MÜNZING

CREATING ADDITIVE VALUE

NORTH AMERICA

ADDITIVES FOR WATER-BASED SYSTEMS:

COATINGS, INKS, ADHESIVES AND BUILDING PRODUCTS



In addition to providing innovative foam control and additive solutions, MÜNZING offers technical service testing to solve customer challenges by duplicating the customer process rather than relying on general formulation characteristics. We employ a wide range of test methods to reproduce the conditions that a coating experiences during manufacturing, packaging and application.

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Defoamers:

AGITAN® and DEE FO®

- Broad range of chemistries with tailored compatibility and persistence
- Balance of foam control and wetting performance
- Suitable for all water-based applications

Wetting and Leveling Agents:

METOLAT® and EDAPLAN® LA

- Wide range of products to tailor compatibility and foam tendency
- Designed to control surface tension and improve substrate and pigment wetting
- Improve film leveling and overall film quality

Pigment Dispersants:

METOLAT® and EDAPLAN®

- Polymeric dispersants for a wide variety of pigments and fillers
- Designed to prevent pigment sedimentation and flocculation, improve color strength and stabilize viscosity

Rheology Modifiers:

TAFIGEL®

- HEUR & HASE associative thickeners for water-based applications
- Range of products provide Newtonian or pseudoplastic behavior
- Tailored product selection to optimize sag, leveling, spatter, sedimentation and flow

Additives for Building and Construction:

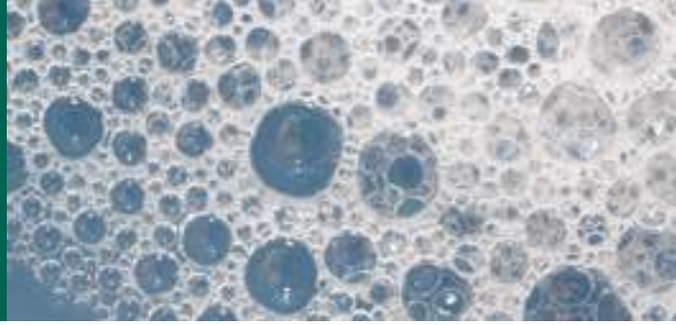
AGITAN® P

- Powder additives to control air content in cementitious systems

METOLAT® P

- Powder additives for cementitious systems to reduce shrinkage during drying and curing and to improve dispersion of particles and fibers

How Defoamers Work



Foam is a dispersion of a gas phase in a liquid system.

Foam Stabilization Mechanisms

- Foam is naturally unstable
- Bubbles must rise to the surface to break
- Drainage of the liquid surrounding the foam bubbles leads to rupture
- Stability of foam comes from surfactants that hinder drainage

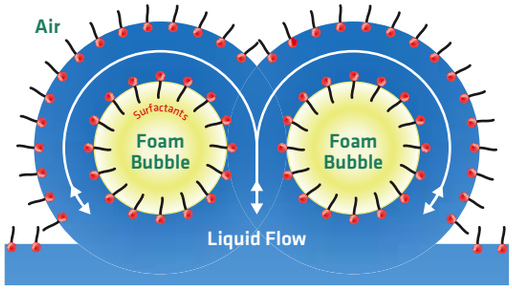
Defoamer Mode of Action

- Defoamers exist as droplets in the liquid and act to destabilize foam by:
  - Entering the foam surface
  - Spreading along that surface and thinning the liquid layer by forcing drainage
  - Bridging the liquid layer to rupture the bubble
- The defoaming process is governed by surface and interfacial tensions
- The surface tension of the defoamer droplets must be lower than that of the liquid

Defoamer Droplet Size

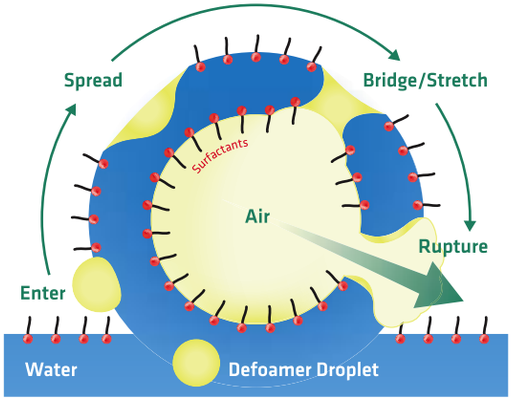
- When a defoamer is incorporated into a system, it disperses into fine droplets
- The droplets need to be the right size to break the foam
- If the defoamer droplets are too small, there is an insufficient amount to produce an overall impact
- Defoamer droplets that are too large will result in poor wetting
- More defoamer droplets of the optimal size will increase the rate of foam breakdown
- Ineffective/intense shearing or excessive/poor compatibility can negatively impact the droplet size
- Optimal defoamer selection requires the defoamer to have the appropriate persistence to shear and ease of incorporation, as described in the matrices as high (H), med (M), and low (L)

Foam Stabilization Mechanisms



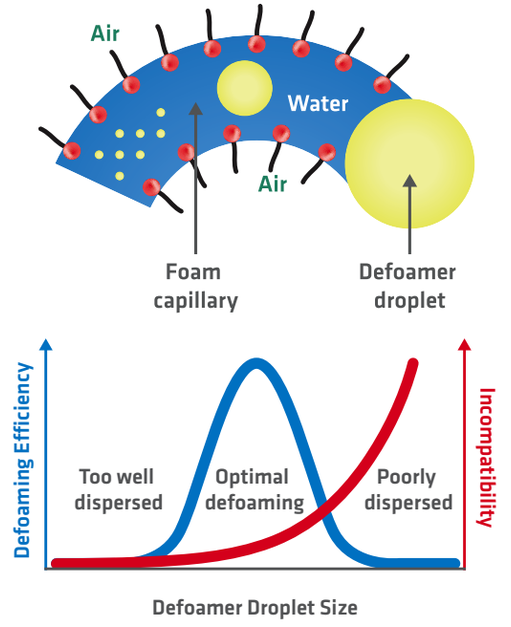
Schematic of foam bubbles on top of a liquid

Defoamer Mode of Action



Schematic of a foam bubble on top of a liquid

Defoamer Droplet Size

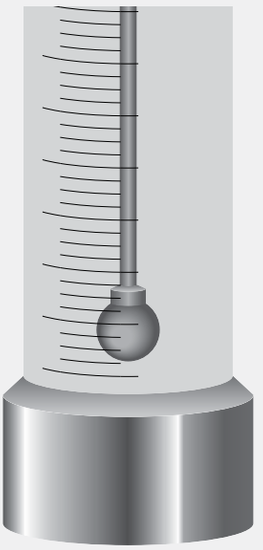


Defoamer Droplet Size

Defoamer Test Methods

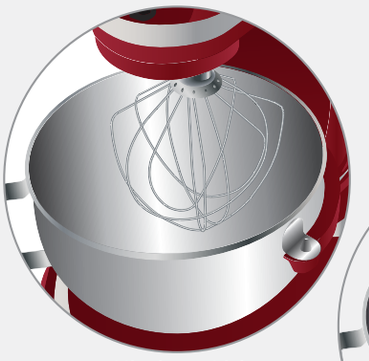
Air Sparge Test

(low shear) – Measures foam volume and collapse

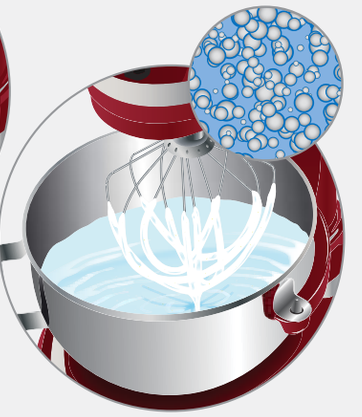


Kitchen Aid Whisk Test

(medium shear) – Measures density and recovery

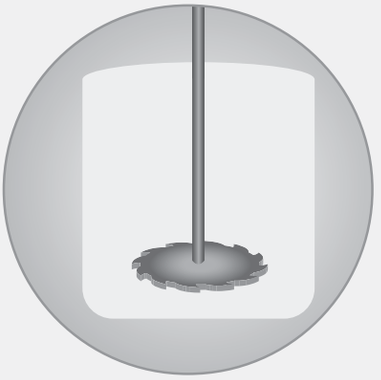


Kitchen Aid Whisk Test

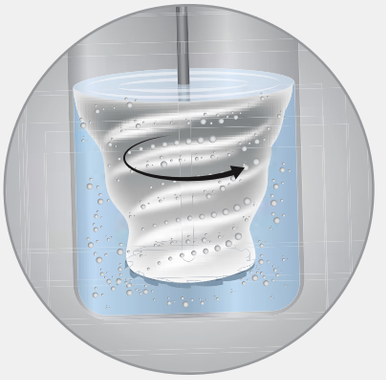


Entrained Macro/Micro Foam

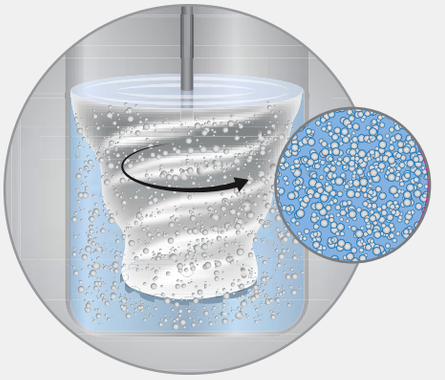
Cowles Test (high shear) – Measures density and recovery



Cowles Test



Micro Foam



Entrained Micro Foam

Application Foam Test – Brush/Dab/Roll (medium shear) and Spray Test (high shear) performance based on foam bubbles/defects like pinholes in the wet and dried film



Roll-Out



Wet Film Covered in Foam



Dry Film, No Foam



Architectural Coatings

Time-tested, cost-effective products that eliminate undesired foam during manufacturing and application.

		DEE FO® 2020A	DEE FO® 3010A	DEE FO® 97-3	DEE FO® 215	AGITAN® 282	AGITAN® 5091	DEE FO® 1015	AGITAN® 350	DEE FO® PI-35	AGITAN® 784	DEE FO® PI-320	AGITAN® 760	AGITAN® 786N
Defoamer Type		M	M	M	M	M	M, POA	M, POA	POA	3D, E	3D, E	3D, POA	OMS, POA	OMS, POA
Defoamer Solids		WA	WA, HS	MS	WA	HS	WA, HS	WA, HS	WA, HS	HS	HS			HS
Application	Emulsion Paints (matte/satin/eggshell)	●	●		●	○	●	●						
	Emulsion Paints (high gloss)									○	●	○	○	●
	Stucco/Textured/Plasters	○	○	●	○	○	●	●	●					
	Traffic Paint	○	●	●		○	●	○						
	Elastomeric Roof Coating	○		○	○		●	●	●			○		
	Grind Phase TiO_2/Fillers	●	●	○			●	●	●		●	○		●
Ease of Incorporation/Emulsifiability		L	L	H	M	H	L	L	L	M	M	M	L	M
Persistence to Shear		M	M	M	M	M	M	H	H	H	H	M	H	H

● = Primary Recommendation ○ = Secondary Recommendation L = Low M = Medium H = High

LEGEND - Defoamer Type and Solids:
E: Aqueous Emulsion; M: Mineral Oil; POA: Polyoxalkylene Technology; 3D: 3-Dimensional Polysiloxane; OMS: Organo-Modified Siloxane; WA: Wax; HS: Hydrophobic Silica; MS: Metallic Stearate



Industrial Coatings

A well-formulated coating is enhanced by the right defoamer – one that maintains gloss, clarity and coating integrity.

		DEE FO® 215	DEE FO® 3010E/50	AGITAN® 282	AGITAN® 350	DEE FO® PI-35	AGITAN® 784	DEE FO® PI-320	DEE FO® 718	AGITAN® 760	AGITAN® 786N	AGITAN® 155	AGITAN® 158
Defoamer Type		M	M	M	POA	3D, E	3D, E	3D, POA	OMS	OMS, POA	OMS, POA	OMS, E	OMS, E
Defoamer Solids		WA	WA, HS	HS	WA, HS	HS	HS		HS		HS	HS	HS
Application	Metal Primers	●	●		●		○			○	○	○	
	Metal Top Coats					○	○	●	○	●		○	●
	Anti-Corrosion Coatings		○	○	○	●	○			●	●	●	
	2K PU and Epoxy Coatings				○	○	○	○	●	●		●	
	Water-Based Alkyds	○				○	●	●					●
	Water-Based UV Coatings		○	○	○					●	○		
	Automotive Fillers	●	●		○		○			○		○	
	Automotive Basecoats	●	●	●	○	○				○	●	○	
	Automotive Clearcoats					○	●	●	○	●		○	●
	Can and Coil Coatings				○					●			○
Ease of Incorporation/Emulsifiability		M	M	H	L	M	M	M	M	L	M	H	H
Persistence to Shear		M	M	M	H	H	H	M	M	H	H	M	M

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Wood Coatings

A wide range of chemistries to meet the demands of a diverse industry.

		DEE FO® 215	AGITAN® 282	DEE FO® 3010E/50	DEE FO® 97-3	AGITAN® 351	AGITAN® 784	DEE FO® PI-320	AGITAN® 760	AGITAN® 786N	AGITAN® 155	AGITAN® 158
Defoamer Type		M	M	M	M	POA	3D, E	3D, POA	OMS, POA	OMS, POA	OMS, E	OMS, E
Defoamer Solids		WA	HS	WA, HS	MS	WA, HS	HS			HS	HS	HS
Application	High Gloss Enamels	○	○				○	●	●	○	○	●
	Varnish/Clear Coating						○	●	●		○	●
	Wood Stain	○		○		○	●			●	○	
	Wood Protective Coating	●	●	●	●		○		○		○	
	2K Polyurethane Coatings					○	○	●	○		○	●
	Water-Based UV Coatings		○	○		○			●			
Ease of Incorporation/Emulsifiability		M	H	M	H	M	M	M	L	H	H	H
Persistence to Shear		M	M	M	M	M	H	M	H	H	M	M

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LEGEND - Defoamer Type and Solids:
E: Aqueous Emulsion; M: Mineral Oil; POA: Polyoxalkylene Technology; 3D: 3-Dimensional Polysiloxane; OMS: Organo-Modified Siloxane; WA: Wax; HS: Hydrophobic Silica; MS: Metallic Stearate



Adhesives

Air bubbles reduce the strength of your bond. Defoamers provide the opportunity to make a good product even better.

		DEE FO® 215	AGITAN® 5068	DEE FO® 2020E/50	DEE FO® 3010E/50	AGITAN® 282	DEE FO® 97-3	DEE FO® PI-12	DEE FO® 1015	AGITAN® 351	AGITAN® 352	AGITAN® 784	AGITAN® 786N
Defoamer Type		M	M	M	M	M	M	M, POA	M, POA	POA	VEG, POA	3D, E	OMS, POA
Defoamer Solids		WA	WA	WA	WA, HS	HS	MS	WA, HS	WA, HS	WA, HS	HS	HS	HS
Application	Pressure Sensitive Adhesive	●	●	●	○	○	○	●					
	Laminating/Clear Coat/Release Liner	●	○	●		●		○				●	●
	Envelope/Label	○	●	●			○	●		○			
	Packaging	●	●	●	○		○	○					○
	Wood Glue	●	○		○	○	●	○		○			●
	Construction	○	●	●		●	●		●	○		○	
	Natural/Neoprene/Nitrile Latex	○	●				●			●		●	○
	Acrylic/EVA/VA Latex	●	●	○	○	●		●		○	●	○	
	Gelatin/Casein/Starch	●	○			○					●	●	○
	Polyvinyl Alcohol	○	○		○	●				●	●		
	High Viscosity	●	●	●					●	●		○	○
Ease of Incorporation/Emulsifiability		M	M	M	M	H	H	H	L	M	M	M	M
Persistence to Shear		M	M	M	M	M	M	M	H	H	M	H	H
FDA 175.105		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	
FDA 176.210				✓	✓				✓	✓	✓		

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Printing Industry

Achieve the delicate balance between compatibility and foam control to reduce film defects.

		DEE FO® 215	DEE FO® 300F	DEE FO® 3010E/50	DEE FO® PI-12	DEE FO® 1537A	AGITAN® 351	DEE FO® PI-547	DEE FO® PI-35	AGITAN® 784	DEE FO® PI-320	DEE FO® PG-2	AGITAN® 155	AGITAN® 150	AGITAN® 158	AGITAN® 786N	AGITAN® 760	DEE FO® 725E
Defoamer Type		M	WO	M	M, POA	M, E	POA	POA	3D, E	3D, E	3D, POA	3D, POA	OMS, E	OMS, E	OMS, E	OMS, POA	OMS, POA	OMS
Defoamer Solids		WA	WA	WA, HS	WA, HS	WA, HS	WA, HS	HS	HS	HS			HS	HS	HS	HS		HS
Application	Corrugated Paper	●	●	○	●		●	●	○	○			●	○		○		
	Coated Paper	○	○		○				●	●	●			●	○	○	●	●
	Film & Foil	●	●	○	○			○	○	●	●	○	○	●	○	●	●	●
	Overprint Varnish	○	○		○			○	○	○	○			○	●	●	●	●
	Metallic Ink	○	○				●	○		○		●	○	○			●	●
	Ink Jet														●		○	○
	Screen Ink	●		○			●		○	○			○	○	●		○	○
	Fountain Solution									○	●	●	○	●				○
	Press-Side	○		○		●							●	○				○
Ease of Incorporation/ Emulsifiability		M	H	M	H	H	M	M	M	M	M	L	H	H	H	M	L	H
Persistence to Shear		M	M	M	M	L	H	H	H	H	M	H	M	M	M	H	H	M
FDA 175.105		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓
FDA 175.300			✓				✓		✓*	✓*							✓	
FDA 176.170		✓	✓	✓	✓	✓	✓	✓	✓*	✓*								
FDA 176.180		✓	✓	✓	✓	✓	✓	✓	✓*	✓*								

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LEGEND - Defoamer Type and Solids:
E: Aqueous Emulsion; M: Mineral Oil; WO: White Oil; POA: Polyoxalkylene Technology; 3D: 3-Dimensional Polysiloxane; OMS: Organo-Modified Siloxane; WA: Wax; HS: Hydrophobic Silica; ✓*:Limited



Grinding Pigments

Long-term defoamer persistence allows efficient and effective production.

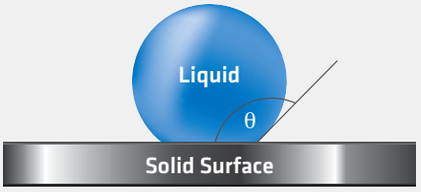
		DEE FO® 215	DEE FO® 3010A	DEE FO® 1015	AGITAN® 350	AGITAN® 351	DEE FO® PI-35	AGITAN® 5232	AGITAN® 5292	AGITAN® 5230	AGITAN® 786N	AGITAN® 760
Defoamer Type		M	M	M, POA	POA	POA	3D, E	3D, POA	3D, POA	3D, POA	OMS, POA	OMS, POA
Defoamer Solids		WA	WA, HS	WA, HS	WA, HS	WA, HS	HS				HS	
Application	Carbon Black	●	●	○	●	○				●	○	○
	Phthalocyanine Blue & Green (e.g. Crude Blue, PBI 15:3, PG 7...)			○		●		●	●	○		○
	Carbazole Violet					○		●	●	○		○
	Organic Red/Yellow (e.g. PR 22, PR 57:1, PY 14...)			○		●			○	○	○	○
	Titanium Dioxide	●	●	●	●	○	●			○	○	
	Transparent Iron Oxide								●	○	○	○
	Opaque Iron Oxide	○	●	●					○		○	
Ease of Incorporation/Emulsifiability		M	M	L	L	M	M	L	L	L	M	L
Persistence to Shear		M	M	H	H	H	H	H	H	H	H	H

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Wetting Theory and Application

The ability of a liquid to wet a solid surface is governed by three forces:

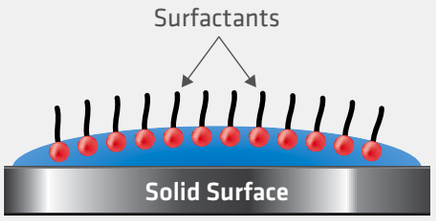


- γ_{LA} = Surface tension of liquid (liquid-air interfacial tension)
- γ_{SA} = Surface energy of solid (solid-air interfacial tension)
- γ_{SL} = Solid-liquid interfacial tension

$$\gamma_{LA} + \gamma_{SL} > \gamma_{SA}$$

- Liquid beads up to minimize liquid-air and solid-liquid interactions
- Low wettability results in a high contact angle (θ>90°)

Wetting can be increased by reducing the surface tension of the liquid (γ_{LA}) with the addition of MÜNZING's high-performance wetting agents.

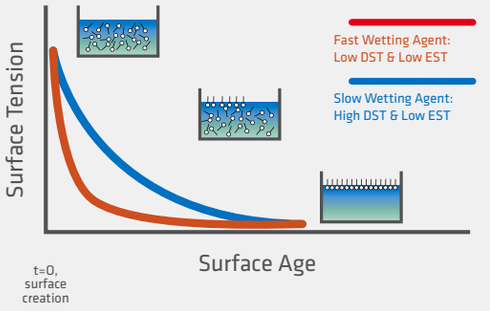


$$\gamma_{LA} + \gamma_{SL} < \gamma_{SA}$$

- Surface tension of liquid (γ_{LA}) becomes significantly lower than the solid surface
- Liquid spreads to maximize liquid-air and solid-liquid interactions
- High wettability results in a low contact angle (θ<90°)

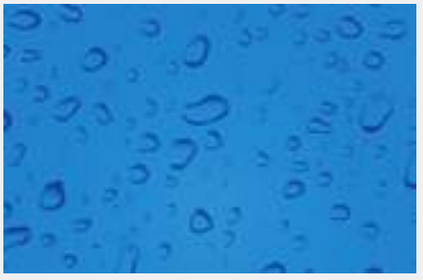
After creation of a new surface, wetting agent in the bulk must migrate to, and adsorb at, the interface in order to reduce surface tension. This migration takes time and is a key component to achieving proper wetting.

- **Dynamic Surface Tension (DST):** Dependent migration of the wetting agent to the interface which indicates how quickly the wetting agent can lower the surface tension.
- **Equilibrium Surface Tension (EST):** Surface tension minimum reached once all the available wetting agent has adsorbed at the interface.



Surface defects can be solved by reducing the surface tension of the coating and/or eliminating surface tension gradients through the addition of wetting and leveling agents.


Craters


Film Retraction


Orange Peel



Wetting and Leveling Agents

Control surface tension to improve substrate wetting, leveling and overall film quality.

		METOLAT® 288	METOLAT® 1299	METOLAT® 388	METOLAT® 355	METOLAT® 700	METOLAT® 725	METOLAT® 750	METOLAT® 775	METOLAT® 780	METOLAT® 7010	EDAPLAN® LA 402	EDAPLAN® LA 403	EDAPLAN® LA 414	EDAPLAN® LA 413	METOLAT® 340
	Type	Anionic Ester		Non-ionic								Acrylic Co-Polymer		OMS		OMS & Non-iconic
Application	Substrate Wetting	●	●			●	●	●	●	●	○				○	●
	Leveling & Anti-Cratering	○	○			●	●	●	●	●		●	●	●	●	○
	Wetting of Pigments & Fillers		●	●	●	●				○	●					
	Aqueous Systems	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Non-Aqueous Systems			●	●							●		●	●	
	Low Foaming			○	○			○	●	●		●	●	●		
	Inks	○	○					●	●	●						
	Adhesives	●	●			○	○	●	●	●						
	Overprint Varnishes	●	●			○	○	●	●	●						
	Industrial & Wood Coatings	●	●					○	●	●			●	●	●	●
	HLB (Griffin Method)	-	-	10.5	14	12.5	11	10	9	9	12.5	-	-	-	-	-
	FDA 175.105	✓	✓	✓					✓	✓		✓	✓			
	FDA 175.300	✓	✓	✓												
	FDA 176.170	✓		✓		✓	✓	✓	✓	✓	✓					
	FDA 176.180	✓	✓	✓		✓	✓	✓	✓	✓	✓					
	FDA 176.210	✓	✓	✓											✓	

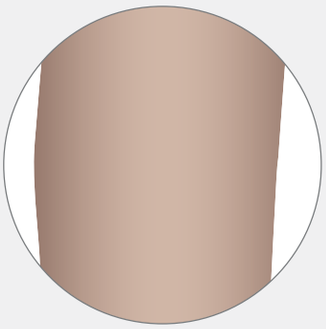
● = Primary Recommendation ○ = Secondary Recommendation

LEGEND - OMS = ORGANO-MODIFIED SILOXANE
All wetting and leveling agents are APEO free.

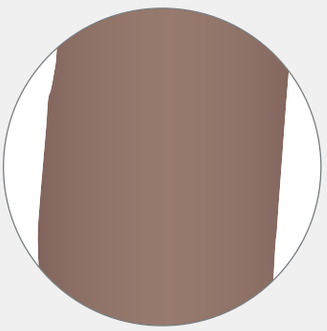
Dispersant Applications

An effective dispersant provides:

a) Color strength



Competitive
Poor rub-out and color development



EDAPLAN® 472
Good rub-out and color development

b) Proper gloss and transparency



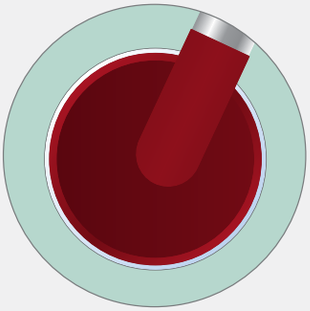
c) Good water resistance



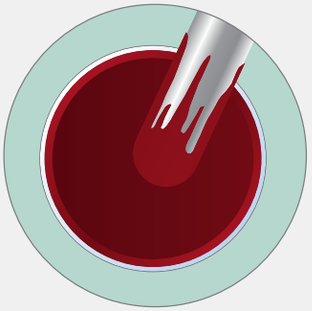
Good water resistance
No yellowing

Poor water resistance
Yellow stains

d) Good storage and viscosity stability
without settling and separation
(prevents flocculation)



Homogeneous

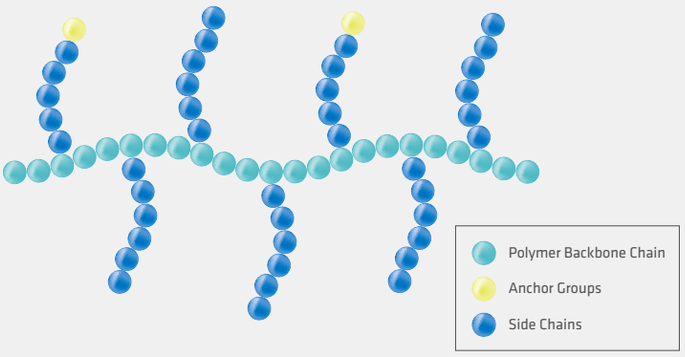


Settling and separation

Dispersants – Product Highlights

Features:
- Stabilization of pigment particles
- Good color strength development
- Broad compatibility with various binders
- Low foam formation
- Reduction of grind time and mill-base viscosity
- Storage stability

Typical Polymeric Dispersant Structure





Pigment Dispersants

Effective particle wetting and dispersing are necessary for high-quality, stable products.

		METOLAT® 390	METOLAT® 392	METOLAT® 394	EDAPLAN® 490	EDAPLAN® 492	EDAPLAN® 494	EDAPLAN® 395	EDAPLAN® 396	EDAPLAN® 918	EDAPLAN® 397	EDAPLAN® 470*	EDAPLAN® 472*	EDAPLAN® 480	EDAPLAN® 482	EDAPLAN® 516	METOLAT® 514
Chemistry		Fatty Derivative Copolymer	Olefinic		High MW Copolymer						Poly glycol ester	High MW Acrylic-Based Polymer				Acrylic-Based Polymer	
Charge		Anionic			Nonionic		Anionic				Non-ionic	Anionic					
% Active		55	45	55	40	35	50	30	35	100	100	50	50	85	85	20	34
Solvent		Water								-	-	BDG		Water			
Application	Inorganic Pigments			○	●	○	●	○	○	○	○	○	○	○	○	●	○
	Organic Pigments	●	○	○	●	●	○	○	●	●	○	○	○	○	●		
	Carbon Blacks		●		○	●	●		○	●		○	○	○	○		
	Transparent Iron Oxides			●	●	○	●	○									
	Fillers			○	●	○	●	○	○		○	○	○	○	○	●	●
Suitability		Water								Water & Solvent		Water					
Typical Dosage in Delivery Form on Organic Pigment %		40 - 100	30 - 100	10 - 60												---	---
Typical Dosage in Delivery Form on Inorganic Pigment %		---	---	0.5 - 20												0.1 - 1.0	0.1 - 1.0

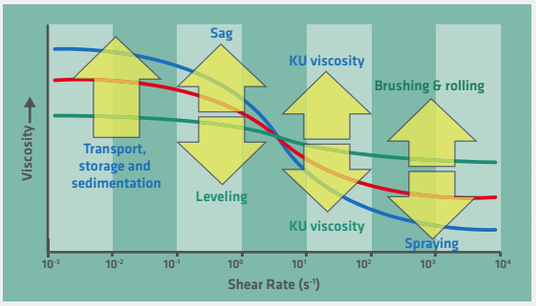
● = Primary Recommendation ○ = Secondary Recommendation

All products are APE free and recommended for water-based systems except where noted.
* EDAPLAN 470 (AN= 110 mg/KOH), EDAPLAN 472 (AN= 75 mg/KOH) need to be neutralized prior to use for water-based systems (TDS).

Rheology Modifiers Theory and Application

TAFIGEL® PUR – hydrophobically modified ethoxylated urethane (HEUR)

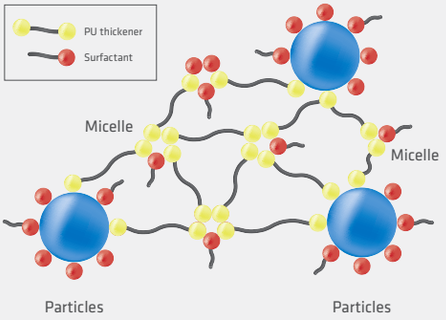
Features:
- Superior flow, leveling, gloss
- High spatter resistance
- Wide range of rheological profiles
- No impact on water resistance
- Not sensitive to pH
- Biostable



Strong pseudoplastic
Excellent anti-sag, anti-settling, sprayability

Medium pseudoplastic
Optimum

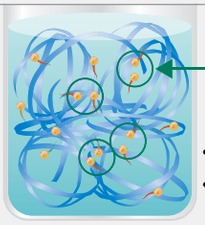
Newtonian
Excellent leveling and brush drag



Thickener 'hydrophobes' associate with each other and the particles in the formulation, resulting in a three-dimensional network that gives resistance to flow (thickening effect).

TAFIGEL® AP – hydrophobically modified alkali swellable emulsion (HASE)

Features:
- Suitable where TAFIGEL® PUR thickeners do not show sufficient efficiency
- Less sensitive to solvents
- No impairment of water/scrub resistance
- Not suitable for systems with pH < 7



- Molecule is completely unwound
- Maximum thickening

pH = 8.2 to 8.7

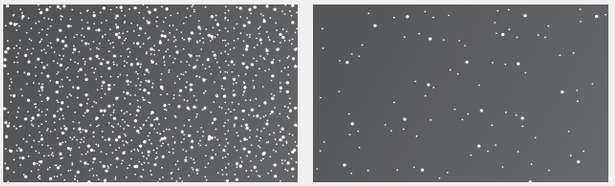
Rheology modifiers influence the following application properties

Leveling



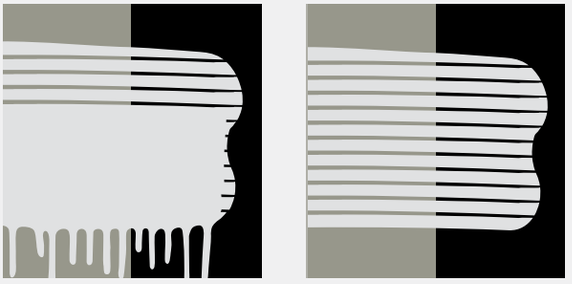
Poor leveling | Good leveling

Spatter

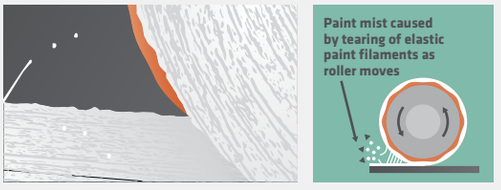


Significant spatter in Spatter-Roller Test | Reduced spatter

Sag Resistance



Poor sag resistance | Good sag resistance



KU (Stormer) Viscosity: Viscosity under mid shear conditions (measure of in-can appearance and handling properties).

ICI Viscosity: Viscosity under high shear conditions using an ICI viscometer (measure of the behavior when brushed, rolled or sprayed).



Rheology Modifiers

HEUR and HASE thickeners to optimize flow, sag, leveling, spatter and sedimentation.

		TAFIGEL® PUR 60	TAFIGEL® PUR 61	TAFIGEL® PUR 64	TAFIGEL® PUR 65	TAFIGEL® PUR 40	TAFIGEL® PUR 41	TAFIGEL® PUR 44	TAFIGEL® PUR 48	TAFIGEL® PUR 50	TAFIGEL® PUR 54	TAFIGEL® PUR 45	TAFIGEL® PUR 80	TAFIGEL® PUR 82	TAFIGEL® PUR 85	TAFIGEL® AP 75N	TAFIGEL® AP 15	TAFIGEL® AP 16	TAFIGEL® AP 20	TAFIGEL® AP 30
Rheology Profile		Strongly Pseudoplastic				Pseudoplastic						Newtonian				Pseudoplastic			Strongly Pseudo-plastic	
Type		Nonionic Polyurethane				Nonionic Polyurethane						Nonionic Polyurethane				Anionic Copolymer Emulsion				
Solvent		BTG + water	Water	BTG + water		Water	BTG + water		Water		BTG + water		Water						White Oil	
Active Content (%)		40	25	40	20	40	20	40		21	20	40	20		25	31	29		31	32
Application	Brush and Roller						●	●	●	●	●	●	●	●	●	●	●	●		
	Spray Applications	●	●	●	●	○	○	○	○	○	○						○	○		
	Sag Resistance & Anti-Settling	●	●	●	●	○	○	○	○	○	○					●	●	●	●	
	Systems Difficult to Thicken	○	●	●	●				●						○	●	●	●	●	●
	Pigment Concentrates															●	●	●	●	●
	KU Builder	●	●	●	●	○	○	○	○	○	○									
	ICI Builder												●	●	●	●				
APE Free		✓	✓	✓	✓	<0.1%	✓	✓	✓	0.05%	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FDA 175.105			✓							✓	✓		✓	✓		✓				

● = Primary Recommendation ○ = Secondary Recommendation

BTG: Butoxytriglycol

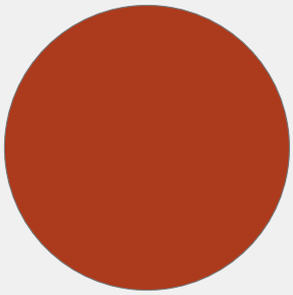
Additives for Building and Construction

MÜNZING offers a wide range of powder additives that are easily miscible with other powder components for use in dry blends which are mixed with water before application.
When mixed with water, the liquid active desorbs from the carrier to act on the system.

Test Methods

Powder Defoamer Test

Measures density
Visual observations of the mold for air entrainment



No defoamer:
many pinholes

With defoamer:
few pinholes

Concrete mold

Powder Wetting Test

Measures density
Visual observations for wetting and color characteristics



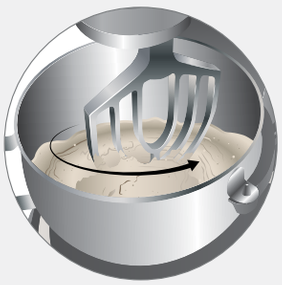
No wetting agent:
poor wetting/color development



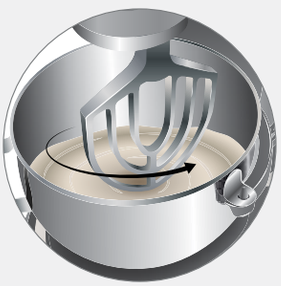
With wetting agent:
uniform wetting/ color development

Visual Mixing Test

Visual observations for flow and mixing time



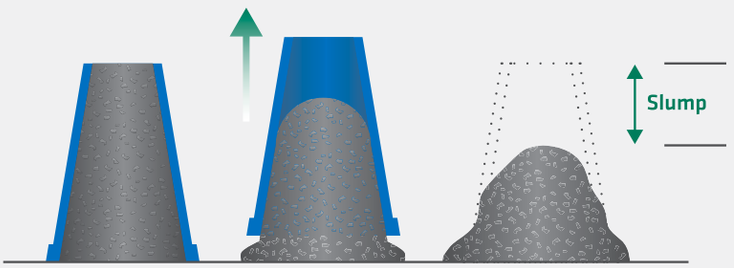
No additive:
difficult to mix, clumpy, increased mixing time



With additive:
easy to mix, smooth, reduced mixing time

Slump and Flow Testing

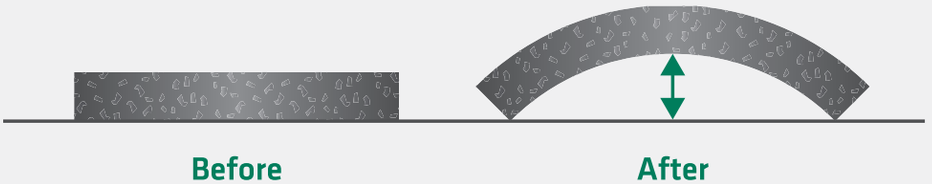
Assesses the effect of additives on the slump/flow of the material



Slump Test Apparatus

Deflection Test

Measures deflection (change in curvature) and change in width over a period of time.





Additives for Building and Construction

Powder additives to control air entrainment, shrinkage and particle wetting to improve the aesthetics and physical properties of cementitious materials.

		AGITAN® P 801	AGITAN® P 803	AGITAN® P 813	AGITAN® P 823	AGITAN® P 8850	AGITAN® P 841	AGITAN® P 840	AGITAN® P 845	METOLAT® P 871	METOLAT® P 872	METOLAT® P 874	METOLAT® P 530	METOLAT® P 590	METOLAT® P 588	METOLAT® P 854
Type of Additive		Powder Defoamer								Powder Anti-Shrink			Powder Wetting Agent			
Chemistry		Mineral Oil, Polyglycol				Veg Oil, Polyglycol		Polyglycol		Glycol	Aliphatic Alcohol, Glycol		SN	Glycol	Poly-glycol Ester	AA
% Active		65	65	50	65	25	55	30	40	55	50	50	90	45	30	35
Application	Self-Leveling		○	○	●	●	●	●	●	●	●	●	●	●	●	●
	Thin Sets		○		●	●	●		○	●	●	●	○	○	○	○
	Stiff Products	●				○	○		●	●	●	●	●	●	●	●
	Joint Fillers, Grouts & Mortars	●			○	○	○		○	●	●	●	●	●	●	●
	Gypsum & Lime	●			○		○			○	○	○				
	Powder Paints	●	●		●	○	○		○	●	●	●	●	●	●	●
	Construction Adhesives					●	●		●	●	●	●	●			
	Premix Pigment Powder	●	●		●	○	○		○	●	●	●	○	●	●	●

● = Primary Recommendation ○ = Secondary Recommendation

SN = Sulfonated Naphthalene Condensate, Anionic; AA = Alkylalkoxylate, Nonionic

Additional Products

Specialty Additives

Easy to Clean - METOLAT® ETC 1

- Surface additive that provides easy to clean surface in solvent-based systems
- Reduced adhesion of spray paint and increased marker resistance
- Provides high tape release and slip effect
- Due to its hydroxy functionality, it can be permanently anchored in the binder matrix using suitable 2-component systems, e.g. based on acrylate/isocyanate

OMBRELUB 533

- Hydrophobizing agent for inks and coatings
- Stable fine dispersion of calcium stearate in water
- Increases slip and anti-blocking
- Improves sandability of wood coatings

ZINPLEX 15

- Crosslinking agent for aqueous carboxylated binders
- Ammonia zinc oxide solution
- Improved resistance against water, detergents and solvents
- Increased blocking resistence

Defoamers for Non-Aqueous Systems

FOAMTROL 110, DEE FO® 135,

DEE FO® 718, DEE FO® XKF-1B

Additional Products

Bio-Based Additives

DEFOAMERS

AGITAN® 109

Bio-based content ~70%

AGITAN® 301

Bio-based content ~85%

AGITAN® 352

Bio-based content ~50%

OMBRELUB 533

Bio-based content ~97%

DISPERSANTS

EDAPLAN® 397

Bio-based content ~30%

WETTING AGENTS

METOLAT® 388

Bio-based content ~50%

METOLAT® 367

Bio-based content ~33%

Bio-based = derived from biomass. Biomass = material of biological origin excluding material embedded in geological formations and/or fossilized. "Bio" refers to "Renewable biological resources" and not "biotechnology". The bio-based product is normally characterized by the bio-based content.

MÜNZING

CREATING ADDITIVE VALUE

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