



AFCONA ADDITIVES

Product application guide for composite industries



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AFCONA China



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Product selection guide

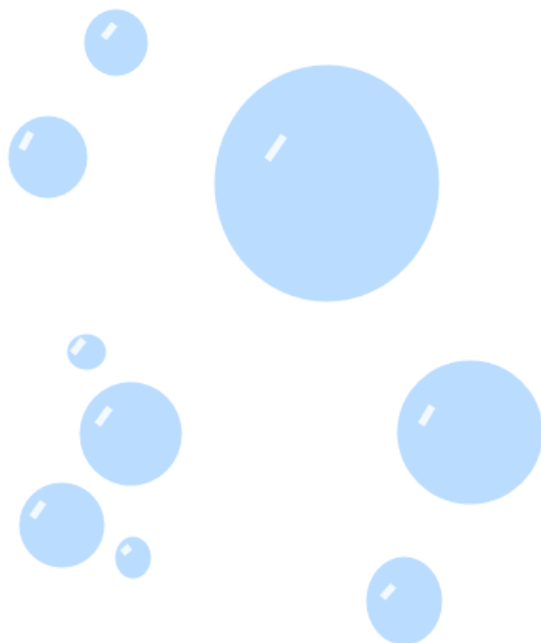
Item	Product Code	Hand Lay-up	Injection Moulding	Filament Winding	RTM Moulding	Vacuum Infusion Moulding	Pultrusion	B M C	S M C
Defoamers	AFCONA 7200	++	++	++	+++	+++	+++	++	+
	AFCONA 7201	+	+	+	+	+	+	-	-
	AFCONA 7202	+++	+++	+++	++	++	+	-	-
	AFCONA 7203	++	++	++	+++	+++	+++	++	+
	AFCONA 7204	+	+	+	+	+	+	-	-
	AFCONA 7206	+++	+++	+++	++	++	+	-	-
	AFCONA 7206-40	+++	+++	+++	++	++	+	-	-
	AFCONA 7207	+	+	+	+	+	+	-	-
Slip and Levelling agents	AFCONA 7300	+	+	+	++	++	++	+	+
	AFCONA 7370	+	++	++	++	++	++	+	+
	AFCONA 7371	+	+++	+++	++	++	++	+	+
	AFCONA 7375	+	++	+	++	++	++	+	+
Wetting and Dispersing agents	AFCONA 7466	++	++	++	+	+	-	-	-
	AFCONA 7472	-	-	-	-	-	+++	+++	+++
	AFCONA 7476	+	+	+	+	+	++	++	++
	AFCONA 7480	+	+	+	+	+	++	++	++
	AFCONA 7500	-	-	-	-	-	+++	+++	+++
	AFCONA 7520	-	-	-	-	-	+++	+++	+++
	AFCONA 7525	+++	+++	++	+	+	-	-	-
Thixotropic agents	AFCONA 7530	++	+++	+	-	-	-	-	-
	AFCONA 7532	++	+++	+	-	-	-	-	-
	AFCONA 7533	++	+++	+	-	-	-	-	-
Processing agents	AFCONA 7565	-	-	-	-	-	+	+++	+++

4 Remarks: +++ recommended ++ suitable + suitable but need to test - not recommended

Product selection guide

Item	Product Code	Gel coat	Pigment concentrates	Polyester putty	Artificial marbles pouring	Crafting pouring	Adhesive	Epoxy flooring
Defoamers	AFCONA 7200	++	+	+	++	+	+	+
	AFCONA 7201	+	+	-	++	+	+	+++
	AFCONA 7202	+++	+	+	+++	-	++	+++
	AFCONA 7203	+	+	-	++	+	+	+
	AFCONA 7204	++	+	-	++	+++	+	++
	AFCONA 7206	+++	+	+	++	-	++	+++
	AFCONA 7206-40	+++	+	+	+++	-	++	+++
	AFCONA 7207	++	+	-	++	++	+	++
Slip and Levelling agents	AFCONA 7300	++	-	+	++	++	++	+++
	AFCONA 7370	+++	+	++	+++	+++	+++	+++
	AFCONA 7371	+++	+	++	+++	+++	+++	+++
	AFCONA 7375	++	+	++	++	+++	+++	+++
Wetting and Dispersing agents	AFCONA 7466	++	++	+	+	-	+	+
	AFCONA 7472	-	-	-	-	-	-	-
	AFCONA 7476	++	+++	-	+	+	-	++
	AFCONA 7480	++	+++	-	+	+	+	++
	AFCONA 7500	-	+	-	-	-	-	+++
	AFCONA 7520	-	+	-	-	-	-	+++
	AFCONA 7525	-	+	+	+++	+	+	-
Thixotropic agents	AFCONA 7530	+++	+	-	-	-	+++	+
	AFCONA 7532	+++	+	-	-	-	+++	+
	AFCONA 7533	+++	+	-	-	-	+++	+
Processing agents	AFCONA 7565	-	-	-	+	+	-	-

Remarks: +++ recommended ++ suitable + suitable but need to test - not recommended 5



DEFOAMERS

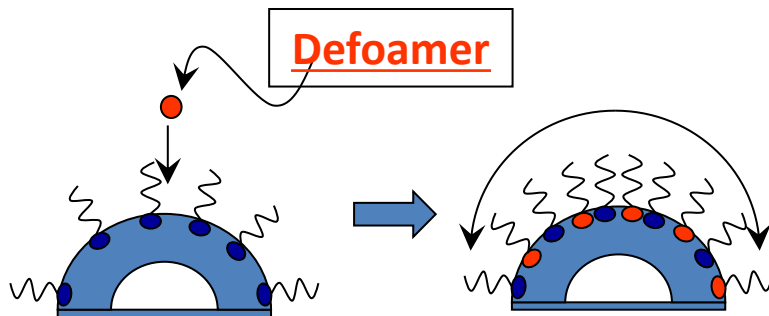
AFCONA 7200 Series

General description

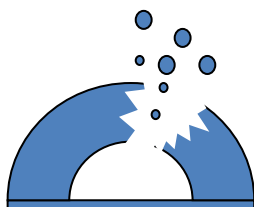
Product Code	Chemical	Wetting properties on fiberglass	Defoaming Effect	Application
AFCONA 7200	<i>Polymer mixture silicone containig</i>	<i>Excellent</i>	<i>Excellent</i>	<i>High thixotropic gelcoat; fiberglass</i>
AFCONA 7201	<i>Polymer mixture silicone containig</i>	<i>Good</i>	<i>Excellent</i>	<i>General use</i>
AFCONA 7202	<i>Polymer silicone free</i>	<i>Good</i>	<i>Excellent</i>	<i>Gelcoat; general use</i>
AFCONA 7203	<i>Modified Polyacrylic</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Fiberglass; general use</i>
AFCONA 7204	<i>Fluorocarbon modified Polysiloxane</i>	<i>Good</i>	<i>Excellent</i>	<i>Transparent; general use</i>
AFCONA 7206 AFCONA 7206-40	<i>Polymer silicone free</i>	<i>Good</i>	<i>Excellent</i>	<i>Gelcoat; general use</i>
AFCONA 7207	<i>Polymer mixture silicone containig</i>	<i>Good</i>	<i>Excellent</i>	<i>Transparent; general use</i>

Theory and criteria for a defoamer

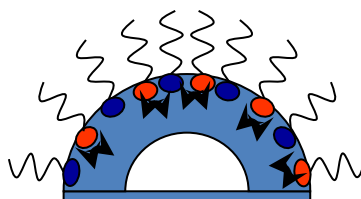
The surface tension of the defoamer must be lower than the surface tension of the system. Then the defoamer is able to penetrate into the foam membrane.



Criteria 1: Surface tension must be lower than the system



Bubble Burst



Defoamer needs to have some extent of incompatibility in order to be de-wet by the system. Then it will accelerate the liquid withdrawing process in the foam membrane.

Criteria 2 : Limited Compatibility

Testing defoamers

STEP 1: Defoaming effect – fast screening

Before shake

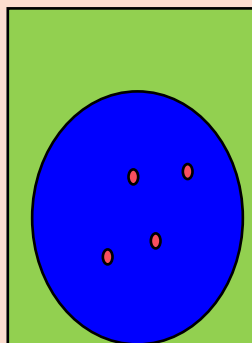
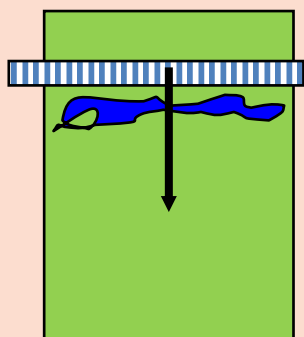


After shake



Evaluate the amount of rising foam and how quickly this disappears.

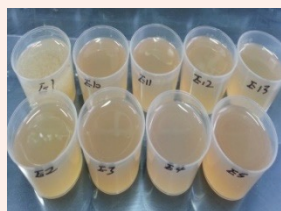
STEP 2: Apply the coating to observe any defects



Evaluate the surface. Must be smooth and even.

STEP 3: Observation after cured

Bubble inside the casting



Evaluate transparency

Wetting properties on fiberglass



Evaluate smooth surface



SLIP and LEVELLING AGENTS

AFCONA 7300 Series

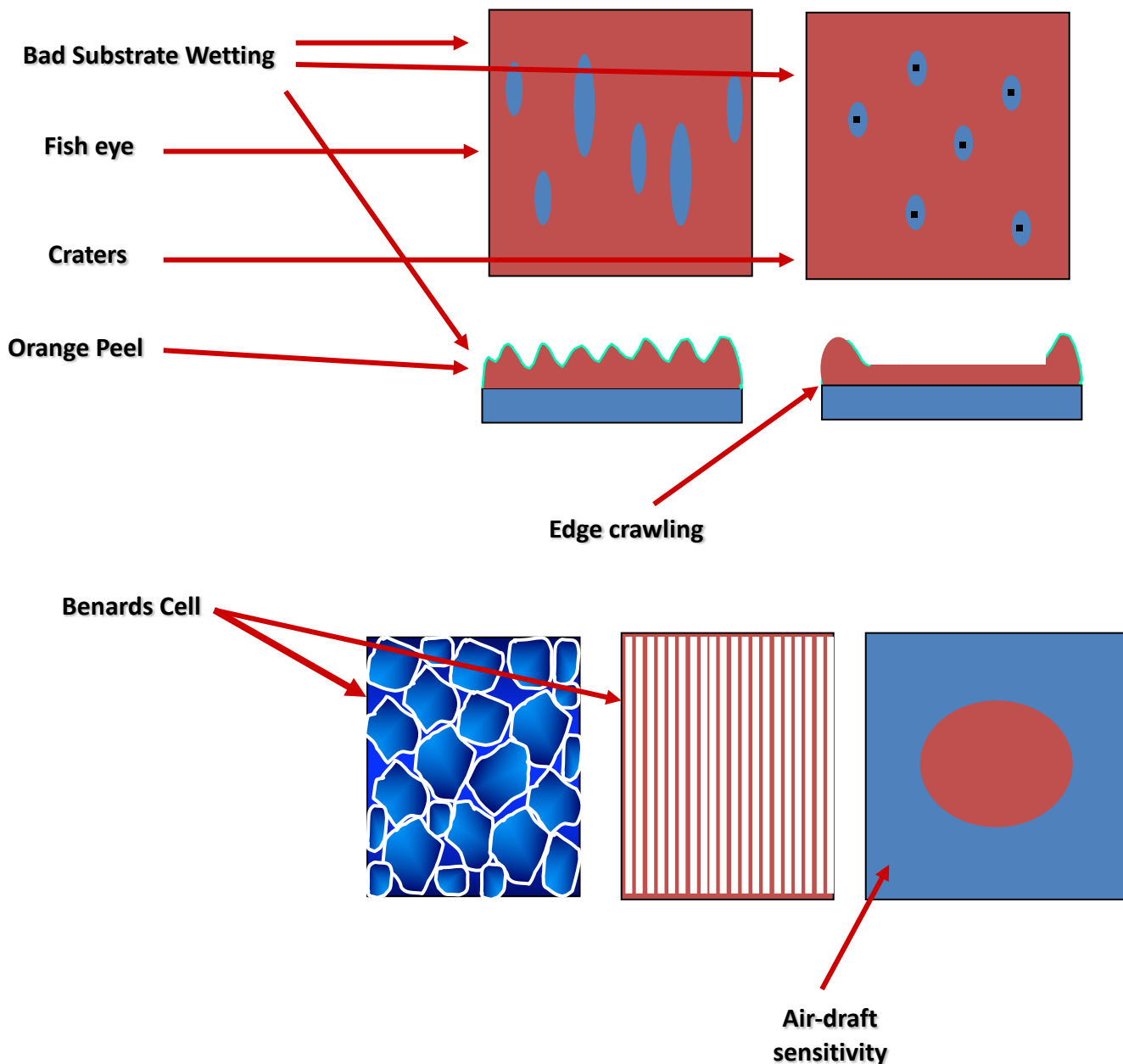


General description

Product Code	Chemical	Initial levelling	Anti-Crater	Substrate Wetting	Defoaming effect
AFCONA 7300	<i>Modified Polysiloxane</i>	<i>Fast</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Good</i>
AFCONA 7370	<i>Modified Polyacrylic</i>	<i>Very fast</i>	<i>Good</i>	<i>Good</i>	<i>Good</i>
AFCONA 7371	<i>Fluorocarbon modified Polyacrylic</i>	<i>Fast</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>
AFCONA 7375	<i>Fluorocarbon modified Polyacrylic</i>	<i>Very fast</i>	<i>Best</i>	<i>Best</i>	<i>Good</i>

Surface defects – causes and remedies

Problems related to the surface tension differences:



All problems can be solved by reducing the surface tension of the liquid system.

Surface defects – causes and remedies

Main Cause of surface defects

The differences of surface tension between the substrate and the coating.

Cause Analysis: The differences of surface tension could be caused by:

Internal Causes

- Solvent Evaporation
- Cross-linking of the resin

External Causes

- Overspray
- Dust particles
- Contamination of substrate

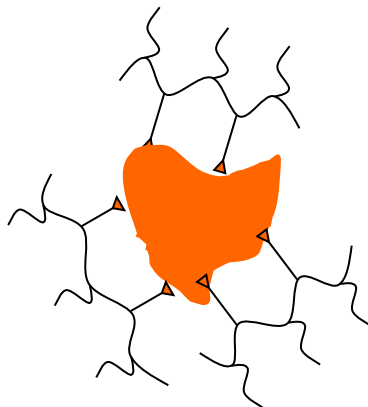
General rule

For efficient wetting, the surface tension of the liquid phase must be lower than the surface tension of the solid substrate.

$$\gamma_L < \gamma_S$$

The surface tension of common liquids and substrates

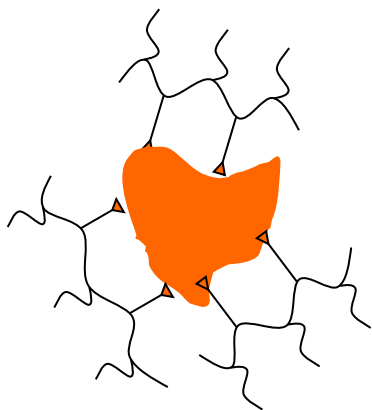
Water	72,2 mN/m
Ethylene Glycol	48,4 mN/m
Xylene	32,0 mN/m
Butyl Acetate	27,6 mN/m
White Spirit	26,0 mN/m
Melamine Resin	58,0 mN/m
Epoxy Resin	47,0 mN/m
Polyester Resin	41,3 mN/m
Polyacrylate Resin	35,0 mN/m
Glass	70.0 mN/m
Steel, pre-treated	45.0 mN/m
Polyethylene	33,2 mN/m
Polypropylene	28.0 mN/m
PTFE	19.0 mN/m



WETTING and DISPERSING AGENTS

AFCONA 7400 Series

AFCONA 7500 Series



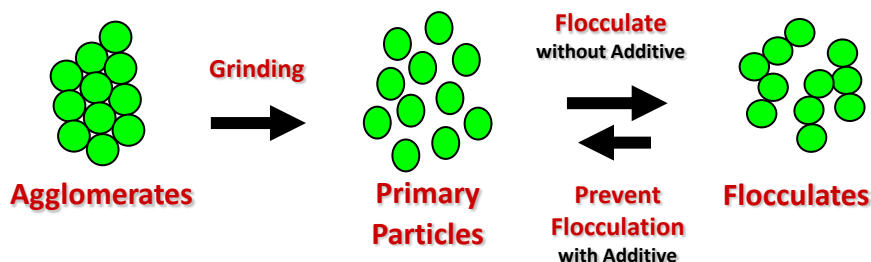
General description

1 ←————→ 10
Excellent Poor

Product Code	Anti-settling	Viscosity reduction	Deflocculation Inorganic pigment	Deflocculation Organic pigment	Recommendation
AFCONA 7500	5	1	2	5	SMC/BMC/ Pultrusion
AFCONA 7520	5	1	2	5	SMC/BMC/ Pultrusion
AFCONA 7525	5	1	2	2	Hand-lay/ Spray/RTM
AFCONA 7530	4	3	3	4	Gelcoat/ Adhesive/ Resin
AFCONA 7532	5	3	3	4	Gelcoat/ Adhesive/ Resin
AFCONA 7533	4	3	3	4	Gelcoat/ Adhesive/ Resin
AFCONA 7565	4	3	3	3	SMC/BMC/ Pultrusion
AFCONA 7466	1	6	1	4	Hand-lay/ Spray/RTM
AFCONA 7472	4	5	4	3	SMC/BMC/ Pultrusion
AFCONA 7476	5	5	4	1	Pigment paste/ color stability
AFCONA 7480	3	3	3	4	Hand-lay/ Spray/RTM

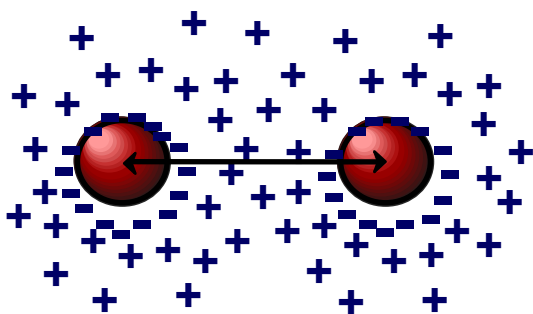
Wetting and dispersing agent

Pigments/Extenders dispersing process

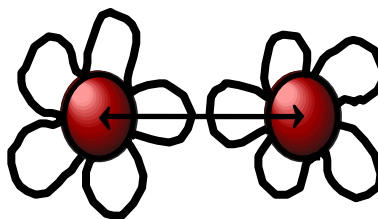


Flocculation can cause color shift, sedimentation, synaerisis and changes in viscosity of the dispersion

Stabilization Mechanism



Electrostatic stabilization takes place when particles bear the same electrical surface charge and as a result, repulsion take place



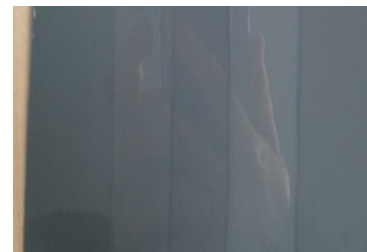
Steric stabilization is brought by adsorbed polymers. The polymer can adsorb onto a particle through the so-called “anchoring groups” or segments that have strong affinity for the chemistry of the surface

Wetting and dispersing agent

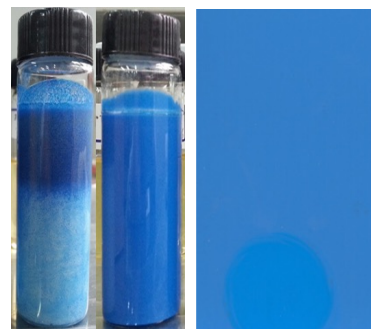
Function and Characteristics

- Reduction of surface tension at the solid/liquid interphase
- Anchoring group adsorb to charged surfaces
- Good compatibility to the medium
- Separation of inorganic particles by wetting
- Separation of inorganic particles by controlled flocculation
- Hydrogen bonding
- Dipole-dipole interaction
- Van De Waals forces

Color difference between batches



Improve floating



Advantages: Improve and stabilize the pigment dispersion

- Prevent color differences between batches
- Prevent floating and flooding
- Prevent settling and separation
- Reduce viscosity

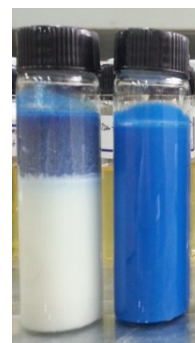
Prevent sagging



Prevent settling

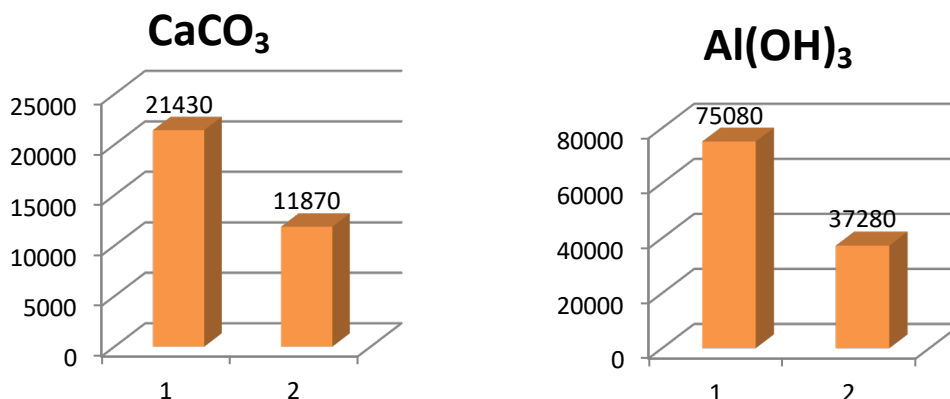


Prevent separation



Wetting and dispersing agent

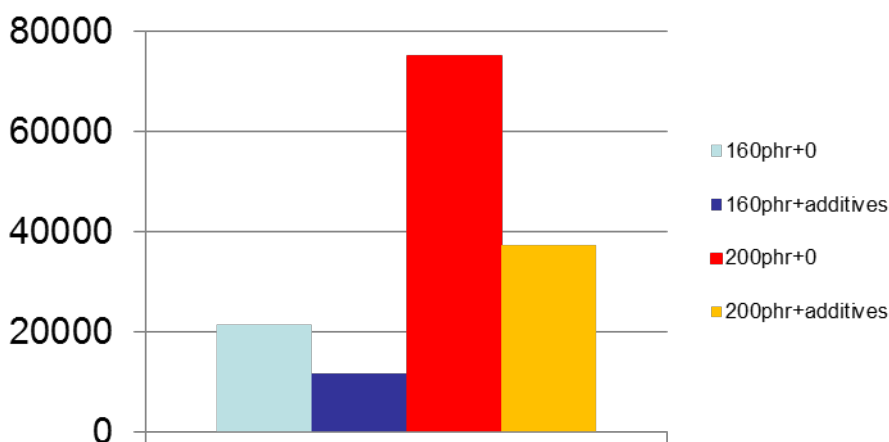
Effect of additives in different filler systems



Additives help to reduce the viscosity in different filler systems

Testing formulation: Resin:Filler =100:200 : 1 Control; 2 Dosage 1%(based on filler content)

Effect of additives in different filler content (Filler: Al(OH)₃,10um)



Additives help to reduce the viscosity in different filler systems

Testing method: Mix in all the liquid ingredients until homogeneous, mix in the extender at 600rpm for 3mins, increase the speed to 1200rpm for 10mins, check the viscosity immediately. Additives can help to reduce the viscosity of the system especially in the higher filler content systems.

PROBLEM SOLVING GUIDE FOR DIFFERENT APPLICATION METHODS

Gelcoat systems

Common defect: Poor Levelling and bad film-forming

Possible causes

Gelcoat must have a uniform levelling. During application, the levelling of the gelcoat will be affected by the application method, application time and the curing of the coating. These could cause: craters, bad substrate wetting, edge-crawling or cracking.



Remedies

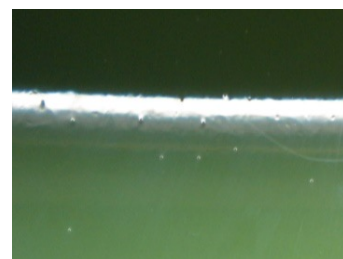
Slip and Levelling agents can help to reduce the surface tension of the gelcoat which can provide better flow and levelling to improve the mould release of gel-coat. This also helps to reduce the surface tension differences between dust particles and the surface of the gel-coat to avoid defects like: fish-eye, uneven thickness, incomplete film-forming and edge-crawling.

- AFCONA 7300 Silicone-based levelling agent, low dosage and good compatibility. May cause foam stabilization in some systems and therefore recommended to combine with a defoamer.
- AFCONA 7370 is the most effective levelling agent based on Polyacrylic. Recommended to use in Polyester, Polyurethane and Epoxy resin systems. It also has defoaming properties.
- AFCONA 7371 is a levelling agent based on Fluorocarbon modified Polyacrylate which can help to reduce the surface tension of the systems. This helps to avoid surface defects like crater, fish-eye and unevenness of thickness.
- AFCONA 7375 has higher content of Fluorocarbon which is more effective than AFCONA 7371. Recommended dosage : 0.3-2.0% based on total formulation.

Common defect: Pinholes and bubbles

Possible causes

Due to the high thixotropy, high viscosity and high thickness (400-800 microns wet film), the entrapped bubbles generated during application by brushing, spraying or rolling can not escape in time before the gelcoat dries. The entrapped bubbles will reduce the compactness and evenness of the final coating film, which will negatively influence water-resistance, weathering resistance, and re-coatability.



Remedies

Defoamers can be very effective to eliminate bubbles.

- AFCONA 7202 can be used in all type of gelcoat, most effective defoamer.
- AFCONA 7203 mostly used in gelcoat, very high surface reactivity which help to perform better in high thixotropic systems.
- AFCONA 7204 recommended to use in transparent gelcoat system.

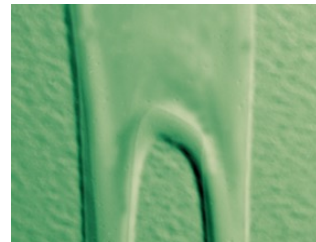
Recommended dosage : 0.2-1.0% (total formulation)

Gelcoat systems

Common defect: Sagging

Possible causes

The thixotropic effect of gelcoat is not very good especially after storage. Therefore, it is very common to use some anti-sagging agents like fumed silica to improve the anti-sagging effect. Fumed silica has very large surface area and is resistant to being wetted by the resin.



Remedies

- AFCONA 7532 gives good wetting and dispersing for the fumed silica which provide a better thixotropic effect. The additive should be added into the resin to improve the wetting properties of the resin. This can help to disperse the fumed silica evenly and gives a very good thixotropic effect. By this, the gelcoat has better storage stability, lower viscosity and improves the workability. By this, it also helps to improve defoaming, flow and levelling of the gelcoat. Recommended dosage : 10-50% based on fumed silica content.

Common defect: Floating and flooding

Possible causes

- Pigment floating and flooding is a common problem in the colored composite. Color differences from batch to batch.
- This can be caused by many factors. The most important one is the mixture of inorganic and organic pigment which have differences in density and particle size. It is also affected by the resin used to disperse the pigment, the effectiveness of the dispersion, the thixotropic effect, the application method and the stability of the pigment dispersion.



Remedies

AFCONA provides wetting and dispersing agents to help disperse all kinds of pigments like inorganic, organic and carbon black. This helps to prevent pigment flocculation, settling, color separation and lower color strength after storage stability.

- AFCONA 7500 is highly recommended for TiO_2 .
- AFCONA 7525, AFCONA 7476 are recommended to use in single color grinding.
- AFCONA 7525, AFCONA 7476 are recommended for anti-floating and anti-flooding.
- AFCONA 7500, AFCONA 7476 are recommended in combination for grey or light blue colors.

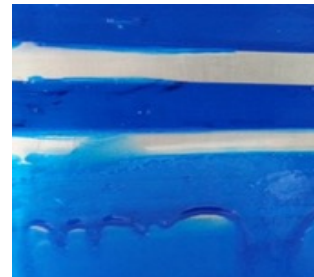
Recommended dosage : 0.2-2.0% (based on inorganic pigment)
 10-100% (based on organic and carbon black)

Laminating resin

Common defect: Sagging

Possible causes

Fumed silica is commonly used as a thixotropic agent in the hand-lay or spray laminating resin systems. Fumed silica can settle and lose its thixotropic effect during storage. This can be caused by the large surface area which is not easy to be wet or dispersed by the resin. Besides that, the differences in polarity of the resin and fumed silica especially in vinyl ester or epoxy can be a cause. The thixotropic effect will be reduced especially for the hydrophilic type of fumed silica.



Remedies

- AFCONA 7532 gives good wetting and dispersing to fumed silica, which provide a better thixotropic effect. Low dosage already gives very high thixotropic effect and improves the anti-sagging properties. It also helps to disperse the hydrophilic type fumed silica easily in vinyl ester and epoxy systems. By this, more variety of resin can be used for different application.
- Recommended dosage : 10-50% based on fumed silica content.

Common defect: Pigments/Extender settling

Possible causes

- Extenders/pigments are widely used in the composite industries for different type of application. Extenders and pigments are required to be wetted and disperse homogenously in the resin systems with long term storage stability. Otherwise:
- Seeding, Syneresis, hard settling can happen during storage.



Remedies

- AFCONA 7466 is widely used in high CaCO_3 and $\text{Al}(\text{OH})_3$ content system. It provides fast wetting and prevents hard settling of fillers.
 - AFCONA 7525 helps to reduce the viscosity and therefore higher filler content can be achieved.
- Recommended dosage : 0.2-2.0% based on filler content

Laminating resin

Common defect: Product deformation

Possible causes

In the mass production of the artificial artwork, settling of fillers is very common. This will cause unevenness of fillers and resins distribution in the casted product. By this, the product may experience some defects like: uneven shrinkage, cracking, warpage, deformity and lower hardness.

Remedies

- AFCONA 7466 helps to reduce the viscosity and gives better anti settling to the system with high filler content.

Recommended dosage : 0.2-2.0% based on filler content.

Common defect: High viscosity and insufficient material

Possible causes

The high viscosity of the casting resin will cause some defect like trapped air bubbles, improper filling of the resin into the corner or tiny area of the casting mould or some flow mark.

Remedies

- AFCONA 7525 helps to reduce the viscosity of the high filler content system. It help to improve the flow and levelling. This helps to reduce the resin content used in the system. It also helps to disperse the fillers into the resin faster and homogeneously, which helps to prevent settling. It can affect the curing time and color of the final casting products.

Recommended dosage : 0.2-1.0% based on filler content.

Common defect: Bubbles

Possible causes

Air or bubbles can be incorporated during mixing and application of the product. These bubbles will be stabilized by some of the wetting agent used to provide better fiber wetting. Defoamers can be used to eliminate the bubbles effectively.

Remedies

- AFCONA 7202 is the most effective defoamer for unsaturated polyester laminating resin systems especially in the application stage.
- AFCONA 7200 and AFCONA 7203 help to reduce the surface tension between the resin and the fibers. By this, it gives better and faster fiber wetting between the laminating layer. This can help to increase the productivity.

Recommended dosage : 0.2-1.0% based on resin content.

Casting (artificial artwork or marble)

Common defect: Bubbles/Pinholes

Possible causes

Bubbles will be incorporated during mixing and application of the product. The curing of the casted products is very quick with the introduction of heat. This helps to improve the production rate. Therefore, the entrapped bubbles will not escape in time before the product is cured.

Remedies

Transparent resin system :

- AFCONA 7204 and AFCONA 7207 are the most compatible defoamers. They are used in transparent clear and non filler systems.

Pigmented or filler containing systems :

- AFCONA 7202 is the most effective defoamer. May cause haziness in transparent clear system.

Recommended dosage : 0.2-2.0% based on resin content



Polyester filler/putty

Common defect: Extender settling

Possible causes

Due to the high extender content in the putty formulation. In the storage or transportation process, the extender has very high tendency to settle to the bottom due to the gravity force which may cause hard settling at the bottom. This makes it difficult to stir at the bottom which will cause uneven distribution of extender. This also will affect the sandability of the putty.



Remedies

- AFCONA 7466 gives better wetting to the extender, to reduce the viscosity and improve the anti-settling of the extender in the polyester filler or putty.

Recommended dosage 0.1-2.0% based on extender content

Common defect: Poor scraping

Possible causes

The high extender content gives high viscosity in the polyester putty. This will affect the flow and the scraping of the putty.



Remedies

- AFCONA 7525 is a wetting and dispersing agent which gives better wetting properties to the extender and disperses the extender more evenly. This will improve the flow and scraping properties. It also helps to reduce the viscosity of the putty, which allows a higher extender load.

Recommended dosage 0.2-1.0% based on total formulation



RTM Technology

Common defect: Poor flow and levelling

Possible causes

In the Resin Transfer Moulding (RTM) application the high amount of fiber and long distance of transfer will affect the flow of the resin. The resin must have good wetting on the fiber and good substrate wetting on the mould. This will help the resin fill the mould more quickly and evenly.



Remedies

- AFCONA 7201 and AFCONA 7203 can help to solve the above problem and also gives very good defoaming properties. This will avoid surface defects and better mechanical strength. Recommended dosage : 0.2-1.0% based on resin content.

Common defect: Extender settling

Possible causes

Extenders are used to improve some properties in some of the application at RTM technology. This will affect the wetting of resin to the fiber and also give settling problems of the extenders. If the resin doesn't wet the fiber quickly and flow slowly along the fiber it will affect the moulding process. This gives more defected products and affects the productivity.

Remedies

- AFCONA 7480 and AFCONA 7466 are able to avoid the extender/pigment to flocculate and settle. By this, they can help to avoid deformation of the product caused by the uneven distribution of extender and uneven shrinkage. They also help to give more even colors and prevents extender to re-flocculate again during storage. Recommended dosage : 0.2-1.0% based on extender content

Common defect: Extender/pigment settling

Possible causes

It is common to have high fiber content in pultrusion application. However, a small amount of extender with bigger particle size will be used to improve the workability during the pultrusion process. This extender can flocculate and settle during storage and application time. This will cause defects like: product deformation and hard settling in the resin tank.

Remedies

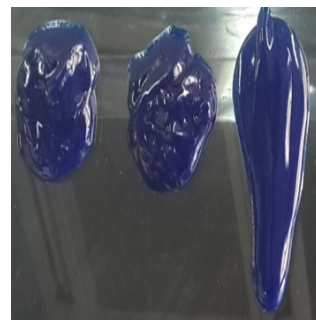
- AFCONA 7480 helps to disperse and prevent settling of the bigger particle size extender.
- AFCONA 7500 is recommended for high filled extender systems.

Recommended dosage : 0.2-1.0% based on extender

Common defect: Poor pigment/extender dispersion

Possible causes

Extenders are used to enhance and improve some of the properties and improve the workability during pultrusion process. Pigments are used to color the products. Improper wetting and dispersing of extender and pigment can lead to defects like: settling, floating, flooding and low colour strength.



Remedies

Wetting and dispersing agent will wet and disperse the extender and pigment homogeneously and also lower the viscosity of the resin system.

- Help to increase the loading of extender and pigment
- Better dispersion and stability
- Faster in production and application
- AFCONA 7500 is specially developed for high filler content and flame retardant pigment systems
- AFCONA 7476 is suitable for high filler content and pigment systems, especially in LS and LP application

Recommended dosage : 0.2-1.0% based on extender

Pultrusion

Common defect: Dry yarn/pinholes

Possible causes

In the high fiber and high speed production systems the good wetting on fiber and defoaming properties play an important role to achieve a stable and quality finished product. Otherwise, the finished product will have many defects like: pinholes or improper formation of the surface, which will affect the productivity and the water and chemical resistance of the finished product.

Remedies

Additives can help to improve the compactness of the finished product. This can improve the water, weathering and chemical resistance.

- AFCONA 7200 and AFCONA 7203 helps to wet the fiber faster which will improve the workability during the pultrusion process.
- AFCONA 7202 and AFCONA 7201 also give very effective defoaming during the forming process.

Recommended dosage : 0.2-0.8 based on resin content

Common defect: Separation – LS/LP material and resin

Possible causes

The differences in polarity lead to the poor compatibility of the resin and the LS/LP material, which cause separation during storage. These will also cause pigment floating and flooding, product deformation and poor mechanical properties during the pultrusion process.

Remedies

Wetting and dispersing agent will wet and disperse the extender and pigment homogeneously and AFCONA 7472 and AFCONA 7476 can help to prevent the separation of the resin and LS/LP material.

This leads to:

- Very stable resin and LS/LP additives mixture
- More homogenous colour
- AFCONA 7472 can be used in all type of formulation.

Recommended dosage : 0.5-1.5% based on liquid content

- AFCONA 7476 is especially suitable for pigmented systems

Recommended dosage : 0.5-2.0% based on liquid content



Common defect: High viscosity and poor extender/pigment dispersion

Possible causes

Extender and pigment are used in the SMC, BMC/DMC application to fulfill final product requirements. The quality of the extender or pigment dispersion will affect the speed of the production and the interior/exterior appearance of the finished product.

Remedies

- AFCONA 7500 is a good wetting and dispersing agent for LS/LP containing systems, which will give the following advantages:
 - Effectively reduce the viscosity of the system
 - Higher loading of extender/pigment, f.e. flame retardant pigments
 - Helps to distribute the extender/pigment homogenously in the system
 - In lower viscosity systems it provides better wetting properties and shorter mixing time

Recommended dosage : 0.2-1.0% based on extender/pigment content

Common defect: Separation – LS/LP material and resin

Possible causes

The differences in polarity lead to poor compatibility of the resin and the LS/LP material. This causes separation during storage.

Remedies

- AFCONA 7472 and AFCONA 7476 will improve the compatibility of the resin and LS/LP material. It gives the following properties:
 - Very stable mixture
 - LS/LP material can be distributed homogeneously
 - Homogeneous in color

- AFCONA 7472 can be used in all type of formulation

Recommended dosage : 0.5-1.5% based on liquid content

- AFCONA-7476 is especially suitable for pigmented system

Recommended dosage : 0.5-2.0% based on liquid content



Common defect: Poor surface properties

Possible causes

In the normal DMC/BMC production, conventional mould release agents can't distribute evenly in the mould and some may migrate to the surface of the moulded product. This may cause problems with re-coatability. Besides that, the migrated mould release agent will transform to gas phase under high temperature and will condensate again under low temperature which will form haze on the surface. This will affect the performance of the final product like transparency, insulation and stain resistance.

Remedies

- AFCONA 7565 is specially developed to counter the conventional mould release agent.

This will help to achieve better surface properties and reduce the haze problem.

Recommended dosage : 3.0-5.0% based on total formulation

Common defect: Floating and flooding/poor colour strength

Possible causes

This can be caused by many factors. The most important one is the mixture of inorganic and organic pigments, which have differences in densities and particle sizes. It is also affected by the resin used to disperse the pigment, the effectiveness of the dispersion, the thixotropic effect, the application method and the stability of the pigment dispersion. These all could cause color differences from batch to batch.



Remedies

- AFCONA 7476 and AFCONA 7480 are able to stabilize the pigment dispersion, which will help to avoid pigment floating and flooding and gives more uniform colors.

Recommended dosage : AFCONA 7476: 0.2%-1.0% base on pigment content
 AFCONA 7480: 0.2%-1.0% based on pigment content

Sheet Moulding Compound (SMC)

Common defect: High viscosity poor dispersion

Possible causes

Extenders/pigments are incorporated into the SMC application to suit different requirements, like flame retardant and high insulation. In the high speed production process, extender/pigment dispersions will affect the productivity and the internal or external appearance of the finished product. It will also affect the consistency of the finished product.



Remedies

- AFCONA 7500 gives the following properties :
 - Reduced viscosity of the system
 - Better wetting and shortens the mixing time
 - Higher pigment/extender loading
 - Disperse the pigment homogeneously in the systems
- AFCONA 7500 mainly used in the high filled systems. Can lower the viscosity effectively.
- AFCONA 7480 mainly used in lower filled or low density systems

Recommended dosage : AFCONA 7500 0.2%-1.5% based on extender content
 AFCONA 7480 0.2%-2% based on extender content

Common defect: Separation – LS/LP material and resin

Possible causes

The differences in polarity lead to the poor compatibility of the resin and the LS/LP material. This will cause separation during storage.

Remedies

- AFCONA 7472 and AFCONA 7476 improves the compatibility of the resin and LS/LP material. It gives the following properties;
 - Very stable mixture
 - LS/LP material can be distributed homogeneously
 - Even in color
 - Prevent product deformation
- AFCONA 7472 can be used in all type of formulation

Recommended dosage : 0.5-1.5% based on liquid content

- AFCONA 7476 is especially suitable for pigmented systems

Recommended dosage : 0.5-2.0% based on liquid content

Sheet Moulding Compound (SMC)

Common defect: Extender settling

Possible causes

In SMC or Pultrusion applications it is common to have lower extender content and normally this is the bigger particle sized one. By this, extender will tend to flocculate and settle down during the application process.

Remedies

Wetting and dispersing agents can help to disperse the extenders homogeneously

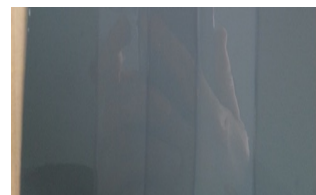
- AFCONA 7472 is suitable to use in systems containing LS/LP material
- AFCONA 7480 is more suitable for pigmented system

Recommended dosage : AFCONA 7472: 0.5%-1.5% based on extender content
 AFCONA 7480: 0.5%-1.5% based on extender content

Common defect: Floating and flooding

Possible causes

Causes could have many factors. The most important one is the mixture of inorganic and organic pigments, which have differences in densities and particle sizes. It is also affected by the resin used to disperse the pigment, the effectiveness of the dispersion, the thixotropic effect, the application method and the stability of the pigment dispersion. This causes colour differences from batch to batch.



Remedies

- AFCONA 7472 and AFCONA 7476 can help to stabilize the pigment dispersion, which will avoid pigment floating and flooding and gives more uniform colour.

Recommended dosage : AFCONA 7472: 0.5%-1.5% based on liquid content
 AFCONA 7476: 0.5%-2% based on liquid content

Sheet Moulding Compound (SMC)

Common defect: Poor substrate wetting

Possible causes

The surface tension differences between the compound and the substrate (Polyethylene, Polyamide film or metal) will cause poor substrate wetting defect like craters or fisheyes.

Remedies

- AFCONA 7371 and AFCONA 7375 can help to reduce the surface tension of the resin compound, which provide a better substrate wetting to most of the substrates.

Recommended dosage: AFCONA 7371: 0.3-2.0% based on the liquid content
 AFCONA 7375: 0.3-1.0% based on the liquid content

Common defect: Poor surface properties

Possible causes

In the normal DMC/BMC production, conventional mould release agents can't distribute evenly in the mould and some may migrate on the surface of the moulded product. This may cause some problem with the re-coatability. Beside that, the migrated mould release agent will transform to gas phase under high temperature and will condense again under low temperature, which will form haze on the surface. These will affect the performance of the final product like: transparency, insulation and stain resistance.



Remedies

- AFCONA 7565 is specially developed to counter the conventional mould release agents. This will help to achieve better surface properties, like: better flow and levelling, no shrink mark, no pinholes, no colour difference between batches and reduce the haze problem. It also allows better re-coatability even without sanding. By this, it can help to improve the productivity.

Recommended dosage : 3.0-5.0% based on total formulation

Sheet Moulding Compound (SMC)

Common defect: Poor fiber wetting/pinholes

Possible causes

In the high fiber and high speed production systems, the good wetting on fibers and defoaming properties play an important role to achieve a stable productivity and quality finished product. Otherwise, the finished product will have many defects like: pinholes or improper formation of the surface. These will affect the productivity and the water or chemical resistance of the finished product.



Remedies

- AFCONA 7203 and AFCONA 7375 help to wet the fibers more quickly which will improve the compactness of the finished product and improve the water-, weathering and chemical resistance

Recommended dosage : 0.3-2.0% based on liquid content



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