



Surfactants for colorants

Nouryon

Colorant formulation
with Amadol and
Phospholan products

Drawdowns with two
magenta colorant
formulations prior
to milling.



Colorant formulation
with competitor
surfactants

Ask us
how to ...

...reduce your
production
time and cost

...reduce your
pigment load

...increase
your colorant
performance



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 increase the available surface area in a chemical way prior to the milling.

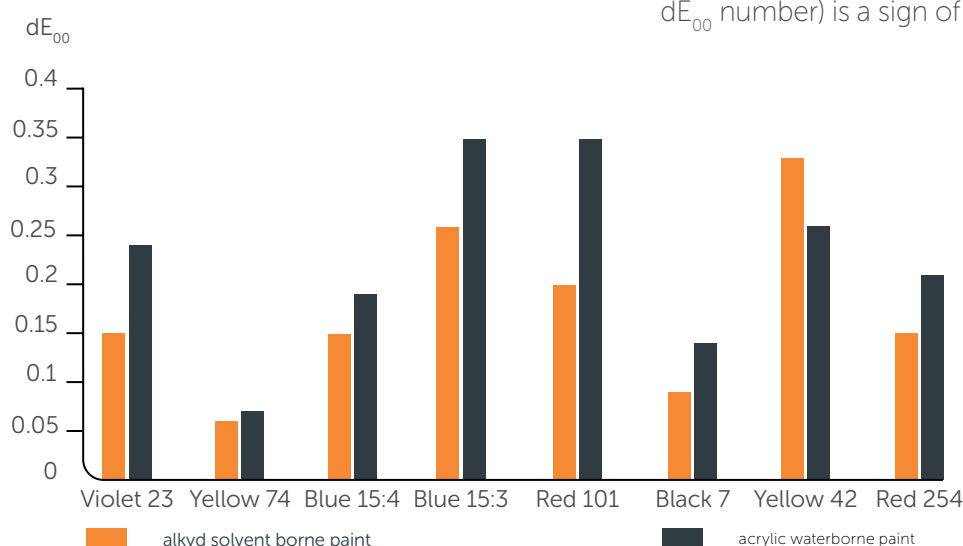
Surfactants used for colorant preparation are often referred to as wetting agents, dispersants, compatibilizers and/or stabilizers.

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 Nouryon 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.



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. dE_{00} below 0.5 is considered non-visible to the naked eye. All formulations are based on Nouryon products.

Product	Guidance	ECO-LABELLING				COLORANT TYPE			PIGMENT TYPE		
		Risk phrase compliance	VOC (wt%)	SVOC polar (wt%)	SVOC non-polar (wt%)	U	WB	SB	Organic	Inorganic	Carbon Black
Anionic surfactants											
Phospholan PS-131 *	Our top performing anionic dispersant		< 1	< 1	6.9	✓	✓	✓	✓	✓	✓
Nonionic surfactants											
Amadol CMA 5	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	1.6	✓	✓		✓		✓
Amadol CMA 8		✓	< 1	< 1	< 1	✓	✓		✓		✓
Amadol CMA 12		✓	< 1	< 1	< 1	✓	✓		✓		✓
Amadol OMA 4W	Specially designed to improve the compatibility with solvent based paints	✓	< 1	< 1	< 1	✓			✓	✓	✓
Berol 185	Very fast wetting agent, an efficient compatibilizer and improves the color acceptance	✓	< 1	1.6	2.6	✓	✓	✓	✓	✓	✓
Ethylan 954 LQ *	Good non-ionic surfactant for waterborne colorant lines	✓	< 1	< 1	< 1		✓		✓	✓	✓
GT 2624 *	Our lowest foaming and fastest wetting agent, suitable for large inorganic pigment to reduce milling time	✓	3.2	10.9	17.2	✓	✓		✓	✓	✓
Polymers											
Alcosperse 747	Good dispersion of carbon black with good storage stability	✓	< 1	< 1	< 1	✓	✓	✓			✓

* 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 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

Mono azo pigments (organic)

Phospholan PS-131
Berol 185 / GT 2624
Amadol OMA 4W

Pigment examples:

Pigment Red 112
Pigment Yellow 74

Iron oxides (inorganic)

Phospholan PS-131
Berol 185 / GT 2624
Amadol OMA 4W

Pigment examples:

Pigment Red 101
Pigment Yellow 42

Carbon Black

Phospholan PS-131
Amadol CMA 12
Amadol OMA 4W
Alcosperse 747

Pigment examples:

Pigment Black 7

Waterborne colorants

Organic pigments

Phospholan PS-131
Berol 185 / GT 2624
Ethylan 954 LQ

Inorganic pigments

Phospholan PS-131
Berol 185 / GT 2624

Selected to add value

Dispersants and wetting agents are key additives to produce high quality colorants with good stability and color acceptance. Nouryon 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 to break down the pigment agglomerates. 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.

Nouryon 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 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

Contact us directly for detailed product information
and sample request at pci@nouryon.com

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We are a global specialty chemicals leader. Markets worldwide rely on our essential chemistry in the manufacture of everyday products such as paper, plastics, coatings, 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, Berol, Amadol and Ethylan.

For more information visit surfacechemistry.nouryon.com

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