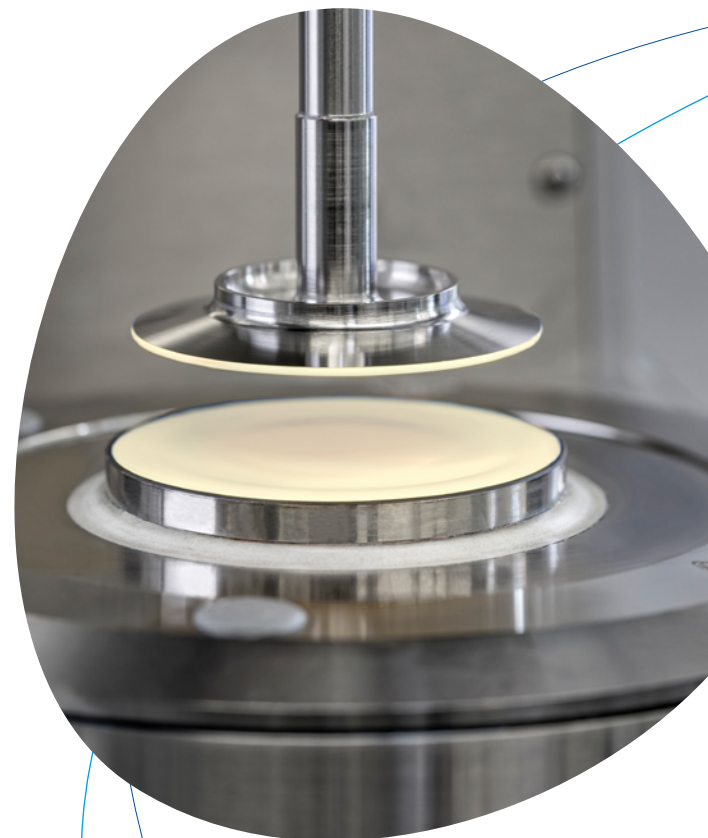
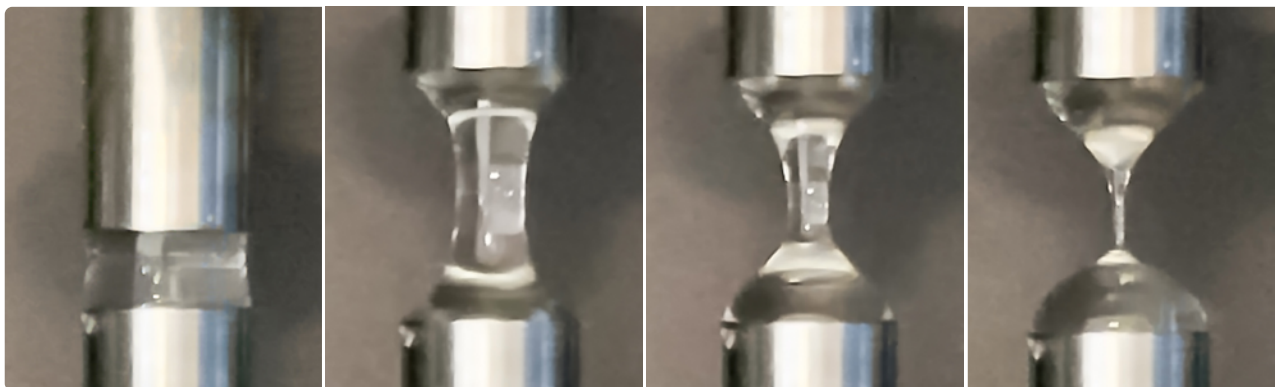
RHEOBYK-T 1000 VF and **RHEOBYK-T 1010 VF** are associative high shear HEUR thickeners which have a minimal impact on low shear viscosity.

To generate pseudoplastic flow behavior with a HASE thickener, **RHEOBYK-HV 80** is the recommended choice.

For low shear stability in aqueous systems, **RHEOBYK-H 3300 VF** or **RHEOBYK-H 7500 VF** are suitable depending on the degree of thickening required.

In addition, a number of our additives work in combination to provide rheology modification under different shear.

Newtonian rheology modifiers provide high shear and elongational stability



Functional additives

Paper coatings can not only provide a protective layer to the paper surface, but also add specialized functional performance. BYK offers a range of additives which provide:

- Anti-static properties
- Barrier properties
- Slip resistance
- Scratch/rub resistance
- Heat sealing
- Thermal image transfer to a different substrate
- Inkjet fixation

For more information on functional additives for specific applications, please visit us on **byk.com** or contact your local sales representative.



ADD-MAX®, ADD-VANCE®, ANTI-TERRA®, AQUACER®, AQUAMAT®, AQUATIX®, BENTOLITE®, BYK®, BYK-AQUAGEL®, BYK-DYNWET®, BYK-MAX®, BYK-SILCLEAN®, BYKANOL®, BYKCARE®, BYKETOL®, BYKJET®, BYKO2BLOCK®, BYKONITE®, BYKOPLAST®, BYKUMEN®, CARBOBYK®, CERACOL®, CERAFAX®, CERAFLOUR®, CERAMAT®, CERATIX®, CLAYTONE®, CLOISITE®, DISPERBYK®, DISPERPLAST®, FULACOLOR®, FULCAT®, GARAMITE®, GELWHITE®, HORDAMER®, LACTIMON®, LAPONITE®, MINERPOL®, NANOBYK®, OPTIBENT®, OPTIFLO®, OPTIGEL®, POLYAD®, PRIEX®, PURABYK®, PURE THIX®, RECYCLOBLEND®, RECYCLOBYK®, RECYCLOSSORB®, RECYCLOSTAB®, RHEOBYK®, RHEOCIN®, RHEOTIX®, SCONA®, SILBYK®, TIXOGEL® and VISCOBYK® are registered trademarks of the BYK group.

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This issue replaces all previous versions.

