



Corporate Center Frankfurt
The Squire 13, Am Flughafen
D 60549 Frankfurt am Main
Germany

www.allnex.com



ADDITIVES

Product Guide - Worldwide



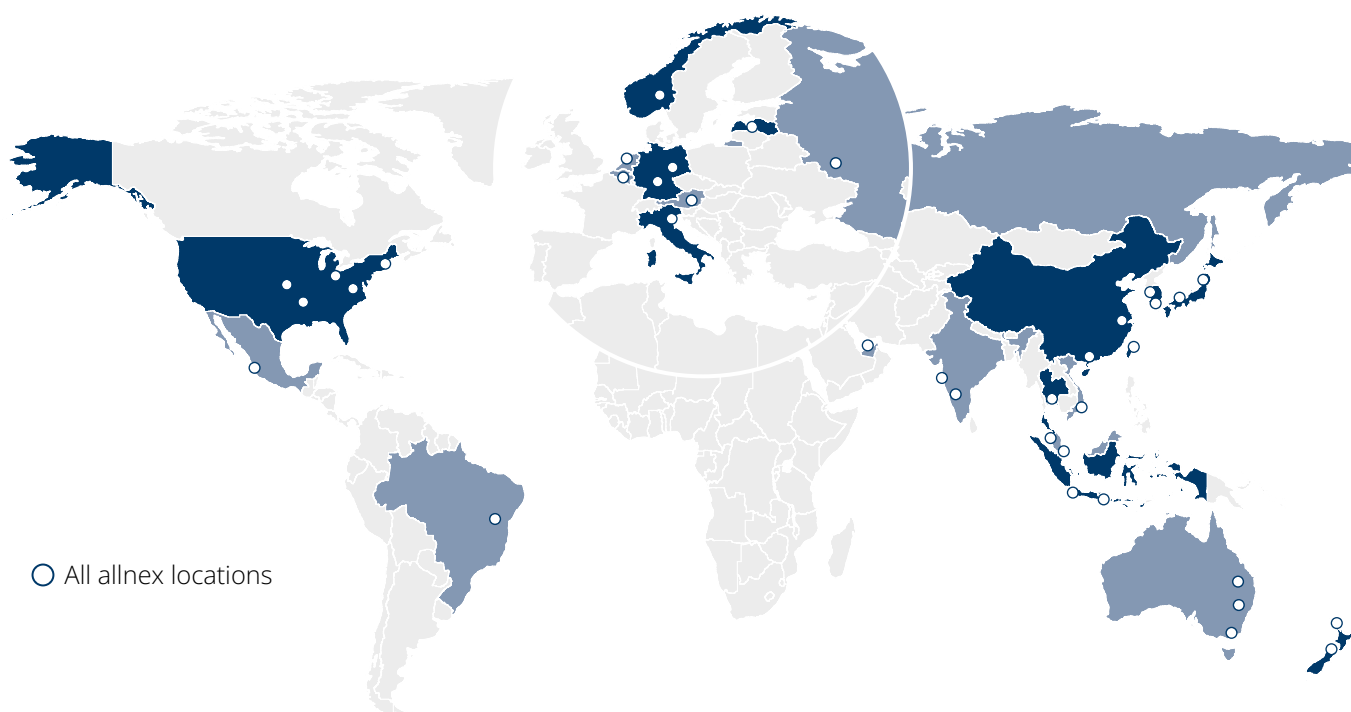


About allnex

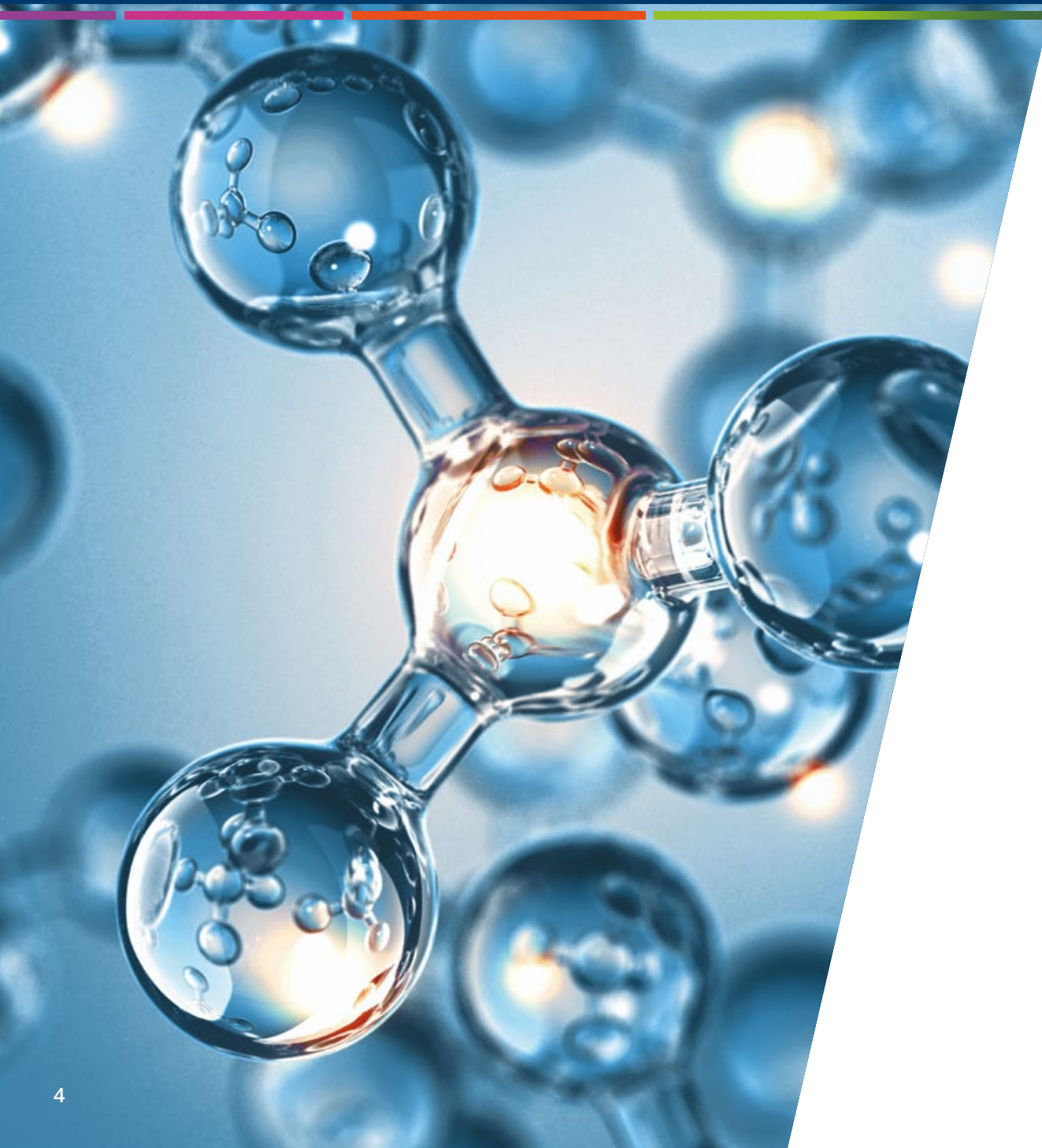
allnex is a leading producer of industrial coating resins and additives for architectural, industrial, protective, automotive and special purpose coatings and inks. With manufacturing facilities and R&D centers located around the world, the allnex group offers access to a huge global network of innovation and provides responsive,

local support to our customers, helping them to quickly bring advanced coating solutions to market. Formed in 2016 by the merger of two leading resin companies, we have recently further strengthened (y)our business by becoming part of major international player PTT Global Chemical.

INNOVATIVE CHEMISTRY
FOR ALL NEX>T GENERATIONS



There for you where you need us –
Our global footprint



About Additives

The coating resins and additives portfolio is on the leading edge of performance. This broad package of products enables our customers to bring coatings faster to the market, solve problems and enhance properties. We offer a broad range of additives for the formulation of coatings. Our portfolio includes low VOC, and hazardous air pollutant substance-free (HAPS free) technologies for solvent-borne, water-borne, high solids, powder coatings, and energy curable systems in both existing and emerging markets.

- Architectural-Decorative Wall and Trim Coatings, Stains, Concrete
- Automotive and Transportation – OEM, Aerospace, Refinish, Parts and Accessories
- General Industry, Wood, Packaging, Coil, Metal Protection
- Marine and Protective

Additives enhance performance by modifying rheological properties, improving flow and leveling, reducing foam, improving pigment dispersability, accelerating cure and crosslinking, improving adhesion and reducing defects. Our high performance dispersants and grinding resins are at the forefront of technology for the preparation of binder free pigment concentrates and pastes. The highest level of pigment, at the lowest VOC, without effects on corrosion resistance and other properties are achieved in systems using wetting and dispersing additives from allnex.

ADDITOL®, *CYCAT*®, and *MODAFLOW*® additive families serve the following applications:

- Wetting and Dispersing Additives
- Flow and Leveling Additives
- Defoamer and Deaerator
- Rheology Modifier
- Catalysts and Driers

Sustainability

A fivefold focus for a new tomorrow – the pillars of our sustainability program

These pillars form the basis of allnex's sustainability program, which covers all aspects from product development, raw material sourcing and manufacturing to supply chain management and customer service. The pillars stand for the circularity that is at the core of all our considerations, defining both how we plan and execute our activities.



Circular Economy

We diligently explore options to limit the consumption of resources, keep them in use as long as possible, and eventually recover and recycle them at the end of service life.



Renewable Sourcing

We aim at minimal use of finite resources and strive to reduce climate impacts by looking at renewable alternatives for raw materials and the energy we use.



Energy Efficiency

We design our product and manufacturing process in a way that enables maximum efficiency in energy utilization across the product lifecycle.



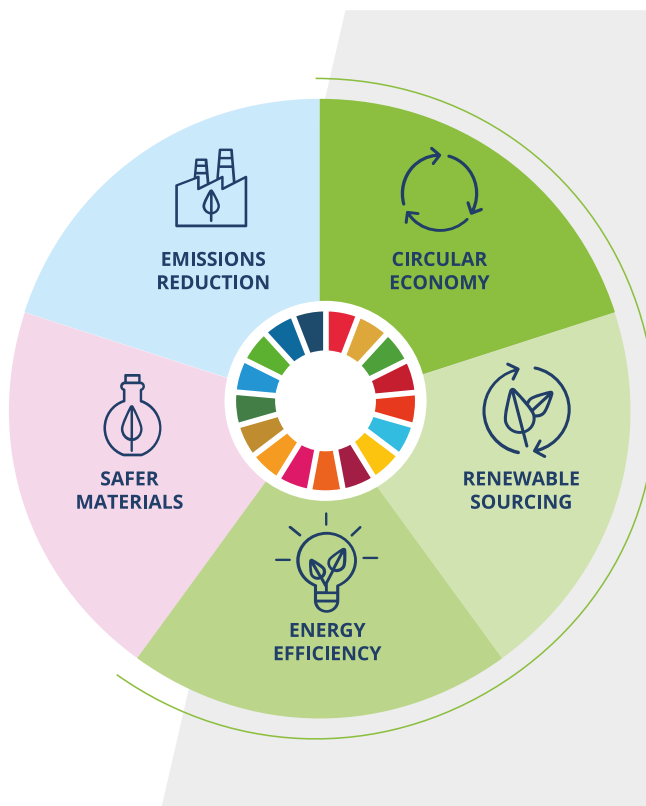
Safer Materials

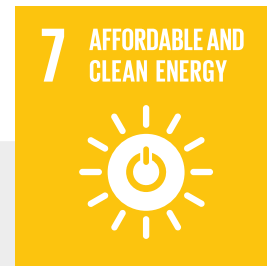
We are committed to making the substitution of potentially harmful chemicals by safer options one of our guiding considerations.



Emissions Reduction

We work to reduce the emissions of volatile organic solvents across the product lifecycle to protect people and the environment.





Being ECOWISE™ is the best way to be part of the solution – and that's exactly what our initiative and ECOWISE™ branded products help everyone to do. They spring from our deep commitment to a more sustainable future. They

are also living proof that, with our broad range of technologies and sustainable focus, we are the ideal partner for smoothly and successfully making the transition to the solutions a more ECOWISE™ future needs.



Content

Wetting and
Dispersing Additives

Page 11

Flow and
Leveling Additives

Page 29

Defoamers and
Deaerators

Page 41

Rheology
Modifiers

Page 51

Driers and
Catalysts

Page 59

Specialty
Additives

Page 73

Additives for
Powder Coatings

Page 86

Radcure
Additives

Page 91

Additives for
Tires

Page 105



INNOVATIVE CHEMISTRY
FOR ALL NEX^T GENERATIONS

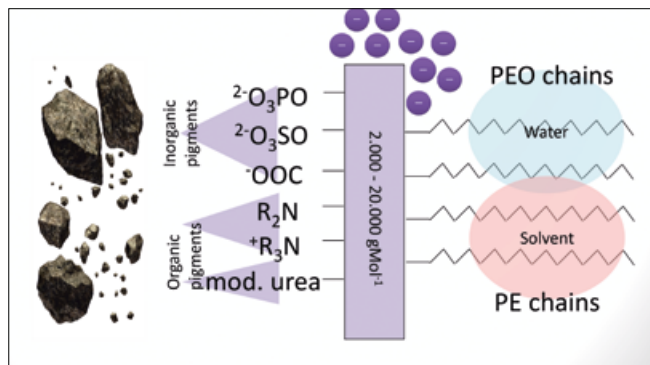
The background of the slide is a dark blue field filled with out-of-focus light spots (bokeh) in various shades of blue and green. On the left side, there are several bright, dense trails of small, glowing particles that appear to be moving or dispersing towards the right. A solid green trapezoidal shape is positioned at the bottom of the slide, containing the title text.

WETTING AND DISPERSING ADDITIVES

Wetting and Dispersing Additives for Pigmented Coating Systems

Additives for pigmented systems – Pigments and extenders are dry solid particles, which have to be incorporated into the liquid phase, consisting of binders and solvents. Protective and decorative properties are influenced by this step in paint production. To reach a high level of performance, it is important to disperse the solid components very well and to stabilize the distribution as homogeneously as possible.

Wetting agents are responsible for the first step in this process. They replace air from the surface of particles and support the liquid phase to cover pigments and extenders. Good wetting of pigments and fillers results in high gloss of coating systems. This kind of additive possesses surface activity character.

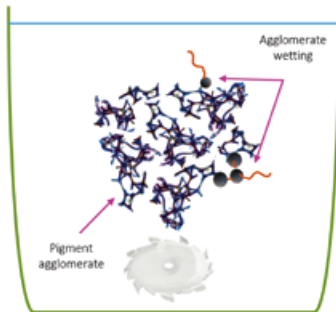


Dispersing agents are responsible for the stabilization of the homogeneous distribution of particles. These additives prevent re-agglomeration of pigments and fillers and the formation of flocculates. There are different kinds of stabilization, which have to be optimized in order to reach required properties of gloss, color strength, hiding power, corrosion protection and viscosity of the formulation.

Often combinations of different types of pigments are used to obtain the desired color and hiding properties. However, combinations of organic and inorganic pigments which have different polarity and surface tensions have a tendency to separate. This separation can be horizontal, forming cell-like structures (Bénard-cells), or vertical, which results in a color change. These effects can be evaluated by the rub-out test. Multifunctional wetting agents with higher surface activity are useful to reduce these defects. These additives work as anti-floating agents.

Modern dispersing additives are built on high polymeric backbones modified with different anchoring groups. To protect particles from re-agglomeration, either ionic repulsion or steric hindering is used. Entropic adsorption is the preferred mechanism in sensitive binder systems.

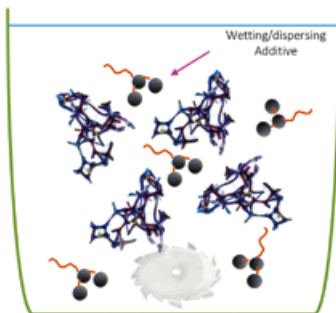
Steps of pigment grinding



Wetting

Replace air on the surface of pigments and fillers, help the resin to cover the new surface of the particles.

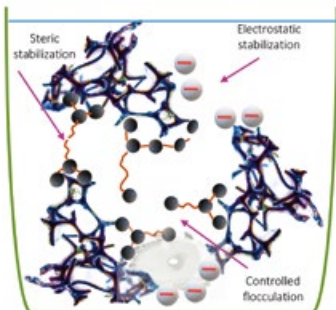
Wetting Anchoring $\downarrow \uparrow$ Flocculation Agglomeration



Dispersing

Break down pigment agglomerates into aggregates and primary particles, by incorporating energy (stirrer, bead mill..).

Stabilization Color development $\downarrow \uparrow$ Flotation Rub-out



Stabilization

Stabilize the homogeneous distribution of the pigments and avoid flocculation and re-agglomeration.

 Mono synapsis wetting

 AB block dispersant

 ABA block Loop dispersant

 Comb structure dispersant

 Star polymer dispersant

 Spacer group

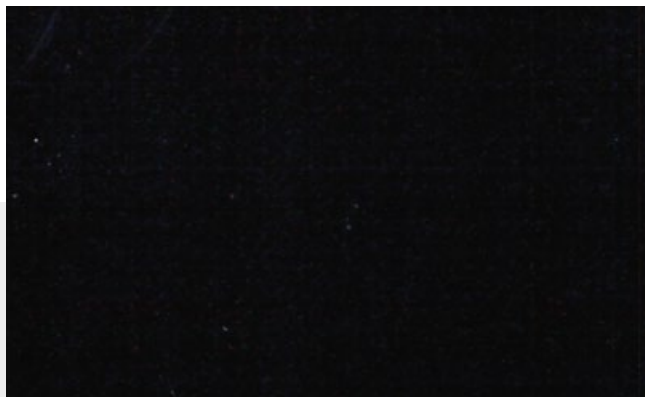
 Anchoring function

About usage of dispersants in epoxy systems

- Ionic dispersants are not used in Epoxy coatings because they can activate the oxirane ring. This results in either immediate reaction or slow destruction and loss of final paint performance.
- To ensure best Epoxy resin stability and performance use special developed *ADDITOL® VXW 6208 DISP* or *ADDITOL® VXW 6208/60 DISP*.
- To achieve extremely high pigment loading in direct grinding processes or for pigment concentrates use *ADDITOL® VXW 6394 DISP*. Additionally, this additive allows sufficient stabilization of inorganic fillers and pigments.
- *ADDITOL® XL 6577 LC DISP* can load up to 50% more inorganic pigments & fillers compared to other dispersants in SB paints & pigment preparations. As a result it reduces viscosity of highly filled formulations and thus enable lower VOC levels.



Destruction of wb Epoxy formulation by ionic dispersants



Stable wb Epoxy formulation including *ADDITOL® VXW 6208 DISP*

Trouble shooting guide: Improved anti-floating effect



Strong pigment floating visible rub-out test



Excellent pigment stabilization rub-out test

Use following products ...

- ADDITOL® XL 6514/80 DISP
- ADDITOL® XL 204 DISP
- ADDITOL® VXW 6208 DISP
- ADDITOL® VXL 6237 N DISP
- ADDITOL® XL 6577 LC DISP



Anti-floating impact of *ADDITOL® XL 204 DISP*

Next-Generation of Pigment Paste Technologies

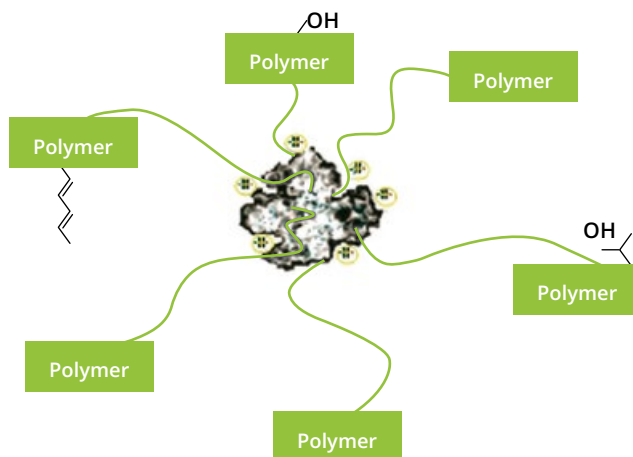
Requirements for modern pigment pastes

The preparation of modern tinting systems has become very important since cycle times, high quality standards and cost efficient production. Each plays a large role in overall profitability. Formulators have been able to use pigment slurry or pigment paste technology to generate high quality coating systems. But what if there is a new system which allows the combination of both of these high performance technologies. These new systems provide: very high loading, wide pigment compatibility, excellent stability and excellent color properties. In addition the new resin systems support effective film formation while meeting VOC targets. All of this can be accomplished while generally reducing the overall system cost.

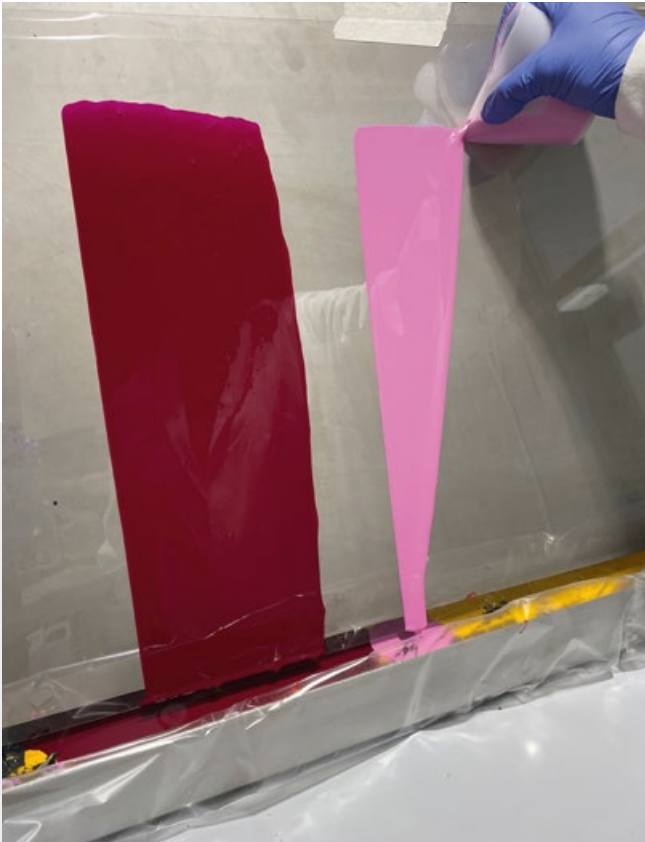
New technologies and trends for pigment pastes

To accomplish these objectives, we cannot simply use a grinding resin or a dispersing agent. Newly designed polymers are modified with strong anchoring groups. These grinding media combine the advantages of selective drying capacity, crosslinking into the film, anti-settling and anti-floating effect and compatibility to both solvent-borne and water-borne systems.

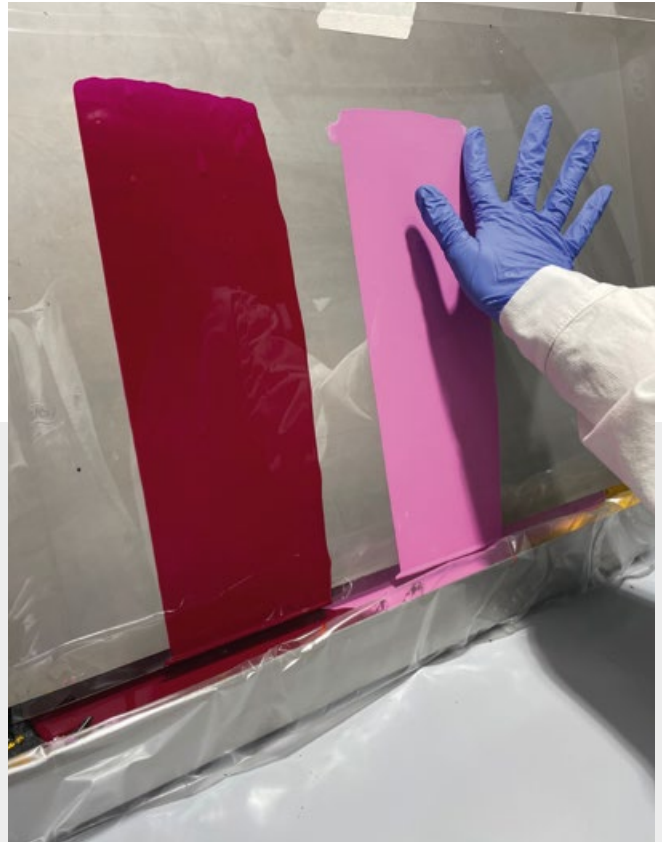
Such novel grinding media can be used to produce highest quality pigment pastes for Automotive OEM and Refinish paints, Industrial Coatings applications and Decorative paints.



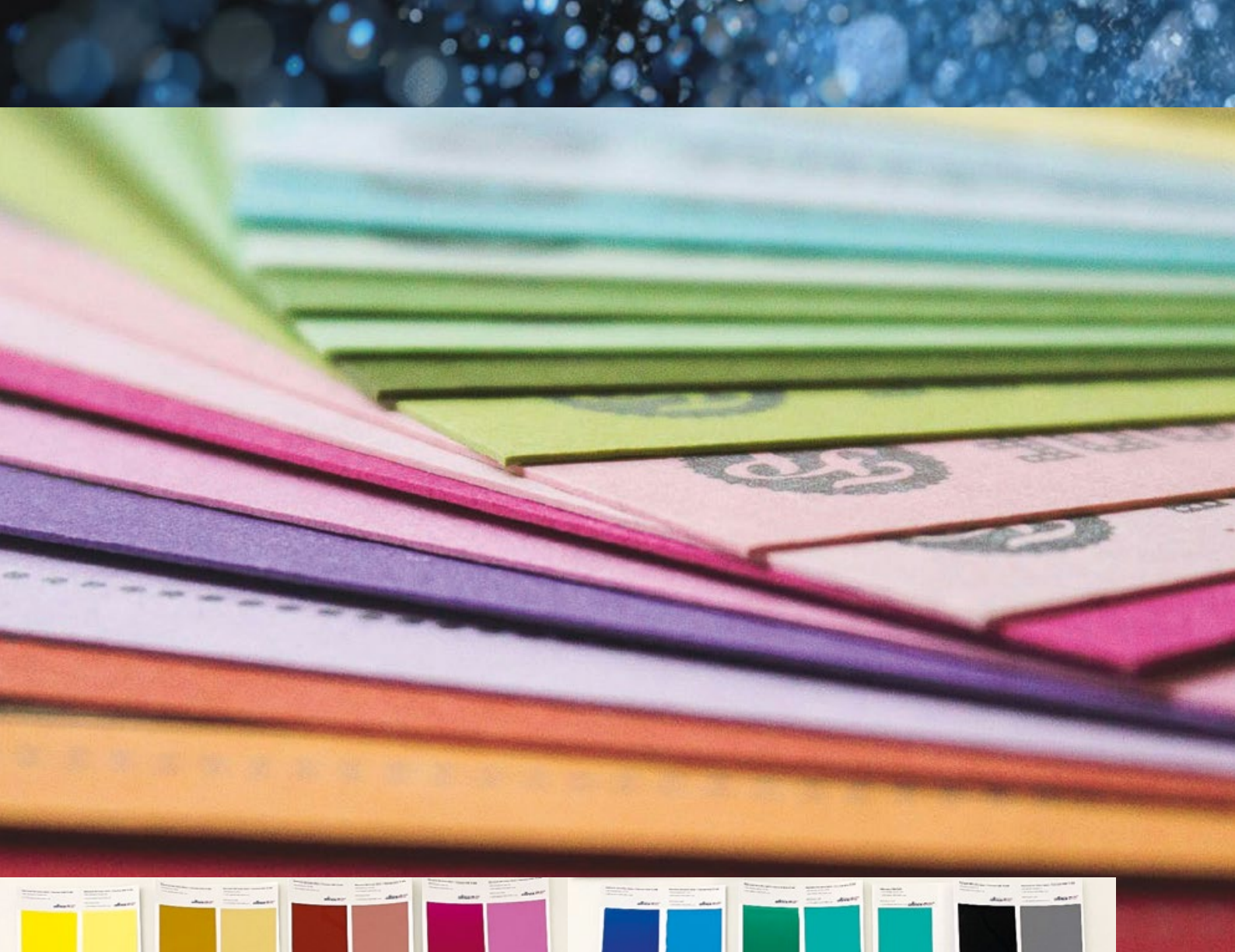
- In stoving and 2 pack systems they can improve chemical resistances and contribute to film hardness.
- In anti-corrosive formulations the new grinding media maintain the high corrosion protection designed into the base coating.
- In Decorative paints the pigment loading is significantly improved compared to conventional paste and slurry technologies. Furthermore a special modification provides compatibility in both solvent-borne and water-borne paints.



Pour-down | pigment stabilization evaluation

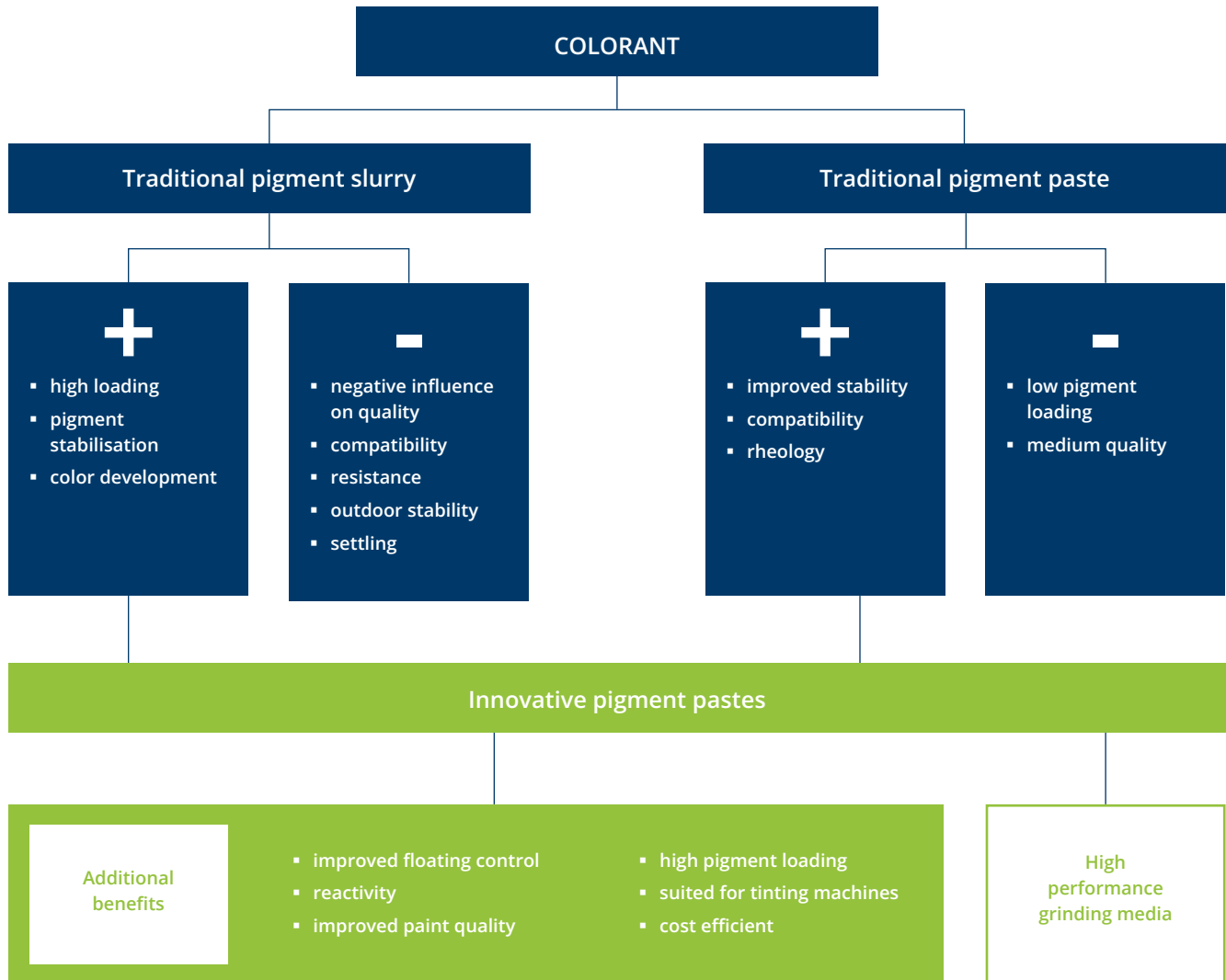


Rub-out test



Full shade and white reduction with colorants based on *ADDITOL® XL 6557 DISP*

About colorants



Additive name	WB	SB	100%	Characteristics	Description	% Active matter
Wetting & Dispersing						
ADDITOL® XL 204 DISP	●	●	●	Silicone containing phosphoric acid ester; anionic	Anti-floating additive to significantly reduce floating issues of inorganic and organic pigments and prevent the formation of Bénard-cells. It has a strong pigment wetting character and helps to reduce dispersing time.	55%
ADDITOL® XL 250 DISP	●	●	●	Phosphoric acid ester, neutralized by amine; anionic; low molecular	Pigment wetting additive with very strong pigment affinity especially to inorganic and metallic pigments. Besides reduced dispersing time it improves gloss and color strength as well as material flow.	55%
ADDITOL® XL 270 DISP		●	●	Special fatty acid modified silicone; amine neutralized	Wetting additive to prevent the sedimentation and floating of pigments in paints. Further reduces the tendency to flow off and improves edge-covering. Recommended for all solvent-based and solvent-free paint systems.	55%
ADDITOL® VXW 6387 DISP	●	●	●	Special fatty acids; amine neutralized; silicone-free	Wetting additive to prevent sedimentation and floating of pigments in paints. Further reduces the tendency to flow off and improves edge-covering. Recommended for all water-borne, solvent-borne and solvent-free paint systems.	60%
ADDITOL® XL 6514/80 DISP		●	●	Salt of a basic amino-amide with an acidic polyester	Wetting and anti-settling additive to improve gloss and pigment stabilization and flow. Especially recommended in low VOC and high solid systems.	80%

Additive name	WB	SB	100%	Characteristics	Description	% Active matter
Wetting & Dispersing						
ADDITOL® XL 6577 LC DISP		●	●	Copolymer with acidic groups	Excellent dispersant for SB and HS / UHS paints and inorganic pigment / filler preparations. Enables highest pigment loading with low viscosity. Supports low VOC formulations.	52%
SETAL® 7		●		Oil/fatty acid based dispersant	Polymeric wetting and dispersing additive to provide faster, finer dispersions with reduced settling at higher pigment loadings.	72%
ADDITOL® XL 255 N DISP		●	●	Modified alkyd polymer; neutralized	Pigment wetting additive to improve gloss and color strength; for all types of pigment recommended. It may be used for direct grinding or pigment paste process.	58%
ADDITOL® XW 6532 DISP	●	●	●	Polymeric dispersing additive, cationic	Highly efficient dispersant for organic pigments and carbon black. It can improve color acceptance of colorants in solvent-borne paints. It is recommended for the production of water-borne pigment slurries.	40%
ADDITOL® VXL 4992 DISP		●	●	Modified polyester	Multi-purpose additive for UP - putties with strong wetting power for inorganic pigments and extenders. It reduces dispersing time and improves degassing and rheology.	50%
ADDITOL® VXL 6212 DISP		●		Urethane modified acrylic copolymer; cationic; high molecular	Pigment wetting additive for difficult-to-disperse pigments. Especially recommended for automotive and industrial paint systems based on acrylates.	30%

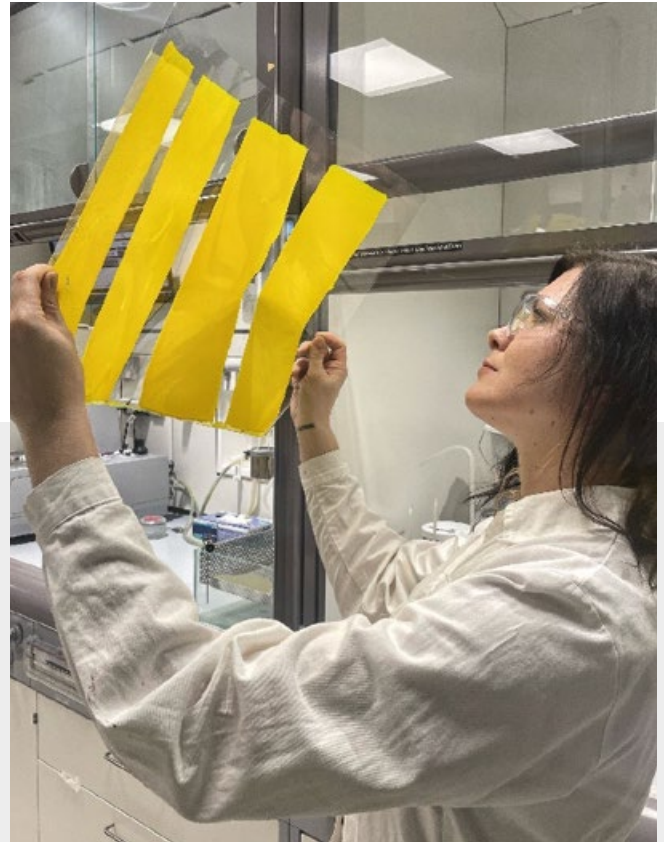
Additive name	WB	SB	100%	Characteristics	Description	% Active matter
Wetting & Dispersing						
ADDITOL® XL 6594 DISP		●	●	Urethane modified acrylic copolymer; cationic; high molecular, NMP-free	High molecular weight dispersing additive for difficult wettable pigments. Recommended for direct grinding processes. Improved compatibility in acrylic systems.	52%
ADDITOL® XL 6593 DISP		●	●	Wetting/dispersing agent; cationic; high molecular weight	High molecular weight dispersing additive for all types of pigment. Provides thixotropy for increased stabilization, especially in pigment concentrates.	45%
ADDITOL® XL 6521 DISP		●	●	Modified block copolymer; high molecular; cationic	Powerful, high molecular weight dispersing additives for very difficult wettable pigments. Especially recommended for all carbon black pigments in order to achieve perfect color properties and extreme high gloss.	60%
ADDITOL® VXL 6237 N DISP		●	●	Wetting/dispersing agent; cationic; high molecular	Highly efficient, high molecular weight dispersing additive for all types of pigment. Recommended for direct grinding as well as for binder free pigment concentrates.	30%
ADDITOL® VXW 6208 DISP	●			Non-ionic stabilized polymer; diluted in water	High molecular weight dispersing additive for all types of pigment. Due to its non-ionic polymer structure it is highly recommended in formulations containing sensitive resins. It is recommended for both, direct grinding and pigment concentrate processes.	50%

Additive name	WB	SB	100%	Characteristics	Description	% Active matter
Wetting & Dispersing						
ADDITOL® VXW 6208/60 DISP	●	●	●	Non-ionic stabilized polymer; diluted in methoxy propanol	High molecular weight dispersing additive for all types of pigment. Due to its non-ionic polymer structure it is highly recommended in formulations containing sensitive resins. It is recommended for both, direct grinding and pigment concentrate processes. Highly recommended in 2K Epoxy formulations.	60%
ADDITOL® XW 6588 DISP	●			Nonionic, polymeric low ion migration (LIM) dispersant	High molecular weight dispersing additive for all types of pigment. Due to its non-ionic polymer structure it is highly recommended in formulations containing sensitive resins. It is recommended for both, direct grinding and pigment concentrate processes.	48%
ADDITOL® XL 6592 DISP	●	●	●	High molecular weight polymer; low ion migration technology (LIM)	Highly efficient, high molecular weight dispersing additive for all types of pigment. Recommended for direct grinding as well as for binder free pigment concentrates.	100%
ADDITOL® VXW 6394 DISP	●			High molecular weight polymer; nonionic	Very sufficient, high molecular weight dispersing additive for all types of pigment. Due to its nonionic polymer structure it is highly recommended in formulations containing sensitive resins. Further it can be used for the production of highly loaded, binder free pigment concentrates.	40%

Additive name	WB	SB	100%	Characteristics	Description	% Active matter
Wetting & Dispersing						
ADDITOL® XW 6596 DISP	●			High molecular weight polymer; nonionic	Sufficient, high molecular weight dispersing additive for all types of pigment. Due to its nonionic polymer structure it is highly recommended in formulations containing sensitive resins. Further it can be used for the production of highly loaded, binder free pigment concentrates.	35%
ADDITOL® XW 6581 DISP	●			Wetting and dispersing agent; free of alkylphenol ethoxylates; non VOC	Wetting additive to improve gloss and color strength of difficult wettable pigments. It allows an improved material flow.	50%
ADDITOL® VXW 6200 DISP	●			Acrylic copolymer-ammonia salt; anionic; medium molecular	Powerful dispersing additive especially for inorganic pigments. It reduces dispersing time and offers very good pigment stabilization. Especially recommended for glossy paints.	40%
ADDITOL® VXW 6205 DISP	●			Acrylic copolymer-sodium salt; anionic; medium molecular	Low molecular weight wetting and dispersing additive especially for inorganic pigments and extenders. Strongly recommended for titanium dioxide white.	40%
ADDITOL® XW 330 DISP	●			Polyacrylic acid-ammonia salt; anionic; low molecular	Low molecular weight wetting and dispersing additive especially for inorganic pigments and extenders. Strongly recommended for titanium dioxide white.	30%
ADDITOL® XW 440 DISP	●			Polyacrylic acid-sodium salt; anionic; low molecular	Anionic wetting and dispersing agent for pigments. Aqueous solution of a sodium salt of a low-molecular polyacrylic acid.	40%

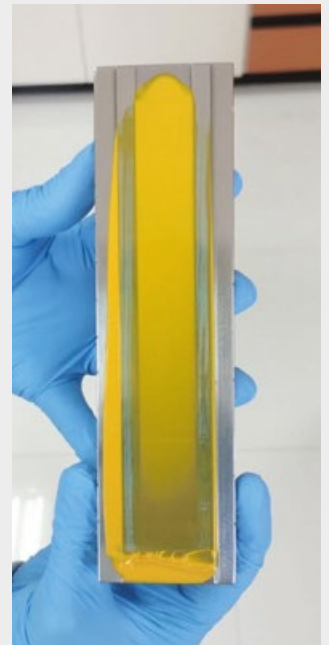
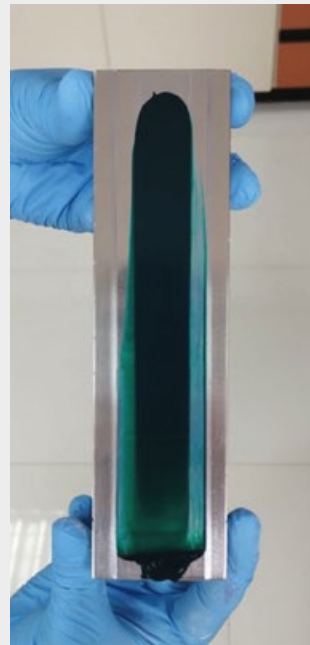
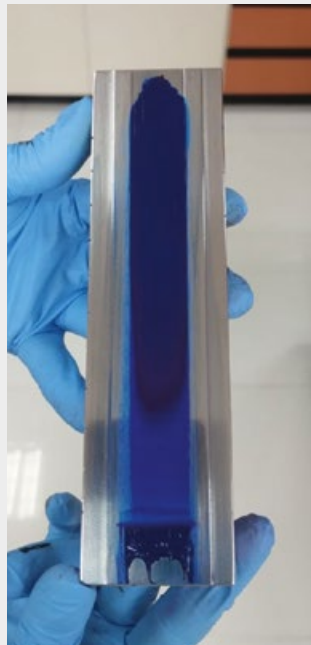
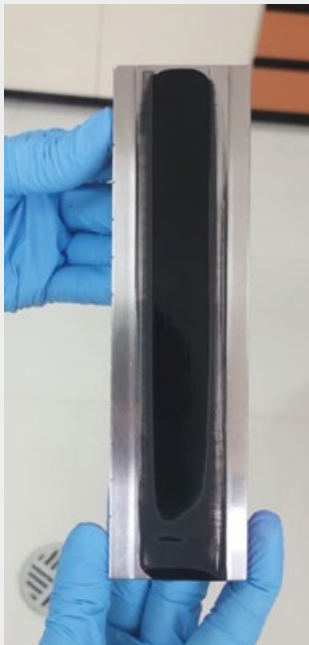
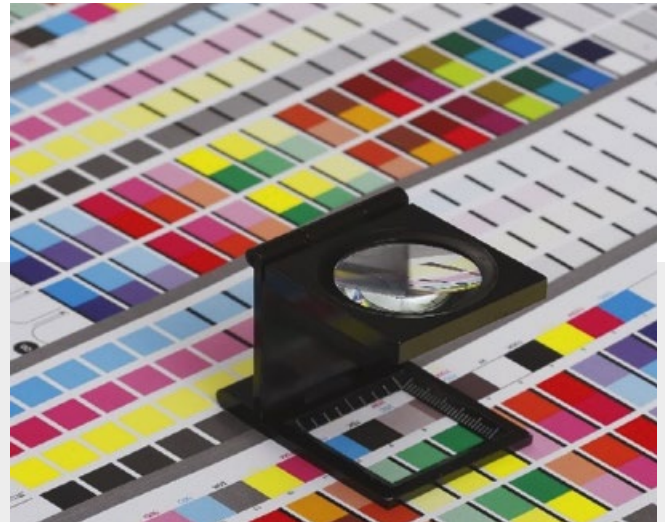


Spray booth: Application



Evaluation of grinding results

Additive name	WB	SB	100%	Characteristics	Description	% Active matter
Grinding Media						
ADDITOL® XL 6557 DISP		●		Air drying alkyd polymer	Pigment grinding medium for solvent-borne (SB) industrial pigment pastes. High pigment concentration. Supports air-drying, physical drying and isocyanate and amino crosslinking systems. Compatible in broadest range of SB resins.	70%
ADDITOL® XW 6535 DISP	●	●	●	High polymeric, auto emulsifying pigment grinding medium	Universal grinding medium for the production of pigment pastes used in all types of tinting machines. For improved color properties and better exterior performance. Recommended for all architectural, decorative and many industrial pigment pastes.	45%
ADDITOL® XW 6565 DISP	●	●	●	High polymeric, auto-emulsifying pigment grinding medium; improved compatibility in non-aqueous paints	Latest generation of high molecular, universal pigment grinding medium for Architectural colorant production. High pigment loading and low mill base viscosities. Designed for POS and in house tinting. Ultra-low VOC and Eco labels 2009/543/EC and 2009/544/EC.	38%
ADDITOL® XW 6591 DISP	●			Polyester modified acrylic polymer; co-crosslinkable	Co-crosslinkable grinding medium with high pigment loading capacity. Due to its special composition and reactivity it can improve chemical resistance and corrosion protection. Broad compatibility. Improved life time stability.	34%
ADDITOL® XL 6589 DISP		●		Thermoplastic grinding medium	Grinding medium that allows for high pigment loading, low viscosity and excellent color development. Shows excellent compatibility in refinish and industrial paints. Allows improved corrosion, water, humidity and weather resistances due to strong hydrophobicity.	65%



Evaluation of grinding efficiency



INNOVATIVE CHEMISTRY
FOR ALL NEX>T GENERATIONS



FLOW AND LEVELING ADDITIVES

Surface additives

Demands on optical performance are very high in most coating application areas. Defects in paint film are divergences from surface evenness and are proof of an imperfect coating process. Flow and Leveling agents are used to prevent or reduce surface defects like poor

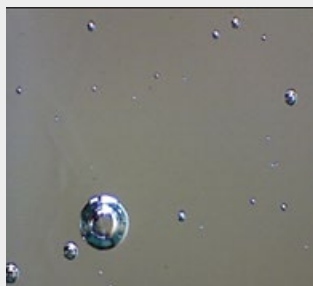
leveling, orange peel or cratering. These additives are surface active materials with a tendency to concentrate at the air coating interface. Poly (methyl) acrylates, polyesters and silicone-containing compounds are used for this application.

Good to know ...

... that some additives bring extra value.



Micro foam bubbles in a solvent-borne clear coat



Micro foam disappears from liquid phase

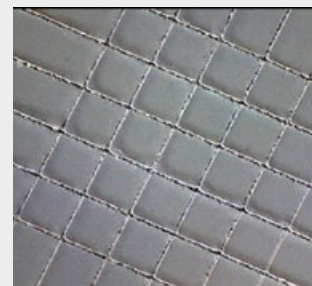
High molecular weight flow promoters can bring added value in systems with entrapped micro foam. They allow for easy degassing even in high viscous formulations.

- Use *MODAFLOW® Resin*, *MODAFLOW® EPSILON* or *ADDITOL® XL 6537 FLOW*

... that standard silicones destroy adhesion.



Loss of interlayer adhesion

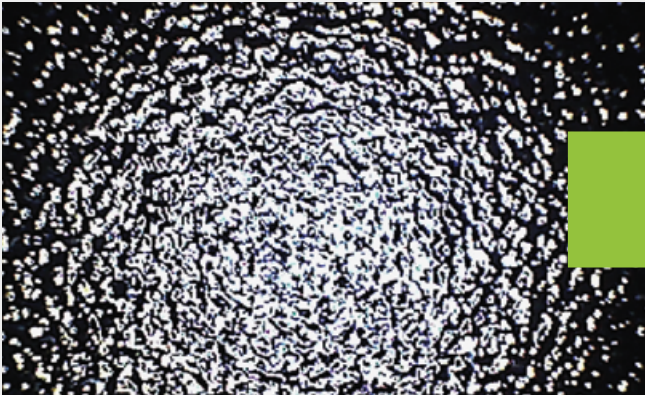


Excellent adhesion on primer

Standard silicone additives are not heat stable and may create condensation products when heated over 150°C. The resultant silicone aggregates lead to crater formation or loss of intercoat adhesion.

- Use *ADDITOL® XL 123 N FLOW*

Trouble shooting guide: Elimination of short and long waves



Co- existence of short and long waves in black top coat

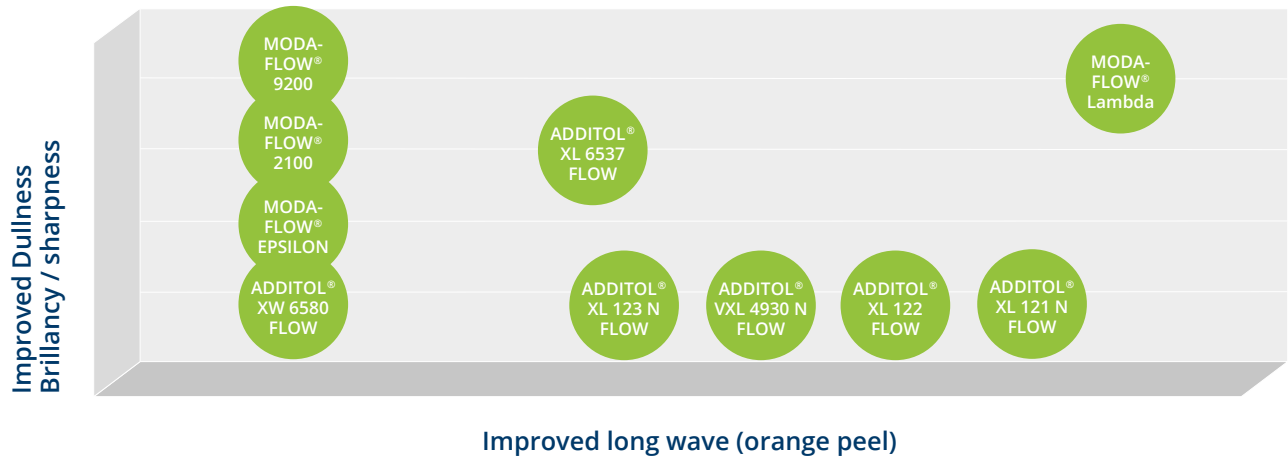
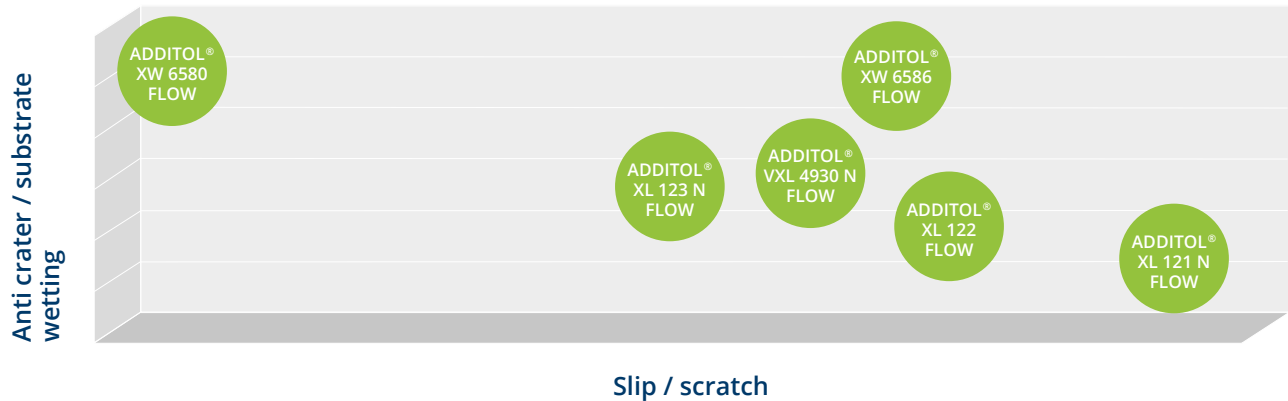


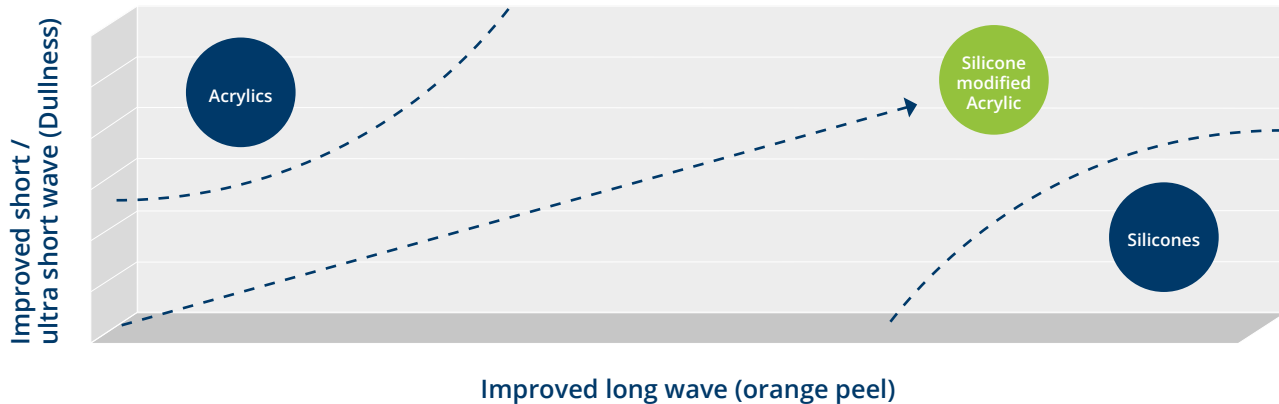
Strong improved sharpness by elimination of short and long waves

Use following products ...

- ADDITOL® VXL 4930 N FLOW
- ADDITOL® XW 395 FLOW
- ADDITOL® XW 6586 FLOW
- MODAFLOW® 2100
- ADDITOL® XL 6537 FLOW
- MODAFLOW® AQ 3025
- MODAFLOW® Lambda
- MODAFLOW® 9200

How to select leveling additives





Surface topography

- The surface topography of physically drying coatings is established during the solvent evaporation stage
- In the locations where the volatile components have evaporated, the surface tension increases, and the coatings flows towards these areas, creating waves

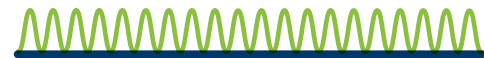
Typically the total wave amplitude is in the range of $1\mu\text{m}$ whereas the wave period varies from about $0,1\text{ mm}$ up to 12 mm . Wave lengths of less than $0,1\text{ mm}$ create dullness or matte image.



Long wave: (w d,e) 1,2-12 mm



Short wave: (w b,c) 0,3-1,2 mm



Ultra short wave: (w a) 0,1-0,3mm

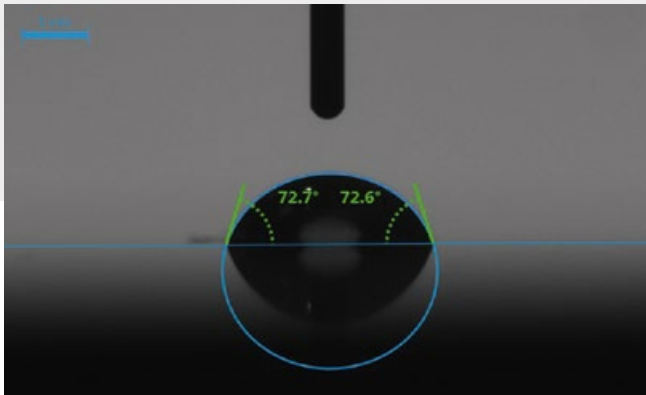


Micro wave. micro structure $<0,1\text{ mm}$

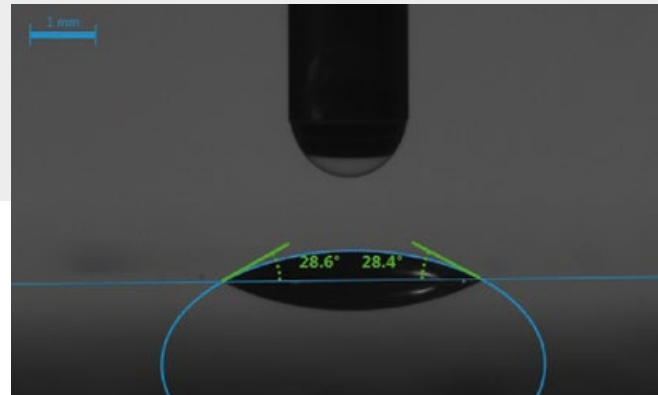
Substrate wetting

When a liquid coating is applied to a substrate, it should spread over the surface easily and uniformly. Proper substrate wetting is essential for a uniform appearance, strong adhesion, and the overall effectiveness of the coating in protecting the substrate. Further, defects such

as craters can be avoided. The main factor influencing wetting is the surface tension of the liquid coating and the solid substrate. To achieve optimal wetting, the coating's surface tension should be lower than that of the substrate.



Water droplet on substrate



Water with 0.1% ADDITOL® Vxw 6503 N Flow on substrate

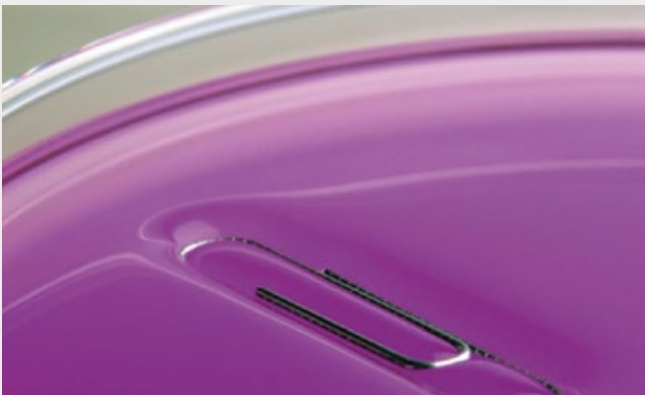
Nano based materials

Films which contain nano-silica exhibit outstanding hardness, chemical, scratch and abrasion resistance coupled with very low haze development after abrasion.

MODAFLOW® NSR 100 is a concentrated dispersion of nano-silica for improving scratch resistance and Easy to Clean properties for UV-based clearcoats as well as pigmented topcoats.



Good to know ...



... that we have the most effective surface energy control additives available.

Improving adhesion of WB and SB paints on porous substrates such as concrete or wood, keep dynamic surface tension low as long as drying/curing effectively takes place. *ADDITOL® XW 6580 FLOW* is a zero VOC surface energy control additive that helps you with substrate wetting and adhesion.

Additive name	WB	SB	100%	Characteristics	Description	% Active matter
Flow and Leveling Additives (silicone free)						
ADDITOL® VXW 4971 FLOW	●			Acrylic copolymer; neutralized by amine	Crosslinkable leveling additive to improve flow and surface quality. It prevents surface defects.	50%
ADDITOL® XL 480 FLOW		●		Modified acrylic copolymer; low molecular weight; FDA-approved	Low molecular weight leveling additive for improved surface and anti-crater effect. Very good compatibility in all major solvent-borne systems. Especially recommended for car refinish and coil coating applications.	70%
ADDITOL® XL 481 FLOW		●	●	Modified acrylic copolymer, medium molecular	Medium molecular weight acrylic leveling additive to improve flow and surface quality. High Tg.	60%
ADDITOL® XL 482 FLOW		●	●	Modified acrylic copolymer, medium molecular	Medium molecular weight acrylic leveling additive to improve flow and surface quality. Effective against film defects.	100%
ADDITOL® XL 490 FLOW		●	●	Modified acrylic copolymer, high molecular	High molecular weight acrylic leveling additive to improve flow and surface quality. Has a degassing effect.	100%
ADDITOL® XW 395 FLOW	●			Acrylic copolymer; neutralized by amine; silicone-free; FDA-approved	Multi-purpose leveling additive to improve surface conditions and prevent pin holes and crater formation. Also efficient against oil contaminations.	58%
ADDITOL® XL 6537 FLOW		●	●	Polyester based flow Additive, medium molecular	Multi-purpose leveling additive to improve surface conditions and prevent pin holes and crater formation. Works as anti-popping additive.	100%
MODAFLOW® 2100		●	●	Acrylic copolymer; medium molecular weight; FDA-approved	Medium molecular weight, highly efficient flow modifier. Good compatibility and easy incorporation, fast mode of action. Recommended also in clear coat applications.	100%

Additive name	WB	SB	100%	Characteristics	Description	% Active matter
Flow and Leveling Additives (silicone free)						
MODAFLOW® 9200		●	●	Modified acrylic copolymer; low molecular weight; crosslinkable	Low molecular weight, highly efficient and crosslinkable flow modifier. It reduces film defects and strongly increases gloss levels. Recommended for all solvent-borne high end applications.	100%
MODAFLOW® AQ 3025	●			Acrylic copolymer; neutralized by amine; silicone-free	Medium molecular weight flow and leveling additive. It supports pigment wetting and allows a fast degassing process.	25%
MODAFLOW® EPSILON		●	●	Acrylic polymer, high molecular weight	Highly efficient flow promoter with excellent degassing properties. Recommended for all solvent-borne systems, especially for pigmented top coats.	80%
MODAFLOW® Resin		●	●	Acrylic copolymer, high molecular weight; FDA-approved	Highly efficient flow promoter with excellent degassing properties. Recommended for all solvent-borne and high solid systems, especially for pigmented top coats.	100%
MULTIFLOW® Resin		●		Acrylic copolymer, diluted in xylene	Highly efficient flow promoter with excellent degassing properties. Recommended for all solvent-borne systems, especially for pigmented top coats.	50%
Substrate wetting (silicone containing)						
ADDITOL® VXW 6503 N FLOW	●	●	●	Silicone tenside	Special silicone tenside with very strong influence on surface tension and excellent substrate wetting performance. It is not foam stabilizing and does not show problems in recoatability.	50%
ADDITOL® XW 6580 FLOW	●	●	●	Silicone tenside	Special silicone tenside with very strong influence on surface tension and excellent substrate wetting performance. It is not foam stabilizing and does not show problems in recoatability.	100%



Spray dust absorption with/ without *ADDITOL® VXL 4930 N FLOW*

Additive name	WB	SB	100%	Characteristics	Description	% Active matter
Silicone Leveling Additives						
ADDITOL® VXL 4930 N FLOW	●	●	●	Polyether-modified silicone	Universal, silicone leveling additive with very good compatibility. It is very well balanced in order to improve spray mist absorption, orange peel, cratering and leveling. Highly efficient and not foam stabilizing.	40%
ADDITOL® XW 6586 FLOW	●	●	●	Organo-modified polysiloxane type	Multipurpose silicone additive for improved surface quality, substrate wetting, slip and scratch resistance. FDA approved	100%
ADDITOL® XL 121 N FLOW		●	●	Modified silicone, very strong reduction of surface tension	Silicone leveling additive that strongly increases slip and scratch resistance. Further it improves material flow.	14%
ADDITOL® XL 122 FLOW		●	●	Modified silicone, strong reduction of surface tension	Silicone leveling additive to improve surface quality, slip and substrate wetting. Very good compatibility.	45%
ADDITOL® XL 123 N FLOW		●	●	Modified silicone, medium reduction of surface tension	Silicone leveling additive to improve slip and scratch resistance. It has degassing properties and is thermo-stable up to 400°C.	50%
Silicone Acrylic Hybrid						
MODAFLOW® Lambda		●	●	Hydroxy-functional acrylic-silicone polymer	Highly efficient, cross linkable flow promoter for improved surface characteristics such as gloss, DOI, brilliancy, anti-orange peel effect.	100%
Nano Additive						
MODAFLOW® NSR 100		●	●	Solvent based dispersion of modified nanosilica	Concentrated dispersion of nanosilica for improving scratch resistance and Easy to Clean properties of automotive OEM, vehicle refinishing, plastic and wood clearcoats as well as pigmented topcoats.	28%

INNOVATIVE CHEMISTRY
FOR ALL NEX>T GENERATIONS





DEFOAMERS AND DEAERATORS

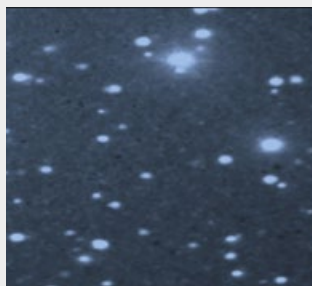
Foam control Additives

In many stages of production, handling and application, air is incorporated and finally dispersed into resins, lacquers and paints. During production and handling, the increase of volume by foam and the incorporated air will cause handling and filling problems. After application of coatings, air inside the system should leave the film while the viscosity is low enough to allow bubble marks to reflow. These larger bubbles are macro foam, which

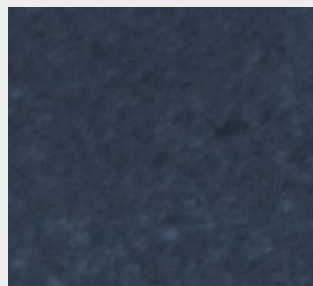
is eliminated by Defoamers. The dispersed air in the system which remains is called micro foam. Deaerators or air release agents are used to carry these very small bubbles to the surface of the liquid phase. The technique of defoaming is based on controlled incompatibility in the system and it is important to calculate the right balance between activity and compatibility to avoid defects.

Good to know ...

... that some defoamers even enhance the system further.



Pinholes in thick layer Epoxy primer

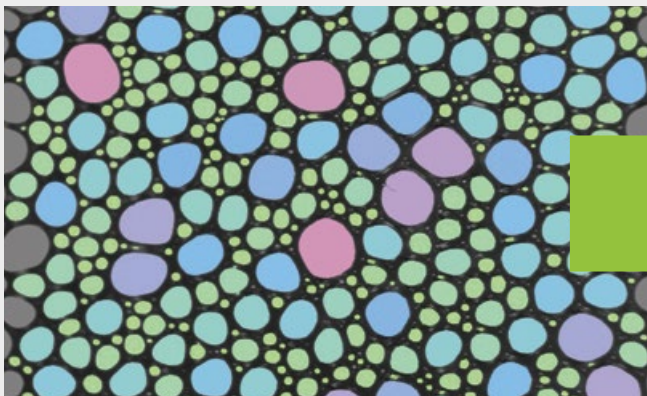


Closed surface obtained with
ADDITOL® XW 6544 XFOAM

Highly viscous and strong pseudoplastic paints applied with high wet film thicknesses e.g. by airless spray gun are very susceptible to entrapped foam. The foam within the coating may lead to pinhole formation and can weaken anti-corrosion performance of paints.

- Use **ADDITOL® XW 6544 XFOAM** for:
 - All high viscous and high film thickness coatings
 - All airless / mix applied paints
 - All water-based pigment pastes
 - High molecular weight flow promoters can bring added value in systems with entrapped foam
- Use **MODAFLOW® Resin** or **MODAFLOW® EPSILON** for:
 - Strong deaeration without use of silicone
 - Combining degassing effect and improvement of leveling

Trouble shooting guide: Reduction of macro and micro foam



Presence of macro foam in wet clear coat

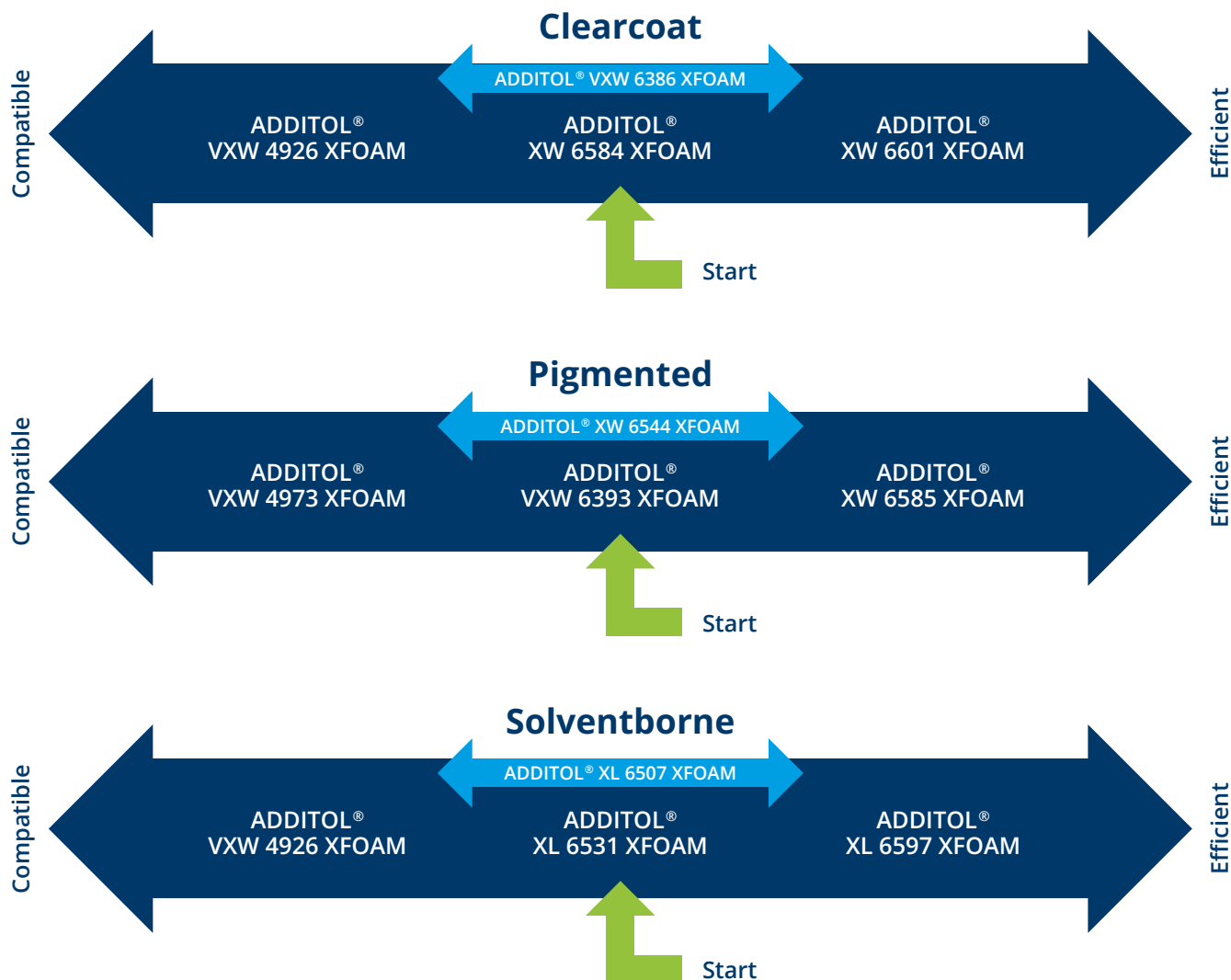


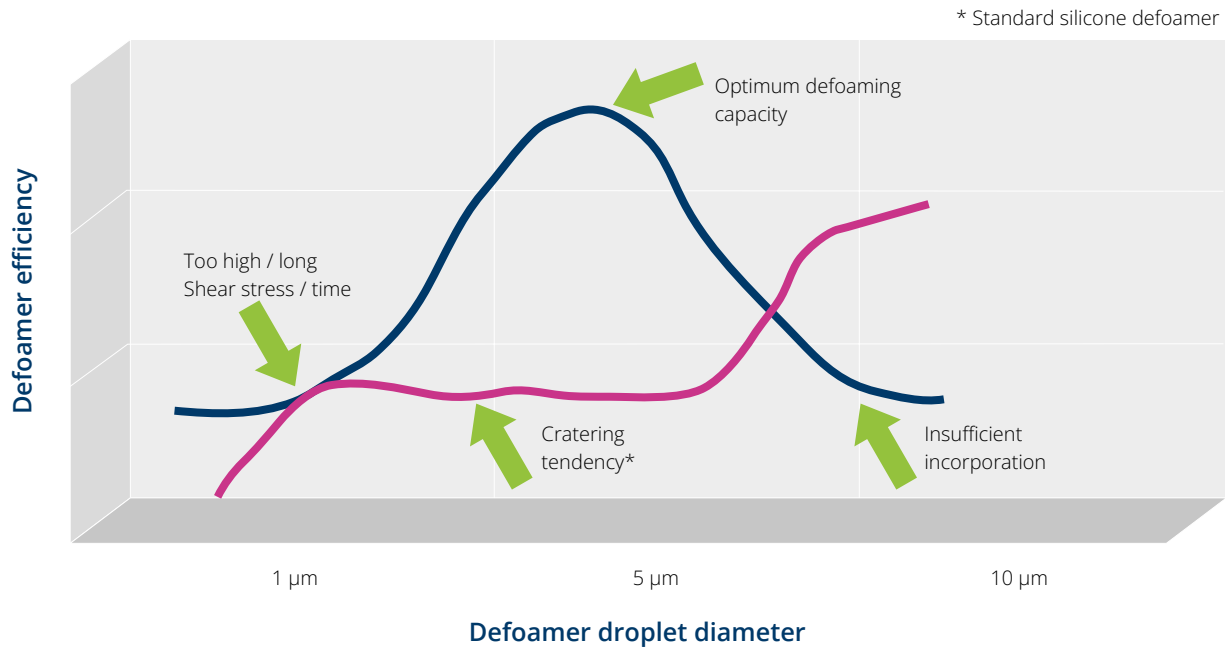
Efficient destruction of macro foam

Use following products ...

- ADDITOL® XL 6507 XFOAM
- ADDITOL® VXW 4926 XFOAM
- ADDITOL® VXW 4973 XFOAM
- ADDITOL® VXW 6386 XFOAM
- ADDITOL® VVXW 6393 XFOAM
- ADDITOL® XW 6544 XFOAM
- ADDITOL® XW 6569 XFOAM
- ADDITOL® XW 6601 XFOAM
- ADDITOL® XL 6597 XFOAM

How to select defoamers and deaerators





Additive name	WB	SB	100%	Characteristics	Description
Defoamer (silicone free)					
ADDITOL® VXW 4973 XFOAM	●			Mineral oil, waxes	Highly efficient defoamer with good compatibility and easy incorporation. Broad field of application.
ADDITOL® VXW 6211 XFOAM	●			Hydrocarbons; hydrophobic solid particles	Very strong defoamer for highly pigmented paints or pigment pastes.
ADDITOL® VXW 6235 XFOAM			●	Defoaming compounds applied on silica; dry powder	Powder defoamer for flooring systems or epoxy cement applications.
ADDITOL® VXW 6386 XFOAM	●			Hydrocarbons, waxes	Defoamer for high quality lacquers with good compatibility. Homogenize prior use.
ADDITOL® VXW 6393 XFOAM	●			Special mineral oil, waxes; low odor	Highly efficient defoamer for architectural and decorative coatings. Low odor, especially for interior applications.
ADDITOL® XW 375 XFOAM	●			Mineral oil, waxes	Highly efficient defoamer for architectural and decorative paint mainly.
ADDITOL® XW 376 XFOAM	●			Mineral oil / wax emulsion	Highly efficient, easy to incorporate defoamer emulsion for architectural and decorative paints mainly.
ADDITOL® XW 6544 XFOAM	●	●		Polymer defoamer, VOC free	Very efficient defoamer and deaerator for high viscous systems with strong gas incorporations. Excellent re-flow effect improves surface quality.
ADDITOL® XW 6567 XFOAM	●			Modified hydrocarbon, waxes	Food contact compliant defoamer for B&B, DWI, general line containers, caps, closures and aerosol industry.

Additive name	WB	SB	100%	Characteristics	Description
Defoamer (silicone)					
ADDITOL® XW 6600 XFOAM	●			Modified silicone, hydrophobic particles, widely compatible	Versatile and efficient defoamer, easy to incorporate. Offers good defoaming capabilities while being less critical than similar grades.
ADDITOL® XW 6601 XFOAM	●			Modified silicone, hydrophobic particles, good balance of efficiency and compatibility	Strong silicone-based defoamer, offers a compromise between efficiency and compatibility.
ADDITOL® VXW 6210 N XFOAM	●			Modified silicone; blend of hydrocarbons	Heavy duty defoamer recommended for preparation of pigment concentrates and strong foaming systems.
ADDITOL® XW 372 N XFOAM	●			Mineral oil, waxes; silicone containing	Defoamer with excellent long term stability, enhances flow and leveling.
ADDITOL® XW 6569 XFOAM	●			Emulsifier free silicone emulsion, hydrophobic solid particles, best compatibility	Defoamer with balanced efficiency and compatibility for transparent and high gloss systems. No impact on rheology modifiers or recoatability.
ADDITOL® XW 6584 XFOAM	●			Emulsifier free silicone emulsion, hydrophobic solid particles, compatible	Highly efficient defoamer for transparent and high gloss pigmented topcoats. Defoamer for low shear incorporation (let down phase).
ADDITOL® XW 6585 XFOAM	●			Emulsifier free silicone emulsion, hydrophobic solid particles, highly efficient	Highly efficient defoamer for transparent and high gloss systems. Suitable for high and low PVC formulations. thickeners - no impact on rheology profile.

Additive name	WB	SB	100%	Characteristics	Description
Deaerator					
ADDITOL® XL 6597 XFOAM		●	●	Polymeric degassing additive, highest efficiency	Strong polymeric deaerator for all solvent-based and solvent-free systems.
ADDITOL® XL 6531 XFOAM		●	●	Polymeric degassing additive, balanced efficiency	Special polymer defoamer/deaerator, recom- mended for pigmented systems.
ADDITOL® XL 6507 XFOAM		●	●	Polymeric degassing additive, good compatibility	Defoamer and deaerator for all industrial paints and lacquers, highly efficient.
ADDITOL® VXW 4926 XFOAM	●	●	●	Special fatty acid ester	Defoamer and deaerator with rheology improve- ment in order to allow better film build-up. Very fast mode of action, crosslinkable.



Defoamer evaluation via roller application



Effect of *ADDITOL® XW 6600 XFOAM*



Microscopic picture of ruptured foam bubble

INNOVATIVE CHEMISTRY
FOR ALL NEX^T GENERATIONS



RHEOLOGY MODIFIERS

Viscosity Control and Anti-Settling

The rheological properties of coating systems are primarily designed to improve paint handling, application and leveling properties. Rheology modifiers are compounds which interact with formulation components, building up a three dimensional network or modifying the fluid phase only. These additives optimize the viscosity profile of coating systems. However viscosity control is also very important to shelf storage stability. Increasing it can help reduce the tendency of pigment and

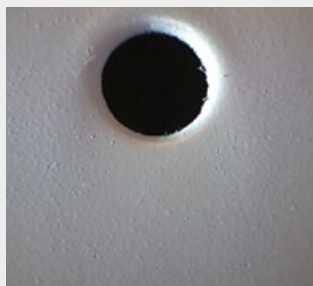
extender sedimentation in the container. During storage, pigments and extenders may show a tendency to settle into a soft or hard layer in the container. This is caused by the higher density of these components in relation to the liquid phase. Sedimentation can be overcome by using additives which form three dimensional networks. Anti-settling agents modify the viscosity at extremely low shear rates which governs.

Good to know ...

... that there is a way to increase wet film thickness without sagging.



Strong sagging of paint



Improved sagging control

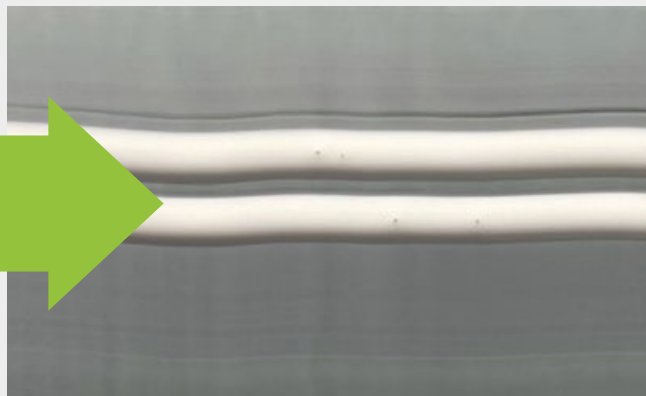
In case of high wet film thicknesses applied e.g. by airless spray gun or in case of overlap areas, PUR thickeners have their limits. The paint will start sagging on vertical substrates.

- Use *ADDITOL® XL 280 RHEO* to achieve extreme high film thickness without sagging.

Trouble shooting guide: Improved sagging on vertical surface



Sagging of paint on vertical substrate



Sagging avoided with addition of *ADDITOL® VXW 6388 RHEO*

Use following products ...

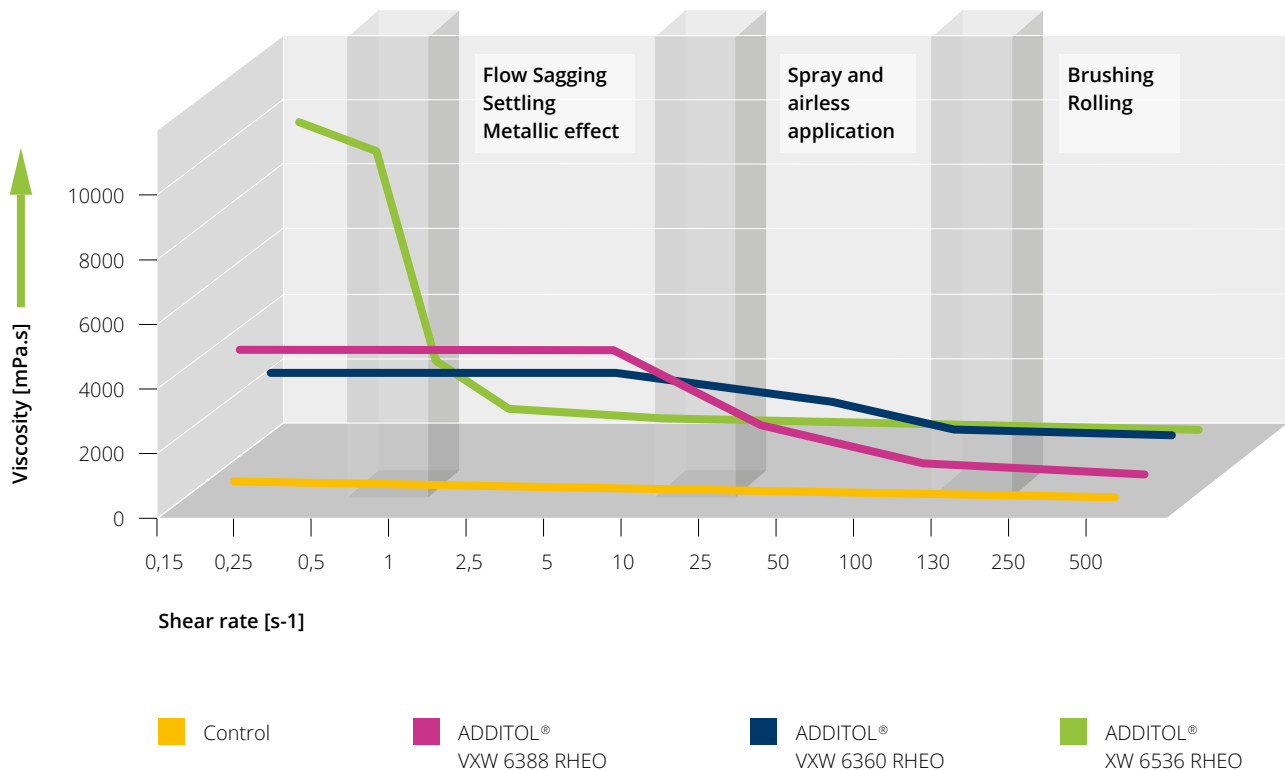
- *ADDITOL® XL 270 DISP*
- *ADDITOL® VXW 6360 RHEO*
- *ADDITOL® VXW 6387 DISP*
- *ADDITOL® VXW 6388 RHEO*
- *ADDITOL® XW 6536 RHEO*
- *ADDITOL® XL 280 RHEO*

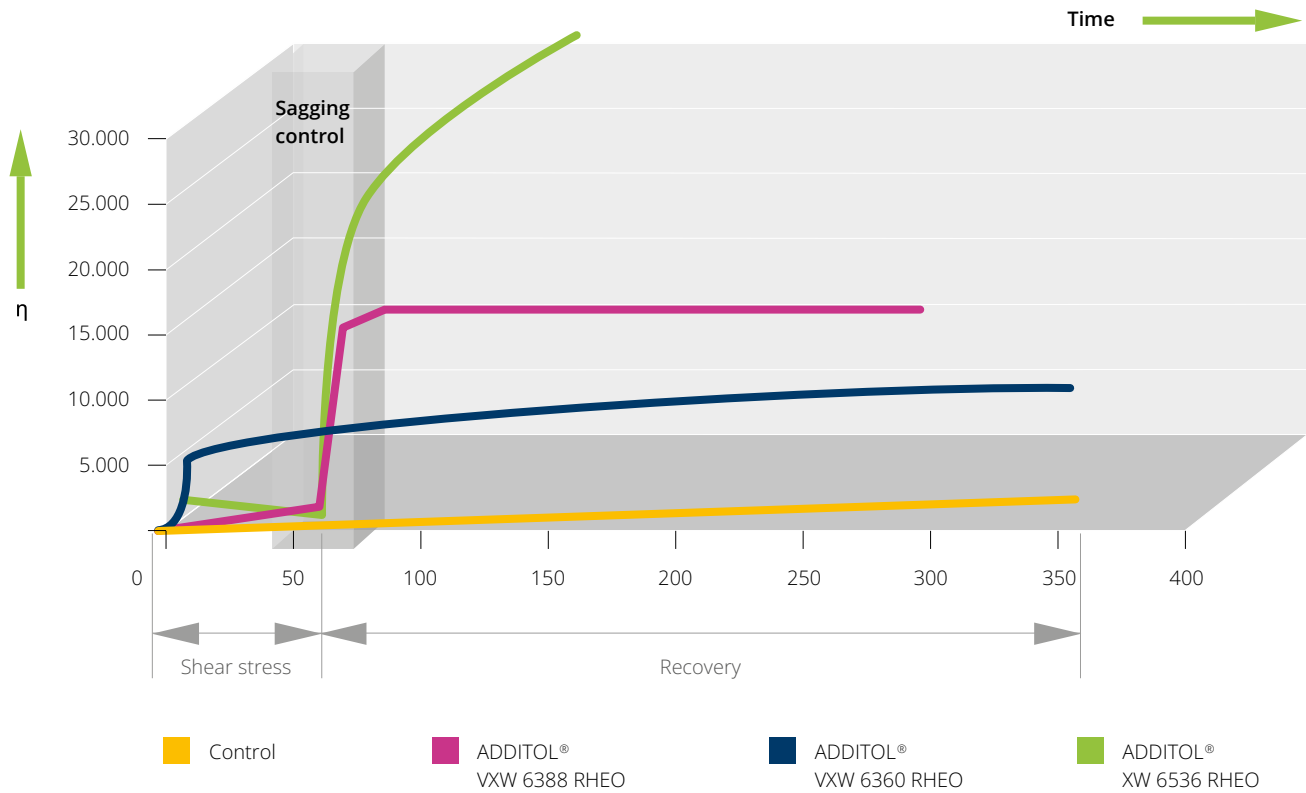


Phase separation with/without *ADDITOL® XL 270 DISP*

How to select rheology modifiers:

Rheology profile of a water-based acrylic clear coat



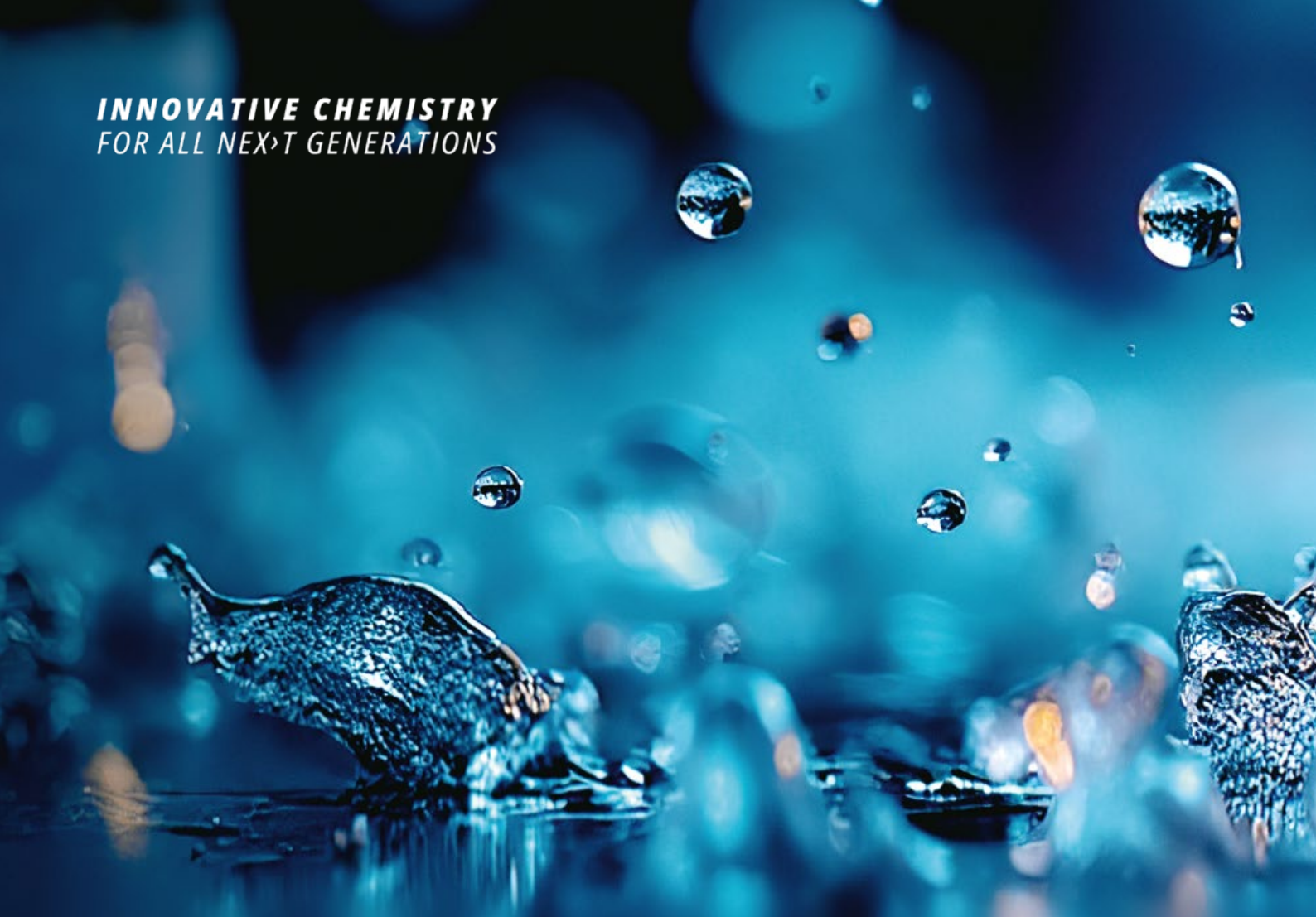




Ladder study of varying dosages of *ADDITOL® VXW 6388 RHEO*

Additive name	WB	SB	100%	Characteristics	Description	% Active matter
Rheology modifiers						
ADDITOL® VXW 4934 RHEO	●			Modified wax emulsion	Reduces settling and sagging, enhances edge covering.	35%
ADDITOL® VXW 6360 RHEO	●			Polyurethane thickener	Associative thickener to control rheology and flow. It improves applicability by roller or brush. Easy to incorporate.	30%
ADDITOL® VXW 6387 DISP	●	●	●	Special fatty acids; amine neutralized; silicone-free	Rheology modifier to prevent pigment sedimentation, sagging and storage stability.	60%
ADDITOL® VXW 6388 RHEO	●			Polyurethane thickener	Associative thickener to control rheology at low shear stress. Recommended for spray application. Excellent against sedimentation and sagging.	35%
ADDITOL® XL 270 DISP		●	●	Special fatty acid modified silicone; amine neutralized	Multi-purpose additive to improve rheology and prevent from settling and floating. Also recommended in high gloss systems.	55%
ADDITOL® XL 280 RHEO		●	●	Special modified montmorillonite clay	Rheology modifier to prevent powerful settling of pigments and extenders, reduces sagging.	36%
ADDITOL® XW 6536 RHEO	●			Special organic activated clay	Special rheology modifier with extremely fast viscosity recovery. Recommended for all high wet film thicknesses e.g. in case of airless application. Prevents sagging and settling at zero and low shear stress sufficiently.	37%

INNOVATIVE CHEMISTRY
FOR ALL NEX>T GENERATIONS





DRIERS AND CATALYSTS

Driers for air-drying systems

The selection of the right Drier and Catalyst is a very important element to ensure the desired performance in reactive and crosslinked coatings. The crosslinking reaction of air drying alkyd systems is based on a radical mechanism, starting with the incorporation of oxygen from air. The absorption step is accelerated by Driers,

which are carboxylic salts of metals. Cobalt, manganese and iron are the most important active drying metals whereas barium, zirconium or calcium belong to the group of secondary drying metals. Pre-emulsified combination driers allow efficient set and through drying with easy incorporation in water-borne paint formulations.

Good to know ...

... that we have fast reactivity Cobalt-free driers.



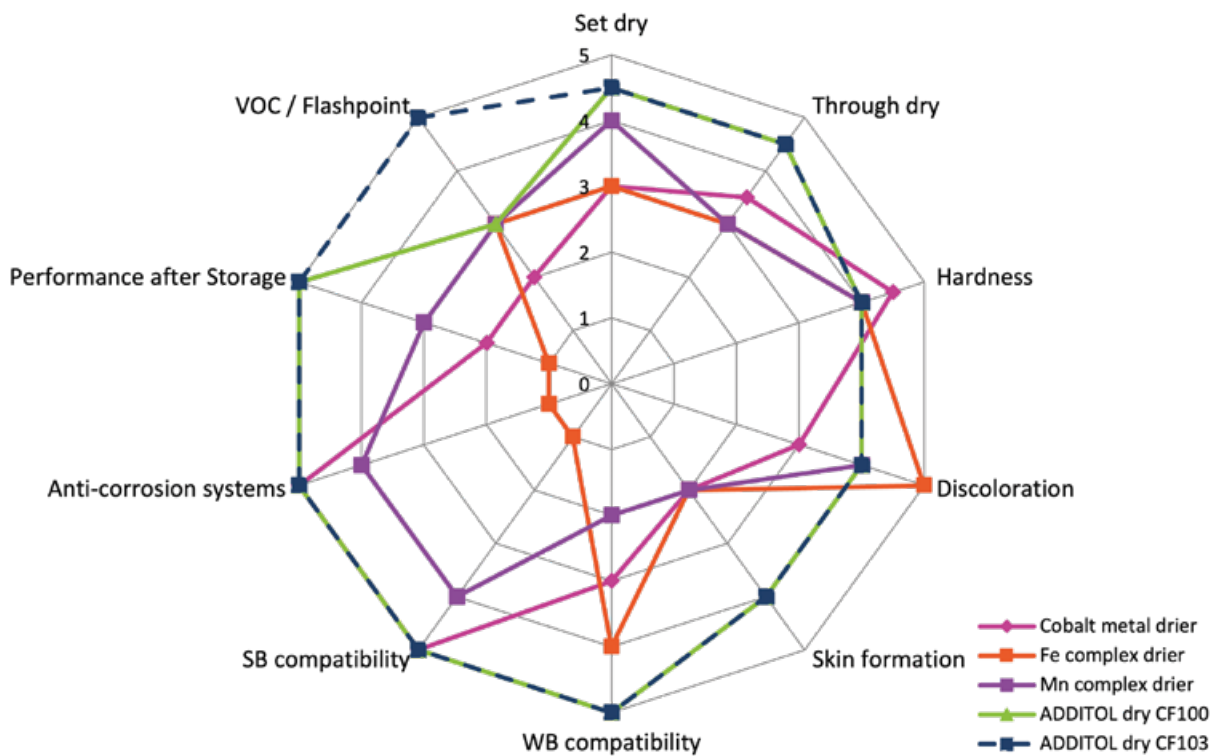
Air drying paint without drier on drying recorder



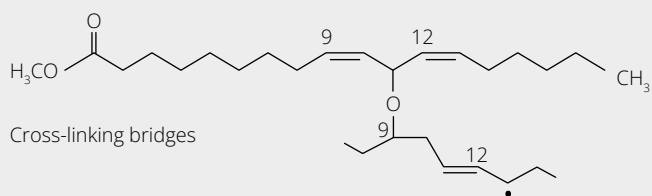
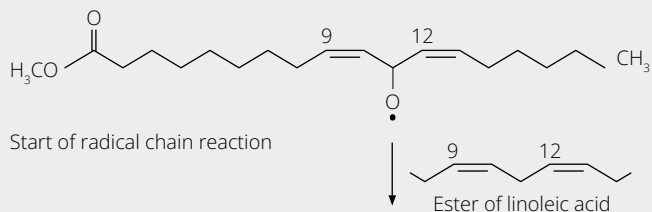
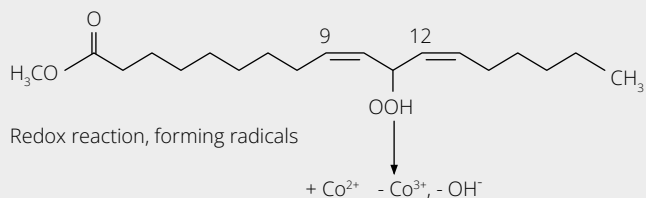
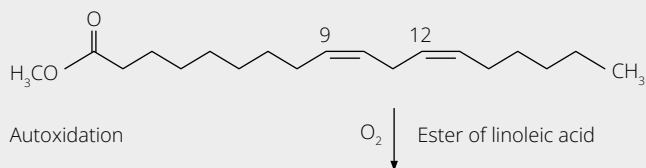
Rapidly drying paint on drying recorder

Next generation Cobalt-free driers are as efficient as Cobalt metal driers and fully in line with latest legislations. *ADDITOL® dry CF* series are universal driers for SB/HS/UHS and WB Architectural & Industrial formulations. Very fast set, through drying and hardness development. Supports anti corrosive performance and long lasting effect during paint storage.

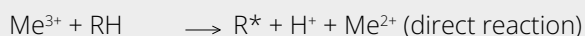
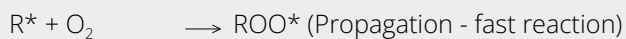
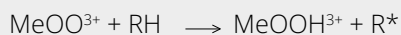
Some driers have compatibility problems when incorporated in water-based paints. In these cases pre-mixing amine with the drier immediately prior to incorporation may solve the problem.



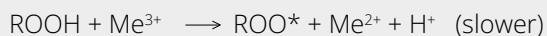
Possible drying reactions



Formation of hydro-peroxide (Oxygen uptake)



Decomposition of hydro-peroxide



Combination with another unsaturated side chain

(start of auto polymerization)

Generation of a carbon-based radical

> Further polymerization



Drying recorder results of *ADDITOL® CF100 DRY* compared to benchmark cobalt free driers



Additive name	Dosage	WB	SB	100%	Characteristics	Description
Driers						
ADDITOL® VXW 4940 N DRY	2,0 – 3,0 % binder	●			Combination drier; 3 % Co / 3 %Ba / 5 % Zr in form of emulsion; NPE-free	Easy to incorporate; enhances surface and through drying.
ADDITOL® VXW 6206 DRY	1,0 – 3,0 % solid binder	●	●		Combination drier; 5 % Co / 0,22 %Li / 7,5 %Zr; NPE-free	Enhances surface and through drying.
ADDITOL® XW 6533 DRY	4,0 – 6,0 % binder	●	●		Special accelerated cobalt free combination drier; contains Mn and Zr	Allows fast set and through drying and excellent hardness development. Recom- mended for primers and top coats.
ADDITOL® XW 6566 DRY	2,5 – 7,5% solid binder	●	●		Nontoxic polymeric cobalt containing combi- nation drier; 2% Co-polymer / 3% Zr / 0,1% Li / VOC < 25g/l	Easy incorporation in WB & SB alkyd paints. Very fast set drying. This drier requires app 48 hours activation time after com- pleting the formulation.



ADDITOL® CF103 DRY for printing inks



ADDITOL® CF100 DRY for architectural applications

Additive name	Dosage	WB	SB	100%	Characteristics	Description
Driers						
ADDITOL® CF100 DRY	0,3 – 1,3% solid binder	●	●		Cobalt free drier; twin accelerated Manganese; ligand protection	Universal high performance drier for SB and WB alkyd paints. Designed for Architectural and Industrial formulations. Fast set & through drying with excellent hardness development. Can replace all Cobalt containing driers (!) Synergy drier recommendation SB: Ca / Zr or Li / Zr. Auxiliary drier for WB systems - ADDITOL® CF200 DRY.
ADDITOL® CF103 DRY	0,3 – 1,3% solid binder	●	●		Cobalt free drier; mono accelerated Manganese; ligand protection	Universal high performance drier for SB and WB alkyd paints. Designed for Inks and Architectural formulations. Fast set & through drying with excellent hardness development. Can replace all Cobalt con- taining driers (!) Synergy drier recommen- dation SB: Ca / Zr or Li / Zr. Auxiliary drier for WB systems - ADDITOL® CF200 DRY or CF 300. Ultra-low VOC.
ADDITOL® CF200 DRY	0,75 – 1,35% solid binder	●			Auxiliary drier combination for ADDITOL® CF DRY series 10% Zr 0,3% Li	Balanced auxiliary drier metal combination to be used together with ADDITOL® CF DRY series in WB alkyd paint formulations. Ready to use, easy incorporation in all WB alkyd formulations. Improves set drying.
ADDITOL® CF300 DRY	0,75 – 1,35% solid binder	●			Auxiliary drier combination for ADDITOL® CF DRY series 8,1% Zr 4,6% Ba	Balanced auxiliary drier metal combination to be used together with ADDITOL® CF DRY series in WB alkyd paint formulations. Ready to use, easy incorporation in all WB alkyd formulations. Improves through drying.
BESCHLEUNIGER Co 1			●		Dissolved Cobalt octoate (contains xylene)	Cobalt accelerator for radical polymeriza- tion of unsaturated polyester products.

Acid catalysts for melamine-crosslinkers

Catalysts are used to speed up cross linking reactions of two-component polyurethane systems or improve curing conditions in stoving enamels. The reaction of melamine resins and polyols is complex and require acidic catalysts. The relative efficiency of catalysts correlates to the acidity and the overall reaction rate is directly proportional to the concentration of the catalyst. Frequently used catalysts are p-toluene sulfonic acid (p-TSA), dodecyl benzene sulfonic acid (DDBSA), dinonyl

naphthalene di sulfonic acid (DNNDSA), phosphoric acid derivatives or organic acids. Ionic or covalently blocked sulfonic acid catalysts are used in amino resin based stoving systems. The heat sensitive deactivation of the sulfonic acid is a very important tool to achieve the desired balance of storage stability of a catalyzed system and then rapid cure when the coating reaches the desired cure temperature.

Trouble shooting guide: Improved corrosion protection



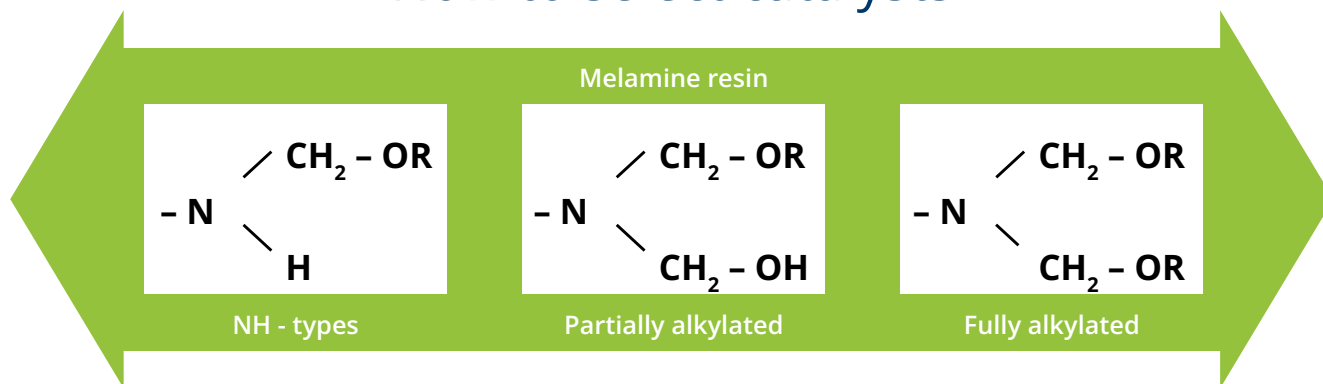
Weak corrosion protection in 2 layer system



Improved corrosion protection by choosing the right catalyst

allnex catalysts are usable in anti-corrosion systems without influence on protective properties.

How to select catalysts



Weak acid catalysts

Strong acid catalysts

Phosphoric
acid catalyst

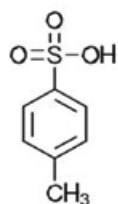
Unblocked alkylbenzene
sulphonic acid type

Blocked alkylbenzene
sulphonic acid type

CYCAT[®] 296-9

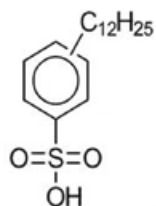
CYCAT[®] 4040

CYCAT[®] VXK 6395
CYCAT[®] 600
CYCAT[®] 4045



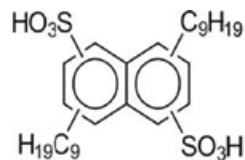
p-TSA

para-Toluene
Sulfonic Acid
Mw: 172
pKa: -2.8
CYCAT® 4040



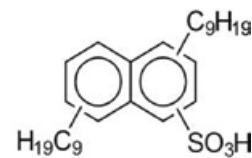
DDBSA

Dodecylbenzene
Sulfonic Acid
Mw: 326.5
pKa: -2.8
CYCAT® 600



DNNSA

Dinonylnaphthalene
Di-Sulfonic Acid
Mw: 540.7
pKa1: 0.1
pKa2: >0.8
CYCAT® 500C



DNNSA

Dinonylnaphthalene
Di-Sulfonic Acid
Mw: 460.7
pKa: 0.7
CYCAT® 6051

p-TSA CYCAT® 4040	DDBSA CYCAT® 600	DNNSA CYCAT® 500C	DNNSA CYCAT® 6051
Strong	Add strenght	Weak	
Hydrophilic	Hydrophobicity	Hydrophobic	
Light	Color	Dark	
Low	Unit Price / Acid Value	High	

	Unblocked	Amine	Covalent
Cure Temperature	Low	Medium - High	Medium High
Shelf Life	Short	Medium - Long	Long
Humidity resistance	Good	Good	Best
Salt fog resistance	Poor - Good	Good	Best
Appearance	Good	Good	Best
Electric resistance	Good	Fair	Best
Pigment interaction	More	Less	Least

Notes

- The table above is based on the same type of sulfonic acid only.
- The cured film properties of blocked catalyst coatings after storage will be more consistent vs. unblocked.
- A primary alcohol is needed in the formulation for better in-can stability.



Additive name	WB	SB	100%	Characteristics	Description
Catalysts (unblocked)					
CYCAT® 204	●	●		pTSA-based catalyst	Strong acid catalyst for highly alkylated melamine, benzoguanamine, glycoluril and urea resins.
CYCAT® 4040	●	●		pTSA-based catalyst	Strong acid catalyst for highly alkylated melamine, benzoguanamine, glycoluril and urea resins.
CYCAT® 600*	●	●		DDBSA-based catalyst	Preferred over p-TSA for low alcohol containing systems; provides improved resistivity for electrostatic spray; FDA 21 CFR 175.300 approved.
CYCAT® 600A	●	●		DDBSA-based catalyst	Preferred over p-TSA for low alcohol containing systems; provides improved resistivity for electrostatic spray; FDA 21 CFR 175.300 approved.
CYCAT® 600C	●	●		DDBSA-based catalyst	Preferred over p-TSA for low alcohol containing systems; provides improved resistivity for electrostatic spray; FDA 21 CFR 175.300 approved.
CYCAT® 6051		●		DNNSA-based catalyst	Best water and corrosion resistance for high temperature applications on metal.
CYCAT® 296-9	●	●		DMAPP-based catalyst	Accelerates the curing reactions of high imino and partially alkylated resins.
CYCAT® 296-10	●	●		Phosphoric acid-based catalyst	Accelerates the curing reactions of partially alkylated amino resins, especially recommended for clear finishes and enamels within low temperature ranges.
CYCAT® XK 406N		●		Phosphoric acid-based catalyst	A derivative of phosphoric acid, designed for use with phenolic resins and used in interior can coatings. FDA 21 CFR 175.300 approved.
CYCAT® XK 406C		●		Phosphoric acid-based catalyst	A derivative of phosphoric acid, designed for use with phenolic resins and used in interior can coatings. FDA 21 CFR 175.300 approved.

* Production site | A America | C China

Additive name	WB	SB	100%	Characteristics	Description
Catalysts (blocked)					
CYCAT® 205	●	●		Amine blocked pTSA catalyst	For highly alkylated melamine, benzoguanamine, glycoluril and urea resins. Provides excellent stability in water-borne and high solid systems.
CYCAT® 4045	●	●		Amine blocked pTSA catalyst	For highly alkylated melamine, benzoguanamine, glycoluril and urea resins. Provides excellent stability in water-borne and high solid systems.
CYCAT® 4107	●	●		Amine blocked pTSA catalyst	Catalyst is specially designed for making a wrinkled finish.
CYCAT® 4786	●	●		Amine blocked pTSA catalyst	Offers low temperature curing with good stability.
CYCAT® VVK 6395*	●	●		Amine blocked pTSA catalyst	Especially for low temperature stoving applications in general industry and OEM.
CYCAT® 6395C	●	●		Amine blocked pTSA catalyst	Especially for low temperature stoving applications in general industry and OEM.
CYCAT® 602	●	●		Amine blocked DDBSA catalyst	Strong catalyst with good storage stability, especially recommended for can and container coatings, automotive coatings and general industry.
CYCAT® 6020	●	●		Amine blocked DDBSA catalyst	Best appearance, excellent color in automotive clear coats.
CYCAT® 6025	●	●		Amine blocked DDBSA catalyst	Provides excellent formulated package stability. Especially recommended for automotive clear coats and general industry coatings.
CYCAT® 6030	●	●		Amine blocked DDBSA catalyst	Under-neutralized for faster cure response. Recommended for automotive topcoats over water-borne base coats.
CYCAT® 6325	●	●		Amine blocked DDBSA catalyst	Accelerates the cure of amino crosslinking agents and provide improved formulated package stability. Recommended for automotive topcoats, general industrial, exterior can coatings.
CYCAT® 6925	●	●		Amine blocked DDBSA catalyst	Amine-blocked version of Cycat® 600A for use with amino resins or phenolic resins in can coatings. FDA 21 CFR Section 175.300 compliant.
CYCAT® 6323	●	●		Amine blocked DNNSA catalyst	Great flow and appearance, excellent humidity and corrosion resistance.

* Production site | **A** America | **C** China

INNOVATIVE CHEMISTRY
FOR ALL NEX^T GENERATIONS

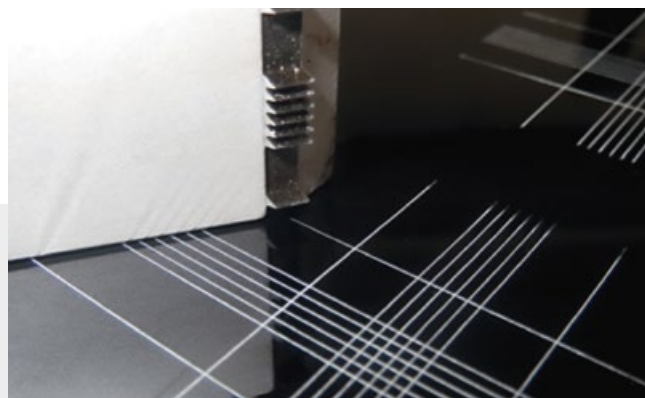


A nighttime photograph of a city skyline across a body of water. In the foreground, a curved bridge with illuminated railings and a small structure is visible. The city lights are reflected in the water. A green diagonal overlay covers the bottom right portion of the image.

SPECIALTY ADDITIVES



Additive name	Dosage	WB	SB	100%	Characteristics	Description
Adhesion promoters						
ADDITOL® XL 180 BOND	0,1 – 1,0 % total	●	●		Phosphoric acid compound	Adhesion promoter for ferrous & non ferrous metals. Interlayer adhesion improve- ment in multilayer systems
ADDITOL® XL 186 BOND	0,3– 1,0 % total	●	●		Phosphoric acid compound	Adhesion promoter for ferrous & non fer- rous metals. Very good interlayer adhesion improvement in multilayer systems.
Anti-skinning additives						
ADDITOL® XL 109/50LG XSKIN	2 - 5% total		●		Phenol resin type	Anti skinning additive that prevent in can skin formation and control through drying by scavenging oxygen radicals
ADDITOL® XL 297 XSKIN	2 - 5% total	●	●	●	Oxime type	Anti skinning additive that prevent in can skin formation. No impact on set drying in applied film.

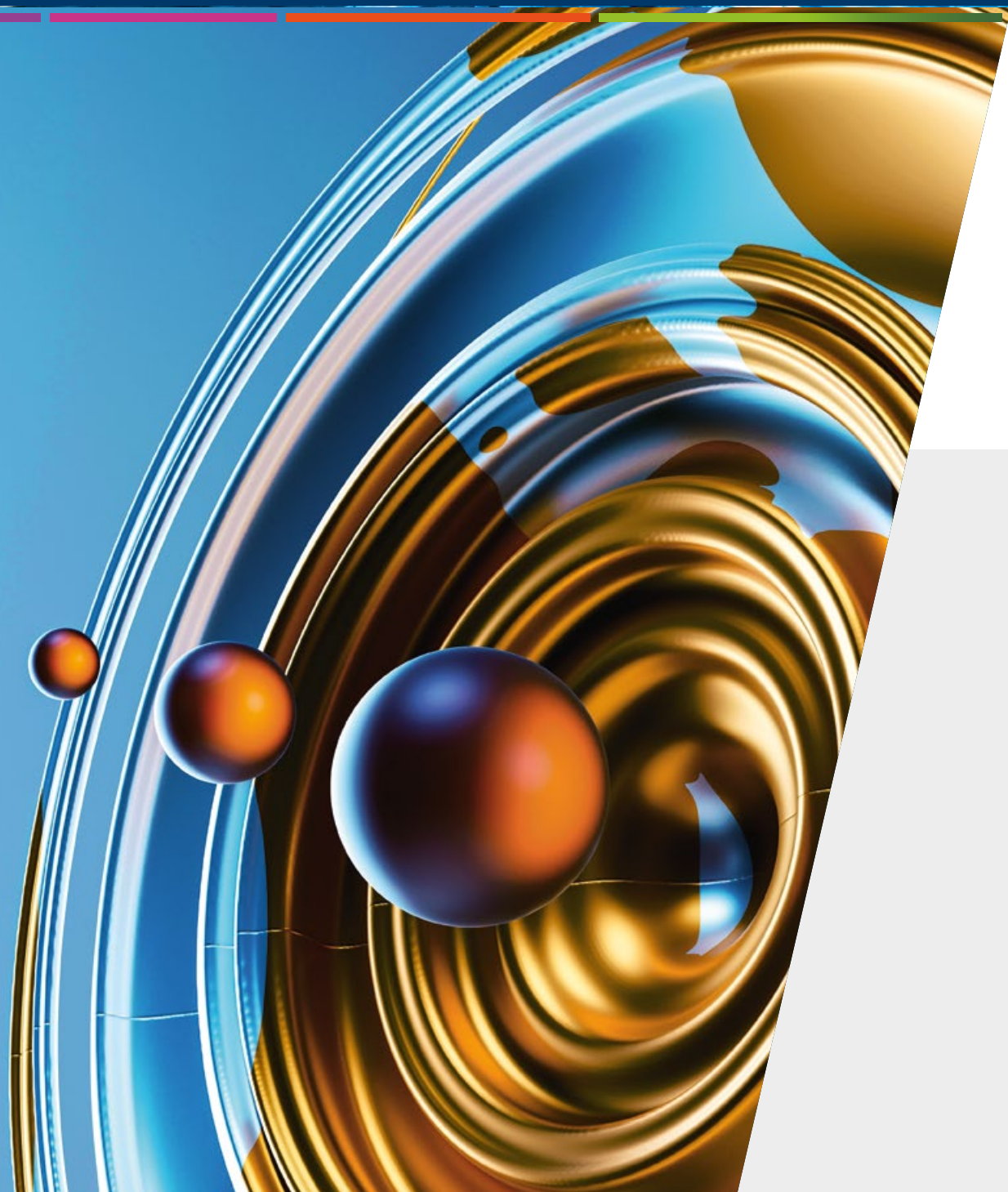


Excellent adhesion with *ADDITOL® XL 180 BOND* and
ADDITOL® XL 186 BOND

Additive name	Dosage	WB	SB	100%	Characteristics	Description
Flexibility/durability improver						
RESAMIN® HF 480	0,5 - 5% total		●	●	Carbamic resin type compound	Special plasticizing and compatibilizing additive for physical, forced drying, 2K and stoving paints. Heat and hydrolysis stable polymer that improves flexibility, adhesion, gloss and outdoor durability. Also recommended for metallic effect paints to improve flip/flop effect.
Special alkyd additive						
TUNGOPHEN® B NV	1 - 3% solid binder	●	●		Modified phenol/ formaldehyde polymer	Special (oxidative) drying control additive to accelerate through drying, improve gloss and flow of SB alkyd systems. Especially recommended for pigmented (non-white) mono/topcoats based on medium oil alkyd resins.



Best in class flexibilization with *RESAMIN® HF 480*



PC-DEFOAMERS™

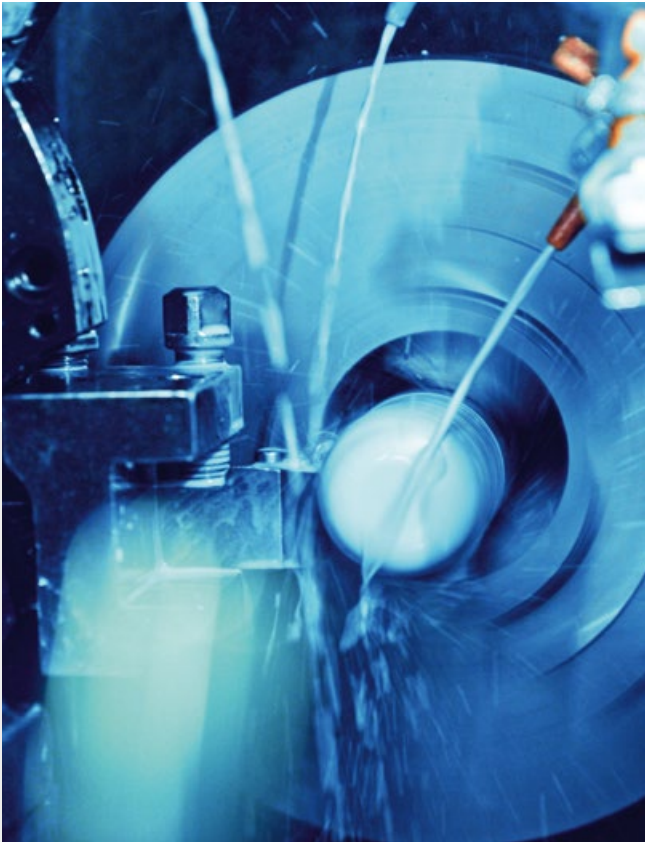
allnex high end foam control range for oils & lubes

Where to use:

- Turbine oils
 - Hydraulic fluids
 - Transmission oils
 - Auto crankcase
 - HD Diesel cran
 - Heat exchange fluids
 - Oil recycling
 - Low temp distillations
 - Solvent recovery/ dehydration
 - Reactor coolants
 - Used oxidized oils
 - Metalworking fluids
 - Lubricants & oils for indirect food contact
- and more.



Product	Active %	Viscosity (SUS, 38°C)	Solvent	Flash point, °C	Dosage/ ppm	Description
Defoamers for Petrochemical systems						
PC™-1244	38 – 42	30 – 80	Hydrocarbon	59	150 – 750	Prevents foam, rapid foam destabilization. For acid, neutral and mildly basic non-aqueous lubricants and fluids. Temperatures up to 204°C. Easy to disperse, excellent shelf stability.
PC™-1344	100	60.000 – 160.000	–	138	150 – 300	Similar properties compared to PC-1244 defoamer except 100% active. FDA compliant.
PC™-1644	38 – 42	30 – 80	Hydrocarbon	63	150 – 750	10–20% more efficient than PC-1244 defoamer in specific applications. Cleaner vs PC-1244 due to reduced residual monomers present. Broad application across many lubricants and fluids.
PC™-1844	38 – 42	100– 600	Hydrocarbon	65	150 – 500	Defoamer of choice if defoaming issues in high temperature (Sequence II and IV) and air release in Group I and III base oils.
PC™-3144	38 – 42	20 – 100	Hydrocarbon	>70	50 – 300	Designed to meet Sequence I – IV defoaming requirements in mineral and synthetic base oils. 30 to 40% more efficient than conventional Polyacrylate defoamers. Excellent in low to high viscosity applications. Needs high speed agitation for effective dispersion.
PC™-4144	100	200 – 800	–	>94	300 – 500	Highly efficient defoaming and deaerating properties in metalworking fluids. 100% active, containing hydrophobic particles for rapid foam destruction.



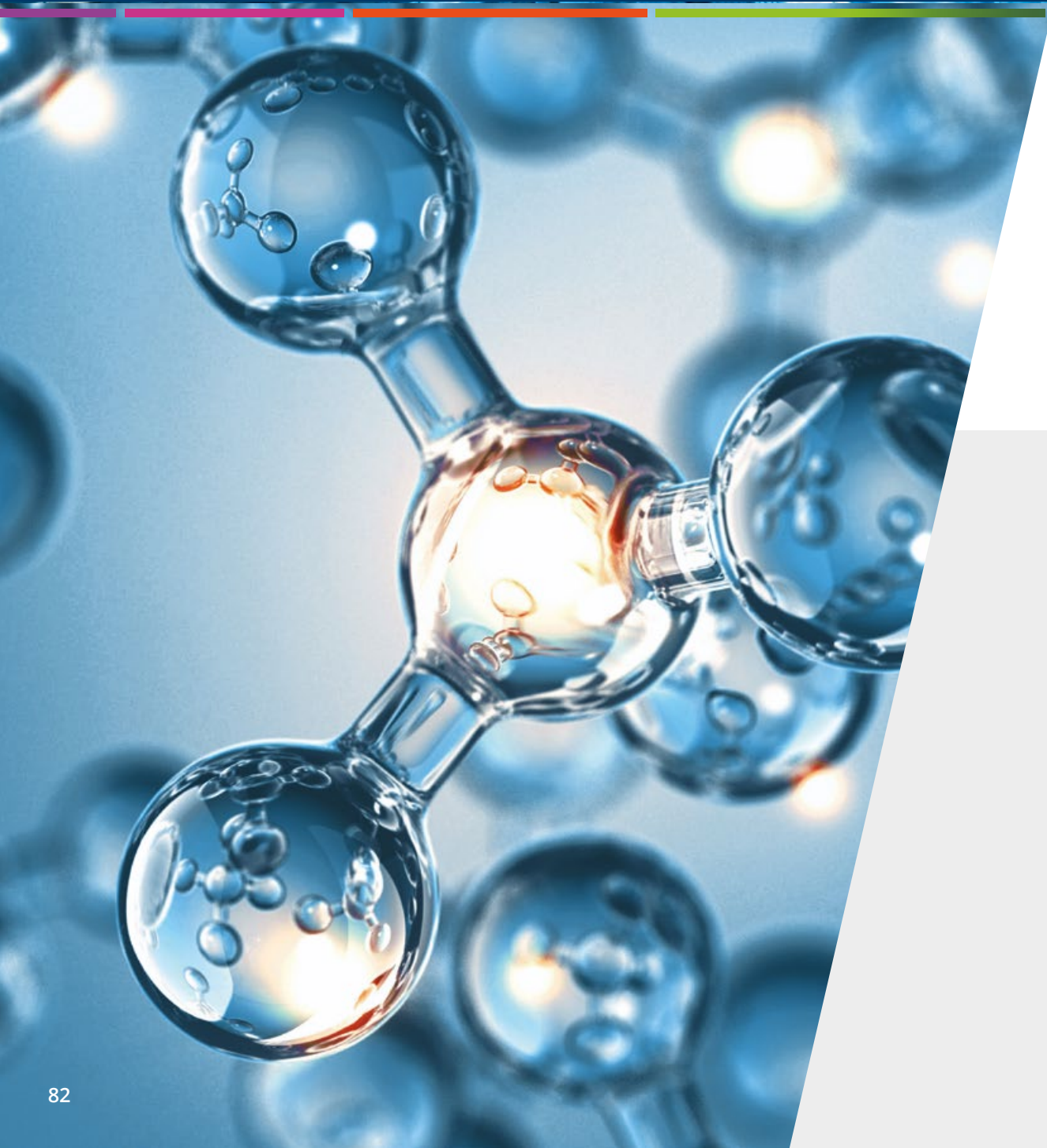


allnex high-end foam control range for oils & lubes

Product	Sequence I	Sequence II	Sequence III	Sequence IV	Air release	Group I	Group II	
PC™-1244	●	●	●	●	●	●●	●●	
PC™-1344	●	●	●	●	●	●●	●●	
PC™-1644	●●	●	●●	●	●	●●	●●	
PC™-1844	●	●●	●●	●●	●●	●●	●●	
PC™-3144	●●	●●	●●	●●	●●	●●	●●	
PC™-4144					●●			

- Recommended
- Highly recommended

	Group III	Synthetic Lubricants	Turbine	Gear	Hydraulic	Auto Crankcase	ATF	Metalworking fluids
	•		•	•	•	••	•	
	•		•	•	•	••	•	
	•		••	••	••	••	••	
	•		•	•	•	••	••	
	••	••	••	••	••	••	••	
								••



WWTP-DEFOAMERS

Waste Water Treatment Plant Defoamers



Our additives: Waste Water Treatment Plant (wwtp) Defoamers

The Compatible ADDITOL® WT 100 DF-M



- Mineral oil / wax - emulsion (50% active)
- For all WW treatment processes stages
- Highly compatible
- Best cost - effective balance

The Strong ADDITOL® WT 101DF-S



- Modified silicone defoamer emulsion (20% active)
- Emulsifier free technology
- For sophisticated & special treatments (zero liquid discharge plants, distillation & evaporation units, membrane reactors)
- Highly effective at low dosage

The One for all

ADDITOL® WT 102 DF-M



- Highly refined mineral oil / wax defoamer (100% active)
- Improved foam lamella penetration for highly effective macro foam destruction
- For all WW treatment process stages

The Eliminator

ADDITOL® WT 103 DF S



- Modified silicone/ silica defoamer emulsion (25% active)
- Emulsifier free technology
- For sophisticated & special treatments (zero liquid discharge plants, distillation & evaporation units, membrane reactors)
- Highly effective at low dosages

INNOVATIVE CHEMISTRY
FOR ALL NEX>T GENERATIONS

ADDITIVES FOR POWDER COATINGS

Product Guide for Powder Coatings

Masterbatches and Additives

Catalysts	Flow Promoters	Flow Aids	Tribo Additives
ADDITOL® P 964 CAT ¹⁾	ADDITOL® P 896 FLOW ¹⁾	MODAFLOW® Powder III ³⁾	ADDITOL® P 950 SPEC ¹⁾
	ADDITOL® P 824 FLOW ¹⁾	MODAFLOW® Powder 6000 ³⁾	
	ADDITOL® P 891 FLOW ¹⁾		
	ADDITOL® E 04826 FLOW ¹⁾		

Acrylic Resins and Additives

Polyanhydride Hardener	Matting Hardener
ADDITOL® P 791 XLINK ¹⁾	SYNTHACRYL® 700 ²⁾

¹⁾ ADDITOL®: Masterbatches for powder coatings
²⁾ SYNTHACRYL®: Acrylic hardeners for powder coatings
³⁾ MODAFLOW® Powder: Flow-promoter on silica carrier for powder coatings

Typical Properties of Masterbatches and Additives

Product	AV/OHV	Viscosity	Tg (°C)	Description
ADDITOL® P 824 FLOW	OHV 45	1400 / 200 °C	49	Flow-aid masterbatch for pigmented durable coatings. 15 % active substance in an outdoor resistant hydroxylated polyester matrix.
ADDITOL® P 891 FLOW	AV 35	2300 / 200 °C	56	Flow-aid masterbatch for clear powder coatings. 5 % active substance in an outdoor resistant carboxylated polyester matrix.
ADDITOL® P 896 FLOW	OHV 45	1700 / 200 °C	57	Flow-aid masterbatch for pigmented powder coatings. 15 % active substance in an outdoor resistant hydroxylated polyester matrix.
ADDITOL® E 04826 FLOW	OHV 50	3800 / 200 °C	54	PFAS-free flow-aid masterbatch for clear powder coatings. 10 % active substance in an outdoor resistant hydroxylated polyester matrix.
ADDITOL® P 950 SPEC	OHV 28	7500 / 200 °C	N / A	Tribo masterbatch for indoor and outdoor coatings. 5 % active substance.
ADDITOL® P 964 CAT	AV 33	3200 / 200 °C	N / A	Catalyst masterbatch for hybrids, TGIC or PT 910 systems. 5 % active substance.

Product	Active %	Volatile Loss %	Density g/cm3	Description
MODAFLOW® Powder III	Min 65	Max 4	0.58 – 0.64	Addition at 0.6 – 1.5 % of the total formulation. Based on FDA listed monomers.
MODAFLOW® Powder 6000	Min 65	Max 4	0.58 – 0.64	Addition at 0.75 – 1.0 % of the total formulation. Excellent flow and gloss. Reduces cross- contamination issues.

Product	EEW	Viscosity	Tg (°C)	Description
SYNTHACRYL® 700	774	39800 / 200 °C	80	Glycidyl poly-acrylic resin designed as a matting hardener in combination with carboxylated polyesters.

Product	PAV	Viscosity	MT (°C)	Description
ADDITOL® P 791 XLINK	317	N / A	85	Aliphatic polyanhydride hardener for use with solid acrylic resins containing glycidyl groups.



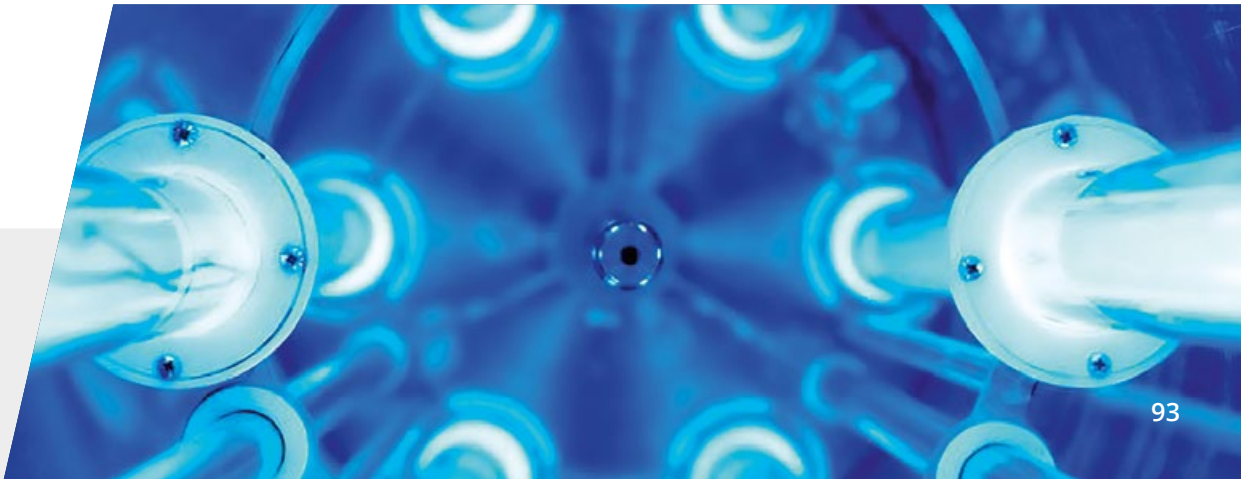
INNOVATIVE CHEMISTRY
FOR ALL NEX^T GENERATIONS

The background of the page is a dark blue field filled with abstract, glowing, wavy lines in shades of light blue and orange. These lines create a sense of movement and depth. A solid green diagonal bar cuts across the bottom right portion of the page, providing a contrasting background for the text.

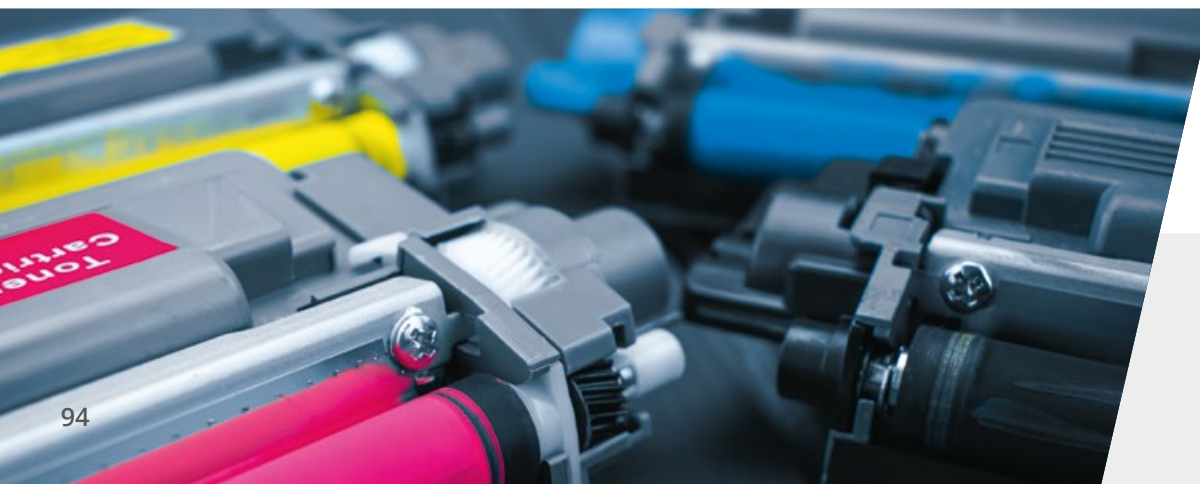
RADCURE ADDITIVES

Additive name	WB	SB	100%	Characteristics	Solvent / Monomer	Description	% Active matter
Wetting & Dispersing							
EBECRYL® 331		●	●	Low molecular wetting additive with phosphoric acid modification	OTA 480	Special pigment wetting additive for 100% UV formulations. It improves color development and pigment stabilization through electrical charging. Recommended for high gloss formulations.	65%
ADDITOL® XL 6577 LC DISP		●	●	Copolymer with acidic groups	MPAC & SNA 150/180	Excellent dispersant for SB and 100% UV paints and combined with inorganic pigments / filler preparations. Enables highest pigment loading with low viscosity.	52%
ADDITOL® XL 6592 DISP	●	●	●	High molecular weight polymer, non-ionic		Highly efficient, high molecular weight dispersing additive for all types of pigment. Recommended for direct grinding as well as for binder free pigment concentrates.	100%
ADDITOL® XL 6590 DISP		●	●	Modified block copolymer, high molecular weight, cationic	OTA 480	Powerful, high molecular weight dispersing additives for very difficult wettable pigments. Especially recommended for all carbon black pigments in order to achieve perfect color properties and extreme high gloss.	65%

Additive name	WB	SB	100%	Characteristics	Solvent / Monomer	Description	% Active matter
Wetting & Dispersing							
ADDITOL® VXW 6394 DISP	●			High molecular weight polymer, non-ionic	Water	Very sufficient, high molecular weight dispersing additive for all types of pigment. Due to it's non ionic polymer structure it is highly recommended in formulations containing sensitive resins. Further it can be used for the production of highly loaded, binder free pigment concentrates.	40%
ADDITOL® XW 6596 DISP	●			High molecular weight polymer, non-ionic	Water	Very sufficient, high molecular weight dispersing additive for all types of pigment. Due to it's non ionic polymer structure it is highly recommended in formulations containing sensitive resins. Further it can be used for the production of highly loaded, binder free pigment concentrates.	35%
ADDITOL® XW 6588 DISP	●			Non-ionic, low-ion migration (LIM) dispersant	Water	High molecular weight dispersing additive for all types of pigment. Due to it's non ionic polymer structure it is highly recommended in formulations containing sensitive resins. It is recommended for both, direct grinding and pigment concentrates.	48%



Additive name	WB	SB	100%	Characteristics	Solvent / Monomer	Description	% Active matter
Flow & Leveling Additives (silicone free)							
EBECRYL® 340		●	●	Silicone free master batch	TPGDA	Silicone free slip additive master batch. Improve slip between cured coatings and provide good intercoat adhesion and glueability. Can be used to avoid show through in shrink sleeves.	20%
MODAFLOW® 2100		●	●	Acrylic copolymer; medium molecular weight		Medium molecular weight, highly efficient flow modifier. Good compatibility and easy incorporation, fast mode of action. Recommended also in clear coat applications.	100%
MODAFLOW® 9200		●	●	Modified acrylic copolymer; low molecular weight; crosslinkable		Low molecular weight, high efficient and all solvent-borne and 100% high end UV applications flow modifier. It reduces film defects and strongly increases gloss levels. Recommended for all solvent-borne high end applications.	100%



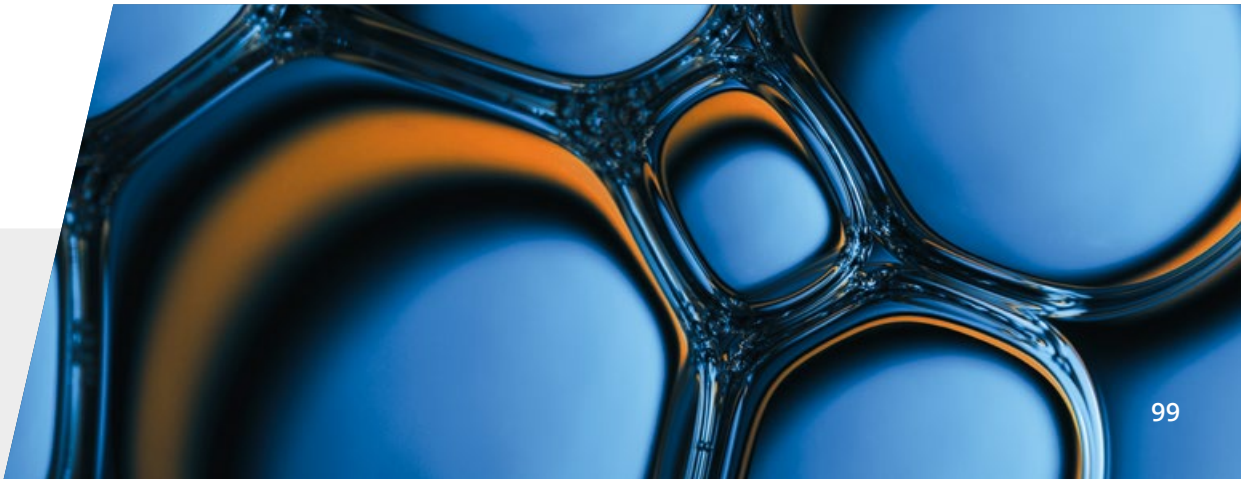
Additive name	WB	SB	100%	Characteristics	Solvent / Monomer	Description	% Active matter
Flow & Leveling Additives (silicone free)							
MODAFLOW® Lambda		●	●	Hydroxyl functional acrylic-silicone polymer		Highly efficient, hybrid flow promoter for improved surface characteristics such as gloss, DOI, brilliancy, anti-orange peel effect. Contains no free silicone due to chemical anchoring.	100%
MODAFLOW® AQ 3025	●			Acrylic copolymer; neutralized by amine; silicone-free	Water	Medium molecular weight flow and leveling additive. It supports pigment wetting and allows a fast degassing process.	25%
ADDITOL® XL 482 FLOW		●	●	Acrylic flow promoter		Medium molecular weight, highly efficient flow modifier. Good compatibility and easy incorporation, fast mode of action. Recommended also in clear coat applications.	100%
ADDITOL® XL 6537 FLOW		●	●	Polyester based flow Additive, medium molecular		Multi-purpose leveling additive to improve surface conditions and prevent pin holes and crater formation. Works as anti-popping additive.	100%

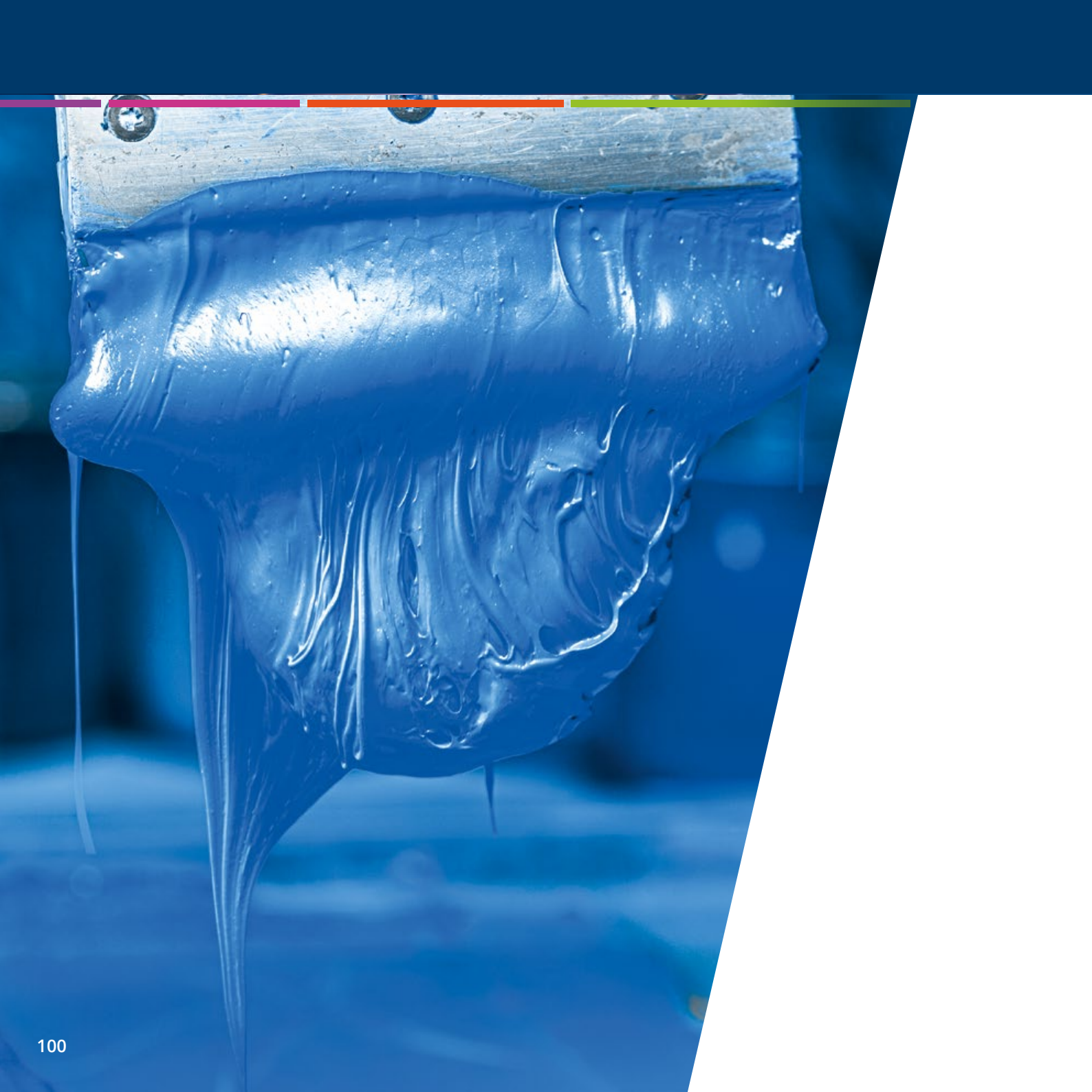
Additive name	WB	SB	100%	Characteristics	Solvent / Monomer	Description	% Active matter
Flow & Leveling Additives (silicone based)							
EBECRYL® 350		●	●	Silicone diacrylate		Silicone diacrylate material which contributes slip, substrate wetting and flow properties when used as an additive in formulations cured by ultraviolet light (UV) or electron beam (EB). Cured films containing EBECRYL 350 will exhibit a smooth, tack free surface, with good blocking resistance. Because of its acrylate functionality, the silicone cures into the polymeric backbone, thus eliminating the migration that free silicones often display in coatings.	100%
EBECRYL® 1215		●	●	Modified silicone oil derivate		Silicone modified oil derivative that is improving slip and scratch resistance in EB cure coatings	100%
EBECRYL® 1360		●	●	Silicone hexa-acrylate material		Silicone hexa-acrylate material which contributes slip, substrate wetting and flow properties when used as an additive in formulations cured by ultraviolet light (UV) or electron beam (EB). Cured films containing EBECRYL 1360 will exhibit a smooth, tack free surface, with good blocking resistance. Because of its acrylate functionality, the silicone cures into the polymeric backbone, thus eliminating the migration that free silicones often display in coatings.	100%
EBECRYL® 1365		●	●	Silicone hexa-acrylate material		High compatibility resulting in clear films. Provides anti-stain and easy-to-clean properties. It can be used as a processing agent in matt and excimer curable formulations, facilitating a uniform film creation.	100%

Additive name	WB	SB	100%	Characteristics	Solvent / Monomer	Description	% Active matter
Flow & Leveling Additives (silicone based)							
ADDITOL® XL 121 N FLOW		●	●	Modified silicone	Toluene	Silicone leveling additive that strongly increases slip and scratch resistance. Further it improves material flow.	14%
ADDITOL® XL 123 N FLOW	●	●	●	Modified silicone	Naphta	Silicone leveling additive to improve slip and scratch resistance. It has degassing properties and is thermostable up to 400°C	50%
ADDITOL® VXL 4930 N FLOW	●	●	●	Polyether-modified silicone	Ethylhexanol	Universal, silicone leveling additive with very good compatibility. It is very well balanced in order to improve spray mist absorption, orange peel, cratering and leveling. Highly efficient and not foam stabilizing.	40%
ADDITOL® XW 6586 FLOW	●	●	●	Organomodified polysiloxane type		Multipurpose silicone additive for improved surface quality and substrate wetting quality, substrate wetting and slip.	100%
Substrate wetting							
ADDITOL® XW 6580 FLOW	●	●	●	Silicone tenside		Special silicone tenside with very strong influence on surface tension and excellent substrate wetting performance. It is not foam stabilizing and does not show problems in recoatability.	100%

Additive name	WB	SB	100%	Characteristics	Description	% Active matter
Defoamer and Deaerator						
MODAFLOW® Resin		●	●	Acrylic copolymer; high molecular weight; FDA-approved	Highly efficient flow promoter with excellent degassing properties. Recommended for all solvent-borne and 100% UV Systems, especially for pigmented top coats.	100%
ADDITOL® XL 6507 XFOAM		●	●	Degassing / defoaming polymers; silicone free	Defoamer and deaerator for all industrial paints and lacquers, highly efficient.	10%
ADDITOL® XL 6531 XFOAM		●	●	Polymer defoamer	Special polymer defoamer/deaerator, recommended for pigmented systems.	40%
ADDITOL® XL 6597 XFOAM		●	●	Polymer defoamer	Strong polymeric deaerator for all solvent-based and solvent-free systems.	20%
ADDITOL® XW 6584 XFOAM	●			Emulsifier free silicone emulsion, hydrophobic solid particles	Highly efficient defoamer for transparent and high gloss systems. Suitable for high and low PVC formulations. No interference with associative thickeners - no impact on rheological profile.	20%

Additive name	WB	SB	100%	Characteristics	Description	% Active matter
Defoamer and Deaerator						
ADDITOL® VXW 6386 XFOAM	●			Hydrocarbons, waxes	Defoamer for high quality lacquers with good compatibility. Homogenize prior use!	100%
ADDITOL® VXW 6211 XFOAM	●			Hydrocarbons; hydrophobic solid particles	Very strong defoamer for highly pigmented paints or pigment pastes.	100%
ADDITOL® VXW 4926 XFOAM	●	●	●	Special fatty acid ester	Defoamer and deaerator with rheology improvement in order to allow better film build-up. Very fast mode of action.	100%
ADDITOL® XW 376 XFOAM	●			Mineral oil / wax emulsion	Highly efficient, easy to incorporate defoamer emulsion.	50%





Additive name	WB	SB	100%	Characteristics	Description	% Active matter
Rheology Modifier						
ADDITOL® VXW 4934 RHEO	●			Modified wax emulsion	Reduces settling and sagging, enhances edge covering.	35%
ADDITOL® VXW 6360 RHEO	●			Polyurethane thickener	Associative thickener to control rheology and flow. It improves applicability by roller or brush. Easy to incorporate.	30%
ADDITOL® VXW 6387 DISP	●	●	●	Special fatty acids; amine neutralized; silicone-free	Rheology modifier to prevent pigment sedimentation, sagging and storage stability.	60%
ADDITOL® VXW 6388 RHEO	●			Polyurethane thickener	Associative thickener to control rheology at low shear stress. Recommended for spray application. Excellent against sedimentation and sagging.	35%
ADDITOL® XL 270 DISP		●	●	Special fatty acid modified silicone; amine neutralized	Multi-purpose additive to improve rheology and prevent from settling and floating. Also recommended in high gloss systems.	55%
ADDITOL® XL 280 RHEO		●	●	Special modified montmorillonite clay	Rheology modifier to prevent powerful settling of pigments and extenders, reduces sagging.	36%
ADDITOL® XW 6536 RHEO	●			Special organic activated clay	Special rheology modifier with extremely fast viscosity recovery. Recommended for all high wet film thicknesses e.g. in case of airless application. Prevents sagging and settling at zero and low shear stress sufficiently.	37%



Additive name	WB	SB	100%	Characteristics	Description
Specialty Additives: Adhesion promoters					
EBECRYL® 168		●	●	Acid modified methacrylate	Methacrylate modified acidic adhesion promoting agent designed as a modifier for ultraviolet (UV) and electron beam (EB) curable coatings on metals.
EBECRYL® 171		●	●	Acid modified methacrylate	Methacrylate modified acidic adhesion promoting agent designed as a modifier for ultraviolet (UV) and electron beam (EB) curable coatings.
EBECRYL® 367		●	●	Polyester acrylate	Offers excellent adhesion on corona treated polyolefin substrates.



Additive name	WB	SB	100%	Characteristics	Description
LED Boosters					
EBECRYL® LED 02		●	●	Mercapto modified polyester-acrylate resin	Mercapto modified polyester acrylate resin, can be added as a co-resin to UV curable formulations. EBECRYL LED 02 transforms formulations into UV LED, UVA, or low energy curable systems by providing better surface cure. In addition, this co-resin can also be used to obtain better surface cure in high energy cure formulations. EBECRYL LED 02 provides better surface cure by mitigating oxygen inhibition of the free radical process.
EBECRYL® LED 03		●	●	Amine modified polyether-acrylate oligomer	UV/EB cured products based on EBECRYL LED 03 are characterized by the following performance properties: Good (surface) cure response, good flexibility, adhesion promotion, high gloss, low odor, low migration potential. In addition, this effect is also seen in high energy cure formulations. The improved surface cure is obtained by mitigating oxygen inhibition of the free radical process and/or by being an amine synergist for Norrish type II photoinitiators.
EBECRYL® LED 04		●	●	Acrylated polyamine	When combined with an appropriate photo initiator system – transforms formulations into UV LED, UVA, or low energy curable systems by providing improved surface cure. In addition, this effect is also seen in high energy cure formulations.
Nano Additives					
MODAFLOW® NSR 100		●	●	Solvent-based dispersion of modified nanosilica	Concentrated dispersion of nanosilica for improving scratch resistance and Easy to Clean properties of automotive OEM, vehicle refinish, plastic and wood clearcoats as well as pigmented topcoats.



INNOVATIVE CHEMISTRY
FOR ALL NEX^T GENERATIONS



ADDITIVES FOR TIRES

Specialty resins – The secret to better tires and rubbers

**The secret to better tires and rubbers.
Helping you drive innovation.**

As a leading global manufacturer of specialty resins, allnex supports tire manufacturers with an industry-leading offering of advanced, eco-friendly additives. With *ALNOVOL*® and *CYREZ*®, our broad range of technical additives includes two co-reactant resins that are specifically designed for the needs of the tire industry and also boost performance in other types of rubber compounding and processing.

ALNOVOL® resins for tire compounding
With profound expertise dating back to the beginnings of phenolic chemistry in the 1950s, allnex has established itself as the producer of a well-rounded and widely respected offering of phenolic and functionalized resins for tire compounding. It is this expertise which today allows us to offer tire makers our *ALNOVOL*® functionalized phenolic resins as a highly effective replacement for problematic adhesion systems. Long the industry standard for steel and tire cord integration but linked with odor issues and environmental drawbacks, these systems can now be substituted with a high-performing alternative. To meet the industry's demand for the removal of chemicals of concern, allnex also offers resorcinol- and cobalt-free options.

Products	Adhesion Promoter	Reinforcement
ALNOVOL® PN 160	●	● ● ●
ALNOVOL® PN 320	● ●	● ●
ALNOVOL® PN 370	●	● ● ●
ALNOVOL® PN 760	● ●	●
ALNOVOL® PN 870	● ● ●	●

Products	Material
CYREZ® 963	100% HMMM
CYREZ® PN 964	65% HMMM + silica
CYREZ® CRA 200	72% HMMM + silica
CYREZ® CRS 400EC	65% HMMM + silica
CYREZ® 964 BC 35	65% HMMM + rice husk silica

TREAD

ALNOVOL® PN 330 | CYREZ

Performance resin increasing wear resistance and chip & chunk for TBR and OTR

CAP PLY

ALNOVOL® PN 760 | ALNOVOL® PN 870 | CYREZ

Adhesion promoters for improving adhesion to steel and textile cords

BELT CARCASS

ALNOVOL® PN 760 | ALNOVOL® PN 870

Adhesion promoters for improving adhesion to steel and textile cords

APEX

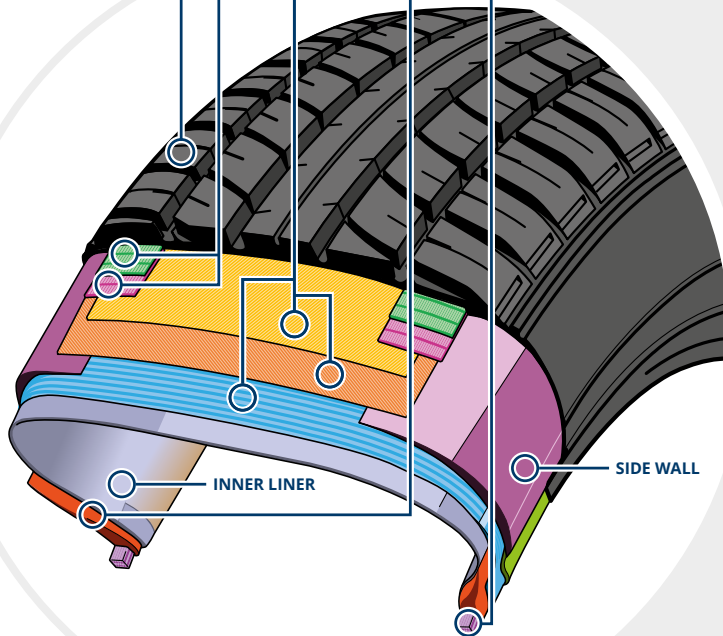
ALNOVOL® UF 410

Reactive resin as oil replacement for high hardness

BEAD

ALNOVOL® PN 160 | ALNOVOL® PN 320 | CYREZ

Reinforcing resins/used to improve hardness and overcome processing issues



INNER LINER

SIDE WALL

Product	Characteristics	Dynamic viscosity 50% in MP1 [mPas] DIN 53177 23 °C	Softening point ring & ball [°C] DIN EN ISO 4625-1 5 °C/min	Content of free phenol [%] DIN EN ISO 8974	Properties	Uses
Reinforcing Resins						
ALNOVOL® PN 160	Modified, non-selfcuring phenol novolac	700 – 1100	101 – 113	< 1.0	Compatibility with NR, SBR, NBR, EPDM. Improved tear strength, heat resistance, and dynamic fatigue perfor- mance.	Reinforcement of rubber
ALNOVOL® PN 320	Non-self-curing phenol novolac	1400 – 2200	108 – 120	< 0.3	Compatibility with NR, SBR, NBR, EPDM. High viscosity, very low free phenol	Reinforcement of rubber
ALNOVOL® PN 370	CNSL mod, non-self-curing phenol novolac	not specified	85 – 100	< 1.0	Enhance vulcanization and oxidative resistance of natural-rubber-based vulcanizates	Reinforcement of rubber
ALNOVOL® VPN 1132	Modified, Non-self-curing phenol novolac	100 – 600	115 – 155	< 1.0	High tear resistance	Reinforcement of rubber

Product	Characteristics	Dynamic viscosity 50% in MP1 [mPas] DIN 53177 23 °C	Softening point ring & ball [°C] DIN EN ISO 4625-1 5 °C/min	Content of free phenol [%] DIN EN ISO 8974	Properties	Uses
Adhesion promoter						
ALNOVOL® PN 760	Functionalized phenol resin	800 – 1800	95 – 115	< 1.0	Very good aging, im- proved adhesion, envi- ronmentally friendly	Textile and steel cord adhesion promoter
ALNOVOL® PN 870	Functionalized phenol novolac	1000 – 2000	110 – 125	< 0.3	Excellent adhesion, resorcionol-free and co- balt-free compounding	Steel cord adhesion promoter
ALNOVOL® PN 871	Functionalized phenol novolac	1000 – 2000	110 – 125	< 0.3	High reactivity, excellent adhesion, resorcionol- free and cobalt-free compounding	Steel cord adhesion promoter
Performance Resin						
ALNOVOL® PN 330	Non-self-curing phenol novolac	1400 – 220	108 – 120	< 0.3	Increasing wear resist- ance and chip & chunk	Performance resin for TBR and OTR tread compounds

1MP Methoxy propanol

Product availability can vary by usage location. Please contact your local representative regarding availability in specific countries and regions.

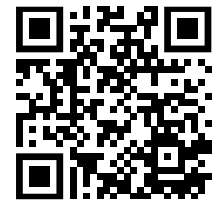
Product	Characteristics	Content of HMMM2 Content of ash3 [%]	Carrier type	Properties	Uses
Adhesion promoter/Crosslinker					
CYREZ® 963 FAMILY	Hexamethoxymethyl melamine resin	> 982	None	Low content of free for- maldehyde	Curing agent for resorci- nol and novolac resins
CYREZ® 964 FAMILY	Hexamethoxymethyl melamine resin	31 - 353	Precipitated amorphous silica	Good flow ability, easily dispersible	Curing agent for resorci- nol and novolac resins
CYREZ® 964 35 BC	Hexamethoxymethyl melamine resin	31 - 353	Rice husk silica	Bio based raw material, good flow ability, easily dispersible	Curing agent for resorci- nol and novolac resins
CYREZ® CRA FAMILY	Hexamethoxymethyl melamine resin	24 - 283	Precipitated amorphous silica	High loading, easily dispersible	Curing agent for resorci- nol and novolac resins
CYREZ® CRA 400 EC	Hexamethoxymethyl melamine resin	24 - 283	Precipitated amorphous silica	Ultra-low content of free formaldehyde, high load- ing, easily dispersible	Curing agent for resorci- nol and novolac resins

Product	Characteristics	Content of HMMM2 Content of ash3 [%]	Carrier type	Properties	Uses
Others					
ALNOVOL® UF 410 RPC	Carbamid resin	31 - 353	Precipitated amorphous silica	Oil replacement, Hardness improvement, low Mooney viscosity	Apex, bead, textile cord adhesion compounds
EBECRYL® TMPTMA	Trimethylolpropan-trimethacrylat	0	None	Coagent for peroxide crosslinking of elastomers	Technical rubber goods

1MP Methoxy propanol
Product availability can vary by usage location. Please contact your local representative regarding availability in specific countries and regions.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

To browse through our portfolio
on our product finder, please scan
the QR code.



Disclaimer: allnex Group companies ('allnex') exclude all liability with respect to the use made by anyone of the information contained herein. The information contained herein represents allnex's best knowledge but does not constitute any express or implied guarantee or warranty as to the accuracy, the completeness or relevance of the data set out herein. Nothing contained herein shall be construed as conferring any license or right under any patent or other intellectual property rights of allnex or of any third party. The information relating to the products is given for information purposes only. No guarantee or warranty is provided that the product and/or information is suitable for any specific use, performance or result. Any unauthorized use of the product or information may infringe the intellectual property rights of allnex,

including its patent rights. The user should perform his/her own tests to determine the suitability for a particular purpose. The final choice of use of a product and/or information as well as the investigation of any possible violation of intellectual property rights or misappropriation of trade secrets of allnex and/or third parties remain the sole responsibility of the user.

Notice: Trademarks indicated with ®, ™ or * as well as the allnex name and logo are registered, unregistered or pending trademarks of allnex Netherlands B.V. or its directly or indirectly affiliated allnex Group companies. Any use of these trademarks without prior authorization is not permitted.

© 2026 allnex Group. All Rights Reserved

Email: business@allnex.com (Worldwide Contact)
Info: www.allnex.com