

# Surfactants for **Colorants**

**AkzoNobel**



# The power of surfactants

All pigments, whether organic or inorganic, consist of primary particles that will aggregate into larger particles. These aggregates will then easily form larger entities, called agglomerates. The color strength given from a pigment will depend on the available surface area. The more surface exposed, the more intense the color. To bring out the highest color strength of the pigment it is important to mill the aggregates and agglomerates to get as much surface per weight of pigment as possible. Once dispersed, it is crucial to stabilize the dispersion to hinder particle re-agglomeration or re-aggregation.

## Reducing energy consumption

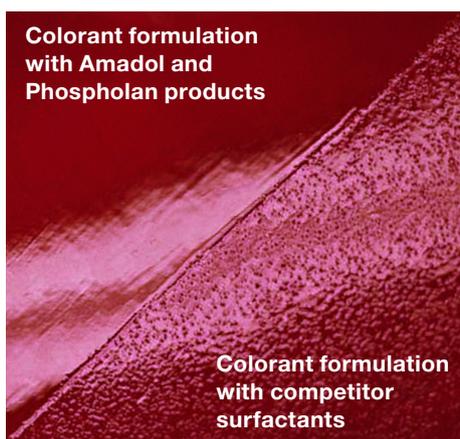
Mechanical milling is an energy consuming step but the need for this can be reduced by using effective wetting and dispersing agents. Effective wetting agents are highly attracted to the pigment surface. When added to a mix of pigment and water, they will quickly position themselves at the pigment surface and lower the surface tension between the pigment and the water. This will break the agglomerates and help to reduce the particle size in a chemical way prior to the milling.

Surfactants used for colorant preparation are often referred to as wetting agents, dispersants, compatibilizers and/or stabilizers. One surfactant often contributes to more than one of these functions. The best performance is obtained by using a combination of two or three different surfactants with different characteristics. This also helps to ensure the compatibility in a variety of base paints.

The strong wetting and dispersing ability of AkzoNobel Surface Chemistry's products is the key to their excellent performance.

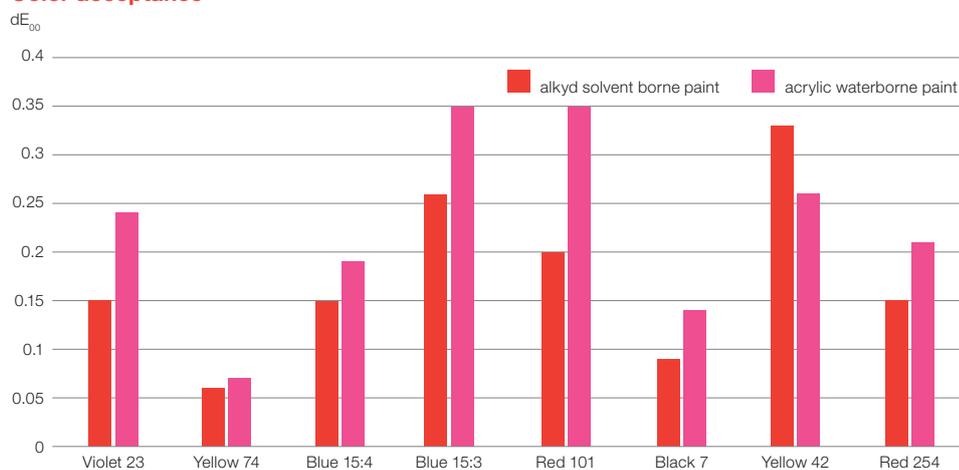
## Color acceptance

An effective way of evaluating the quality of the colorant is to check the color acceptance in various base paints. Good color acceptance (low  $dE_{00}$  number) is a sign of a well dispersed system.

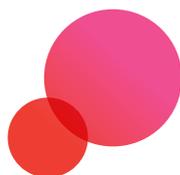


Drawdowns with two magenta colorant formulations prior to milling.

## Color acceptance



Evaluation of Color Acceptance, 4 wt% colorant in different types of white base paints. The lower the  $dE_{00}$  values, the less difference between the drawdown and rub-out areas. Below 0.5 is considered non-visible to the naked eye. All formulations are based on AkzoNobel Surface Chemistry products.



Product	Guidance	Eco-labelling				Colorant type			Pigment type		
		Risk phrase compliance	VOC (wt%)	SVOC (WB) (wt%)	SVOC (SB) (wt%)	U	WB	SB	Organic	Inorganic	Carbon Black
<b>Anionic surfactants</b>											
Phospholan PS-131 **	Our top performing anionic dispersant		< 1	< 1	6.8	√	√	√	√	√	√
Phospholan PS 1770 LP **	Specialized for waterborne colorants		< 1	< 1	< 1		√		√	√	√
<b>Nonionic surfactants</b>											
Amadol CMA 5 *		√	< 1	< 1	1.6	√	√		√		√
Amadol CMA 8 *	Choose one of our Amadol products to ensure the stability of the colorant. They are all compatible with paint types over a broad spectrum	√	< 1	< 1	< 1	√	√		√		√
Amadol CMA 12 *		√	< 1	< 1	< 1	√	√		√		√
Amadol LMA 11 **		√	< 1	< 1	< 1	√	√		√		√
Amadol OMA 4W *	Specially designed to improve the compatibility with solvent based paints	√	< 1	< 1	< 1	√			√	√	√
Ethylan 954 LQ **	Our best non-ionic surfactant for waterborne colorant lines	√	< 1	< 1	< 1		√		√	√	√
GT 2624 **	Our fastest wetting agent, suitable for large inorganic pigment to reduce milling time	√	3.2	10.9	17.2	√	√		√	√	√

\* Globally available

\*\* Available in most countries, please check with your regional sales contact

## General recommendations

The choice of products will mainly depend on the type of pigment being used. Wetting agents and dispersants for inorganic pigments will be somewhat different than for organic pigments. We generally give the following recommendations:

### Universal colorants

#### Polycyclic and phthalocyanine pigments (organic)

Phospholan PS-131  
Amadol CMA 12 / Amadol LMA 11  
Amadol OMA 4W

#### Mono azo pigments (organic)

Phospholan PS 1770 LP  
GT 2624  
Amadol OMA 4W

#### Iron oxides (inorganic)

Phospholan PS-131  
GT 2624  
Amadol OMA 4W

#### Carbon Black

Phospholan PS-131  
Amadol CMA 12  
Amadol OMA 4W

#### Pigment examples:

Pigment Blue 15:1-4  
Pigment Green 7  
Pigment Red 122  
Pigment Red 202  
Pigment Red 209  
Pigment Violet 19  
Pigment Violet 23

#### Pigment examples:

Pigment Red 112  
Pigment Yellow 74

#### Pigment examples:

Pigment Red 101  
Pigment Yellow 42

#### Pigment examples:

Pigment Black 7

### Waterborne colorants

#### Organic pigments

Phospholan PS 1770 LP  
GT 2624  
Ethylan 954 LQ

#### Inorganic pigments

Phospholan PS 1770 LP  
GT 2624

# Selected to add value

Dispersants and wetting agents are key additives to produce high quality colorants with good stability and color acceptance. AkzoNobel Surface Chemistry takes quality one step further, adding values like reliability and efficiency to the colorant production.

Our expertise within surface chemistry has enabled us to specialize in universal colorants where the demands on the formulation are the highest. We are proud to offer complete solutions for organic, inorganic and carbon black pigments which can help to reduce raw material complexity.

## For the Colorant producer

The milling step in the colorant production process is crucial in many ways. To ensure the performance of the colorant, the pigment needs to be mechanically milled down to very fine particles. This step requires both time and energy. With effective wetting and dispersing agents, the chemistry will do part of that work. This will reduce the need for mechanical energy, saving time and cost.

AkzoNobel Surface Chemistry's products will enable:

- **Reduced production time.** Lab tests show 40% reduction in milling cycles for Pigment Red 101 and 25% reduction for Carbon Black 7
- **Reduced energy cost** in the milling step
- **Reduced pigment load.** For some pigments our products enable a 10% reduction in pigment load to obtain the same color strength as industry standards on the market

## For the End Customer

High quality colorants will only be obtained when the pigment is well dispersed in small particle sizes and when the colorant is stable. Stable colorants prevent the particles from re-aggregating or flocculating. This usually requires more than just one surfactant, especially to ensure that the colorant is compatible with a broad range of base paint types.

Our surfactant portfolio offers complete surfactant combinations for the majority of pigment types and will enable:

- **Excellent color acceptance**
- **Excellent compatibility** with water and solvent borne paints of various categories
- **Minimal viscosity influence** of the base paint

Ask us  
how to ...

... reduce your  
production  
time and cost

... increase  
your colorant  
performance

... reduce your  
pigment load

# Planet Possible: Our commitment to doing more with less

Our success as a company depends on sustainability. At AkzoNobel we have sharpened our focus on sustainability by reviewing our sustainability risks and opportunities against global trends and evaluating how they will impact our customers by 2020. We express the outcome as our Planet Possible approach to sustainability. It's our commitment to creating more value from fewer resources.



We know only too well that our future hinges on our ability to radically do more while using less.

- More innovation, less traditional solutions;
- More renewable energy and materials, less fossil-based;
- More value chain focus, less introverted thinking.

Employing our new strategy of radical efficiency, we work with customers and suppliers to open infinite possibilities to a finite world. Learn more at [www.akzonobel.com/planetpossible](http://www.akzonobel.com/planetpossible)

## Number 1

our position in the Materials industry group on the 2015 Dow Jones Sustainability Index.

## At least 20%

share of revenue we aim to achieve by 2020 from products with a sustainability advantage for customers.

## More than 25%

reduction we aim to achieve in our cradle-to-grave carbon foot print per ton of product by 2020.

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