



# Industrial Coatings

## Raw Material Selection Guide





# Business Overview

## Global Resins and Additives powering up your formulations

We develop, produce and market a variety of high-quality and high-performance resins and additives worldwide, which are used in formulations for Automotive, Industrial and Wood coatings, as well as solutions for the Printing and Packaging industry. With our comprehensive product portfolio, extensive industry knowledge and global presence, we offer innovative and sustainable solutions for our customers globally.

The broad BASF Resins portfolio includes aliphatic polyisocyanates, acrylic and polyurethane dispersions, (acrylic, bio-based) polyols, solid-grade resins, aldehyde resins, specialty monomers and oligomers, covering systems such as water-based, solvent-based, radiation-curable, solvent-free and powder systems.

BASF also offers a strong portfolio of industry leading additives that enable sustainable and performance-driven solutions for industrial coatings applications. Our broadest technology of Dispersing Agents, Wetting Agents and Surface Modifiers, Defoamers, Rheology Modifiers, Film-Forming Agents, Light Stabilizers and Antioxidants can not only help reduce your overall formulation cost, they can also enhance the performance of your formulations and place them in a class of their own.

We are committed to providing innovative, top-quality resins and additives with excellence in support and first-in-class sustainability to enhance your formulations!

## Our global commitment to sustainability

Within the BASF Resins and Additives groups, we aim to make sustainability a key driver of our business. By focusing on developing sustainable technologies including the elimination of VOCs and CMR-components, as well as increasing renewable content and enabling eco-label conformity, we strive to enhance the value-add of our products.

As a member of the international Responsible Care initiative, BASF is committed to ecological sustainability as one of our core responsibilities. We actively support legislative authorities worldwide in their efforts to ensure environmental and human health safety. BASF has implemented REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals) and GHS (Global Harmonized System) guidelines in our production and supply chains, and our experts are available to advise customers and partners on the implementation of new safety standards.

## Technical prowess within BASF global Resins and Additives

Within the BASF Resins and Additives businesses, our key laboratory and testing capabilities include polymerization of resins, analytical services labs, testing of coating performance according to industry standards as well as longer term testing capabilities such as accelerated weathering, corrosion and real world outdoor exposure fence evaluation.



# BASF solutions across coatings applications

At BASF, we create chemistry. We provide sustainable solutions for automotive, industrial and wood coatings Industries to meet a wide range of applications by providing high quality products with superior performance.

System	Brand Name	Type	Page	Automotive & Transportation				Industrial Coatings							Furniture & Flooring		
				OEM	Refinish	Car Parts	Transportation	Marine	Maintenance	Windmill	Coil	Plastics	General Industry	ACE	Furniture	Flooring	Concrete Flooring
Water-based (WB)	Joncryl®	Acrylic dispersions, PUDs and hybrids	8	●	●	●●	●●		●●		●	●●	●●	●●	●●	●●	●●
	Luhydran®	Acrylic copolymer dispersions	13	●		●	●		●			●●	●●	●	●●	●●	●
	Acronal® PRO	Modified acrylic dispersions	14						●●			●	●●	●	●		
	Basonol® PU	Polyurethane dispersions (PUDs)	17	●●	●	●●	●			●		●●	●	●			
	Basonat®	Polyisocyanates	19	●●	●●	●●	●●		●●	●●		●●	●●	●●	●●	●●	●
Solvent-based (SB)	Joncryl®	Acrylic polyols	24	●●	●●	●●	●●	●●	●●	●●		●●	●●	●●	●●	●●	●
	Basonol® HPE	Hyperbranched polyester polyols	26	●	●●	●●	●				●	●	●	●			
	Acronal® F/L	Soft acrylic resins	29		●			●●	●●		●	●	●		●		
	Basonat®	Polyisocyanates	30	●●	●●	●●	●●	●●	●●	●●		●●	●●	●●	●●	●●	●
	Laropal®	Aldehyde resins	32		●	●	●	●●	●●			●●	●●	●●	●●	●●	
Solvent-free (SF)	Sovermol®	Bio-based polyols	36			●●		●	●●	●●		●●	●●			●	●●
	Basonat®	Polyisocyanates	38	●●	●●	●●	●●	●●	●●	●●		●●	●●	●●	●●	●●	●●
Powder	Joncryl®	Acrylic resins	39			●	●						●●				
	Laropal®	Aldehyde resins	39			●	●						●●				
Radiation curable (UV)	Laromer®	Acrylates	42		●●	●●	●●		●●	●	●●	●●	●●		●●	●●	●●

# Resins Products

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# Waterborne Systems

The growing trend toward water-based systems is driven by an ever-increasing focus on environmental protection, health, safety and sustainability. BASF offers a wide range of acrylic emulsions for 1-component (1K) and 2-component (2K) coating systems. These products are designed to deliver high performance for clear and pigmented coatings on a variety of substrates such as wood, concrete, plastic and metal. We are committed to advancing our customers' waterborne coating systems by identifying industry needs and delivering new solutions.

## **Acronal® and Acronal PRO – Acrylic dispersions**

Modified acrylic dispersions that are mainly developed for industrial metal protection.

'PRO' = Protection and Professional

## **Luhdran® – Core shell structure acrylic dispersions**

Resins based on surfactants, self-crosslinking or crosslinking that are particularly suitable for interior wood coatings or as blending resins in some exterior applications.

## **Basonat® – Polyisocyanates**

Modified-aliphatic polyisocyanates for 2K Polyurethane (PU) coating systems. These can be widely used as the reactive partner in water-based, solvent-based, and solvent-free systems.

## **Joncryl®, Basonol® – Acrylic dispersions and polyurethane dispersions**

Includes colloidal, rheology-control dispersions and self-crosslinking dispersions, mainly for the application of wood, plastic and metal applications.

Joncryl OH – Hydroxyl functional acrylic dispersions

Joncryl BRC – Biorenewable content based acrylic dispersions

Joncryl HYB – Polyurethane acrylic dispersions

Joncryl U – Polyurethane dispersions (PUDs)

Basonol PU – Polyurethane dispersions (PUDs)

Basonol AC – Acrylic-based dispersions

## **Laropal® - Aldehyde grinding resin**

Water-based grinding resin for pigment preparation





# Waterborne Technology Highlights

## Waterborne system approach for anti-corrosive performance

Primer: 80 micron coating based on Acronal PRO 770  
 Topcoat: 50 micron coating based on Basonol AC 2120 W



Mild steel SA 2 1/2

480 hours: No blistering, minimal rust creepage at scribe  
 720 hours: No blistering, Small blister at scribe, minimal rust creepage at scribe  
 1440 hours: No blistering, few blisters at scribe, small amount of rust creepage at scribe

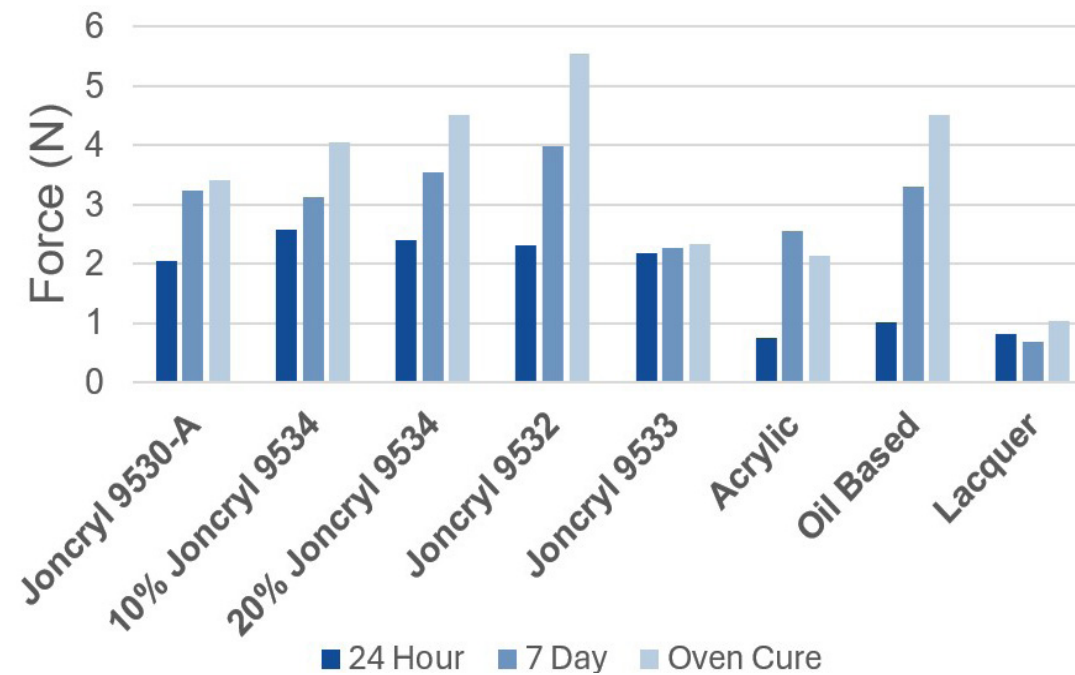
Salt spray resistance testing based on ASTM B-117

Waterborne technology for high durability protection of metal surfaces is highlighted in the picture above. The system is based on Acronal PRO 770 na\* as a DTM primer, providing outstanding chemical and corrosion resistance without the need for anti-corrosive pigments at 100 g/L VOC. The primer layer is top-coated with a white-pigmented formulation based on Basonol AC 2120 W, a waterborne polyol emulsion, crosslinked with Basonat HW 1000, a high-performance hydrophilically modified polyisocyanate. This system approach provides outstanding gloss retention, humidity resistance and corrosion resistance where outstanding durability is required.

\*Acronal PRO 770 was used in this study but represented in this brochure is Acronal PRO 770 na which is manufactured in the US

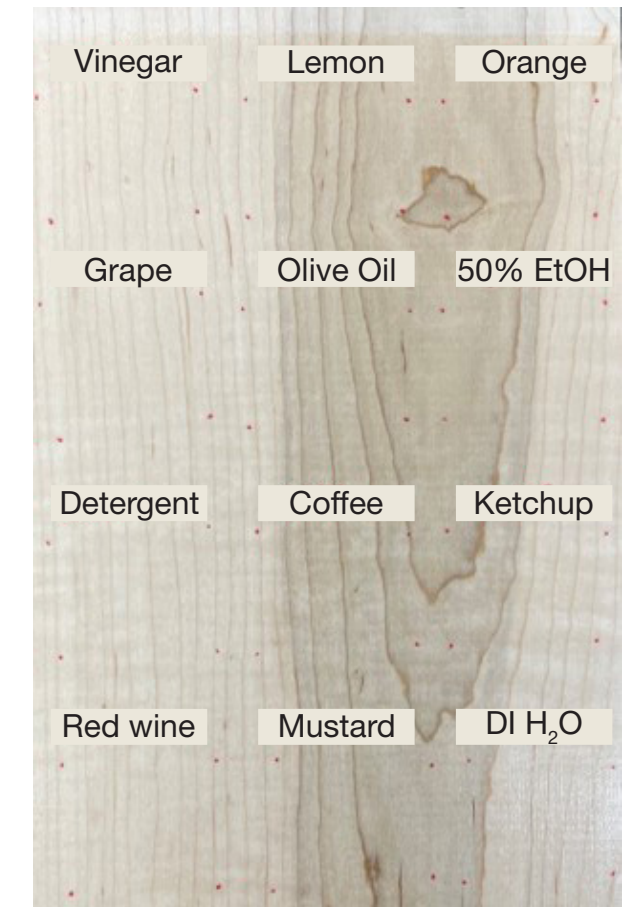
## 1K waterborne scratch resistance: force at coating break

The graph highlights the resistance to scratching based on ramped force applied by a tip via a nanoscratch tester. Force is indicated when the coating first breaks. The data indicates the impact of the Joncryl 953x series versus commercial products for wood coatings (which are solvent-based).



BASF's Phoenix Platform is a Joncryl 953x series of products developed to rival solvent-borne coatings for wood and high-performance topcoats. It provides high wet film clarity and outstanding hardness, scratch, and chemical-resistant film performance in both clear and pigmented coatings. This is achieved through a unique polymer design, enabling considerably lower VOC levels to achieve high performance.

## Self-crosslinking Resins for chemical resistance



Chemical resistance of vinegar, lemon juice, orange juice, grape juice, olive oil, 50% ethanol, detergent, coffee, ketchup, red wine, mustard and deionized water on coated maple.

Self-crosslinking resins can provide high chemical resistance and water resistance in a 1K, low VOC package. Products like Joncryl 8383-A offer robust performance over a variety of substrates, such as wood, concrete, and plastics. Household chemical resistance and acid etch resistance are hallmarks of this product along with its utility for interior and exterior performance. Demonstrated in the picture, are the resistance properties (after chemical spot testing) of a clear coat based on Joncryl 8383-A, displaying outstanding chemical resistance, high clarity and grain enhancement over maple.



# Joncryl

## Acrylic emulsions

Product	Solids (wt. %)	Viscosity (cps)	Tg (°C)	MFFT (°C)	pH	Acid Number (on solids)	Freeze-Thaw Stable	Grind Vehicle	Applications						Descriptions and Applications
									Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Joncryl 95	30	100	43	20	8	70	Yes	No					••	Ultra-fine particle size, colloidal dispersion for wood penetration and in-can clarity. Demonstrates minimal grain raising, excellent sandability and sealing characteristics. For use in stains, sealers, and wood preservatives. Features high Tg/low MFFT balance.	
Joncryl 1532	51	400	12	14	8	26	Yes	No	•	••		••	••	A versatile emulsion offering excellent adhesion to a wide variety of substrates including plastics, galvanized steel, and previously painted or chalked surfaces. Useful as a bonding primer to concrete. Can also be applied under a wide range of temperature and humidity conditions. Low VOC capability.	
Joncryl 1534	49	250	18	12	7.7	15	Yes	No		•		••	••	Used as a universal primer with excellent resistance properties.	
Joncryl 1907	46	500	21	20	8.3	55	Yes	Yes		•			••	Film forming emulsion used as a blend vehicle to impart flexibility, adhesion and reduced solvent demand. Used for wood finishes and hardboard primers. Suitable for interior gloss brushing enamels and as a modifier to improve chalk penetration.	
Joncryl 1908	48	500	98	100	8.3	55	Yes	Yes		•			••	A very hard emulsion often used as a blend vehicle to impart hardness and block resistance. Suitable for wood finishes and hardboard primers.	
Joncryl 1915	44	800	43	0	8.5	60	No	Yes		•			••	Offers outstanding block resistance and filler acceptance for use in primer applications or topcoats where fast block resistance is required. Can be formulated without added solvents in many applications.	



# Joncryl

## Acrylic emulsions

Product	Solids (wt. %)	Viscosity (cps)	Tg (°C)	MFFT (°C)	pH	Acid Number (on solids)	Freeze-Thaw Stable	Grind Vehicle	Applications						Descriptions and Applications
									Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Joncryl 1916	46	1,900	17	< 5	8.3	61	Yes	Yes		●				●●	A versatile emulsion with well balanced water resistance, block resistance, and adhesion. Can be formulated into lower VOC products in many applications.
Joncryl 1919	47	1,600	29	19	8	60	No	Yes	●	●●				●●	Emulsion for use in primer application for hardboard, cement fiberboard, and metal markets. Offers excellent adhesion, with good water and block resistance. Strong adhesion to aluminum. Can be formulated without added solvents in many applications.
Joncryl 1921	45	1,200	25	12	8.8	58	Yes	Yes	●	●●				●●	Offers outstanding water resistance while maintaining block resistance and adhesion properties for hardboard primer coatings.
Joncryl 1954	47	500	38	27	8.5	54	Yes	Yes		●				●●	A unique emulsion providing a balance of low solvent demand with excellent hardness. Useful for wood finishes, wood flat-stock primers, and topcoats. Good sanding properties for enamel undercoat and interior wood coating applications.
Joncryl 2153	50	700	75	60	8.4	50	Yes	Yes	●	●				●●	A rheology controlled acrylic emulsion for waterborne wood clear and hardboard primer applications; provides low foam, good adhesion, high gloss, and fast drying without the use of conventional surfactants.
Joncryl 2534	46	500	20	20	8	—	Yes	Yes		●				●●	A rheology controlled acrylic emulsion for waterborne interior and exterior architectural coatings. Provides alkyd-like rheology, gloss, and pigment dispersing capabilities.



# Joncryl

## Acrylic emulsions

Product	Solids (wt. %)	Viscosity (cps)	Tg (°C)	MFFT (°C)	pH	Acid Number (on solids)	Freeze-Thaw Stable	Grind Vehicle	Applications						Descriptions and Applications
									Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Joncryl 2536	46	150	45	40	9	—	Yes	Yes		●				●●	A rheology controlled acrylic emulsion for waterborne high gloss architectural coatings that offers excellent adhesion to a wide variety of substrates.
Joncryl 2561	48.5	750	-11	< 5	8	50	Yes	Yes						●●	A versatile emulsion for use in low odor, low VOC gloss paints; or as a modifier vehicle to improve adhesion, water spot, and block resistant properties. Also used as a wood stain vehicle.
Joncryl 2570	48	500	-18	< 5	8.2	43	No	Yes		●●					Acrylic emulsion for cost-effective metal applications. Provides adhesion to multiple substrates with good block resistance, fast dry, and low VOC. Anti-corrosion additives required for ferrous substrates.
Joncryl 537	45.5	150	44	42	9	40	Yes	Yes	●	●●		●●	●●		A “workhorse” emulsion with excellent gloss, clarity, adhesion, and manufacturing ease. Suitable as a sole vehicle or alkyd modifier for a variety of general metal, wood, and plastic finishes. Modifier for acrylic and vinyl acrylic architectural paints.
Joncryl 538-A	45	200	64	65	9.3	53	Yes	Yes	●	●●		●●	●●		A multipurpose acrylic emulsion featuring acid, gasoline, and MEK resistance. Suggested for wood flat-stock primers and topcoats, can also be used as a modifier to improve hardness and solvent resistance.
Joncryl 9522	45	200	—	20	7.5	—	No	No						●●	Hydrophilic emulsion for use in primers in knot-bleeding prevention. For maximum performance, coatings based on this product should be overcoated with a hydrophobic coating. Contains 20% C14 renewable content.



# Joncryl

## Acrylic emulsions

Product	Solids (wt. %)	Viscosity (cps)	Tg (°C)	MFFT (°C)	pH	Acid Number (on solids)	Freeze-Thaw Stable	Grind Vehicle	Applications						Descriptions and Applications
									Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Joncryl 8211	44	150	60	57	7.7	26	Yes	Yes	●	●●	●	●●			Broad adhesion to multiple metal substrates and plastics. Provides metallic pigment stability and good durability.
Joncryl PRO 1522	45	400	34	26	9	20	Yes	No	●	●●	●				An OEM direct-to-metal emulsion that has excellent corrosion resistant properties without the use of anti-corrosive pigments, which offers exterior durability, is compatible with anti-corrosive pigments, and can be formulated between 100 - 250 g/l VOC. Great for dip coating and low film build performance.
Joncryl PRO 1537-A	47	200	46	50	8.6	49	Yes	Yes	●	●●			●●		An ultra fine particle size acrylic emulsion for general and specialty purpose industrial coatings offering a unique balance of acrylic benefits along with alkyd-like features. It is possible to improve stain resistance, water resistance, adhesion, and gloss properties when used as a modifier. Can be blended with water-reducible alkyds to provide faster drying while maintaining performance.

# Joncryl

## Acrylic emulsions, self-crosslinking

Product	Solids (wt. %)	Viscosity (cps)	Tg (°C)	MFFT (°C)	pH	Acid Number (on solids)	Freeze-Thaw Stable	Grind Vehicle	Applications						Descriptions and Applications
									Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Joncryl 9530-A	40.5	100	-	45	7.5	-	No	No	●			●	●●	An emulsion offering excellent clarity, scratch resistance, stain resistance, and block resistance. Recommended for interior wood coatings like furniture and cabinetry for ambient cure or forced cure conditions.	
Joncryl BRC 9630	40.5	250	-	35	7.5	-	No	No	●			●	●●	10% biogenic carbon based version of Joncryl 9530.	
Joncryl 9532	40	375	-	48	8	20	No	No	●			●	●●	An emulsion offering higher scratch and stain resistance for interior wood coatings. Great blending partner with PUDs for wood flooring applications.	
Joncryl 9533	40	120	-	5	8	23	No	No		●		●	●●	An emulsion offering low to zero co-solvent needed. Excellent early hardness development and block resistance. Fine particle size for high clarity.	
Joncryl 9534	40	275	-	80	7.5	43	No	No		●		●	●●	An emulsion offering high Tg for improvements to hardness development and block resistance. Fine particle size for high clarity.	
Joncryl 541	45	100	-	20	8	-	Yes	No		●●		●●	●●	An emulsion offering fast-drying and block resistance, with hardness build at low VOC capability (50 g/L). Excellent for wood coatings, plastics, topcoats for metal, stabilized exterior applications.	



# Joncryl, Luhydran

## Acrylic emulsions, self-crosslinking

Product	Solids (wt. %)	Viscosity (cps)	Tg (°C)	MFFT (°C)	pH	Acid Number (on solids)	Freeze-Thaw Stable	Grind Vehicle	Applications						Descriptions and Applications
									Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Joncryl 8383-A	40	95	14	16	8.2	23	No	Yes		●		●●	●●	●●	An emulsion offering good clarity and “warmth of wood”; good chemical (acid etch resistance) and block resistance with excellent water resistance and wet adhesion. Recommended for concrete and wood applications.
Joncryl 8331	38.5	80	–	59	8.1	17	No	No					●●		An emulsion offering fast dry, quick sandability and hot block resistance with excellent chemical resistance in line applied wood coatings.
Joncryl 1984	41	< 100	78	> 70	8.4	17	No	No	●	●	●	●●	●●	●●	An emulsion with formulation stability, exhibiting UV resistance, and film hardness. Recommended for concrete and wood applications.
Joncryl 2980	45	< 300	10	18	9	7	No	No		●			●	●●	A one-component acrylic emulsion that provides a wet-look appearance for interior and exterior clear and pigmented coatings at 100 g/l VOC. High water blush resistance.
Joncryl 2981	44	< 500	35	45	8.8	9	No	Yes		●●	●	●●	●●	●●	An emulsion offering excellent clarity, weatherability, and excellent chemical resistance. Good balance of hardness and flexibility. Versatility for formulation as DTM, weatherable topcoats, wood coatings, concrete-coatings.
Luhydran A 849 S2	44	200	–	39	7	–	No	No		●			●●	●●	An emulsion offering high standard dispersion for joinery, industrial wood, and concrete applications. Good chemical and mechanical resistance.

# Acronal

## Acrylic emulsions, self-crosslinking

Product	Solids (wt. %)	Viscosity (cps)	Tg (°C)	MFFT (°C)	pH	Acid Number (on solids)	Freeze-Thaw Stable	Grind Vehicle	Applications						Descriptions and Applications
									Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Acronal PRO 770 NA	49.5	< 1000	-	19	7.8	7	No	No	●	●●	●●	●	●	Direct-to-metal emulsion with 100 g/L capability. Broad metal adhesion, outstanding chemical resistance, water and humidity, and corrosion resistance without anti-corrosive pigments for >240 hr salt spray. For primer or DTM applications.	
Acronal 6323	42	275	-	< 1	8.3	-	No	No		●		●	●●	An emulsion offering outstanding water resistance and adhesion with good block resistance for exterior wood coating and topcoat application. Low level of anti-blocking agents required for fast line speeds. Fantastic sag/leveling balance.	
Acronal LR 9014	45	250	-	< 3	8	-	No	No		●		●●	●●	An emulsion easy to formulate with excellent block resistance and wet adhesion. Suitable for exterior, clear or pigmented wood coatings from medium gloss to high gloss.	
Acronal TC 1015 NA	50	600	-	< 0	3.5	300	No	Yes	●	●●	●			Self-reacting dispersion for formaldehyde-free 1K stoving coatings for metal and glass protection. Replaces the need for use of formaldehyde resins. Requires baking temperatures of 150°C. Contains 120 mg KOH/g of hydroxyl value on solids. Works well for glass and metal protection.	



# Joncryl

## Solid acrylic resins

Product	Function	Acid Number (on solids) (mg KOH/g)	Density supplied (g/cm <sup>3</sup> )	Molecular Weight (Mw)	Softening Point (°C)	T <sub>g</sub> (°C)	Applications						Descriptions and Applications
							Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Joncryl 678	Carboxyl acrylic	215	1.16	8500	165	85	●	●●	●●	●●	●●	●●	Alkali-soluble, mid-range molecular weight resin. Recommended as a pigment dispersant in waterborne coatings.
Joncryl 67	Carboxyl acrylic	213	1.14	13000	143	73	●	●●	●●	●●	●●	●●	Alkali-soluble, high molecular weight resin. Good for pigment chipping and presscake dispersion.
Joncryl HPD 671	Carboxyl acrylic	214	1.14	17250	173	128	●	●●	●●	●●	●●	●●	Useful for dispersion of organic pigments and carbon black with good stability.

# Joncryl, Laropal

## Acrylic resin solutions and aldehyde resin solution

Product	Solids (wt. %)	Viscosity (cps)	Density supplied (g/cm3)	Molecular Weight (Mw)	pH	Acid Number (on solids) (mg KOH/g)	VOC (%)	Applications						Descriptions and Applications
								Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Joncryl 60	34	5500	1.07	8500	8.5	215	0.5	●	●●	●●	●●	●●	●●	Low VOC solution of Joncryl 678 in water and ammonia for gloss, holdout and clarity in pigment dispersions.
Joncryl 63	30.5	5000	1.07	13000	8.5	213	0.5	●	●●	●●	●●	●●	●●	Low VOC solution of Joncryl 67 for high quality pigment dispersions.
Joncryl HPD 71	27.5	4000	1.05	17250	8.5	214	0.2	●	●●	●●	●●	●●	●●	Solution of Joncryl HPD 671 for cost-effective, heat-resistant, high quality pigment dispersions with very good viscosity stability.
Joncryl HPD 96	34	5000	1.1	16000	8.5	220	0.6	●	●●	●●	●●	●●	●●	Solution of high molecular weight acrylic resin that improves color development and gloss of pigment dispersions without compromising stability.
Joncryl HPD 196	36	3800	1.08	9200	8.6	200	0.4	●	●●	●●	●●	●●	●●	Solution of mid-range molecular weight acrylic resin that improves viscosity and shock stability of high pigment loading dispersions.
Joncryl HPD 296	36.3	600	1.03	11500	8.1	141	0.4	●	●●	●●	●●	●●	●●	High-performance resin solution that improves viscosity and shock stability with broad range for inorganics, organics, and carbon blacks.

Product	Solids (wt%)	Viscosity (cPs)	Density (g/cm3)	MFFT (°C)	pH	Dispersability	Compatibility	Applications						Descriptions and Applications
								Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Laropal LR 9008	35	8000	1.03	20	8	Glycol ethers, water	Water-reducible alkyd, Alkyd emulsion, Acrylic, PUD	●●	●●	●●	●●	●●	●●	Aqueous preparation of a modified aldehyde resin for aqueous pigment paste manufacturing with broad compatibility of pigment and system.



# Joncryl, Basonol PU

## Polyurethane dispersions

Product	Type of Co-polymer	Solids	Viscosity (cps)	Tg	MFFT	pH	Acid Number (on solids)	Hydroxyl value (on solids)	Applications						Descriptions and Applications
									Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Joncryl U 4190	PUD	37	< 100	-	23	8.3	-	-	●			●●	●●	●	High abrasion resistance, good clarity, broad applicability as a workhorse emulsion. Plastic performance with addition of polyisocyanate.
Joncryl FLX 5200	PUD	40	55	-	0	8	-	-	●	●●		●●	●●	●	Soft PUD for adhesion promotion on wood, metal, and plastic. Can be blended with hard resins and is tack free on its own. Resistance to boiling water when combined with polyisocyanate with strong water vapor permeability.
Joncryl U 4500	Self-crosslinking PUD	37	110	-	17	8.3	-	-	●			●●	●●	●	Self-crosslinking PUD for high chemical resistance with abrasion and scratch resistance. Plastic performance with addition of polyisocyanate.
Joncryl HYB 6340	Acrylic / PUD Hybrid	40	50	-	45	7.6	12	-	●				●●	●	Hybrid for high quality water-based clear coats on wood for professional flooring and high performance furniture.
Basonol PU 1035 W	Hydroxyl-functional PUD	42	425	- 30	0	7	-	35	●●	●●		●●	●●	●	Reactive PUD for 1K stoving and 2K primer applications. Excellent flexibility, stone-chip resistance, and formulation latitude.

# Joncryl, Luhydran, Basonol

## Polyol emulsions for reactive systems

Product	Solids (wt. %)	Viscosity @ 23°C (cps)	Hydroxyl Number (on solids)	MFFT (°C)	pH	Acid Number (on solids)	Applications						Descriptions and Applications
							Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Glass	
<b>Hydroxyl functional</b>													
Joncryl 540	44	300	42	2.5	8.5	49		●●				●●	A crosslinkable emulsion with melamines, neutralized with DMEA. High gloss potential with good hardness and resistance properties. Suitable for thermoset, metal, hardboard and coil coating applications.
Joncryl 1540	42.5	500	57	40	8.5	13		●●				●●	A crosslinkable emulsion with melamines, neutralized with ammonia. High gloss potential with good hardness, fast cure and high resistance properties. Suitable for thermoset, metal, hardboard and coil coating applications.
Luhydran S 938 T	45	25	100	60	2.5	—		●●				●●	Versatile crosslinkable emulsion for furniture laminates or heat-cure coatings and two-component polyurethane applications (when neutralized in formulation) with high resistance properties.
Joncryl OH 8300	43	275	42	15	9.6	55		●				●●	Workhorse product for 1K stoving coating for glass. Applicability for metal protective coatings.
Joncryl OH 8312 NE	44	300	100	48	8.2	8		●●	●●	●●	●●	●	Primary dispersion with fast drying capabilities and high wet-film build on application. High gloss capability with hydrophilically modified isocyanates. Lower gloss capable with hydrophobic isocyanate. Exterior/interior versatility.
Joncryl OH 8710	46	< 200	125	44	7.8	—	●	●●	●●			●	Primary dispersion that has compatibility with hydrophobic isocyanates and high gloss. Performance comparable to secondary dispersions. Great balance of hardness and flexibility, high gloss and weathering. Great application properties for use in clear and pigmented topcoats.
Basonol AC 2120 W	42	400	118	5	7	15	●	●●	●●	●●			Primary dispersion that has compatibility with hydrophobic isocyanates and high gloss. Great balance of hardness and flexibility, high gloss and weathering. Performance comparable to high functionality secondary dispersions. Has broad formulation latitude. Works well for plastics. Product contains 6.6% propylene-glycol n-butyl ether.



# Basonat

## Water dispersable polyisocyanates

Product	Type	Solids (wt. %)	Solvent	NCO (%)	Equivalent Weight	Viscosity @ 23°C (cps)	Density @ 20°C (g/cm3)	Applications						Descriptions and Applications
								Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
<b>Water-emulsifiable HDI isocyanurate</b>														
Basonat HW 1000	Modified polyisocyanate	100	—	16.5 - 17.5	247	2,000 - 6,000	1.17	●●	●●	●●	●●	●●	●●	Excellent gloss retention and light stability with outstanding weather and chemical resistance. Emulsifiable in water with good stability, long pot life, and broad formulation latitude. Suitable for automotive, plastic, and industrial applications for high gloss in waterborne systems.
Basonat HW 1180 PC		80	Propylene carbonate (Solvenon® PC)	13 - 14	312	450 - 850	1.18	●●	●●	●●	●●	●●	●●	
Basonat HW 2000		100	—	17.5 - 18.5	233	1,500 - 3,000	1.16	●●	●●	●●	●●	●●	●●	
Basonat HW 2100		100	—	16.9 - 17.9	241	2,000 - 3,600	1.16	●●	●●	●●	●●	●●	●●	

# Joncryl, Zinc Oxide Solution

Wax emulsions and zinc oxide solution

Product	Physical Form	Wax Particle Size (nm)	Solids (wt. %)	Viscosity (cps)	pH	Density supplied (g/cm <sup>3</sup> )	Freeze Thaw Stable	Applications						Descriptions and Applications
								Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Joncryl Wax 4	Opaque emulsion	4,000	40	1,000	9	0.92	No	●●	●●	●●	●●	●●	●●	Polyethylene wax emulsion imparting excellent mar, scuff, and rub resistance at lower use levels than typical wax emulsions. May reduce gloss at high loading levels.
Joncryl Wax 26	Translucent emulsion	53	26	10	9.8	0.98	No	●●	●●	●●	●●	●●	●●	Fine particle size polyethylene wax; improves mar, early block, and water resistance. Normal levels will not affect gloss, clarity, or appearance of coating.
Joncryl Wax 120	Hazy emulsion	93	34	400	9	0.97	No	●	●●	●	●●	●●	●●	Improves mar and scuff resistance (paraffin/polyethylene wax). High levels will impart water beading and reduce gloss.
Zinc Oxide Solution #1 NA	Aqueous ammonia solution of zinc ions	—	15	5	11.4	1.21	Yes		●●	●●		●●	●	Crosslinking agent reacts with free acid groups of polymer. Modification improves early water, salt spray, and block resistance of the coating.







# Solvent-Based Systems

Solvent-based systems represent the majority of applications in the coatings industry. We offer a wide range of hydroxy-functional acrylic co-polymers, hyperbranched polyesters, hardeners and grinding resins for all solvent-borne binder classes. Our high-quality products are suitable for 1K and 2K systems and comply with current VOC regulations. Performance is of utmost importance, with good adhesion, resistance to weathering, yellowing and chemicals, as well as flexibility and cost-effectiveness being among the key features of these product ranges. Our products cover a broad range of applications in terms of temperature, humidity, film thickness and offer options for physical drying, low-bake systems and high-bake processes. They are suitable for a majority of substrates and can achieve both matte and high-gloss finishes.

BASF provides a wide selection of products for solvent-borne and solvent-free systems. Joncryl polyol grades, hydroxy-functional acrylic co-polymers, are commonly used as binders crosslinked with polyisocyanates like Basonat in 2K PU coatings. High-solid Joncryl polyols can also be combined with other binder chemistries to enhance performance while reducing VOC levels.

## **Joncryl® – Acrylic polyols**

Hydroxyl functional acrylic co-polymers for solvent-based coatings. They can be used as binders in 2K-PU systems for crosslinking with polyisocyanates such as Basonat or in combination with other binder systems to improve performance at reduced VOC levels.

## **Laropal® – Aldehyde Resins**

Grinding resins used in water-based and solvent-based systems

## **Basonat® – Polyisocyanates**

Aliphatic polyisocyanates for 2K PU coating systems. This product portfolio can be widely used as the reactive partner in water-based, solvent-based, and solvent-free systems.

## **Functional Resins**

Basonal® HPE – Hyper-branched polyester resin

Acronal® – Acrylic resins



# Solvent-Based Technology Highlights

## Solventborne monocoat DTM performance

Joncryl xDTM-B provides outstanding hardness, corrosion resistance, chemical resistance, and adhesion for monocoat SB 2K PU applications. Exposure of monocoat films based on white-pigmented monocoat based on Joncryl xDTM-B and a competitive polyol for DTM applications were evaluated in the same formulation. Visual corrosion evaluation at 987 hrs of salt fog exposure highlights the excellent resistance properties. Comparitively, the field and scribe over unpolished cold rolled steel for the Joncryl xDTM-B formulation displays significantly less blistering and rusting at the scribe.

**Joncryl xDTM-B based DTM formulation**



**Competitor polyol based DTM formulation**



987 hours of ASTM B-117 salt spray at 2 mil DFT

## Isocyanate impact on rapid property development based 2K PU coatings

	More Swings		
	HI 100 NG HB 275B HA 1000 HA 2000	HI 100 NG	HI 100 NG
HI 190 B/S NG	HB 100	HA 1000	HA 275
	HI 290B NG	HI 2000 NG	HA 1000
		HB 100	HI 2000 NG
		HB 275B	HB 100
Fewer Swings	HI 2000 NG	HA 2000	HI 290B NG
	HA 3000	HI 290B NG	HA 2000
		HA 3000	HA 3000
	1 day	7 days	30 days

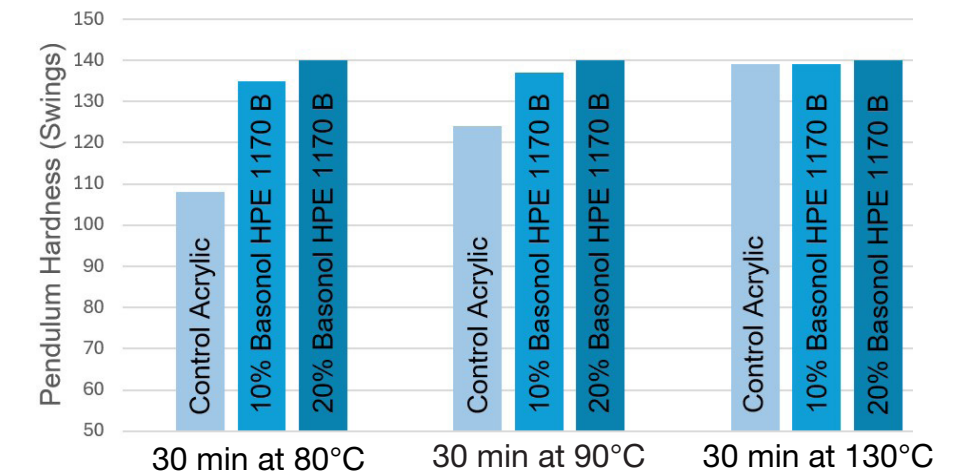
Hardness development (König swings) for automotive coating formulations containing Joncryl RPD 950 AC/P crosslinked with a variety of Basonat hardener resins.

The Basonat line of isocyanates is built on HDI backbones and offers a variety of performance benefits ranging from high hardness and weatherability to low viscosity and high flexibility. This is demonstrated in the graphic above which highlights the ultimate hardness over time when reacting aliphatic hydrophobic isocyanates with a rapid property development polyol Joncryl RPD 950 AC/P. Rapid property development polyols offers a distinct advantage in maintaining workable potlife with much shorter backend cure times compared to traditional polyols.

## Reduced energy requirement on cured with Basonol HPE 1170 B

Basonol HPE 1170 B is a unique structure, hyper-branched polyester resin which provides benefits as a blending partner with many systems and end applications including but not limited to: improving weatherability in lower-performing acrylics, reducing curing temperature requirements while maintaining properties or increasing throughput at higher temperatures, property improvement for chemical resistance and crosslink density, and modifying high solids systems for improved performance based on its high solids composition.

### Automotive Coating



One key value is demonstrated in the graph above, whereby Basonol HPE 1170 B is substituted up to 20% in an acrylic urethane formulation for automotive OEM clear coat. Hardness development is emphasized, which demonstrates the value in the addition of Basonol HPE 1170 B to achieve the same hardness value at 50°C less (low bake) versus traditional bake temperatures. This introduction of Basonol HPE 1170 B also increases resistance properties to chemicals like tree sap, dilute sulfuric acid, and pancreatin.



# Joncryl

## Acrylic polyols

Product	VOC Range formulated (lbs/gal)	Solids (wt. %)	Primary Solvent**	Tg (°C)	Equivalent Weight (-OH, on solids)	Hydroxyl Number (on solids)	Viscosity (cps)	Recommended for Baking Applications	Applications						Descriptions and Applications
									Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Joncryl 500	2.3 - 3.8	80	MAK	- 7	400	140	3,900	Yes	●●	●●	●●	●	●	●	Acrylic polyol with good hardness, stain resistance, and pigment dispersibility. Broad resin compatibility and useful as a low VOC modifier for appliance, office furniture, and general metal coatings. Recommended for high-build maintenance finishes and other polyurethane coatings. Can be reacted with melamine resins for 1K baking systems.
Joncryl 507	2.8 - 3.8	80	n-butyl acetate	- 7	400	140	3,800	Yes	●●	●●	●●	●	●	●	Alternate solvent version of Joncryl 500 for non-HAPs applications.
Joncryl 508	2.8 - 3.8	75	t-butyl acetate	- 7	400	140	4,000	No	●●	●●	●●	●	●	●	Alternate solvent version of Joncryl 500 for applications using exempt* solvents.
Joncryl 550	4.0 +	62	PM acetate toluene (65:35)	49	620	90	6,500	Yes	●●	●●	●●	●	●	●	Conventional solids polyol. Fast dry with long pot life and good exterior durability. High hardness. Excellent for clear and pigmented formulations.
Joncryl 552	4.0 +	62	n-butyl acetate	49	620	90	5,500	Yes	●●	●●	●●	●	●	●	Joncryl 550 resin in an alternative non-HAPs solvent.
Joncryl 581	4.0 +	100	—	62	360	155	solid	Yes		●●			●	●	100% solids polyol used in both two-component urethane and acid-cure coatings offering good chemical resistance and hardness. Ideal for interior or sheltered exterior wood and metal applications. Benefits in aiding hardness development in alkyd systems.



# Joncryl

## Acrylic polyols

Product	VOC Range formulated (lbs/gal)	Solids (wt. %)	Primary Solvent**	Tg (°C)	Equivalent Weight (-OH, on solids)	Hydroxyl Number (on solids)	Viscosity (cps)	Recommended for Baking Applications	Applications						Descriptions and Applications
									Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Joncryl 587	4.0 +	100	—	57	610	92	solid	Yes	●●	●●	●●	●	●	●	Conventional solids, “workhorse” polyol. Very fast dry with long pot life and excellent UV and chemical resistance. Solid form provides cost benefit and formulator versatility.
Joncryl 587-AC	Exempt*	50	acetone	57	610	92	200	No	●●	●●	●●		●	●	50% solids cut of Joncryl 587 in acetone for applications using exempt solvents*.
Joncryl 804	4.0 +	100	—	70	1,250	45	solid	Yes	●	●●	●●	●●	●	●	High equivalent weight for low NCO demand. Can be used to formulate low cost, two-component urethane coatings. Fast drying when used as a modifier.
Joncryl 901	3.2 - 4.4	77	MAK	20	500	112	17,500	Yes	●●	●●		●	●	●	Excellent exterior durability with good chemical and solvent resistance. Ideal for high performance, lower VOC maintenance, and rail and transportation topcoats.
Joncryl 903	4.0 +	60	PCBTF	20	500	112	6,070	Yes	●●	●●		●	●	●	Excellent exterior durability with good chemical and solvent resistance. Ideal for high performance, lower VOC maintenance, and rail and transportation topcoats.
Joncryl 906-AC	Exempt*	75	acetone	16	600	93	6,500	No	●●	●●		●	●	●	For applications using exempt* solvents providing excellent weatherability, hardness and clarity.
Joncryl 933	2.9 - 4.0	80	n-butyl acetate	7	800	70	8,000	Yes	●●	●●		●	●	●	Lower VOC, high equivalent weight acrylic polyol for industrial two-component polyurethane applications. Recommended for industrial maintenance finishes requiring long pot life and good weatherability.

\*Exempt based on acetone from Federal Register, Volume 60, 31633, 1995.

# Joncryl, Basonal

## Acrylic polyols

Product	VOC Range formulated (lbs/gal)	Solids (wt. %)	Primary Solvent**	Tg (°C)	Equivalent Weight (-OH, on solids)	Hydroxyl Number (on solids)	Viscosity (cps)	Recommended for Baking Applications	Applications						Descriptions and Applications
									Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Joncryl 935	3.2 - 4.4	70	MAK	17	375	150	8,500	No	●●	●●		●	●	●	High performance polyol for polyurethane coatings. Offers excellent chemical resistance and exterior durability with highest hardness. Suitable for automotive refinish and industrial applications.
Joncryl xDTM-B	3.2 - 4.4	70	n-butyl acetate	26	400	140	4,000	No	●	●●	●●	●			Resin for Direct-to-Metal (DTM) applications with excellent dry and wet adhesion to multiple metal substrates. Produces excellent pot life, high film hardness, and good corrosion protection.
Reactive modifiers															
Joncryl 963	1.0 +	98 +	—	- 59	432	130	7,500	Yes	●●	●●	●●	●●	●●		A reactive diluent or flexibilizing modifier resin for high performance automotive and industrial applications. Offers VOC reduction with improved weatherability without sacrificing hardness as well as improved acid-etch resistance in weaker performing systems.
Basonal HPE 1170 B	3.2 - 4.4	70	n-butyl acetate	19	200	280	4,400	Yes	●●	●●	●●	●●	●●		Hyperbranched polyester for improving properties of ambient and low bake systems including chemical resistance, faster hardness development, and scratch resistance. Compatible with alkyds, polyesters, acrylics. Recommended usage 10-30% of resin content.

# Joncryl

## Fast cure acrylic polyols

Product	VOC Range formulated (lbs/gal)	Solids (wt. %)	Primary Solvent**	Tg (°C)	Equivalent Weight (-OH, on solids)	Hydroxyl Number (on solids)	Viscosity (cps)	Applications						Descriptions and Applications
								Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Joncryl 909	3.3 - 4.5	68	n-butyl acetate	25	480	117	6,500	●●	●●	●●	●	●	●	Offers early hardness development and through cure with balanced pot life. Good gloss retention, durability, and chemical resistance makes it suitable for automotive and industrial applications.
Joncryl 910	3.4 - 4.7	71	MAK	9	600	94	7,000	●●	●●	●●	●	●	●	High performance, high solids polyol for polyurethane coatings. Offers unusually good pot life, Skydrol* resistance, and dry time characteristics with outstanding QUV gloss retention.
Joncryl 915	3.2 - 4.4	77	n-butyl acetate	13	590	95	7,500	●●	●●	●●	●	●	●	Lower VOC polyol offering very fast dry characteristics combined with strong acid etch resistance and balance of impact resistance and hardness.
Joncryl 920	2.3 - 3.8	80	MAK	- 7	400	140	6,000	●●	●●	●●	●	●	●	A low VOC polyol offering fast dry time and long pot life characteristics with high impact resistance. Useful as a sole resin or a modifier for other polyols such as Joncryl 910.
Joncryl 922	2.3 - 3.8	80	n-butyl acetate	- 7	400	140	5,500	●●	●●	●●	●	●	●	Alternate solvent version of Joncryl 920 for high performance, low odor applications.
Joncryl 924	3.3 - 4.5	70	PCBTF	- 7	400	140	6,000	●●	●●	●●	●	●	●	Alternate solvent version of Joncryl 920 for high performance, low odor applications.

\*Skydrol is a registered trademark of Eastman Chemical Company



# Joncryl

## Rapid property development acrylic polyols

Product	VOC Range formulated (lbs/gal)	Solids (wt. %)	Primary Solvent**	Tg (°C)	Equivalent Weight (-OH, on solids)	Hydroxyl Number (on solids)	Viscosity (cps)	Recommended for Baking Applications	Applications						Descriptions and Applications
									Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Joncryl RPD 950-AC/P	2.1 +	65	acetone / PCBTF (3:1)	27	510	110	3,000	No	●●	●●	●●	●	●	●	Acrylic polyol for solventborne 2K polyurethane systems in auto refinish and general industrial applications; fast cure, early hardness, and long pot life. Supplied in VOC exempt* solvents.
Joncryl RPD 950-B	4.0 +	61	n-butyl acetate	27	510	110	4,500	No	●●	●●	●●	●	●	●	Acrylic polyol for solventborne 2K polyurethane systems in auto refinish and general industrial applications; rapid cure, early hardness, and long pot life.
Joncryl RPD 980-B	2.1 +	80	n-butyl acetate	- 7	400	140	5,800	No	●●	●●	●●	●	●	●	Acrylic polyol for high solids solventborne 2K polyurethane systems in auto refinish and general industrial applications; rapid cure, early hardness, and long pot life. Can be formulated for use as blend partner and for some direct-to-metal applications.

# Joncryl, Acronal

## Specialty acrylic resins

Product	Function	Acid Number	Viscosity	Density	Softening	Tg	Applications						Descriptions and Applications
							Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Joncryl 611	Carboxyl	53	–	1.1	112	50	●	●●	●●	●	●●	●●	Solvent-soluble, compatible with most resins for fast dry, high gloss, and high solids at low viscosity.
Acronal 4F	Non-functional	–	150	1.05	–	- 40	●●	●●	●●	●●	●●	●●	Poly-n-butyl acrylate resin for plasticization, compatibility with cellulose nitrate, vinyl chloride resins, polyvinyl ethers, polyacrylates.
Acronal 4L (50% ethyl acetate)	Non-functional	–	2000	1.05	–	–	●●	●●	●●	●●	●●	●●	Poly-n-butyl acrylate resin for plasticization, compatibility with cellulose nitrate, vinyl chloride resins, polyvinyl ethers, polyacrylates.

# Basonat

## Polyisocyanates

Product	Type	Solids (wt. %)	Solvent	NCO (%)	Equivalent Weight	Viscosity @ 23°C (cps)	Density @ 20°C (g/cm <sup>3</sup> )	Applications						Descriptions and Applications
								Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
<b>HDI isocyanurate</b>														
Basonat HI 100 NG		100	—	21.5 - 22.5	191	2,500 - 4,000	1.17	●●	●●	●●	●	●	●	Excellent gloss retention and light stability with outstanding weather, chemical, and abrasion resistance. Recommended for automotive, plastic, and industrial applications.
Basonat HI 190 B/S NG	Isocyanurate based polyisocyanate	90	n-butyl acetate / Solvesso™ 100* (1:1)	19.3 - 20.3	212	450 - 650	1.13	●●	●●	●●	●	●	●	
Basonat HI 290 B NG		90	n-butyl acetate	19.3 - 20.3	212	400 - 600	1.13	●●	●●	●●	●	●	●	
Basonat HI 2000 NG	Lower viscosity isocyanurate polyisocyanate	100	—	22.5 - 23.5	182	900 - 1,500	1.17	●●	●●	●●	●	●	●	
<b>HDI biuret</b>														
Basonat HB 100		100	—	22 - 23	187	2,500 - 4,500	1.12	●●	●●	●●	●●	●●	●●	Offers superior weather and chemical resistance with excellent gloss retention and light stability. Compatible with a wide range of resins. Recommended for wood, furniture, plastic, and industrial finishes. Offers balance of hardness and flexibility.
Basonat HB 175 MP/X	Biuret based polyisocyanate	75	methoxypropyl acetate/xylene	16 - 17	255	130 - 300	1.07	●●	●●	●●	●●	●●	●●	
Basonat HB 275 B		75	n-butyl acetate	16 - 17	255	130 - 300	1.06	●●	●●	●●	●●	●●	●●	

\*Solvesso is a Registered Trademark of ExxonMobil Corporation



# Basonat

## Polyisocyanates

Product	Type	Solids (wt. %)	Solvent	NCO (%)	Equivalent Weight	Viscosity @ 23°C (cps)	Density @ 20°C (g/cm3)	Applications						Descriptions and Applications
								Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
HDI allophanate														
Basonat HA 1000	Allophanate modified isocyanurate polyisocyanates	100	—	21 - 23	191	900 - 1,500	1.1	●	●●	●●	●●	●●	●●	Offers superior lightfast and weather resistance for high solids coatings. Homogeneous incorporation into polyester emulsions, alkyd resin emulsions, and secondary dispersions. Imparts flexibility. Suitable for automotive, wood/furniture, plastic, and industrial finishes. Hardness development HA 1000>2000>3000.
Basonat HA 2000		100	—	18.5 - 21.5	210	500 - 900	1.1	●	●●	●●	●●	●	●●	
Basonat HA 3000		100	—	19 - 20	215	200 - 400	1.1	●	●●	●●	●●	●●	●●	

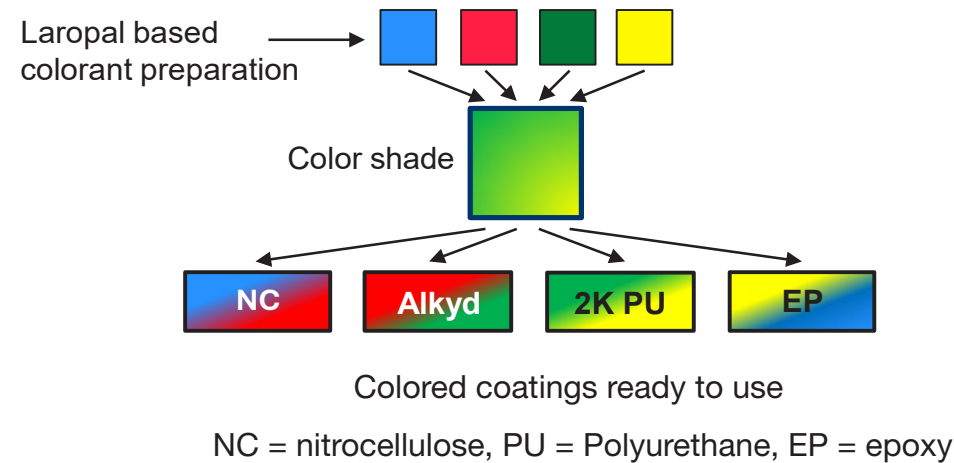
# Laropal

## Aldehyde Grinding Resins

Product	Physical Form	Solids (wt. %)	Softening Range (°C)	Iodine Color (max)	OH Value calculated (mg KOH/g)	Saponification Value (mg KOH/g)	Tg (°C)	Solubility	Compatibility	Applications						Descriptions and Applications
										Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Laropal A 81	pale colored pellets	98 +	80 - 95	3	40	65	57	alcohols, esters, ketones, aromatic hydrocarbons, (aliphatic hydrocarbons restricted)	nitrocellulose, alkyds, acrylates, chlorinated rubber, VC co-polymers	●●	●●	●●	●●	●●	●●	Light stable, low viscosity, and very compatible aldehyde resins with excellent pigment wetting. Ideal for solventborne and 100% solids energy cure pigments and pigment pastes; can be used as co-binders for improving solids content.
Laropal A 101	pale colored pellets	98 +	95 - 110	5	35	62	73	alcohols, esters, ketones, aromatic hydrocarbons, (aliphatic hydrocarbons restricted)	nitrocellulose, alkyds, acrylates, chlorinated rubber, VC co-polymers	●●	●●	●●	●●	●●	●●	Light stable, low viscosity, and very compatible aldehyde resins with excellent pigment wetting. Ideal for solventborne and 100% solids energy cure pigments and pigment pastes; can be used as co-binders for improving solids content. Can be used as a leveling agent in epoxy powder coatings.

# Laropal Technology Highlights

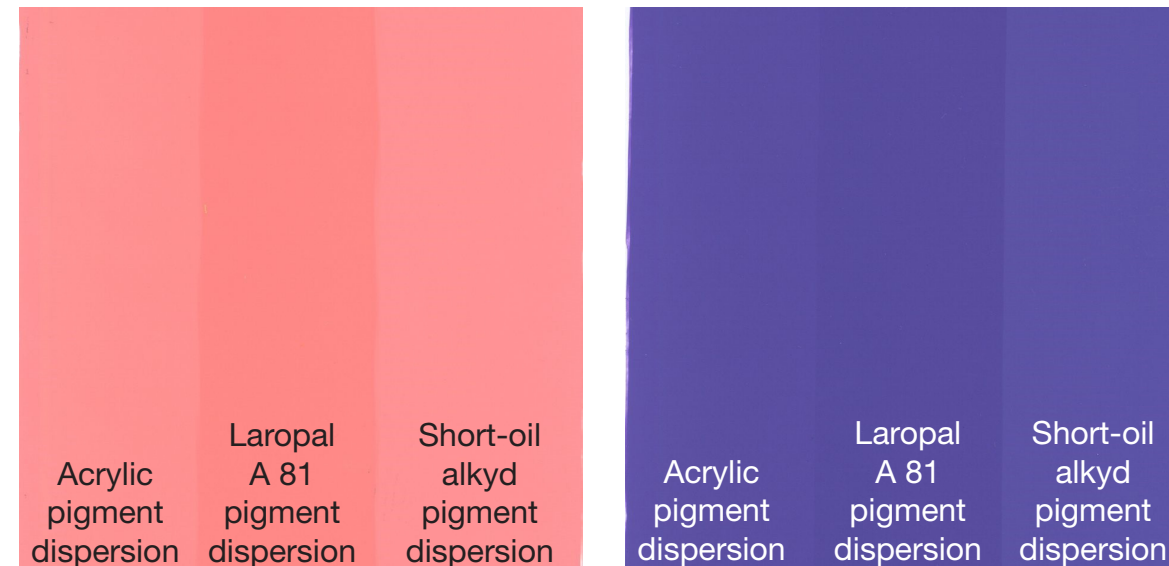
## Laropal universal mixing system for pigment preparation



Laropal A 81 and A 101 are solid aldehyde-based resins for efficient use in pigment paste preparation for solvent-based and high-solids systems. Outstanding compatibility across multiple chemistries, including but not limited to polyurethanes, acrylics, alkyds, epoxies, and nitrocellulose systems simplifies colorant manufacturing by reducing the number of grinding resins required to formulate for multiple pigment types and chemistries while offering outstanding weathering and hardness development.

## Color Strength Development with Laropal A 81

Demonstrated in the photos are applications of Laropal A 81 based pigment dispersions versus alternative grinding resin chemistries, which highlight the improvement in color strength for equal loadings of pigment preparation based on equal pigment loadings in each coating system. The example on the left shows a dispersion of Pigment Orange 73 in a 2K SB PU coating. The example on the right shows a dispersion of Pigment Violet 23 in a stoving alkyd-melamine coating. Another benefit of the Laropal A 81 based pigment grinds is the viscosity control vs. pigment loading as compared to other chemistries. In many cases, the Laropal A 81 offers increased pigment loading at workable viscosities.



Pictures:

(L) Pigment dispersions with different grind resin chemistry in a SB 2K PU Coating  
 (R) Dispersions with different grind resin chemistry in a stoving alkyd-melamine Coating.





# Solvent-Free Systems

Reducing the use of organic solvents and VOC emissions in coating production and processes has always been a goal of environmental protection and sustainable development. BASF's environmentally friendly product, Sovermol bio-based polyols, are derived from renewable materials and can meet the most stringent environmental standards and regulations. They can be widely used in new energy vehicles, windmills, flooring, construction and industrial protective coatings when combined with Basonat polyisocyanates to produce solvent-free PU coatings. Focusing on high solids, there is a push for high-performing powder coatings. Acid-functional polyols aid powder coatings formulators in building chemical resistance, hardness, and gloss control, especially in combination with epoxy hybrid systems. Joncryl solid acrylic polyols can also be used to manufacture highly weatherable polyurethane powder coatings.

## **Sovermol® – Bio-Based polyols**

Natural-oil polyols are polyfunctional alcohols based on renewable raw materials like rapeseed oil, castor oil, soybean oil and palm kernel oil. The practical advantages of these products include good adhesion, excellent workability and good weathering properties. They can also be used on a wide variety of substrates.

## **Laropal® – Aldehyde resins**

Grinding resins used in 100% solids systems

## **Basonat® – Polyisocyanates**

Aliphatic polyisocyanates for 2K PU coating systems. This product portfolio can be widely used as the reactive partner in water-based, solvent-based, and solvent-free systems.

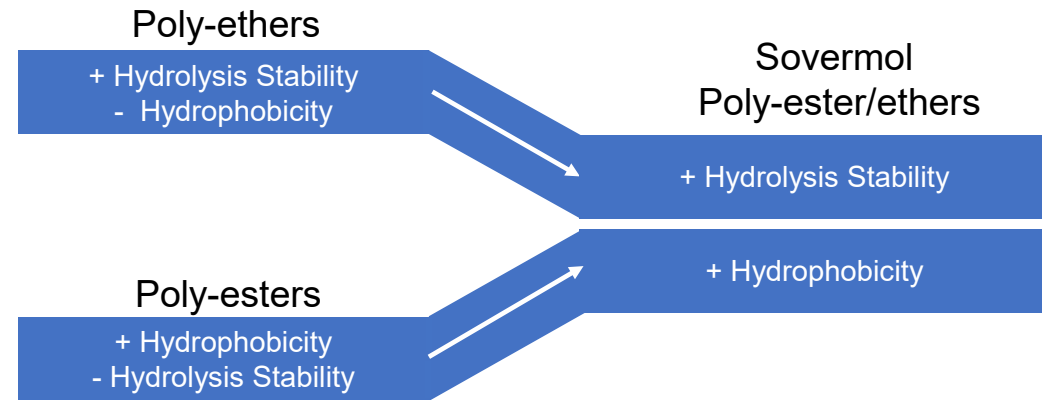
## **Joncryl® – Polyol / Acid-functional 100% resins**

Hydroxyl-functional acrylic co-polymers for solvent-free systems. They can be used as binders in 2K-PU systems for crosslinking with polyisocyanates such as Basonat or in combination with other binder systems to improve performance at reduced VOC levels. Acid functional acrylics provides a gateway to high performance powder coatings, especially when reacting with epoxies.



# Solvent-Free Technology Highlights

## Sovermol 100% solids, biobased polyols



Natural oil-based (e.g. castor oil) polyols crosslinkable via OH functionality

Sovermol polyols are a series of polyester/ether polyols which are low viscosity at 100% solids and based on bio-based building blocks. This offers formulators the option to formulate at 100% solids or very high solids when used as blending partners to reduce VOC contributions. When combined with aromatic polyisocyanates, these products offer outstanding properties for adhesives and flooring applications, while reacting with aliphatic isocyanates provides weatherable, robust performance.

### Reduction of VOCs by using Sovermol 1092 as a blending partner with Joncryl RPD 980 B and Joncryl 804 while producing a higher performing coating

2.1 lb/gal VOC clear coat with non-exempt solvents and acetone

2.1 lb/gal clear coat based on Joncryl RPD 980-B / Joncryl 804 / Sovermol 1092 cured with Basonat HI 100 NG



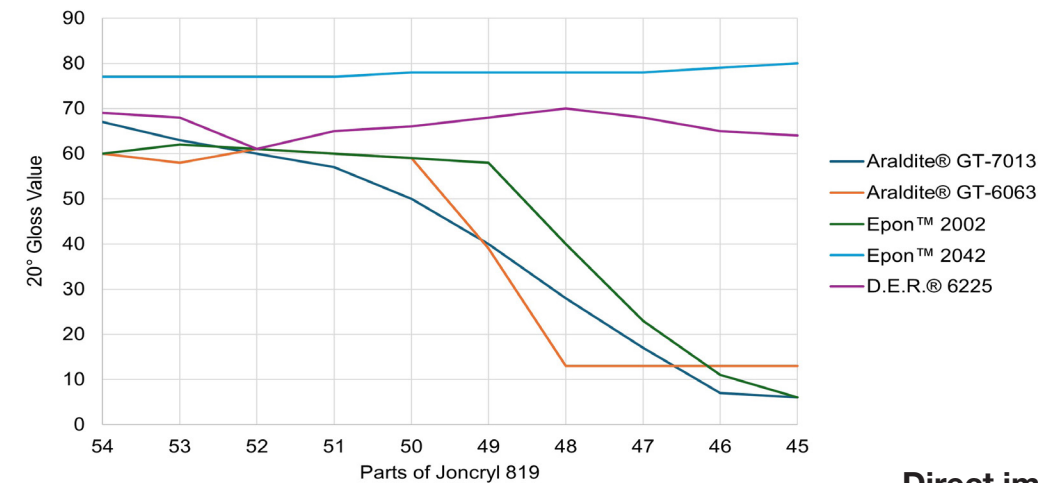
Improved appearance of Sovermol containing clear coat sprayed over a red base coat

## Acrylic Resins for powder coatings

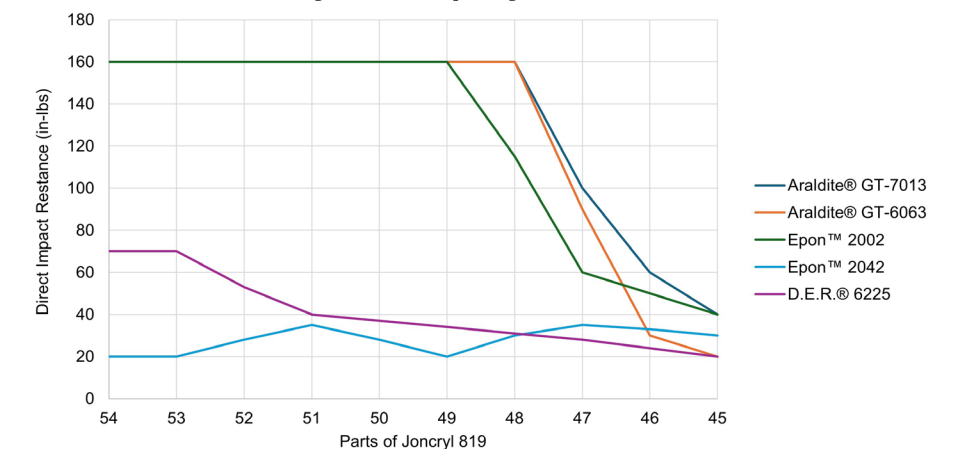
Joncryl acid functional acrylic resins provide a differentiated backbone to conventional polyester or epoxy powder coatings and offer the advantage of gloss and property control based on stoichiometry when combining with epoxies to make hybrid powder coatings as well as providing outstanding resistance properties to materials like detergents.

Joncryl 819, a workhorse acrylic with outstanding properties when formulated into epoxy hybrid powder coatings provide the formulator with flexibility in property. Compatibility of the epoxy and adhering to the stoichiometry of the acid/epoxy reaction is critical to achieve desired properties. In the charts below, Joncryl 819 is varied in ratio (outside of 1:1 stoichiometry) to different epoxy resins for powder coatings. The gloss and impact resistance can be impacted by the stoichiometry chosen as well as the type of epoxy resin. The maximal performance in gloss and impact can be achieved when adhering to an exact stoichiometric condition.

### 20° gloss as a function of Joncryl 819 / Epoxy Resin



### Direct impact resistance as function of Joncryl 819 / Epoxy Resin



Araldite® is a registered trademark of Hunstman Corporation  
 Epon™ is a registered trademark of Olin Corporation  
 D.E.R.® is a registered trademark of Westlake Epoxy



# Sovermol

## Bio-based polyols

Product	Type	Renewable Content (%)	Solids (wt. %)	Hydroxyl Value (mg KOH/g)	Hydroxyl Equivalent Weight	Viscosity @ 25°C (cps)	Applications						Descriptions and Applications
							Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Sovermol 100 N	Branched polyether	–	100	880	64	6,000		●●	●	●	●	●●	A polyol used in combination with other Sovermol types for solvent-free, UV-stable coatings for floorings, adhesives, and casting materials with high chemical resistance and hardness; increases Tg temperature and crosslinking density.
Sovermol 750	Branched polyether/ polyester	65 - 80	100	315	178	1100, @ 20°C	●●	●●	●	●	●	●●	A polyol used in combination with isocyanates as a reactive component for 2-pack polyurethane coatings, floorings, and casting materials; excellent UV, weathering, and chemical resistance with HDI isocyanates. Provides impact resistance improvements in systems where blended with acrylics.
Sovermol 760		65 - 80	100	390	145	2,300	●	●●	●●	●	●	●●	A polyol used in combination with isocyanates as a reactive component for 2-pack polyurethane coatings, floorings, and casting materials; excellent UV, weathering, and chemical resistance with HDI isocyanates. Provides impact resistance improvements in systems where blended with acrylics. Higher Tg versus Sovermol 750.
Sovermol 780		50 - 65	100	510	110	2,300 (20°C)		●●	●	●	●	●●	Excellent chemical resistance, good wathering resistance, suitable for outdoor applications. Hydrolysis resistance, high saponification stability, suitable for flooring. High Tg, high hardness (D ~90).
Sovermol 1092		65 - 80	100	283	198	800		●●	●	●	●●	●●	A high performance polyol used in combination with isocyanates as a reactive component for ductile - hard polyurethane coating and casting materials; excellent pigment wetting, very low viscosity, less sensitivity to moisture while curing, and extremely hydrophobic. Blendable with acrylic polyols for lowering VOC with good application properties.
Sovermol 1093		65 - 80	100	229	245	2,500	●	●●	●●	●	●●	●●	Universal polyol. Excellent impact resistance, shore D hardness (D ~70).
Sovermol 805		65 - 80	100	170	330	3,500	●	●●	●	●	●●	●●	Universal polyol. High hydrophobicity. Excellent impact resistance, shore D hardness (D ~70). Self-leveling flooring coatings based on reaction with aromatic polyisocyanates. Offers crack bridging performance.
Sovermol 815		80-100	100	220	260	1,600	●	●●	●	●	●●	●●	Universal polyol. Extremely hydrophobic, good elastic memory, strong chemical resistance, impact resistance and water repellancy. Useful in flooring, crack-bridging, and adhesives.



# Sovermol

## Bio-based polyols

Product	Type	Renewable Content (%)	Solids (wt. %)	Hydroxyl Value (mg KOH/g)	Hydroxyl Equivalent Weight	Viscosity @ 25°C (cps)	Applications						Descriptions and Applications
							Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
Sovermol 818	Fatty-chemistry polyester	80-100	100	236	238	750	●	●●	●	●	●●	●●	Universal polyol. Extremely hydrophobic with excellent flexibility below 0°C. Self-leveling, bonding, and water repellancy. Can be used for electropotting compounds. Excellent pigment wetting.
Sovermol 1005	Slightly branched aliphatic diol	80 - 100	100	122	460	700 (20°C)	●	●●	●	●	●●	●●	Soft, elastic performance with plasticizer attributes and long open time. Great for adhesives, water resistance.
Sovermol 1006	Polyester diol	80 - 100	100	60	935	8,000 (20°C)	●	●●	●	●	●●	●●	Useful as a co-polyol with hydrolysis stability, soft, elastic performance. Effective in crack bridging and sports flooring.
Sovermol 1014	Aliphatic triol	80 - 100	100	160	350	700	●	●●	●	●	●●	●●	Soft, elastic performance, hydrophobic. For use in foams, flooring and adhesives.
Sovermol 1102	Slightly branched polyether/polyester	80 - 100	100	230	245	400 (20°C)	●	●●	●	●	●●	●●	Universal co-polyol. Acts as a reactive diluent with soft, elastic performance. Gel-time prolonger and some UV stability.
Sovermol 1055	Epoxy functional polyester	80 - 100	100	Epoxy content ~ 4.8%	Epoxy equivalent weight = 350	15 (20°C)	●	●●	●	●	●	●●	Epoxy functional bio-based polyester. UV stability, plasticizer attributes. Non-reactive diluent for 2K PU coatings. Diluent for epoxy systems.
Sovermol 1058	Fatty acid polyester	80 - 100	100	---	---	5 (20°C)	●	●	●	●	●	●	Hydrophobic, non-reactive diluent in 2K PU systems to decrease viscosity and improve processing properties. VOC free and extremely low water. Diluent for epoxy systems.

# Basonat

## Solvent-free polyisocyanates

Product	Type	Solids (wt. %)	Solvent	NCO	Equivalent Weight	Viscosity	Density	Applications						Descriptions and Applications
								Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
HDI isocyanurate														
Basonat HI 100 NG	Isocyanurate based polyisocyanate	100	—	21.5 - 22.5	191	2,500 - 4,000	1.17	●●	●●	●●	●	●	●	Excellent gloss retention and light stability with outstanding weather, chemical, and abrasion resistance. Recommended for automotive, plastic, and industrial applications.
Basonat HI 2000 NG	Lower viscosity isocyanurate polyisocyanate	100	—	22.5 - 23.5	182	900 - 1,500	1.17	●●	●●	●●	●	●	●	
HDI biuret														
Basonat HB 100	Biuret based polyisocyanate	100	—	22 - 23	187	2,500 - 4,500	1.12	●●	●●	●●	●●	●●	●●	Offers superior weather and chemical resistance with excellent gloss retention and light stability. Compatible with a wide range of resins. Recommended for wood, furniture, plastic, and industrial finishes. Offers balance of hardness and flexibility.
HDI allophanate														
Basonat HA 1000	Allophanate modified isocyanurate polyisocyanates	100	—	21 - 23	191	900 - 1,500	1.1	●	●●	●	●●	●●	●●	Offers superior lightfast and weather resistance for high solids coatings. Homogeneous incorporation into polyester emulsions, alkyd resin emulsions, and secondary dispersions. Imparts flexibility. Suitable for automotive, wood/furniture, plastic, and industrial finishes. Hardness development HA 1000>2000>3000.
Basonat HA 2000		100	—	18.5 - 21.5	210	500 - 900	1.1	●	●●	●	●●	●	●●	
Basonat HA 3000		100	—	19 - 20	215	200 - 400	1.1	●	●●	●	●●	●	●●	

# Joncryl

## Resins for powder coatings

Product	Functionality	Solids	Acid / Hydroxyl Number	Equivalent Weight	Molecular Weight	Softening Point (°C)	Tg (°C)	Chemistry	Appearance	Chemical Resistance	Corrosion Resistance	Flexibility	Flow	Hardness	Applications						Descriptions and Applications
															Auto	General Industrial	Protective	Plastics	Furniture & Flooring	Concrete	
<b>Hydroxyl acrylic</b>																					
Joncryl 587	Hydroxyl	98	92	610	18,000	110	57	urethane	●	●			●	●	●	●	●	Acrylic polyol for UV resistant powder coatings.			
Joncryl 804	Carboxyl / hydroxyl	≥ 98.5	15/45	1,250	12,500	105	70	urethane	●				●	●	●	●	●	Acrylic polyol for UV resistant powder coatings.			
<b>Carboxyl acrylic</b>																					
Joncryl 611	Carboxyl	> 98	53	1,058	8,100	112	50	hybrid	●			●				●	●	Acrylic resin for higher gloss acrylic hybrid powder coatings, higher compatibility.			
Joncryl 682	Carboxyl	> 99	238	236	1,700	105	56	hybrid	●	●	●		●	●		●	●	Acrylic resin for semi-gloss acrylic hybrid powder coatings.			
Joncryl 819 / 820	Carboxyl	> 99	75	748	15,000	115	57	hybrid	●	●		●		●		●	●	Acrylic resin for 50/50 acrylic hybrid powder coatings, offering hardness and chemical resistance.			
Joncryl 843	Carboxyl	> 98	204	275	6,100	140	86	hybrid	●	●	●	●				●	●	Acrylic resin for hybrid powder coatings producing ultra low gloss with exceptional chemical resistance and high impact resistance. FDA 175.300 in specific applications.			
Joncryl 848	Carboxyl	≥ 98.5	215	261	4,500	127	67	hybrid	●	●	●		●			●	●	Acrylic resin for gloss control in acrylic hybrid powder coatings with broader temperature cure range; also used as a sole acrylic for ultra low gloss. FDA 175.300 in specific applications.			
Laropal A 81	Hydroxyl	> 98	40	1402	—	80 - 95	57	hybrid / urethane	●				●		●	●	●	Pigment grinding aid.			
Laropal A 101	Hydroxyl	> 98	35	1602	—	95-110	73	hybrid / urethane	●				●		●	●	●	Pigment grinding aid with flow and leveling characteristics.			



# Radiation Curable Systems

BASF is your ideal choice for high-performance radiation-curable resins. Our Laromer products enable you to create coatings tailored to your needs. Your challenges are our challenges, and we are constantly driven to improve our product portfolio with innovative solutions for your coating formulations. With our continuous focus on research and development, investments in assets and people and close interaction with formulators and machine manufacturers, we are shaping the future of radiation-curable resins.

UV energy or electron-beam technology is utilized in various applications and industries, including adhesives, transportation and industrial coatings, furniture and flooring, electronics and special applications. The advantages of this technology include: faster curing rates compared to conventional drying techniques, low thermal stressing on substrates, good adhesion to a wide range of substrates, low energy consumption, high scratch and chemical resistance, and reduced use of VOC solvents.

BASF offers a broad portfolio of high-quality, high-functionality oligomers and monomers to meet a wide range of formulation requirements.

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## **Laromer® – UV Oligomers (100% solids)**

Laromer UA – Urethane acrylates

Laromer EA / LR – Epoxy acrylates

Laromer PO – Polyether acrylates

Laromer PR – Performance resins

Laromer PE – Polyester acrylates

Laromer UP – Unsaturated polyesters

Laromer ECO – Biorenewable content containing

## **Laromer® AQUA – Waterborne UV applications**

Laromer PE AQUA – Waterborne polyester acrylate dispersion

Laromer UA AQUA – Waterborne urethane acrylate dispersion

## **Laromer® – UV Monomers**

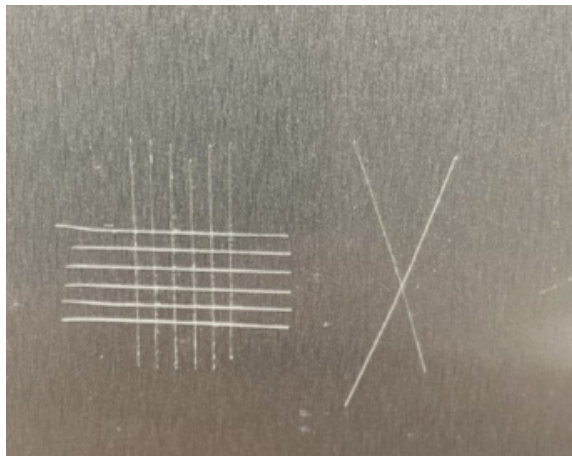
Reactive diluents are a key ingredient in most UV and EB formulations, allowing for the desired viscosity to match a wide variety of application conditions. Additionally, they influence performance properties such as reactivity, hardness and adhesion. BASF offers a broad portfolio of high-quality monomers for the coatings industry.



# Radiation Curable Technology Highlights

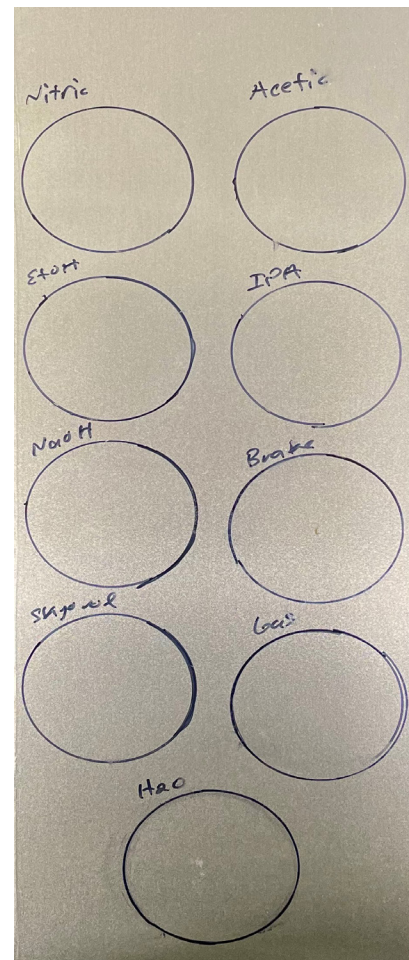
## DTM coating with Laromer Resins

Our resins provide excellent adhesion directly to both aluminum and cold-rolled steel. By incorporating our oligomers, you can tailor your property needs to improve hardness, chemical resistance, or mechanical properties. With the ability to work in both clear and pigmented systems, our resins are versatile enough to meet the demands of a wide range of applications, ensuring optimal performance and durability across various environments.



Cross-hatch and X-cut adhesion on aluminum

Clear SPF @ ~ 1.0 mils	%
Laromer EA 9124	40 - 65
Laromer UA 9186	0 - 20
Laromer POEA	20 - 25
Additional Monomer	0 - 5
Laromer PA 9083	6 - 10
Photoinitiator	5 - 6

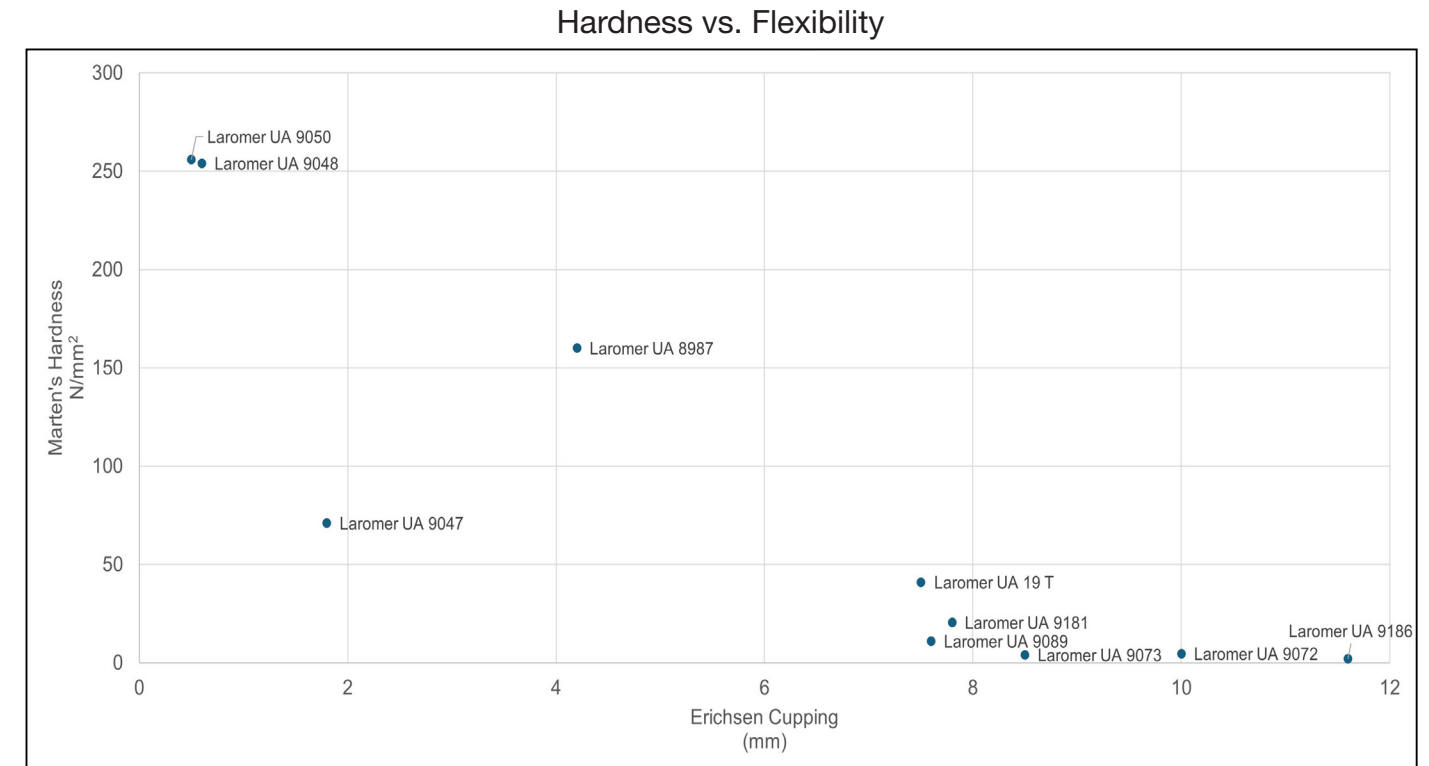


Chemical Spot Test  
 5% Nitric Acid      5% Acetic Acid  
 50% Ethanol        70% IPA  
 10% NaOH          Brake Fluid  
 Skydrol™\*         Gasoline  
 DI Water

\*Skydrol is a registered trademark of Eastman Chemical Company

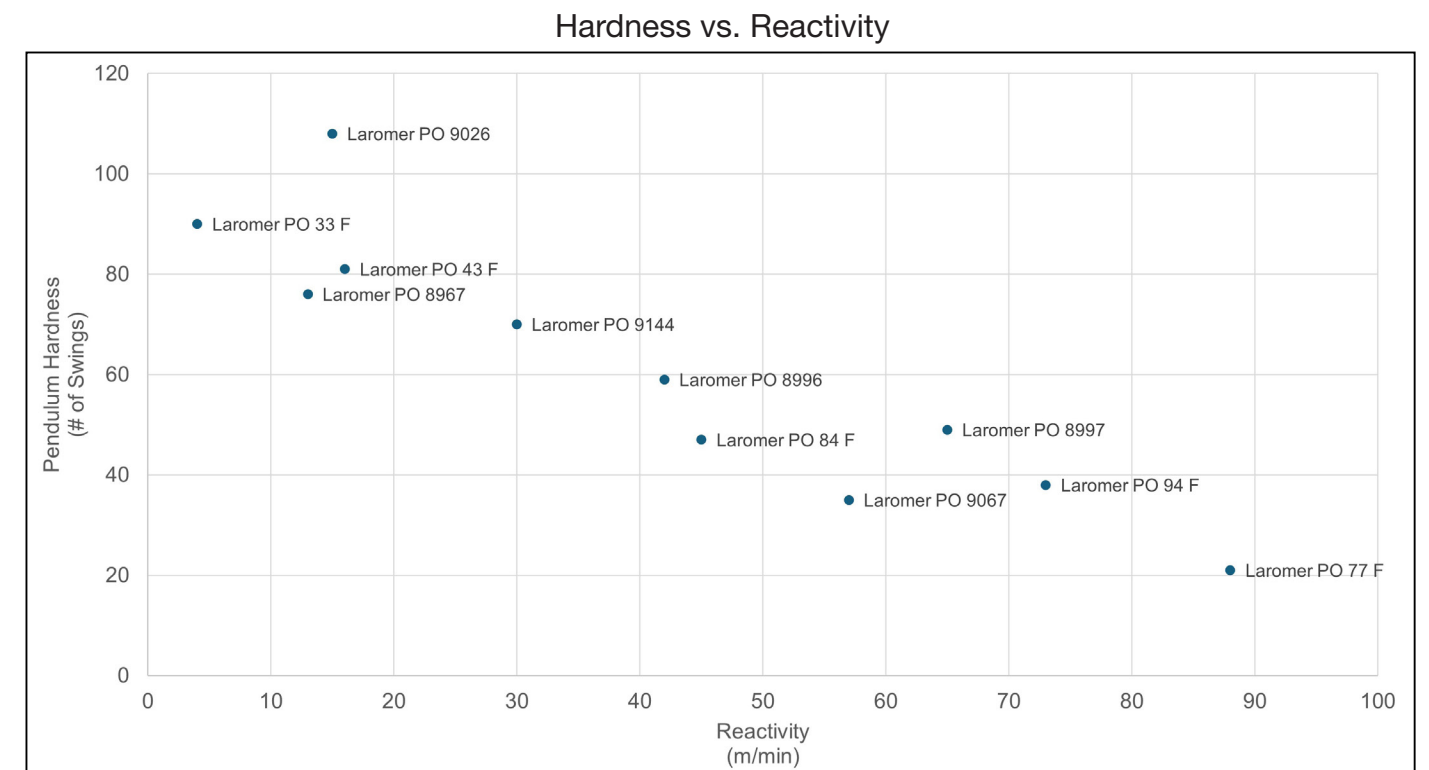
## Graph of hardness versus flexibility (urethane)

Our energy-curable resin portfolio offers innovative solutions for entering new markets, featuring highly flexible oligomers ideal for coil coatings and durable coatings that adhere directly to aluminum and steel. By utilizing energy-curable resins in these applications, these products offer a sustainable approach, significantly reducing energy consumption through the use of Electron Beam and UV curing ovens while also improving daily output.



## Graph of hardness versus reactivity (polyethers)

Our amine-modified polyether acrylates provide outstanding reactivity, enabling faster output, and operational efficiency. Our top products have the benefit of LED cure capability offering additional energy savings without the loss in performance. These resins maintain high performance at low viscosity, allowing you to reduce the levels of monomer in your formulations, making it a safer alternative for your manufacturing needs.



# Laromer Urethane Acrylate

Laromer	Key Performance	Diluent	Functionality	Viscosity (cps)	End Product Performance				Application Recommendations										
					Hardness	Elasticity	Reactivity	Chemical Resistance	Furniture	Flooring	Building Products	Industrial Metal	Transportation	Printing & Packaging	Adhesion				
															Metal	Wood	Plastic	Paper	Glass
UA 19 T E	Highly elastic, low yellowing, good adhesion, flexibilizer.	TPGDA (35%)	2.9	14,000 - 32,000	●●	●●●	●	●	✓	✓	✓	✓	✓	✓	◆	◆		◆	
UA 8987 E	Excellent weatherability, chemical, scratch resistant.	HDDA (30%)	2.4	4,000 - 6,000	●●●	●●	●●	●●●		✓	✓	✓	✓	✓	◆	◆		◆	
UA 9047	Scratch resistant, tack-free before UV, weathering resistance, functionality.	BuAc (30%)	3.5	2,000 - 7,000	●●●	●●	●	●●●●			✓	✓			◆	◆			
UA 9048	Scratch and abrasion resistant, high functionality, chemical resistance.	DPGDA (25%)	7.5	10,000 - 20,000	●●●●	●	●●●	●●●●	✓	✓	✓	✓	✓		◆	◆			
UA 9050	Low yellowing, excellent scratch, monomer free version of UA 9048.	BuAc (20%)	8.3	2,000 - 15,000	●●●●	●	●●●	●●●	✓	✓	✓	✓	✓	✓	◆	◆			
UA 9072	Highly elastic, tear resistant, low yellowing, good adhesion.	TBCH (30%)	2.9	2,000 - 15,000 (60° C)	●	●●●●	●	●●	✓	✓	✓	✓	✓	✓	◆	◆	◆	◆	◆
UA 9073*	Highly elastic, abrasion resis (falling sand) good adhesion.	-	2.0	2,000 - 15,000 (60°C)	●●	●●●	●●	●●	✓	✓		✓	✓	✓	◆	◆	◆	◆	
UA 9089	High elasticity, excellent PVC adhesion and weathering resistance.	-	2.0	10,000 - 30,000	●●	●●●	●●	●●	✓	✓		✓	✓	✓	◆	◆	◆	◆	
UA 9181*	Good adhesion to plastic, Good toughness.	DPGDA (40%)	2.1	1,000 - 2,500	●	●●●	●●	●●	✓	✓	✓	✓		✓	◆	◆	◆	◆	
UA 9186 E	Very elastic, low yellowing, good adhesion, medium reactivity.	CTFA (30%)	1.9	15,000 - 25,000	●	●●●●	●●●	●●	✓	✓	✓	✓		✓	◆	◆	◆	◆	

\*Aromatic



# Laromer Epoxy Acrylate

Laromer	Key Performance	Diluent	Functionality	Viscosity (cps)	End Product Performance				Application Recommendations										
					Hardness	Elasticity	Reactivity	Chemical Resistance	Furniture	Flooring	Building Products	Industrial Metal	Transportation	Printing & Packaging	Adhesion				
															Metal	Wood	Plastic	Paper	Glass
EA 8765 R	Flexible, highly reactive, partially water soluble, BPA Free	-	2.0	600 - 1,500	●	●●●	●●●	●	✓	✓	✓	✓		✓	◆	◆		◆	
EA 9082 ECO	Outstanding chemical resistance, high hardness and reactivity, bio content 16%	TPGDA (30%)	2.0	6,000 - 9,000	●●●●	●●	●●	●●●●	✓	✓	✓			✓		◆		◆	
EA 9124	Excellent reactivity, high abrasion and chemical resis, good adhesion to plastic/metal	HDDA (20%)	2.0	7,000 - 15,000	●●●●	●	●●●	●●●●	✓	✓	✓	✓		✓	◆	◆	◆	◆	
EA 9138	Excellent reactivity, gloss, chemical resistance	TPGDA (25%)	2.0	10,000 - 20,000	●●●●	●●	●●	●●●●	✓	✓	✓	✓		✓	◆	◆		◆	
EA 9143 ECO	Good chemical resistance, excellent hardness	GPTA (25%)	2.3	35,000 - 55,000	●●●●	●●	●●●	●●●●	✓	✓	✓	✓		✓	◆	◆		◆	
EA 9145	Fast cure, excellent chemical resistance	DPGDA (30%)	2.0	4,000 - 7,000	●●●●	●●	●●	●●●●	✓	✓	✓	✓		✓	◆	◆		◆	
LR 8986 ECO	Low viscosity, good chemical resistance, high hardness	-	2.4	3,000 - 6,000	●●●●	●●●	●●	●●●●	✓	✓	✓	✓		✓	◆	◆	◆	◆	
LR 9019	Highly reactive, good chemical resistance, UV LED curing	-	2.4	12,000 - 20,000	●●●	●●●	●●●●	●●●●	✓	✓	✓	✓		✓	◆	◆		◆	
LR 9023	Diluted Version of LR 9019	DPGDA (15%)	2.4	2,000 - 5,000	●●●	●●	●●●	●●●●	✓	✓	✓	✓		✓	◆	◆		◆	

# Laromer Polyester Acrylate

Laromer	Key Performance	Diluent	Functionality	Viscosity (cps)	End Product Performance				Application Recommendations										
					Hardness	Elasticity	Reactivity	Chemical Resistance	Furniture	Flooring	Building Products	Industrial Metal	Transportation	Printing & Packaging	Adhesion				
															Metal	Wood	Plastic	Paper	Glass
PE 44 F	Low viscosity resin with low odor and good balance of properties.	-	3.0	2,000 - 5,000	●	●●●	●●	●●●	✓	✓	✓			✓		◆	◆	◆	
PE 55 F	Workhorse resin with high toughness and abrasion resistance, good adhesion and chemical resistance.	-	3.1	25,000 - 45,000	●●	●●●	●●●	●●●	✓	✓	✓		✓		◆	◆	◆		
PE 56 F	Improved compatibility with reactive diluents (PE 55 F).	-	3.1	20,000 - 40,000	●●	●●●	●●●	●●●	✓	✓	✓		✓	✓	◆	◆	◆	◆	
PE 8800	Low viscosity resin with excellent hardness and chemical resistance. Low odor.	-	3.0	4,000 - 8,000	●●●	●●	●●	●●●●	✓	✓	✓	✓		✓	◆	◆	◆	◆	
PE 8981	Excellent reactivity and flexibility. Good for sandability.	-	3.0	4,000 - 14,000	●	●●●	●●●●	●●●	✓	✓	✓					◆	◆		
PE 9004	Excellent flexibility and chemical resistance. Good adhesion.	-	2.6	20,000 - 50,000	●●	●●●	●●●	●●●	✓	✓	✓			✓		◆	◆	◆	
PE 9074	Excellent flexibility and abrasion resistance. Good chemical resistance.	-	3.2	7,000 - 13,000	●●	●●●	●●●	●●●	✓	✓	✓			✓		◆	◆	◆	
PE 9079	Highest viscosity version of PE 9074.	-	3.4	2,000 - 4,000 (60° C)	●●	●●●	●●●	●●●	✓	✓	✓			✓		◆	◆	◆	

# Laromer Unsaturated Polyester

Laromer	Key Performance	Diluent	Functionality	Viscosity (cps)	End Product Performance				Application Recommendations										
					Hardness	Elasticity	Reactivity	Chemical Resistance	Furniture	Flooring	Building Products	Industrial Metal	Transportation	Printing & Packaging	Adhesion				
															Metal	Wood	Plastic	Paper	Glass
UP 35 D	Easy to sand, hard and scratch-resistant, good adhesion to multiple substrates	DPGDA (45%)	3.5	3,000 - 6,000	●●	●●●	●●	●●●	✓	✓	✓	✓					◆	◆	
UP 9096	Hard and scratch-resistant, good leveling, high gloss	GPTA (60%)	4.8	5,000 - 10,000	●●	●●	●●	●●●	✓	✓	✓	✓					◆	◆	
UP 9115	Balanced mechanical properties	TPGDA (38%)	2.5	13,000 - 19,000	●●	●●●	●●	●●●	✓	✓	✓	✓					◆	◆	
UP 9118	Hard, good chemical resistance, BPA-free	DPGDA / TMPTA (42%)	4.5	26,000 - 31,000	●●●	●	●●●	●●●	✓	✓							◆	◆	
UP 9178	Good sanding properties, excellent cost performance ratio, good leveling and adhesion on many substrates	DPGDA (24%)	2.8	20,000 - 35,000	●●	●●●	●●	●●●	✓	✓	✓	✓					◆	◆	



# Laromer Performance Resins

Laromer	Key Performance	Diluent	Functionality	Viscosity (cps)	End Product Performance				Application Recommendations										
					Hardness	Elasticity	Reactivity	Chemical Resistance	Furniture	Flooring	Building Products	Industrial Metal	Transportation	Printing & Packaging	Adhesion				
															Metal	Wood	Plastic	Paper	Glass
PA 9083	Adhesion promoter for metal and plastic, when used as a modifying resin to a formulation.	-	1.0	1,250 - 3,500	-	-	-	-	✓	✓	✓	✓	✓		◆	◆	◆		
PR 9000	A low viscosity dual-cure resin featuring both NCO and UV reactive groups that enhances adhesion and shadow cure areas. It offers an improvement to scratch and chemical resistance and exterior durability.	-	2.0	1,000 - 1,400	●●●●	●	●●	●●●●			✓	✓	✓		◆				◆
PR 9013	Excellent pigment wetting, low shrinkage, high flexibility, good adhesion to plastic.	-	1.5	45,000 - 70,000	●●●	●	●	●●	✓		✓	✓		✓	◆	◆	◆		
PR 9052	High hardness/scratch, best taber results when combined with aluminum oxide.	TMPTA (60%)	6.0	4,000 - 8,000	●●●	●	●●	●●●		✓									◆
PR 9058	Excellent pigment wetting, high filler acceptance, low viscosity.	-	2.3	3,000 - 6,000	●●●	●●	●●●	●●●	✓	✓				✓			◆	◆	◆
PR 9119	Performance alternative to BPA, all round resin, good reactivity, hardness and chemical resistance, easy to matte.	TMPTA (62%)	5.5	5,000 - 9,000	●●●	●	●●	●●●	✓	✓							◆		

# Laromer Polyether Acrylate

Laromer	Key Performance	Diluent	Functionality	Viscosity (cps)	End Product Performance				Application Recommendations										
					Hardness	Elasticity	Reactivity	Chemical Resistance	Furniture	Flooring	Building Products	Industrial Metal	Transportation	Printing & Packaging	Adhesion				
															Metal	Wood	Plastic	Paper	Glass
PO 33 F	Good hardness, solvent resistance, good cure speed	-	2.7	70 - 130	●●●	●	●	●●●	✓	✓	✓	✓	✓	✓	◆	◆	◆	◆	
PO 8967	Balanced property profile, low viscosity with good chemical resistance and medium reactivity and elasticity	-	2.6	120 - 190	●●●	●●	●●	●●●	✓			✓		✓	◆	◆	◆		
PO 8982	Partially water soluble (adjust spray viscosity)	-	2.7	150 - 300	●●	●●	●●	●●	✓	✓						◆			
PO 9026	High scratch resistance, silica modified product	-	1.5	600 - 1,500	●●●●	●	●●	●●●		✓			✓			◆	◆		

# Laromer Amine Modified Polyether Acrylate

Laromer	Key Performance	Diluent	Functionality	Viscosity (cps)	End Product Performance				Application Recommendations										
					Hardness	Elasticity	Reactivity	Chemical Resistance	Furniture	Flooring	Building Products	Industrial Metal	Transportation	Printing & Packaging	Adhesion				
															Metal	Wood	Plastic	Paper	Glass
PO 77 F	All-round reactive resin, sandability.	-	2.5	1,000 - 3,000	●	●●●	●●●	●●●	✓		✓		✓	✓	◆	◆	◆	◆	
PO 84 F	Good pigment wetting, film formation.	-	2.6	400 - 700	●●	●●	●●●	●●●	✓		✓		✓	✓	◆	◆	◆	◆	
PO 94 F	High reactivity with very good chemical resistance.	-	2.6	300 - 500	●●	●●●	●●●●	●●●●	✓		✓		✓	✓	◆	◆	◆	◆	◆
PO 8996	Very low color and viscosity.	-	2.6	50 - 90	●●	●●	●●●	●●●	✓		✓		✓	✓	◆	◆	◆	◆	
PO 8997	Highly reactive, very good in color.	-	2.6	300 - 500	●●	●●	●●●●	●●●	✓		✓		✓	✓	◆	◆	◆	◆	
PO 9067	Outstanding reactivity, excellent film forming, high solvent resistance, bio-based content (C14).	-	2.6	400 - 700	●●	●●	●●●	●●●	✓		✓		✓	✓	◆	◆	◆	◆	



# Laromer Waterborne UV

Laromer	Key Performance	Diluent	Functionality	Viscosity (cps)	End Product Performance				Application Recommendations										
					Hardness	Elasticity	Reactivity	Chemical Resistance	Furniture	Flooring	Building Products	Industrial Metal	Transportation	Printing & Packaging	Adhesion				
															Metal	Wood	Plastic	Paper	Glass
PE 22 Aqua	Low yellowing, excellent chemical resistance, wood warmth	Water (50%)	2.2	50 - 500	●●	●●	●●	●●●●	✓	✓	✓	✓			◆	◆	◆		
PE 55 Aqua	Good elasticity and toughness, wood warmth and grain enhancement	Water (50%)	2.2	250 - 650	●●	●●●	●●●	●●●	✓	✓	✓						◆	◆	◆
UA 8983 Aqua	Dry-to-touch pre-cure, excellent elasticity, good chemical resistance	Water (60%)	1.6	50 - 300	●●	●●●●	●●	●●	✓	✓	✓	✓		✓		◆	◆	◆	
UA 9005 Aqua ECO	Excellent hardness/scratch and chemical resistance, great physical drying	Water (60%)	5.2	20 - 250	●●●●	●●	●●	●●●●	✓	✓	✓			✓		◆	◆	◆	
UA 9095 Aqua	High grain enhancement, good hardness and chemical resistance, low yellowing	Water (60%)	2.2	50 - 500	●●●●	●●	●●●	●●●	✓	✓		✓	✓	✓		◆	◆	◆	
UA 9059 Aqua	Excellent adhesion primer on wood, excellent flexibility and coin-test results	Water (30%)	1.8	6,000 - 11,000	●	●●●●	●●●	●	✓	✓	✓			✓		◆	◆	◆	
UA 9122 Aqua	Fast physical drying, adhesion to PVC, abrasion and scratch resistance	Water (62%)	3.4	200 - 800	●	●●●	●●●	●●	✓	✓	✓		✓	✓		◆	◆	◆	
UA 9135 Aqua	Great coffee resistance, viscosity stability, weatherability	Water (60%)	3.9	10 - 600	●●●●	●●	●●	●●●●	✓	✓	✓		✓	✓		◆	◆	◆	

# Laromer Reactive Diluents

Laromer		Key Performance	Functionality	Viscosity (cps)	Application Recommendations										
					Furniture	Flooring	Building Products	Industrial Metal	Transportation	Offset Inks	Flexographic Inks	Screen Ink	Digital Ink	Overprint Varnish	
POEA	Phenoxyethyl acrylate	Excellent adhesion and pigment wetting	1.0	11					✓					✓	
TBCH	4-t-Butylcyclohexyl acrylate	High flexibility and good adhesion	1.0	9			✓	✓	✓		✓	✓	✓	✓	✓
DPGDA	Dipropylene glycol diacrylate	Excellent cutting power	2.0	8	✓	✓	✓	✓							
HDDA	Hexanediol diacrylate	Excellent cutting power and adhesion	2.0	6	✓	✓	✓	✓	✓						
TPGDA	Tripropyleneglycol diacrylate	Good cutting power and reactivity	2.0	15	✓	✓	✓	✓							
GPTA	Propoxylated glycerol triacrylate	Outstanding ink/water balance, good balance hardness/flexibility, good cure speed, 13% C14 content	3.0	70 - 120	✓	✓	✓	✓	✓	✓	✓			✓	✓
TMPTA	Trimethylolpropane triacrylate	High cure speed, chemical resistance	3.0	100 - 150	✓	✓	✓	✓							
LR 8863	Ethoxylated TMPTA	High cure speed, good blend hardness/flexibility	3.0	50 - 100	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓









# Light Stabilizers

Your best choice for light stabilizers and other performance additives

The demand for paints and coatings that cover ever-greater surfaces per liter without compromising long-term protection continues to rise. Avoiding light- or heat-induced degradation of coatings for extended periods involves mastering a complex array of challenges. As a pioneer in this special area of coatings technology, BASF draws on decades of experience and the broadest, most diverse portfolio of light stabilizers in our industry. The range can be roughly divided into two main technologies: filters that block ultraviolet radiation and scavengers that “hunt down” and eliminate free radicals within the coating. As diverse as our solutions are, they all serve to enable coatings that protect, beautify and extend the service life of UV-sensitive substrates.

One of the highlights is our innovative **Tinuvin® DW ECO** line for water-based applications. The light stabilizers are based on a proprietary technology that encapsulates the active agents in an acrylic copolymer matrix, termed Novel Encapsulated Additive Technology (NEAT). The solvent-free additives feature low viscosity, freedom from EUH 208 labeling and long-term storage stability without sedimentation or phase separation. NEAT-based UV absorbers are not only ideal for **low and zero-VOC formulations**, but also **easy to incorporate**. They disperse homogeneously into water and /or water-based paint, and can be added in the final stage of the production process under **normal stirring conditions** without special equipment or dispersing aids like emulsifiers or co-solvents. Coating properties such as **color, gloss, transparency or resistance to wear are left unaffected**.

For **UV protection coupled with enhanced gloss and color retention in solvent-based formulations**, we offer the **Tinuvin® 5000 series**. These easy-to-handle additives are compatible and soluble in most solvent-based systems, and meet all performance demands of automotive, industrial and architectural applications. The series also contains subgroups with specific properties such as suitability for wood, plastic and metal substrates or exceptionally high thermal stability. The **Lignostab®** solutions provide highly effective **long-term UV protection** in wood-impregnation systems.

## Light Stabilization of Coatings





# Light Stabilizers

## Highlights

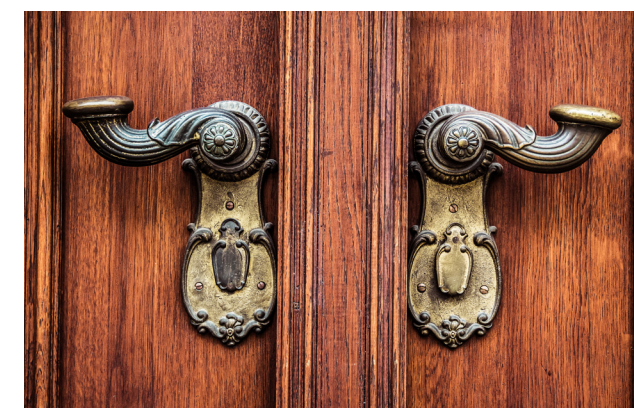
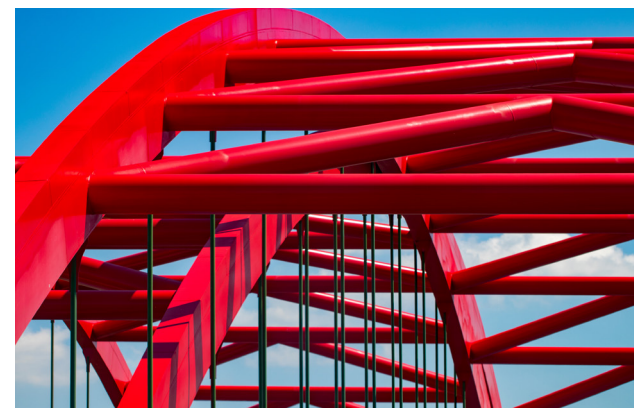


### Key benefits

- Solutions for water- and solvent-based applications
- Improved sustainability (e.g. eco-labeling, low VOC)
- Easy stir-in during processing
- Long-term durability
- Excellent long-term color retention
- Lower coat weight without compromising stability
- Long service life / renovation intervals e.g. in architectural applications
- Prevents surface defects

We are equipped with broad application knowledge – from automotive and industrial coatings to wood, plastic and glass applications – as well as adhesives and sealants and printing and packaging.

Product Range	Chemistry	Characteristics
<b>Tinuvin®</b>	Light Stabilizers	Excellent protection from degradation through ultraviolet radiation coupled with compatibility in water- and solvent-based systems.
<b>Lignostab®</b>	HALS	Lignin Stabilizer via wood pretreatment, color retention, improved durability.
<b>Chimassorb®</b>	Light Stabilizers	Protection from degradation through ultraviolet radiation coupled with compatibility in solvent-based systems.



# Chimassorb, Tinuvin

## UV absorbers

Product	Chemistry	Physical Form	Melting Point [°C]	Molecular weight [g/mol]	Applications					Key Properties and Applications
					Water-based systems	Solvent-based systems	Automotive and transportation	Industrial	Furniture and flooring	
Benzotriazole (BTZ)										
Tinuvin 1130	Benzotriazole (BTZ)	Liquid	–	637 & 975	●●	●●	●●	●●	●●	UVA for medium performance coatings, requires predissolution in cosolvent for use in water-based formulations.
Tinuvin 384-2	Benzotriazole (BTZ)	Liquid 95% in MPA**	–	452		●●	●●	●●		Multipurpose UVA for medium to high durability requirements, minimum color impact in refinish clear coat applications.
Tinuvin 99-2	Benzotriazole (BTZ)	Liquid 95% in MPA**	–	452		●●		●●	●●	UVA for medium-performance solvent-based coatings.
Tinuvin 9945-DW ECO	Benzotriazole (BTZ)	Liquid 45% active	–	452	●●			●●	●●	Multipurpose UVA for medium to high durability requirements.
Tinuvin 171	Benzotriazole (BTZ)	Liquid	–	395		●●		●●	●●	UVA for medium-performance solvent-based coatings.
Tinuvin 900	Benzotriazole (BTZ)	Solid	138 - 142	448		●●	●●	●●		UVA for medium to high durability requirements in powder and coil coating applications, limited solubility in organic solvents.
Tinuvin 928	Benzotriazole (BTZ)	Solid	109 - 113	442		●●	●●	●●		UVA for medium to high durability requirements in powder and coil coating applications, excellent solubility in organic solvents.
Tinuvin CarboProtect®	Benzotriazole (BTZ)	Solid	132 - 136	560		●●	●●	●●		Very red-shifted UVA for protection of aromatic epoxy systems, especially recommended for carbon or glass fiber reinforced composites; allows < 1% transmittance up to 420 nm.

\* Tg [°C]

\*\* 1-methoxy-2-propyl acetate

# Tinuvin

## UV absorbers

Product	Chemistry	Physical Form	Melting Point [°C]	Molecular weight [g/mol]	Applications					Key Properties and Applications
					Water-based systems	Solvent-based systems	Automotive and transportation	Industrial	Furniture and flooring	
Tris-Resorcinyltriazine (TRT), high photo- and thermal-permanence										
Tinuvin 477	Tris-Resorcinyltriazine (TRT)	Liquid 80% in MPA**	–	Mixture		●●		●●	●●	Red-shifted UVA with high extinction coefficient, for high durability wood coating requirements, allows < 1% transmittance up to 370 nm.
Tinuvin 477-DW ECO	Tris-Resorcinyltriazine (TRT)	Liquid 20% active	–	Isomer Mix	●●				●●	Red shifted UVA for high performance wood coatings.

\* Tg [°C]

\*\* 1-methoxy-2-propyl acetate

# Tinuvin

## UV absorbers

Product	Chemistry	Physical Form	Melting Point [°C]	Molecular weight [g/mol]	Applications					Key Properties and Applications
					Water-based systems	Solvent-based systems	Automotive and transportation	Industrial	Furniture and flooring	
HydroxyPhenylTriazine (HPT), best photo- and thermal-permanence, no interaction with amines, strong alkali, or any metal catalysts										
Tinuvin 400	Hydroxyphenyltriazine (HPT)	Liquid 85% in 1-methoxypropan-2-ol	–	647		●●	●●	●●	●●	Blue-shifted UVA for high durability requirements in clear coat applications including UV-curing systems, excellent spectral coverage in combination with Tinuvin 479.
Tinuvin 400-DW ECO	Hydroxyphenyltriazine (HPT)	Liquid 20% active	–	647	●●		●●	●●	●●	Blue shifted UVA for high performance applications, excellent spectral coverage in combination with Tinuvin 477-DW ECO or with Tinuvin 479-DW ECO.
Tinuvin 405	Hydroxyphenyltriazine (HPT)	Solid	73 - 77	584		●●	●●	●●		Blue-shifted UVA for high durability requirements in powder clear coats, excellent spectral coverage in combination with Tinuvin 479.
Tinuvin 479	Hydroxyphenyltriazine (HPT)	Solid	39 - 43*	678		●●	●●	●●	●●	UVA with extremely high extinction coefficient, for highest durability requirements in clear coats, powder coatings, or UV-curing systems, specifically suited for thin film applications.
Tinuvin 479-DW ECO	Hydroxyphenyltriazine (HPT)	Liquid 20% active	–	678	●●		●●	●●	●●	UVA with extremely high extinction coefficient, for highest durability requirements in clear coats, specifically suited for thin film applications.

\* Tg [°C]

\*\* 1-methoxy-2-propyl acetate



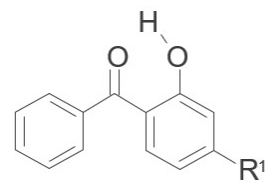
# UV-VIS Absorbance Spectra of UV Absorbers

The required concentration of UVA for effective protection depends on the dry-film thickness of the coating

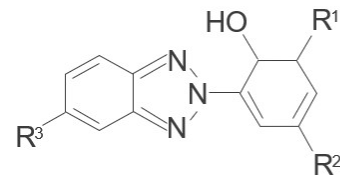
Dry film thickness	UVA concentration based on binder solids (% w / w)
10–20 $\mu\text{m}$	8 – 4
20–40 $\mu\text{m}$	4 – 2
40–80 $\mu\text{m}$	2 – 1

General structures:

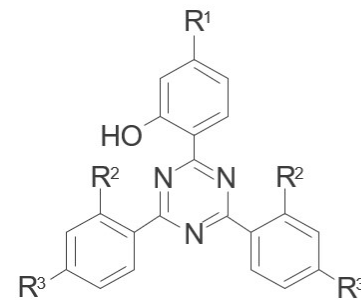
2-hydroxyphenyl-benzophenone (BP),  
2-(2-hydroxyphenyl)- benzotriazole (BTZ),  
2-hydroxyphenyl-s-triazine (HPT) UV absorbers



BP



BTZ



HPT

Beer – Lambert law

Transmittance T decreases exponentially, absorbance A increases direct proportionally to

- Chromophore concentration c
- Light path length or film thickness d
- Extinction coefficient  $\epsilon$

$$A = \log_{10} \left( \frac{1}{T} \right) = \epsilon \cdot c \cdot d$$



# Tinuvin

## Hindered Amine Light Stabilizers and Lignin Stabilizers

Product	Chemistry	Physical Form	Melting Point [°C]	Molecular weight [g/mol]	Applications					Key Properties and Applications
					Water-based systems	Solvent-based systems	Automotive and transportation	Industrial	Furniture and flooring	
Non-basic HALS										
Tinuvin 152	N-OR HALS	Solid	72 - 76 (Tg)	757		●●	●●	●●		Non-migrating, reactable low basic HALS for polar solvent-based coatings over plastic substrates (e.g. polycarbonate, ABS substrate).
Tinuvin 144	N-R HALS	Solid	148 - 152	685		●●	●●	●●		Antioxidant-functionalized HALS with tribo electric charging activity for power coatings.
Tinuvin 770 DF	N-H HALS	Solid	81 - 85	480		●●		●●		HALS suitable for powder-coating applications.
Tinuvin 622 SF (ED)	Oligomeric N-R HALS	Solid	57 - 61 (Tg)	3,100 - 4,000		●●		●●		Low-basic HALS for powder-coating applications with very good antioxidant properties, limited solubility in organic solvents.
Basic HALS										
Tinuvin 292	N-R HALS	Liquid	—	509 / 370	●●	●●	●●	●●	●●	Multipurpose basic HALS for various applications, use in water-based coatings may require addition of cosolvents, may interact with sensitive dispersion binders.
Tinuvin 292 HP	N-R HALS	Liquid	—	509 / 370	●●	●●	●●			Multipurpose basic HALS for color-sensitive applications such as refinish coatings, use in water-based coatings may require addition of cosolvents, may interact with sensitive dispersion binders.

# Tinuvin, Lignostab

## Hindered Amine Light Stabilizers & Lignin Stabilizers

Product	Chemistry	Physical Form	Melting Point [°C]	Molecular weight [g/mol]	Applications					Key Properties and Applications
					Water-based systems	Solvent-based systems	Automotive and transportation	Industrial	Furniture and flooring	
Basic HALS										
Tinuvin 123	N-OR HALS	Liquid	–	737		●●	●●	●●	●●	Non-basic HALS for acid-catalyzed and oxidative curing coatings, improves yellowing resistance in direct-fired gas ovens.
Tinuvin 123-DW ECO	N-OR HALS	Liquid 30% active	–	737	●●		●●	●●	●●	Non-basic HALS for waterborne formulations, no interaction with sensitive dispersions.
Tinuvin 5100	N-OR HALS	Liquid	–	737		●●		●●	●●	Non-basic HALS for oxidative curing coatings.
Tinuvin 249	N-R HALS	Liquid	–	482		●	●●	●●	●●	Non-basic HALS, no exudation from solvent-based polar coatings, low viscosity and very low inherent color
Tinuvin 249-DW ECO	N-R HALS	Liquid, 40% active	–	482	●●		●●	●●	●●	Non-basic HALS for water-based formulations; no interaction with sensitive dispersions; does not interact with acidic paint ingredients such as catalysts, biocides and pigments.
Lignin stabilizers										
Lignostab 530	ESQ	Liquid, 10% in water	–	711	●●				●●	Lignin stabilizer solution for wood impregnation without imparting initial wood color.
Lignostab 1198	Activated HALS	Solid	66 - 70	172	●●	●●			●●	Lignin stabilizer for wood impregnation.

# Tinuvin

## Light stabilizers blends

Product	Chemistry	Physical Form	Melting Point [°C]	Molecular weight [g/mol]	Applications					Key Properties and Applications
					Water-based systems	Solvent-based systems	Automotive and transportation	Industrial	Furniture and flooring	
Tinuvin PUR 866	UVA / N-R HALS	Solid	–	Mixture		●●		●●		High-performance UV stabilization package designed for polyurethane systems.
Tinuvin B 75	AO / N-alkyl HALS / UVA	Liquid	–	Mixture		●●			●●	Stabilizer blend for furniture and flooring applications.
Tinuvin 5050	BTZ / N-alkyl HALS	Liquid	–	Mixture		●●		●●	●●	UVA / HALS blend for solvent-based applications.
Tinuvin 5060	BTZ / N-OR HALS	Liquid	–	Mixture		●●		●●	●●	UVA / non-basic HALS blend for solvent-based oxidative curing coatings.
Tinuvin 5071	UVA / N-OR HALS	Liquid	–	Mixture		●●	●●	●●	●●	UVA / non-basic HALS blend, meet good performance and durability requirements of exterior solvent-based industrial, automotive refinish and architectural coatings.
Tinuvin 5151	BTZ / N-alkyl HALS	Liquid	–	Mixture	●●	●●	●●	●●	●●	UVA / HALS blend for solvent-based coatings, use in water-based coatings may require addition of cosolvent.
Tinuvin 5350	BTZ / N-alkyl HALS	Liquid	–	Mixture		●●		●●	●●	UVA / HALS blend for solvent-based applications.
Tinuvin 5251	HPT / N-alkyl HALS	Liquid	–	Mixture		●●	●●	●●		UVA / HALS blend for high-performance solvent-based applications.



# Tinuvin

## Light stabilizers blends

Product	Chemistry	Physical Form	Melting Point [°C]	Molecular weight [g/mol]	Applications					Key Properties and Applications
					Water-based systems	Solvent-based systems	Automotive and transportation	Industrial	Furniture and flooring	
Tinuvin 5333-DW ECO	UVA / HALS blend	Liquid 40% active	–	Mixture	●●			●●	●●	High-performance UVA / non-basic HALS blend for water-based applications with broad spectral coverage, specially designed for high performance wood coatings.
Tinuvin 5321-DW ECO	UVA / HALS blend	Liquid 40% active	–	Mixture	●●			●●	●●	Designed to meet good performance and durability requirements of exterior water-based industrial and architectural coatings.

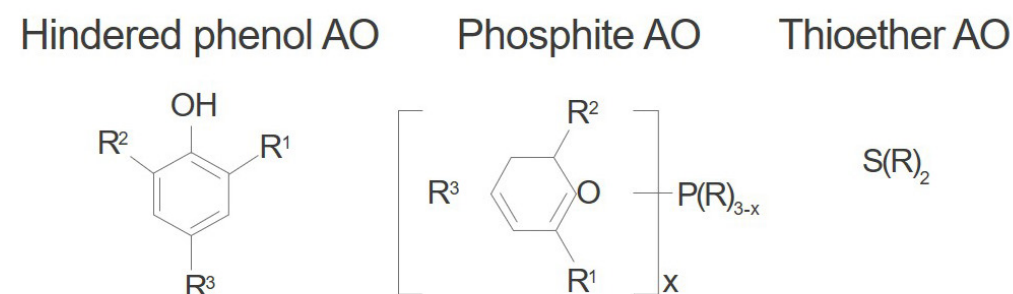
# Antioxidants

Oxidation can be a major issue, especially in coatings subject to heat exposure during processing, curing and baking at high temperatures. As in the area of light stabilizers, BASF has played a pioneering role in developing effective primary and secondary antioxidant (AO) technologies and continues to offer an industry leading portfolio of effective solutions. This diverse range of easy-to-process thermal and oxidative stabilizers for water-based, solvent-based and powder coating systems enables us to address virtually any issue you may encounter in your formulations.

With our **Irganox**<sup>®</sup> and **Irgafos**<sup>®</sup> antioxidants, coatings, adhesives and sealants are effectively protected against thermally induced polymer oxidation during production and application as well as in their service life. Special highlights include low-viscosity, easy stir-in solutions like **Irganox 1010-DW ECO** for water-based systems.

The **Irganox** lineup is made up of sterically hindered phenols and thioethers as well as blends of different AO technologies. Our **Irgafos** solutions are secondary AO process stabilizers using phosphite chemistry.

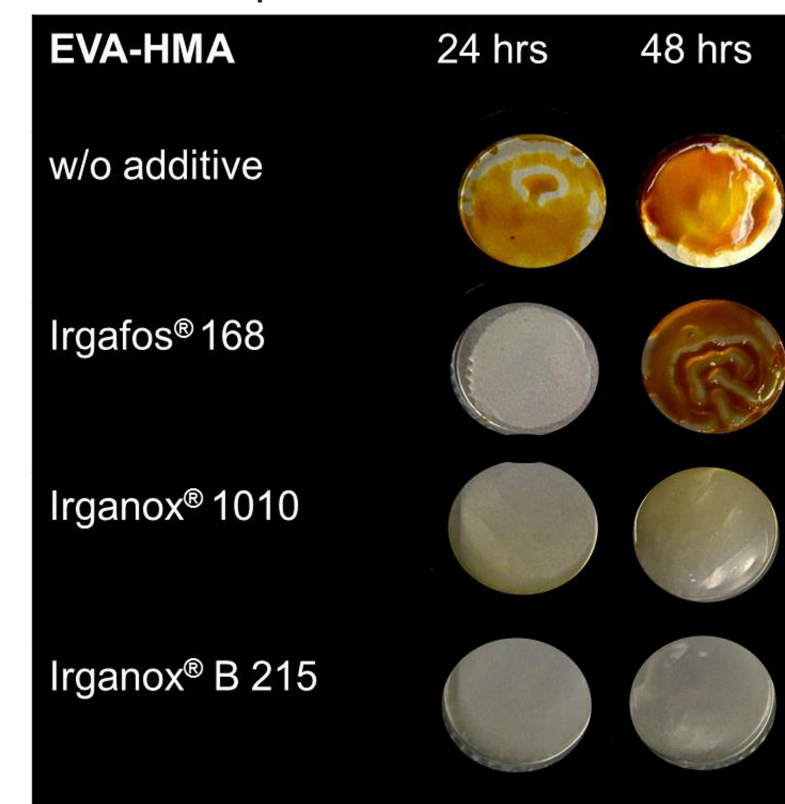
## AO structures



Complementing our antioxidant range, we offer the **Tinopal**<sup>®</sup> optical brightener solutions for water- and solvent-based systems. These fluorescent whitening agents brighten or mask yellowing and can also be used as a marker where fluorescence is used to detect film voids or for registration and identification purposes.

## Antioxidant Chemistry & Mechanism of Stabilization Effectiveness of Antioxidant Blends in Color Retention

Color development EVA HMA at 177 ° C



Irganox B 215, a blend of primary and secondary antioxidants, provides superior color retention in an EVA – HMA

# Antioxidants

## Highlights



### Key benefits

- Solutions for water- and solvent-based applications
- Improved sustainability (e.g. eco-labeling)
- Easy stir-in during processing
- Effective protection from thermally induced oxidation during processing
- Yellowing prevention during processing
- Improves stability of adhesives and sealants
- Prevents loss of mechanical properties
- Lower coat weight without compromising stability

Product Range	Chemistry	Characteristics
<b>Irganox®</b>	Antioxidants	Prevent oxidation of polymers from heat exposure from production, processing to extending application service life.
<b>Irgafos®</b>	Antioxidants	Prevent oxidation of polymers from heat exposure from production, processing to extending application service life. Helps to retain integrity of coatings.
<b>Irgastab®</b>	Antioxidants Blends	Thermal and process stabilizer, focusing on adhesive and sealant applications.
<b>Tinopal®</b>	Optical Brighteners	Fluorescent whitening agents, brightens coatings, masks yellowing.

# Irganox

## Antioxidants and Optical Brighteners

Product	Chemistry	Physical Form	Melting Point [°C]	Molecular weight [g/mol]	Applications			Key Properties and Applications
					Automotive and transportation	Industrial	Furniture and flooring	
Hindered phenolic (primary antioxidants)								
Irganox 245	Phenol	Solid	76 - 79	587	●●	●●		AO for solvent-based and powder-coating applications, not to be used in direct-fired gas ovens.
Irganox 245 DW	Phenol	Liquid, 40% active	–	587		●●		AO for water-based coating applications, not to be used in direct-fired gas ovens.
Irganox 1010	Phenol	Solid	110 - 125	1,178	●●	●●		AO for solvent-based and powder-coating applications, not to be used in direct-fired gas ovens.
Irganox 1010-DW ECO	Phenol	Liquid 20% active	–	–	●●			AO for water-borne applications that demand long-term thermal stabilization, enhanced with encapsulation technology; offers superior extraction resistance vs. wash water at the same time.
Irganox 1035	Phenol	Solid	63 - 78	643		●●		AO for solvent-based coating applications, not to be used in direct-fired gas ovens.
Irganox 1076	Phenol	Solid	50 - 55	531	●●	●●		AO for 100% and solvent-based applications, not to be used in direct fired gas ovens.
Irganox 1135	Phenol	Liquid	–	390	●●	●●		AO for all solvent-based applications, not to be used in direct fired gas ovens.
Multifunctional phenolic antioxidant								
Irganox 565	Phenol / Thioether	Solid	91 – 96	604	●●	●●		AO for solvent-based and powder-coating applications, prevents yellowing in direct gas fired ovens.



# Irgafos, Irganox, Tinopal

## Antioxidants and Optical Brighteners

Product	Chemistry	Physical Form	Melting Point [°C]	Molecular weight [g/mol]	Applications			Key Properties and Applications
					Automotive and transportation	Industrial	Furniture and flooring	
Phosphite (secondary antioxidants)								
Irgafos 126	Phosphite	Solid	160 - 175	604	●●	●●		AO for solvent-based and powder-coating applications, prevents yellowing in direct gas fired ovens.
Irgafos 168	Phosphite	Solid	183 - 186	647	●●	●●		AO for solvent-based and powder-coating applications, prevents yellowing in direct gas fired ovens.
Thioether (secondary antioxidant)								
Irganox PS 802 FL	Thioether	Solid	50 - 55	683		●●		Thiosynergist suitable when high-temperature aging is required, needs combination with primary AO.
Antioxidant blends								
Irganox B 225	Phenol / phosphite	Solid	> 100	–		●●		AO blend for powder-coating applications, not to be used in direct fired gas ovens.
Irganox B 215	Phenol / phosphite	Solid	–	–		●●		Synergistic processing and long-term thermal stabilizer system.
Optical brighteners								
Tinopal NFW10 Liquid	Biphenyl-stilbene	Liquid 10% active	–	563		●●		Liquid optical brightener for water-based white and pastel-tone paints, clear coats, overprint varnishes.
Tinopal OB CO	Benzoxazole	Solid	196 - 203	431		●●		Solid optical brightener for solvent-based and 100% applications, white and pastel tone paints, clear coats, overprint varnishes.
Tinopal SFP	Triazine-stilbene	Solid	–	1,305		●●		Water-soluble optical brightener for photographic color developer baths or as fluorescent tracers.

# Dispersing Agents

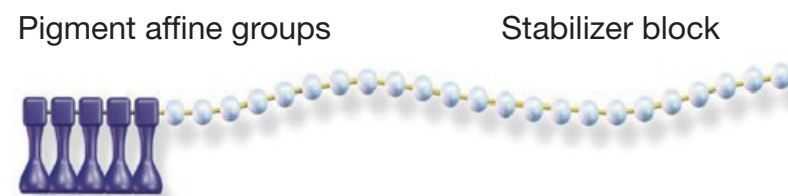
Our extensive portfolio of dispersing agents contains solutions for **water-based, solvent-based, high solids, 100% solids systems and universal pigment concentrates**. These polymeric, oligomeric and surfactant-based technologies are known for outstanding color development, viscosity reduction, enhanced gloss and stability as well as suitability for **low-VOC** and **APEO-free systems**.

A prime example of the advanced chemistry behind our dispersants is the **award-winning controlled free-radical polymerization (CFRP) technology**. It allows the creation of highly efficient and widely compatible block-copolymer dispersants that offer optimal rheology control and improved coloristic.

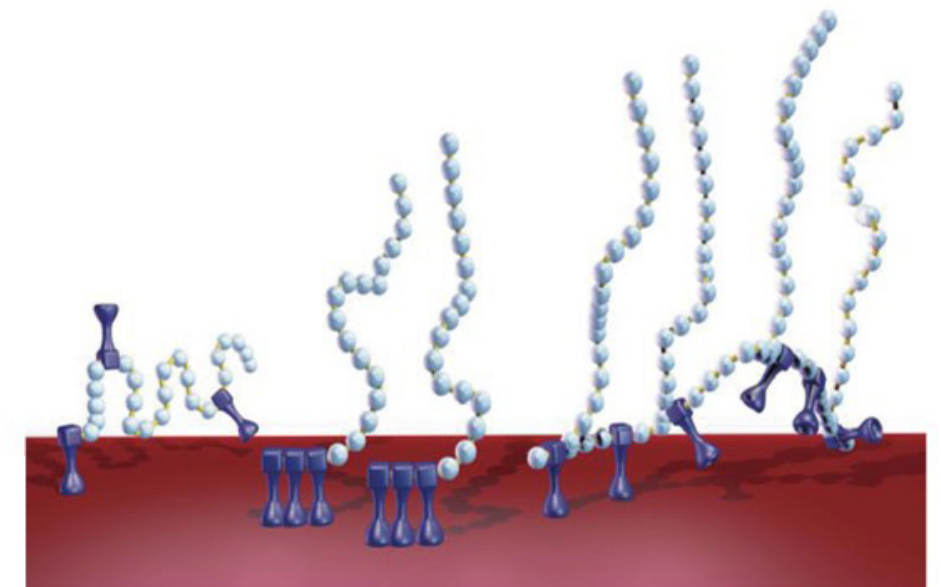
Highly specialized additives are needed to wet, disperse, and stabilize dry pigment powders in liquid formulations. Dispersing agents represent an essential component of most paint and coating formulations. Their specialized function ensures color strength, gloss, viscosity stability, and prevents sedimentation of particles. Today, high-quality coatings of high brilliance and color strength are characterized by a perfect pigment dispersion, optimal pigment particle size, and long-term stabilization of the dispersed particles in the formulation.

**The Efka® PX and Dispex® Ultra PX** ranges comprise our top-line dispersing agents. They are characterized by a defined polymer architecture, which provides high affinity for the pigment surface and robust stabilization against flocculation. These additives help to differentiate formulations with improved properties, such as higher transparency and exceptional jetness development. Also, improved value in use of high-performance pigments can be achieved by enhancing color strength.

Controlled polymers;  
Acrylic block copolymers with highest efficiency



Structure of dispersing agents designed with CFRP technology



Random copolymer (non CFRP)      CFRP based block copolymer      Copolymer with comb structure

Comparison of anchoring efficiency of different dispersants: random copolymer, CFRP technology, comb structure

# Dispersing Agents

## Highlights



### Key benefits

- Excellent compatibility with a broad range of resin systems
- Highest performance with all kind of pigment classes
- Improved sustainability
- Shorter dispersion time
- Reduced mill base viscosity
- Prevention of pigment settling, flooding and floating
- Increased color strength and hiding power
- Highest transparency and jetness
- Enhanced gloss

Product range for water-based systems	Chemistry	Characteristics
<b>Dispex® Ultra FA</b>	Low molecular weight	Broad range of surfactant-type dispersants for water-based systems, broad applicability, excellent compatibility, improvement of color acceptance.
<b>Dispex® Ultra FA</b>	Oligomeric (FAME)	Versatile, oligomeric dispersants allow for universal colorants and improvement of color acceptance.
<b>Dispex® AA</b> <b>Dispex® CX</b>	High molecular weight	Established anionic dispersants for decorative paints and coatings, excellent in stabilizing inorganic pigments and fillers, high pigment and filler loading possible, improved wet-scrub resistance with hydrophobic types.
<b>Dispex® Ultra PA</b> <b>Dispex® Ultra PX</b>	Advanced high molecular weight	Broad range of high-performance dispersing agents, excellent stabilization and color development, low pigment concentrate viscosities.
Product range for solvent-based systems (incl. 100% systems)	Chemistry	Characteristics
<b>Efka® PX</b>	Advanced high molecular weight	Broad range of high-performance dispersing agents, excellent stabilization and color development.
<b>Efka® FA</b>	Low molecular weight	Range of surfactant-type dispersants, broad applicability, excellent anti-settling properties.
<b>Dispex® Ultra FA</b> <b>Efka® FA</b>	Oligomeric (FAME)	Versatile, oligomeric dispersants allow for universal colorants and improvement of color acceptance.
<b>Efka® PA</b> <b>Efka® PU</b>	High molecular weight	Established range of high molecular-weight dispersants, excellent viscosity reduction and stabilization.

# Dispex

## Water-based dispersing agents

Product Name <sup>1</sup>	Description	Solids [%]	Amine number [mg KOH/g]	Acid value [mg KOH/g]	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Anionic dispersing agents based on polyacrylic acid													
Dispex AA 4040	Ammonium polyacrylate (co-)polymer	45	–	–	< 0.1	●●	●●			Low polydispersity with higher efficiency for inorganic fillers and pigments, suitable for exterior coatings.		●	●●
Dispex CX 4230	Ammonium polyacrylate (co-)polymer	28	–	–	< 0.5	●●	●●			Medium-hydrophobic dispersing agent for interior and exterior architectural coatings; good liquefying effect.		●	●●
Dispex CX 4231	Ammonium polyacrylate (co-)polymer	30	–	–	< 1	–				Hydrophobic character lowers leaching tendency (snail trails) in exterior paints, reduces water uptake, enables high-gloss.		●●	●●
Dispex CX 4240	Ammonium polyacrylate (co-)polymer	40	–	–	< 0.1	●●	●●			For inorganic pigments and extenders; more hydrophobic than Dispex AA 4040.		●	●●
Dispex CX 4248	Ammonium polyacrylate (co-)polymer	32	–	–	< 0.1	●●	●●			Most hydrophobic dispersing agent, suitable for TiO <sub>2</sub> reduction and high-gloss; good blistering and snail trail resistance.		●	●●
Dispex AA 4135 NA	Sodium polyacrylate (co-)polymer	35	–	–	< 0.1	●●	●●			Standard dispersing agent for inorganic fillers and pigments.		●	●●
Dispex AA 4140	Sodium polyacrylate (co-)polymer	43	–	–	< 0.1	●●	●●			Low polydispersity for efficient dispersing properties and liquefying effect.		●	●●
Dispex AA 4144 EB	Sodium polyacrylate (co-)polymer	35	–	–	< 0.3	●●	●●			Efficient dispersing properties, excellent gloss development.		●●	●●
Dispex CX 4348	Sodium polyacrylate copolymer	32	–	–	< 0.1	●●	●●			Most hydrophobic dispersing agent for interior, with potential to optimize binder and TiO <sub>2</sub> content.		●	●
Dispex CX 4320 AM	Carboxylic acid copolymer, sodium salt	25	–	–	< 0.1	●●	●●			Excellent dispersing performance; improves gloss, wet-scrub and blocking-resistance; excellent ZnO compatibility.		●	●●

<sup>1</sup> APEO has not been intentionally added.

<sup>2</sup> All measurements reflect approximate values.

<sup>3</sup> Measurements done according to the EU Ecolabel 2014/312/EU for indoor and outdoor paints and varnishes.

For products with a VOC level above 10% the value is based on calculation according to recipe.

<sup>4</sup> Controlled free radical polymerization.



# Dispex

## Water-based dispersing agents

Product Name <sup>1</sup>	Description	Solids [%]	Amine number [mg KOH/g]	Acid value [mg KOH/g]	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Low molecular weight dispersing agents mainly designed for water-based systems, surfactant-like types													
Dispex Ultra FA 4404	Chelating agent	50	–	–	< 0.1	●●	●●			Anionic dispersing agent; excellent liquefying effect in inorganic pigment slurry formulations.		●●	●●
Dispex Ultra FA 4416	Surfactant mixture	75	–	–	< 2	–	●●			Suitable for inorganic and organic pigments and pigment concentrates.	●	●●	●●
Dispex Ultra FA 4420	Fatty acid modified emulsifier (FAME)	100	35	22	< 1	●●	●●	●●	●●	Universal dispersing agent; also suitable as co-dispersant; improves compatibility and color acceptance in basepaints.	●	●●	●●
Dispex Ultra FA 4425	Fatty acid modified emulsifier (FAME)	100	47	46	< 1	●●	●●	●●	●●	Dispersing agent for universal colorants for decorative tinting systems; excellent compatibility with aromatic-free alkyd paints.	●	●●	●●
Dispex Ultra FA 4431	Aliphatic polyether with acidic groups	100	–	100	< 0.1	●●	●●	●●	●●	Dispersing agent for inorganic pigments and fillers for decorative and industrial coatings.	●	●●	●●
Dispex Ultra FA 4437	Modified natural oil	>99	–	–	< 0.1	●●	●●			Non-ionic dispersant for organic pigment concentrates, enhances effect pigment orientation.	●●	●●	●●
Dispex Ultra FA 4483	Phosphoric acid ester	30	–	25	< 0.1	●●	●●			Universal, anionic wetting and dispersing agent; especially suitable for inorganic pigment concentrates.	●●	●●	●●
Dispex Ultra CX 4452	Anionic copolymer	40	–	–	< 0.1	●●	●●			Excellent for inorganic pigments and transparent iron oxides; strong viscosity reduction with low-foaming during milling.	●●	●●	●●

<sup>1</sup> APEO has not been intentionally added.

<sup>2</sup> All measurements reflect approximate values.

<sup>3</sup> Measurements done according to the EU Ecolabel 2014/312/EU for indoor and outdoor paints and varnishes. For products with a VOC level above 10% the value is based on calculation according to recipe.

<sup>4</sup> Controlled free radical polymerization.

# Efka

## Solvent-based dispersing agents

Product Name <sup>1</sup>	Description	Solids [%]	Amine number [mg KOH/g]	Acid value [mg KOH/g]	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Low molecular weight dispersing agents mainly designed for solvent-based systems, conventional types													
Efka FA 4600 EG	Surface-active anionic compounds	35.5	–	–	27.5	–		••		Anti-settling agent for non-aqueous systems; provides good anti-settling properties in polar systems.	•	••	
Efka FA 4601	Blend of fatty alcohol sulfates	47	–	–	16	–		••		Anti-settling agent for non-aqueous systems; good anti-settling properties for medium-polar systems.	•	••	
Efka FA 4608 AN	Hydroxyl functional unsaturated modified carboxylic acid	100	85	–	< 1	••		••		For solvent-based decorative systems; from low to polar solvent containing systems.		••	••
Efka FA 4609	Solution of a copolymer with acidic groups	52	–	50	48	–		••	••	Excellent dispersant for inorganic pigments, especially TiO <sub>2</sub> ; strong reduction of mill base viscosity; increased hiding power.	••	••	••
Efka FA 4610	Acidic polyester polyamide	50	–	140	50	–		••	••	Suitable for inorganic pigments in industrial coatings and dispersion of extenders and fillers in composites (SMC + BMC).		••	
Efka FA 4611	Copolymer with acidic groups	100	–	129	< 2.5	••		••	••	Solvent-free wetting and dispersing agent; strong reduction of mill base viscosity; high pigment and filler loading; increased hiding power.	••	••	••
Efka FA 4620	Acidic polyether	100	–	290	< 2.5	–	••	••	••	Dispersing agent for inorganic pigments; suitable for all types of industrial coatings. Dispersion of extenders and fillers in composite formulations (SMC+BMC).		••	••

<sup>1</sup> APEO has not been intentionally added.

<sup>2</sup> All measurements reflect approximate values.

<sup>3</sup> Measurements done according to the EU Ecolabel 2014/312/EU for indoor and outdoor paints and varnishes. For products with a VOC level above 10% the value is based on calculation according to recipe.

<sup>4</sup> Controlled free radical polymerization.

# Efka

## Solvent-based dispersing agents

Product Name <sup>1</sup>	Description	Solids [%]	Amine number [mg KOH/g]	Acid value [mg KOH/g]	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Efka FA 4644	Unsaturated polyamide and acid ester salts	52	16	25	48	–	••	•	For solvent-based and solvent-free systems; also effective for gelling bentonite concentrates.	•	••	•	
Efka FA 4663 AN	Salts of a polycarboxylic acid	50	56	56	50	–	••	•	Provides excellent anti-settling and anti-floating properties, improves alu flakes orientation.	••	••		
Efka FA 4665	Modified carboxylic acid blend	52	–	120	48	–	••	•	For polyurethane systems and stoving enamels; also for orientation of aluminum pigments in CAB automotive base coats.	••	••		
Efka FA 4666	Unsaturated carboxylic acid	52	–	140	48	–	••	•	For polyurethane systems and stoving enamels; strong anti-settling effect.	•	••		

<sup>1</sup> APEO has not been intentionally added.

<sup>2</sup> All measurements reflect approximate values.

<sup>3</sup> Measurements done according to the EU Ecolabel 2014/312/EU for indoor and outdoor paints and varnishes. For products with a VOC level above 10% the value is based on calculation according to recipe.

<sup>4</sup> Controlled free radical polymerization.

# Dispex

## High molecular weight dispersing agents

Product Name <sup>1</sup>	Description	Solids [%]	Amine number [mg KOH/g]	Acid value [mg KOH/g]	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Dispex Ultra PA 4550	Modified polyacrylate polymer	50	27	–	< 1	●●	●●			pH-independent with broad compatibility in water-based systems; good water resistance properties. Suitable for making resin-containing and resin-free pigment concentrates.	●●	●●	●●
Dispex Ultra PA 4560	Modified polyacrylate polymer	40	25	–	< 1	●●	●●			For water-based decorative and industrial coatings, pH-independent; broad compatibility.	●●	●●	●●
Dispex Ultra PA 4530	Modified polyacrylate polymer	50	26	35	–	–	●●	●●		Stabilizes the pigment dispersion of difficult inorganic and organic pigments and offers excellent water resistance and wide-spread compatibility in both solvent- and water-based systems.		●●	
Dispex Ultra PA 4580	Modified polyacrylate polymer	40	15	–	–	●●	●●			Used exclusively as a dispersing agent to formulate resin free pigment concentrates for VOC-free applications and stabilizes pigment dispersion of inorganic and organic pigments.		●●	
Dispex Ultra PX 4275	Copolymer	37.5	–	–	< 0.5	●●	●●			Specifically designed for semi-gloss and high-gloss paint formulations and pigment concentrates.	●●	●●	●●
Dispex Ultra PX 4290	Copolymer	40	–	9	< 0.1	●●	●●			Excellent for water-based universal colorants with broadest pigment affinity. Suitable for coatings, printing inks and adhesives.	●●	●●	●●

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<sup>2</sup> All measurements reflect approximate values.

<sup>3</sup> Measurements done according to the EU Ecolabel 2014/312/EU for indoor and outdoor paints and varnishes. For products with a VOC level above 10% the value is based on calculation according to recipe.

<sup>4</sup> Controlled free radical polymerization.



# Dispex

## High molecular weight dispersing agents

Product Name <sup>1</sup>	Description	Solids [%]	Amine number [mg KOH/g]	Acid value [mg KOH/g]	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Dispex Ultra PX 4565	Acrylic block copolymer (CFRP <sup>4</sup> )	40	11	–	–	●●	●●			Offers strong viscosity reduction during pigment grinding of many organic pigments and carbon blacks and provides excellent coloristic properties.	●	●●	●
Dispex Ultra PX 4575	Acrylic block copolymer (CFRP <sup>4</sup> )	40	32	–	< 0.1	●●	●●			Excellent performance with inorganic pigments; broad compatibility across binder systems; for colorants and co-grinding.	●●	●●	●●
Dispex Ultra PX 4585	Acrylic block copolymer (CFRP <sup>4</sup> )	50	20	–	< 0.1	●●	●●			Best-in-class for high-jetness application and enhanced coloristics for industrial and automotive coatings; broad binder compatibility.	●●	●●	●●

<sup>1</sup> APEO has not been intentionally added.

<sup>2</sup> All measurements reflect approximate values.

<sup>3</sup> Measurements done according to the EU Ecolabel 2014/312/EU for indoor and outdoor paints and varnishes. For products with a VOC level above 10% the value is based on calculation according to recipe.

<sup>4</sup> Controlled free radical polymerization.

Product Name <sup>1</sup>	Description	Solids [%]	Amine number [mg KOH/g]	Acid value [mg KOH/g]	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Efka PU 4009	Modified polyurethane polymer	60	9	13	40	–		••		Suitable for general industrial application for optimum value in use.	•	••	•
Efka PU 4010	Modified polyurethane polymer	51	6	12	49	–		••	••	General industrial coatings, wood coatings for stabilization of TiO <sub>2</sub> , and matting agents.	•	••	••
Efka PU 4046	Modified polyurethane polymer	40	19	–	60	–		••	•	General industrial coatings.	••	••	••
Efka PU 4047	Modified polyurethane polymer	35	17	–	65	–		••	•	Standard dispersing agent for optimum performance in industrial applications, including automotive OEM and refinish.	••	••	••
Efka PU 4061	Second generation of modified polyurethane polymer	30	8	–	70	–		••		High-quality industrial, automotive, and refinish applications, strong viscosity-depressing properties.	••	••	•
Efka PU 4063	Modified polyurethane polymer	45	10	–	55	–		••	•	Polymeric dispersing agent for the deflocculation of inorganic and organic pigments in high-quality solvent-based pigment pastes.	••	••	••
Efka PA 4404	Modified polyacrylate polymer	40	36	–	60	–		••		For automotive OEM and refinish topcoats; also suitable for coil coating applications.	••	••	
Efka PA 4401	Modified polyacrylate polymer	50	50	–	50	–		••		Industrial coatings, automotive topcoats; for industrial colorants in combination with grinding resins such as Laropal A81.	••	••	

<sup>1</sup> APEO has not been intentionally added.

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<sup>3</sup> Measurements done according to the EU Ecolabel 2014/312/EU for indoor and outdoor paints and varnishes. For products with a VOC level above 10% the value is based on calculation according to recipe.

<sup>4</sup> Controlled free radical polymerization.

# Efka

## High molecular weight dispersing agents

Product Name <sup>1</sup>	Description	Solids [%]	Amine number [mg KOH/g]	Acid value [mg KOH/g]	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Efka PX 4300	Acrylic block copolymer made by controlled free radical polymerization (CFRP <sup>4</sup> )	80	56	–	20	–	••	••	High-end dispersing agent for solvent-based industrial coatings including medium- and long-oil alkyds.	••	••	•	
Efka PX 4310		50	19	–	50	–	••	••	High-quality solvent-based industrial and automotive coatings; setting new standards as a dispersing agent for carbon blacks giving extremely high jetness and for resin-free pigment pastes in coil coatings.	••	••	•	
Efka PX 4320		50	28	–	50	–	••	••	Delivers ultra-high jetness with carbon black and high transparency with organic pigments; suitable for mid-polar to non-polar systems.	••	••	•	
Efka PX 4321		50	30	–	50	–	•	•	Provides very strong viscosity control, excellent coloristics, works with wide range of pigments, including inorganics and especially gives access to high transparency.	•	•		
Efka PX 4330		70	28	–	30	–	••	••	Solvent-based industrial coatings; excellent (broad compatibility) for industrial colorants (pigment pastes) in combination with grinding resins such as Laropal A 81.	••	••	••	
Efka PX 4340		55	4	–	45	–	••	••	Solvent-based high-end applications, industrial, automotive systems; good performance in CAB-modified systems but also with 2-pack PUR and 2-pack epoxies.	••	••	••	
Efka PX 4350		51	12	–	49	–	••	••	Highly efficient dispersing agent for β- and ε-blue Cu-phthalocyanine pigments and pigment green; high gloss due to excellent compatibility; for high-quality solvent-based coatings	••	••	•	
Efka PX 4360		50	13	–	50	–	••	••	Offers high efficiency in stabilizing organic pigments and carbon blacks and demonstrates a broad compatibility with many resin systems and suitable for use in resin-free (RFPC).	••	••	•	

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<sup>4</sup> Controlled free radical polymerization.

# Efka

## High molecular weight dispersing agents

Product Name <sup>1</sup>	Description	Solids [%]	Amine number [mg KOH/g]	Acid value [mg KOH/g]	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Efka PX 4701	Acrylic block copolymer made by controlled free radical polymerization (CFRP <sup>4</sup> )	100	40	–	< 2.5	●●		●●	●●	Dispersing agent for high-performance pigments especially for energy-curable systems; especially for UV inkjets; also for solvent-based applications, both mild-solvent and strong-solvent.	●●	●●	●●
Efka PX 4703		100	56	–	< 2.6	●●		●●	●●	Solvent-free dispersing agent well suited for solvent-based resin-free (RFPC) and resin-containing pigment concentrates (RCPC) in a wide range of applications.	●●	●●	●●
Efka PX 4733	Advanced polymer	100	25	–	< 2.5	●●		●●	●●	Suitable for energy-curable and solvent-based systems; broad pigment affinity, including matting agents.	●●	●●	●●
Efka PX 4753	Advanced polymer	51	12	–	49	–		●●		Dispersing agent for high-quality solvent-based coatings; suitable for high-performance organic pigments including a-blue Cu-phthalocyanine pigments; high gloss due to excellent compatibility; tin-free.	●●	●●	●●
Efka PX 4780	Advanced polymer	100	20	–	< 2.5	●●		●●	●●	Highly efficient for organic pigments and carbon-blacks; cross-linkable dispersing agent for excellent film properties; strong viscosity reduction during milling.	●●	●●	●●
Efka PX 4787	Advanced polymer	70	15	–	30	–		●●	●	Highly efficient, cross-linkable dispersing agent for excellent film properties; strong viscosity reduction during milling.	●●	●●	●●

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<sup>2</sup> All measurements reflect approximate values.

<sup>3</sup> Measurements done according to the EU Ecolabel 2014/312/EU for indoor and outdoor paints and varnishes. For products with a VOC level above 10% the value is based on calculation according to recipe.

<sup>4</sup> Controlled free radical polymerization.







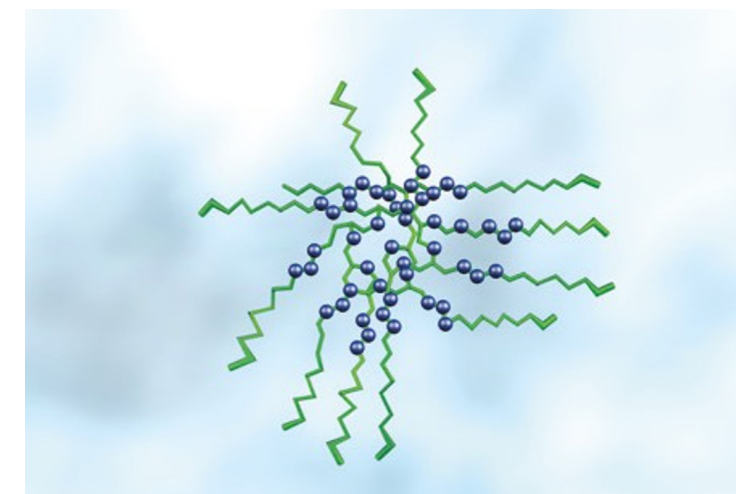
# Defoamers

For paint manufacturers and applicators foam control is one of the major tasks to ensure a smooth and even appearance of the paint film. Thus, high-performing defoamers are needed to prevent the formation of bubbles in liquid paints. They reduce foam and avoid foam-formation during the production, application, and transport of paint formulations.

Especially in industrial surroundings, foam is a very undesirable phenomenon that can emerge during dispersing processes, pumping, stirring operations, or while applying paints. This foam can, for example, increase the production time, create difficulties in filling vessels, reduce the efficiency of many high-speed operations, and promote surface defects like craters, fish-eyes, pinholes, and weak points in the dried film.

Our lineup ranges from products based on mineral oils or native oils, specialty-emulsions and organosilicone-based solutions to silicone-free and star-polymer defoamers. The additives are defined by **excellent foam suppression and micro-foam removal, high compatibility, long-term efficiency and easy handling in perfect balance.** The range also includes solutions for environmental compliance such as **low VOC, low SVOC and low odor foam suppressants.**

One of the outstanding innovations in the BASF defoamer portfolio is our award-winning **FoamStar® technology.** It is based on a hyper-branched polymer with a 3-dimensional star-shaped structure, containing hydrophilic as well as hydrophobic elements. Unlike conventional mineral-oil and silicone defoamers, our FoamStar technology breaks down foam on a molecular level. It acts as a unique surfactant interacting with the foam-related surfactants and destabilizes the foam bubbles. When combined with conventional defoamer types, it accelerates bubble-break times and boosts efficiency.



The FoamStar® star-shaped polymer

# Defoamers

## Highlights



### Key benefits

- Solutions for water-based and non-aqueous formulations
- Improved sustainability (e.g. renewables, low VOC, low odor)
- Broad country registrations
- Food contact compliance
- Effective foam suppression and micro foam elimination.
- Cost savings due to shorter production processes
- Faster bubble break time
- Prevention of surface defects

Systems	Product Range	Chemistry	Characteristics
Water-based	<b>Foamaster® MO</b>	Mineral oil based	Removes macro foam, universal.
	<b>Foamaster® NO</b>	Natural oil based	Renewable raw materials, low SVOC.
	<b>Foamaster® WO</b>	White oil based	Allows for food contact compliance, better odor, low fogging.
	<b>FoamStar® ED</b>	Emulsion based	Universal, easy to incorporate.
	<b>FoamStar® PB</b>	Polymer based	High efficiency.
	<b>FoamStar® SI</b>	Silicone based	For high-gloss systems, e.g. industrial, printing inks.
	<b>FoamStar® ST</b>	Star polymer based	High efficiency, fast foam knock-down.
Non-aqueous	<b>Efka® PB</b>	Polymer based	High efficiency.
	<b>Efka® SI</b>	Silicone based	High efficiency, high-gloss.

# Foamaster

Defoamers designed to be used in water-based systems

Product Name <sup>1</sup>	Description	Incorporation	Dosage [%]	Solids <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Foamaster MO 2107	Mineral oil based	High-shear / Mill base / Low-shear / Let down stage	0.2 - 1.0	100	2	●●	●●			Provides efficient foam and froth control and suitable for low surfactant containing systems.	●	●●	
Foamaster MO 2111 NC	Mineral oil based	High-shear / Mill base / Low-shear / Let down stage	0.2 - 0.6	100	< 0.1	●●	●●			Effective defoaming performance with outstanding long-term efficiency; recommended for pigment paste grinding.	●●	●●	●●
Foamaster MO 2133	Mineral oil based	High-shear / Mill base / Low-shear / Let down stage	0.2 - 1.0	> 98	2	●●	●●			100% active defoamer developed to provide efficient and economical defoaming in water-based coatings.		●●	●●
Foamaster MO 2140	Mineral oil based	High-shear / Mill base / Low-shear / Let down stage	0.2 - 1.0	> 98	2	●●	●●			Developed to provide effective long term defoaming, effective in paints using associative thickeners.	●	●●	●●
Foamaster MO 2152	Mineral oil based	High-shear / Mill base / Low-shear / Let down stage	1.0 - 2.0	> 97	3	●●	●●			Provides efficient defoaming performance in the manufacture and application of paints and inks from synthetic latex; It offers high persistency and broad compatibility.		●●	●●
Foamaster MO 2170	Mineral oil based	At any stage of the production process	0.2 - 1.0	> 92	8	●●	●●			Very effective defoamer for aqueous emulsion-based paints, as well as for monomer stripping.	●	●●	●●
Foamaster MO 2172	Mineral oil based	High-shear / Mill base / Low-shear / Let down stage	0.2 - 1.0	> 95	5	—	●●			100% active, mineral oil defoamer; specially designed for water-based paints, aqueous adhesives, and synthetic latex manufactured products.		●●	●●
Foamaster MO 2175	Mineral oil based	At any stage of the production process	0.2 - 1.0	> 98	2	●●	●●			Good persistency; non-settling; non-separating.	●	●●	



# Foamaster

Defoamers designed to be used in water-based systems

Product Name <sup>1</sup>	Description	Incorporation	Dosage [%]	Solids <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Foamaster MO 2185	Mineral oil based	High-shear / Mill base / Low-shear / Let down stage	1.0 - 2.0	> 94	6	●	●●			100 % active antifoamer developed to meet the need for a foam-counteracting additive. It has high defoaming efficiency and easy water dispersibility.		●●	●●
Foamaster MO 2190	Mineral oil based	High-shear / Mill base / Low-shear / Let down stage"	0.2 - 0.5	> 93	7	●	●●			100% active, liquid defoamer proven effectiveness, persistence and compatibility in latex-based adhesives and also effective in certain latex-based coating and ink applications.		●●	●●
Foamaster MO NDW NC	Mineral oil based	High-shear / Mill base / Low-shear / Let down stage	0.2 - 0.5	100	< 0.1	●●	●●			For systems based on synthetic latex, especially those based on SB, PVA, acrylic and water-soluble alkyds. It continues to defoam effectively, even after months of storage, contributes to excellent brushability, does not cause fish-eyes and effect on the final paint film.		●●	●●
Foamaster MO NXZ NC	Mineral oil based	High-shear / Mill base / Low-shear / Let down stage	0.2 - 0.5	100	< 0.1	●●	●●			Universal oil-based defoamer for emulsion coatings and adhesives based on styrene-butadiene, acrylic, polyvinyl chloride and its copolymers, ethylene vinyl acetate, vinylidene chloride and water-soluble alkyds.		●●	●
Foamaster NO 2331	Natural oil based	High-shear / Mill base / Low-shear / Let down stage	0.05 - 0.8	100	< 0.1	●●	●●			Natural oil process defoamer based on renewable, with broad global food contact compliance, demonstrates excellent defoaming properties and long-term stability.		●●	
Foamaster WO 2310	White oil based	High-shear / Mill base / Low-shear / Let down stage	0.01 - 0.50	100	< 0.1	●●	●●			Process defoamer based on pharmaceutical white oil with broad global food contact compliance; offers high compatibility and provides significant long-term stability.		●●	

# Foamaster, FoamStar

## Defoamers designed to be used in water-based systems

Product Name <sup>1</sup>	Description	Incorporation	Dosage [%]	Solids <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Foamaster WO 2323	White oil based	–	0.1 - 0.3	100	< 0.1	●●	●●			Defoamer for low-odor emulsion paints, its defoaming properties are not affected, if the product is mixed thoroughly prior to use.		●●	
FoamStar ED 2522 NC	Emulsion based	Grinding stage / let-down	0.1 - 1.0	~ 20	< 0.1	●●	●●			High-performance, ultra low SVOC silicone emulsion defoamer for premium water-based paints, clear coats, and inks; excellent storage stability; extremely low-SVOC content.		●●	●●
FoamStar ED 2523	Emulsion based	Grinding stage / let-down	0.2 - 0.6	~ 27	< 0.1	●●	●●			Ultra low SVOC, emulsion defoamer for medium to high PVC coatings.			●●
FoamStar ED 2528 EL	Emulsion based	High-shear / Mill base / Low-shear / Let down stage	0.1 - 3.0	28	< 0.1	●●	●●			Highly effective silicone-based deaerator and defoamer for aqueous spray coating applications, but also for brush and roller applications. Particularly suited for airless / airmix spraying. It provides excellent foam knock-down and elimination of micro foam.			●●

<sup>1</sup> APEO has not been intentionally added.

<sup>2</sup> All measurements reflect approximate values.

<sup>3</sup> Measurements done according to the EU Ecolabel 2014/312/EU for indoor and outdoor paints and varnishes. For products with a VOC level above 10% the value is based on calculation according to recipe.

# FoamStar

## Defoamers designed to be used in water-based systems

Product Name <sup>1</sup>	Description	Incorporation	Dosage [%]	Solids <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
FoamStar SI 2210 NC	Modified silicone based	Grinding stage / let-down	0.1 - 0.5	100	< 0.5	●●	●●		●●	100%-active-content defoamer for non-pigmented and low-pigmented aqueous coatings and UV-curable systems; provides a strong spontaneous defoaming effect; outstanding long-term defoaming persistency.		●●	●●
FoamStar SI 2213	Modified silicone based	High-shear / Mill base / Low-shear / Let down stage	0.1 - 0.5	100	< 0.1	●●	●●			Specifically developed to prevent foam in clear and low pigmented aqueous coatings. It is a highly effective defoamer with excellent compatibility – which makes it ideally suitable for use in modern coatings such as those based on finely dispersed acrylics.		●●	
FoamStar SI 2240	Modified silicone based	Grinding stage / let-down	0.1 - 0.5	100	< 0.1	●●	●●			Highly effective defoamer for aqueous pigment concentrates and systems with high surfactant content.		●●	●●
FoamStar SI 2250	Modified silicone based	Grinding stage	0.1 - 0.3	100	< 1	●●	●●			Defoamer for water-based coatings and pigment concentrates where high-shear processing or application exists; most effective in the range.	●●	●●	●●
FoamStar SI 2280	Modified silicone based	Grinding stage / let-down	0.1 - 1.0	100	< 0.5	●●	●●			Easy to incorporate, high-shear stable defoamer; recommended for water-based paints and pigment concentrates.	●●	●●	●●
FoamStar SI 2281	Modified silicone based	Grinding stage / let-down	0.2 - 1.0	100	< 0.1	●●	●●			Highly effective silicone based defoamer recommended for high shear processes and well suitable as universal grinding stage defoamer for architectural paints and stains based on pure acrylates and acrylic copolymers as well as for wood coatings based on acrylates and polyurethane emulsions.	●●	●●	●●

# FoamStar

Defoamers designed to be used in water-based systems

Product Name <sup>1</sup>	Description	Incorporation	Dosage [%]	Solids <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
FoamStar SI 2292 NC	Modified silicone based	Low-shear / Let down stage	0.5 - 3.0	> 10	90	●●	●●			Defoamer and de-aerating agent for use in purely aqueous coatings and those coatings containing cosolvents based on polymer emulsions and applied by curtain coating, spraying, dipping, rolling, or brushing on wood, wood products or metal.	●	●●	●●
FoamStar SI 2299	Modified silicone based	Grinding stage / let-down	0.1 - 1.5	100	< 0.1	●●	●●			Highly effective deaerator and defoamer for aqueous spray coating applications; effectively removes micro-foam from water-based spray coatings; remains persistent over longer storage periods; offers an outstanding combination of effectiveness and compatibility.		●●	●●
FoamStar ST 2400	Star polymer based	Grinding stage / let-down	0.25 - 0.5	100	< 1	●●	●●			Ultra low silicone defoamer, remains persistent over longer storage periods; offers an outstanding combination of effectiveness and compatibility.	●●		
FoamStar ST 2410	Star polymer based	Grinding stage / let-down	0.25 - 0.50	> 98	2	●●	●●			Low use level; excellent persistence; good choice for low-VOC emulsion paints.		●	●
FoamStar ST 2412	Star polymer based	Grinding stage / let-down	0.25 - 0.50	> 98	2	●●	●●			Low use level; excellent persistence; good choice for styrene-acrylics.		●	●
FoamStar ST 2434	Star polymer based	Grinding stage / let-down	0.25 - 0.50	> 98	2	●●	●●			Silicone-based defoamer that offers easy incorporation; post addable; semi-gloss and gloss coatings.		●	●



# FoamStar

## Defoamers designed to be used in water-based systems

Product Name <sup>1</sup>	Description	Incorporation	Dosage [%]	Solids <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
FoamStar ST 2420	Star polymer based	High-shear / Mill base / Low-shear / Let down stage	0.3 - 1.0	100	< 0.5	●●	●●			Silicone-based defoamer are amongst the most efficient defoamers requiring up to 50% less dosage to achieve the performance of benchmark mineral oil defoamers.		●	●
FoamStar ST 2438	Star polymer based	Grinding stage / let-down	0.25 - 0.5	100	< 0.5	●●	●●			Silicone-based defoamer for high-quality water-based paints, delivering excellent long-term persistency and foam knock down.	●	●●	●●
FoamStar ST 2439	Star polymer based	Grinding stage / let-down	0.25 - 0.50	>98	2	●●	●●			Silicone-based defoamer; unlike conventional defoamers (mineral oil), defoams on a molecular level as unique mechanism, more potent version of FoamStar ST 2438.		●	●
FoamStar ST 2445	Star polymer based	High-shear / Mill base / Low-shear / Let down stage	0.25 - 0.5	> 99	1	●●	●●			Based on Star Polymer technology combined organo-modified silicones - effective in very difficult-to-defoam gloss formulations; provides wetting properties not found in other conventional defoamers.		●●	●●
FoamStar ST 2446	Star polymer based	High-shear / Mill base / Low-shear / Let down stage	0.15 - 1.0	> 99	1	●●	●●			A product of choice when other defoamers do not work, based on a Star polymer compounded with high-end organo-silicone polymers, recommended for medium to low PVC premium paints and allows very good film appearance properties.		●●	●●

<sup>1</sup> APEO has not been intentionally added.

<sup>2</sup> All measurements reflect approximate values.

<sup>3</sup> Measurements done according to the EU Ecolabel 2014/312/EU for indoor and outdoor paints and varnishes. For products with a VOC level above 10% the value is based on calculation according to recipe.

# Efka

## Defoamers designed to be used in non-aqueous systems

Product Name <sup>1</sup>	Description	Incorporation	Dosage [%]	Solids <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Efka PB 2001	Silicone-free	Before or after processing	0.05 - 0.5	26	74	–		●●	●●	Silicone-free air-release agent for non-aqueous coatings such as epoxy, polyurethane, or UPE systems.	●●	●●	
Efka PB 2020	Silicone-free	Before or after processing	0.1 - 0.7	–	~ 80	–		●●	●●	Acid-cured and NC-curtain coating systems, unsaturated polyesters and gelcoats; broad use silicone-free defoamer.	●●	●●	●●
Efka PB 2725	Silicone-free	Before or after processing	0.1 - 1.0	–	60	–		●●	●●	Used in pigmented or non-pigmented resin systems such as: unsaturated polyester, epoxy, and polyurethane systems.		●●	●●
Efka PB 2744	Polymer based, silicone-containing	Before or after processing	0.2 - 1.5	100	< 0.1	●●		●●	●●	Ultra low-VOC defoamer and de-aerator for high-solid and solvent-free formulations; excellent efficiency; improves leveling and imparts surface smoothness; excellent longterm persistency.		●●	
Efka PB 2770	Polymer based, silicone-free	Before or after processing	0.2 - 1.0	100	< 0.1	●●			●●	Silicone free; polymer based defoamer with outstanding compatibility, ideal for clearcoat.	●●	●●	●●
Efka SI 2022	Silicone based	Before or after processing	0.1 - 1.0	–	> 90	–		●●		Silicone containing defoamer for pigmented system; especially suited for polyurethane based formulations.		●●	●●

# Efka, FoamStar

Defoamers designed to be used in non-aqueous systems

Product Name <sup>1</sup>	Description	Incorporation	Dosage [%]	Solids <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Efka SI 2722 S	Silicone based	Prior to processing	0.5 - 1.5	-	> 70	-			●●	Used in pigmented or non-pigmented resin systems such as solvent-free epoxy systems and solvent-free polyurethane systems.		●●	
Efka SI 2723	Silicone based	Prior to processing	0.5 - 1.5	-	< 25	-		●●	●●	Silicone containing defoamer for pigment grinding; strong defoaming efficiency.		●●	●●
Efka SI 2041	Silicone based	Prior to processing	0.1 - 0.7	-	-	-		●●	●●	High efficient silicone defoamer that prevents the formation of foam in applications like spray, brush, and roller applications.		●●	●●
Efka SI 2042	Silicone based	Prior to processing	0.1 - 0.7	-	-	-		●●	●●	High efficient silicone defoamer that prevents the formation of foam in applications like spray, brush, and roller applications.		●●	●●
Efka SI 2751	Silicone based	Grinding stage / let-down	0.1 - 1.0	-	-	-		●●	●●	Defoamer effective in acetate/reduced nitrocellulose-based systems and especially effective in gravure and flexo.		●	●
FoamStar PB 2707	Mixture of an ester and an emulsifier	Before or after processing	0.1 - 0.5	-	-	-	●●	●●		Low-viscosity defoamer that can be drip feed into coating colours.		●●	

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<sup>2</sup> All measurements reflect approximate values.

<sup>3</sup> Measurements done according to the EU Ecolabel 2014/312/EU for indoor and outdoor paints and varnishes. For products with a VOC level above 10% the value is based on calculation according to recipe.

# Rheology Modifiers

Rheological modifiers are key ingredients in paints and coatings as they help control the coating application and the final appearance. Without these special additives, such media would be as “runny” as water. During application, paints would spatter in all directions, have little hiding power and exhibit a much shorter shelf life. Rheology modifiers enable formulators to adjust the flow behavior of paints and coatings. That way, painters benefit from improved viscosity and application characteristics.

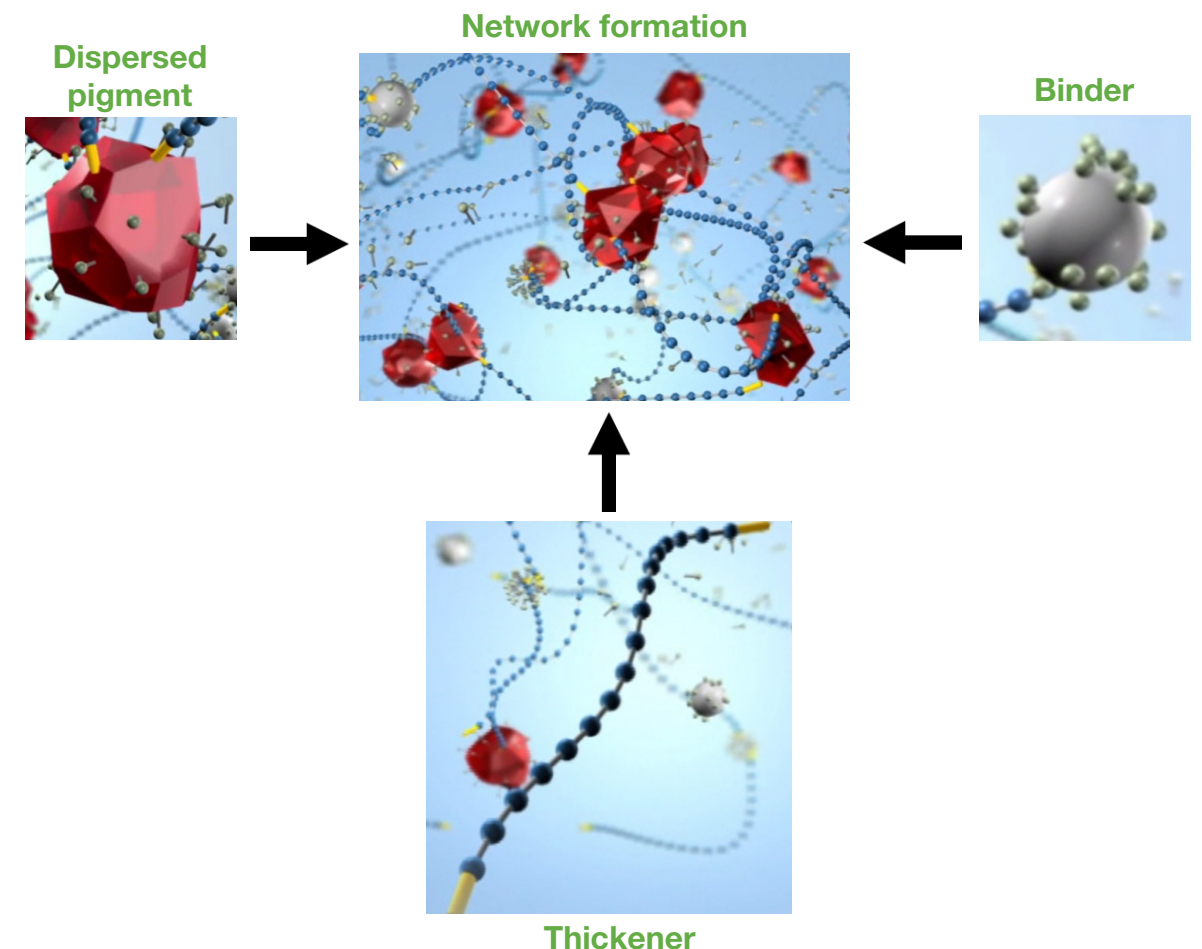
Our focus is on highly efficient additives for water-based systems. Our rheology modifiers also provide additional functionalities like wetting properties and health or environmental benefits such as suitability for formulations **low in VOCs, odors, free of APEO and tin**.

Rheology modifiers from BASF effectively reduce dripping and spattering of paints during roller or brush application. Sag resistance is improved by a rapid but controlled viscosity increase after application. They also reliably prevent sedimentation of pigments during transport and storage of the paints.

We offer six classes of rheological additives for paints and coatings:

- Alkali swellable emulsions (**ASE**)
- Hydrophobically modified alkali swellable emulsions (**HASE**)
- Hydrophobically modified polyurethanes (**HEUR**)
- Hydrophobically modified polyethers (**HMPE**)
- Attapulgites (inorganic rheology modifiers)
- Castor oil, wax and urea based thixotropes

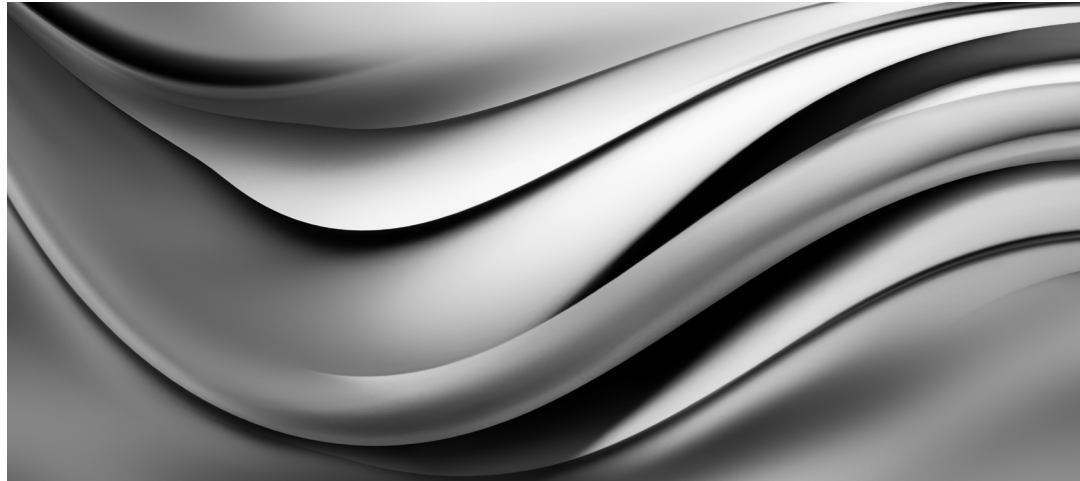
Each product class has its own properties and applications. Our **Rheovis® PU and PE series** of associative thickeners stand out as a class of groundbreaking additives based primarily on hydrophobically modified polyether and polyurethane derivatives.





# Rheology Modifiers

## Highlights



### Key benefits

- Broad range of rheology profiles
- High efficiency across many resin types
- pH-independency (PU / PE)
- Improved sustainability
- Improved wash and scrub-resistance
- Low impact on water-uptake / whitening
- Excellent leveling and sag resistance
- Reduced spattering

Product Range	Chemistry	Characteristics
<b>Rheovis® HS</b>	Associative acrylic (HASE)	Strong thickening response, reduced syneresis, easy to handle.
<b>Rheovis® AS</b>	Non-associative acrylic (ASE)	Pseudoplastic rheology profiles, reduced syneresis, easy to handle.
<b>Rheovis® PE</b>	Associative polyether (HMPE)	Newtonian rheology profiles, non-ionic chemistry, avoids spattering, good wet-scrub resistance.
<b>Rheovis® PU</b>	Associative polyurethane (HEUR)	Broad range of rheology profiles, non-ionic chemistry, excellent wet-scrub resistance, low effect on gloss development.
<b>Attagel®</b>	Organo clay types	Inorganic Rheology Modifiers with strong anti-settling properties and good syneresis control.
<b>Efka® RM</b>	Miscellaneous	Excellent anti-settling and anti-sag properties.

# Attagel, Rheovis

Rheovis, Attagel Rheology modifiers designed to be used in water-based systems

Product Name <sup>1</sup>	Description	Solids [%] <sup>2</sup>	Viscosity [mPa·s] <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC paints <sup>3</sup>	Tin-free	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Attagel 50	Natural attapulgite clays	100	Powder	< 0.1	●●	●●	●●	●		Additionally to key benefits, it improves anti-spatter and syneresis control with a smaller particle size than Attagel 40.	●●	●●	●●
Rheovis AS 1125 NA	Non-associative thickener: anionic polyacrylate copolymer (ASE)	25	< 20	< 0.1	●●	●●	●●			Shear thinning rheology curve providing a high yield point.	●●	●●	●●
Rheovis AS 1130	Non-associative thickener: anionic polyacrylate copolymer (ASE)	30	< 40	< 0.1	●●	●●	●●			Highly efficient and shear thinning rheology curve, used in pigment and filler slurries. Standard in automotive formulations.	●●	●●	●●
Rheovis AS 1187	Non-associative thickener: anionic polyacrylate copolymer (ASE)	55	< 3.000	< 10	—	●●	●●			Highly active, inverse emulsion with outstanding low-shear thickening efficiency which can be used in a pH range between 6-12; sodium salt.		●●	
Rheovis HS 1153	Associative thickener: anionic polyacrylate copolymer, hydrophobically modified (HASE)	40	<50	< 0.1	●●	●●	●●			High polymer content. Imparts slight thixotropy and prolongs the open time. Especially recommended for paints and plasters.	●●		
Rheovis HS 1162	Associative thickener: anionic polyacrylate copolymer, hydrophobically modified (HASE)	35	< 50	< 0.1	●●	●●	●●			Combines slightly thixotropic flow behavior with low water uptake. Has no impact on wet adhesion even after long water contact.	●●		●●
Rheovis HS 1169	Associative thickener: anionic polyacrylate copolymer, hydrophobically modified (HASE)	30	< 50	< 0.1	●●	●●	●●			Recommended as co-thickener for spray applications with lower water uptake and elongation of open time.	●●	●●	

# Rheovis

Rheovis, Attagel Rheology modifiers designed to be used in water-based systems

Product Name <sup>1</sup>	Description	Solids [%] <sup>2</sup>	Viscosity [mPa·s] <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC paints <sup>3</sup>	Tin-free	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Rheovis HS 1212	Associative thickener: anionic polyacrylate copolymer, hydrophobically modified (HASE)	40	< 50	< 0.5	●●	●●	●●			Allround mid-shear thickener with high polymer content, excellent efficiency and sizable food contact compliance.			●●
Rheovis HS 1332	Associative thickener: anionic polyacrylate copolymer, hydrophobically modified (HASE)	40	< 50	< 0.1	●●	●●	●●			High polymer content with newtonian flow behavior; improves leveling; sizable food contact compliance.		●●	●●
Rheovis HS 1303 EB	Associative thickener: anionic polyacrylate copolymer, hydrophobically modified (HASE)	25	< 50	< 0.1	●●	●●	●●			Acrylic thickener with pronounced high-shear behavior for many aqueous paint and coating systems; excellent Newtonian flow behavior; especially suited for wood coatings for brush and roller applications.			●●
Rheovis PU 1192	Associative thickener: hydrophobically modified ethoxylated urethane (HEUR)	32	3,000	< 0.1	●●	●●	●●			Most efficient low-shear HEUR combined with low VOC, combining convenient handling and easier defoaming.		●●	●●
Rheovis PU 1193	Associative thickener: hydrophobically modified ethoxylated urethane (HEUR)	25	3,000	< 20	-	●●	●●			Most efficient low-shear HEUR, combining convenient handling and easier defoaming.	●●	●●	●●
Rheovis PU 1235 EC	Associative thickener: hydrophobically modified ethoxylated urethane (HEUR)	25	1,200	< 20	-	●●	●●			Build of mid shear viscosity combined with excellent syneresis control.		●●	●●

# Rheovis

Rheovis, Attagel Rheology modifiers designed to be used in water-based systems

Product Name <sup>1</sup>	Description	Solids [%] <sup>2</sup>	Viscosity [mPa·s] <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC paints <sup>3</sup>	Tin-free	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Rheovis PU 1256 EC	Associative thickener: hydrophobically modified ethoxylated urethane (HEUR)	35	23,000	< 0.1	-	●●	●●			Low to mid-shear profile and low VOC.		●●	●●
Rheovis PU 1291	Associative thickener: hydrophobically modified ethoxylated urethane (HEUR)	45	3,000	< 0.1	●●	●●	●●			Mid- to low shear thickener, VOC-free and easy handling.	●●	●●	
Rheovis PU 1333	Associative thickener: hydrophobically modified ethoxylated urethane (HEUR)	20	3,000	< 0.1	●●	●●	●●			Imparts outstanding efficiency, the most Newtonian rheology profile in water-based applications and remarkable good coloristics.		●●	●●
Rheovis PU 1341 EC	Associative thickener: hydrophobically modified ethoxylated urethane (HEUR)	20	2,800	< 0.1	●●	●●	●●			Excellent high-shear thickener imparting excellent flow and low VOC (preferred outside EMEA).		●●	●●
Rheovis PE 1331 EC	Associative thickener: hydrophobically modified polyether (HMPE)	21	2,300	< 0.1	●●	●●	●●			Most newtonian rheology profile imparting excellent flow and low VOC (preferred outside EMEA).		●●	●●

<sup>1</sup> APEO has not been intentionally added.

<sup>2</sup> All measurements reflect approximate values.

<sup>3</sup> Measurements done according to the EU Ecolabel 2014/312/EU for indoor and outdoor paints and varnishes. For products with a VOC level above 10% the value is based on calculation according to recipe.



# Efka

## Efka Rheology modifiers designed to be used in solvent-based systems

Product Name <sup>1</sup>	Description	Solids [%] <sup>2</sup>	Viscosity [mPa·s] <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC paints <sup>3</sup>	Tin-free	Recommended for			Features and Benefits	Applications		
							Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Efka RM 1469	Polyamide wax	20	Paste	80	–	●●		●●		Pre-activated polyamide wax thickener; excellent anti-sagging and anti-settling properties for solvent-based OEM and refinish as well as for wood coatings; minimum effect on color and gloss.	●●	●●	
Efka RM 1900	Modified hydrogenated castor oil	100	Powder	< 0.1	–	●●		●●	●●	Provides excellent sag resistance for non-aqueous formulations; higher temperature stability.		●●	●●
Efka RM 1920	Hydrogenated castor oil	99	Powder	< 0.1	–	●●		●●	●●	Provides excellent sag resistance for non-aqueous formulations; standard thixotropy.	●●	●●	●●
Efka RM 1965	Overbased calcium sulfonate complex	70	Paste	30	–	●●		●●		Prevents settling of pigments by developing a more shear thinning rheological behavior; prevents the formation of hard pigment sediments.	●●	●●	●●

<sup>1</sup> APEO has not been intentionally added.

<sup>2</sup> All measurements reflect approximate values.

<sup>3</sup> Measurements done according to the EU Ecolabel 2014/312/EU for indoor and outdoor paints and varnishes. For products with a VOC level above 10% the value is based on calculation according to recipe.

# Wetting Agents

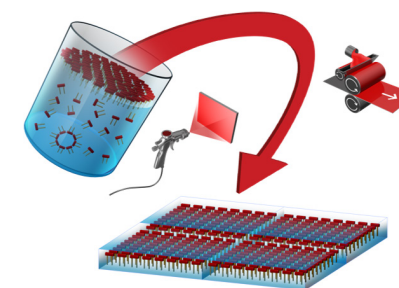
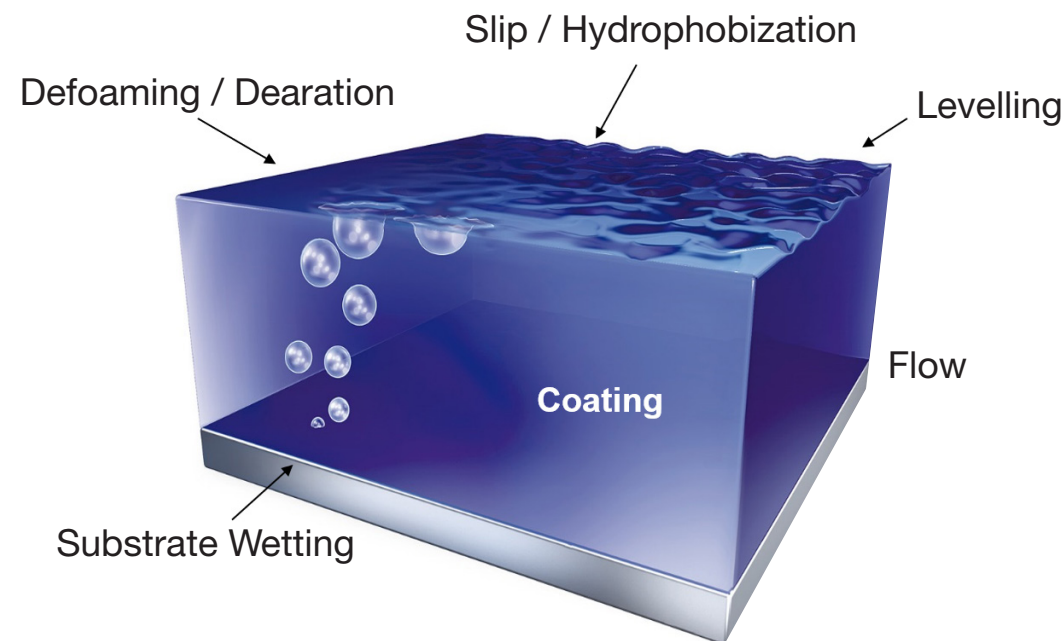
Wetting agents and surface modifiers are essential components of modern paints and coatings. They provide a formulation with adequate wetting properties, enhance different component compatibility, and improve the surface of a coating. Most coating systems need good flow and leveling in order to have a smooth appearance. A flat and even surface will give a higher gloss and is therefore eye-catching. As shown, wetting agents and surface modifiers can have a strong influence on coating properties like substrate wetting, slip, flow, and leveling.

With wetting agents and surface modifiers for water-based and non-aqueous coatings, we can provide solutions for almost any paint, coating and ink system. Our broad technology portfolio includes **polymeric, oligomeric and surfactant-based products** such as slip agents with very good recoatability and wetting properties or polymeric flow and leveling agents that offer excellent appearance. Formulators value wetting agents and surface modifiers from BASF for high efficiency, allowing dosage reduction and universal suitability.

## Coating Properties Influenced by Wetting Agents & Surface Modifiers

Several coating effects like substrate wetting, flow and leveling, surface slip, and defoaming are controlled by wetting agents and surface modifiers.

- (Substrate) Wetting
- Flow & Leveling
- Gloss
- Foam / Deaeration
- Slip / Antiblocking
- (Intercoat) Adhesion



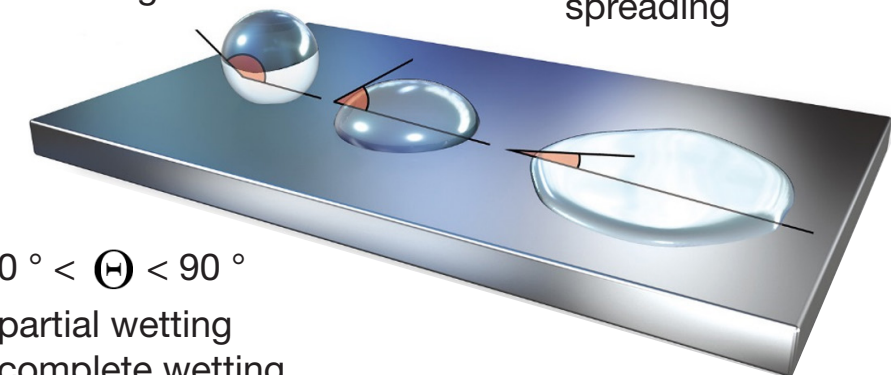
### Substrate Wetting

3 distinct situations by contact angle determination

$90^\circ < \Theta < 180^\circ$   
negligible wetting  
no wetting

$\Theta = 0^\circ$   
spreading

$0^\circ < \Theta < 90^\circ$   
partial wetting  
complete wetting



# Wetting Agents

## Highlights



### Key benefits

- Solutions for water-based and non-aqueous formulations
- High efficiency at low dosage
- Excellent compatibility and low-foaming
- Improved sustainability
- Improved substrate wetting and leveling
- Enhanced effects for extended durability

Product Range	Chemistry	Characteristics
<b>Hydropalat®</b>	Alkoxylated surfacants	Low-foaming substrate wetting agents for water-based applications.
	Sulfosuccinates	Cost-effective substrate-wetting agents with excellent dynamic surface-tension reduction.
	Star-shaped polymers	Defoaming wetting agents based on star-shaped polymers for excellent dynamic surface-tension reduction.
<b>Efka® Hydropalat®</b>	Silicone surfacants	Substrate-wetting agents with generally very low static surface tension.
<b>Efka®</b>	Polyacrylates	Acrylate leveling agents for solvent-based and solvent-free applications.
	Silicone-modified polyacrylates	Flow and leveling agents to facilitate excellent flow and recoatability (at once).



# Hydropalat

## Substrate wetting agents slip and leveling agents

Product name <sup>1</sup>	Description	Dosage [%] <sup>2</sup>	Solids [%] <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Silicone containing	Features and Benefits	Applications		
						Water-based systems	Solvent-based systems	Solvent-free systems			Automotive	Industrial	Furniture and flooring
Substrate wetting agents													
Hydropalat WE 3111	Alkoxylated surfactants	0.2 - 1.0	80	< 1.0	●●	●●			-	APEO-free alternative for enhanced color acceptance in water-based systems, supports pigment wetting and improves freeze-thaw stability.		●●	
Hydropalat WE 3120	Alkoxylated surfactants	0.5 - 5.0	> 99	< 0.3	●●	●●			-	Low-foaming wetting agent for aqueous formulations; excellent reduction of dynamic surface tension.	●●	●●	●●
Hydropalat WE 3136	Alkoxylated surfactants	-	100	< 0.1	●●	●●			-	Difunctional block copolymer surfactant with primary hydroxyl groups; non-ionic and 100% active; HLB ~7.		●●	●●
Hydropalat WE 3147	Alkoxylated surfactants	0.5 - 1.0	70	< 1	●●	●●			-	APEO-free; non-ionic surfactant; stabilizes high inorganic filler content; suitable for emulsion polymerization; HLB ~18.		●●	●●
Hydropalat WE 3311	Alkoxylated surfactants	0.1 - 0.5	100	< 0.1	●●	●●			-	Excellent for color development / acceptance and improved substrate wetting; suitable for binder stabilization; HLB ~14.		●●	●●

<sup>1</sup> APEO has not been intentionally added.

<sup>2</sup> All measurements reflect approximate values.

<sup>3</sup> Measurements done according to the EU Ecolabel 2014/312/EU for indoor and outdoor paints and varnishes. For products with a VOC level above 10% the value is based on calculation according to recipe.



# Hydropalat

## Substrate wetting agents with slip and leveling agents

Product name <sup>1</sup>	Description	Dosage [%] <sup>2</sup>	Solids [%] <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Silicone containing	Features and Benefits	Applications		
						Water-based systems	Solvent-based systems	Solvent-free systems			Automotive	Industrial	Furniture and flooring
Hydropalat WE 3320	Alkoxylated surfactants	0.1 - 1.5	90	< 0.1	●●	●●				Excellent for color development / acceptance and improved substrate wetting; suitable for binder stabilization; HLB ~14.		●●	
Hydropalat WE 3694	Alkoxylated surfactants	0.2 - 2.0	> 85	< 15	—	●●				Non-ionic wetting agent for aqueous formulations with excellent wetting and emulsification properties; low foaming and low surface tension.	●●	●●	●●
Hydropalat WE 3966	Alkoxylated surfactants	—	100	< 0.5	●●	●●				Solid block-copolymer surfactant; excellent improvement of shock stability in inks; highly compatible across all systems.		●●	●●
Hydropalat WE 3220	Silicone surfactants	0.1 - 0.5	90	< 4	—	●●	●●	●●		Silicone surfactant with strong reduction of surface tension in aqueous formulations; excellent substrate and anti-crater additive with good recoatability.	●●	●●	●●
Hydropalat WE 3221	Silicone surfactants	0.2 - 1.0	45	55	—	●●		●●		Silicone surfactant in dipropylene glycol monomethyl ether with strong reduction of surface tension in aqueous formulations; excellent substrate and anti-crater additive with good recoatability.	●●	●●	●●
Hydropalat WE 3225	Silicone surfactants	0.1 - 0.5	—	—	—	●●		●●		Excellent silicone based wetting agent with pronounced defoaming action, eliminates surface defects and improves gloss, flow and leveling.		●●	●●

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# Hydropalat

## Substrate wetting agents with slip and leveling agents

Product name <sup>1</sup>	Description	Dosage [%] <sup>2</sup>	Solids [%] <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Silicone containing	Features and Benefits	Applications		
						Water-based systems	Solvent-based systems	Solvent-free systems			Automotive	Industrial	Furniture and flooring
Hydropalat WE 3229	Silicone surfactants	0.1 - 1.0	100	< 3	-	●●	●	●●	Excellent wetting agent for high speed application with good deaeration and excellent anticratering performance, suitable for 100% UV systems.		●●	●●	
Hydropalat WE 3475	Sulfosuccinates	0.1 - 1.0	75	~ 6	-	●●		-	Highly efficient wetting agent; strong reduction of dynamic surface tension; standard product used in overprint varnishes.			●●	
Hydropalat WE 3477	Sulfosuccinates	0.1 -1.0	77	~ 6	-	●●		-	Highly efficient wetting agent; strong reduction of dynamic surface tension; alternative solvent.		●		
<b>Slip and leveling agents</b>													
Hydropalat SL 3683	Aqueous dispersion of an ultra-high molecular weight silicone	0.05 - 1.0	65	< 0.2	●●	●●		●●	Strong slip and anti-blocking additive for aqueous systems; good compatibility properties.		●●	●●	

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# Efka

## Flow and leveling agents

Product name <sup>1</sup>	Description	Dosage [%] <sup>2</sup>	Solids [%] <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Silicone containing	Features and Benefits	Applications		
						Water-based systems	Solvent-based systems	Solvent-free systems			Automotive	Industrial	Furniture and flooring
Flow and leveling agents													
Efka FL 3740 EH	Copolyacrylates	0.2 - 1.0	> 95	< 0.5	●●		●●	●●	-	Silicone- and solvent-free flow and leveling agent with air-release properties for non-aqueous coatings.	●●		
Efka FL 3745	Copolyacrylates	0.2 - 1.0	> 96	< 0.5	●●		●●	●●	-	Silicone-free flow and leveling agent with air-release properties for solvent-based, solvent free and powder coatings system.		●●	●●
Efka FL 3750 AN	Copolyacrylates	0.05 - 0.5	100	< 1.0	●●		●●	●●	-	100% version of Efka FL 3755; suitable for solvent and solvent-free application.	●●	●●	●●
Efka FL 3755	Copolyacrylates	0.1 - 1.0	52	48	-		●●		-	Silicone-free and highly compatible leveling agent with excellent flow; no impact on recoatability and intercoat adhesion.	●●	●●	●●
Efka FL 3287	Silicone-modified polyacrylate	0.5 - 2.0	> 98	< 0.5	●●		●●	●●	●●	Enhance the leveling and wetting properties of solvent-based and solvent-free formulations and broad compatible with various resins systems.		●●	
Efka FL 3782	Silicone-modified polyacrylate	0.5 - 2.0	~ 60	40	-		●●	●●	●●	Improve the leveling and wetting properties of solvent-based, water-based, and solvent-free formulations.	●●	●●	

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# Efka

## Slip and leveling agents

Product name <sup>1</sup>	Description	Dosage [%] <sup>2</sup>	Solids [%] <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Silicone containing	Features and Benefits	Applications		
						Water-based systems	Solvent-based systems	Solvent-free systems			Automotive	Industrial	Furniture and flooring
Slip and leveling agents													
Efka SL 3030	Modified polysiloxanes	0.1 - 0.3	52	48	–	●●	●●		●●	Organically modified polysiloxane; improved slip and mar resistance, very compatible.	●●	●●	●●
Efka SL 3031	Modified polysiloxanes	0.1 - 0.3	52	48	–		●●		●●	Organically modified polysiloxane; solventbased metal, wood, and paper coatings including UV-cured.		●●	●●
Efka SL 3033	Modified polysiloxanes	0.1 - 1.0	15	85	–		●●	●●	●●	Organically modified polysiloxane; improved surface flow, excellent compatibility in clear coats.	●●	●●	●●
Efka SL 3035	Modified polysiloxanes	0.1 - 0.5	52	48	–	●●	●●		●●	Organically modified polysiloxane; solventand water-based coatings, stoving enamels, unsaturated PE including UV-cured.	●●	●●	●●
Efka SL 3200	Modified polysiloxanes	0.05 - 0.25	> 95	< 0.5	●●	●●	●●	●●	●●	Universal silicone-based solvent-free slip and leveling agent; suitable for aqueous, solvent-based and UV formulations.		●●	●●
Efka SL 3210	Modified polysiloxanes	0.1 - 0.3	100	< 1	●●	●●	●●	●●	●●	Broad spectrum and efficient flow and slip enhancer; economic solutions.		●●	●

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# Efka

## Slip and leveling agents

Product name <sup>1</sup>	Description	Dosage [%] <sup>2</sup>	Solids [%] <sup>2</sup>	VOC content [%] <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Silicone containing	Features and Benefits	Applications		
						Water-based systems	Solvent-based systems	Solvent-free systems			Automotive	Industrial	Furniture and flooring
Slip and leveling agents													
Efka SL 3236	Modified polysiloxanes	0.04 - 0.4	> 98	< 1	●●		●●	●●	●●	Solvent-free modified polysiloxane; solventbased wood finishes, industrial coatings, and solvent-free floor coatings.	●●	●●	●●
Efka SL 3257	Modified polysiloxanes	0.05 - 1.0	> 95	< 0.5	●●	●●	●●	●●	●●	Excellent slip with good levelling; broad compatibility across various resin systems.		●●	●●
Efka SL 3299	Modified polysiloxanes	0.05 - 3.0	> 98	< 1	●●	●●	●●	●●	●●	Organically modified polysiloxane; strong slip and surface smoothness effect for high-gloss industrial coatings.	●●	●●	●●
Efka SL 3883	Reactive polysiloxanes	0.2 - 1.0	70	30	-		●●	●●	●●	Polysiloxane-modified with unsaturated terminal groups; UV-curing systems for wood, plastic, and paper coatings.		●●	●●

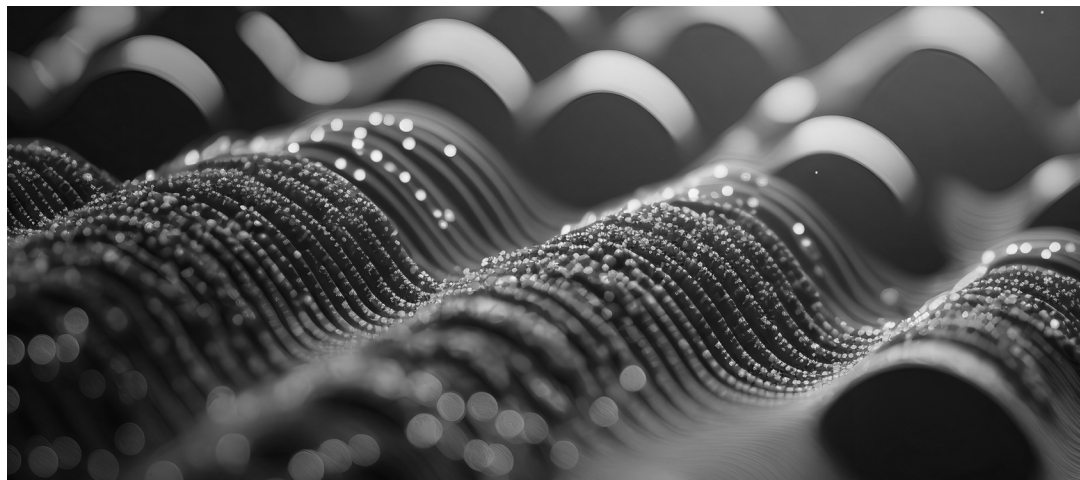
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# Film-Forming Agents and Others

BASF offers film-forming agents including coalescents, open-time prolongers and plasticizers. Our portfolio focuses on **high performance** and **sustainable products with renewable content that are non-phthalate** and have **lowest-possible VOC emissions** in systems ranging from paints to plasters and sealants.



## Key benefits

- Solutions for water-based and non-aqueous formulations
- Improved sustainability (e.g. renewables, low VOC, low odor)
- Food-contact compliance
- Broad country registration
- Enhanced mechanical properties
- Improved workability
- Conductivity improvement

Product class	Product name	Characteristics
Coalescents	<b>Loxanol® CA</b>	Lower film-forming temperature; improved film formation.
Open-time prolongers	<b>Loxanol® OT</b>	Dispersions of oleo-compounds; increased open time, prevention / reduction of crack formation, improved workability.
Plasticizers	<b>Loxanol® PL</b>	Plastification for water-based formulations.
	<b>Efka® PL</b>	Plastification for solvent-based and 100% systems.
Miscellaneous	<b>Loxanol® MI</b>	Product specific (see details).
	<b>Efka® MI</b>	
Conductivity aids	<b>Efka® IO</b>	Ionic liquids; conductivity improvement.

# Film-Forming Agents and Others Highlights

Our coalescing agents and plasticizers deliver **high performance** coupled with **extremely low VOC content**. We also provide a complete range of open time prolongers based on renewable raw materials. Different chemical compounds and functional groups enable you to fine-tune your formulations for specific properties, including **low film-forming temperatures, increased plasticization, reduced brittleness and improved adhesion**. In addition, we offer a range of products with specific properties, like conductivity improvement, improvement of adhesion, early rain resistance etc.



Performance and Formulation  
Sustainability Website



BASF Additives  
LinkedIn Page

At BASF Performance and Formulation Additives, you will find experts in your specific needs who are glad to support you in finding the right film-forming agents for your formulations.

For more information, you can also look here: [www.basf.com/additives](http://www.basf.com/additives)

# Efka, Loxanol

## Plasticizer and coalescents

Product name <sup>1</sup>	Description	Solids (%) <sup>2</sup>	Product viscosity (mPas) <sup>2</sup>	VOC content (%) <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
						Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Plasticizer												
Efka PL 5381	Epoxidized soy bean oil	100	550	< 0.1	●●		●●		Standard epoxy plasticizer which is extraction-resistant to many industrial agents. The migration resistance is comparable with polymeric plasticizers; contains bio-based materials.		●●	●●
Efka PL 5382	Epoxidized soy bean oil	100	550	< 0.1	●●		●●		Higher purified version of Efka PL 5381, with a slightly broader food contact range; contains bio-based materials.		●●	●●
Efka PL 5651	Bis(butylcarbitol) formal	100	100	< 0.1	●●	●●	●●		Highly compatible plasticizer designed to provide maximum low temperature flexibility to various types of elastomers; enhances low temperature properties and reduces processing viscosities in elastomers and thermoplastic elastomers.	●●	●●	●●
Coalescents												
Loxanol CA 5310	Propylene glycol monoester	> 98	30	2	●●		●●		Excellent balance of coalescent properties; based on renewable raw materials.		●●	●
Loxanol CA 5140	Methyl ester of natural fatty acid	100	6	< 0.1	●●		●●		Highly efficient coalescing agent for interior/exterior paints: based on renewable raw materials.		●	●

<sup>1</sup> APEO has not been intentionally added.

<sup>2</sup> All measurements reflect approximate values.

<sup>2</sup> Recommend to determine the optimum dosage level by laboratory trials to achieve optimum performance

<sup>3</sup> Measurements done according to the EU Ecolabel 2014/312/EU for indoor and outdoor paints and varnishes.

For products with a VOC level above 10% the value is based on calculation according to recipe.



Product name <sup>1</sup>	Description	Solids (%) <sup>2</sup>	Product viscosity (mPas) <sup>2</sup>	VOC content (%) <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
						Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Conductivity aids												
Efka IO 6782	Solution of quaternary ammonium salt	80	–	30	–	●	●●		Increases the electric conductivity of a liquid or solid paint film; short chain fatty acid modified salt.	●●	●●	●●
Efka IO 6783	Ionic liquid, hydroxy functional ammonium salt	> 98	1.1	< 2	–	●●	●●		Conductivity promoter to adjust anti-static property of coatings and resistivity in liquid formulations to prevent static charge build-up or dust attraction during and after the drying process.	●●	●●	●●
Efka IO 6785	Ionic liquid, non-functional imidazolium salt	> 97	120	< 3	–	●●	●●		Conductivity promoter to adjust anti-static property of coatings and resistivity in liquid formulations to prevent static charge build-up or dust attraction during and after the drying process; medium active.	●●	●●	●●
Efka IO 6786	Ionic liquid, non-functional imidazolium salt	> 97	20	< 3	–	●●	●●		Conductivity promoter to adjust anti-static property of coatings and resistivity in liquid formulations to prevent static charge build-up or dust attraction during and after the drying process; highly active.	●●	●●	●●
Efka MI 6790 ED	Fatty acid ester	–	–	–	●●	–	●●		Prevents building up of direct current potentials during electrostatic powder spray coating.		●●	

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# Loxanol

## Conductivity aids and miscellaneous

Product name <sup>1</sup>	Description	Solids (%) <sup>2</sup>	Product viscosity (mPas) <sup>2</sup>	VOC content (%) <sup>2</sup>	Recommended for low-VOC systems <sup>3</sup>	Recommended for			Features and Benefits	Applications		
						Water-based systems	Solvent-based systems	Solvent-free systems		Automotive	Industrial	Furniture and flooring
Miscellaneous												
Loxanol MI 6311	Polyamide	75	700	-	●●	●●			Highly efficient formaldehyde scavenger for water-based paints.		●●	
Loxanol MI 6627	Zinc salt of an organic nitrogen compound	> 99	-	< 0.1	●●	●●			Highly efficient corrosion inhibitor in combination with zinc phosphate.		●●	
Loxanol MI 6727	Polyethylene imine	-	~ 1.700	-	-	●●			Soluble in alcohols from methanol to propanol but not in solvents like ethyl acetate, hexane or toluene and compatible with cationic and nonionic systems.		●●	●●
Loxanol MI 6730	Polyethylene imine	50	25000	< 0.1	●●	●●			Used as a primer for coatings applications; highly effective adhesion promotor in multi layer packaging films; recommended for ionic / cationic binders and in a pre-treatment solution.	●	●	
Loxanol MI 6600	Methane sulfonic acid solution	70	-	-	-	●●			Used in cationic electrodeposition tanks for pH adjustment; provides low volatility and lower odor than other MSA acid options.	●●		
Loxanol MI 6840	Paraffin wax dispersion	62	350	< 0.4	●●	●●			Improved hydrophobicity; reduces mud cracks; reduces snail trail tendency under critical conditions.	●	●●	●●

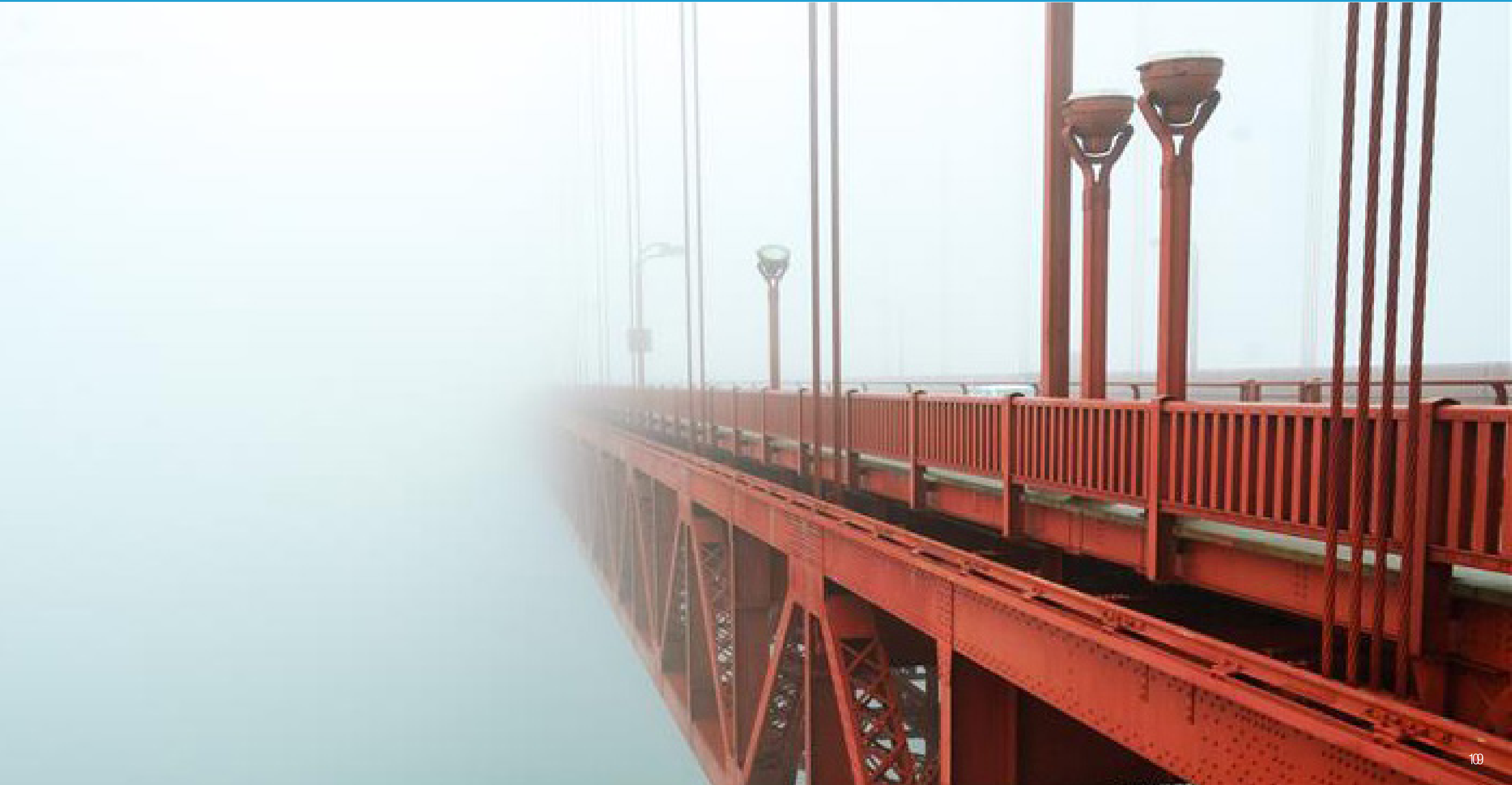
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For products with a VOC level above 10% the value is based on calculation according to recipe.















# Resources

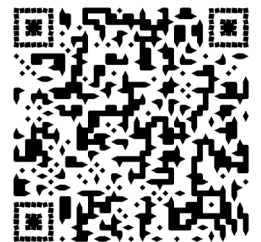
Our team brings a wealth of expertise, a broad portfolio, and a commitment to delivering exceptional quality to every project. We understand the scope of industry transformation to sustainable, high impact formulations and look forward to helping to support your needs. Our expansive portfolio showcases our dedication in supporting a multitude of industries and markets. We prioritize quality to ensure that our products and services meet the standards of our customers, and we look forward to connecting with you to help bring success to your visions through sharing knowledge of how to utilize our portfolio while continuously progressing to more sustainable solutions.



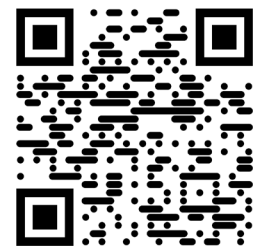
Industrial Coatings  
Digital Brochure  
(access the latest version here)



Performance and  
Formulation Additives



Lab Assistant



## About BASF

At BASF, we create chemistry for a sustainable future. We combine economic success with environmental protection and social responsibility. Around 112,000 employees in the BASF Group contribute to the success of our customers in nearly all sectors and almost every country in the world. Our portfolio comprises six segments: Chemicals, Materials, Industrial Solutions, Surface Technologies, Nutrition & Care and Agricultural Solutions. BASF generated sales of €68.9 billion in 2023. BASF shares are traded on the stock exchange in Frankfurt (BAS) and as American Depositary Receipts (BASFY) in the United States. Further information at [www.basf.com](http://www.basf.com).

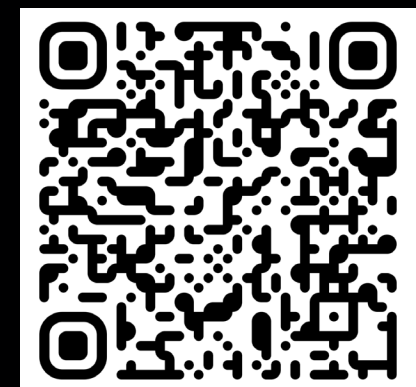
## About BASF's Dispersions and Resins Business

The Dispersions and Resins business of BASF develops, produces, and markets a range of high-quality resins, additives, colorants, and polymer dispersions worldwide. These raw materials are used in formulations for coatings and paints, printing and packaging products, construction coatings, adhesives, cellulose and composites, and paper manufacturing. With a comprehensive product portfolio and extensive knowledge of the industries we serve, our customers benefit from innovative and sustainable solutions to help them advance their formulations through chemistry. For further information about the Dispersions & Resins business in North America, please visit <http://www.basf.us/dpsolutions>.

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