

ELEMENTIS

Performance specialties

Asia



Unique chemistry,
sustainable solutions

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Overview

Elementis is a global specialty chemicals company that delivers enhanced performance through applied innovation. We partner with our customers to provide innovative and leading technologies in personal care, coatings, and energy around the globe.

We offer a variety of rheology modifiers and specialty additives for architectural and industrial paints and coatings, adhesives and sealants and inks.

In close partnership with our customers, we develop innovative solutions for both waterborne, solvent and solvent-free systems that enhance the look, feel, and stability of our customers' products. Our technology addresses performance needs through our rheological additives, wetting and dispersing agents, defoamers, waxes and slip aids, adhesion promoters and other performance enhancing additives.

Our trademarks, such as BENTONE®, RHEOLATE®, THIXATROL®, THIXCIN®, M-P-A®, DAPRO®, NUOSPERSE®, SLIP-AYD®, SUPREAD™, DeuRheo, NALZIN®, Defom, Levelol, Levaslip, Dispone are recognized worldwide.

We continue to focus on harnessing our expertise in high-performing ingredients to enhance our customers' product performance and bring new technologies to the markets we serve.

Rheological additives

RHEOLATE® nonionic synthetic associative thickeners

Basic principles

Most Elementis associative thickeners are hydrophobically modified ethoxylated polyurethanes. These are the RHEOLATE® 200 series and RHEOLATE® 600 series as well as the RHEOLATE® FX, HX and CVS grades. The RHEOLATE® 600 products are alternative, low-VOC versions of their RHEOLATE® 200 equivalents. Elementis has also developed a class of hydrophobically modified polyether polyol associative thickeners, the RHEOLATE® 300 series. Both ranges of products represent advanced technology for waterborne systems and provide superior rheological performance.

Recommendations

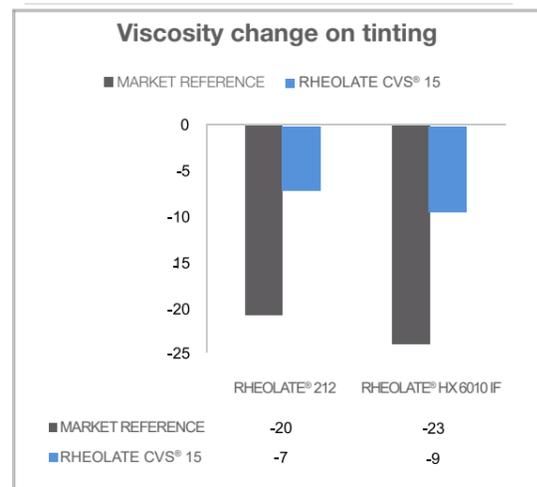
The new RHEOLATE® HX series comprises several high-efficient nonionic synthetic associative thickeners with excellent beneficial characteristics. RHEOLATE® HX 6008 has outstanding rheological properties for aqueous applications. It develops high-shear viscosity (ICI) very efficiently and additionally displays some mid-shear viscosity contribution. RHEOLATE® HX 6008 is effective in a broad range of latex chemistries particularly in acrylic and styrene acrylic emulsions.

RHEOLATE® HX 6050 is especially efficient in hydrophilic resins such as VAE-latices and in Vina-Veova latices. RHEOLATE® HX 6010 and RHEOLATE® HX 6025 have the most Newtonian rheological profile, has very low contribution to mid-shear (KU) viscosity and offers excellent flow and leveling and other application properties in hydrophobic acrylic and styrene acrylic binders.

RHEOLATE® HX 6050 IF is especially efficient in hydrophilic resins such as VAE and in Vina-Veova latices. RHEOLATE® HX 6010 and RHEOLATE® HX 6025 have the most Newtonian rheological profile, with very low contribution to mid-shear (KU) viscosity. They offer excellent flow and leveling and other application properties in hydrophobic acrylic and styrene acrylic binders.

RHEOLATE CVS® 15 is our newest mid-shear associative thickener. It provides paint formulations viscosity retention upon point-of-sale or in-plant color tinting in combination with excellent color properties such as improved color float resistance and greatly improved color rub up performance. The product has superior sag and leveling properties which provide excellent application properties when applied with brush, roller or when sprayed.

The large variety of available RHEOLATE® associative thickeners allow maximum flexibility to adjust and fine-tune the flow behavior of a system to meet the required performance.



Architectural coatings

Depending on the application, an architectural paint can be formulated in various ways.

It can be formulated using a combination of a mid-shear (Stormer) viscosity associative thickener and a high shear (ICI) viscosity thickener. This combination allows maximum flexibility to adjust the application performance of a paint. Examples are the combination of RHEOLATE® 655 and RHEOLATE® 212 or RHEOLATE CVS® 15 and RHEOLATE® HX 6010 or RHEOLATE® HX 6025.

Architectural coatings can also be made using a single associative thickener like shear, RHEOLATE® HX 6050 IF or RHEOLATE® 678. If a more balanced flow behavior for decorative coating systems is required, such as a Newtonian type of flow for alkyd emulsion paints, it is advised to use RHEOLATE® 212 or RHEOLATE® HX 6010. Most associative thickeners recommended for decorative coatings allow the formulation of VOC-complaint coatings, or even very low VOC if required.

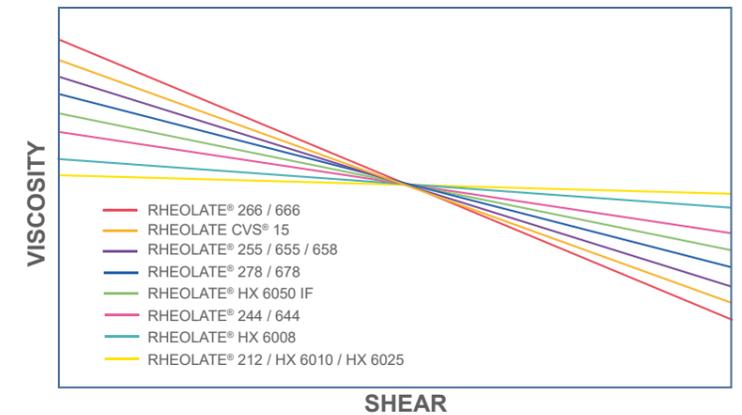
Industrial coatings

For industrial coatings, sag resistance, to allow for high film builds, and shear thinning behavior, to allow for spray application, are the most important properties.

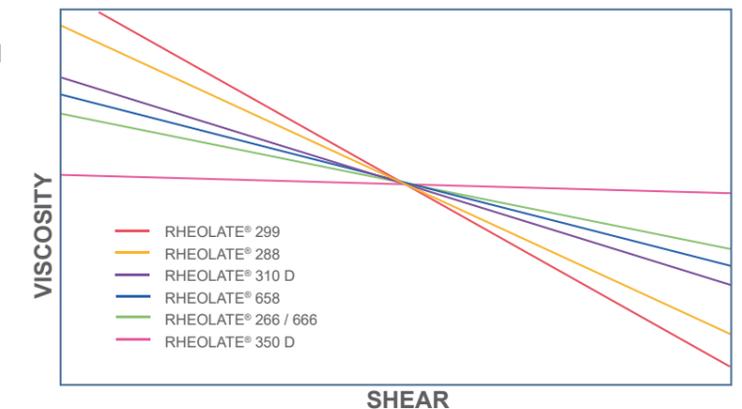
The following products are recommended for industrial coatings:

- RHEOLATE® 299 for high build, spray applied coatings
- RHEOLATE® 288 for spray applied coatings, particular clear coats
- RHEOLATE® 310 D for general industrial coatings
- RHEOLATE® 266/666 for general industrial spray applied coatings
- RHEOLATE® 350 D for wood coatings in general

RHEOLATE® NiSAT for architectural coatings



RHEOLATE® NiSAT for industrial coatings



Rheological additives

RHEOLATE® acrylic thickeners

Basic principles

RHEOLATE® alkali swellable rheological additives for aqueous systems are free-flowing liquids (25 - 30 % active in water). Each product enhances viscosity development, flow and application properties and can easily be post-added in the manufacturing process.

RHEOLATE® hydrophobically modified alkali swellable additives are highly efficient thickeners with predictable rheological profiles. They can be used as full or partial replacements for HEC and HMHEC. They enhance spatter resistance, flow and leveling, and since they are enzyme resistant, they give improved bio-stability, all at a lower cost in use.

Recommendations

RHEOLATE® 1 is an efficient low-shear ASE thickener. It is an effective alternative to cellulosics, with improved resistance to sag and settling. It is used extensively in low PVC systems.

RHEOLATE® 125 is a strongly shear-thinning ASE thickener offering improved pigment suspension and stable viscosity across a very wide pH window. An excellent choice for spray applied industrial coatings.

RHEOLATE® 150 and RHEOLATE® 175 are cost effective HASE thickeners for semi-gloss and flat latex paints, waterborne inks and waterborne adhesives. RHEOLATE® 150 is designed for excellent low-shear viscosity build in medium to high PVC formulations. RHEOLATE® 175 provides superb mid- to high-shear viscosity build.

RHEOLATE® 135 is the most newtonian HASE thickener in our portfolio. It has excellent performance in high PVC and contractor grade paints.

RHEOLATE® 425 is an associative HASE thickener for mid-shear viscosity build, improved leveling and spatter resistance while retaining good sag control. It works well in high PVC systems.

RHEOLATE® 465 and RHEOLATE® 475 are highly associative HASE thickeners for high-shear viscosity increase with some KU contribution. They provide an excellent balance between spatter resistance and flow and leveling. RHEOLATE® 465 and RHEOLATE® 475 have outstanding storage stability and is recommended for high quality decorative coatings.

RHEOLATE® 185 is a highly-efficient acrylic thickener developed to fully replace cellulosic thickeners in architectural paint formulations. It is more economical to use. It shows improved hide because of its superior roller pattern and leveling (see figure below). Like all HASE type thickeners, it has improved spatter resistance, especially when compared to HEC type thickeners. It can be used in paints that are developed to be brushed, rolled or sprayed, or without, additional dilution.



Rheological additives

RHEOLATE® thickeners

Product name	Composition	Description	Solventborne	Waterborne	Application																				Shear Rate			
					Architectural coatings					Industrial coatings					Construction					Others					Low	Medium	High	
					Exterior coatings	High PVC coatings	Flat coatings	Semi-gloss/gloss coatings	Water reducible coatings	Car-OEM coatings	Car refinishing coatings	Coil coatings	General industrial coatings	Marine protective coatings	Plastic coating	Wood coatings	Asphalt emulsion	Concrete coatings	Grouts	Plaster/stucco	Roof coatings	Tile adhesives	Adhesives and sealants	Inks				Leather coatings
Acrylic thickeners																												
RHEOLATE® 1	Acrylic emulsion	Excellent low shear ASE-type viscosity builder. Cost-effective replacement for medium molecular weight HEC with improved sag and settling for low PVC systems, including wood, architectural, and industrial coatings.		●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○		
RHEOLATE® 135	Acrylic emulsion	Excellent performance in high PVC and contractor grade paints. Good contribution to mid and high shear viscosity.		●	○	●	●	●	●						○	●	●		●							○	●	
RHEOLATE® 150S	Acrylic emulsion	Excellent low shear viscosity builder. Most pseudoplastic of all HASE products shown. Cost-effective alternate to high molecular weight HEC. Recommended for interior paints.		●	○	●	●	●	○	○	○	○	●	○	○	●	○		●	●	●	●	●	○	○			
RHEOLATE® 175S	Acrylic emulsion	Excellent mid to high shear viscosity builder. Provides excellent film build, leveling and spatter resistance.		●	○	●	●	●	○	○	○	○	○	○	○	○	○	○	●	●	●	○	○	○	○	○	○	○
RHEOLATE® 185	Acrylic emulsion	Excellent low-shear acrylic thickener that was developed to replace HEC in interior and exterior formulations, giving improved applied hide and reduced spatter.		●	○	●	●	○	○							●	○		●		●	●	●	●	●	●	●	
RHEOLATE® 465	Acrylic emulsion	HASE thickener with unique flow and leveling properties. Works well across all decorative latex systems.		●	○	○	●	●	●	○	○		○		○	○		●							○	○	●	
RHEOLATE® AP 425	Proprietary acrylic emulsion in water	Economical and versatile hydrophobically modified alkali swellable thickener designed to fully or partially replace cellulosic thickeners in a variety of waterborne systems.		●	○	○	●	●	●	○	○		○		○	○						●	●	○	○	○	●	
DeuRheo WT-115	Anionic-polyacrylate	A highly efficient alkali swellable acrylic associate thickener (HASE). It is easy to use with excellent thickening effect, flow and leveling. When applied by roller it eliminates spattering and has good syneresis resistance.		●	○	○	○	○				●									●	●		●				

Rheological additives

RHEOLATE® thickeners

Product name	Composition	Description	Solventborne	Waterborne	Application																			Shear Rate		
					Architectural coatings					Industrial coatings						Construction				Others				Low	Medium	High
					Exterior coatings	High PVC coatings	Flat coatings	Semi-gloss/gloss coatings	Water reducible coatings	Car-OEM coatings	Car refinsh coatings	Coil coatings	General industrial coatings	Marine protective coatings	Plastic coating	Wood coatings	Asphalt emulsion	Concrete coatings	Grouts	Plaster/stucco	Roof coatings	Tile adhesives	Adhesives and sealants			
Nonionic associative thickeners (NiSAT)																										
RHEOLATE CVS® -10	Polyurethane solution	Excellent low-mid shear viscosity builder, provides good balance of sag, flow and leveling, reduced viscosity loss on tinting, excellent color properties and syneresis control.		●	●	●	●	●					●								●	●	●	○		
RHEOLATE CVS® -15	Polyurethane solution	Highly efficient, zero VOC , mid-shear builder with minimum KU drop upon tinting.		●	●	●	●	●	●	●			●	●	●	●					●	●	●	○		
RHEOLATE® 208	Polyurethane solution	Powdered rheology modifier, excellent mid-shear builder.		●	●	●	●	●					●										○	●	○	
RHEOLATE® 212	Polyurethane solution	Excellent high-shear viscosity builder. Highly Newtonian profile with little influence on mid-shear viscosity. Used often in combination with RHEOLATE® 666, RHEOLATE® 655, or RHEOLATE CVS® thickeners for ideal balance of properties.		●	●	○	●	○	○	●	●	●	●	●	●	●					●		○		●	
RHEOLATE® 222	Polyurethane solution	Highly efficient high-shear viscosity builder for aqueous applications, provides excellent flow and levelling.		●	●	○	●	○	○	●	●	●	●	●	●	●					●		○		●	
RHEOLATE® 244	Polyurethane solution	Good high-shear viscosity build. Higher KU build in small particle-size binders than RHEOLATE® 212. Best balance of KU/ICI viscosities, ideal for use as sole thickener in small particle-size binders.		●	●	○	●	●	●				●											○	○	
RHEOLATE® 255	Polyurethane solution	Good mid-shear viscosity builder, especially with small particle-size binders. Works well in flat through gloss paints.		●	●		●	●	●	●	●		●	●	●	●					●	●	●	○	●	
RHEOLATE® 266	Polyurethane solution	Excellent low-shear viscosity builder. Highly pseudoplastic rheology, excellent for spray and thick film application.		●	●		●	●	●	●			●	●	●	●					●	●		●	○	
RHEOLATE® 278 TF	Polyurethane solution	Excellent mid-high shear viscosity builder. Can be used as the sole thickener in quality acrylic flats and eggshell finishes.		●	●	○	●	●	●	●	●		●	●	●	●							○	●	○	
RHEOLATE® 288	Polyurethane solution	Suitable for high-gloss, clear and pigmented coatings and haze-free architectural and industrial finishes.		●	●		●	●	●	●			●	●	●	●							●			
RHEOLATE® 299	Polyurethane solution	Highly efficient thickener that provides excellent sag resistance on spraying.		●	●		●	●	●	●			●	●	●	●					●	●	●	●		
RHEOLATE® 300 D	Polyether polyol solution	Excellent mid-shear viscosity builder. Good color, sag resistance, and suspension properties. Less sensitive to higher HLB surfactants. Best used in combination with RHEOLATE® 350 for good overall balance of properties.		●	●		●	●	●				●			○					○		●	○	●	

Rheological additives

RHEOLATE® thickeners

Product name	Composition	Description	Solventborne	Waterborne	Application																			Shear Rate			
					Architectural coatings					Industrial coatings					Construction				Others			Low	Medium	High			
					Exterior coatings	High PVC coatings	Flat coatings	Semi-gloss/gloss coatings	Water reducible coatings	Car-OEM coatings	Car refinsh coatings	Coil coatings	General industrial coatings	Marine protective coatings	Plastic coating	Wood coatings	Asphalt emulsion	Concrete coatings	Grouts	Plaster/stucco	Roof coatings				Tile adhesives	Adhesives and sealants	Inks
Nonionic associative thickeners (NiSAT)																											
RHEOLATE® 310 D	Polyether polyol solution	RHEOLATE® 310 is a solvent-free version of RHEOLATE® 300.		•	•		•	•	•					•			○				○		•				
RHEOLATE® 350 D	Polyether polyol solution	Excellent high-shear viscosity build, great synergy with RHEOLATE CVS® rheology modifiers, excellent color properties and good syneresis resistance. More contribution on the mid-shear viscosity than RHEOLATE® 212.		•	•		•	•	•	•	•			•	•	•	•					•	•	•		•	
RHEOLATE® 644	Polyurethane solution	Low VOC, solvent free, APE-free, provides efficient thickening in high and mid-shear viscosity ranges		•	•	○	•	•	•					•											○	○	
RHEOLATE® 655	Polyurethane solution	Low VOC, solvent-free, APE-free, provides thickening efficiency primarily in the medium-shear rate range viscosity.		•	•		•	•	•	•	•			•	•	•	•						•	•		•	
RHEOLATE® 658	Polyurethane solution	Excellent mid-shear viscosity builder, especially with small particle-size binders. Works well in low and zero VOC flat through gloss paints.		•	•		•	•	•	•	•			•	•		•						•	•	○	•	
RHEOLATE® 666	Polyurethane solution	Low VOC, solvent free, APE-free, provides viscosity at low and medium-shear rates and provides effective flow and leveling control.		•	•		•	•	•	•	•			•	•	•	•						•	•		•	○
RHEOLATE® 678	Polyurethane solution	RHEOLATE® 678 is a solvent-free version of RHEOLATE® 278.		•	•		•	•	•	•	•			•	•	•	•						•		○	•	○
RHEOLATE® FX 1070	Polyurethane solution	Zero-VOC liquid rheology modifier for high shear viscosity in aqueous coatings.		•	•		•	•	•	•	•			•	•	•	•						•	•			•
RHEOLATE® FX 1010	Polyurethane solution	Rheology modifier for low to mid shear viscosity. provides good sag resistance, and anti-settling properties.		•						•	•			•	•	•	•							•	○	•	
RHEOLATE® FX 1080	Polyurethane solution	Very low VOC, high efficiency, high active content polyurethane mid-shear thickener for the use in aqueous coatings.		•	•		•	•	•					•			•								○	•	○
RHEOLATE® HX 6008	Polyurethane solution	Efficient, Zero VOC, APEO free, high-shear builder. Excellent efficiency with both hydrophobic and hydrophilic resins with some low-shear contribution.		•	•	○	•	○	○	•	•			•	•	•	•						•	•	•	○	•
RHEOLATE® HX 6010	Polyurethane solution	Highly efficient, zero VOC, APEO free, Newtonian high-shear builder. Excellent efficiency with hydrophobic resins with exceptional application properties.		•	•	○	•	•	•	•	•			•	•	•	•						•	•			•
RHEOLATE® HX 6025	Polyurethane solution	Zero VOC, APEO free, high-shear builder. Excellent stain resistance and applied hide		•	•	○	•	•	•					•			•										•
RHEOLATE® HX 6050 IF	Polyurethane solution	Highly efficient, zero VOC, APEO free, high-shear builder. Excellent efficiency with hydrophilic resins and significant low-shear contribution.		•	•	•	•			•	•			•	•	•	•						•			○	•
Powdered NiSATs																											
RHEOLATE® 208	Polyurethane powder	Powdered rheology modifier, excellent mid-shear builder.		•	•		•	•	•					•											○	•	○
RHEOLATE® FX 1100	Polyurethane powder	Powdered, high efficiency, high-shear polyurethane thickener developed for use in sustainable waterborne systems		•	•		•	•	•					•			•		○	○	○	•		○		○	•
RHEOLATE® PHX 7025	Polyurethane powder	Zero VOC, high-shear builder. Excellent stain resistance and applied hide. Powdered rheology modifier for sustainable formulations		•	•	○	•	•	•					•			•	•	•	•			•				•

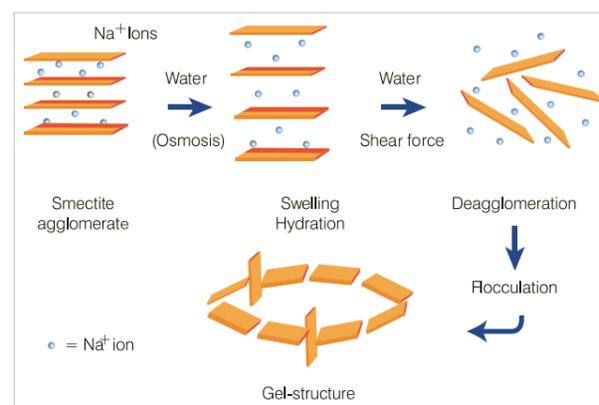
Rheological additives

BENTONE® clays for waterborne applications

Basic principles

Elementis clay products for waterborne systems are mainly based on hectorite, a naturally occurring smectite clay. Hectorite is a hydrophilic swelling clay composed of silicate sheets, which delaminate in water to provide an open three-dimensional structure. Because of this behavior, hectorite clays have the ability to thicken aqueous systems and are widely used as rheological additives.

BENTONE® clay thickening mechanism



BENTONE® rheological additives improve suspension properties and are easy to handle. They are also suitable for applications requiring fast water release and exceptional sag resistance. In construction applications, they give easier workability for tile adhesives, grouts, skim coats and mastics. Examples of very different types of modified clays are listed below.

Recommendations

BENTONE® DE is a refined natural hectorite clay modified for easy dispersion. It allows for high pregel solids (up to 14 %) with pourable viscosity. BENTONE® DE provides excellent in-can stability and sag control for a wide range of coating formulations.

BENTONE® DY CE is an optimized blend of smectite clay with a natural polymer. This product was specifically designed to prevent syneresis in standard architectural paints while maintaining open time. It is also suitable for industrial coatings including waterborne epoxies.

BENTONE® EW-NA is a highly-purified (beneficiated), easily dispersible powdered hectorite clay. This product is suitable for both architectural and industrial paint applications. It can be used to improve flow properties and reduce syneresis and settling.

BENTONE® LT is an organically modified hectorite clay that builds viscosity and shear-thinning flow efficiently in waterborne systems. It may be used as a direct substitute for HEC thickeners.

Product name	Composition	Description	Solventborne	Waterborne	Application																			Shear Rate		
					Architectural coatings				Industrial coatings						Construction				Others							
					Exterior coatings	High PVC coatings	Flat coatings	Semi-gloss/gloss coatings	Water reducible coatings	Can coatings	Car-OEM coatings	Car refinish coatings	Coil coatings	General industrial coatings	Marine protective coatings	Plastic coating	Wood coatings	Asphalt emulsion	Concrete coating	Grouts	Plaster/stucco	Roof coatings	Tile adhesive	Adhesives and sealants	Inks	Leather coatings
BENAQUA® 4000	Modified smectite clay	Hectorite clay-polymer for textured, spray applied and high build coatings		•	•	•			•										•					•		
BENAQUA® 5000	Modified smectite clay	Hectorite clay composite for the adhesives and grouts		•															•					•		
BENTONE® DE	Modified smectite clay	Hyperdispersible hectorite clay for waterborne decorative coatings		•						•	•	•	•	•	•	•				o	o			•	•	
BENTONE® DY CE	Modified smectite clay	Modified clay to improve sag resistance and flow in waterborne systems		•	•	•	•			•	•	•	•	•	•										•	o
BENTONE® EW NA	Modified smectite clay	Hectorite clay for suspension control for waterborne systems		•	•	o	•	•	•	•	•	•	•	•	•					•	•	•	•	•	•	
BENTONE® GS	Modified smectite clay	Hectorite clay for waterborne adhesives/sealants and construction systems		•	•										•		•	•	•	•				•	•	
BENTONE® HC	Modified smectite clay	Refined hectorite for waterborne adhesives, sealants and high PVC emulsion paints		•		•										•	•	•		•				•	•	
BENTONE® HD	Modified smectite clay	Hyperdispersible hectorite clay for industrial coatings		•																				•	•	
BENTONE® LT	Modified smectite clay	Modified hectorite clay for waterborne paints		•					•	•	•	•	•	•	•					•	•	•		•	o	
BENTONE® OC	Smectite clay	Hectorite clay for waterborne construction systems, 50% active		•	•					•									•	•				•	•	
BENTONE® WBS	Smectite clay	Recommended for plasters, mortars and renderings based on lime, cement and gypsum		•	•	•	•	o											•	•	•			•		

Rheological additives

BENTONE® and BENGEL® organoclays for solventborne applications

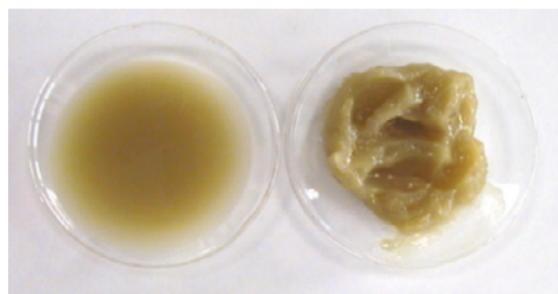
Basic principles

BENTONE® and BENTONE SD®, BENGEL®, organoclay rheological additives are reaction products of highly purified smectite clay and a quaternary ammonium salt. For applications that include coatings, adhesives and sealants, the clays are beneficiated before being converted into organoclays. When properly selected and activated, they will increase low shear viscosity, reduce sagging and help reduce settling in non-aqueous systems.

As supplied, BENTONE® and BENTONE SD® additives are powders in the form of agglomerated platelet stacks. A combination of wetting and mechanical energy deagglomerates the platelet stacks. Conventional BENTONE® additives require chemical polar activation, whereas in typical solventborne systems, the super dispersible BENTONE SD® additives do not. Polar activators can be 95/5 methanol/water mixture where methanol can still be used, 95/5 ethanol/water or propylene carbonate.

Thickening mechanism and incorporation

In a system containing the fully dispersed and separated organoclay platelets, a gel structure will develop by edge-to-edge hydrogen bonding between hydroxyl groups on the organoclay platelet edges. The most efficient gel structure develops when the hydroxyl groups are bridged by water molecules. If the water bridge is not present, the hydrogen bonding is significantly weaker, causing poor gel development.



BENTONE® 34 pregel without polar activator BENTONE® 34 pregel with polar activator

Typical incorporation of organoclays follows these steps:

1. Add organoclay to a mixture of solvent and resin
2. Mix for 5 minutes
3. Add the polar activator (if needed)
4. Disperse at high shear for a minimum of 15 minutes
5. Continue with the rest of the formula

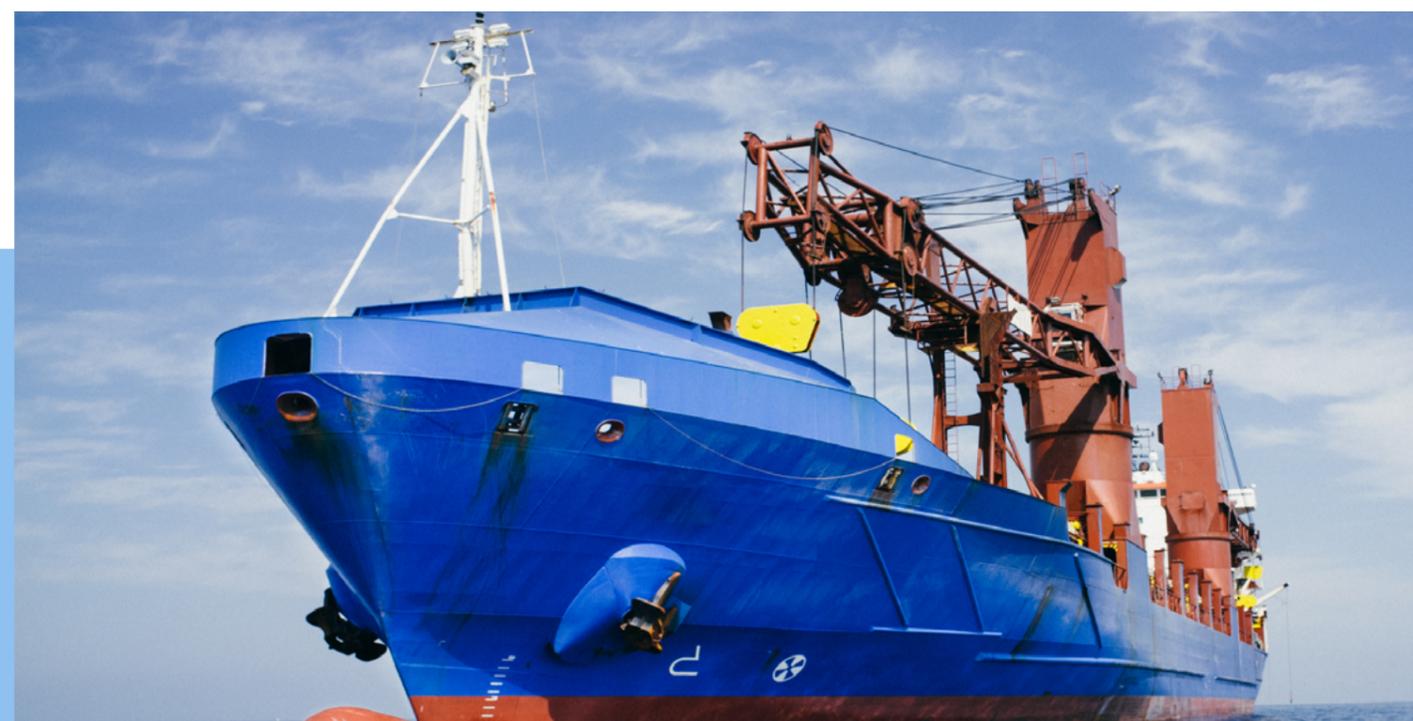
Solvent compatibility

Organoclays are compatible with most resin systems, including acrylics, epoxies, and polyurethane. The choice of BENTONE® and BENGEL® additives depends on the solvent and the resin used in the system. BENTONE® and BENGEL® rheological additives are available in conventional form and in super dispersible form for easier incorporation.

Low polarity Systems	Mid polarity systems	High polarity systems	Activation	
			Polar activator required	Easy to disperse
Aliphatic Solvents, Mineral Spirits, Isopars, Naphtha, etc.	Aromatic and Hydrocarbon Solvents, Xylene, Toluene, etc.	Aldehydes, Acetates, Alcohols, Esters, Ethers, Glycols, Ketones.		
Organoclay additives				
	BENTONE® 34, BENTONE® 1000		•	
	BENGEL® 434, BENGEL® 908		•	
	BENGEL® 818, BENGEL® 958			•
	BENTONE SD®-1			•
	BENTONE® 52		•	
	BENTONE® 54			•
	BENTONE® 38 (*)		•	
	BENTONE SD®-3 (*)			•
		BENTONE SD® -2		•
		BENGEL® 828		
		BENTONE® 27 (*), BENTONE® 57	•	
		BENGEL® 988		•

* Hectorite-based

Typical polar activators: methano/water 95/5, propylene carbonate



Rheological additives

BENTONE® organoclays

Product name	Composition	Description	Solventborne	Waterborne	Application														Polarity			
					Deco		Industrial coatings						Construction		Others				Low	Medium	High	
					Long-oil alkyds	Can coatings	Car-OEM coatings	Car refinish coatings	Coil coatings	General industrial coatings	Marine protective coatings	Plastic coatings	Wood coatings	Asphalt	Roof coatings	Adhesives and sealants	Inks	Leather coatings				
BARAGEL® 3000	Organoclay	Organically modified bentone clay for low polarity systems	•			•				•					•	•	•	•		•		
BENATHIX®	Organoclay	Modified smectite clay for unsaturated polyester, plastisols and putties	•															•			•	
BENGEL® 434	Organoclay	Conventional organoclay for wide range of low polarity systems	•					○		•	•	•	•				•	•		•		
BENGEL® 818	Organoclay	Superdispersable organoclay for low polarity applications	•					○	•	•	•	•	•				•	•		•		
BENGEL® 828	Organoclay	Super dispersible rheological additive that greatly simplifies the formulation and manufacture of paint systems that contain moderate to high polarity solvents.	•						•	•	•	•	•				•	•				•
BENGEL® 908	Organoclay	General purpose and highly cost effective organoclay designed for low to medium polarity aliphatic and aromatic coating systems. It also works well in other high polarity systems.	•							•	•		•				•	•		•	•	
BENGEL® 958	Organoclay	A grade that is easy to disperse and provides good thixotropy, sag resistance, and anti-settling properties. It is recommended to be used in diverse low to medium polarity binders and solvent systems.	•		•	○	○	•	○	•	•	○	○		•	•	•			•	•	
BENGEL® 968	Organoclay	Designed for low to medium polarity coating systems. It can be used for versatile coating applications and provides good compatibility, viscosity increase as well as anti-settling properties.	•							•	○	○	•							•	•	
BENGEL® 988	Organoclay	Easy to incorporate and designed for use in low to high polarity system of containing aliphatic solvents, aromatic solvents, ketones, esters, glycol ethers and alcohols.	•			○	○	○	○	•	•	•	•							•	•	•
BENTONE SD® -1	Organoclay	Superdispersable organoclay for low polarity applications	•		•	•	•	•	•	•	•	•	•		•	•	•			•		
BENTONE SD® -2	Organoclay	Superdispersable organoclay for high polarity applications	•			•	•	•	•	•	•	•	•				•	•				•
BENTONE SD® -3	Organoclay	Organoclay for intermediate polarity applications	•			•	○	○	○	•	○	○	○				•	•			•	
BENTONE® 1000	Organoclay	High performance organoclay for low to intermediate polarity systems	•		•	•				•				•			•	•		•		
BENTONE® 27	Organoclay	Conventional hectorite-based organoclay for high polarity systems, polyol, epoxy, etc.	•			•	•	•	•	•	•	•	•				•	•	•			•
BENTONE® 30	Organoclay	Conventional organoclay for wide range of low to mid polarity solvent systems	•							•										•		
BENTONE® 34	Organoclay	Conventional organoclay for wide range of low polarity solvent systems	•		•	○	○	○	○	•	•	•	•	•	•	•	•	•		•		
BENTONE® 38	Organoclay	Conventional organoclay for intermediate polarity organic solvent systems	•			•	•	•	•	•	•	○	•				•	•		•	•	
BENTONE® 52	Organoclay	Conventional organoclay for intermediate polarity solvent systems	•				○	○		•	•	•	○					○		•	•	
BENTONE® 54	Organoclay	Organoclay for low to mid-polarity solvent systems	•		•			•			•		•	•	○			•		•	•	
BENTONE® 57	Organoclay	Conventional organoclay for high-polarity solvent systems	•							•	•						•					•
BENTONE® 54K	Organoclay	This rheological additive is designed for low to intermediate polarity organic systems.	•			○	○	•	○	•	•	○	○				•			•	•	

Rheological additives

THIXATROL® organic thixotropes and M-P-A® wax dispersions

Basic principles organic thixotropes

THIXATROL® and THIXCIN® rheological additives are based on castor oil derivatives, modified castor oil derivatives, polyamide or polyester amides. They typically must be subjected to appropriate wetting, deagglomeration, dispersion forces and minimum temperature requirements, to reach an activated structure.

Recommendations

THIXATROL® MAX provides outstanding sag resistance in high solids solventborne epoxy primers and polyurethane topcoats. Overcoatability of coatings containing THIXATROL® MAX is excellent.

THIXATROL® AS 8053 and PM 8056 are new additions to the Elementis portfolio. The key features of these new rheology modifiers are low activation temperatures, high structure built and thixotropy at low loading levels. They contribute to shorter production cycles, energy savings and excellent structure conservation upon storage.

THIXATROL® AS 8053 performs particularly well in high-performance sealants. THIXATROL® PM 8056 has been developed for high-performance protective coatings. Depending on the formulation, THIXATROL® AS 8053 also shows advantages in industrial protective coatings.

The THIXATROL® P200 series of products are pre-activated diamides in various solvents for post-corrections.

THIXATROL® P2100W is a special polyamide based waterborne rheology modifier, which provides anti-settling, anti-sagging properties and improves orientation of metallic pigment in waterborne coatings.

THIXATROL® 5020W is a new modified EVA emulsion additive which enhances metallic paint orientation through a viscoelastic performance designed for waterborne non-baking paint.

DeuRheo 556 series contains solventborne copolymeric wax dispersions, which can be used to improve the orientation of metallic flakes in paint.

DeuRheo 201P is a 10% active, polyethylene wax, dispersion that acts as an anti-settling agent and which does not effect the bulk viscosity. It can be handled easily and dispersed rapidly in solventborne coatings, DeuRheo 202P is a higher solid grade at 20% solids. It needs to be premixed in the mill base before dispersing it with high shear equipment at a temperature of 20 to 40 °C.

DeuRheo 229 is a preactivated polyamide wax dispersion in xylene, it provides strong thixotropic properties and imparts anti-sagging in high film build solventborne coatings.

DeuRheo 2810 is an urea based liquid rheology modifier for solventborne coatings. It can be easily incorporated and does not require a specific activation temperature. It prevents settling and sagging of paints even after diluting.

Basic principles M-P-A®

M-P-A® anti-settling agents inhibit pigment, filler and extender movement in the paint. In most formulations, any settling problem will be eliminated. These products function by chain entanglement. M-P-A® grades can be used alone or in combination with a thixotropic additive for enhanced performance. Product selection is typically dependent on the solvent and reactivity of the system to be modified.



Wetting and dispersing agents

Dispersing agents for WB colorants and pigment concentrates

Basic principles

Proper pigment wetting and dispersion are essential for optimum coating performance and appearance. Pigment dispersions and color concentrates should provide full color strength, broad compatibility and excellent stability against flocculation of pigments and viscosity change, all obtained through maximum grinding efficiency with minimum processing time to ensure high production throughput. NUOSPERSE® wetting and dispersing agents help meet these goals.

In highly-concentrated pigment dispersions, NUOSPERSE® multifunctional dispersing agents wet and deflocculate pigment particles without causing foaming or adversely affecting film properties of the final coatings. NUOSPERSE® dispersing agents provide the following benefits:

- Rapid pigment wetting
- Good flow at high pigment loading
- Increased mill output
- Maximum tinting strength development
- Full color development
- Compatibility with a broad range of coatings
- Elimination of floating, flooding and rub-up
- Long-term viscosity stability
- Elimination of hard settling

Waterborne pigment dispersions

NUOSPERSE® FX 7500W and NUOSPERSE® W-30 are high performance dispersants for universal waterborne resin-free pigment dispersions of all pigment types for use in a wide variety of coating systems. NUOSPERSE® FX 7500W is based on a high molecular weight copolymer with multiple anchoring groups. It works exceptionally well with carbon blacks and organic pigments resulting in high jetness and color strength performance. Besides, it also has a broad resin compatibility, hence negligible impact on film gloss of tinted systems.

Waterborne light industrial pigment dispersions can be formulated with a combination of NUOSPERSE® FX 365 and NUOSPERSE® FX 600. The amounts and ratios between the two additives are dependent on the pigments used. Organic pigments and carbon blacks need to be processed on a media mill, while most inorganic pigments can be dispersed via a high speed disperser.

Dispersing and wetting agents for waterborne coatings

Starting point formulas with NUOSPERSE® FX 7500W

Pigment	Conc. [%]	NUOSPERSE® FX 7500W [%]	Defoamer [%]	Preservative [%]	DMAE [%]	Propylene glycol [%]	Water [%]
Carbon Black MA 100	35.0	17.5	0.1	0.1	0.3	4.0	43.0
Evonik® FW 200	15.0	22.5	0.3	0.1	1.0	—	61.1
MONARCH® 1300	15.0	16.5	0.3	0.1	1.0	—	67.1
MONARCH® 1400	18.0	22.5	0.3	0.1	1.0	—	58.1
EMPEROR® 2000	18.0	21.6	0.3	0.1	1.0	—	59.0
Raven® 5000	20.0	30.0	0.3	0.1	1.0	—	48.6
Heliogen® Blue D 7079	37.0	24.0	0.3	0.1	—	—	38.6
Ti-Pure™ R-706	72.0	10.8	0.1	0.2	—	—	16.9
Bayferrox® 3920	55.0	19.3	—	0.2	—	—	25.4

NUOSPERSE® polymeric dispersing agents

NUOSPERSE® FX 600 is a polyelectrolyte-based dispersing agent for industrial and waterborne alkyd-based systems. In addition to being an effective dispersing agent, NUOSPERSE® FX 600 has no negative influence on water and corrosion resistance of coating films. NUOSPERSE® FX 631 and NUOSPERSE® FX 665 are versatile hydrophobic copolymer dispersants that find use in interior and exterior decorative coatings, gloss and semigloss paints, inorganic pigment dispersions, DTM and waterbased inks.

NUOSPERSE® non-ionic wetting agents

NUOSPERSE® non-ionic wetting agents are used for pigments wetting and improving storage stability of paints, including freeze-thaw stability. They are also used for substrates wetting and overcoming compatibility and color acceptance issues.

Featured low-foaming APE-free products are:

- NUOSPERSE® FN 211: decorative indoor and outdoor paints and low-cost paints.
- NUOSPERSE® FN 265: decorative indoor and outdoor paints, pigment concentrates and colorants.
- NUOSPERSE® FX 365: industrial waterborne coatings, pigment concentrates and colorants

NUOSPERSE® color acceptance improvers

Universal point-of-sales colorants can cause color acceptance issues at times. A quick remedial is to use color acceptance improvers to improve color development and stability, compatibility between base paints and colorants and reduce rub out issue. NUOSPERSE® 2006 and NUOSPERSE® FA 196 are highly versatile color acceptance improvers that can be used in all types of waterborne and solvent-thinned coatings. They ensure homogeneous distribution of the pigments and compatibility of the paint components in tinted systems. The result is homogeneous color shades from batch-to-batch. NUOSPERSE® FA 115 improves color acceptance similarly to NUOSPERSE® 2006 but only in waterborne systems.

DAPRO® and SUPREAD™ interfacial tension modifiers

DAPRO® and SUPREAD™ are surface active additives that are used to promote substrates wetting, eliminate or reduce film defects such as crawling, fish-eyes and cratering. They promote spreading and uniform film formation on hard-to-wet or contaminated surfaces without affecting recoatability. SUPREAD® 2059 is an innovative, VOC and APEO free low foaming non-ionic surfactant with multifunctional properties. It offers fast dynamic surface wetting, and prevents surface defects on glass, wood, metal and low energy surfaces, e.g. plastics. In wood coatings, it gives excellent pore filling properties and minimizes microfoam and macrofoam. It can be added at any stage of the manufacturing process, and does not impact film gloss, drying time, hardness, block resistance and water resistance properties.

Wetting and dispersing agents

Dispersing agents for solventborne applications

Recommendations

NUOSPERSE® AP 657 is a versatile wetting, dispersing and stabilizing aid for solventborne coatings such as alkyd paints. It is compatible with a broad range of air-drying resins as well as plasticizers.

NUOSPERSE® FA 196 is a 100% active dispersing agent for a wide range of pigments and carbon blacks. It is effective in reducing rub-up and preventing pigment flooding and floating.

NUOSPERSE® FX 9200 and NUOSPERSE® FX 9360 are hyperdispersants used in industrial & automotive coatings and inks (including UV) applications. Based on high molecular weight branched copolymers with multiple pigment anchoring groups, they provide exceptional pigment wetting and dispersing efficiency thereby allowing high pigment loading with full color strength development after a short dispersion time.

Disponer® 9250 is a versatile carboxylated copolymer that works across all types of TiO₂ and inorganic pigments. It results in coatings with enhanced storage stability and color strength.

NUOSPERSE® FX 9086, Disponer 983 and Disponer 9850 are polymeric dispersing agents that are effective for dispersing carbon blacks and organic pigments. They are used in a wide range of high performance solventborne industrial coatings



Defoamers

Defoamers for waterborne applications

Selecting the optimum defoamer

Foam control is a complex problem. No single product is adequate for all applications. DAPRO® defoamers are based on a variety of active materials to provide air release and bubble-breaking for most applications. Elementis DAPRO® defoamers are effective in both the grind and the letdown stages of a wide range of systems in the manufacturing of coatings. This enables customers to reduce the number of foam control agents stocked. It is suggested to evaluate several DAPRO® foam suppressors to determine the most effective one for any given formulation.

Basic principles

In general, defoamers work by destabilizing foam through an incompatibility mechanism. It is important to select a combination of grind and letdown defoamers that works synergistically. This combination is often required when the pigment dispersion retains a lot of air. When the optimum grind and letdown defoamers are used together, a lower total amount of defoamer is required.

Defoamers which are more dispersible improve compatibility and gloss, reduce film defects and improve color acceptance. Typically, letdown defoamers are less hydrophobic and have better dispersibility.

When there is little air entrained in the grind paste, a small amount of a defoamer appropriate for the letdown can often be used in both the grind paste and letdown.

Grind defoamers require shear to disperse into the system. The lower the dispersibility, the more shear is required and the more effective the defoamer will be. Typically, grind defoamers are very hydrophobic and have low dispersibility. They are usually very effective and only a small amount is used. They are normally not recommended for letdown as they may cause surface defects.

Letdown defoamers require low shear to disperse into the system. The higher the dispersibility, the easier the defoamer will mix into the system.

Mineral oil defoamers are cost effective and have good persistency; however, in some systems they can cause gloss reduction at higher dosage levels.

Glycols and polyglycols do not reduce gloss and have good compatibility with resins but are often less effective and persistent than oil-based defoamers.

Product highlights

DAPRO® AP 7010 is a tried-and-true industry standard defoamer offering outstanding anti-foaming, bubble breaking and superb storage stability. It is free of APEO and VOC and specially developed for architectural paints and adhesives systems.

DAPRO® AP 7015S is an APEO- and VOC-free defoamer which gives excellent balance between anti-foaming, bubble breaking and compatibility. It provides optimum storage stability and water dispersibility in waterborne systems.

DAPRO® AP 7072 is a water dispersible foam control agent. It has good compatibility in most waterbased systems, while exhibiting excellent defoaming and anti-foaming performance. DAPRO® AP 7072 is recommended for use in architectural coatings and adhesives applications.

DAPRO® DF 7079 is an APEO-free and cost effective defoamer for architectural paints such as low odor environmentally friendly coatings. This defoamer offers excellent anti-foaming and defoaming performance with good long-term persistency.

DAPRO® DF 7160 is a highly dispersible mineral oil-based defoamer with fast spreading speed, easy emulsification for low shear incorporation. It is suitable for a wide range of applications, such as pressure sensitive adhesives, water based ink, emulsion polymerization and leather finishing offering excellent antifoam and defoaming performance.

DAPRO® DF 696 is a highly efficient silicone grind defoamer which gives effective and persistent foam control in water-based inks and coatings formulations. It is easy to incorporate and disperses well into a wide range of formulations giving excellent performance and compatibility.

DAPRO® BIO 9910 is a vegetable oil-based defoamer that gives similar, if not better than, defoaming/anti-foaming performance as standard mineral oil defoamers such as DAPRO® AP 7010. It shows excellent compatibility and can be used in milbase and letdown processes.

Defoamers for solventborne applications

Basic principles

DAPRO® and Defom defoamers are silicone and silicone-free polymers. This broad product line offers a multitude of solutions in combating foam generated during the manufacture and application processes of solventborne coatings.

Defom 3500 is a polyacrylate defoamer specially developed for alkyd-based wood primers containing zinc stearate. When used together with Disponer 912, a synergistical effect in defoaming and wetting on wood pores is seen.

Products highlights

DAPRO® AP 1622 is a highly effective silicone defoamer used in oil and alkyd modified urethanes, nitrocellulose lacquers, chlorinated rubber and epoxies.

Defom 5300 is a general purpose silicone defoamer that provides excellent defoaming and compatibility in industrial solventborne coatings such as auto refinishing coatings.

Defom 5800F is an aromatic-free, general purpose defoamer for industrial solventborne coatings. It shows good system compatibility in various coating systems.



Defoamers

Defoamers

Product name	Composition	Description	Solventborne	Waterborne	Application																				
					Architectural coatings					Industrial coatings						Construction					Others				
					Deco grind	Deco letdown	Flat coatings	Semi-gloss/gloss coatings	Water reducible coatings	Can coatings	Car-OEM coatings	Car refinish coatings	Coil coatings	General industrial coatings	Marine protective coatings	Plastic coatings	Wood coatings	Asphalt emulsion	Concrete	Grouts	Plaster/stucco	Roof coatings	Tile adhesive	Adhesives and sealants	Emulsion synthesis
DAPRO® AP 1622	Modified polysiloxane solution	Has outstanding defoaming properties in a variety of solvent systems. Easy to incorporate in solventborne coatings and inks.	•								•	•	•	•	•	•						•	•		
DAPRO® AP 7010	Dispersion of wax in mineral oil	It is specially recommended for systems with good emulsifying properties, such as surfactant stabilised emulsions and emulsion paints. The product shows very good long-term efficiency.		•		•	•								•	•									•
DAPRO® AP 7015	Dispersion of wax in mineral oil	A defoamer for waterborne systems with good emulsifying properties. It has excellent anti-foaming and de-foaming effects.		•	•	•	•								•	•		•		•	•	•	•		•
DAPRO® AP 7072	A blend of hydrophobic silica, emulsifiers and mineral oil	Effective in high quality rubber applications and provides excellent foam suppression and defoaming performance. DAPRO® AP 7072 is readily dispersible in water.		•																	•	•	•		
DAPRO® DF 605	Silicone emulsion	An excellent defoamer for water based elastomeric coatings, mastics and water reducible industrial coatings		•						◦								◦	•	•	•	•			
DAPRO® DF 675	Blend of glycols and modified polysiloxanes	Useful in high quality decorative and no-VOC decorative coating for maintaining gloss and minimizing surface defects		•	•		•	•	•	•	•	•	•	•	•	•	•					•	•		•
DAPRO® DF 677	Silicone emulsion	An excellent defoamer for water based industrial coatings and inks.		•						•	•	•	•	•	•	•	•					•	•		•
DAPRO® DF 7005	dispersion of wax in mineral oil, Silicone free	Silicone free mineral oil type defoamer for deco paints application with long-term efficiency		•	•	•	•															•			
DAPRO® DF 7073	An emulsion of water, hydrophobic silica and mineral oil	Water dispersible foam control agent for decorative paints and coatings. It is effective in a broad range of high PVC paint systems by providing rapid bubble break at low concentrations. DAPRO® DF 7073 has little to no effect on gloss.		•			•																		
DAPRO® DF 7079	A blend of hydrophobic silica in mineral oil	Excellent foam control as both the grind and let down defoamer in paints and coatings. It is particularly effective in semi-gloss and high gloss paints in providing rapid bubble break at low concentrations.		•			•						•	•		•						•			
DAPRO® DF 7160	Hydrophobic silica blending with mineral oil	Easy disperse for pressure sensitive adhesive, latex synthesis and ink application with excellent antifoam and defoaming performance Shows excellent foam control, less microfoam and increase coating speed while roller coating adhesive latex on BOPP film to reduce file transparency concern after processing.		•		•	•						•									•	•	•	•
DAPRO® DF 880	Silicone free	Metallic salt of fatty acid for industrial coatings, inks, architectural coatings		•						•					◦										•
DAPRO® PD 827	A blend of liquid defoamer on an inert carrier	Effective in the defoaming of entrained air in drywall joint compounds and other dry mixes		•														•	•	•					
DAPRO® PD 829	A blend of liquid defoamer on an inert carrier	Effective at preventing air entrainment in dry wall joint compounds and other dry mixes	•	•														•	•	•					

Defoamers

Defoamers (Page 2)

Product name	Composition	Description	Solventborne	Waterborne	Application																								
					Architectural coatings				Industrial coatings						Construction					Others									
					Deco grind	Deco letdown	Flat coatings	Semi-gloss/gloss coatings	Water reducible coatings	Can coatings	Car-OEM coatings	Car refinish coatings	Coil coatings	General industrial coatings	Marine protective coatings	Plastic coatings	Wood coatings	Asphalt emulsion	Concrete	Grouts	Plaster/stucco	Roof coatings	Tile adhesives	Adhesives and sealants	Emulsion synthesis	Inks	FRP	Leather coatings	
Defom 2700	Foam destroying polymer silicone-free	A silicone-free bubble releasing and anti-foaming agent for solventborne or solvent-free systems. It is more suitable for epoxy, unsaturated polyester and UV curing coatings.	•											•	•										•				
Defom 3100	Foam destroying polymer silicone-free	A silicone-free bubble releasing and anti-foaming agent for solventborne and solvent-free system.	•											•	•										•		•		
Defom 3200	Foam destroying polymer silicone-free	A silicone-free bubble releasing and anti-foaming agent for solventborne and solvent-free systems.	•											•	•										•		•		
Defom 3500	Foam destroying polymer, silicone-free	A silicone-free bubble releasing and anti-foaming agent for solventborne and solvent-free systems, especially in deaeration of high filler content wood primer.	•											•											•		•		•
Defom 5300	Modified polysiloxane	A bubble releasing, anti-foaming agent for high build PU coatings.	•							•	•	•	•	•	•	•	•								•				
Defom 5400	Modified polysiloxane	A solventborne bubble releasing, anti-foaming agent characterized by its improved compatibility.	•							•	•	•	•	•	•	•	•								•				
Defom 5500	Modified polysiloxane	A bubble releasing, anti-foaming agent for solventborne coatings.	•							○	•	•	○	•	•	•	•								•				•
Defom 5800F	Modified polysiloxane	An aromatic-free defoamer used in solventborne coatings.	•							•	•	•	•	•	•	•	•								•				
Defom 6500	Modified polysiloxane	A bubble releasing, anti-foaming agent for solventborne coatings.	•							○	•	•	○	•	•	•	•								•				
Defom 6800	Polysiloxane containing hydrophobic particles	A bubble releasing, anti-foaming agent for thick film epoxy floor coatings and silk screen ink.	•											•	•										•		•		•
Defom W-0506	Polysiloxane emulsion	An emulsified polysiloxane defoamer used as an anti-foam agent during manufacturing and application of waterborne coatings.		•										•													•		•
Defom W-082	Mixture of mineral oil and hydrophobic particle	A hydrocarbon based waterborne defoamer, exhibit excellent antifoaming and defoaming effect.		•			•	•																	•	•	•		•
Defom W-086	Mixture of mineral oil and hydrophobic particle	Hydrocarbon based waterborne defoamer, exhibits excellent anti-foaming and defoaming properties. Disperses well in water.		•			•	•																	•	•	•		
Defom W-090	Special hydrocarbon mixture, silicone free	Highly effective defoamer which is used to prevent foaming during manufacturing and application of emulsion paints and adhesives.		•			•																		•		•		•
AU-311	Foam destroying polymer, silicone free	Defoam and air-releasing agent, good wetting for substrate and resin with glass fiber.	•																										•

Slip and leveling additives

Basic Principles

DAPRO®, Levaslip and Levelol leveling and slip agents are based on modified polysiloxane and polyacrylate chemistries. They improve surface slip and leveling by quickly migrating to the coating surface and reduce surface tensions of the drying films. They promote levelling and eliminate the development of Benard cells, thus providing a uniform surface and color. In addition, the structures of the modified polysiloxanes provide a low coefficient of friction on coating surface after drying and enhance surface smoothness, slip and anti-scratch properties. Polysiloxane leveling agents can negatively impact recoatability of dried films if they are too incompatible with other paint components or degrade under high temperature. Where the use of polysiloxane leveling agents is not recommended, Levelol polyacrylate leveling agents are the best alternatives for systems requiring good recoatability such as primers. They not only enhance film smoothness, but also promote leveling speed and substrate wetting. For very demanding applications, fluorocarbon-modified additives such as Levelol 837 and Levelol 839 are recommended.



Slip and leveling additives

Slip and leveling additives

Product name	Composition	Description	Solvent	Non-volatile content [%]	Solventborne	Waterborne	Application											
							Industrial coatings								Others			
							Can coatings	Car-OEM coatings	Car refinsh coatings	Coil coatings	General industrial coatings	Marine protective coatings	Plastic coatings	Wood coatings	Adhesives and sealants	Inks	Leather coatings	
SLIP-AYD® FS 444	Modified polysiloxane	Slip and mar resistance agent for a wide range of applications such as waterborne and polar solventborne applications	Dipropylene glycol ether	50.0	●	●				●		●		●	●	●	●	●
Levaslip 411	Modified polysiloxane	Improves slip and leveling properties, reduces craters, fish eyes and pinholes.	Toluene	7.2	●							●	●	●	●			●
Levaslip 432	Modified polysiloxane	Provides leveling, slip and substrate wetting, enhances orientation of matting silica to achieve uniform appearance.	Xylene/ethyleneglycol monobutyl ether/ toluene	13.5	●					●		●	●	●	●			
Levaslip 435	Modified polysiloxane	Provides excellent slip, anti-silicone effect, reduces coating's defects such as pinholes and craters on contaminated substrates.	None	>98.0	●							○		○	○		●	●
Levaslip 455	Modified polysiloxane	Enhances leveling, slip and anti-floating properties. Provides anti-blocking for both water- and solventborne applications.	Ethyleneglycol monobutyl ether	50.0	●	●						●		○	○	●	○	●
Levaslip 466	Modified polysiloxane	Good flow, leveling and slip performance, excellent wetting properties. Prevents surface defects.	Xylene/ethyleneglycol monobutyl ether	24.0	●							●	●	●	●			
Levaslip 467	Modified polysiloxane	Slip and leveling agent suitable for waterborne, non-aqueous based coatings. It contains hydroxyl groups and can react with the cross-linker maintaining its long efficiency.	N.A.	100.0	●									●	●			●
Levaslip 468	Modified polysiloxane	A modified polysiloxane leveling agent, provides good leveling and slip performance.	N.A.	>94.5	●	●						●		●	●	●	●	●
Levaslip 810	Modified polysiloxane	A modified polysiloxane, imparts leveling and slip performance.	N.A.	>90.0	●					●		●	○	●	●		●	●
Levaslip 836	Modified polysiloxane	Good compatibility and recoatability in various non-aqueous coatings, enhances orientation in metallic and mat coatings.	Xylene/isobutanol	24.0	●							●	●	●	●			
Levaslip 866	Modified polysiloxane	An additive to increase mar resistance and to improve slip as well as surface flow, suitable for solventborne systems	Xylene/ethyleneglycol phenyl ether	24.5	●							●	●	●	●			
Levaslip 872	Polyester modified polysiloxane	A polyester modified silicone, exhibits excellent recoatability and thermostability for use in baking coatings.	Xylene	26.0	●		●			●		●						●
Levaslip 875	Modified polysiloxane	Polysiloxane surface additive with excellent compatibility, anti cratering, slip and leveling for wood coatings and general industrial coatings	Aromatic hydrocarbon solvent/ r-btyrolactone	50.0	●							●		●	●			
Levaslip 876	Modified polysiloxane	Good compatibility polysiloxane surface additive to provide good substrate wetting, ant-cratering performance, slip and excellent leveling for wood coatings, and general industrial coatings.	Xylene/ethyleneglycol phenylether	13.0	●							●	●	●	●			
Levaslip 879	Modified polysiloxane	Excellent slip performance, good compatibility and recoatability	N.A.	>94.0	●					●		●	●	●	●	●	●	
Levaslip W-461	Modified polysiloxane	Provide slip, mar-resistance and anti-blocking.	Water	80.0		●						●		●	●		●	●
Levelol 495	Acrylic copolymer	Non-silicone flow and leveling agent, reduces craters and pinholes.	Xylene	50.0	●		●	●	●	●	●	●	●	●	●	●		
Levelol 835	Acrylic copolymer	Improves flow and leveling, good compatibility and intercoat adhesion.	Xylene	50.0	●		●	●	●	●	●	●	●	●	●			●
Levelol 837	Fluorocarbon modified polyacrylate	Excellent substrate wetting, improves flow and leveling, good compatibility and intercoat adhesion.	Xylene	70.0	●		●	●	●	●	●	●	●	●	●	●		●
Levelol 839	Fluorocarbon modified polyacrylate	An aromatic free, flow and leveling agent used in solventborne coatings. It can reduce the surface tension of a coating system, and shows good substrate wetting. It prevents crater, pinhole, and fisheye defects.	Propylene glycol monomethylether acetate	50.0	●		●	●	●	●	●	●	●	●	●	●		●
Levelol TSP	High boiling point solvents with surfactant	Leveling, anti-blushing, anti-popping agent, helps release of entrapped air	Aromatic hydrocarbon solvent	100.0 (active)	●		●	●	●	●	●	●	●	●	●			
Levelol W-469	Modified polysiloxane	Silicone type substrate wetting agent for waterborne systems	N.A.	ca. 100.0	●	●		●	●			●	●	●	●	●	●	●

Specialty additives



Rust Inhibitors

NALZIN® FA 179 and NALZIN® FA 180 are flash rust and corrosion inhibitors for waterborne coatings to counteract flash rusting. They may be used as inhibitors against in-can corrosion as well.



	After 1 hr.	After 2 hrs.	After 3 hrs.	After 24 hrs.
+0.30 wt% NALZIN® FA 179	0	0	0	0
Blank	6	6	16	90

DAPRO® coalescing agents

DAPRO® BIO 400 is a highly efficient replacement for glycol coalescing solvents in architectural and industrial coatings. Produced from biomass derived chemicals, its high efficiency provides a route to lower formulation VOC via lower use levels. DAPRO® BIO 400 provides superior coalescence performance and low odor, while conferring the sustainability benefits of a 100% bio-based raw material.

Adhesion Promoters

Elementis supplies a range of Adherent and DAPRO® adhesion promoters to improve adhesion of coating films on various substrates. Adherent 1121 is an amino silane coupling agent which improves the adhesion of air-dry alkyd paints to glass and metal substrates. It also improves the salt spray resistance of epoxy coating film when subjected to high humidity or water immersion conditions.

Adherent ADP is a non-silicone polymeric compound that improves adhesion of paint film on non-ferrous substrates. Used mainly in baking paints, it improves the flexibility and impact resistance of paint films and shows good thermostability. Adherent ADP does not discolor at elevated temperature.

Adherent APW is an additive that improves intercoat adhesion and binding of metal pigments in the paint film. It also improves the flexibility and chemical resistance of paint films of acrylic and alkyd baking paints.

Adherent CP-7540 is a chlorinated polyolefin modified acrylic resin that gives excellent adhesion property in solventborne primers for PP bumpers. DAPRO® ACP-16W is an APEO and VOC-free waterborne acrylic modified chlorinated polyolefin dispersion that provides superior adhesion on polypropylene (PP) and thermoplastic polyolefin (TPO) substrates.

DAPRO® ACP-16W can be used as the main resin or combined with other resins. It may be formulated into clear coat or colored coat for waterborne automotive basecoats, adhesives and inks, etc.

Specialty additives

Specialty additives

Product name	Composition	Description	Solventborne	Waterborne	Application																		
					Architectural coatings					Industrial coatings						Construction					Others		
					Exterior coatings	High PVC coatings	Flat coatings	Semi-gloss/gloss coatings	Water reducible coatings	Can coatings	Car-OEM coatings	Car refinish coatings	Coil coatings	General industrial coatings	Marine protective coatings	Plastic coatings	Wood coatings	Asphalt emulsion	Concrete	Grouts	Plaster/stucco	Roof coatings	Tile adhesives
Adhesion promoters																							
DAPRO® ACP-16W	Chlorinated polyolefin modified acrylic emulsion	Promotes adhesion of waterborne coatings and inks on polypropylene substrates.		•																		•	
Adherent 1032	Amino silane	Adhesion promoter for solventborne air-dry paints in glass and metal substrates.	•							•	•		•	•									
Adherent 1051	Epoxy silane	Improves adhesion of organic and inorganic resins to inorganic surfaces.	•							•	•		•	•								•	
Adherent 1121	Amino silane	Provides adhesion of paint to glass and metal substrates and enhances salt spray resistance.	•	•						•	•		•	•								•	
Adherent ADK	Non-silicone polymer solution	Improves the adhesion between OPP laminating ink and PET film. Does not effect gloss or color strength of printing inks.	•																			•	
Adherent ADP	Non-silicone polymeric compound	An additive to improve adhesion of stoving paints on non-ferrous substrates	•									•	•										
Adherent APC	Non-silicone polymeric solution	Provides adhesion of paint to metallic pigment or substrates.	•																				
Adherent APW	Modified acrylate oligmer	Provides adhesion of paint to metal substrate in UV curable coatings.	•									•	•									•	
Adherent CP-7540	Chlorinated polyolefin modified acrylic resins	Provides adhesion of paint to PP substrate.	•									•										•	
Adherent PLH	Non-silicone polymeric compound	Adherent PLH is an additive to provide adhesion of paint film to non-ferrous substrates. It is mainly used in stoving paints.	•									•	•										
Adherent PPB	Chlorinated PP	Provides good adhesion to PP substrates.	•									•										•	
Coalescents																							
DAPRO® FX 514	Plasticizer	Coalescing agent for VOC compliant systems		•	•	○	•	•														•	
DAPRO® BIO 400	Levulinic ketal	Coalescing agent for VOC compliant systems		•	○	•	•	○	○													○	

Hydroxyl acrylic resins

Basic principles

DAPRO®, Levaslip and Levelol leveling and slip agents are based on modified polysiloxane and polyacrylate chemistries. They improve surface slip and leveling by quickly migrating to the coating surface and reduce surface tensions of the drying films. They promote levelling and eliminate the development of Benard cells, thus providing a uniform surface and color. In addition, the structures of the modified polysiloxanes provide a low coefficient of friction on coating surface after drying and enhance surface smoothness, slip and anti-scratch properties.

Hypomer MT-2550K Functional matting resin

Hypomer MT-2550K is a hydroxyl acrylic resin that gives excellent matting effect yet better clarity and transparency than conventional 2K PU coatings incorporated with matting agents e.g. silica. Apart from the excellent optical properties, this resin also provides good hand feel, slip property as well as excellent adhesion performance on plastic substrates such as ABS or ABS/PC. A key benefit of this resin is its gloss consistency over a wide range of dry film thickness compared to the conventional system in spray application.

Hypomer MT-2550K allows the formulation of coatings with varying degrees of gloss (from full matt to semi-gloss finishes) by combining with other hydroxyl acrylic resins. The resultant coatings can be widely used in various industrial applications such as 3C products (computers, communication and consumer), automotive interior and exterior coatings, auto refinish, wood coatings and inks.

Hypomer FS-2060A Hydroxyl acrylic resin for special substrate

Hypomer FS-2060A is a hydroxyl acrylic resin for special substrates. It provides good adhesion on non-ferrous metals and plastics, such as aluminum, aluminum alloy, galvanized sheet, chrome plated sheet, PC, ABS/PC etc.. It also gives good pigment wetting ability and excellent compatibility with CAB. It can be formulated as pigmented coating and metallic coating with perfect substrates/intercoat adhesion, good film properties and easy application.

Hypomer FS-4075AF

Hypomer FS-4075AF is a new generation of high solid content and low viscosity hydroxyl acrylic resin with no benzene, toluene and xylene present. It effectively reduces the VOC of a paint formulation and is more environmentally friendly.

In spray application, Hypomer FS-4075AF provides excellent film performance including long/short wavelength leveling, high film build, high gloss and DOI. With all these benefits, it is suitable for high quality paint film coatings, such as automotive coatings, car refinish coatings and railway coatings.



Resins

Product name	Composition	Description	Non-volatile content %	OH %	Application					
					Car-OEM coatings	Car Refinish coatings	General industrial coatings	Inks	Plastic coating	Wood coating
BLR-8086	Blocked aliphatic polyisocyanate	BLR-8086 is a blocked aliphatic polyisocyanate, which is used to formulate one component polyurethane baking paint	74.0 - 76.0	N.A.	●		●			
Hypomer AC-7435	Acrylic copolymer	Fast drying, good hardness, good adhesion to plastic surfaces. Good water sweat and alcohol resistance	48.0 - 52.0	N.A.					●	
Hypomer AC-7450	Acrylic copolymer	Rapid drying, good adhesion to plastics, alcohol resistance	48.0 - 52.0	N.A.					●	
Hypomer FS-2050	Hydroxyl acrylic copolymer	Rapid drying, good adhesion to plastics	49.5 - 52.0	1.00	●	●	●		●	
Hypomer FS-2052	Hydroxyl acrylic copolymer	Fast drying, weather resistance, good compatibility with CAB	48.0 - 52.0	1.00	●	●	●	●	●	
Hypomer FS-2060A	Hydroxyl acrylic copolymer	Adhesion to various plastics and metals	59.0 - 61.0	1.20	●	●	●		●	●
Hypomer FS-2060AF	Hydroxyl acrylic copolymer	Good adhesion to plastics and metal substrates, good weather resistance, BTX-free	58.0 - 62.0	1.20	●	●	●		●	●
Hypomer FS-2060B	Hydroxyl acrylic copolymer	Automobile refinishes, plastic coatings	58.0 - 62.0	1.20	●	●	●		●	●
Hypomer FS-2451	Hydroxyl acrylic copolymer	Fast drying and high hardness, good adhesion to plastic substrates. Good alcohol resistance, good orientation of metallic pigments, good compatibility with cellulose acetobutryrate (CAB) and nitrocellulose	48.0 - 52.0	1.20	●	●	●		●	
Hypomer FS-2451F	Hydroxyl acrylic copolymer	Fast drying, high hardness, good solvent resistance, good adhesion to plastic substrates, good orientation of metallic pigments, more environmentally friendly solvent composition	48.0 - 52.0	1.20	●	●	●		●	
Hypomer FS-2460A	Hydroxyl acrylic copolymer	Good adhesion to plastics, excellent weather and yellowing resistance	59.0 - 62.0	1.44	●	●	●		●	●
Hypomer FS-2655	Hydroxyl acrylic copolymer	Fast drying and high hardness, good weather resistance, good pigment wetting	53.0 - 57.0	1.43	●	●	●		●	●
Hypomer FS-2820	Hydroxyl acrylic copolymer	Good adhesion to plastics, excellent weather and yellowing resistance	59.0 - 62.0	1.68	●	●	●		●	●
Hypomer FS-2860A	Hydroxyl acrylic copolymer	High film build, gloss and DOI, good leveling, good pigment wetting	58.0 - 61.0	1.68	●	●	●		●	●
Hypomer FS-2860AF	Hydroxyl acrylic copolymer	High gloss, good hardness, high curing speed, BTX-free	58.5 - 61.5	1.68	●	●	●		●	●
Hypomer FS-2970B	Hydroxyl acrylic copolymer	High film build, high gloss	67.5 - 70.0	2.03	●	●	●		●	
Hypomer FS-2970D	Hydroxyl acrylic copolymer	High film build, gloss and DOI, good pigment wetting	67.0 - 71.0	2.03	●	●	●		●	
Hypomer FS-2970F	Hydroxyl acrylic copolymer	High film build, gloss and DOI, good leveling, good pigment wetting	67.0 - 71.0	2.03	●	●	●		●	
Hypomer FS-3060	Hydroxyl acrylic copolymer	Low viscosity, excellent film build, gloss and DOI, fast curing speed, excellent hardness and solvent resistance, pigment dispersibility	59.0 - 62.0	1.80	●	●	●		●	●
Hypomer FS-3071	Hydroxyl acrylic copolymer	Excellent film build, gloss and DOI, pigment dispersibility	67.0 - 71.0	2.10	●	●	●		●	●
Hypomer FS-3270	Hydroxyl acrylic copolymer	High film build, high gloss, DOI	68.0 - 72.0	2.24	●	●	●		●	●
Hypomer FS-3566F	Hydroxyl acrylic copolymer	Excellent film build, gloss and DOI, fast cure, long pot-life, low VOC, BTX-free	63.0 - 67.0	2.28	●	●	●		●	●
Hypomer FS-4070F	Hydroxyl acrylic copolymer	Excellent film build, gloss and DOI, good leveling, good weather resistance	67.0 - 71.0	2.80	●	●	●		●	
Hypomer FS-4075AF	Hydroxyl acrylic copolymer	High solids low viscosity, good leveling, high film build	73.0 - 77.0	3.00	●	●	●		●	
Hypomer FS-4080F	Hydroxyl acrylic copolymer	High solids low viscosity, good leveling, high film build	76.0 - 80.0	3.12	●	●	●		●	
Hypomer FS-4365AF	Hydroxyl acrylic copolymer	Automobile refinish, transportations and industrial applications.	63.0 - 66.0	2.80	●	●	●		●	
Hypomer FS-4470	Hydroxyl acrylic copolymer	High solid with low viscosity, high gloss and film build, good leveling	68.0 - 72.0	3.10	●	●	●		●	
Hypomer FS-4660	Hydroxyl acrylic copolymer	Superior gloss, DOI, solvent resistance	58.5 - 61.5	2.76	●	●	●		●	●
Hypomer FS-4660P	Hydroxyl acrylic copolymer	Superior gloss and DOI, good leveling, solvent resistance	57.5 - 61.5	2.76	●	●	●		●	●

Resins

Resins (Page 2)

Product name	Composition	Description	Non-volatile content %	OH %	Application					
					Car-OEM coatings	Car Refinish coatings	General industrial coatings	Inks	Plastic coating	Wood coating
Hypomer FX-2050	Hydroxyl acrylic copolymer	Rapid drying, good adhesion to plastic substrates	50.0 - 52.0	1.00	●	●	●		●	
Hypomer FX-2451F	Hydroxyl acrylic copolymer	Fast drying and high hardness, good adhesion to plastic substrates, good alcohol resistance, more environmentally friendly solvent composition	48.0 - 52.0	1.20	●	●	●		●	
Hypomer FX-2820F	Hydroxyl acrylic copolymer	Good pigment wetting, good weather resistance, more environment friendly solvent composition	58.0 - 62.0	1.68	●	●	●		●	●
Hypomer FX-2860A	Hydroxyl acrylic copolymer	High gloss, good hardness, rapid drying, fast curing, solvent resistant, good film build	58.0 - 62.0	1.68	●	●	●		●	●
Hypomer FX-2970A	Hydroxyl acrylic copolymer	High film build, gloss and DOI	67.5 - 70.5	2.03	●	●	●		●	
Hypomer FX-3270	Hydroxyl acrylic copolymer	High film build, high gloss, DOI	67.0 - 71.0	2.24	●	●	●		●	●
Hypomer FX-4660	Hydroxyl acrylic copolymer	High gloss, superior leveling, hardness and high crosslinking density	58.5 - 61.5	2.76	●	●	●		●	●
Hypomer MT-2350	Hydroxyl acrylic copolymer	Good matting function, easy incorporation, less sedimentation	48.0 - 52.0	1.17	●	●	●	●	●	●
Hypomer MT-2550K	Hydroxyl acrylic copolymer	Good matting function, good scratch resistance, good weather resistance, easy incorporation, more environmentally friendly solvent composition, good touch feel	48.5 - 52.0	1.25	●	●	●	●	●	●
Hypomer PE-8043F	Hydroxylate polyester polyol	High film build, good leveling, excellent low temperate elasticity, good pigment wetting	77.0 - 81.0	3.40					●	
Hypomer UA-M6	Acrylic acrylate	Good adhesion to aluminum basecoat	65.0 - 68.0	N.A					●	●

