Dispersions

Bayhydrol® Bayhydur® Baybond®
Bayhytherm® Desmodur®
Impranil® Dispercoll®

covestro

Contents

04 Our mission: INVENTING FOR YOU

06 Aqueous dispersions – an innovative and eco-friendly platform

08 Quality & supply security – sustainability

10 Bayhydrol® A
Aqueous acrylic polyol primary dispersions

11 Bayhydrol® A
Aqueous acrylic polyol secondary dispersions

12 Bayhydrol® A
Building blocks

13 Manufacturing procedures for acrylic primary and secondary dispersions

14 Bayhydrol® U
Aqueous polyurethane-polyol dispersions

15 Bayhydrol® UH
Aqueous high molecular weight polyurethane dispersions

16 Bayhydrol® UH
Fatty acid-modified polyurethane dispersions

17 Bayhydrol® UA
PAC-mod. aqueous high molecular weight polyurethane dispersion

18 Bayhydrol® UV
Radiation curing polyurethane dispersions

19 Bayhytherm®, Bayhydur® BL, Baybond®
Crosslinkers for waterborne 1K stoving applications

20 Process of 2k waterborne film formation

21 Bayhydur® family
Hydrophilic-modified polyisocyanates

22 Desmodur® N family
Low viscous polyisocyanates

24 Impranil®
Aqueous PUR dispersions for textile coatings

27 Baybond®
Products for glass fibre sizings

29 Dispercoll® U
PUR dispersions for adhesive applications

30 Dispercoll® C
CR dispersions for adhesive applications

32 Dispercoll® S
Nano SiO_2 dispersions

35 Crosslinking technologies for PU adhesive dispersions

36 Dispercoll®, Desmodur®, Bayhydur®
Crosslinkers for adhesive apllications

37 Legend

38 Fast-lane access to polyurethane innovations

INVENTING **VISIONS** FOR YOU

As your leading partner for polyurethane chemistry, we know you are competing in increasingly challenging environments: Your customers are becoming more and more demanding in their expectations for the quality, durability, sustainability and aesthetics of products. And they have more choices. For you this means that cost pressure is rising – while innovation cycles are becoming faster and faster.

Helping you to turn this challenge into your competitive advantage is the goal that drives our daily work. We call it: INVENTING FOR YOU. But what exactly are the basic values underlying this promise? What principles enable us to improve your productivity, drive sustainability, ensure reliability and co-create future-proof businesses? First and foremost, we are curious. Because only if we listen closely to you and ask the right questions can we respond to your individual needs with new, creative and unexpected solutions that make a real difference to you. That's why inventing for us always starts with thinking about your unmet business challenges. It requires an in-depth understanding of your needs along the whole value chain. To ensure that what we invent stands the test of time. Living up to this aspiration requires more than competencies – it calls for a corporate culture of being courageous. A culture that is defined and lived by dedicated people who cooperate to push the boundaries of invention founded on knowledge and experience. Our courage permeates our entire business – from partnerships to business models. This is also reflected in our colorful business philosophy.

We appreciate partnerships that go beyond traditional black-and-white ways of acting and thinking. An attitude of openness that invites you to co-create new things – enabling you rather than just providing. We are optimistic and resourceful in finding solutions that inspire our customers and partners.

This set of fundamental values adds up to an unrivaled performance orientation to constantly strive for something better, be it through big or small changes. A true sense of business regardless of function. And a deep commitment to delivering our promise every-day. Anywhere. Again and again.

INVENTING FOR YOU.

Aqueous dispersions – an innovative and eco-friendly platform

Pioneering polyurethane chemistry
Ever since the Otto Bayer's discovery of the polyisocyanate poly-addition process in 1937, Bayer – now Covestro – has pioneered poly-urethane chemistry. 50 years ago, Bayer – now Covestro – developed the first applications using polyisocyanates for the coatings and adhesives sectors. We work closely with our customers to systematically advance the state of the art in polyurethane technology. Using market-oriented research and development, we specifically adapt our product portfolio to our customers' increasingly stringent requirements. Together with you, we want to continue our successful journey along this path.

High-performance waterborne portfolio
As one of the leading producers of coating and adhesive raw materials, we offer a comprehensive range of high-grade raw materials for polyurethane coatings and adhesives. The demand for ecological technology is steadily growing and has greatly accelerated the shift away from solvent-borne coatings and adhesives to solvent-free and waterborne systems. With our ecological technology platform we offer a wide variety of aqueous dis-persions for the coatings and adhesives market. Our mission is to provide competitive advantages for our customers: eco-friendly products with superior quality and performance to enable highly efficient coating and bonding processes. We are continuously developing innovative dispersi-ons to complement our range of waterborne products based on a variety of chemistries – polyurethane, polyacrylate, and polyester dispersions.

Depending on your requirements and cost-performance demands, we can offer the most attractive formulation option based on a 1K or 2K system.

Main application areas
The most important areas of application for our waterborne coating raw materials are wood and furniture coatings, metal and plastic coatings for industrial applications, high-grade floor coatings, automotive OEMs, transportation vehicle and refinishing coatings and textile coatings. More-over, we offer specialty products for glass fiber sizes and applications in the paper and printing ink industries.

As a fast-growing and highly promising segment for waterborne coatings technology, UV-curing polyurethane dispersions combine fast curing with excellent coating properties. Firmly established in wood coatings and growing in plastics coatings, we are continuously extending our range to include additional applications.

Our waterborne adhesive raw materials are first choice in heat-activated bonding applications from 3-D film lamination in the furniture industry and heat lamination for car interior trims to bonding footwear. Besides the classical foam bonding market, more and more applications are now emerging for our waterborne contact adhesives.

Why not check out our waterborne product lines: Bayhydrol® and Bayhytherm® for coating applications, Dispercoll® for adhesives appli-cations, Impranil® for textile applications, and Baybond® for glass fiber sizes. In combination with our polyisocyanate crosslinkers Desmodur® and Bayhydur® we offer superior system solutions for 2K or 1K stoving applications.

What we do

As a world-leading polymer and material science company, we inspire innovation and drive growth through profitable products and technologies that benefit society and reduce the impact on the environment.

Who does all this?

It's our people! And the way we work together as one global team following a set of six elementary principles – value creation, sustainability, innovation, focus on people, safety and fair play. This is our formula for success.

What this means for our Coating, Adhesive & Specialty business

Quality & supply security
Our products are of outstanding quality and we offer supply security – worldwide.

Covestro, the world's leading manufacturer of aliphatic and aromatic polyisocyanates, offers an extensive range of raw materials and services for the coatings and adhesives industry. This allows the very latest technology to be used extremely effectively for a variety of applications.

Our global setup enables you to increase your competitive advantage.

What we offer:

- A global network of research & development centers where our staff are dedicated to offering solutions for the coating and adhesive industry.
- A unique setup and worldwide network of state-of-the-art production sites ensuring short lead times and supply chain flexibility.
- Outstanding product quality through fulfilling the requirements of state-of-the-art quality, environmental and safety (HSEQ) as well as energy management standards; we are proud of having enjoyed ISO 9001, ISO 14001, ISO 18001 and ISO 50001 certifications for many years.

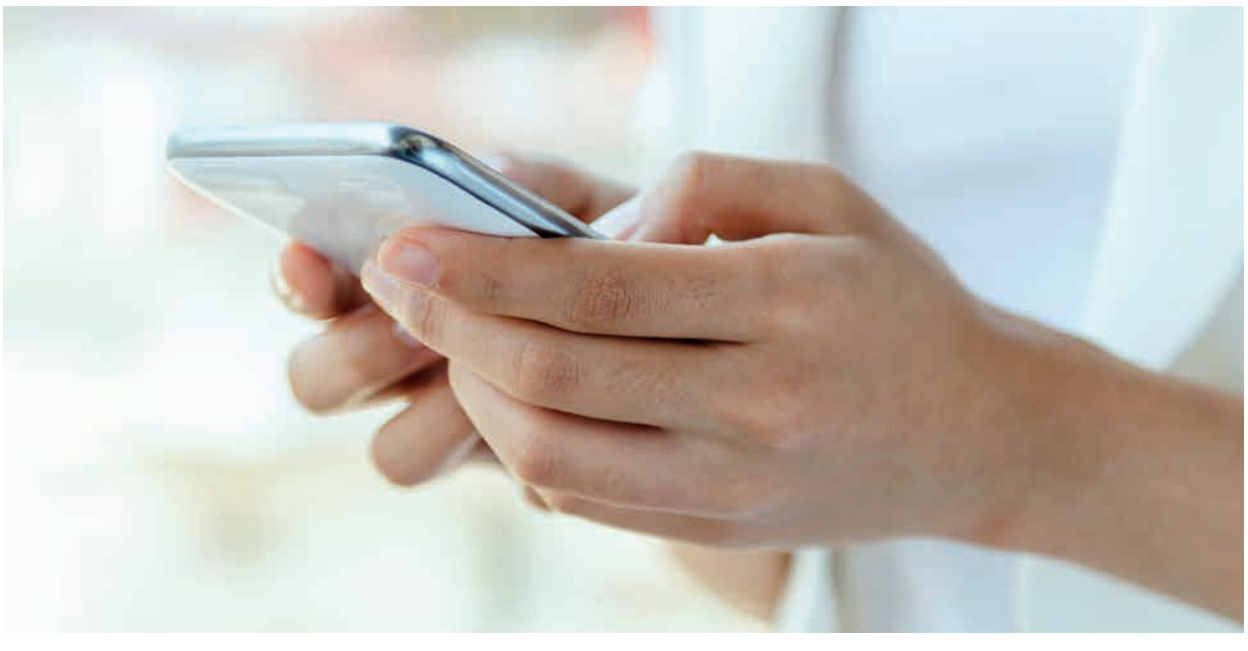
Covestro is your reliable partner for polyurethane chemistry.

Solutions to enhance your process efficiency
Nowadays, the quality demands made on industrial processes are very high. This is equally true of the cost-cutting requirements. However, both goals can be achieved by increasing process efficiency. At Covestro, we have a wide range of solutions designed to enhance your process efficiency. Why not take advantage of our know-how? These solutions will benefit your bottom line.

Sustainability
Sustainability is at the heart of the Covestro strategy. We inspire innovation and drive growth through profitable products and technologies that benefit society and reduce the impact on the environment.

Our coatings, adhesives and specialty products and solutions contribute to sustainability through:

- **Saving energy – fast and smart**
  Polyurethane systems represent a benchmark in productivity and process efficiency in many industries. We strive to further push the limits of efficiency by developing game-changing new solutions.
- **Reducing waste**
  We offer solutions such as innovative 1K technologies that enable our value chain partners to use materials more efficiently and reduce waste.
- **Cutting emissions**
  Bayhydur® and Desmodur® grades are key enablers for low-emission solutions in the coatings and adhesives industries – waterborne and high solids/solvent-free!
- **Responsible management of natural resources**
  Highly durable PU-based coatings and adhesives significantly extend the lifetime of a coated product and thus help to prolong resource use.
- **Closing the loop (circularity)**
  Through economically viable products made from biobased raw materials – with no deterioration in performance – we help our customers and value chain partners to reduce their carbon footprint and offer solutions that incorporate renewable building blocks.



Bayhydrol® A

Building blocks for high-end & low-VOC waterbased coatings systems that match solvent-borne performance.

Aqueous acrylic polyol primary dispersions for waterborne 1K and 2K PUR & 1K PUR stoving systems

	NON-VOLAT. CONTENT APPROX. [%]	NEUTRALIZATION AGENT	OH CONTENT [%] ON SOLIDS	T_g APPROX. [°C]	MFT [°C]	COMMENTS
Bayhydrol® A 2846	40	NH_3	1.5	65	64	Self crosslinking resin for 1K and cost effective 2K coatings, fast drying, good chemical resistance, high hardness and long pot life.
Bayhydrol® A 2427	42	NH_3	2.0	88	> 80	In 1K as well as in 2K formulations, fast drying, good adhesion to plastics.
Bayhydrol® A 2457	41	NH_3	2.5	56	26	Good chemical resistance, outstanding water resistance.
Bayhydrol® A 242	42	NH_3	4.0	29	< 0	Good chemical resistance.
Bayhydrol® A 2546	41	NH_3	4.8	64	18	Outstanding chemical and water resistance, suitable for construction applications and also for fast sanding sealers.
Bayhydrol® A 2865 XP NEW	40	NH_3	-	70		Bayhydrol® A 2865 XP has been developed for combination with semi-crystalline PUR dispersions for adhesive applications.

PES- or PC modified aqueous acrylic polyol secondary dispersions for waterborne 2K PUR & 1K PUR stoving systems

	NON-VOLAT. CONTENT APPROX. [%]	NEUTRALIZATION AGENT	CO-SOLVENT CONTENT [%] IN SUPPLY FORM	OH CONTENT [%] ON SOLIDS	T_g APPROX. [°C]	COMMENTS
Bayhydrol® A 2861	53	DMEA	PnB 1.2	3.5	-27	Mainly for air- and forced-drying coating systems with very high flexibility.
Bayhydrol® A 2139/2	47	DMEA	BG 2.5	3.8	14	Fatty acid modified, high gloss.
Bayhydrol® A 2227/1	42	DMEA	BG 7.0	3.8	29	For topcoats and primers with low co-solvent content (< 5%) and very good overbaking resistance.
Bayhydrol® A 2058	42	DMEA	BG 2.0	4.8	-2	Elastic, good adhesion to plastics, low VOC content.

Bayhydrol® A

Aqueous acrylic polyol secondary dispersions for waterborne 2K PUR & 1K PUR stoving systems

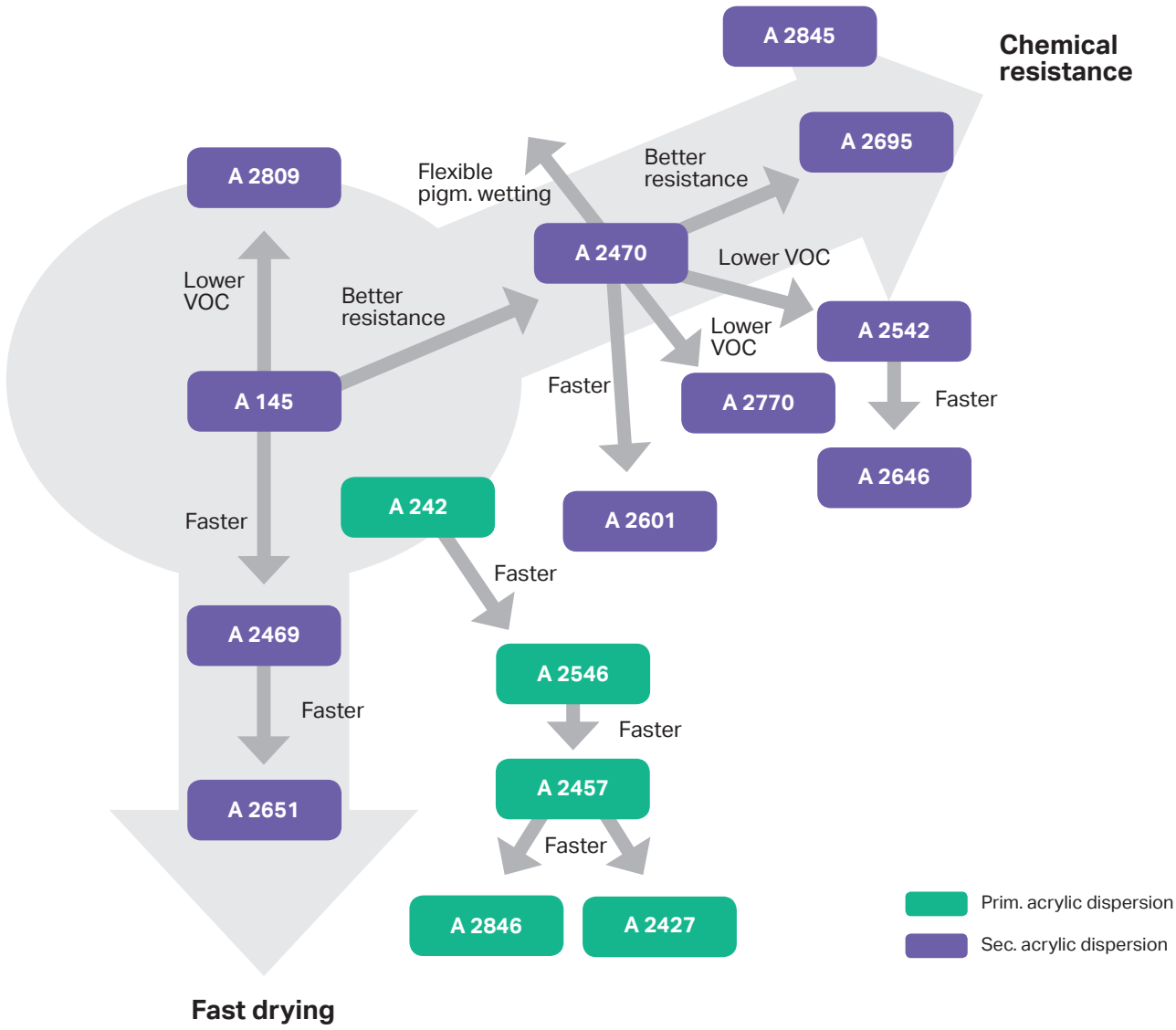
	NON-VOLAT. CONTENT APPROX. [%]	NEUTRALIZATION AGENT	CO-SOLVENT CONTENT [%] IN SUPPLY FORM	OH CONTENT [%] ON SOLIDS	T_g APPROX. [°C]	COMMENTS
Bayhydrol® A 2469	45	DMEA	PnB 7.9	2.5	33	High gloss, cost effective.
Bayhydrol® A 2651	41	DMEA	PnB 3.4	3.0	54	Fast drying, high chemical resistance, excellent grain accentuation ("Anfeuerung") on wood.
Bayhydrol® A 145	45	DMEA	SN 4/BG 4	3.3	36	Suited for high gloss, clear and pigmented topcoats and primers.
Bayhydrol® A 2809	47	DMEA	PnB 2.0	3.3	16	Suitable for high gloss, clear and pigmented topcoats and primers, low VOC. Good adhesion and good levelling properties.
Bayhydrol® A 2542	50	Triethanolamine	PnB 1.1	3.8	17	High gloss, good chemical and mechanical resistance, outstanding water resistance. Not recommendable for spray applications.
Bayhydrol® A 2646	50	Triethanolamine	PnB 1.1	3.8	15	Faster drying version of A 2542 with similar property profile. Not recommendable for spray applications.
Bayhydrol® A 2470	45	DMEA/ Triethanolamine	SN 4/PnB 4	3.9	59	For high-performance clear-/topcoats in various applications, excellent gloss, chemical & weathering resistance.
Bayhydrol® A 2601	45	DMEA/ Triethanolamine	SN 4/PnB 4	3.9	50	High gloss, high chemical resistance, very fast drying & curing, but with long pot life.
Bayhydrol® A 2770	44	DMEA	PnB 3.6	3.9	47	Low VOC version of A 2470, faster drying.
Bayhydrol® A 2845	40	DMEA	PnB 3.2	4.5	31	High gloss, good chemical and weather resistance, low thermoyellowing, low VOC.
Bayhydrol® A 2695	41	DMEA/ Triethanolamine	PnB 7.2	5.0	53	For clear-/topcoats with high hardness, very high chemical and weather resistance, for primers and fillers with excellent corrosion protection properties.

Bayhydrol® A

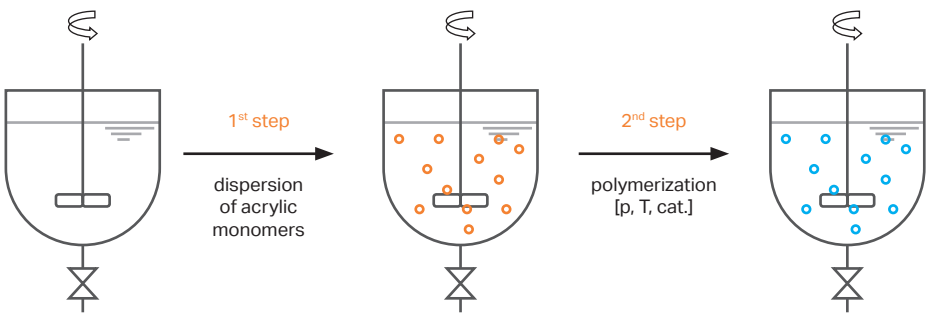
Building blocks for high-end & low-VOC waterbased coatings systems that match solvent-borne performance.

Benefits of Bayhydrol® A types:

- Drying Speed
- Hardness
- Chemical and weather resistance



Manufacturing procedures for acrylic primary dispersions



Advantages

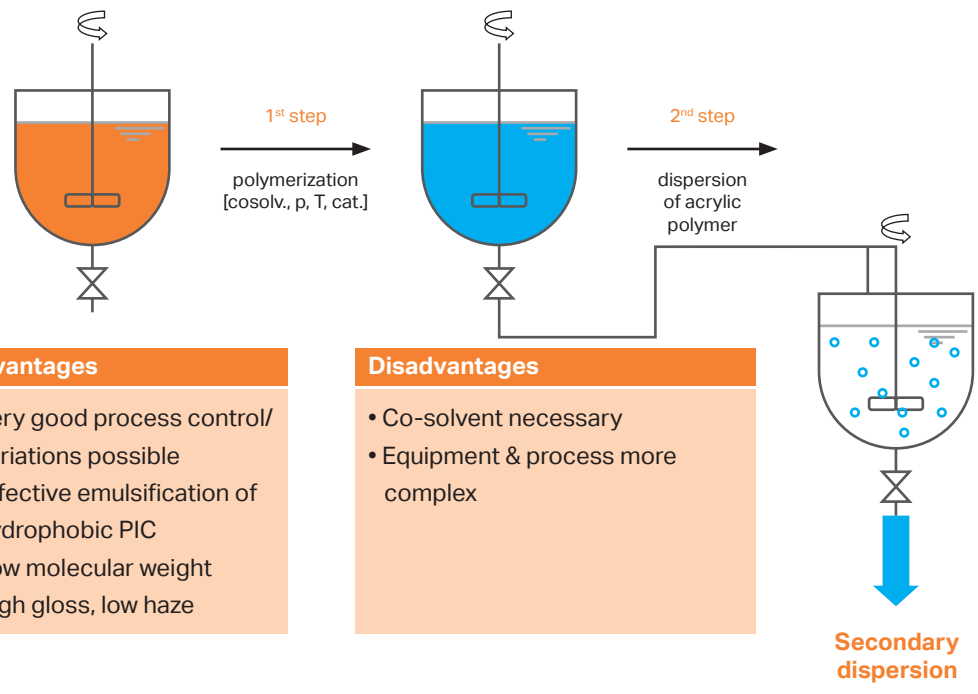
- No co-solvent necessary
- Quick drying properties
- Manufacturing process simple & cheap

Disadvantages

- Little control of polymerization process
- High molecular weight
- In many cases bad levelling
- Low gloss, higher haze

Primary dispersion

Manufacturing procedures for acrylic secondary dispersions



Advantages

- Very good process control/ variations possible
- Effective emulsification of hydrophobic PIC
- Low molecular weight
- High gloss, low haze

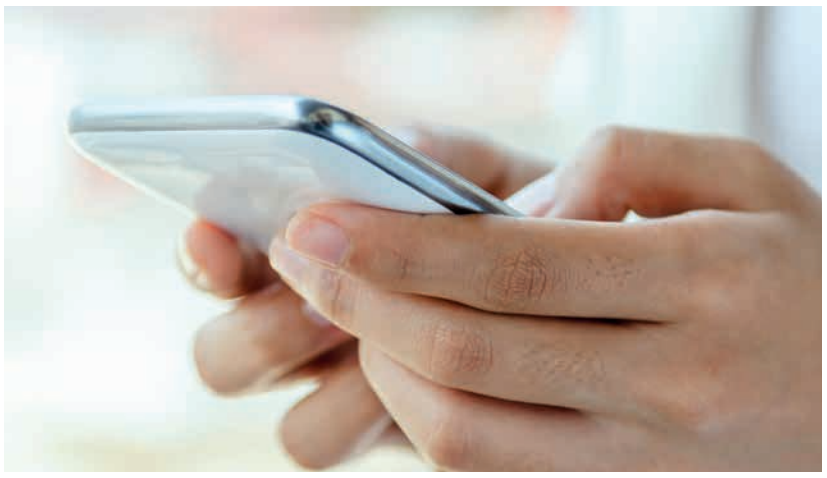
Disadvantages

- Co-solvent necessary
- Equipment & process more complex

Bayhydrol® U

Elastic and durable OH-functional polyurethane dispersions for waterborne 2K coatings & 1K PUR stoving systems.
Bayhydrol® U is manufactured without use of organic co-solvents.

Aqueous polyurethane-polyol dispersions for waterborne 2K & 1K PUR stoving systems	NON-VOLAT. CONTENT APPROX. [%]	NEUTRALIZATION AGENT	OH CONTENT [%] ON SOLIDS	T_g APPROX. [°C]	COMMENTS
Bayhydrol® U XP 2698	52	DMEA	1.5	-40	Pure version of former Bayhydrol® U 355.
Bayhydrol® U XP 2750	41	DMEA	3.6	16	For high gloss, clear and pigmented topcoats and primers, outstanding weather resistance, marked self-healing effect after scratching.
Bayhydrol® U 2757	52	DMEA	1.8	-18	For plastic coatings incl. soft-feel, universal adhesion profile on plastics, good hydrolysis resistance, long pot life. Product also suitable for natural wood appearance.
Bayhydrol® U 2766	37	DMEA	4.0	51	Very high gloss for clearcoats and pigmented topcoats, fast drying, chemical resistance and hardness development, low thermoyellowing.



Bayhydrol® UH

Fast-drying polyurethane dispersions for tough, durable and elastic waterborne coatings. Excellent for 1K formulations. Bayhydrol® UH is manufactured without use of organic co-solvents.

Aqueous high molecular weight polyurethane dispersions for waterborne 1K PUR coatings	NON-VOLAT. CONTENT APPROX. [%]	NEUTRALIZATION AGENT	MFT [°C]	T_g APPROX. [°C]	COMMENTS
Bayhydrol® UH 240	40	Na salt	0	-50	For soft-feel coatings and flexibilization of 1K & 2K industrial coatings.
Bayhydrol® UH 340/1	40	Na salt	0	-45	Highly elastic for the flexibilization of hard PAC and PUR dispersions and 1K industrial coatings. For soft-feel coatings with excellent soft-touch effect.
Bayhydrol® UH 650	50	Na salt	0	-3	Air- and forced-drying basecoats for two-layer plastic coatings, combination resin for soft-feel coatings.
Bayhydrol® UH 2305	50	Na salt	0	-50	Highly elastic dispersion for primers and soft-feel coatings.
Bayhydrol® UH 2660/1	40	Na salt	0	-35	Combination resin for soft-feel coatings, improved stability against hydrolysis, solvents and suntan lotions.
Bayhydrol® UH 2558	37	TEA	24	-60	High hardness and abrasion resistance, tough and elastic, well suited for 2K applications.
Bayhydrol® UH XP 2648	35	TEA	0	-45	For the formulation of water-thinnable 1K- and 2K coatings with broad adhesion profile on different substrates, especially for plastic. Very suitable as flexibilizing co-binder. Well suited for metallic coating systems, fillers and topcoats.
Bayhydrol® UH XP 2719	40	TEA	20	-54	Fast build up of high blocking resistance, good chemical resistance, fast drying, adhesion to aluminum.
Bayhydrol® UH 2606	35	EDIPA	45	-45	Broad adhesion profile, high hardness and toughness, well suited for 2K formulations.
Bayhydrol® UH 2952/1	40	DMEA	0	-40	For metallic basecoats and primers, excellent stability against hydrolysis.
Bayhydrol® UH 2648/1	35	DMEA	0	-45	For the formulation of water-thinnable 1K- and 2K coatings with broad adhesion profile on different substrates, especially for plastic. Very suitable as flexibilizing co-binder. Well suited for metallic coating systems, fillers and topcoats.

Bayhydrol® UH

Fatty acid-modified polyurethane dispersions for waterborne 2K & 1K PUR coatings

	NON-VOLAT. CONTENT APPROX. [%]	NEUTRALIZATION AGENT	MFT [°C]	T_g APPROX. [°C]	COMMENTS
Bayhydrol® UH XP 2592	45	EDIPA	2	30	Oxidative drying. Co-solvent, drier and anti-skin agent not intentionally added. Wood exterior, industrial coatings with low VOC, excellent corrosion protection, primers and high gloss topcoats, crosslinking with e.g. polyisocyanates possible, calculated OH-content: approx. 2% (on solids).
Bayhydrol® UH 2557	35	TEA	38	-8	Self-crosslinking, fatty acid modified, solvent-free alternative to former Bayhydrol® UH 2342, good abrasion resistance, good black-heel mark resistance.
Bayhydrol® UH 2593/1	35	TEA	60	103	Self-crosslinking, fatty acid modified, good black-heel mark resistance and high hardness, improves drying speed as co-binder.

Bayhydrol® UA

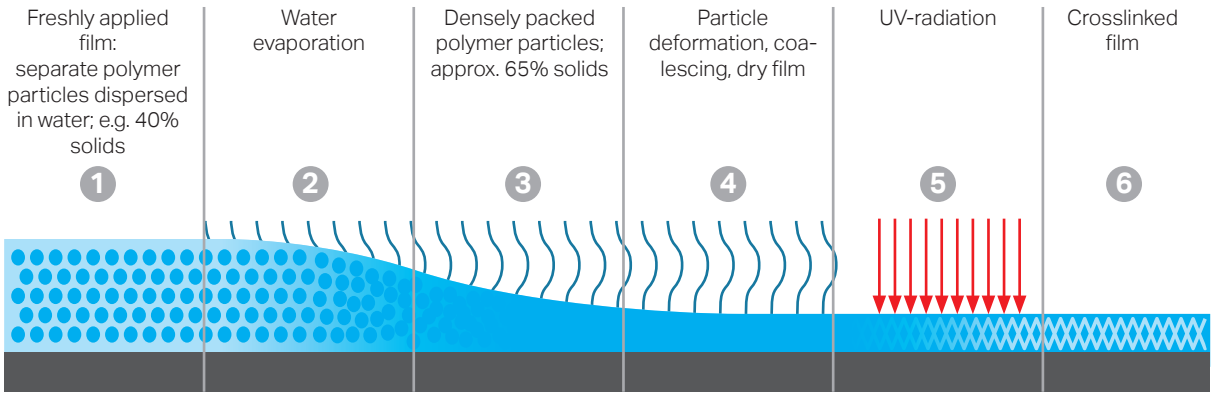
PAC-mod. aqueous high molecular weight polyurethane dispersion

	NON-VOLAT. CONTENT APPROX. [%]	NEUTRALIZATION AGENT	MFT [°C]	T_g APPROX. [°C]	COMMENTS
Bayhydrol® UA 2856 XP	35	DMEA	0	-45	For air- and forced-drying metallic basecoats, highly flexible stone chip primers, good shear stability, less sensitive against co-solvents.

Bayhydrol® UV

Bayhydrol® UV waterborne UV-curing resins

The most promising technology among the various environmentally friendly wood and plastic coating systems are UV-curing PU dispersions, and coatings based on them are growing very fast in the wood market. Their key property is their similarity to conventional PU coatings so that equal performance can be achieved using comparable application methods at similar or faster drying times.



Radiation curing polyurethane dispersions

		NON-VOLAT. CONTENT APPROX. [%]	VISCOSITY AT 23°C APPROX. [mPa · s] D = 40 s^{-1}	T_g APPROX. [°C]	COMMENTS
Bayhydrol® 2282		39	160	-30	High chemical resistance, good grain wetting, physical drying, for all-around use (multicoat), does not contain intentionally added organotin compounds.
Bayhydrol® UV 2317/1	NEW	37	350	-29	High wet-film transparency, good grain wetting, physical drying, does not contain intentionally added organotin compounds.
Bayhydrol® UV UV 2280		39	60	76	Outstanding physical drying, good standard product for pigmented coatings.
Bayhydrol® UV XP 2687		49	400	-15	PUR emulsion. Grain wetting, high solids, good adhesion, especially for clear coats.
Bayhydrol® UV 2689/2	NEW	42	100	-35	Highest crosslinking density, low physical drying, especially for wood and clear coats or single layer metallic coats. High gloss, high chemical resistance and high scratch resistance, does not contain intentionally added organotin compounds.
Bayhydrol® UV 2720/1		40	< 200	-23	Combines physical drying and highest crosslinking density, especially for pigmented systems, thermoformable before UV, does not contain intentionally added organotin compounds.
Bayhydrol® UV XP 2775		40	< 300	32	Excellent chemical and stain resistance, in white pigmented topcoats or matt clearcoats, does not contain intentionally added organotin compounds.
Bayhydrol® UV 2877	NEW	40	90	48	Self crosslinking UV-curing polyurethane dispersion, strong physical drying, shadow curing, fast water release, very good chemical resistance.

Bayhytherm® Bayhydur® BL Baybond®

The key to high coatings performance in 1K stoving applications

Thermally activated waterborne polyurethane crosslinker for 1K waterborne stoving systems

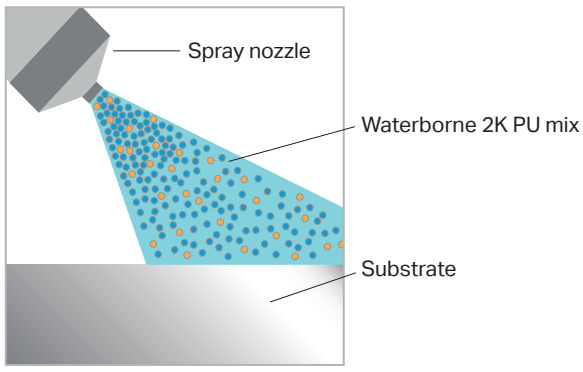
	TYPE	BLOCKING AGENT	SUPPLY FORM APPROX. [%]	VISCOSITY AT 23°C APPROX. [mPa · s]	CALCULATED BLOCKED NCO CONTENT ON SUPPLY FORM/ (RESIN) APPROX. [%]	EQUIVALENT WEIGHT APPROX.	COMMENTS
Bayhydur® BL XP 2706	HDI/IPDI	DMP	40 in water	< 2,500	3.3/(8.2)	1,275	High reactive, good chemical resistance, lowest thermal yellowing, neutralized with DMEA.
Bayhydur® BL 2867 NEW	HDI	DMP	38 in water	< 1,500	5.0/(12.7)	870	High reactive, good chemical resistance, high flexibility and outstanding adhesion.
Bayhydur® BL 5335	H_{12}MDI	MEKO	35 in water/MPA/X	< 200	2.5/(7.1)	1,680	High flexibility, caustic resistance, limited UV stability.
Baybond® XL 6366	HDI	MEKO	45 in water	< 200	4.3/(12.5)	975	High solid content, high flexibility.
Baybond® XL 825	HDI	ε-CAP	30 in water	< 200	3.0/(10.0)	1,400	Low thermal yellowing, improved impact strength, adhesion and flexibility.
Baybond® XL 7270	HDI	ε-CAP	30 in water	< 100	4.2/(13.1)	1,000	Low thermal yellowing, improved impact strength, adhesion and flexibility, food contact acc. to EU 10/2011.
Baybond® XL 3674 XP	HDI	ε-CAP	30 in water	< 200	3.2/(10.7)	1,310	Food contact acc. to EU 10/2011.

Self-crosslinking urethane dispersion for 1K waterborne stoving systems

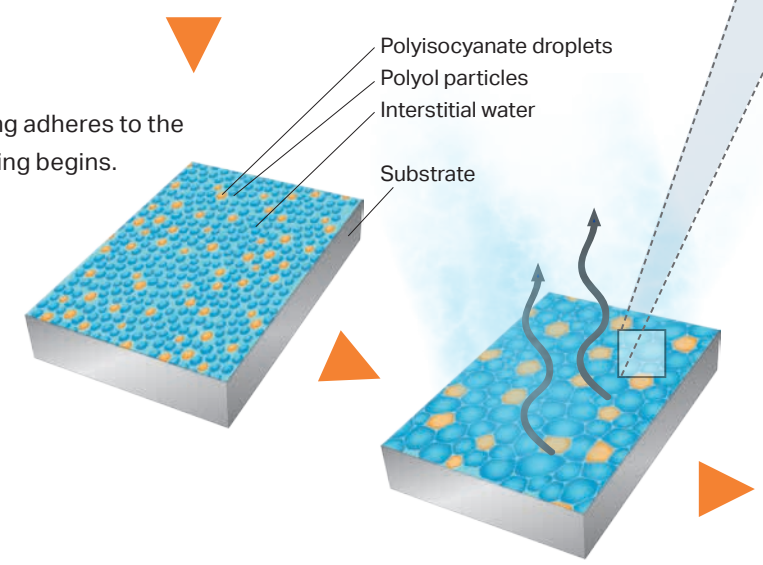
	TYPE	BLOCKING AGENT	SUPPLY FORM APPROX. [%]	VISCOSITY AT 23°C APPROX. [mPa · s]	COMMENTS
Bayhytherm® 3246	HDI	DMP	46 in water/MPA/SN 100	800	For OEM primer surfacers, also for general industrial coatings.

Process of 2K waterborne film formation

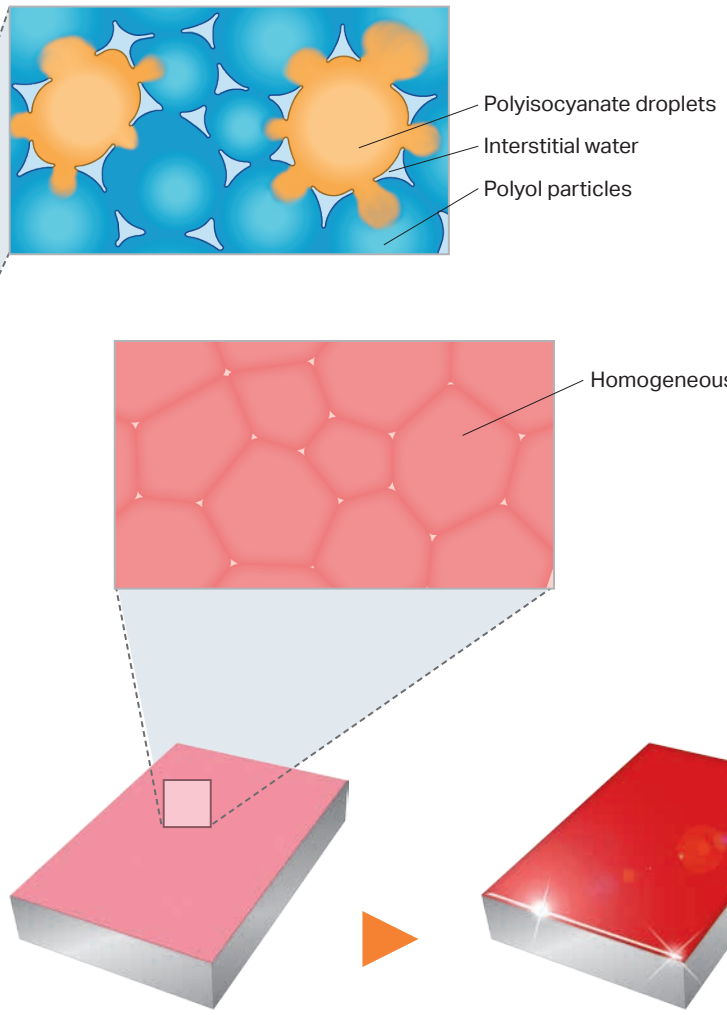
1. The waterborne 2K PU mix, the PIC-in-polyol emulsion, is sprayed on.



2. The wet coating adheres to the substrate, drying begins.



3. Polyol particles and polyisocyanate droplets coalesce and react. The film begins to form. Interstitial water evaporates.



4. A touch-dry film forms. Physical drying is complete, and chemical hardening is well underway.

5. Curing is complete. The result is a top-quality coating.

Bayhydur® family

The key to easy and reliable application of waterborne two-component polyurethane systems.

Hydrophilic-modified polyisocyanates	TYPE	SUPPLY FORM APPROX. [%]	VISCOSITY AT 23°C APPROX. [mPa · s]	NCO CONTENT ON SUPPLY FORM APPROX. [%]	EQUIVALENT WEIGHT APPROX.	FUNCTIONALITY APPROX.	COMMENTS
Bayhydur® 3100	HDI	100	2,800	17.4	240	3.1	Polyether-modified, standard, versatile and economical.
Bayhydur® 304	HDI	100	4,000	18.2	230	3.8	Polyether-modified, versatile use and improved mixing. Excellent water resistance.
Bayhydur® 305	HDI	100	6,500	16.2	260	4.0	Polyether-modified, easiest mixing and high gloss.
Bayhydur® XP 2451/1	HDI	100	800	20.3	205	3.0	Polyether-modified, low viscosity, suitable for pure waterbased formulations, indoor-air-quality-compliant.
Bayhydur® XP 2487/1	HDI	100	5,400	20.6	205	3.4	Ionically modified (sulfonic acid), highest chemical resistance.
Bayhydur® XP 2547	HDI	100	650	22.5	185	3.0	Ionically modified (sulfonic acid), highest chemical resistance, low viscosity, suitable for pure waterbased formulations.
Bayhydur® XP 2655	HDI	100	3,500	20.8	205	3.2	Ionically modified (sulfonic acid), highest chemical resistance, easy mixing.
Bayhydur® XP 2700	HDI	65 in PGDME	75	10.6	400	4.0	Ready to use hardener based on Bayhydur® 305, easiest mixing and high gloss.
Bayhydur® 2858 XP NEW	HDI/IPDI	70 in PGDA	500	13.3	315	3.4	Ionically modified (sulfonic acid) ready to use hardener, fast drying, easy mixing, high chemical resistance and long pot life.
Bayhydur® 401-70	IPDI	70 in MPA/X	600	9.4	440	2.9	Polyether-modified, standard, fast drying, good chemical resistance.
Bayhydur® 401-60 PGDA NEW	IPDI	60 in PGDA	1,150	8.0	525	2.9	Supply form of Bayhydur® 401-70 without aromatic solvents.
Bayhydur® XP 2759	IPDI	70 in MPA	6,500	11.0	380	3.1	Ionically modified (sulfonic acid), fast drying, easy mixing, high chemical resistance.

Desmodur® N family

Best in class: lowest viscosity polyisocyanate crosslinkers.

Low viscous polyisocyanates

	TYPE	SUPPLY FORM APPROX. [%]	VISCOSITY AT 23°C APPROX. [mPa · s]	NCO CONTENT ON SUPPLY FORM APPROX. [%]	EQUIVALENT WEIGHT APPROX.	FUNCTIONALITY APPROX.	COMMENTS
Desmodur® N 3400	HDI uretdione	100	150	21.8	195	2.5	Extremely low-viscosity crosslinker for waterborne and solvent-borne 2K PUR coatings, also for moisture-curing 1K PUR systems, for topcoats in many construction applications.
Desmodur® N 3600	HDI trimer	100	1,200	23.0	185	3.2	Low-viscosity crosslinker for lightfast 2K PUR coatings (high solids/waterborne, e.g., in combination with Bayhydur® types) for automotive refinish, automotive OEM and industrial applications, also for structural coatings and topcoats, recommendable for aliphatic cast systems.
Desmodur® N 3900	HDI trimer	100	730	23.5	180	3.2	Low-viscosity crosslinker for lightfast 2K PUR coatings (high solids/waterborne, e.g., in combination with Bayhydur® types) for automotive refinish, automotive OEM, transportation and plastics finishing applications, recommendable for aliphatic cast systems.
Desmodur® XP 2565	IPDI allophanate	80 in BA	2,800	12.0	350	2.5	Crosslinker for weatherstable, fast-drying high solids and waterborne 2K PUR coatings, e.g., in combination with Bayhydur® types, for automotive refinish and transportation applications.
Desmodur® XP 2860 NEW	HDI allophanate	100	500	20.0	215	2.5	Flexible, low-viscosity crosslinker for weather-stable high solids and waterborne 2K PUR coatings (e.g., in combination with Bayhydur® or Desmodur® types), especially for industrial, automotive refinishing, transportation and plastic coatings, recommendable for flexible aliphatic cast systems.
Desmodur® 2840	HDI uretdione/trimer	100	500	23.0	185	3.0	Low-viscosity crosslinker for waterborne and solvent-borne 2K PUR coatings, also for moisture-curing 1K PUR systems.

Flexibilizing polyisocyanates

	TYPE	SUPPLY FORM APPROX. [%]	VISCOSITY AT 23°C APPROX. [mPa · s]	NCO CONTENT ON SUPPLY FORM APPROX. [%]	EQUIVALENT WEIGHT APPROX.	FUNCTIONALITY APPROX.	COMMENTS
Desmodur® N 3800	HDI trimer	100	6,000	11.0	380	3.8	For highly elastic coatings with excellent weather resistance, combination with suitable polyisocyanates allows adjustments of the elasticity using the same polyol mill base, specially suitable for plastic coatings systems, for topcoats in many construction applications.

Impranil®

Waterborne, anionic/nonionic aliphatic and aromatic polyurethane dispersions for coating textiles, solvent-free and environment-friendly. Suitable for all common textile coating processes in the fields of sports, clothing, fashion articles, technical items, and general protective equipment.

Aqueous PUR dispersions for textile coatings	TYPE	NON-VOLAT. CONTENT APPROX. [%]	LIGHT-FASTNESS DIN 75202	RESISTANCE TO HYDROLYSIS	100% MODULUS DIN 53504 [MPa]	TENSILE STRENGTH DIN 53504 [MPa]	ELONGATION AT BREAK DIN 53504 [%]	MELTING RANGE [°C]	COMMENTS
Impranil® DLP-R	Polyester	50	7	+	1.3	10	1,600	200–220	Very soft product with good adhesion to different substrates; mainly used as tie-coat.
Impranil® DLN-SD	Polyester	40	7	0	2.0	35	1,500	175–200	Soft, dry hand; good washing resistance when crosslinked; good film forming; excellent composting behavior.
Impranil® DLN W 50	Polyester	50	7	0	2.0	35	1,500	175–200	Soft, dry hand; good washing resistance when crosslinked; good film forming; excellent composting behaivior and suitable for mechanical foaming.
Impranil® DLS	Polyester	50	7	0	2.5	30	1,000	170–180	High flexibility, suitable for mechanical foaming.
Impranil® DLV/1	Polyether/ Polycarbonate	40	7	++	2.0	25	1,200	200–220	Very good resistance to hydrolysis; crosslinkable; good alcohol resistance; dry and skin-like touch; excellent washing resistance.
Impranil® DLU	Polyether/ Polycarbonate	60	7	++	2.0	30	900	200–230	High solids content, outstanding resistance to hydrolysis, excellent mechanical foaming, high scratch resistance.
Impranil® DLH	Polyester	40	7	0/+	5.0	50	1,100	165–175	Low melting point; high flexibility; high lightfastness.
Impranil® DLC-F	Polycarbonate	40	7	++	5.0	50	600	215–225	Excellent resistance to hydrolysis, good resistance to ageing, high scratch resistance and alcohol resistance.
Impranil® DL 2611/ 2611/1	Polyester	40	7	+	13	40	400	200–220	Dry hand and transparent finish with good hydrolysis and abrasion resistance.

0 = moderate + = good
0/+ = satisfactory ++ = excellent

Impranil®

Aqueous PUR dispersions for textile coatings	TYPE	NON-VOLAT. CONTENT APPROX. [%]	LIGHT-FASTNESS DIN 75202	RESISTANCE TO HYDROLYSIS	100% MODULUS DIN 53504 [MPa]	TENSILE STRENGTH DIN 53504 [MPa]	ELONGATION AT BREAK DIN 53504 [%]	MELTING RANGE [°C]	COMMENTS
Impranil® DL 1554	Polyester	60	7	0	2.5	26	1,000	200–220	High flexibility; excellent mechanical foaming; high solids content.
Impranil® DL 1537	Polyester	60	7	+	1.3	15	1,200	200–210	Good resistance to hydrolysis, good adhesion, high solids content, soft handle. Perfectly suited for direct coating to apply high dry add-on in one coat.
Impranil® DL 3040	Polyester	40	7	0	2.0	40	1,200	175–200	Flexible, semi-crystalline, dry, tough.
Impranil® XP 2772	Polyester	40	7	0	2.0	40	1,600	175–200	Semi-crystalline, good alcohol resistance, good elongation, works perfectly in combination with SBR latex for glove coating to increase washing resistance and cut resistance.
Impranil® DLE	Polyether	50	7	+	1.5	25	1,600	215–225	Very elastic, good wet adhesion and outstanding washing resistance after crosslinking, good flex resistance.
Impranil® DLC-T NEW	Polyester/ Polycarbonate	35	7	++	5.0	6	400	150–160	Good printability, good hydrolysis resistance after crosslinking, gives matt finish on different substrates such as PVC, PU, TPU or TPO.
Impranil® DL 519	Polyester	40	7	0	9.0	40	500	180–200	Finish for synthetics; flexible, dry touch, alcohol resistance.
Impranil® DL 1069	Polyether	50	7	+	2.0	20	1,200	220–240	High elasticity, good abrasion resistance; good flex resistance.
Impranil® DL 2077	Polycarbonate	35	7	++	25.0	25–30	150–200	220–230	Very hard, excellent hydrolysis resistance.
Impranil® DAH	Polyether	35	4	+	2.0	10	700	150–170	Soft aromatic tie coat with very good adhesion to various substrates.

0 = moderate + = good
0/+ = satisfactory ++ = excellent

Impranil®

Aqueous PUR dispersions for textile coatings

	TYPE	NON-VOLAT. CONTENT APPROX. [%]	LIGHT-FASTNESS DIN 75202	RESISTANCE TO HYDROLYSIS	100% MODULUS DIN 53504 [MPa]	TENSILE STRENGTH DIN 53504 [MPa]	ELONGATION AT BREAK DIN 53504 [%]	MELTING RANGE [°C]	COMMENTS
Impranil® DL 1380	Polyester	60	7	0	1.4	25	1,400	210–220	Very soft and comfortable haptic feeling; excellent film building ability; good adhesion on conventional fabrics such as cotton, polyester etc.; suitable for mechanical foaming, high solids content.
Impranil® DAA	Polyether	40	3	+	0.5	1	> 3,000	140–160	Very soft aromatic PUD for dry lamination.
Impranil® CIL NEW	Polyester	55	7	0	1.4	25	1,500	210–220	Perfectly usable for direct coating to produce a base and nubuk material.
Impranil® DLI NEW	Polyester	50	7	0	2	37	1,300	190–200	Nonionic, high flexibility, suitable for mechanical foaming.
Impranil® DL 1016 NEW	Polyester	50	7	+	2.5	30	1,600	170–180	Improved hydrolysis resistance, high flexibility, suitable for mechanical foaming.
Impranil® DL 1116 NEW	Polyether	60	7	+	1.4	25	1,500	210–220	Improved hydrolysis resistance, very soft and comfortable haptic feeling; excellent film building ability; good adhesion on conv. fabrics such as cotton, polyester etc.; suitable for mech. foaming and textile printing, high solids content.

0 = moderate + = good
0/+ = satisfactory ++ = excellent

Baybond®

Generally used in manufacturing glass fiber sizes, Baybond® grades display good compatibility with silanes and the following additives: adhesion promoters, slip agents, antistatic agents and flexibilizers.

Products for glass fiber sizings

	TYPE	HYDROPHILIC CHARACTER	SOLIDS APPROX. [%]	pH-VALUE APPROX.	HYDROLYTIC RESISTANCE	100% MODULUS, [N/mm²]	TENSILE STRENGTH, [N/mm²]	ELONGATION AT BREAK [%]	THERMOSTABILITY	T_g [°C]
Baybond® PU 406	Polyether	Nonionic	34	6.5	+++	3.7	20	700	++	-72
Baybond® PU 7269	Polyether	Ionic/nonionic	30	8.5	+++	1.0	4	700	++	-62
Baybond® XP 2728	Polycabonate-polyether	Ionic/nonionic	59	8.0	++++	3.1	25	900	+++	-69
Baybond® PU 330	Polyester	Ionic/nonionic	30	7.3	+	0.5	1	2,000	+	-56
Baybond® PU 401-A	Polyester	Ionic/nonionic	50	7.5	++	3.0	51	1,200	++	-51
Baybond® PU 407	Polyester	Ionic/nonionic	40	7.0	++	2.7	40	1,200	++	-46
Baybond® PU 409 XP	Polyester	Ionic/nonionic	50	7.5	++	2.0	10	1,000	+++	-48
Baybond® PU 411	Polyester	Ionic/nonionic	40	7.0	++	3.0	20	1,000	++++	-46
Baybond® VP LS 2777	Polyester	Ionic/nonionic	40	7.5	++	2.1	28	1,250	++	-49

+ = average ++ = good +++ = very good ++++ = excellent

Thermally activated PUR dispersions for glass fiber sizings

	TYPE	HYDROPHILIC CHARACTER	BLOCKING AGENT	SOLIDS APPROX. [%]	pH-VALUE APPROX.	DEBLOCKING TEMPERATURE [°C]
Baybond® PU 405	Polyether	Ionic/nonionic	Ε-CAP	30	7.0	170°C
Baybond® PU 403	Polyester	Ionic/nonionic	MEKO	39	7.0	150°C

Baybond®

Thermally activated crosslinkers for glass fiber sizings

	TYPE	HYDROPHILIC CHARACTER	BLOCKING AGENT	SOLIDS APPROX. [%]	pH-VALUE APPROX.	DEBLOCKING TEMPERATURE [°C]
Baybond® XL 825	HDI	Ionic/nonionic	Ε-CAP	30	7.0	170°C
Baybond® XL 6366 XP	HDI	Ionic/nonionic	MEKO	45	8.0	150°C

PUR dispersions for glass fiber sizings compliant to 2011/10/EU for food contact

FOOD CONTACT

	TYPE	HYDROPHILIC CHARACTER	SOLIDS APPROX. [%]	pH-VALUE APPROX.	HYDROLYTIC RESISTANCE	100% MODULUS, [N/mm²]	TENSILE STRENGHT, [N/mm²]	ELONGATION AT BREAK [%]	THERMOSTABILITY	T_g [°C]
Baybond® PU 404 XP	Polyester	Nonionic	50	7.0	++	2.1	37	1,300	++	-49
Baybond® PU 571 XP	Polyether	Nonionic	34	6.5	+++	3.7	20	700	++	-72
Baybond® PU 1810/1	Polyester	Nonionic	50	6.0	+++	2.2	26	1,000	++	-47

+ = average ++ = good +++ = very good ++++ = excellent

Thermally activated PUR crosslinkers for glass fiber sizings compliant to 2011/10/EU for food contact

FOOD CONTACT

	TYPE	HYDROPHILIC CHARACTER	BLOCKING AGENT	SOLIDS APPROX. [%]	pH-VALUE APPROX.	DEBLOCKING TEMPERATURE [°C]
Baybond® XL 7270	HDI	Ionic/nonionic	Ε-CAP	30	7.7	170°C
Baybond® XL 3674 XP	HDI	Ionic/nonionic	Ε-CAP	30	9.0	170°C

Dispercoll® U

Aqueous, anionic dispersions of high molecular weight polyurethanes. Dispercoll® U grades are especially suitable for the manufacturing of heat-activated adhesives with outstanding bonding properties on most synthetic and natural materials.

PUR dispersions for adhesive applications

	NON-VOLAT. CONTENT APPROX. [%]	VISCOSITY [mPa · s]	CRYSTALLIZATION TENDENCY	RECOMMENDED BONDLINE TEMP. [°C]	COMMENTS
Dispercoll® U 8755	45	< 1,000	++	80–100	Especially suitable for heat activation above 80°C, gives high heat resistance also when used without crosslinker.
Dispercoll® U 2849 XP	50	< 2,000	-	80–100	Suitable for adhesive applications with improved climate resistance.
Dispercoll® U 42	50	150–800	--	80–100	Soft and flexible polymer film, especially suitable for wet-bonding of textile substrates, suitable for lamination of packaging films.
Dispercoll® U XP 2710	45	< 1,000	+	65–75	Especially suitable for heat activation bonding applications with high initial heat resistance, e.g., footwear sole bonding, high shear stability.
Dispercoll® U XP 2612	50	50–800	+	65–75	Especially suitable for heat activation bonding applications with high initial heat resistance, e.g., for footwear sole bonding.
Dispercoll® U 53	40	50–600	++	60–70	Raw material for the formulation of heat-activated adhesives for use in, for example, the furniture and automotive industries.
Dispercoll® U 54	50	40–600	+	60–70	Raw material for the formulation of heat-activated adhesives for use in, for example, the furniture, automotive and especially the footwear industries.
Dispercoll® U 56	50	50–900	+	55–65	Especially suitable for bonding at low heat activation temperatures in the furniture and automotive industries.
Dispercoll® U XP 2702	47	< 1,000	+	55–65	Especially suitable for latent-reactive adhesives in conjunction with deactivated aliphatic isocyanates.
Dispercoll® U 58 NEW	50	50–800	+	50–70	Especially suitable for heat activation bonding applications with high initial heat resistance, e.g., footwear sole bonding, good tack properties.
Dispercoll® U 2824 XP	40	50–400	+	50–60	Suitable for heat activation bonding at low temperature, i.e. packaging lamination, polymer contains carboxyl groups that can be crosslinked with polycarbodiimide crosslinker.
Dispercoll® U XP 2682	50	< 1,000	0	50–60	Lower molecular weight crystallizing polyurethane dispersion, especially suitable for applications at low heat activation temperatures in the furniture and automotive industries and for packaging lamination, good wetting properties due to low melt viscosity.
Dispercoll® U 2815 XP	35	< 1,000	-	> RT	Slowly crystallizing polyurethane dispersion, especially suitable for contact bonding at low to moderate temperatures or even at room temperature.
Dispercoll® U XP 2643	40	< 1,000	--	> RT	Especially suitable for bonds at low to moderate temperatures, even at room temperature, polymer contains carboxyl groups that can be crosslinked with polycarbodiimide crosslinker, suitable for packaging film lamination.

++ = very fast + = fast o = medium - = low -- = non crystallizing

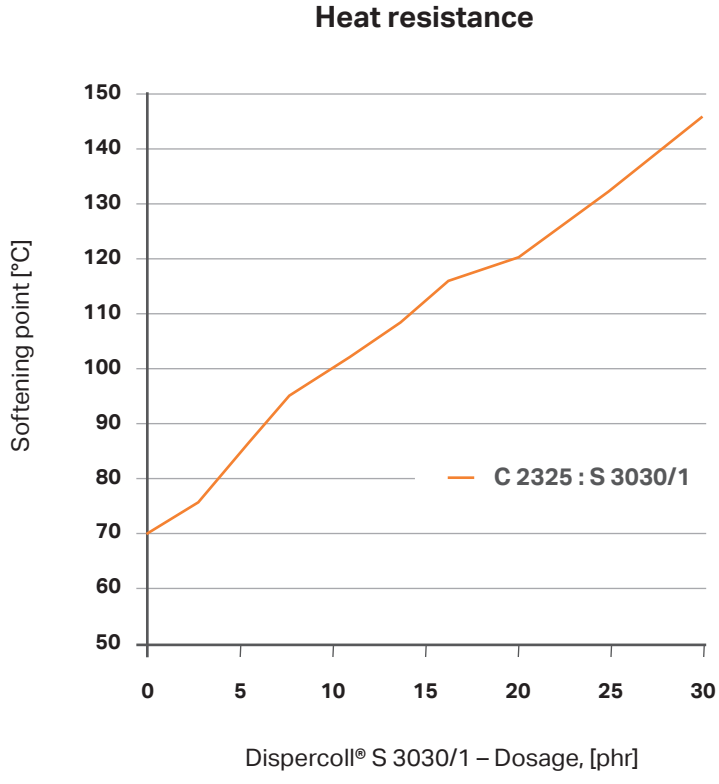
Dispercoll® C

Aqueous anionic dispersions of a 2-chlorobutadiene polymer with varying crystallization tendency. Dispercoll® C dispersions are suitable for the formulation of aqueous contact adhesives. Dispercoll® C adhesives can be used to substitute solvent-borne contact adhesives in a wide range of applications with no loss of performance, while at the same time bringing great improvements with respect to environmental, handling and workplace safety issues.

CR dispersions for adhesive applications	NON-VOLAT. CONTENT APPROX. [%]	pH VALUE APPROX.	CRYSTALLIZATION	GEL CONTENT	COMMENTS
Dispercoll® C 84	55	13	Very fast	Very low	Fast bond formation, good contactability and high bond strength.
Dispercoll® C XP 2694	28	9	Very fast	Very low	Immediate tack if sprayed to foam or textiles, Dispercoll® C XP 2694 is typically used for the production of sprayable foam adhesives.
Dispercoll® C 2325	55	12	Fast	Medium-low	Fast bond formation, good contactibility and high bond strength, good heat resistance in formulations with Dispercoll® S and high crosslinking density with isocyanate crosslinker, excellent storage stability.
Dispercoll® C 74	58	13	Medium	Medium	Good heat resistance and long open time.
Dispercoll® C VP LS 2372/1	58	13	Very slow	Medium-low	Good contactibility and good wet tack, good adhesion to unpolar substrates, high crosslinking density with isocyanate crosslinker, Dispercoll® C VP LS 2372/1 is typically used as blend component to improve wet tack, excellent storage stability.

Dispercoll® C
Dispercoll® S

Heat resistance



Excellent heat resistance of formulations with Dispercoll® C 2325 and Dispercoll® S 3030/1

Dispercoll® S

Nano SiO_2 dispersions with small particle size. Formulated with a Dispercoll® C grade in combination with ZnO, the Dispercoll® S grades can act as thickener. For improved drying behavior and initial tack the grades with high solids content should be preferred. The effect on rheology, HCl stability as well as reinforcing effect and heat resistance is higher with low particle size Dispercoll® S. Dispercoll® S can also be used as an additive for other polymer dispersions such as Dispercoll® U.

Nano SiO_2 dispersions as additives for Dispercoll® C and other polymer dispersions	pH VALUE APPROX.	NON-VOLAT. CONTENT APPROX. [%]	PARTICLE SIZE [nm]	SPEC. SURFACE [m^2/g]	DENSITY [g/cm^3]	EFFECT ON REINFORCEMENT	EFFECT ON RHEOLOGY	COMMENTS
Dispercoll® S 5005	9	50	55	50	1,390	o	o	For Dispercoll® C contact adhesives for flexible substrates such as leather and textiles.
Dispercoll® S 4510	10	45	30	100	1,340	o	o	
Dispercoll® S 2020 XP	3	20	15	200	1,130	++	+	For 1K sprayable adhesives with low pH.
Dispercoll® S 4020	10	40	15	200	1,295	++	++	For Dispercoll® C contact adhesives with high strength and heat resistance.
Dispercoll® S 3030/1 NEW	11	30	8	350	1,208	+++	+++	

o = low + = medium ++ = high +++ = very high

Crosslinking technologies for PU adhesive dispersions

Bonding technologies	Waterborne 2K technology	Latent reactive 1K technology (waterborne)	1K Crosslinking with carbodiimide (waterborne)
Crosslinker	Hydrophilic modified polyisocyanate (e.g. Desmodur® DN)	Surface-deactivated solid polyiso-cyanate (e.g. Dispercoll® BL XP 2514)	Hydrophilic modified polycarbodiimide (Desmodur® XP 2802)
Processing	2-component	1-component	1-component
Potlife of mixture	6 to 8 hours	3 to 6 months	3 to 6 months
Open time of dried adhesive layer	6 to 8 hours	> 6 months	< 1 hour
Curing speed	Hours to days	Hours to days	Minutes to hours

Dispercoll®
Desmodur®
Bayhydur®

Crosslinkers for adhesives applications.

Crosslinkers for latent reactive polyurethane adhesives

	TYPE	NON-VOLAT. CONTENT [%]	T_g [°C]	NCO CONTENT APPROX. [%]	COMMENTS
Dispercoll® BL XP 2514	Aqueous TDI-dimer suspension	40 in water		9.0	Crosslinker suspension for latent-reactive PUD.
Desmodur® Z 2589	Micronized IPDI-isocyanurate	100	65	17.0	IPDI-trimer powder for preparation of crosslinker-suspensions for latent-reactive PUD.

Crosslinkers for adhesive dispersions

	TYPE	NON-VOLAT. CONTENT [%]	VISCOSITY AT 23°C APPROX. [mPa · s]	NCO CONTENT APPROX. [%]	COMMENTS
Desmodur® DN	Hydrophilic modified isocyanate	100	1,250	21.8	Low hydrophilicity.
Desmodur® DA-L	Hydrophilic modified isocyanate	100	3,000	20.0	Low hydrophilicity.
Bayhydur® 3100	Hydrophilic modified isocyanate	100	2,800	17.4	High hydrophilicity, in compliance with U.S. FDA's guideline "Title 21 CFR:" Section 175.105 "Adhesives".
Bayhydur® 304	Hydrophilic modified isocyanate	100	4,000	18.2	High hydrophilicity, in compliance with U.S. FDA's guideline "Title 21 CFR:" Section 175.105 "Adhesives".
Desmodur® XP 2802	Aqueous dispersion of hydrophilic polycarbodiimide	40 in water	30	approx. 1 mmol –N = C = N –/g	Crosslinker for carboxylate functionalized dispersions, suitable for 2K formulations with long pot life.

Crosslinker for CR dispersions

	TYPE	NON-VOLAT. CONTENT [%]	VISCOSITY AT 23°C APPROX. [mPa · s]	NCO CONTENT APPROX. [%]	COMMENTS
Bayhydur® 401-70	IPDI-based hydrophilic polyisocyanate	70 in MPA/X	600	9.4	Used in CR-dispersion formulations, yields a high chemical crosslinking density to achieve excellent heat resistance, featuring very long pot life even at high pH, excellent storage stability.

Legend

Solvents

AMP	Aminomethyl propanol
BA	Butyl acetate
BDG	Butyl diglycol
BG	Butyl glycol
DPGDA	Dipropylen glycol diacetate
EA	Ethyl acetate
IB	Isobutanol
MPA	Methoxypropylacetate
MPA/X	Methoxypropylacetate/Xylene
PGDME	Dipropylenglycol dimethyl ether
PGDA	Propylene glycol diacetate
PnB	Propylenglycol-n-bulylether
SN	Solvent naphtha
X	Xylene

Neutralization agents

DMEA	Dimethyl ethanol amine
EPIDA	Ethyl diisopropyl amine
NH_3	Ammonia
TEA	Triethyl amine

Isocyanates

HDI	Hexamethylene diisocyanate
IPDI	Isophorone diisocyanate
$H_{12}MDI$	Dicyclohexylmethane diisocyanate

Dispersions

PAC	Polyacrylate
PES	Polyester
PUR	Polyurethane

Blocking agents

DMP	Dimethylpyrazol
MEKO	Methyl ethyl ketoxime
ε-CAP	Caprolactam

Fast-lane access to polyurethane innovations

At Covestro, innovation is in our DNA. Ever since Otto Bayer discovered polyurethanes in 1937, we have been driving polyurethane innovations in coatings and adhesives as well as in other application areas. As our partner, you enjoy fast-lane access to polyurethane innovations, and can help us in developing the next generation of polyurethanes to meet the industry's upcoming challenges and needs. What can we offer you?

- Powerful know-how on both established and new polyisocyanates, as well as on new polyurethane hybrid technologies.
- The prospect of new application technologies to enable efficient processes.
- More sustainable, biomass- or CO_2-based materials that do not sacrifice high performance.

Join us to shape the future!

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