



Metal Packaging & INKS APPLICATIONS

Hero product selection

Metal Packaging & INKS APPLICATIONS

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Metal Packaging & INKS APPLICATIONS

Introduction

Packaging coatings are specialized finishes applied to packaging materials to improve their functionality, appearance, and durability. These coatings are used on a variety of packaging substrates, including paper, cardboard, plastic, metal, and glass, to enhance protection, facilitate printing and ensure that the packaging meets regulatory and consumer demands. The coating process often involves multiple layers, including primers, barrier coatings, and topcoats, each with specific drying and curing requirements.

Can coatings are specialized coatings applied to the interior and exterior surfaces of metal cans used for packaging food, beverages, personal care products and other consumer goods. These coatings play a vital role in protecting the metal substrate from corrosion, preventing chemical reactions between the metal and the contents of the can and ensuring the safety and longevity of the packaged products. Can coatings are formulated to meet strict regulatory standards for food safety, including compliance with health and environmental regulations.

Drum coatings refer to the specialized coatings used to protect the interior and exterior surfaces of drums, which are commonly used for storing and transporting a variety of substances, including chemicals, oils, food products, and hazardous materials. These coatings are essential for ensuring the integrity, safety, and longevity of the drums, as well as for maintaining the quality of the products they contain.

Phenolic product range for Metal packaging

High chemical resistance group

Products	NV (solid content / solvent)	Color* (cured film)	Availability		HazCom	
			Germany	China	Free formaldehyde (%)	Bisphenol F (%)
PHENODUR® EP 560	71	less dark	Yes	No	0.1	1.5
PHENODUR® PR 371	70 B	less dark	Yes	Yes	1.5	0.3
PHENODUR® PR 385	64 B	less dark	Yes	No	0.1	0.3
PHENODUR® PR 401	72 B	very bright	Yes	Yes	1.5	N/A
PHENODUR® PR 405	72 B	very bright	Yes	Yes	0.5	N/A
PHENODUR® PR 411	75 B	very bright	Yes	Yes	0.5	N/A
PHENODUR® PR 515	60 LG / 60 BX	bright	Yes	Yes	0.8	N/A
PHENODUR® PR 516	60 B / 60 B LF	bright	Yes	Yes	1.0 / 0.4	N/A
PHENODUR® PR 521	65 B	less dark	Yes	No	0.1	N/A
PHENODUR® PR 898	52 BGB	less bright	Yes	No	1.5	0.9
PHENODUR® PR 899	60 MPAC	less dark	Yes	Yes	0.5	0.1



Phenolic product range for Metal packaging

High flexibility group

Products	NV (solid content / solvent)	Color* (cured film)	Availability		HazCom	
			Germany	China	Free formaldehyde (%)	Bisphenol F (%)
ALNOVOL® PN 650	60 B	dark	Yes	No	0.1	N/A
PHENODUR® PR 566	65 BX	very bright	Yes	Yes	0.6	N/A
PHENODUR® PR 612	80 B / 80B LF	less dark	Yes	Yes	0.5 / 0.1	N/A
PHENODUR® PR 825	70 MPAC	very bright	Yes	Yes	0.5	N/A
PHENODUR® PR 827	70 MPAC	very bright	Yes	No	0.5	N/A



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Phenolic
product range

Amino
product range

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product range

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Defoamer

Phenolic product range for Metal packaging

Good sulfur resistance group

Products	NV (solid content / solvent)	Color* (cured film)	Availability		HazCom	
			Germany	China	Free formaldehyde (%)	Bisphenol F (%)
PHENODUR® PR 517	60 B	less dark	Yes	No	0.5	N/A
PHENODUR® PR 722	53 RBGB	less dark	Yes	Yes	0.1	N/A

Balanced properties group

Products	NV (solid content / solvent)	Color* (cured film)	Availability		HazCom	
			Germany	China	Free formaldehyde (%)	Bisphenol F (%)
PHENODUR® PR 285	55 IBB	dark	Yes	No	0.01	N/A
PHENODUR® PR 616	65 B	less dark	Yes	No	0.1	N/A
PHENODUR® PR 787	50 B/X	less dark	Yes	No	0.01	N/A
PHENODUR® VPR 1785	50 MP, 65B	less dark	Yes	No	0.1	N/A



Phenolic product range for Metal packaging

Special phenolic resins						
Products	NV (solid content / solvent)	Color* (cured film)	Availability		HazCom	
			Germany	China	Free formaldehyde (%)	Bisphenol F (%)
Non-phenolic crosslinker for epoxy functional or polyester resins						
PHENODUR® VPM 1150	50 EPAC	clear	Yes	No	N/A (formaldehyde-free)	N/A
Coloring resin as additive						
PHENODUR® PR 308	62 MP	very dark	Yes	No	0.01	1
PHENODUR® PR 309	63 BMP	very dark	Yes	No	0.1	N/A



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Phenolic product range for Metal packaging

Water based phenolics						
Products	NV (solid content / solvent)	Color* (cured film)	Availability		HazCom	
			Germany	China	Free formaldehyde (%)	Bisphenol F (%)
PHENODUR® VPW 1942	52 WA	N/A	Yes	No	N/A	0.5
PHENODUR® VPW 1946	46 WA	N/A	Yes	No	0.1	N/A
PHENODUR® VPW 1947	50 WA	N/A	Yes	No	0.2	N/A
PHENODUR® VPW 1952	40 WA	N/A	Yes	No	N/A	N/A



B	n-butanol
IB	Iso-butanol
LG	Solvent mixture
X	Xylene
BG	Butylglycol(butyl cellosolve)
MPAC	Methoxy propyl acetate
MP	Methoxy propanol
EPAC	Ethoxy propyl acetate
WA	Water

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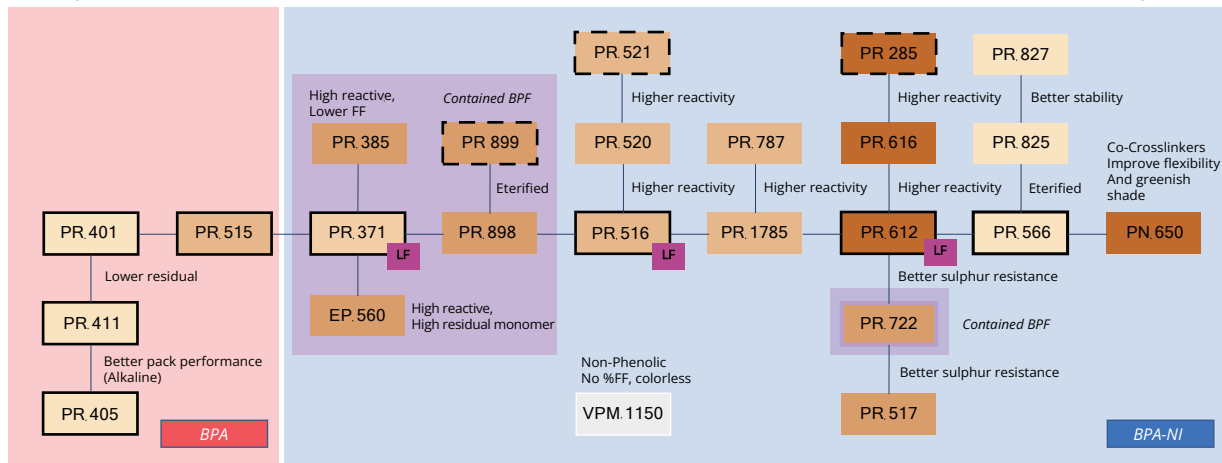
Surface
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Defoamer

Phenolic product range

Reactivity

Flexibility



*Eterified = By n-butanol to improve product stability, lower reactivity.

Dry film color indicator (Pale – Dark gold)

Available at JX

Have Low formaldehyde (LF) version

Under consideration for availability at JX

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Phenolic product range

Amino product range

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Surface appearance

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Amino product range for Metal packaging

PRODUCT NAME	TYPE	SOLID CONTENT (%)	VALUE PROPOSITION
Urea resin			
CYMEL® U-80	Highly butylated urea resin	> 96	Very hydrophobic. Excellent water resistance, adhesion property and good flexibility.
CYMEL® U-216-8	Partially butylated urea resin	57 - 61	Excellent compatibility with hydrophobic resin.
CYMEL® U-216-10 LF	Partially butylated urea resin	58 - 62	Higher reactivity and Low FF version of CYMEL U-216-8
CYMEL® U-640	Partially butylated urea resin	58 - 62	Low reactivity, excellent compatibility, flow in epoxies, contain silicone additive.
ETERMINO 9115-60	n-butylated urea resin	60	Fast cure, Economical, <i>*Not accessed to FCN*</i>
ETERMINO 9121-60	iso-butylated urea resin	60	Fast cure, Economical, <i>*Not accessed to FCN*</i>
Melamine resin			
CYMEL® 303 LF	Highly methylated melamine resin	> 98	For high solids formulations very good film flexibility, Formulation stability and resistance properties.
CYMEL® MM-100	Highly methylated melamine resin	> 98	For high solids formulations very good film flexibility, More Oligomeric than CYMEL 303. Good water resistance
CYMEL® 325	Methylated high NH melamine resin	78 - 82	For very fast curing medium to high solids formulations. Low HCHO release.
CYMEL® 327	Methylated high NH melamine resin	88 - 92	For fast curing medium to high solid formulations with improved film flexibility properties.
CYMEL® 370	Partially methylated melamine resin	86 - 90	General purpose melamine resin. Fast curing.
CYMEL® 1156	Highly butylated melamine resin	> 96	For improve hydrophobicity characteristic and good flexibility.



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Amino product range for Metal packaging

PRODUCT NAME	TYPE	SOLID CONTENT (%)	VALUE PROPOSITION
Benzoguanamine resin			
CYMEL® 659E	Partially butylated Benzoguanamine resin	70 - 74	Good flexibility and good alkali resistance
CYMEL® 5010/5010B	Partially butylated Benzoguanamine resin	64 - 68	Pack performance located between CYMEL 659E and CYMEL 1123
ETERMINO 9411-75	n-butylated Benzoguanamine resin	75	Good adhesion and good alkali resistance
ETERMINO 9412-70	n-butylated Benzoguanamine resin	70	Good flexibility and good alkali resistance
MYCOAT® 616 RESIN	High Imino butylated Benzoguanamine resin	77-81	Suited for Exterior B&B
CYMEL® 1123	Mixed ether highly alkylated Benzoguanamine resin	> 96	Good chemical resistance and retort resistance, can use for solvent based and water based. <i>*Not complied to FDA 175.300*</i>
MYCOAT® 137	Mixed ether highly alkylated Benzoguanamine resin	> 97	Balance flexibility and chemical resistance. <i>*Not complied to FDA 175.300*</i>
Glycoluril resin			
CYMEL® 1170	Solvent-based Highly butylated glycoluril	> 97	High chemical resistance with moderate flexibility, good overbaked resistance, suited for B&B
CYMEL® 1172	Water-based Un-alkylated glycoluril	45	High chemical resistance with moderate flexibility, good overbaked resistance, suited for B&B



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CAN COATING

Epoxy-Based Coatings are traditionally the most common type of can coatings due to their excellent chemical resistance and adhesion properties. They are often used for both food and beverage cans. Typically cured at temperatures ranging from 180°C to 210°C. Curing times can vary but are usually in the range of 8 to 15 minutes, depending on the thickness of the coating and the oven configuration.

Acrylic and Polyester Coatings used as alternatives to Epoxy coatings, particularly in regions where bisphenol-A(BPA) restrictions are in place. These coatings offer good clarity, flexibility, and resistance to food and beverage acids. Cured at temperatures between 160°C and 200°C. Typically cured in 10 to 15 minutes. Faster curing cycles are possible with optimized oven conditions.



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END USE	APPLICATIONS	TECHNOLOGY	HERO PRODUCT	VALUE PROPOSITION
CAN COATING	BPA INTERIOR	Amino	CYME [®] 303 LF	Solvent-free, excellent stability as resin and in coating formulation, low self-condensation tendency
			CYME [®] 3745	Excellent formulation stability, balanced performance of retort resistance, flexibility and surface hardness
			CYME [®] 659E	Butylated benzoguanamine resin, improve adhesion and retort resistance, no catalyst required
			CYME [®] 5010	Butylated benzoguanamine resin, improve adhesion and retort resistance, no catalyst required, higher reactive than CYME [®] 659E
			CYME [®] U-216-8	Partially butylated urea resin. Excellent compatibility with hydrophobic resin.
			CYME [®] U-216-10LF	Partially butylated urea resin Higher reactivity and Low FF version of CYME U-216-8
			CYME [®] U 80	Highly butylated urea resin, low free formaldehyde, high flexibility and excellent adhesion on various metal substrates
		Phenolic	PHENODUR [®] PR 285	Very low free monomer content, high intrinsic flexibility. Bis-a and bis-f free
			PHENODUR [®] PR 612	Good adhesion and chemical resistance, catalyst addition required. Bis-a and bis-f free
			PHENODUR [®] PR 401	Straight Bisphenol A based products. Very reactive, very light color, good sterilization resistance.
			PHENODUR [®] PR 516	BISPHENOL A free alternative to PHENODUR [®] PR 515; recommended for BADGE- and BPA-NI usage. Low free formaldehyde version available.
			PHENODUR [®] PR 566	Good flexibility and Sulphur resistance, light color, Medium reactivity.
			PHENODUR [®] VPM 1150	Not a phenolic resin, TMA hardener (crosslinker) for high molecular weight epoxide resins to formulate clear and white interior/exterior coatings. Formaldehyde-free product.
		Catalyst	CYCAT [®] XK 406N	Phosphoric acid-based catalyst, increase curing speed, FDA § 175.300 compliant
			CYCAT [®] 600A	Non-blocked sulfonic acid-based catalyst, support reaction speed of any amino resin, for food contact application.

Solvent-based Amino crosslinkers Phenolic crosslinkers Additives



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END USE	APPLICATIONS	TECHNOLOGY	HERO PRODUCT	VALUE PROPOSITION
CAN COATING	BPA-NI INTERIOR	Polyester	DUROFTAL® PE 6619	Especially developed as replacement of high molecular weight epoxy resins for interior packaging that contain neither BADGE nor Bisphenol A.
			MARCOA™ CH491	Especially developed as replacement of high molecular weight epoxy resins for interior packaging that contain neither BADGE nor Bisphenol A. High Tg, suited for severed food media.
			MARCOA™ CH470	Especially developed as replacement of high molecular weight epoxy resins for interior packaging that contain neither BADGE nor Bisphenol A. Medium Tg, suited for low aggressive food media.
			MARCOA™ C 4421F	Especially developed as replacement of high molecular weight epoxy resins for interior packaging that contain neither BADGE nor Bisphenol A. Medium Low, Co-binder for phenolic compatibility improvement.
		Amino	CYMEL® 303 LF	Solvent-free, excellent stability as resin and in coating formulation, low self-condensation tendency
			CYMEL® 659E	Butylated benzoguanamine resin, improve adhesion and retort resistance, no catalyst required
			CYMEL® 5010	Butylated benzoguanamine resin, improve adhesion and retort resistance, no catalyst required, Higher reactive than CYMEL® 659E
		Phenolic	PHENODUR® PR 516	BISPHENOL A free alternative to PHENODUR® PR 515; recommended for BADGE- and BPA-NI usage. Low free formaldehyde version available.
			PHENODUR® PR 521	Higher reactive version of PHENODUR® PR 516, for BADGE- and BPA-NI usage.
			PHENODUR® PR 371	Straight phenol-based type of very high chemical resistance and limited flexibility. For can coatings including BADGE- and BPA-NI formulas and interior drum linings. Very low free phenol content. Contained BisF from synthesis.
			PHENODUR® PR 385	Straight phenol-based type of very high chemical resistance and limited flexibility. For can coatings including BADGE- and BPA-NI formulas and interior drum linings. Very low free formaldehyde and phenol content. Contained BisF from synthesis.
		Catalyst	CYCAT® 600A	Non-blocked sulfonic acid-based catalyst, support reaction speed of any amino resin, for food contact application.
			CYCAT® 6925	Amine- blocked version of CYCAT® 600A, for solvent and water-borne coatings with food contact application.

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END USE	APPLICATIONS	TECHNOLOGY	HERO PRODUCT	VALUE PROPOSITION
CAN COATING	BPA EXTERIOR	Amino	CYMEL® 303 LF	Solvent-free, excellent stability as resin and in coating formulation, low self-condensation tendency
			CYMEL® 3745	Excellent formulation stability, balanced performance of retort resistance, flexibility and surface hardness
			CYMEL® 659E	Butylated benzoguanamine resin, improve adhesion and retort resistance, no catalyst required
			CYMEL® 5010	Butylated benzoguanamine resin, improve adhesion and retort resistance, no catalyst required, higher reactive than CYMEL® 659E
			CYMEL® U-216-8	Partially butylated urea resin. Excellent compatibility with hydrophobic resin.
			CYMEL® U-216-10LF	Partially butylated urea resin Higher reactivity and Low FF version of CYMEL U-216-8
			CYMEL® UM 15	Urea based resin, directly water-soluble, high solid content and very fast curing speed
		Phenolic	PHENODUR® PR 285	Very low free monomer content, high intrinsic flexibility. Bis-a and bis-f free
			PHENODUR® PR 612	Good adhesion and chemical resistance, catalyst addition required. Bis-a and bis-f free
			PHENODUR® PR 411	Straight Bisphenol A based products. Very reactive, very light color, good sterilization resistance, excellent acid and fume resistances
			PHENODUR® PR 566	Good flexibility and Sulphur resistance, light color, Medium reactivity.
			PHENODUR® VPM 1150	Not a phenolic resin, TMA hardener (crosslinker) for high molecular weight epoxide resins to formulate clear and white interior/exterior coatings. Formaldehyde-free product.
		Catalyst	CYCAT® XK 406N	Phosphoric acid-based catalyst, increase curing speed, FDA § 175.300 compliant
			CYCAT® 600A	Non-blocked sulfonic acid-based catalyst, support reaction speed of any amino resin, for food contact application.

Solvent-based Amino crosslinkers Phenolic crosslinkers Additives

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END USE	APPLICATIONS	TECHNOLOGY	HERO PRODUCT	VALUE PROPOSITION
CAN COATING	BPA-NI INTERIOR	Polyester	DUROFTAL® VPE 6128	Low viscous oil free polyester resin, possible for high solid lacquer for non-FCN materials
			SETAL® 185	Good sterilization resistance and good flexibility for non-FCN materials
			MARCOA™ CL250	Medium Tg, Medium MW for exterior can coatings for FCN materials
			MARCOA™ CL360	Medium Tg, Medium MW for exterior can coatings for FCN materials
		Amino	CYMEL® 303 LF	Solvent-free, excellent stability as resin and in coating formulation, low self-condensation tendency
			CYMEL® 659E	Butylated benzoguanamine resin, improve adhesion and retort resistance, no catalyst required
			CYMEL® 5010	Butylated benzoguanamine resin, improve adhesion and retort resistance, no catalyst required, Higher reactive than CYMEL® 659E
		Phenolic	PHENODUR® PR 516	BISPHENOL A free alternative to PHENODUR® PR 515; recommended for BADGE- and BPA-NI usage. Low free formaldehyde version available.
			PHENODUR® PR 521	Higher reactive version of PHENODUR® PR 516, for BADGE- and BPA-NI usage.
			PHENODUR® PR 371	Straight phenol-based type of very high chemical resistance and limited flexibility. For can coatings including BADGE- and BPA-NI formulas and interior drum linings. Very low free phenol content. Contained BisF from synthesis.
			PHENODUR® PR 385	Straight phenol-based type of very high chemical resistance and limited flexibility. For can coatings including BADGE- and BPA-NI formulas and interior drum linings. Very low free formaldehyde and phenol content. Contained BisF from synthesis.
			PHENODUR® PR 566	Good flexibility and Sulphur resistance, light color, Medium reactivity.
		Catalyst	CYCAT® 600A	Non-blocked sulfonic acid-based catalyst, support reaction speed of any amino resin, for food contact application.
			CYCAT® 6925	Amine- blocked version of CYCAT® 600A, for solvent and water-borne coatings with food contact application.

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100%UV product range for Metal packaging

PRODUCTS	Description • Key Features & Performance	Functionality	Viscosity mPa.s, 25 °C	Acid value mg KOH/g	OH value mg KOH/g	Adhesion	Solvent resistance	Reactivity	Flexibility	Pigment Wetting
Polyester Acrylates & Diluted Polyesters										
EBECRYL® 450	- Fatty Acid Modified Polyester Hexaacrylate - Very good lithographic behavior, good pigment wetting and high reactivity	6	8600	20	70	***	**	****	•	****
EBECRYL® 452	- Polyester Tetraacrylate - Exceptional pigment wetting allows preparation of highly concentrated pigment pastes.	4	600	10	20	**	•	***	**	****
EBECRYL® 657	- Polyester Tetraacrylate - Very good lithographic behavior and pigment wetting.	4	125000	20	25	•	•	***	**	****
EBECRYL® 820	- Polyester Hexaacrylate - Low migration product; exceptional pigment wetting allows preparation of highly concentrated pigment pastes.	6	550	10	-	**	***	***	•	****
EBECRYL® 859	- High Reactivity Polyester Acrylate - Excellent lithographic behavior on high-speed presses, high reactivity, and very good pigment wetting.	6	36000	3	-	***-	***-	****-	***	****-
EBECRYL® 1859	Non-BPA version of EBECRYL® 859 - best compromise ink/water balance & very good for black pigments	6	48000	10	25	**	***	****	•	****
EBECRYL® 870	- Fatty Acid Modified Polyester Hexaacrylate - High reactivity; very good litho behavior and pigment wetting. Biobased content: 30% C14. Residual TMPTA <0,1%	6	45000	15	30	**	**	****	•	****
EBECRYL® 875	- Polyester Tetraacrylate - Good adhesion to plastics, good cure response, low tack and low in misting. Recommended for waterless offset inks	4	75000	8	-	**	•	**	**	**
EBECRYL® 811	- Polyester Tetraacrylate - Good reactivity, good pigment wetting and good ink-water balanced, low misting.	4	7500	9	-	***	***	**	•	****



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PRODUCTS	Description • Key Features & Performance	Functionality	Viscosity mPa.s, 25 °C	Acid value mg KOH/g	OH value mg KOH/g	Adhesion	Solvent resistance	Reactivity	Flexibility	Pigment Wetting
Polyester Acrylates & Diluted Polyesters										
EBECRYL® 4744	• Polyester Triacrylate • Tough but flexible. Low viscosity, good balance between hardness and flexibility. Hydroxy groups containing type for dual-cure formulations (80 mg KOH/g).	3	5000	<3	-	•	...	..	•	..
EBECRYL® LEO 10801	• Polyester hexaacrylate • For indirect food packaging - produced under GMP. Excellent pigment wetting and ink water balance.	6	48000	10	<25	..	...		•	
EBECRYL® 436	• Diluted Chlorinated Polyester • Very good combination of adhesion and reactivity. • 40% TMPTA	-	1500 (60 °C)	25	-		•	...	..	•
EBECRYL® 417	• Diluted Chlorinated Polyester • 40% PPTTA, BPA free • Good adhesion, Fast cure response, Good adhesion to metals, plastics and paper	-	2000 (60 °C)	<15	-		•	..	•	•
EBECRYL® 418	• Diluted Chlorinated Polyester • 40% OTA-480 • BPA free, Good adhesion, Fast cure response, Good adhesion to metals, plastics and paper	-	1800 (60 °C)	<15	-		•	..	•	•
EBECRYL® 444	• Diluted Chlorinated Polyester • 40% OTA-480 • Good adhesion, Fast UV cure response, Good lithographic behavior • BPA and Sn free	-	75000	25	-		•	..	..	•
EBECRYL® 445	• Diluted Chlorinated Polyester • 40% TMPTA • Good adhesion, Fast UV cure response, Good lithographic behavior • BPA and Sn free	-	75000	25	-		•	..	..	•
EBECRYL® 446	• Modified Chlorinated Polyester Resin • Similar performance to EBECRYL 436 with improved lithographic behavior.	-	1800 (60 °C)	25	-		•	...	..	•

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PRODUCTS	Description • Key Features & Performance	Functionality	Viscosity mPa.s, 25 °C	Acid value mg KOH/g	OH value mg KOH/g	Adhesion	Solvent resistance	Reactivity	Flexibility	Pigment Wetting
Polyurethane Acrylate										
EBECRYL® 220	• Aromatic Urethane Hexaacrylate • Fast cure, high hardness and solvent resistance	2	28500	-	-	*	*****	*****	*	...
EBECRYL® 225	• Aliphatic Urethane Deca-acrylate • Tin-free. Outstanding surface hardness, good reactivity also for LED	10	2100*	-	-	*	*****	*****	*	...
Epoxy Acrylate										
EBECRYL® 3701	• Modified Bisphenol-A Epoxy Acrylate • Flexible, good adhesion to plastics.	2	1250000	5	-	...		...	...	...
EBECRYL® 3420	• Modified Bisphenol-A Epoxy Acrylate • Flexible, good wetting of carbon black pigments-brings reactivity	2	22000	2	-	**	*****	*****	...	**



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Hero 100%UV product for Metal packaging

END USE	APPLICATIONS	TECHNOLOGY	HERO PRODUCT	VALUE PROPOSITION
Non Food packaging	LITHO	Polyurethane acrylate	EBECRYL® 220	Fast cure, high hardness and solvent resistance
			EBECRYL® 225	Tin-free. Outstanding surface hardness, good reactivity also for LED.
		Polyester acrylate	EBECRYL® 870	High reactivity; very good litho behavior and pigment wetting. Biobased content: 30% C14. Residual TMPTA <0,1%
			EBECRYL® 875	Good adhesion to plastics, good cure response, low tack and low in misting. Recommended for waterless offset inks
			EBECRYL® 811	Good reactivity, good pigment wetting and good ink-water balanced, low misting.
			EBECRYL® 4744	Tough but flexible. Low viscosity, good balance between hardness and flexibility. Hydroxy groups containing type for dual-cure formulations (80 mg KOH/g).
		Chlorinated polyester	EBECRYL® 436	BISPHENOL A free alternative to PHENODUR® PR 515; recommended for BADGE- and BPA-NI usage. low free formaldehyde version available.
			EBECRYL® 446	Higher reactive version of PHENODUR® PR 516, for BADGE- and BPA-NI usage.
		Epoxy acrylate	EBECRYL® 3701	Flexible, good adhesion to plastics.
			EBECRYL® 3420	Flexible, good wetting of carbon black pigments-brings reactivity
Food Packaging	LITHO	Polyester acrylate	EBECRYL® 1859	Non-BPA version of EBECRYL® 859 - best compromise ink/water balance & very good for black pigments
			EBECRYL® LEO 10801	For indirect food packaging - produced under GMP. Excellent pigment wetting and ink water balance.
		Chlorinated polyester	EBECRYL® 418	Chlorinated polyester diluted in OTA480 (GPTA) - good adhesion to metal - flexible
		Self-curing Acrylate resin	EBECRYL® LEO 10103	Self curing acrylated binder. Use 15-20% in offset inks - free choice of synergist.
		LED booster	EBECRYL® LED 04	LED booster to help in surface curing in litho – good ink/water balance – pigment stab

Polyurethane acrylate Polyesther acrylate Chlorinated polyester Epoxy acrylate Self-curing acrylate LED booster



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Dispersants

Surface
appearance

Defoamer



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Amino
product range

Hero product for
Metal packaging

Printing Inks

Additive
product range

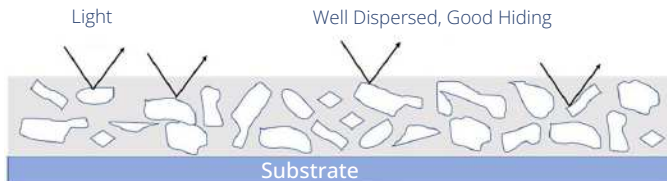
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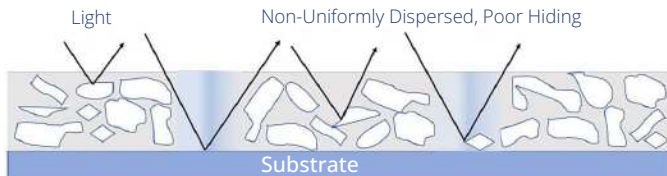
Dispersant Overview

Pigments are specifically created as insoluble particles to add color to various materials. They can be categorized into four types: **organic, inorganic, effect, and functional pigments**. A suitable **dispersion process** and the appropriate selection of pigments and additives are fundamental in determining the performance of the finished coating.



A good dispersion of pigments will result in optimal characteristics:

- Color strength
- Minimum viscosity
- Maximum dispersion stability
- Hiding power
- Gloss



Possible effects and defects of a poor dispersion:

- Very time-consuming and costly process
- Low gloss
- Flocculation and flotation
- Low light and weather resistance
- Poor paint stability

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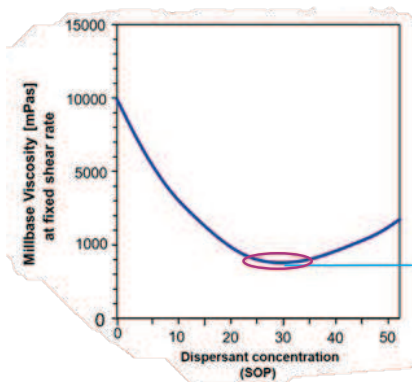
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Dispersant Concentration Selection and Optimization

Dispersant Demand Curve Experiment:

Consists of varying concentration of dispersant with fixed amount of pigment, resin and solvent.



This represents the lowest viscosity, the maximum amount of dispersion absorption, the highest gloss, and the BEST performance.

Other possible ways to assess the optimal amount of dispersant:

- Accelerated aging stability test
- Analysis of the formulation, application, and visual characteristics of the sample

As a rule, 2mg of polymeric dispersant per square meter of pigment surface area will be close to the optimum amount required. To determine the amount of dispersant needed, a straight forward calculation expressed as a percentage of Agent On Weight of Pigment (%AOWP) may be used.

$$\text{Active dispersant amount on pigment (\%)} = \frac{\text{Pigment Surface Area(BET)}}{4 \text{ or } 5}$$

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Wetting and Dispersing Additives

ADDITIVE NAME	DOSAGE	SB/WB	CHARACTERISTICS	DESCRIPTION	%ACTIVE MATTER
Anti-floating					
ADDITOL® XL 204	0,5 – 6,0% pigment		Silicone containing phosphoric acid ester; anionic	Anti-floating additive to improve significantly floating of inorganic and organic pigments and prevents the formation of Bénard cells. It has a strong pigment wetting character and helps to reduce dispersing time.	55%
Dispersants					
ADDITOL® XW 6588	3,0 – 10% inorg. 15 – 50% org. pigment		Nonionic, polymeric low ion migration (LIM) dispersant	Low ion migration dispersant for direct-to-metal applications imparting high pigment loading and improved corrosion resistance	48%
ADDITOL® VXW 6208	3,0 – 10% inorg. 15 – 50 % org. pigment		Nonionically stabilized polymer; diluted in water	High molecular weight dispersing additive for all types of pigment. Due to its non ionic polymer structure it is highly recommended in formulations containing sensitive resins. It is recommended for both, direct grinding and pigment concentrate processes.	50%
ADDITOL® VXW 6394	10 – 30% inorg. 30 – 75 % org. pigment		High molecular weight polymer; nonionic	Very sufficient, high molecular weight dispersing additive for all types of pigment. Due to its non ionic polymer structure it is highly recommended in formulations containing sensitive resins. Further it can be used for the production of highly loaded, binder free pigment concentrates.	40%
ADDITOL® XL 250	0,5 – 5,0% pigment / extender		Phosphoric acid ester, neutralized by amine; anionic; low molecular	Pigment wetting additive with very strong pigment affinity especially to inorganic and metallic pigments. Besides reduced dispersing time it improves gloss and color strength as well as material flow.	55%
ADDITOL® XL 6592	1,0 – 5% inorg. 5 – 30% org. pigment		High molecular weight polymer; nonionic	High efficient, high molecular weight dispersing additive for all types of pigment. Recommended for direct grinding as well as for binder free pigment concentrates.	100%
ADDITOL® VXW 6208/60	3,0 – 10% inorg. 15 – 50 % org. pigment		Nonionically stabilized polymer; diluted in methoxy propanol	High molecular weight dispersing additive for all types of pigment. Due to its non ionic polymer structure it is highly recommended in formulations containing sensitive resins. It is recommended for both, direct grinding and pigment concentrate processes. Highly recommended in 2K Epoxy formulations.	60%
ADDITOL® XL 270	0,1 – 2,0% pigment		Special fatty acid modified silicone; amine neutralized	Multi purpose additive to improve rheology and prevent from settling and floating. Also recommended in high gloss systems.	55%

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Wetting and Dispersing Additives

ADDITIVE NAME	DOSAGE	SB/WB	CHARACTERISTICS	DESCRIPTION	%ACTIVE MATTER
Dispersants					
ADDITOL® XL 255N	0,2 – 2,0% inorg. 1,0 – 5,0% org. pigment		Modified alkyd resin; neutralized	Pigment wetting additive to improve gloss and color strength; for all types of pigment recommended. It may be used for direct grinding or pigment paste process.	55%
ADDITOL® XL 6514/80	0,2 – 1,0% inorg. pigment 1,0 – 5,0% org. pigment		Salt of a basic aminoamide with an acidic polyester	Wetting and anti-settling additive to improve gloss and pigment stabilisation and flow. Especially recommended in low VOC and high solid systems.	80%
ADDITOL® VXL 6237N	3,0 – 10% inorg. 10 – 50% org. pigment		Wetting/dispersing agent; cationic; high molecular	High efficient, high molecular weight dispersing additive for all types of pigment. Recommended for direct grinding as well as for binder free pigment concentrates.	30%
ADDITOL® XL 6521	3,0 – 10% inorg. 15 – 60% org. pigment		Modified block copolymer; high molecular; cationic	Powerful, high molecular weight dispersing additives for very difficult wettable pigments. Especially recommended for all carbon black pigments in order to achieve perfect color properties and extreme high gloss.	60%
ADDITOL® XL 6593	5-20% inorg. 30 – 60% org. pigment		Wetting/dispersing agent; cationic; high molecular weight	Ideal for difficult-to-disperse pigments, targeting VR and industrial applications	45%
ADDITOL® XL 6594	3,0 – 10% inorg. 10 – 50% org. pigment		Urethane modified acrylic copolymer; cationic; high molecular	High molecular weight dispersing additive for difficult wettable pigments. Recommended for direct grinding processes. Improved compatibility in acrylic systems.	30%
ADDITOL® XL 6590	5 - 30% inorg. 10 - 50% org. pigment		Polyester	Outstanding performance in UV/EB chemistries offering excellent compatibility with (in)organic pigments, especially carbon black, and sensitive curing mechanisms, diluted with 35% OTA-480	100%

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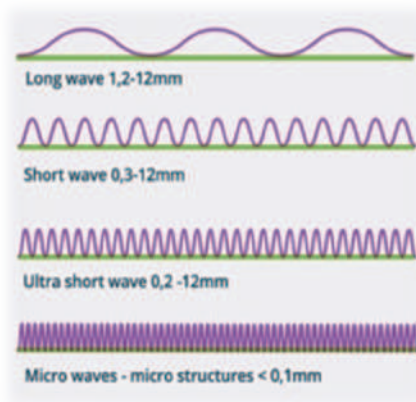
Defoamer

Surface and Appearance Overview

To obtain good leveling (for physically drying coatings), sufficient substrate wetting, uniform solvent(s) evaporation, and well-balanced surface tension throughout the drying phase are essential.

Surface Topography

- The surface topography of physically drying coatings is established during the solvent evaporation stage.
- In the locations where the volatile components have evaporated, the surface tension increases, and the coating migrates toward the higher surface tension areas, creating waves impacting appearance, coating uniformity, and application complexity (higher surface tension, harder to spray).



(Meth)-acrylics

- + Reduce microstructure
- + No impact on surface tension
- + No impact on interlayer adhesion

Silicones

- + Reduce long wave
- + Increase slip performance
- + Reduce surface tension
- Decrease interlayer adhesion !

Flow and leveling additives are used to prevent surface waviness materializing in coating defects including orange peel, brush marks, peaks, craters, fisheyes and pinholes (depending on application and application technique).

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Flow and Leveling Additives

ADDITIVE NAME	ACTIVE (%)	VISCOSITY (cps)	CHEMISTRY	WB/SB/UV	MW	ATTRIBUTES
ADDITOL® XL 121N	14	–	Silicone		L	Improves substrate wetting and coating slip, has excellent compatibility with conventional solventborne chemistries
ADDITOL® XL 122	45	–	Silicone		L	Imparting slip, scratch resistance, and substrate wetting with medium impact on surface tension for conventional solventborne chemistries
ADDITOL® XL 123N	60	–	Silicone		M	Outstanding performance: reduces microstructures, excellent flow and leveling, offers dynamic surface tension reduction in both UV/EB and conventional solvent- and water-borne coatings. Ideal for SKU reduction, plus a unique scratch resistance synergy when used in conjunction with Modaflow® NSR 100
ADDITOL® VXL 4930N	40	75	Silicone		M	Polyether-modified silicone, offers balanced performance such as suitable substrate wet out, leveling, orange peel correction, and anti-catering without stabilizing foam. Compatible with solvent- and water-borne conventional and UV/EB coatings
ADDITOL® XW 6580	100	60	Silicone		L	VOC-free, improves substrate wetting agents for waterborne and solventborne paint systems making an ideal product for SKU consolidation
ADDITOL® XW 6503N	50	-	Silicone		L	Improves substrate wetting agents for waterborne and solventborne paint systems making an ideal product for SKU consolidation
ADDITOL® XW 6586	100	1500	Polysiloxane		L	Versatile, FDA compliant flow and leveling silicone that offers excellent performance at low dosage. Reduces surface friction and improves hardness and slip without affecting re-coatability. Can be used in UV/EB and conventional 100% solids, waterborne and solvent coatings making it ideal for SKU consolidation
EBECRYL® 341	80	50	Acrylate		L	Improves coatings slip and release and enhances leveling in UV/EB applications without silicones
EBECRYL® 350	100	350	Silicone diacrylate		L	Improves substrate wetting, slip, release, and flow properties with minimum impact on coating surface tension in UV/EB applications
EBECRYL® 1360	100	2100	Silicone hexa-acrylate		L	Films will exhibit a smooth, tack-free surface with good anti-blocking resistance and increased hardness due to higher cross-link density in UV/EB applications
EBECRYL® 1365	100	2500	Silicone hexa-acrylate		L	Fast migration to the surface for dynamic reduction to surface energy, outstanding resin compatibility, improves scratch, mar, and stain resistance in UV/EB applications, high water contact angle 105°.

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Flow and Leveling Additives

ADDITIVE NAME	ACTIVE (%)	VISCOSITY (cps)	CHEMISTRY	WB/SB/UV	MW	ATTRIBUTES
ADDITOL® XW 395	58	1200	Polyacrylate		L	FDA compliant, silicone-free, flow and leveling agent that improves wetting on difficult to "wet out" substrates. Eliminates craters without stabilizing foam. Ideal for RESYDROL® paint systems and can be used in conventional waterborne, water reducible, or solventborne coatings.
ADDITOL® VXW 4971	50	4500	Acrylate		L	Amine-neutralized systems designed to improve surface appearance and reduce surface imperfections' impact on coating quality, designed primarily for Resydrol stoving systems
MODAFLOW® AQ 3025	25	150	Acrylate		H	Opportunities to reduce SKUs, offering excellent compatibility and performance in both conventional and UV/EB aqueous chemistries with robust substrate wetting without silicone, including not-so-perfect surfaces
MODAFLOW® 9200	100	3000	Acrylate		L	Robust surface wetting performance for 100% solids, high solids, and solventborne conventional and UV/EB applications, additional benefit as a co-dispersant for pigments
MODAFLOW® 2100	100	8500	Acrylate		M	Improves surface wetting, flow, and leveling in clear and pigmented systems. Reduces pinholes, craters, and orange peel. Aids in pigment dispersion and de-aging in UV/EB and conventional chemistries.
ADDITOL® XL 480/481	70	200/100	Acrylate		M	Excellent for not-so-clean substrates such as coil, creating a robust surface quality, reducing surface imperfections such as craters without silicones, can be used in conventional and UV/EB chemistries, ideal for 100% solid, high solids, and solventborne applications
ADDITOL® XL 482	100	20000	Acrylate		M	Cost-effective flow modifier that reduces pinholes, fisheyes, craters, and orange peel that aids in air release and pigment dispersions; works well in sensitive cure mechanism and can be used in UV/EB applications, ideal for 100% solid, high solids, and solventborne applications
MODAFLOW® Epsilon	80	1000	Acrylate		H	Effective in eliminating pinholes and craters in epoxy, polyester, urethane, and acrylic coating and suitable for UV/EB applications
MODAFLOW® Resin	100	100000	Acrylate		H	Robust substrate wetting for 100% solids, high solids, and solventborne conventional and UV/EB coatings, Modaflow resin also reduces orange peel, craters, and pinholes and aids in formulation degassing and pigment dispersion, making it multitude of performance features ideal candidate to reduce flow and leveling SKU
MODAFLOW® Lambda	100	15000	Acrylate Hybrid		L	Crosslinkable flow promoter that improves surface characteristics such as gloss, DOI, and brilliancy and reduces orange, nonmigrating silicone for conventional and UV/EB Chemistries
ADDITOL® XW 6537	100	10000	Polyester		M	Cost-effective flow and leveling agent that reduces orange peel and pinholes. Improves substrate wetting w/o silicone. Can be used in 100% solids and high solids conventional and UV/EB coatings

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Surface and Appearance Comparison

MODAFLOW®

EBECRYL®

ADDITOL®

Attributes	MODAFLOW® Resin	MODAFLOW® 9200	MODAFLOW® Lambda	ADDITOL® XL 123N	ADDITOL® XL 480/481/482	ADDITOL® XW 6503N	EBECRYL® 1365	ADDITOL® XL 6537
Gloss	✓	✓	✓	✓	✓	✓	✓	✓
DOI	✓	✓	✓	✓	✓	✓	✓	✓
Leveling	✓	✓	✓	✓	✓	✓	✓	✓
Crater Control	✓	✓	✓	✓	✓	✓	✓	✓
Pinhole Elimination	✓	✓	✓	✓	✓	✓	✓	✓
Defoaming	✓	✓	✓	✓	✓	✓	✓	✓
Surface Wetting	✓	✓	✓	✓	✓	✓	✓	✓
Slip & Mar resistance	✓	✓	✓	✓	✓	✓	✓	✓
Adhesion substrate	✓	✓	✓	✓	✓	✓	✓	✓
Recoatability	✓	✓	✓	✗	✓	✓	✗	✓
Cross Compatibility	✓	✓	✓	✓	✓	✓	✓	✓
Special Textures	✓	✓	✓	✓	✓	✓	✓	✓
Clarity	✓	✓	✓	✓	✓	✓	✓	✓
Orange Peel	✓	✓	✓	✓	✓	✓	✓	✓
Facilitate Pigment Dispersion	✓	✓	✗	✗	✓	✓	✗	✗
Air Release	✓	✓	✓	✓	✓	✓	✓	✓

 Highly Recommended
  Recommended
  Not recommended

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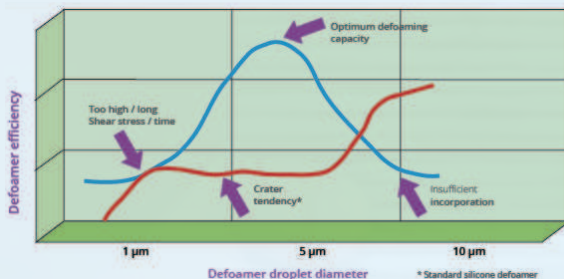
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During production and handling, the increased volume by foam and the incorporated air will cause handling and filling problems. After application of coatings, air inside the system should leave the film while the viscosity is low enough to allow bubble marks to reflow. These larger bubbles are macro foam, which is eliminated by Defoamers. The dispersed air in the system which remains is called micro foam. Deaerators or air release agents carry these very small bubbles to the surface of the liquid phase. Highly viscous and intense pseudoplastic paints applied at high wet film thicknesses, e.g., by an airless spray gun, are susceptible to entrapped foam. The foam within the coating may lead to pinhole formation and can weaken the anti-corrosion performance of paints.



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Defoamer Additives

ADDITIVE NAME	ACTIVE (%)	CHEMISTRY	DOSAGE %	WB/SB/UV	ATTRIBUTES
ADDITOL® VXW 4926	100	Fatty oil	2.0-15.0% (binder)		Balance of defoaming and deairing performance for aqueous solutions that is cross-linkable, an excellent option for high film build applications.
ADDITOL® VXW 4973	100	Mineral oil and wax	0.1-0.6%		Highly efficient mineral oil and wax defoamer for waterborne coatings offering robust performance in a variety of markets and applications.
ADDITOL® VXW 6211	100	Hydrocarbon and silicone	0.05-0.5%		For pigmented paints or pigment pastes, one of the most effective defoamers for conventional waterborne systems.
ADDITOL® XW 376	50	Mineral oil	0.05-0.5% (Paint)		Cost-effective, highly efficient, easy to incorporate defoamer for UV/EB and conventional water-based coatings, shear stable, alkali resistant (up to pH of 13), and excellent product for consolidation of SKU for aqueous applications.
ADDITOL® XW 6393	100	Mineral oil	0.1-0.5%		Highly efficient low-odor defoamer for aqueous industrial and architectural paints.
ADDITOL® XW 6544	100	Polymeric	0.05-0.5%		Highly efficient defoamer with excellent re-flow effect improves surface quality for conventional and UV/EB waterborne systems, perfect product for SKU simplification
ADDITOL® XW 6569	20	Hydrophobic	0.05-0.5%		Well-balanced, emulsifier-free defoamer/deaerator for transparent and high gloss systems, species no impact on rheology modifiers or re-coatability
ADDITOL® XW 6585	25	Silicone	0.2-1.0%		Emulsifier-free silicone defoamer modified with hydrophobic polymers to produce a highly effective defoamer for clear and pigmented conventional and UV/EB water-based coatings, XW 6585 does not interfere with rheology modifiers such as associative thickeners, and VOC-, mineral oil-, and APEO- free.
ADDITOL® XW 6567	100	Hydrocarbon	0.05-0.5%		FDA Compliant, VOC free, silicone-free defoamer for waterborne applications, Shear stable under high shear (high shear needed for incorporation, High efficiency in foam destruction, Can be added at any stage
ADDITOL® XL 6507	10	Polymeric	0.1-1.5%		Polymer defoamer that offers efficiencies like silicone or hybrid silicone perfluorinated polymers, ideal for UV/EB and conventional high solids and solventborne coatings
ADDITOL® XL 6531	39	Polymeric	0.1-0.5%		Solution of foam-destroying polymers for 100%, high solids, or solventborne systems. Highly effective for pigmented or transparent systems

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