



AFCONA Additives Product List



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quality meet perfection**

**AFCONA Additives
Version 7
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www.afcona.com.my

Additives For Coatings Or New Applications



AFCONA Malaysia

AFCONA China



AFCONA Holland

AFCONA USA



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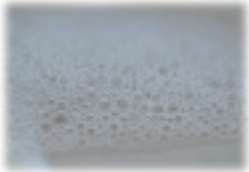
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Additives for solvent-based systems

1000 Series – Universal resins for pigment concentrates

Product Name	Properties
AFCONA-1101	Universal dispersing resin for pigment concentrates. Must be combined with a High-Molecular-Weight Dispersant from the AFCONA-4000 series or with AFCONA-5280. Compatible with most of the resin systems such as polyurethane, alkyd melamine, acrylic melamine, polyester melamine (butylated and HMMM grade), acid curing, etc.
AFCONA-1102	Cheaper version of AFCONA-1101. Gives stronger viscosity reduction in pigment concentrates and has better compatibility, especially in TPA and epoxy systems. Both contain primary OH-groups which may react in PU and baking paints. Therefore it will not act as a hard resin or plasticizer.



2000 Series – Non-silicone-based defoamers and deaerators

Product Name	Properties
AFCONA-2018	AFCONA-2018 has very good compatibility and is extremely suitable for clear and high-gloss coatings. It is suitable for solvent-based wood finishes like: NC, Acid Curing and PU (except the acrylic based).
AFCONA-2020	AFCONA-2020 is a very strong defoamer. It may cause some haziness in clear systems. It is widely used in NC and AC lacquer wood finishes especially applied by curtain coater. It is also suitable for cold cured epoxy as well as UPE's like: SMC, BMC and gel coats.
AFCONA-2021	Moderate performance, good balance between defoaming and compatibility. Mainly recommended for wood coatings and high polar systems. Not suitable for acrylic based systems.
AFCONA-2024	A very strong defoamer and deaerator with better compatibility than AFCONA-2020 in PU, Epoxy and NC.
AFCONA-2050	A very strong defoamer and deaerator. Economical replacement for AFCONA-2020.
AFCONA-2270	Recommended for brush, conventional and airless spray applications. Very suitable for pigmented and matted UV coatings, epoxies, polyurethanes and baking paints.
AFCONA-2290	Non-silicone defoaming substance where it is designed for solvent containing and solvent-free systems of Epoxy, Polyurethane, UPE and UV coating. It has very good performance in defoaming and anti-foam.
AFCONA-2720	Mainly used in UPE's, epoxies, polyester baking systems and UV coatings. Also suitable for coil and can coatings.
AFCONA-2725	Very strong defoamer and deaerator. Suitable for high solid and high viscosity systems such as UPE, PU, Epoxy and PMMA flooring.
AFCONA-2754	Anti-foam and deaeration agent for solvent containing and solvent-free systems of Epoxy, Polyurethane, coil coatings and wood coatings.

Additives for solvent-based systems

2000 Series – Silicone-based defoamers and deaerators

Product Name	Properties
AFCONA-2022	Very strong defoamer and deaerator. Suitable for all solvent-based systems, especially PU and Baking paints. Also suitable for curtain coating applications.
AFCONA-2023	Moderate defoamer, well balanced between defoaming and compatibility. Suitable for PU systems that are used in refinish, wood and industrial paints. Furthermore good for NC and AC wood coatings, air-drying long oil and medium oil alkyds.
AFCONA-2025	Moderate defoamer, well balanced between defoaming and compatibility. Very wide application from low to high polar systems. Mainly for physical drying systems and air-drying alkyds.
AFCONA-2027	Developed for low and high polar printing ink applications such as offset, gravure, flexo and UV.
AFCONA-2028	For all solvent-based applications especially curtain coating. Works as post-add additive to break the foam created during processing. Add slowly while stirring.
AFCONA-2035	Universal defoamer for all systems from low to high polar, especially air-drying alkyds, physical drying systems, wood coatings, auto refinishes and general industrials. Moderate defoamer, well balanced between defoaming and compatibility.
AFCONA-2038	The most compatible defoamer in AFCONA range. Recommended for clear coats. Best performance in PU, Epoxy, UV and UPE systems. Widely used in refinish topcoats clear, UV systems and wood coatings.
AFCONA-2040	Same group as AFCONA-2035, with additional levelling properties. Recommended to test next to AFCONA-2035 because of different performances.
AFCONA-2045	Very compatible defoamer with good defoaming effect. Particularly suitable for medium to high polar systems such as PU, Epoxy, TPA and UPE. Outstanding performance in PU systems.
AFCONA-2048	Particularly suited for high gloss solvent-based wood finishes. Good compatibility. No unacceptable haze. Extremely suitable for brush applications where quick solvents evaporate and rapid defoaming is required.
AFCONA-2051	Strong defoamer for solvent-based applications. Specially developed for clear top coat applications.
AFCONA-2721	Defoamer dissolved in a reactive solvent (HEA). Recommended for UV coatings.
AFCONA-2722	Very strong defoamer and deaerator. Suitable for high solid & high viscosity systems, such as PU and Epoxy floorings.
AFCONA-2723	Improved version of AFCONA-2720 for UPE systems. Better transparency and defoaming properties. Also suitable in PU and Epoxy floorings.
AFCONA-2724	Anti-foam and deaeration agent for solvent containing and solvent-free systems such as Epoxy, Polyurethane, coil and wood coatings.
AFCONA-2726	Very strong defoamer for high solid and high viscosity systems such as PU and Epoxy flooring. Additionally good levelling properties.
AFCONA-2727	Stronger defoamer with easier incorporation than AFCONA-2726. Very good performance for Epoxy and PU, especially in the solventless types.
AFCONA-2763	Very strong defoamer with reasonably good compatibility and clarity in high-gloss UV systems, epoxies, polyurethanes, baking paints and other high viscosity systems.

General indicator on recommendation

- Highly recommended
- Recommended
- Can be used

Chemical	Dosage	Solvent	Flash Point	Solvent-based System										2000 Series Product Name				
	(Based on total formulation)			Air-drying Alkyd (medium and long oil)	Inds. Baking Paint (Al or Ac/Melamine)	Auto OEMI (PE or Acrylic/Melamine)	Alkyd NC/Alkyd Aminol(AC)	2K PU (Alkyd/PE OH Functional)	2K PU (Acrylic Polyol OH Functional)	2K PU (Acrylic OH Functional Solventless)	Unsaturated Polyester	Epoxy - Solvent-based	Epoxy - Solventless		CAB Polyester/Polyacrylic	Thermoplastic Acrylic (TPA)	Coil and Can Coating	Chlorinated Rubber
Modified Polysiloxane	0.1~1.0%	Xy/MPA/BAC/EAc	19°C	●	●	●	●	●	●						●			AFCONA-2022
Modified Polysiloxane	0.1~0.5% (0.2~0.4%)	MPA/Alkylbenzene	42°C	●		●	●	●	●	●					●	●		AFCONA-2023
Fluorocarbon Modified Polysiloxane	0.1~1.0% (0.2~0.4%)	Cyclohexanone	42°C	●		●	●	●	●	●	●			●	●			AFCONA-2025
Fluorocarbon Modified Polysiloxane	0.1~1.0% (0.2~0.4%)	Ethyl Acetate	-1°C				●	●	●	●	●						●	AFCONA-2027
Modified Polysiloxane	0.1~1.0% (0.2~0.4%)	Xy/MPA/BAC/EAc	22°C		●	●	●	●	●						●			AFCONA-2028
Fluorocarbon Modified Polysiloxane	0.1~1.0% (0.2~0.4%)	DIBK	49°C	●		●	●	●	●	●	●				●			AFCONA-2035
Modified Polysiloxane	0.1~1.0% (0.2~0.4%)	Alkylbenzene/MPA/Xylene	25°C			●	●	●	●				●	●			●	AFCONA-2038
Fluorocarbon Modified Polysiloxane	0.1~1.0%	DIBK	49°C	●	●	●	●	●	●	●	●	●	●	●	●	●		AFCONA-2040
Modified Polysiloxane	0.1~0.7%	Xylene/Butylacetate	27°C	●		●	●	●	●	●	●			●			●	AFCONA-2045
Fluorocarbon Modified Polysiloxane	0.1~0.5%	Cyclohexanone	42 °C	●		●	●	●	●									AFCONA-2048
Modified Polysiloxane	0.2~ 0.5%	DIBK/MPA	42°C		●	●	●	●	●	●	●	●	●	●	●	●		AFCONA-2051
Modified Polysiloxane	0.1~1.0% (0.2~0.5%)	2-ethylhexyl acrylate	46 °C														●	AFCONA-2721
Modified Polysiloxane	0.5~1.5%	Alkylbenzene/MPA/Pine Oil	42 °C					●	●	●	●	●						AFCONA-2722
Modified Polysiloxane	0.1~0.5%	MPA/SBP/Spirit/Alylbenzene/MIBK	77 °C					●	●	●	●	●		●				AFCONA-2723
Modified Polysiloxane	0.1~1.0%	MPA/Alkyl Benzene/MIBK/Propylene Glycol	25°C					●	●	●	●	●						AFCONA-2724
Modified Polysiloxane	0.5~1.5%	SBP Spirit	43 °C			●	●	●	●	●	●	●						AFCONA-2726
Modified Polysiloxane	0.5~1.5%	SBP Spirit	>100 °C					●	●	●	●	●						AFCONA-2727
Fluorocarbon Modified Polysiloxane	0.1~1.0%	DIBK/MIBK	14 °C	●	●	●	●	●	●	●	●	●					●	AFCONA-2763

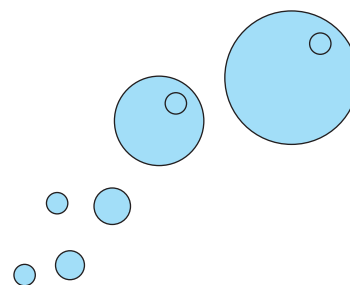
2000 Series – Defoamer

Properties	Defoamers		Remark
Easy incorporation	AFCONA-2038 AFCONA-2724 AFCONA-2050 AFCONA-2018	AFCONA-2024 AFCONA-2051 AFCONA-2023	<i>AFCONA-2038 is most easily incorporated, followed by grades ranging sequence.</i>
Medium incorporation <i>(Need medium speed/shear force to incorporate. For the incorporation fluorocarbon containing grades, in-can transparency is much better than others.)</i>	AFCONA-2035 AFCONA-2040 AFCONA-2721 AFCONA-2045 AFCONA-2028 AFCONA-2021	AFCONA-2025 AFCONA-2027 AFCONA-2763 AFCONA-2754 AFCONA-2723	<i>AFCONA-2035 is most easily incorporated, followed by grades ranging sequence.</i>
Delicate incorporation <i>(Need high speed/shear force to incorporate. Normally gives in-can haziness.)</i>	AFCONA-2720 AFCONA-2022 AFCONA-2726 AFCONA-2020 AFCONA-2280	AFCONA-2722 AFCONA-2725 AFCONA-2727 AFCONA-2290 AFCONA-2270	<i>AFCONA-2720 is most easily incorporated, followed by grades ranging sequence.</i>

Selection of a Defoamer

Testing in Skandex (Quick Test)

- 1) Mix the different defoamers into the clear binder individually.
- 2) Shake for 3 minutes.
- 3) Observe the following phenomena below:
 - a. The foam level immediately from skandex; the less foam sample represents better **anti-foam**.
 - b. Observe the movement of the foam from bottom to top; faster movement represents better **deaeration**.
 - c. Observe the foam breaking speed; faster foam breaking represents better **defoaming**.



Comparison test between AFCONA-2020 and AFCONA-2050 in PU acrylate with OH value at 2.5%

In-can clarity. Side view



In-can clarity. Top view

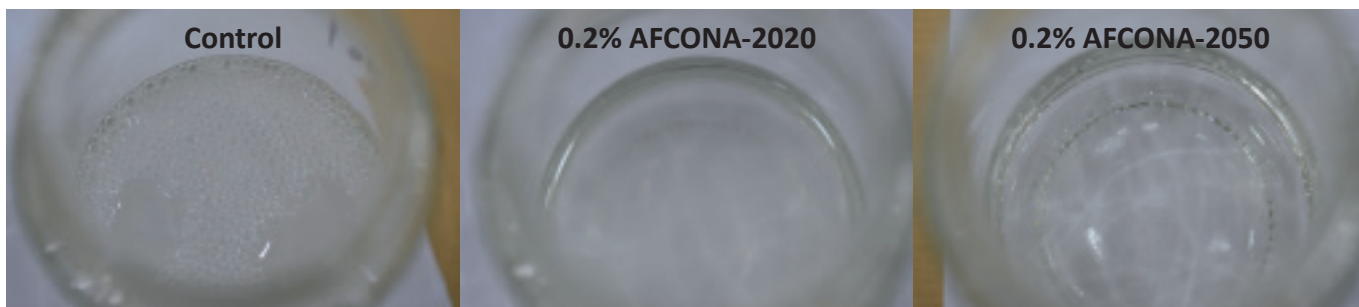


The good transparency performance of AFCONA-2050 only applicable to acrylate resin. However acrylate resin varies from each formulation.

For those very high polar acrylate resin, slight haziness may occur.

For other resin systems. slight to medium haziness may occur.

Defoaming performance



Influence on levelling performance

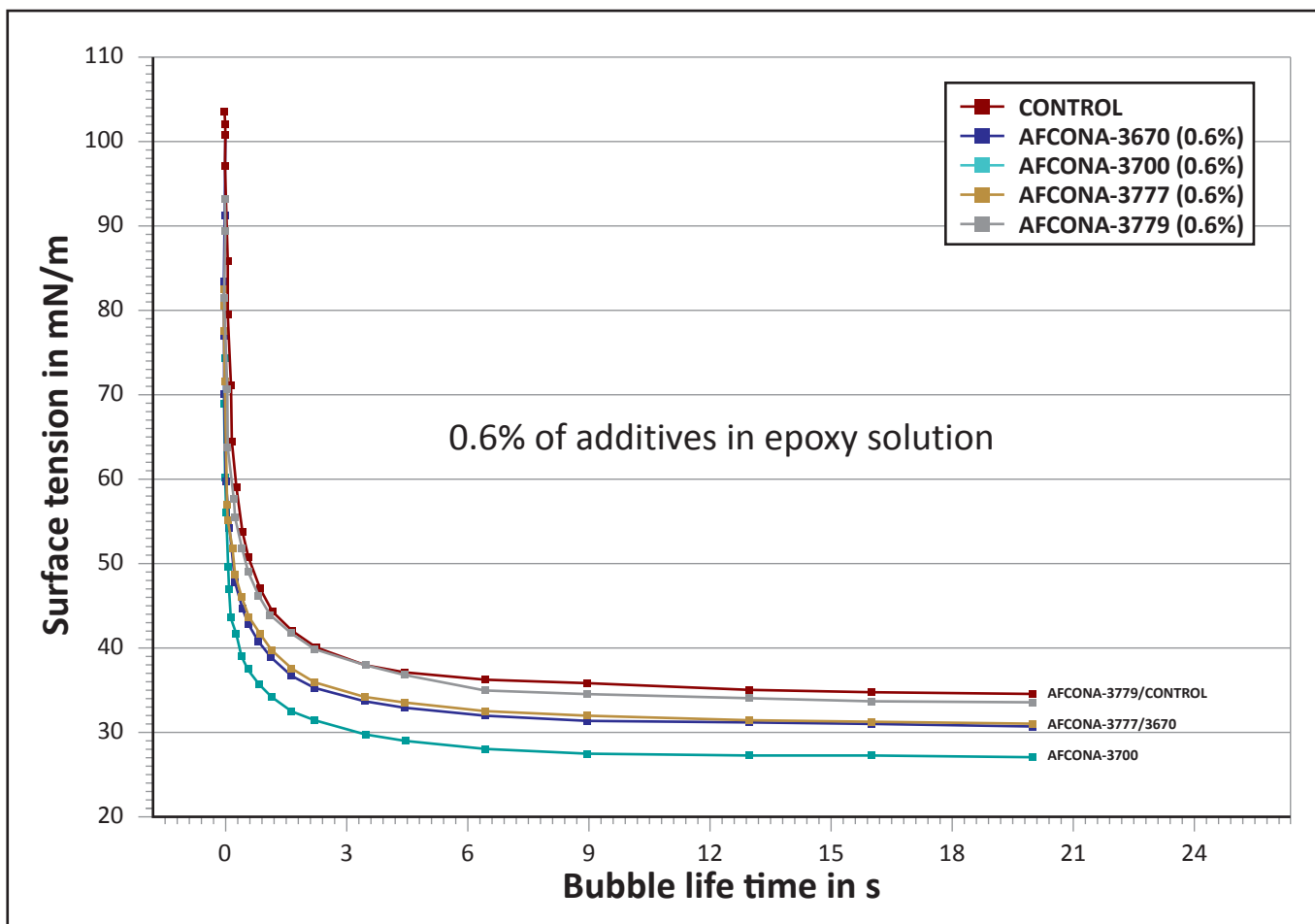
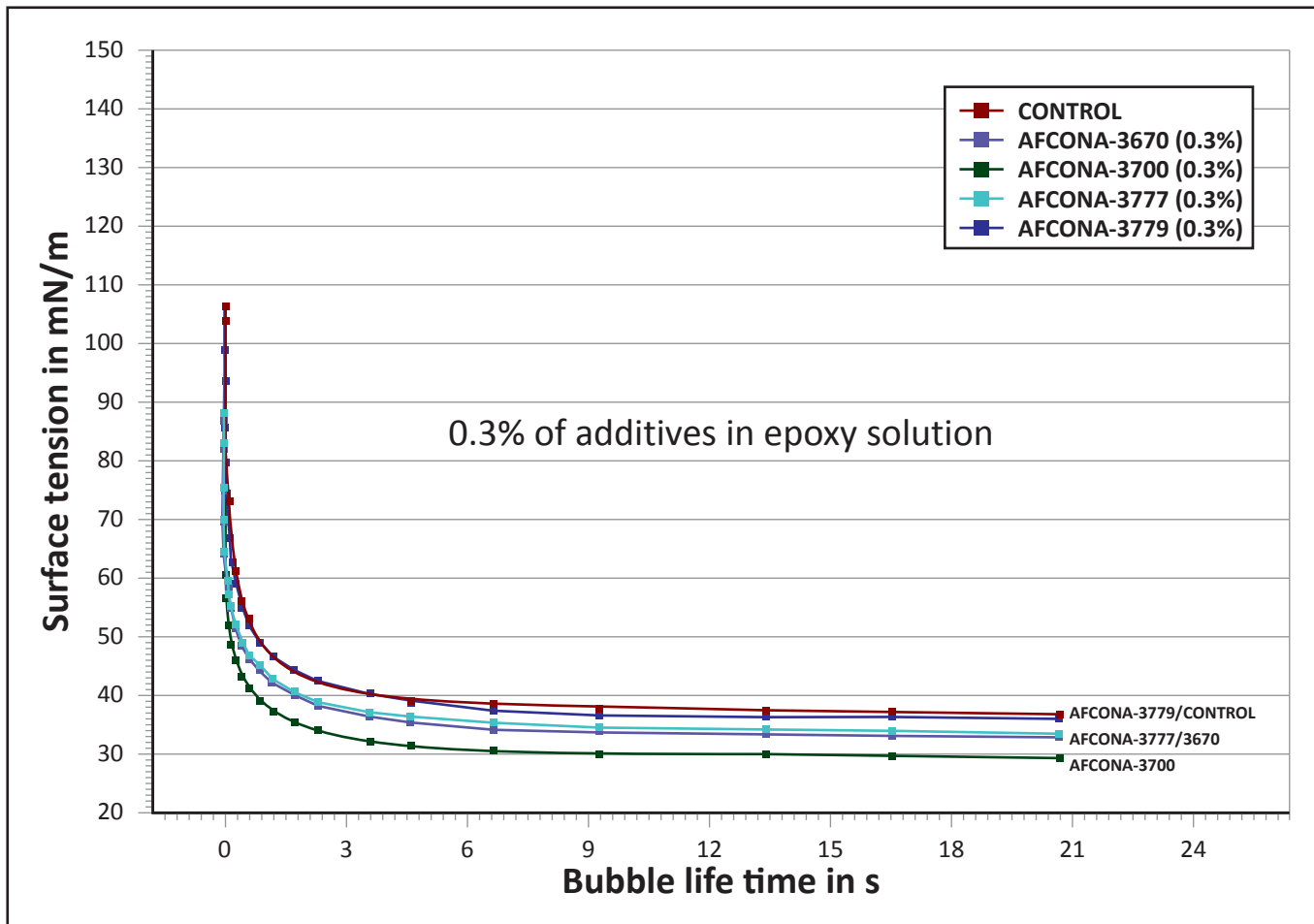


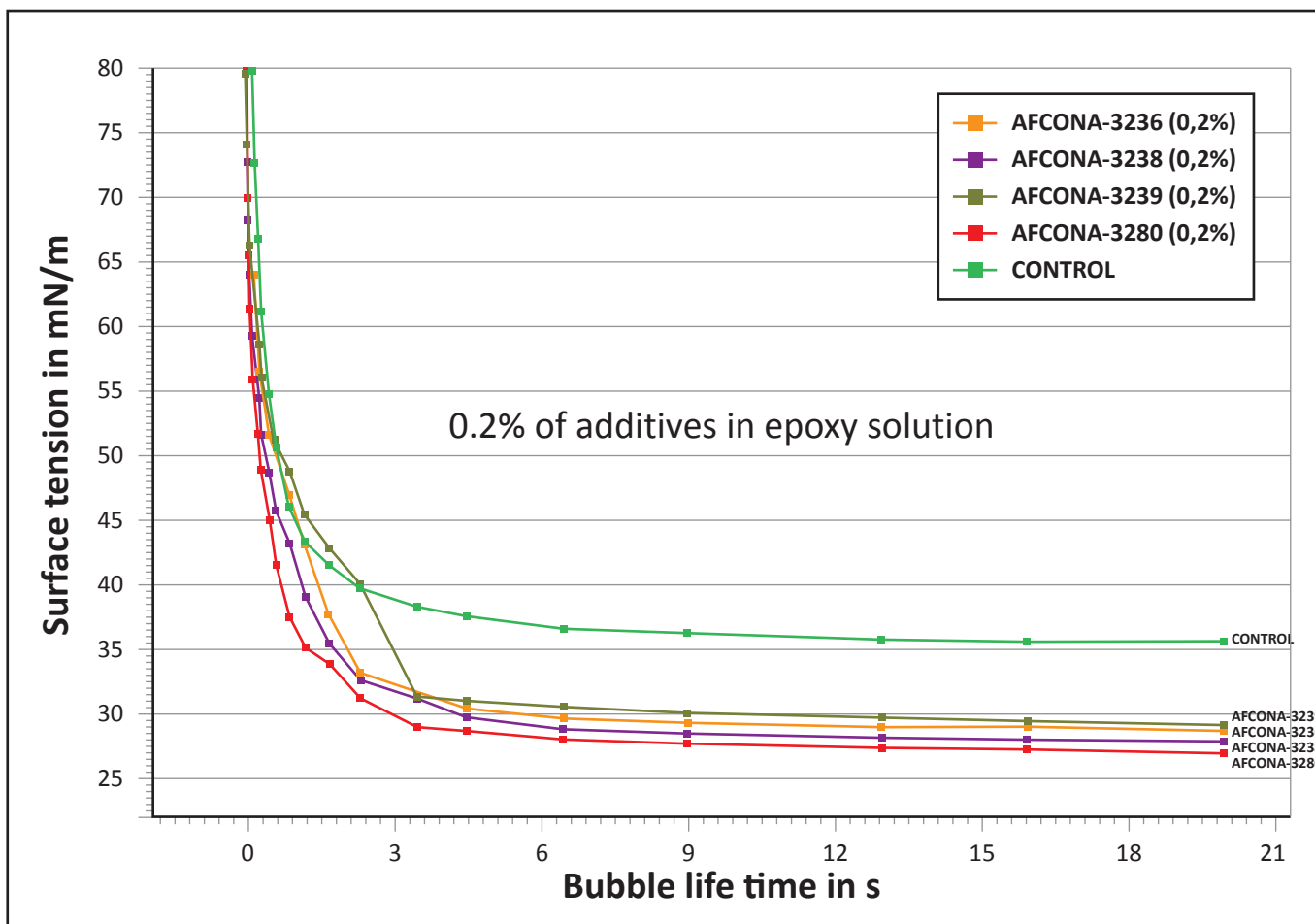
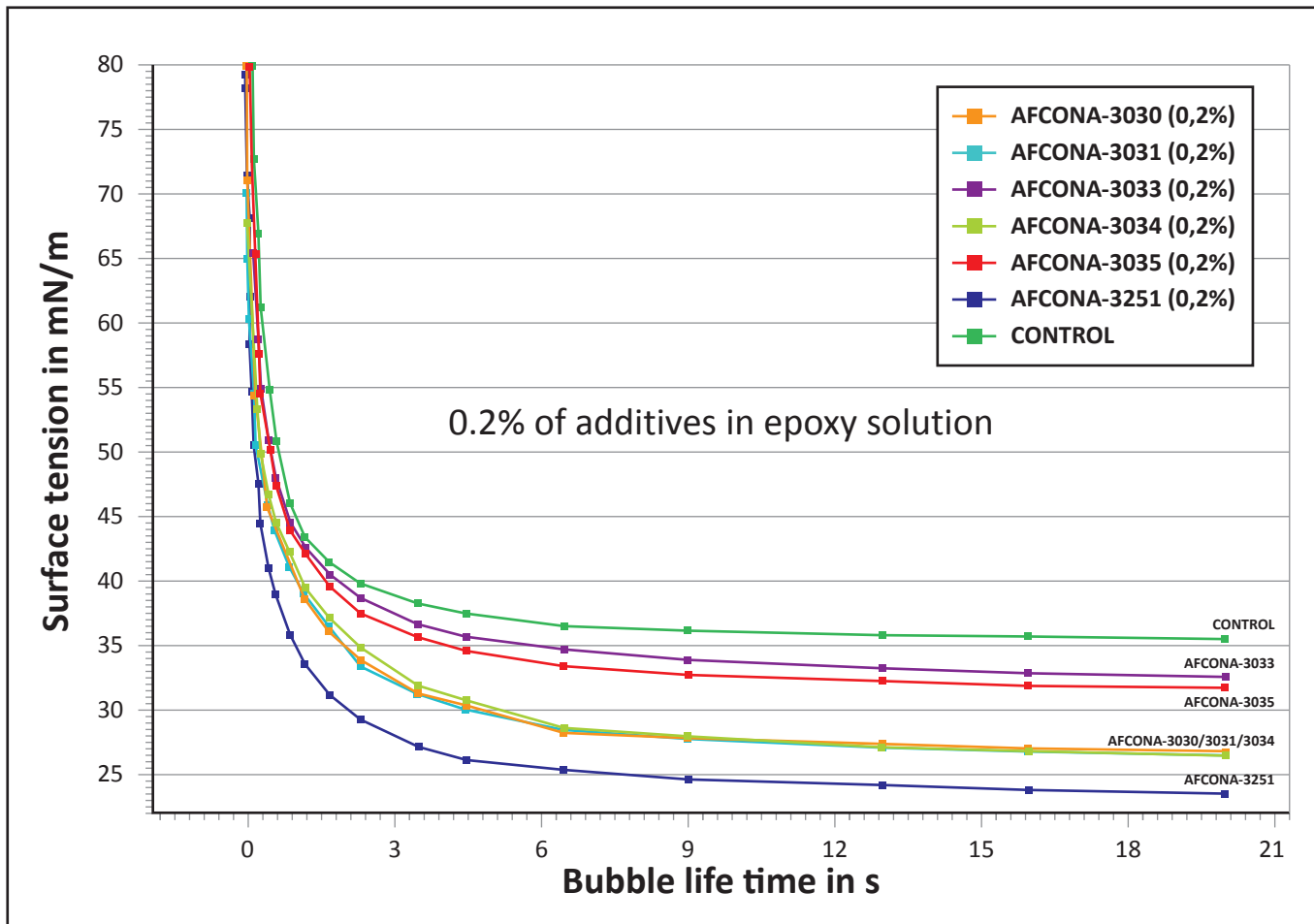
Additives for solvent-based systems

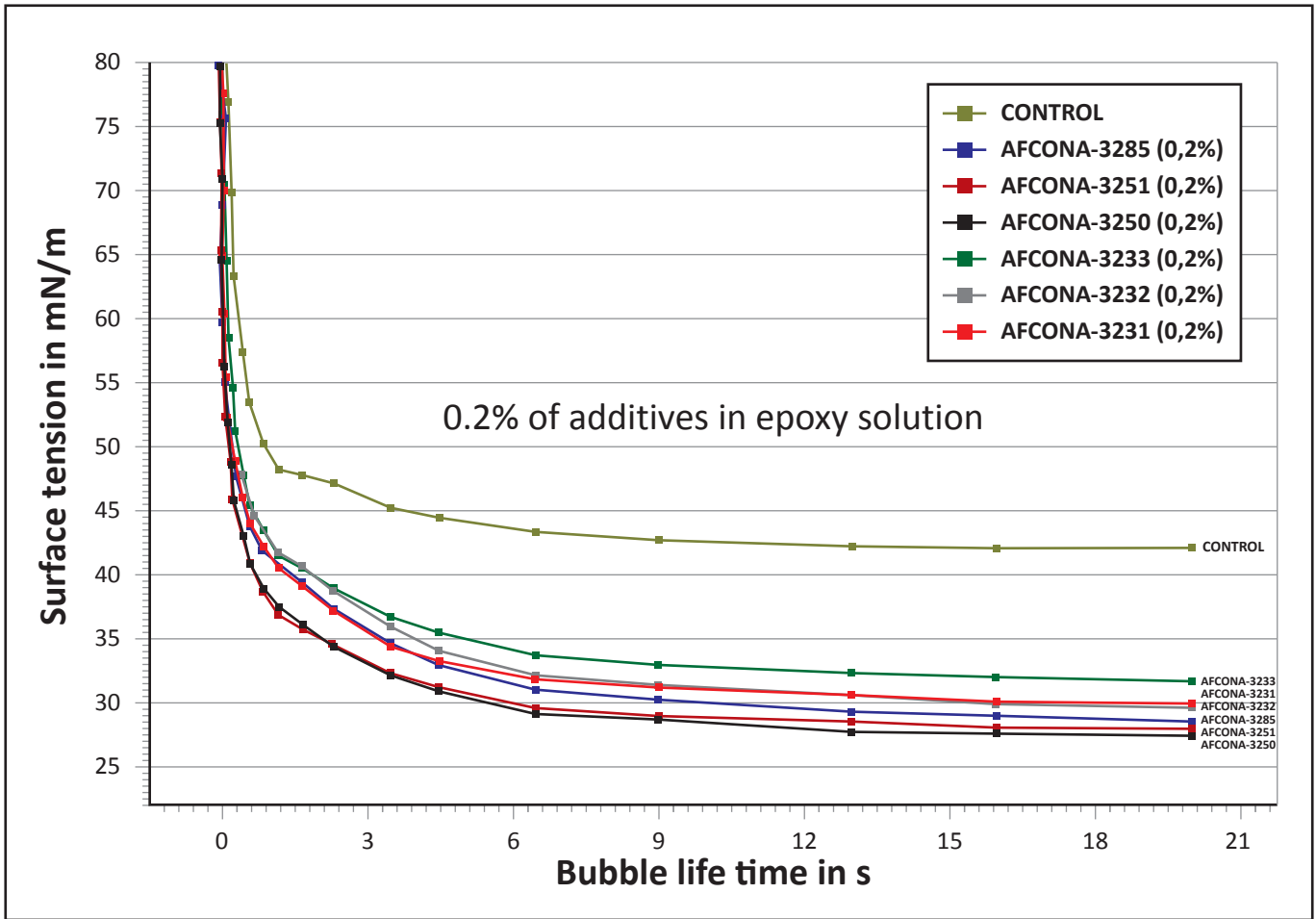
3000 Series – Organically modified polysiloxane based slip and levelling agents

Product Name	Properties
AFCONA-3030*	Universal slip and levelling agent for all solvent-based and water-based systems. Very effective in preventing Bénard cells and good anti-crater properties in PU. Provides moderate slip.
AFCONA-3031	Suitable for solvent-based coatings. Has high, oily-feeling slip performance. Oily effect enhances build up appearance. Good for metal coatings, refinish and baking paints. Low inner bubble sensitivity in PU coatings.
AFCONA-3033	High dry-feeling slip performance. Very good compatibility in all solvent-based systems. Very suitable for clear coatings. Mainly recommended for wood and plastic coatings and physical drying systems.
AFCONA-3034*	Fluorocarbon modified polysiloxane with strong surface tension reduction properties, excellent anti-crater properties, substrate wetting and improved vertical levelling.
AFCONA-3035*	Specifically developed for UPE systems. Improves levelling and promotes a smoother surface to the coatings. Furthermore suitable for UV coatings.
AFCONA-3037	Combination of high boiling point solvents. Contains a small amount of very compatible polysiloxane. Promotes flow of the system and prevents solvent boiling problems that lead to pin holes.
AFCONA-3085	Polysiloxane-based polymer with di-hydroxyl functional groups at both ends. Can be cross-linked in polyurethane systems as well as in baking paints. Very high slip and levelling performance.
AFCONA-3230	One of the highest slip performances of AFCONA silicone-based levelling agents. Low foam stabilizing effect, very good compatibility and no influence on in-can transparency.
AFCONA-3231*	Supplied as 100% active additive. Strong slip combined with wet feel. For UV, metal coatings and baking paints. Also for refinish as it enhances the build up appearance.
AFCONA-3232	100% active version of AFCONA-3033.
AFCONA-3233*	Supplied as 100% active additive. Universal slip and levelling agent for all solvent-based systems. Anti-cratering, slip, and no Bénard cells.
AFCONA-3236	Slip, levelling, and defoaming. For foam sensitive systems (PU, epoxy, coil coating). Slight in-can haziness in clears vs AFCONA-3238 and AFCONA-3239. High-temperature resistance (280°C).
AFCONA-3238	Better defoaming in medium to high polar systems. Moderate slip, levelling and serious in-can haziness. For foam sensitive systems (PU, epoxy, wood coatings). Often selected for defoaming properties.
AFCONA-3239	Defoaming > AFCONA-3236, < AFCONA-3238 in medium to high polar systems. For foam sensitive systems (PU, epoxy). Improves matting in UV coatings.
AFCONA-3250	Same family as AFCONA-3230, but overall more compatible.
AFCONA-3251	Improved version of AFCONA-3250, better levelling and anti-crater performances in PU and UV coatings.
AFCONA-3280	Short-chain polysiloxane, will not influence intercoat adhesion. For baking paints based on alkyd-melamine, oil-free polyesters and thermoset acrylics. Improves hot water soak.
AFCONA-3285	Polysiloxane polymer terminated with di-hydroxyl functional groups at both ends, enabling AFCONA-3285 to cross-link in polyurethane systems as well as in baking paints. Very high slip and levelling performance. 100% version of AFCONA-3085.
AFCONA-3835	Reactive polysiloxane with methacrylate functionality, crosslinks into UV/EB systems. For coatings with permanent slip, anti-blocking and anti-scratch performance.

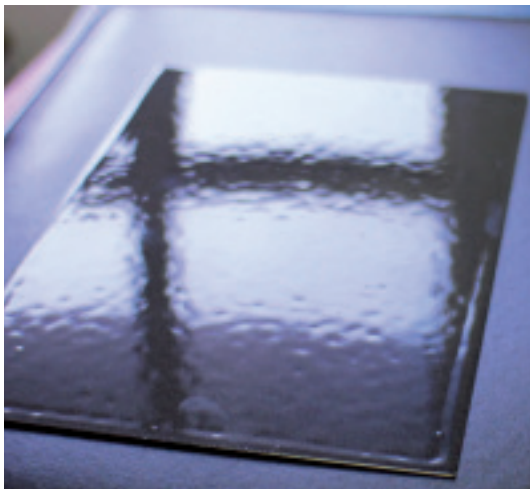
* Suitable for solvent-based and water-based coatings.







Levelling Performance of AFCONA-3779 in PU Refinish Clearcoat



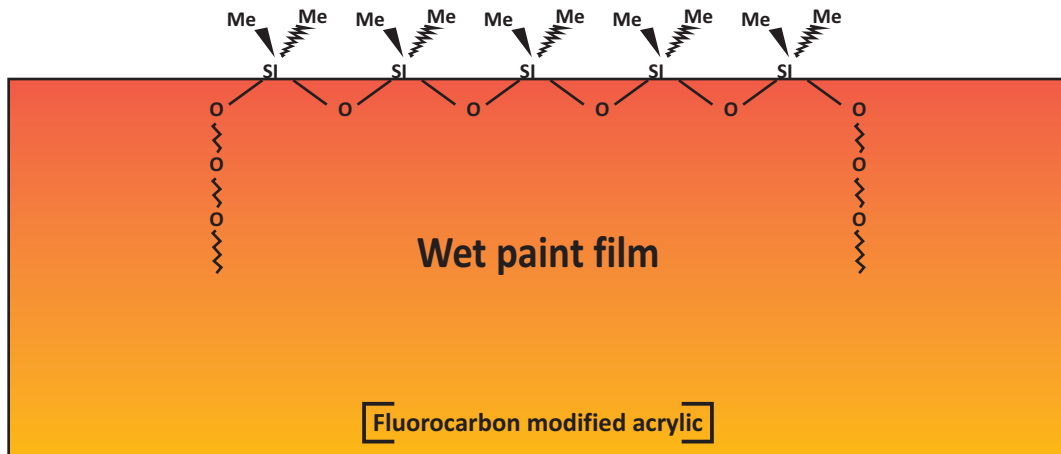
Control



AFCONA-2040	0.2%
AFCONA-3031	0.2%
AFCONA-3779	0.5%

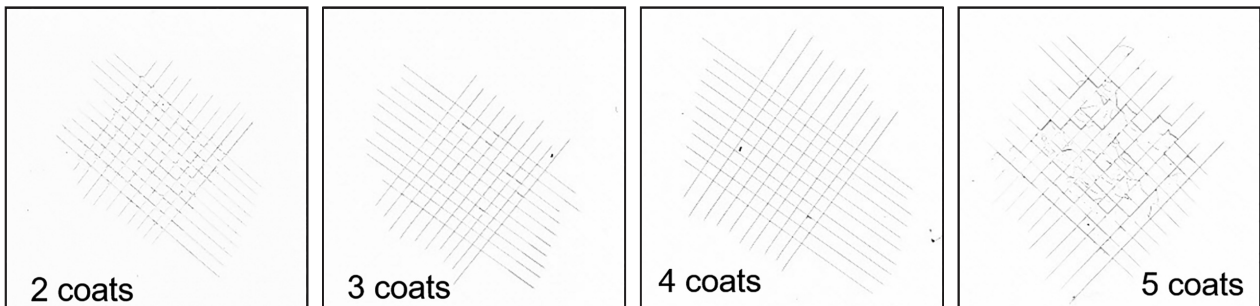
Silicone and non-silicone additives

Combination of silicone and non-silicone levelling agents

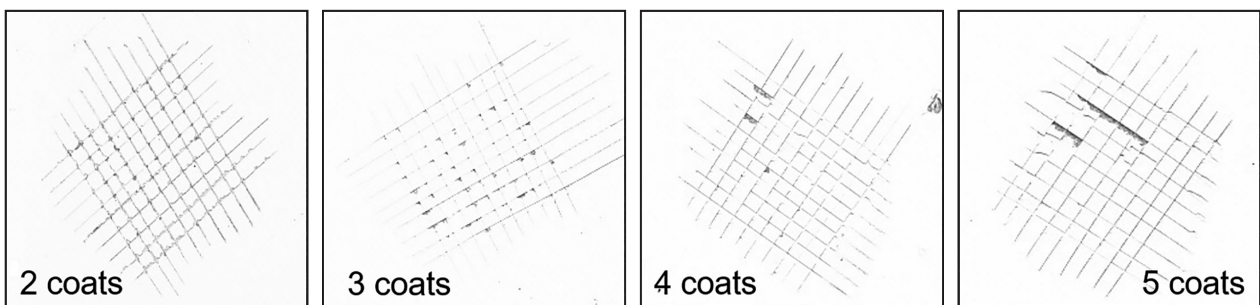


AFCONA-3280 in promoting intercoat adhesion

With 0.2% of AFCONA-3280 in polyester melamine system



Control



Additives for solvent-based systems

3000 Series – Non-silicone-based levelling agents

Product Name	Properties
AFCONA-3038	More polar combination of high boiling point solvents than AFCONA-3037. Promotes flow and prevents solvent boiling problems that lead to pin holes.
AFCONA-3277	100% version of AFCONA-3777.
AFCONA-3670	Improved version of AFCONA-3777. Based on the same chemistry but with better anti-crater performances. Suitable for all solvent-based systems.
AFCONA-3700	High-fluorocarbon-content polyacrylic with very strong surface tension reduction. Excellent tool for anti-crater, substrate wetting and promotion of vertical flow. Suitable for all solvent-based systems, especially car refinishing, plastic paint and industrial coating.
AFCONA-3730	High-Molecular-Weight polyester. Very good compatibility and levelling performance. Suitable for coil coatings, can coatings, PU's, epoxies and other solvent-based coatings.
AFCONA-3750	52% solid version of AFCONA-3700 for better handling at low temperatures.
AFCONA-3755	Pure polyacrylic levelling agent. Designed for applications where levelling and defoaming are both important, such as coil and can coatings. Can also be used in other foam-sensitive systems.
AFCONA-3758	In today's coating world polymers containing fluorocarbon are nearly banned in all coatings related to electronic applications. Mainly developed to replace fluorocarbon-modified levelling agents giving the same levelling and anti-crater performances.
AFCONA-3770	Fluorocarbon-modified polyacrylic for solvent-based systems. Very fast initial levelling, anti-crater performance and defoaming properties. Very suitable for coil coatings and UV coatings and other applications that need fast levelling. Causes in-can haziness in clear coatings.
AFCONA-3772*	Fluorocarbon-modified polyacrylic for solvent-based systems. Becomes water-soluble after neutralization with a suitable amine. Considered a polar polymer with very good compatibility in all resin systems. Stronger anti-crater properties than AFCONA-3730. Less in levelling performance.
AFCONA-3775	Same category product as AFCONA-3770, but with stronger defoaming performance. Less in anti-crater properties.
AFCONA-3777	First-generation fluorocarbon-modified polyacrylic. Suitable for all solvent-based systems to improve levelling, anti-crater performance and substrate wetting. When special results are needed, products from the newly-developed generation will perform better.
AFCONA-3778	Pure polyacrylic levelling agent. Improves levelling and has defoaming properties. Can cause in-can haziness in some systems.
AFCONA-3779	Pure polyacrylic levelling agent. Well known for flow and levelling performance. Also acts as defoamer in most coating systems.

* Suitable for solvent-based and water-based coatings.



Additives for solvent-based systems

4000 Series – High-Molecular-Weight Dispersing agents – First generation polyurethane types

Product Name	Properties
AFCONA-4009*	Mainly used in preparation of pigment concentrates due to good compatibility and price advantage. Can also be used as a dispersant for normal grinding, especially for inorganic pigments.
AFCONA-4010*	Good dispersant for inorganic pigments, especially TiO ₂ and matting agents. Widely used as a dispersant for inorganic pigment for pigment concentrate preparations.
AFCONA-4011*	Improved version of AFCONA-4010. Better balance between price and performance. Principally developed for stabilizing inorganic pigments such as TiO ₂ , iron oxides and matting agents. Can be used in almost all solvent-based coating systems.
AFCONA-4015*	Co-grinding aid for solvent-based systems. Needs a strong solvent such as MEK or MIBK in mill base for optimal performance.
AFCONA-4017*	Polymeric dispersant mainly developed for co-grinding processes for coil and can coatings, baking polyesters and acrylic, epoxy and polyurethane systems. Among all the best co-grinding agent.
AFCONA-4046*	Universal and efficient dispersant for all pigments, including organic and carbon black. Good pigment deflocculation strength. Improves dry film glosses and prevents floating and flooding.
AFCONA-4047*	Better performing dispersant with higher molecular weight than AFCONA-4046, especially for carbon black and difficult to disperse organic pigments. Recommended for high quality paints such as OEM, refinish and industrial coatings.
AFCONA-4050*	More economical dispersant than AFCONA-4046. Very good to disperse all kinds of pigments. Recommended for PU, baking paint, epoxy, etc.
AFCONA-4060	Medium to low polar dispersant. Suitable for coil and can coatings and polyester resin systems.
AFCONA-4070*	Improved version of AFCONA-4060 with much better pigment stability and viscosity reduction properties. Gives very high Jetness to carbon black dispersions. May crystallize at temperatures below 15 °C.
AFCONA-4080*	Very High-Molecular-Weight Dispersant with very good pigment stability performance. Especially for organic reds and other difficult to disperse pigments. Recommended for epoxies, coil coatings, fluorocarbon coatings and other high quality paints.
AFCONA-4109	More economical version of AFCONA-4009. Mainly used in pigment concentrates. Can be used as an economical universal dispersant for applications that do not have to meet the highest requirements.
AFCONA-4146	More economical version of AFCONA-4046. Can be used as a universal dispersant for all kind of pigments. Also suitable for pigment concentrates.

* These products will become slightly hazy at temperatures below 15 °C. This will not influence the quality.



Additives for solvent-based systems

4000 Series – High-Molecular-Weight Dispersing agents – New-generation polyurethane types

Product Name	Properties
AFCONA-4000*	Supplied in a high solid form, 65%. Wide compatibility, especially in those systems where previous generations PU dispersants are not fully compatible. Excellent performance in Thermoplastic Acrylic, NC, CAB and other less compatible resin systems.
AFCONA-4001*	Special dispersant high solid (55%) for carbon black. For black coatings with high Jetness and blue shade. Good dispersant for other pigments in all solvent-based systems.
AFCONA-4063*	Effective polymeric dispersant for stabilizing inorganic and organic pigments as well as carbon blacks. Very good stability performance, through effective steric hindrance on all types of pigments, especially in organic red, yellow and violet.
AFCONA-4067*	BTX-free version of AFCONA-4063. Very effective in stabilizing inorganic and organic pigments and carbon black. Especially effective for organic red, yellow and violet due to the three-dimensional steric hindrance network. Very good viscosity reduction and improvement of colour strength.
AFCONA-4071*	Improved version of AFCONA-4070, better in overall performances. Supplied in higher solid, 45%. Recommended for refinishes, can coatings, dispersion of transparent iron oxides and other industrial coatings and pigment concentrates.
AFCONA-4077*	Very similar to AFCONA-4071 but with lower viscosity-depressing property. In terms of pigment dispersion, AFCONA-4071 is better in overall performances.
AFCONA-4200*	Polyurethane dispersant supplied in 100% active form. Recommended for solvent-free systems, where conventional wetting and dispersing agents can not perform with organic pigments and carbon blacks. Extremely good compatibility with thermoplastic acrylic, NC and CAB. Very interesting for ink dispersions because of the free solvent choice.
AFCONA-4201*	Same structure as AFCONA-4200. However, the polymer chain is longer, providing better steric hindrance. Performs stronger in pigment stability, colour and gloss developments.
AFCONA-4202*	Very compatible polymeric dispersant. Compatible with most of the resin systems on the market, ranging from Alkyd to NC, CAB, Epoxy and Thermoplastic Acrylic. Therefore highly recommended for solvent-based Resin Minimal Pigment Concentrates. Good viscosity reduction and easy incorporation, especially in NC systems.

4000 Series – High-Molecular-Weight Dispersing agents – Polyacrylate types

AFCONA-4400*	Suitable for nearly all solvent-based systems. Should be avoided in epoxy because of the high amine value. Very good pigment stability with organic pigments, less with inorganic pigments. Less viscosity reduction compared to polyurethane dispersants.
AFCONA-4401*	Higher solid version of AFCONA-4400 with lower molecular weight. Better compatibility. Less viscosity reduction compared to polyurethane dispersants. Suitable for most solvent-based systems.
AFCONA-4403*	More compatible version of AFCONA-4401. Special modification gives lower surface tension on polymer and allows dispersant to penetrate more easily to the surface of the pigment. Therefore, better wetting and faster grinding. Pigment concentrates based on AFCONA-4403 give easier incorporation, especially in NC.
AFCONA-4474*	Very strong dispersant especially for TiO ₂ dispersion in oil-free polyester/melamine systems. Use of TiO ₂ dispersions in coil and can coating applications will increase whiteness as well as hiding power of coating. Reduces the viscosity of the system, therefore higher pigment loading can be achieved. Very suitable for UPE & Epoxy systems due to the acid functional pigment affinity group. Common dispersants mostly contain amine values which could affect the self- and pot-life.
AFCONA-4531**	Polymeric dispersant for stabilizing inorganic and organic pigments in water- and solvent-based systems. In solvent-based systems, a polar polymer with very good compatibility to difficult polar systems such as NC, wash primer etc. Pigment paste based on AFCONA-4531 giving very easy incorporation. Must be neutralized for water-based applications.
AFCONA-4570**	For water and solvent -based universal decorative pigment concentrates. Especially for those used in high solid aromatic-free long oil alkyds. Also effective as an additive to improve colour acceptance of commercial colourants.

4000 Series – High-Molecular-Weight Dispersing agents - Based on Controlled Free Radical Polymerisation

AFCONA-4701	Innovative dispersant based on Controlled Radical Polymerisation (CRP). Recommended for all kind of pigments, including difficult organic pigments and High Channel Carbon Blacks. Recommended for coating systems that need the highest requirements such as automotive OEM and refinish, coil and industrial stoving systems.
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* These products will become slightly hazy at temperatures below 15°C. This will not influence the quality.

** Suitable for Water- and Solvent-based coatings.

Recommended dosage of high molecular weight dispersant on several common pigments, fillers and matting agents.

Pigment type	Based on solid to solid (%)	Based on surface area (m ² /g)
Titanium Dioxide	2-3%	10% on oil absorption
Iron Oxide Pigments	3-4%	10% on oil absorption
Chrome Oxide Pigments	2-4%	10% on oil absorption
Fillers (Clay, CC powder, Kaolin, Barium Sulphate)	1-2%	10% on oil absorption
Matting agents	2 -3%	10% on oil absorption
Phthalocyanine pigments	15-25%	15-25% on BET value
Organic Red	15-25%	15-25% on BET value
Organic Yellow	15-25%	15-25% on BET value
Organic Violet	15-30%	15-25% on BET value
Regular Carbon Black	20%	20% on BET value
High Channel Carbon Black	30-50%	30-50% on BET value

BET (Brunauer, Emmett and Teller) value - Measurement of surface area of pigment by using N₂ absorption.

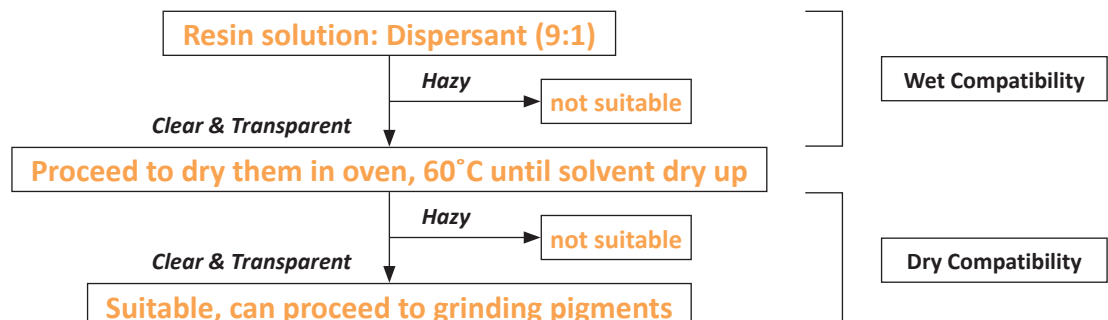
DBP (DiButyl Phthalate) value - Measurement of surface area of carbon black by using dibutyl phthalate.

Dispersing concept

In order for a dispersing and wetting agent to function in particular systems, they must be complied to certain basic rules:

Compatibility with resin systems

Compatibility can split to wet compatibility and dry compatibility

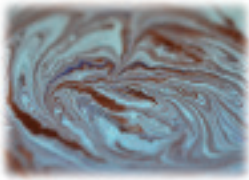


Polyurethane-based Dispersant

AFCONA-4009	AFCONA-4067	
AFCONA-4010	AFCONA-4071	
AFCONA-4011	AFCONA-4077	
AFCONA-4015	AFCONA-4080	
AFCONA-4017	AFCONA-4109	
AFCONA-4046	AFCONA-4146	Only for co-grinding
AFCONA-4047	AFCONA-4200	Best for inorganic pigments
AFCONA-4050	AFCONA-4201	For all solvent-based systems
AFCONA-4060	AFCONA-4530	For water-based systems
AFCONA-4063	AFCONA-5585	With excellent anti-settling

Polyacrylate-based Dispersant

AFCONA-4400	AFCONA-4570	
AFCONA-4401	AFCONA-4595	
AFCONA-4474	AFCONA-4597	
AFCONA-4531	AFCONA-4598	
AFCONA-4550	AFCONA-4599	For all solvent-based systems
AFCONA-4560	AFCONA-4700	For water-based systems
AFCONA-4565	AFCONA-4701	CRP technology dispersant



Additives for solvent-based systems

5000 Series – Conventional wetting and dispersing agents

Product Name	Properties
AFCONA-5008*	Universal dispersant for all solvent-based systems. Can be used to prepare bentonite gels. Economic replacement for AFCONA-5044 as both are supplied in the same solid content.
AFCONA-5009*	Economical wetting and dispersing agent for pigment dispersions. Designed to replace old-fashioned products such as AFCONA-5044, AFCONA-5054 and AFCONA-5207. Stabilizes pigments through electrically charged repulsion forces. Very effective in bentonite gel preparation.
AFCONA-5010*	Special dispersant for pure white paints. Very good viscosity reduction. Suitable for most of the solvent-based systems. Not suitable for air-drying alkyd systems.
AFCONA-5030*	Amine rich dispersing agent for carbon blacks and organic pigments. Particularly suited for artificial leather, PU, Alkyd, Polyamide and printing ink systems.
AFCONA-5044*	Universal dispersant for all solvent-based systems. Can be used to prepare bentonite gels.
AFCONA-5051*	Dispersant, mainly developed for dispersing and stabilizing transparent iron oxide pigments. May also be used as a dispersant for other inorganic pigments and extenders to reduce viscosity in the dispersion. Very useful in high filled systems.
AFCONA-5054*	Higher polarity than AFCONA-5044. Used in low to medium polar systems. Can cause yellowing in NC. Mostly recommended for bentonite gel preparations.
AFCONA-5065*	Effective co-grinding agent, containing polysiloxane. Can be used as a post-additive to correct floating and flooding problems. Can give foam-stabilizing effect due to the silicone modification.
AFCONA-5066*	Silicone-free version of AFCONA-5065. No foam-stabilizing effect. Stronger in anti-settling properties.
AFCONA-5071**	Very good anti-settling effect. Recommended for water and solvent-based systems. Extremely suitable for wash primers.
AFCONA-5207*	Specially designed for all kind of pigments in air-drying alkyds.
AFCONA-5209*	Economical solvent-free dispersing agent for pigment dispersions. Designed to replace old-fashioned products such as AFCONA-5044, AFCONA-5054 and AFCONA-5207. Stabilizes the pigments through electrically charged repulsion forces. Very effective in bentonite gel preparation.
AFCONA-5210**	100% active version of AFCONA-5010.
AFCONA-5244*	100% active version of AFCONA-5044.
AFCONA-5251*	Mainly developed for dispersing and stabilizing transparent iron oxide pigments. May also be used as a dispersant for other inorganic pigments and extenders, where it reduces the viscosity in the dispersion. Very useful in high filled systems.
AFCONA-5280**	Improved version of AFCONA-5207. Also for other resins systems. Dispersant with performance in between High-Molecular-Weight Dispersants and conventional dispersing agents. Therefore suitable to replace High-Molecular-Weight Dispersants for economical reasons.
AFCONA-5285**	Good viscosity-depressing wetting agent for primers and highly loaded extender systems.
AFCONA-5290**	Suitable for all solvent-based systems ranging from low polar to high polar, including air dry alkyd. Very high pigment stability, good viscosity reduction and high colour strength. Supplied in 100% active ingredients. Excellent dispersant for Polyurethane, epoxy and UV coating.
AFCONA-5708*	Economical dispersant for all solvent-based systems. Stabilizing all kinds of pigments. For applications where price and performance balance must be on a good level. Xylene free.

* These products will become slightly hazy at temperatures below 15°C. This will not influence the quality.

** Suitable for Water- and Solvent-based coatings.



Additives for solvent-based systems

6000 Series – Miscellaneous products

Product Name	Properties
AFCONA-6220*	Fatty acid modified emulsifier. Recommended to improve colour acceptance of colourants in base paints. The use in coloured NC can improve gloss.
AFCONA-6225*	Better pigment stability than AFCONA-6220. Suitable as colour acceptance additive, as well as effective dispersant for all kind of pigments for water-based and solvent-based systems. Can be used to formulate water-based resin-free pigment concentrates for universal colourants.
AFCONA-6226*	Improved version of AFCONA-6225. Exhibits more hydrophilic behaviour than AFCONA-6225. Therefore giving better colour strength, viscosity reduction, pigment stability and colour acceptance in water-based and solvent-based paints.
AFCONA-6230*	Suitable for most water- and solvent-based systems. Effective viscosity reduction agent for all highly filled systems with inorganic pigments and extenders.
AFCONA-6700	Anti-gelling agent for air-drying alkyd and baking paints. In air-drying alkyd paints, the ketoxime forms a protective layer on top of the paint to reduce the oxidation caused by oxygen. In Stoving paints, it helps to block the reactive group of the melamine and will be released for further curing of the paint film when the temperature reaches 80-100 °C.
AFCONA-6701	Xylene-free version of AFCONA-6700.
AFCONA-6745	Synergist agent for phthalocyanine pigments, carbon blacks and violet pigments. Must be used in combination with AFCONA-4000 series dispersant. Improves gloss, viscosity depression and pigment stability.
AFCONA-6755*	Water-based version of AFCONA-6745. In systems that contain high amounts of alcohol or ketone solvent, AFCONA-6755 is the better choice.
AFCONA-6788	Compatible polymer for pigment concentrates. Provides pigment concentrates with an easier incorporation into the base paints. May even occur with hand stirring. Combination with AFCONA-4071 results in pigment paste with an easy incorporation without seeding.

* Suitable for Water- and Solvent-based coatings.

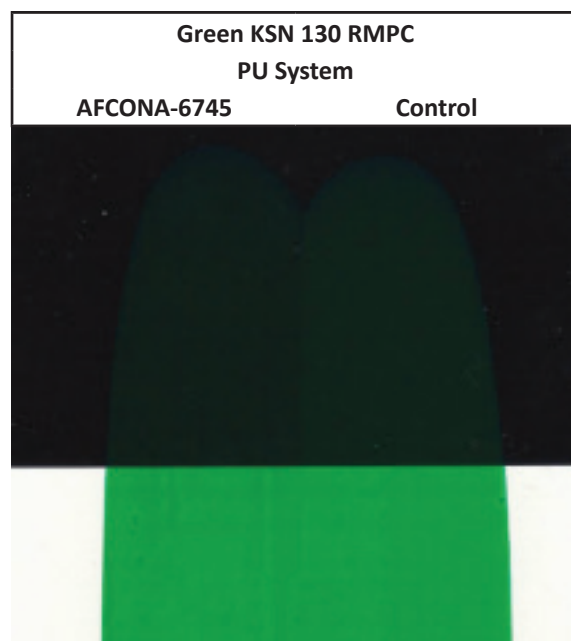
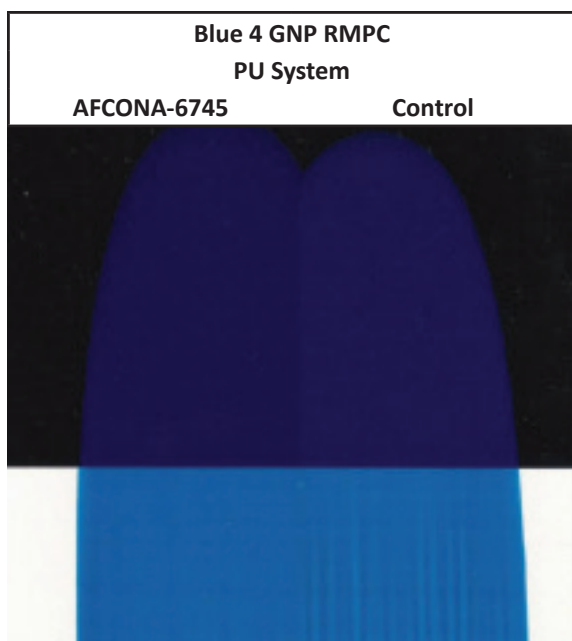
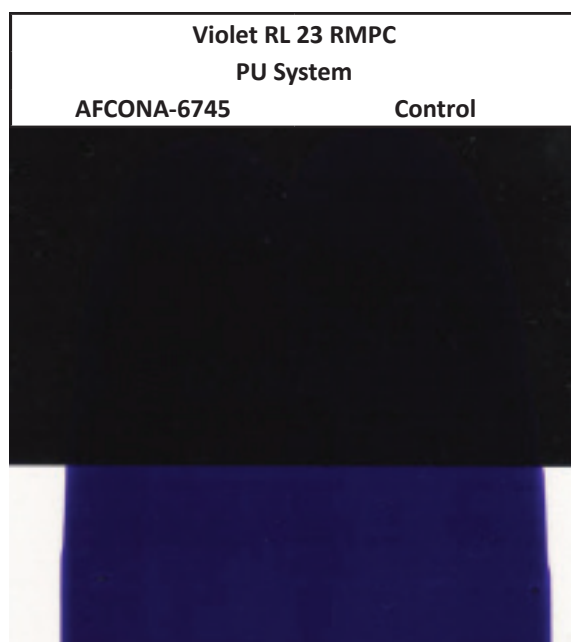
Auto Refinish Pigment paste formulations

Raw materials	PB 15:3		PR 122		PG 7		PR 101		Monarch 1400		PR 179	
Laropal A81 60%	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
AFCONA-4701	-	6.00	-	4.90	-	6.00	-	9.00	-	5.75	-	7.20
PU dispersant (45% solid)	6.67	-	5.44	-	6.67	-	10.00	-	6.39	-	8.00	-
Xylene	20.47	20.80	22.38	22.65	20.47	20.80	17.30	17.80	23.93	24.25	20.00	20.40
Butyl acetate	20.46	20.80	22.38	22.65	20.46	20.80	17.20	17.70	23.93	24.25	20.00	20.40
Pigments	12.00	12.00	9.80	9.80	12.00	12.00	15.00	15.00	5.75	5.75	12.00	12.00
AFCONA-6745	0.40	0.40	-	-	0.40	0.40	-	-	-	-	-	-
Cab-O-Sil M5	-	-	-	-	-	-	0.50	0.50	-	-	-	-
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
% of dispersants on pigment	25	25	25	25	25	25	30	30	50	50	30	30

Performance test of synergist agent AFCONA-6745 in black, violet, blue and green pigment

Test Formulations

Raw material	Black FW 200		Violet RL 23		Blue 4 GNP		Green KSN 130	
	Control	AFCONA-6745	Control	AFCONA-6745	Control	AFCONA-6745	Control	AFCONA-6745
AFCONA-1102	30	30	30	30	30	30	30	30
PMA	25	24.75	26.6	26.35	22.5	22.25	19.4	19.15
Xylene	25	24.75	26.6	26.35	22.5	22.25	19.4	19.15
AFCONA-4071	8	8	6.8	6.8	9	9	11.2	11.2
Pigment	12	12	10	10	16	16	20	20
AFCONA-6745	-	0.5	-	0,5	-	0.5	-	0.5
Total	100	100	100	100	100	100	100	100



Physical test of pigment concentrate

Raw material	Black FW 200		Violet RL 23		Blue 4 GNP		Green KSN 130	
	Control	AFCONA-6745	Control	AFCONA-6745	Control	AFCONA-6745	Control	AFCONA-6745
Fineness	30	30	30	30	30	30	30	30
Viscosity / CPS (Spin=34; 0.3 rpm)	25	24.75	26.6	26.35	22.5	22.25	19.4	19.15

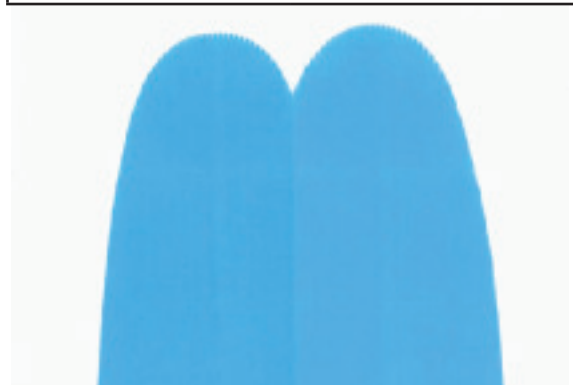
Properties test of pigment concentrate in PU system

Properties test		Full shade	Tint Strength	Pour out	
				Degree of flocculation	Transparency
Black FW 200	Control	4	4	5	5
	AFCONA-6745	5	5	5	5
Violet RL 23	Control	5-	4	5	5
	AFCONA-6745	5	5	5	5-
Blue 4GNP	Control	4	4	5	5
	AFCONA-6745	5	5	5	4
Green KSN 130	Control	4	4	5	5
	AFCONA-6745	5	5	5	4

Violet RL 23 RMPC
PU System
AFCONA-6745 Control



Blue 4 GNP RMPC
PU System
AFCONA-6745 Control



Green KSN 130 RMPC
PU System
AFCONA-6745 Control



Suggesting formulation based on AFCONA-4071 and Laropal A81

Pigment paste for high quality paint

Dispersant: AFCONA-4071

Resin: Laropal A81

Items	FW-200	MA100 (or special black 100)	Blue PB 15:3	Green PG 7	Red 254 PR254	Violet RL special PV23	Bayferrox 110	Bayferrox 3920
Laropal A81 (60% in PMA)	30.00	30.00	25.00	25.00	25.00	30.00	10.00	10.00
AFCONA-4071	12.00	12.00	9.00	9.00	12.00	7.00	4.50	4.00
AFCONA-6745	0.00	0.00	1.00	1.00	0.00	2.00	0.00	0.00
Pigment	10.00	20.00	20.00	20.00	20.00	10.00	65.00	55.00
Blanc Fix Micro	0.00	0.00	0.00	0.00	0.00	1.00	5.00	5.00
Touch Anset 3300	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00
Solvesso 100	24.00	19.00	23.00	23.00	22.00	25.00	7.50	12.50
PMA	24.00	19.00	22.00	22.00	21.00	25.00	7.00	12.50
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
% Dispersant	54.00	27.00	20.25	20.25	27.00	31.50	3.12	3.27

Suggesting formulation based on AFCONA-6226 and Laropal A81

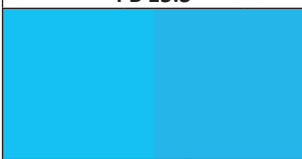


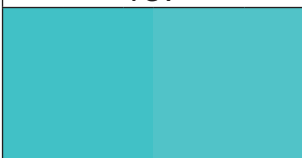

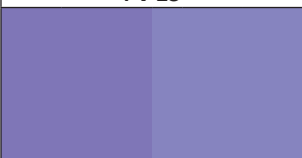
Pigment paste for economy reason

Dispersant: AFCONA-6226





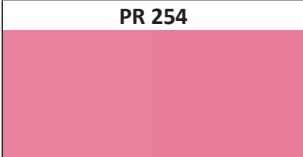
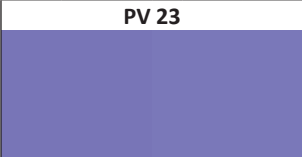
Resin: Laropal A81

Items	FW-200	MA100 (or special black 100)	Blue PB 15:3	Green PG 7	Red 254 PR254	Violet RL special PV23	Bayferrox 110	Bayferrox 3920
Laropal A81 (60% in PMA)	30.00	30.00	25.00	25.00	25.00	30.00	10.00	10.00
AFCONA-6226	5.00	6.00	5.00	5.00	5.00	3.00	2.50	2.00
AFCONA-6745	0.00	0.00	1.00	1.00	0.00	2.00	0.00	0.00
Pigment	10.00	20.00	20.00	20.00	20.00	10.00	65.00	55.00
Blanc Fixe Micro	0.00	0.00	0.00	0.00	0.00	1.00	5.00	5.00
Touch Anset 3300	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00
Solvesso 100	28.00	22.00	25.00	25.00	21.00	27.00	8.50	13.50
PMA	27.00	22.00	24.00	24.00	25.00	27.00	8.00	13.50
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
% Dispersant	50.00	30.00	25.00	25.00	25.00	30.00	3.85	3.64


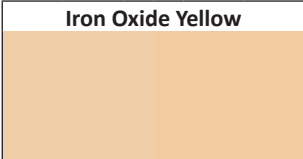


Tinting Comparison

Resin: Polyacrylate with OH value at 3.5%					Ratio: 3% paste in white paint									
PB 15:3					FW 200					MA 100				
														
4071		6226			4071		6226			4071		6226		
	L	A	B	ΔE		L	A	B	ΔE		L	A	B	ΔE
6226	69.1	-21.9	-32.0	-	6226	62.9	-5.0	-0.7	-	6226	51.4	-4.8	-2.6	-
4071	-1.0	-0.9	-1.6	2.1	4071	-0.6	+0.2	+0.6	0.9	4071	+0.5	+0.1	+0.6	0.8
PG 7					PR 254					PV 23				
														
4071		6226			4071		6226			4071		6226		
	L	A	B	ΔE		L	A	B	ΔE		L	A	B	ΔE
6226	78.5	-28.2	-1.3	-	6226	68.0	+37.0	+4.8	-	6226	62.2	+8.7	-30.1	-
4071	-0.4	-1.3	-0.5	1.4	4071	+0.3	-0.3	-0.1	0.4	4071	-2.6	+1.7	-2.6	4.1

Remark: Almost all organic pigments paste with AFCONA-4071 gives better colour strength.

Resin: Epoxy Solvent free					Ratio: 3% paste in white paint									
PB 15:3					FW 200					MA 100				
														
4071		6226			4071		6226			4071		6226		
	L	A	B	ΔE		L	A	B	ΔE		L	A	B	ΔE
6226	65.8	-21.9	-32.4	-	6226	57.9	-4.4	+0.7	-	6226	46.9	-4.3	-1.3	-
4071	-0.7	-0.3	-0.9	1.2	4071	-0.8	-0.2	+0.1	0.8	4071	+0.8	+0.1	+0.2	0.8
PG 7					PR 254					PV 23				
														
4071		6226			4071		6226			4071		6226		
	L	A	B	ΔE		L	A	B	ΔE		L	A	B	ΔE
6226	74.7	-40.3	-1.0	-	6226	66.6	+34.9	+5.4	-	6226	58.3	+8.6	-35.6	-
4071	-0.6	-1.0	-0.2	1.2	4071	+0.2	-0.6	-0.4	0.7	4071	-0.1	-0.3	-0.4	0.5

Remark: Almost all organic pigments paste with AFCONA-4071 gives better colour strength.

Resin: Polyacrylate with OH value at 3.5%					Ratio: 3%					Resin: Epoxy Resin free					Ratio: 3% paste in white paint				
Iron Oxide Red					Iron Oxide Yellow					Iron Oxide Red					Iron Oxide Yellow				
																			
4071		6226			4071		6226			4071		6226			4071		6226		
	L	A	B	ΔE		L	A	B	ΔE		L	A	B	ΔE		L	A	B	ΔE
6226	67.0	-21.9	+17.6	-	6226	86.3	-0.0	+30.0	-	6226	67.0	-21.9	+17.6	-	6226	86.3	-0.0	+30.0	-
4071	+0.9	-0.8	-0.3	1.2	4071	+0.3	-0.2	-0.5	0.6	4071	+0.9	-0.8	-0.3	1.2	4071	+0.3	-0.2	-0.5	0.6

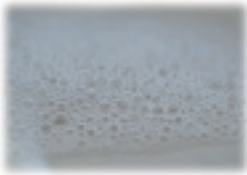
Remark: For iron oxide pigments, better stabilized pigment gives lower colour strength because it gives cleaner and not dirty colour tone.



Additives for water-based systems

1000 Series – Universal resins for pigment concentrates

Product Name	Properties
AFCONA-1501	Recommended to combine with High-Molecular-Weight Dispersing agents such as AFCONA-4560, AFCONA-4570 or AFCONA-6226 for preparation of water-based pigment concentrates. Complete water-solubility is reached by adding 8% AMP95.



2000 Series – Silicone-based defoamers and deaerators

Product Name	Properties
AFCONA-2502	Defoamer based on a modified polysiloxane with fine silica. Very high resistance to shear forces and temperatures. Suitable for pigment concentrates, coatings, printing inks and other highly filled and high solid systems.
AFCONA-2503	Defoamer for water-based applications, mainly for the preparation of pigment concentrates. Less tendency to form craters than AFCONA-2502. Also improves levelling.
AFCONA-2505	Strong defoamer for water-based applications. Effective in coating systems ranging from PU dispersions for industrial to acrylic based decorative paints. Also suitable for pigment concentrates and inks for high speed flexo-printing process.
AFCONA-2507	Strong defoamer for PUD and polyacrylic emulsion resin systems. Also suitable for clear applications. Widely used in pigment concentrate preparations and printing inks.
AFCONA-2524	Specifically developed for PU dispersions. Good defoaming as well as levelling and anti-crater action. Based on modified polysiloxane and very easy to incorporate, even in low-shear conditions.
AFCONA-2530	Strong defoamer for water-based applications. Particularly suitable for clear top coat applications. Easy incorporation.
AFCONA-2592	Strong defoamer for all kind of water-based coatings. Especially developed for airless spray application where it works very well against micro foam.

2000 Series – Non-silicone-based defoamers and deaerators

AFCONA-2270	Defoamer for water-based-systems. Due to very high shear force resistance very suitable for production of pigment concentrates.
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AFCONA-2503

Defoamer for high shear application for use in water-based pigment concentrates and fast speed printing inks.

Resistance to:

High shear force

Long time grinding

Temperatures up to 250°C for 15 minutes

General indicator on recommendation

- - Highly recommended
- - Recommended
- - Can be used

Chemical	Active Ingredient	Dosage			Acid value mgKOH/g	Amine value mgKOH/g	Flash Point	Water-based System										1000 Series Product Name	
		Inorganic pigment	Organic pigment	Carbon Black				Alkyd Emulsion	Alkyd Water-reducible	Emulsion Acrylic Copolymer	Polyurethane 2 Component	Polyurethane Dispersion (PUD)	Epoxy 2 Component	Polyester/Melamine	UV Curing System	Printing Inks Systems	Pigment paste water-based		Pigment paste water and solvent-based
Modified fatty acid Polymer	>96%	4-5 times of solid dispersant	3-5 times of solid dispersant	3-5 times of solid dispersant	34-45	-	>100°C	●	●	●								●	AFCONA-1501

General indicator on recommendation

- - Highly recommended
- - Recommended
- - Can be used

Chemical	Active Ingredient	Dosage		Solvent	Flash Point	Water-based System										2000 Series Product Name				
		(Based on total formulation)				Alkyd Emulsion	Alkyd Water-reducible	Emulsion Acrylic Copolymer	Polyurethane 2 Component	Polyurethane Dispersion (PUD)	Epoxy 2 Component	Polyester/Melamine	UV Curing System	Printing Inks Systems	Pigment paste water-based		Pigment paste water and solvent-based			
Polysiloxane containing defoamer	80~84%	0.1~ 0.5%		Hydrocarbon Solvent	117°C		●	●											●	AFCONA-2502
Polysiloxane containing defoamer	>96%	0.05~ 1.0%		-	>100°C	●	●	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-2503
Organically modified Polysiloxane	>96%	0.05~ 1.0%		-	>100°C	●	●	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-2505
Organically modified Polysiloxane with hydrophobic silica	>96%	0.05~ 1.0%		-	>100°C	●	●	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-2507
Polysiloxane containing defoamer	17~19%	0.1~ 2.0%		Water/Hydrocarbon solvent	117°C	●	●	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-2524
Solution of a silicone modified polymer	90%	0.2~ 1.0%		DPM	75°C	●	●	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-2530
Polysiloxane containing defoamer	29%	0.1~ 1.0%		Water	>100°C	●	●	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-2592
Modified Polymer	>96%	0.1~ 0.7%		-	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-2270

Defoaming test in PU dispersion at 0.5% dosage based on total formulation shake for 2 mins.

Side view



AFCONA-2524 Competitor A

Crater test



AFCONA-2524 Competitor A

Dilemma of a water based defoamer

- 1) Good defoaming lead to more craters
- 2) Good defoamer always affect the levelling
- 3) Adding levelling will lead to more foam.

AFCONA-2524

- 1) Excellent in defoaming
- 2) Easy incorporation, even by hand
- 3) Improve the levelling performance
- 4) Very low tendency to craters.



Additives for water-based systems

3000 Series – Organically modified polysiloxane-based slip and levelling agents

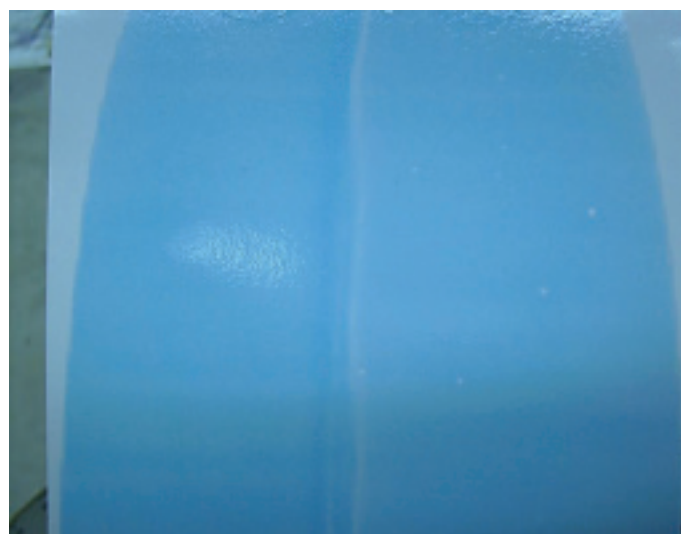
Product Name	Properties
AFCONA-3035*	Normally used in solvent-based systems, but also effective as a levelling and anti-crater agent in water-based applications.
AFCONA-3522	Emulsion of non-polar polysiloxane in water. Gives water resistance and slip performance. No foam-stabilizing effect. High dosages provide water-repellent effect.
AFCONA-3571	Modified anionic polydimethyl siloxane emulsion. Enhances surface properties like: slip, soft feel and anti tackiness in water-based applications.
AFCONA-3580	Short-chain polysiloxane with no influence on intercoat adhesion in multi-coat systems. Very strong anti-crater performance. Must be used in combination with a suitable defoamer. Recommended for electro deposition coatings and all other water-based systems.
AFCONA-3581E	50% solution of AFCONA-3580 in DMP.
AFCONA-3585	Very strong surface tension reduction and good compatibility properties. Very fast substrate wetting and anti-crater effect in all water-based systems.
AFCONA-3588	Levelling agent for aqueous coatings systems with excellent substrate wetting and anti-crater properties. No influence on intercoat adhesion.

3000 Series – Non-silicone-based levelling agents

AFCONA-3500	Fluorocarbon-modified polyacrylic for water-based systems. Stronger in levelling and anti-crater performance than AFCONA-3570. Only recommended for systems with a pH higher than 8.
AFCONA-3570	Fluorocarbon-modified polyacrylic for water-based systems. Very good in levelling and anti-crater performance. Only recommended for systems with a pH higher than 8.
AFCONA-3772*	Fluorocarbon-modified polyacrylic. Becomes water-soluble after neutralization with a suitable amine. Without neutralization, very suitable in solvent-based high-gloss clear coatings.

* Suitable for Water- and Solvent-based coatings.

Crater test



0.5% AFCONA-3570

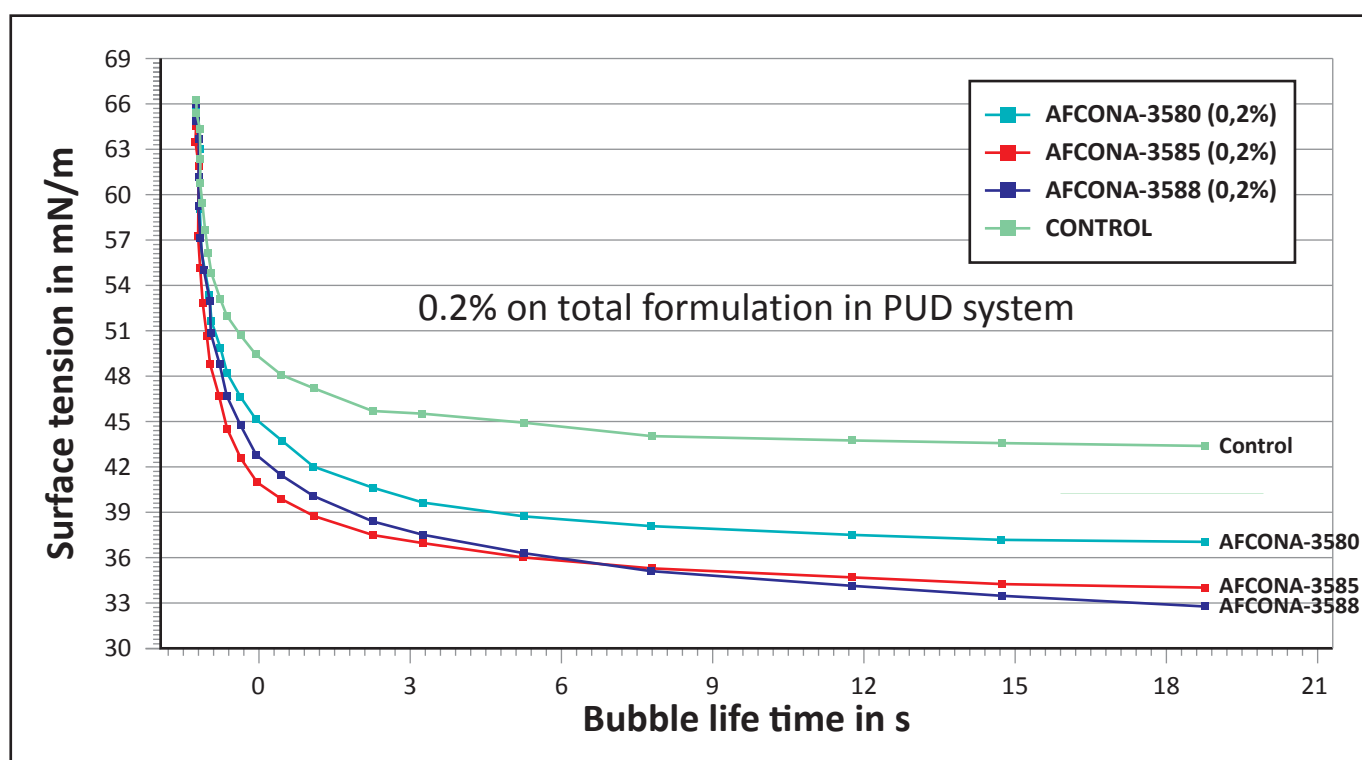
Zero test

General indicator on recommendation

- - Highly recommended
- - Recommended
- - Can be used

Chemical	Active Ingredient	Dosage (Based on total formulation)	Solvent	Flash Point	Water-based System										3000 Series Product Name	
					Alkyd Emulsion	Alkyd Water-reducible	Emulsion Acrylic Copolymer	Polyurethane 2 Component	Polyurethane Dispersion (PUD)	Epoxy 2 Component	Polyester/Melamine	UV Curing System	Printing Inks Systems	Pigment paste water-based		Pigment paste water and solvent-based
Organically modified polyether polysiloxane	50~54%	0.1~ 0.5%	PM Solvent	32°C			●	●	●	●	●	●	●			AFCONA-3035*
Modified polysiloxane emulsion (APE free)	34~36%	0.1~ 1.0%	Water	>100°C	●	●	●	●	●	●	●	●	●			AFCONA-3522
Modified anionic polydimethylsiloxane emulsion	58~62%	0.1~ 1.0%	Water	>100°C	●	●	●	●	●	●	●	●	●			AFCONA-3571
Organically modified polysiloxane for aqueous systems	>95%	0.1~ 1.0%	-	-	●	●	●	●	●	●	●	●	●			AFCONA-3580
Organically modified polysiloxane for aqueous systems	50~54%	0.1~ 1.0%	DPM	75°C	●	●	●	●	●	●	●	●	●			AFCONA-3581E
Organically modified polysiloxane for aqueous systems	>96%	0.1~ 1.0%	-	-	●	●	●	●	●	●	●	●	●			AFCONA-3585
Organically modified polysiloxane for aqueous systems	>96%	0.1~ 1.0%	-	>100°C	●	●	●	●	●	●	●	●	●			AFCONA-3588

Fluorocarbon modified polyacrylate	30~32%	0.5~ 1.5%	Water	-	●	●	●	●	●	●	●	●	●			AFCONA-3500
Fluorocarbon modified polyacrylate	59~61%	0.5~ 1.5%	Water	>110°C	●	●	●	●	●	●	●	●	●			AFCONA-3570
Fluorocarbon modified polyacrylate	59~61%	0.3~2.0%	Sec. Butanol	24°C	●	●	●	●	●	●	●	●	●			AFCONA-3772*





Additives for water-based systems

4000 Series – High-Molecular-Weight Dispersing agents - Polyacrylic and polyurethane

Product Name	Properties
AFCONA-4530*/**	Polymeric dispersant for stabilizing inorganic and organic pigments in water-based systems. Through effective steric hindrance and electrostatic repulsion an excellent stability performance in all type of pigments.
AFCONA-4531 ^o */**	Polymeric dispersant for stabilizing inorganic and organic pigments in water and solvent-based systems. In water-based systems, it should be pre-neutralized to become completely soluble in water. Not suitable for preparation of resin-free pigment concentrates.
AFCONA-4550*/**	Water-based pH-independent dispersant for all kind of pigments in industrial coatings. Can be used as effective dispersant to formulate resin-free pigment concentrates.
AFCONA-4560*/**	Water-based pH-independent dispersant for all kind of pigments in decorative and industrial coatings. Can be used as effective dispersant to formulate resin-free pigment concentrates.
AFCONA-4565*/**	pH-independent with a wide compatibility in most commonly used water-based decorative and industrial coatings. Completely water soluble, does not have to be neutralized. However neutralization will improve the viscosity reduction.
AFCONA-4570 ^o */**	Water-based pH-independent dispersant for all kind of pigments. Better in viscosity depressing and pigment stability than AFCONA-4550. Can be used as effective dispersant to formulate resin-free pigment concentrates. Furthermore, an effective additive to improve colour acceptance.
AFCONA-4590*/**	Dispersing agent for all water-based coating systems. Both decorative as well as industrial, in combination with or without a grinding resin. Can also be used in water-based resin-free pigment concentrates. These RFPC can have a universal character and can be used in both water-based and solvent-based coatings.
AFCONA-4595***	Improved version of AFCONA-4560. Better viscosity-depression on pigment dispersions, especially for Carbon blacks and transparent iron oxides. Also more effective for the production of water-based pigment concentrates.
AFCONA-4597*/**	Improved water-resistance version of AFCONA-4595. For water-based applications which need high water-resistance. Universal in use for all kind of pigments.
AFCONA-4598*/**	Special designed block copolymer with anchoring groups. Economical version of AFCONA-4595 with better water resistance.
AFCONA-4599*/**	Special designed modified polyacrylic polymer with low influence to the water resistance of the final coating. Very good in viscosity depressing of inorganic pigment concentrates.

^o Suitable for Water- and Solvent-based coatings

* These products will become slightly hazy at temperatures below 15°C. This will not influence the quality.

** Keep in a cool and dry place

*** Below 0 °C separation or turbidity could occur. Warm up to 20 °C and mix well.

"" Dosage for transparent Iron Oxide pigments.

General indicator on recommendation

- - Highly recommended
- ◐ - Recommended
- ◑ - Can be used

Chemical	Active Ingredient	Dosage				Acid value mgKOH/g	Amine value mgKOH/g	Solvent	Flash Point	Water-based System										4000 Series Product Name	
		TiO2 (Other Inorganic Pigment)	Organic pigment	Carbon Black						Alkyd Emulsion	Alkyd Water-reducible	Emulsion Acrylic Copolymer	Polyurethane 2 Component	Polyurethane Dispersion (PUD)	Epoxy 2 Component	Polyester/Melamine	UV Curing System	Printing Inks Systems	Pigment paste water-based		Pigment paste water and solvent-based
Modified Polyurethane Polymer	38~42%	2~3% (2~4%)	20~40%	20~60%	-	12~20	Water	>100°C	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-4530*/**
Modified Polyacrylic Polymer	48~52%	2~3% (2~4%)	20~40%	20~60%	30~40	20~30	Methoxy propanol	32°C	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-4531 ^o */**
Modified Polyacrylic Polymer	48~52%	2~3% (2~4%)	20~40%	20~60%	-	20~35	Water	>100°C	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-4550
Modified Polyacrylic Polymer	38~42%	2~3% (2~4%)	20~40%	20~60%	-	25~35	Water	>100°C	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-4560
Modified Polyacrylic Polymer	38~42%	2~3% (2~4%)	20~40%	20~60%	-	25~35	Water	>100°C	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-4565
Modified Polyacrylic Polymer	58~60%	2~3% (2~4%)	20~40%	20~60%	-	40~50	TPM	116°C	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-4570 ^o */**
Modified Polyacrylic Polymer	40~43%	2~3% (2~4%)	20~40%	20~60%	-	35~45	Water/TPM	116°C	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-4590*/**
Special Designed Block Copolymer	38~43%	4~5% (8~12%) "10~15%	12~30%	50~60%	7~15	-	Water	>100°C	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-4595***
Special Designed Block Copolymer	38~42%	4~5% (8~12%)	12~30%	50~60%	6~13	10~16	Water	>100°C	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-4597*/**
Special Designed Block Copolymer	39~43%	4~5% (8~12%)	12~30%	50~60%	6~13	7~15	Water	>100°C	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-4598*/**
Modified Polyacrylic Polymer	39~43%	2~5% (5~10%)	20~60%	40~80%	4~10	8~14	Water	>100°C	●	●	●	●	●	●	●	●	●	●	●	●	AFCONA-4599*/**

Recommended dosage of High-Molecular-Weight Dispersant on several common pigments, fillers and matting agents		
Pigment type	Based on oil to solid (%)	Based on surface area (m ² /g)
Titanium Dioxide	2 - 3%	10% on oil absorption
Iron Oxide pigments	3 - 4%	10% on oil absorption
Chrome Oxide pigments	2 - 4%	10% on oil absorption
Fillers (Clay. CC powder. Kaolin. Barium Sulphate)	1 - 2%	10% on oil absorption
Matting agents	2 - 3%	10% on oil absorption
Phthalocyanine pigments	15 - 25%	15 - 25% on BET value
Organic Red	15 - 25%	15 - 25% on BET value
Organic Yellow	15 - 25%	15 - 25% on BET value
Organic Violet	15 - 30%	15 - 30% on BET value
Regular Carbon Black	20%	20% on BET value
High Channel Carbon Black	30 - 50%	30 - 50% on BET value
<i>BET (Brunauer, Emmet and Teller) value - Measurement of surface area pigment by using N2 absorption</i>		
<i>DBP (DiButyl Phthalate) value - Measurement of surface area of carbon black by using DiButyl Phthalate</i>		

Performance test of AFCONA-4595 against competitor's product AFCONA-4595 (40%) / Competitor (40%)

Test formulation in Resin Free Pigment Concentrate

Raw material	Yellow Oxide P4920	Chrome Yellow P103	Red Oxide P-K130	Ferric Yellow Oxide	Ferric Red Oxide	Antanil Yellow 260	Hostaperm Pink E	Novoperm Red F2RK	Green PG7	Blue PG 15:3	Violet RL 23	Sunblack X-15	FW 200
Water	23.3	18.3	13.3	35.8	35.8	34.3	36.8	29.3	21.8	29.3	36.8	28.1	51.8
Propylene Glycol	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
AMP 95	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Dispersant	10.0	10.0	10.0	22.5	22.5	15.0	17.5	20.0	22.5	20.0	17.5	26.2	22.5
Pigment	55.0	60.0	65.0	30.0	30.0	40.0	35.0	40.0	45.0	40.0	35.0	35.0	15.0
AFCONA-2503	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
AFCONA-5071	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Transparency for transparent Iron Oxide Red and Yellow

Pigment	Dispersant	Transparency	
		Initial Sample	After Stability
Ferric Yellow Oxide	Competitor AFCONA-4595	4	4
		5	5
Ferric Red Oxide	Competitor AFCONA-4595	4	4
		5	5

Rating: 1-Poor and 5-Excellent

Ferric Yellow Oxide
Competitor AFCONA-4595



Ferric Red Oxide
Competitor AFCONA-4595



Pigment	Dispersants	Fineness		Viscosity	
		Initial Sample	After Stability	Initial Sample	After Stability
Ferric Yellow Oxide	Competitor AFCONA-4595	<10 µm <10 µm	<10 µm <10 µm	3 3	3 3
Ferric Red Oxide	Competitor AFCONA-4595	<10 µm <10 µm	<10 µm <10 µm	3+ 3+	3+ 3+
Chrome Yellow P103	Competitor AFCONA-4595	<10 µm <10 µm	<10 µm <10 µm	3 3-	3 3-
Yellow Oxide P4920	Competitor AFCONA-4595	<10 µm <10 µm	<10 µm <10 µm	4 4	3+ 3+
Red Oxide P-K130	Competitor AFCONA-4595	<10 µm <10 µm	<10 µm <10 µm	4 4	4 4
Antanil Yellow 260	Competitor AFCONA-4595	<10 µm <10 µm	<10 µm <10 µm	3 3	3 3-
Hostaperm Pink E	Competitor AFCONA-4595	<10 µm <10 µm	<10 µm <10 µm	3 3	3 3
Novoperm Red F2RK	Competitor AFCONA-4595	<10 µm <10 µm	<10 µm <10 µm	3 3	3 3
Green PG7	Competitor AFCONA-4595	<10 µm <10 µm	<10 µm <10 µm	3 3	3 3
Blue PG 15:3	Competitor AFCONA-4595	<10 µm <10 µm	<10 µm <10 µm	3+ 3+	3+ 3+
Violet RL 23	Competitor AFCONA-4595	<10 µm <10 µm	<10 µm <10 µm	4 4	4 3
Sunblack X-15	Competitor AFCONA-4595	<10 µm <10 µm	<10 µm <10 µm	3 3	3 3
FW 200	Competitor AFCONA-4595	<10 µm <10 µm	<10 µm <10 µm	4 4	4 3+

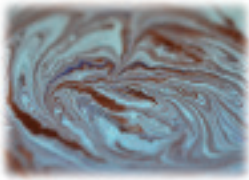
Rating: 1-High viscosity and 5-Low viscosity

Pigment	Dispersants	Rub Out Test		Tinting Strength	
		Initial Sample	After Stability	Initial Sample	After Stability
Chrome Yellow P103	Competitor AFCONA-4595	5 5	5 5	5 5	5 5
Yellow Oxide P4920	Competitor AFCONA-4595	5 5	5 5	5- 5	5 5
Red Oxide P-K130	Competitor AFCONA-4595	5 5	5 5	5 5	5- 5
Antanil Yellow 260	Competitor AFCONA-4595	5 5	5 5	5 5	5 5
Hostaperm Pink E	Competitor AFCONA-4595	5 5	5 5	5 5	5 5
Novoperm Red F2RK	Competitor AFCONA-4595	5 5	5 5	5 5	5- 5
Green PG7	Competitor AFCONA-4595	5 5	5 5	5 5-	5 5
Blue PG 15:3	Competitor AFCONA-4595	5 5	5 5	5 5	5 5
Violet RL 23	Competitor AFCONA-4595	5 5	5 5	5 4	5 5-
Sunblack X-15	Competitor AFCONA-4595	5 5	5 5	5- 5	5 5-
FW 200	Competitor AFCONA-4595	5 5	5 5	5- 5	5- 5

Rating: 1-Poor and 5-Excellent

Test Panels: Rub-out test and Tinting Strength (Mixing ratio Pigment paste: White base 3:100)





Additives for water-based systems

5000 Series – Conventional wetting and dispersing agents

Product Name	Properties
AFCONA-5071**	Very good anti-settling effect. Used in combination with another dispersant for better anti-settling, anti-floating and anti-flooding performances.
AFCONA-5585*/**	High-Molecular-Weight Dispersing agent which stabilizes all kind of pigments through steric hindrance. Very suitable for the production of universal pigment concentrates for solvent-based and water-based systems.
AFCONA-5586*/**	Specially modified High-Molecular-Weight block copolymer with pigment affinic groups. Solvent-free. For universal pigment concentrates. Suitable for ECO-friendly systems.



6000 Series – Miscellaneous products

Product Name	Properties
AFCONA-6220**	Fatty acid modified emulsifier. Recommended to improve colour acceptance of colourants in base paints. Can be used to formulate water-based resin-free pigment concentrates with inorganic pigments.
AFCONA-6225**	Better pigment stability performances than AFCONA-6220. Suitable to use not only as a colour acceptance additive, but also as an effective dispersant for all kind of pigments for water-based and solvent-based systems. Can be used to produce water-based Resin-Free Pigment Concentrates for universal purposes.
AFCONA-6226**	Improved version of AFCONA-6225. More hydrophilic behaviour, therefore better colour strength, viscosity reduction, pigment stability and colour acceptance for water-based and solvent-based systems. Can be used for environment-friendly systems.
AFCONA-LE 1000**	Solvent-free wetting and dispersing additive for universal colourants. Suitable for all kind of pigments. Completely water-soluble, does not necessarily have to be neutralized. However, neutralization to pH 9 will strongly improve viscosity reduction performance. Suitable for ECO-friendly systems.
AFCONA-6230**	Suitable for most water-based and solvent-based systems. Effective viscosity reduction agent for any highly filled system containing inorganic pigments and/or extenders.
AFCONA-6755**	Water-based version of AFCONA-6745. Synergist for Phthalocyanine and violet pigments. Also suitable for carbon blacks. Must be used in combination with one of the AFCONA-4000 series. Improves gloss, viscosity-depression and pigment stability.

* These products will become slightly hazy at temperatures below 15°C. This will not influence the quality.

** Suitable for Water- and Solvent-based coatings

PRODUCT

SELECTOR

		Solvent-based application				Water-based application							
	CHLORINATED RUBBER	UV CURING SYSTEM	UNIVERSAL PIGMENT PASTE SOLVENT-BASED	ALKYD EMULSION	ALKYD WATER-REDUCIBLE	EMULSION ACRYLIC COPOLYMER	POLYURETHANE 2 COMPONENT	POLYURETHANE DISPERSION	EPOXY 2 COMPONENT	POLYESTER/MELAMINE	UV CURING SYSTEM	PIGMENT WASTE WATER-BASED	
DISPERSION RELATED	Higher color strength	5207/5209	4201/PF1611	4071+6788	5071/6226	5071/6226	5071/6226	5071/6226	5071/6226	5071/6226	5071/6226	5071/6226	
	Lower millbase viscosity	5207/5209	4067/4201	4071+6788	4530/4595	4530/4595	4530/4595	4530/4595	4530/4595	4530/4595	4530/4595	4530/4595	
	Better pigment stability	5207/5209	4067/4201	4071+6788	4530/4595	4530/4595	4530/4595	4530/4595	4530/4595	4530/4595	4530/4595	4530/4595	
	Co-grinding	5209	5066	Not applicable	4530/4570	4530/4570	4530/4570	4530/4570	4530/4570	4530/4570	4530/4570	4530/4570	
	Color acceptance	Not applicable	Not applicable	4570/6226	4570/6226	4570/6226	4570/6226	4570/6226	4570/6226	4570/6226	4570/6226	4570/6226	
SURFACE RELATED	Reduces flooding and floating	5065	5066	5065/6226	4570/6226	4570/6226	4570/6226	4570/6226	4570/6226	4570/6226	4570/6226	4570/6226	
	Cost effective	5209	5290/PF1611	PF1611	4570/6226	4570/6226	4570/6226	4570/6226	4570/6226	4570/6226	4570/6226	4570/6226	
	Improves mar resistance, increases slip	3030/3233	3251/3835	Not applicable	3522/3571	3522/3571	3522/3571	3522/3571	3522/3571	3522/3571	3522/3571	Not applicable	
	Anti-cratering	3030/3233	3034+/-3700	Not applicable	3570+/-3585	3570+/-3585	3570+/-3585	3570+/-3585	3570+/-3585	3570+/-3585	3570+/-3585	Not applicable	
	Improves substrate wetting	3670/3700	3670/3700	Not applicable	3500/3570	3500/3570	3500/3570	3500/3570	3500/3570	3500/3570	3500/3570	Not applicable	
AIR RELATED	Reduces Bénard cells	3030/3233	3251	Not applicable	3585/3588	3585/3588	3585/3588	3585/3588	3522	3522	3522	Not applicable	
	Improves levelling	3030/3233	3250+3700	Not applicable	3233+3570	3570	3570+3585	3570+3585	3522+3570	3522+3570	3522+3570	Not applicable	
	Defoaming	2040/2763	2720/2763	Not applicable	2524/2530	2501	2524/2530	2524/2530	2524/2530	2524/2530	2524/2530	2524/2530	
	Deaeration	2040/2763	2720/2763	Not applicable	2503/2592	2524/2530	2505	2503	2503/2592	2502/2592	2503	2507	

Remark: / = use either one; +/- = use alone or in combination; + = use in combination

PRODUCT

SELECTOR

Solvent-based application

	AIR DRY ALKYD (LONG AND MEDIUM OIL)	INDUSTRIAL BAKING PAINT ALKYD/ MELAMINE ACRYLIC/ MELAMINE	AUTOMOTIVE OEM POLYESTER/ MELAMINE ACRYLIC/ MELAMINE	ALKYD/ NC ALKYD/ AMINO (AC)	2K PU ALKYD/ PE OH FUNCTIONAL	2K PU ALKYD OH FUNCTIONAL	2K PU ALKYD OH FUNCTIONAL SOLVENT FREE	UNSATURATED POLYESTER	EPOXY SOLVENT BASED	EPOXY SOLVENT FREE	CAB/ ACRYLIC CAB/ PE	ACRYLIC THERMO-PLASTIC	
DISPERSION RELATED	Higher color strength	Inorganic pigment	4011/5280	4071/5280	4071/5280	4011/4071	4071/5290	4011/5251	4011/5251	4011	4011/4063	4200/4201	
	Lower millbase viscosity	Organic pigment	4063/4067	4071	4050/4071	4047/4063	4071/4201	4071/4570	4050/4063	4080	4063/4067	4201	
	Better pigment stability	Carbon Black	4047/4067	4063	4047/4067	4047/4067	4201	4063/4570	4047/4063	4080	4063/4067	4201	
	Co-grinding		4017/5066	5290	4017/5066	4017/5066	4017	4017	4017	4017	4017	5065	
	Color acceptance												
	Reduces flooding and floating		5066	5065/6226	5065/6226	5065	5066	5066/6226	5066/6226	5066/6226	5066/6226	5066	5065/6226
	Cost effective		5280/5290	5209	5209/5290	4071/5290	4071/5290	4071/5290	4071/5290	4071/5290	4011/5280	5209	
	Improves mar resistance, increases slip		3251/3285	3251/3285	3251/3285	3251/3285	3236/3239	3035/3251	3236/3239	3236/3239	3236/3239	Not applicable	3251/3285
	Anti-cratering		3034+/-3700	3034+/-3700	3034+/-3700	3034+/-3700	3034+/-3700	3035+/-3777	3034+/-3700	3236+/-3700	3236+/-3700	3700	3034+/-3700
	Improves substrate wetting		3670/3700	3670/3700	3670/3700	3670/3700	3670/3700	3670/3700	3670/3700	3670/3700	3670/3700	3670/3700	3670/3700
SURFACE RELATED	Reduces Bénard cells		3030/3233	3033/3251	3030/3251	3030/3251	3700	3035/3251	3030/3670	3700	3670	3033	
	Improves levelling		3251/3285	3251+3670	3033+3670	3251+3670	3236+3700	3035+3670	3239+3670	3236+3670	3700	3033/3251	
	Defoaming		2021/2720	2018/2020/2050	2018/2020/2050	2725/2754	2270/2290	2020/2050/2290	2722/2754/2290	2722/2754/2290	2021	2020/2021/2050	
AIR RELATED	Deaeration		2022	2038/2045	2038/2045	2038/2045	2722/2727	2040/2727	2045/2727	2045/2727	2038	2038/2040	

Remark: / = use either one; +/- = use alone or in combination; + = use in combination



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