

QUALITY PERFORMS.

Polyurethane Dispersions

for coatings, adhesives and sealants

X Witcobond®
— PU Dispersions

QUALITY WORKS.

LANXESS
Energizing Chemistry

LANXESS IS A GLOBAL SUPPLIER OF HIGH PERFORMANCE WATER-BASED POLYURETHANE DISPERSIONS FOR COATINGS, ADHESIVES AND SEALANTS

Industry demand for sustainable coatings and adhesive solutions has initiated a shift from solvent-borne towards water-based systems over past decades. More than 40 years ago LANXESS developed **Witcobond®** polyurethane dispersions (PUD) to offer a system, not only allowing customers to comply with increasingly demanding regulations on volatile organic content (VOC), but also to develop high performance and high solids products to bring solutions to specific application needs.

Our portfolio is complemented by our blocking technology, offering fully reacted polyurethane dispersions combined with our blocked systems for 1K and 2K stoving applications.

Benefits of Witcobond® PUD

- Balanced portfolio with strong performance in high solids grades
- Water-based blocked crosslinkers for 1K and 2K stoving systems
- More than 40 years of experience and ability to customize for applications
- High quality and batch to batch consistency



PROVIDING A RANGE OF SOLUTIONS TO SATISFY REQUIRED LEVELS OF PERFORMANCE AND DURABILITY

Formulators of water-based coating systems can choose from our broad range of **Witcobond®** polyurethane dispersions. LANXESS offer ester and ether types as well as anionic, nonionic and cationic grades. We can help to deliver variations in final coating properties, such as hardness, flexibility, toughness and chemical resistance.

Key Features

- Solids contents varying from 30% to 60% w/w
- Co-solvent and surfactant-free grades available for optimizing HS&E requirements
- Tailored grades for specific coating needs (e.g. matt surfaces or soft touch)
- Compatibility with a wide range of aqueous co-binders, such as acrylic dispersions
- Compoundable with pigments, matting agents, flame retardants and other auxiliaries



WITCOBOND® POLYURETHANE DISPERSIONS CAN BE USED IN WATER-BASED COATINGS WITH OR WITHOUT CROSSLINKERS

Witcobond® polyurethane dispersions can be crosslinked with various agents to further improve chemical resistance, coating adhesion, and robustness. Our **Trixene® Aqua** range includes water-dispersed latent crosslinkers and adhesion promoters to formulate 1K or 2K stoving systems. When heated these multifunctional blocked isocyanates start crosslinking with complementary functional groups in the coating and substrate.



WITCOBOND® POLYURETHANE DISPERSIONS TARGET SPECIFIC NEEDS OF DEMANDING APPLICATIONS

Fiber sizing and composites

LANXESS' polyurethane dispersions are widely used in the fiber sizing industry, and can be tailored for new requirements. They offer superior bonding of filaments in fiber and composite processing, and outstanding physical properties in end applications.

Witcobond® 374-13 is a polyester-based polyurethane dispersion that is commonly used as the film former in glass sizing recipes. It confers excellent integrity for chopped strand production and good adhesion with various thermoplastic and thermosetting matrices.

Adhesion between matrix and fiber can be further improved by using blocked isocyanate technology. Special polyurethane dispersions can be manufactured with blocking groups on the polymer backbone, or additives such as **Trixene® Aqua BI 201** can be added to the normal size formulation.



Industrial coatings



Soft touch coatings

Soft grades such as **Witcobond® 374-13** can be incorporated into coating formulations that modify the haptics of normally harsh surfaces. Such coatings protect the base materials used in e.g. automotive interior facias and teletronic components, and provide improved aesthetics.

Coating of hard substrates

Alternatively, hard products such as **Witcobond® 781** and **Witcobond® 457-66** can be used in durable, chemically-resistant 1K and 2K systems applied to hard substrates such as wood, metals, glass, plastics, concrete and masonry.

Textile processing

Waterborne polyurethane dispersions such as **Witcobond® 363-02** and **Witcobond® 737** are broadly used in textile processing. Typical applications range from full waterproof and weatherproof coatings, backcoatings, laminating adhesives, pigment binders used in textile printing, and clothing with imperceptible finishes on yarns and fibers. Other functional textile uses include protective coatings on belts, ropes, braids, optical fibers and filament yarns.

APPLICATION GUIDE

Witcobond® Product	Fiber Sizing		Industrial: Coatings, Paints and Lacquers							Textiles		Leather		Adhesives			Others		
	Glass Fiber	Other Fiber	Wood	Concrete	Glass	Plastics, Rubbers	Heavy Industrial	Soft Feel	Stain Blocker	Base	Top	Base	Top	Flock	Abrasive	Laminating	Gloves	Printing Inks	Graphics
Anionic – ester types																			
A-100			●	●	●		●												●
235S														●		●			
240			●			●													
281F														●		●			
290H						●	●	●		●		●		●	●				
295						●	●	●		●		●		●					
373-04										●		●		●	●				
374-13	●	●				●		●		●		●		●	●				
386-03			●	●		●	●												
460-10	●																		
460-64				●	●	●	●				●		●					●	●
769						●				●		●				●	●	●	
781			●	●		●					●					●	●	●	●
Anionic – ether types																			
358-90										●		●							
358-95												●				●			
363-02										●		●							
372-95							●				●		●						
386-51D	●																		
386-53	●							●		●		●							
390	●							●		●		●							
737		●					●			●		●				●			
Self-matting, anionic																			
391-64						●	●						●						
Hydroxyl-functional, anionic																			
457-66			●	●	●	●	●												
Nonionic																			
320										●		●				●			

SELECTION GUIDE FOR POLYURETHANE DISPERSIONS

Witcobond® Product	Chemical Type	Solids (% w/w)	Viscosity at 25°C (mPa·s)	pH	Tensile Strength (MPa)	100% Modulus (MPa)	Elongation at Break (%)	König Hardness (secs)	Blocking Temperature (°C)
Anionic – ester types									
A-100	Aliphatic Polyester	35	50	8	50	45	140	160	>200
235S^a	Aliphatic Polyester	30	50	8	45	17	240	60	n/a
240^a	Aliphatic Polyester	30	<60	8	41	-	70	n/a	n/a
281F	Aliphatic Polyester	40	100	8	60	8	600	25	160
290H^b	Aliphatic Polyester	62	400	8	40	2	600	20	n/a
295	Aliphatic Polyester	50	300	8	44	1.4	680	30	130
373-04	Aliphatic Polyester	60	200	8	20	1	1000	15	140
374-13	Aliphatic Polyester	60	200	8	30	2	800	20	170
386-03	Aliphatic Polyester	40	200	8	40	20	400	120	120
460-10	Aliphatic Polyester	60	300	8	30	2	800	20	170
460-64^c	Aliphatic Polyester	30	100	8	60	14	600	60	160
769^a	Aliphatic Polyester	40	100	8	45	3	850	25	130
781	Aliphatic Polyester	40	200	8	50	6	700	30	150
Anionic – ether types									
358-90	Aliphatic Polyether	60	200	8	7	1	1000	35	190
358-95	Aromatic Polyether	35	100	8	5	1	1100	15	120
363-02	Aliphatic Polyether	40	200	8	10	1	1100	25	130
372-95	Aliphatic Polyether	40	100	8	20	7	400	40	180
386-51D	Aliphatic Polyether	60	200	8	40	2	1000	15	170
386-53	Aliphatic Polyether	50	200	8	50	3	900	40	150
390	Aliphatic Polyether	60	500	8	30	2	800	35	185
737	Aliphatic Polyether	40	100	8	40	5	1000	25	110
Self-matting, anionic									
391-64	Aliphatic Polyester	40	500	8	non-film forming				
Hydroxyl-functional, anionic									
457-66	Aliphatic Polyether	30	100	8	for 2-K systems; 3% OH content based on 100% solids				
Nonionic									
320^b	Aliphatic Polyether	35	300	7	31	3	700	n/a	n/a

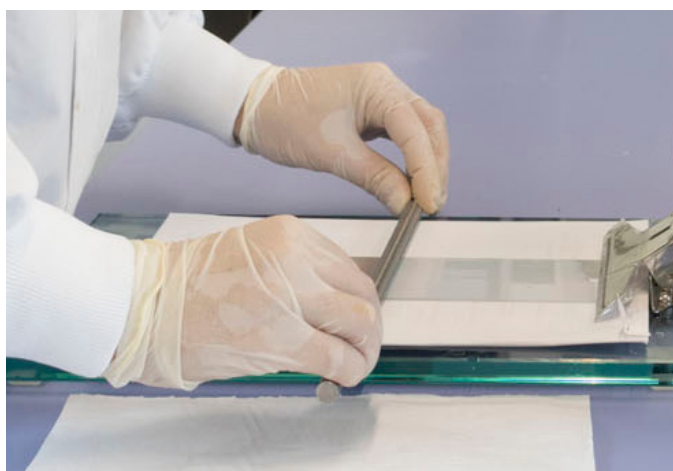
^a Contains NMP (N-methyl-2-pyrrolidone) as a cosolvent, ^b Contains APEO (alkylphenol ethoxylate) surfactant, ^c Contains DPGDME (dipropylene glycol dimethyl ether) as a cosolvent. Data provided in the table above is characteristic of the product grade, and does not constitute a specification. Further information is given in technical and material safety data sheets for individual Witcobond® products. Samples, supplementary data, formulating advice and papers/presentations giving further details of our polyurethane dispersion chemistry can be supplied on request. Other products are available which may offer a different balance of application properties and technical performance. We can also tailor polyurethane dispersions to meet specific customer requirements.

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DEDICATED PUD RESEARCH AND DEVELOPMENT FOCUSED ON CUSTOMER NEEDS, MARKET TRENDS AND REGULATORY DYNAMICS

Urethane coatings demand wear, abrasion, chemical and UV resistance, for which LANXESS can offer a range of solutions. We have a dedicated polyurethane dispersions laboratory in Latina, Italy, which is capable of supporting market needs in a variety of coatings and adhesives applications. Our experienced technical team are capable of conducting analytical work, formulation development and synthesis of novel products with a high degree of technical differentiation.

We support our customers across a wide range of applications, including glass fiber sizing, plastic, glass and metal substrates, coatings and textile finishing. With growing demand from customers for VOC (volatile organic compounds) free and lower carbon footprint materials, as well as increasing regulatory pressure upon restricted chemicals, LANXESS' applied research in water-based technologies deliver greener technologies and chemistry for our customers.



Pilot plant scale-up capability

LANXESS Urethane Systems pilot plant in Perth Amboy, USA, is capable of handling scale-up projects for our customers. This plant complements our production and ensures:

- Flexible and reliable product supply
- Faster customer sampling
- Acceleration of LANXESS' innovation and commercialization of new products

LANXESS URETHANE SYSTEMS IS LEADING WITH TECHNOLOGY AND INNOVATION

We provide our customers with decades of urethane chemistry know-how, comprehensive application expertise, and deep manufacturing experience. LANXESS can provide custom formulations, contact us about your requirements.

As well as our polyurethane dispersions, LANXESS also offer blocked isocyanate, blocked prepolymer and innovative Low Free (LF) isocyanate systems for a range of coating, adhesive and sealant application needs.



**Specialized provider
of urethane systems,
tailored to meet specific
customer needs**



**Truly global and diverse
coverage, offering quick
and flexible responses to
customer needs**



**Strong focus on
sustainability with a
broad portfolio providing
performance, processing,
and EH&S advantages**



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