

Technology for a Safer Tomorrow

POLYMER INNOVATIONS

WATERBORNE POLYURETHANE DISPERSION PUD

Robust and environmentally sound solutions for surfaces

For High Performance Wood; Floor Coatings; Textile, Plastic and Metal Coatings and Adhesive



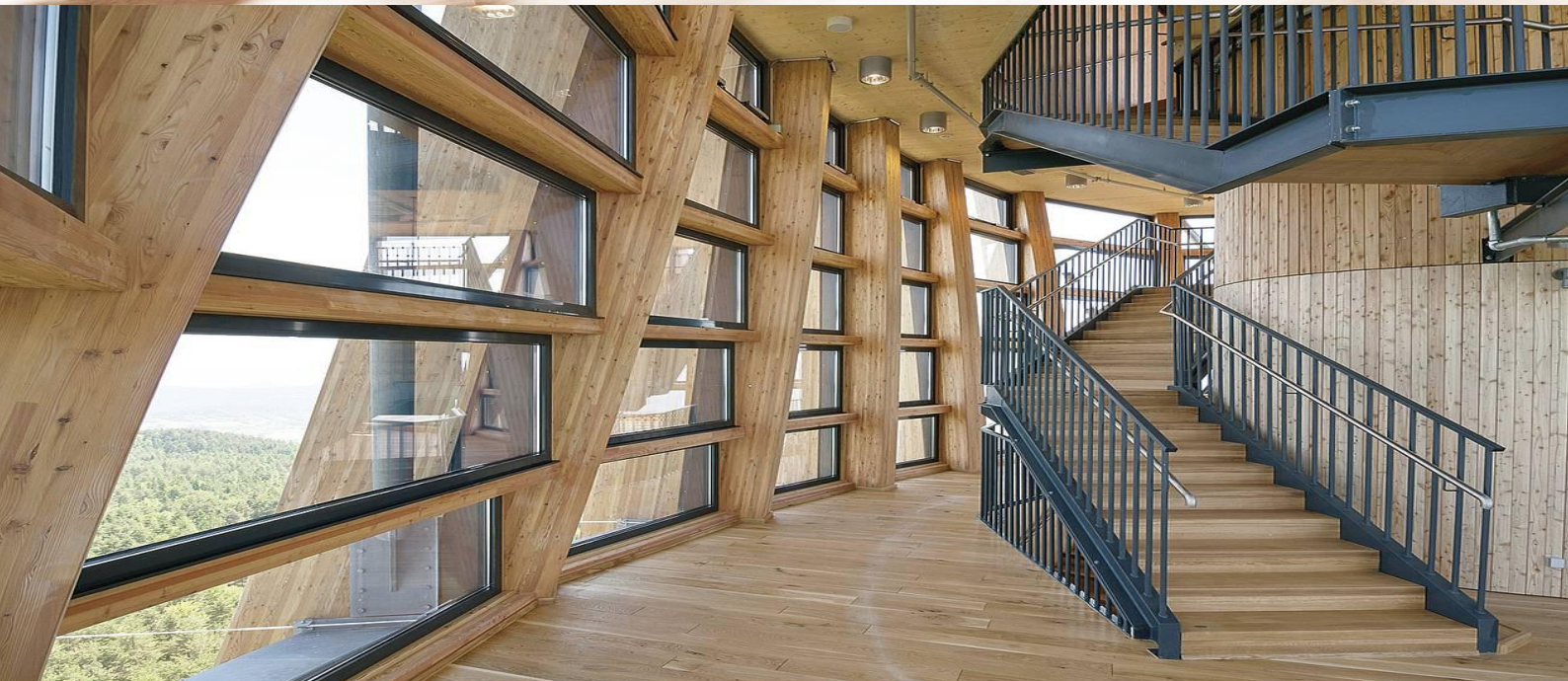
PAINTS & COATINGS

INDUSTRIAL COATINGS

Water-based polymers for wood,
metal, concrete and other
industrial coatings

VaraTan PUD

Polyurethane Dispersion PUD



Polyurethane dispersions for high-quality coating applications

Due to the special structural composition of the polymer chain into soft and hard segments, the polymer film generates special properties that no other class of binder exhibits.

The hard segments, consisting of RNCO units, are integrated into the matrix of the soft segments, consisting of polydiol chains, resulting in excellent mechanical property profiles.

On the one hand, polyurethane dispersions can exhibit an extremely high level of hardness without making the polymer film brittle. On the other hand, this class of binders also offers an extremely high level of flexibility without making the film appear too soft or even tacky. Good chemical resistance can be produced by the specific selection of polydiol chains.

These durable, resistant coatings are used especially in high-quality paint applications, such as parquet and furniture coatings, which are exposed to high mechanical stresses due to abrasion and scratching. The varnish layer, protecting for the wood surface, must be extremely tough and elastic to prevent breakage due to cracking.

Polyurethane dispersions can also be made highly flexible, for example for plastic applications, to give the coating film a very high flexural strength. At the same time, the polymer retains a high level of resistance so that the protective function is guaranteed.

VaraTan PUD

Polyurethane dispersions PUD for particularly stressed paint coatings

Polyurethane dispersions have been established in various coatings applications for many years and are an indispensable part of modern coatings formulations.

The polymeric structure of polyurethanes permits a large number of variations, which means that a wide variety of property profiles can be tailor-made. Users of these coating systems are particularly impressed by their mechanical properties.

VaraTan PUD

Acrylate hybrid systems PUD

A widely used method in the development of coating formulations is the combination of polyurethane and acrylate dispersions. By mixing them, positive properties of both binder classes can be combined in many cases. For example, hardness and blocking resistance can be increased by combining softer acrylates with harder polyurethane dispersions in order to create a more resistant coating film.

Key Advantages of Water-Based Polyurethane Dispersions:

- **Eco-Friendly and Non-Toxic:** PUD systems are non-toxic and non-flammable, making them safer for the environment and human health.
- **Flexible Formulation:** They offer excellent flexibility and can be customized for different viscosity levels and mechanical properties.
- **High Performance:** PUD systems provide strong adhesion, chemical resistance, and hydrolysis resistance, outperforming many solvent-based alternatives.



VaraTan PUD; Polyurethane dispersions, waterbased PUD

Product	Solid [%]	Solvent	Viscosity [mPa.s]/20°C	pH content	Main uses and characteristics
PUD 1000	30	Water	20 – 200	7.5 – 8.5	Polyurethane dispersion, used in wood and parquet coatings, good chemical and abrasion resistance.
PUD R-974	40	Water/NMP	100 – 300	7.5 – 8.5	A hard, low cosolvent containing polyurethane dispersion, used in wood and parquet lacquers, metal and plastic coatings, water resistant floor polishes. Processes hard, good chemical and abrasion resistance, offers good humidity resistance.
PUD 2000	30	Water	900 – 1.500	7.7 – 8.0	Polyurethane dispersion, used in wood and parquet coatings, good chemical and abrasion resistance.
PUD M-36	38	Water	max. 140	8.0 – 9.5	PUD water-based dispersion and wax emulsion for the manufacture of dry-bright emulsions intended for floor polish, automotive polish, shoe polish and leather polish applications.
PUD 1065	42	Water/ NMP (2-3%)	max. 500	7.5 – 8.5	Polyurethane dispersion, used in wood and parquet coatings, metal coating, good chemical and abrasion resistance.
PUD 2500	30	Water	max. 100	7.0 – 8.5	PUD water-based dispersion for the manufacture of dry-bright emulsions intended for wood, flexible coatings, plastic coating.
PUD 910	30	Water	max. 100	7.5 – 8.5	A self-crosslinking, aliphatic polyester polyurethane dispersion that can be formulated for high-performance coatings for wood and plastic. It has excellent hardness and black heel mark resistance, excellent chemical and plasticizer resistance, high gloss, excellent adhesion to multiple substrates and excellent fingernail mar resistance.
PUD 6100	36	Water	max. 200	8.0 – 9.0	An aqueous, colloidal anionic, low viscous dispersion of an aliphatic polyester-polyurethane without free isocyanate groups, very good on ABS, PC, PVC, PU, PA and PS, with very good pigmentability, suitable for automotive base coats, if combined with acrylic dispersions. Good plasticizer barrier on PVC-foils.
PUD 610	30	Water	max. 100	7.5 – 8.5	An aqueous, colloidal, low viscous dispersion of an aliphatic polyester-polyurethane. Used for automotive OEM top coats and base coats. Offers very good pigmentability. Blocking temperature 140°C and MFT 0°C.
PUD 1228	38	Water	max. 10.000	7.0 – 8.0	The special manufacturing process of PU 1228 allows a high urethanization, which leads to a faster hardness development and drying. The combination of physical drying and oxidative curing makes it possible to achieve high chemical resistance without using siccatives. PU 1228 is recommended for the manufacture of waterborne wood coatings.
PUD 1227	40	Water	max. 10.000	6.8 – 7.5	Polyurethane dispersion, used for the production of water thinnable lacquers for wood. Offers very good through drying and hardness.



VaraTan PUD Hard polyurethane dispersion for highly stressed systems

It can also be used in high-quality furniture coatings, where fast drying and high blocking resistance are also required.

VaraTan PUD 1163 & 1199

VaraTan PUD 1163 is a fine particle polyurethane dispersion for use in coating formulations.

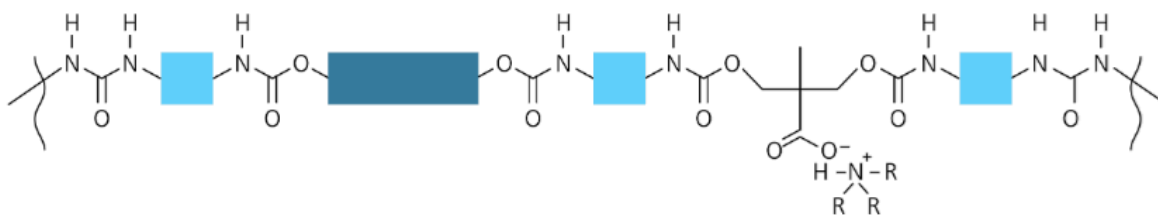
VaraTan PUD 1163 forms very hard, tough-elastic films which are characterized by very high mechanical strengths such as abrasion and scratch resistance. The coating film is also characterized by very good water resistance and detergent resistance. Possible areas of application are therefore wood furniture lacquers, parquet and floor coatings in general.

The binder needs a co-solvent for good film formation. A number of common agents come into question. Dowanol DPnB has proven itself in laboratory tests.

Mobility with acrylates copolymer dispersions and alkyd emulsions is possible in principle. However, these must be determined individually by the user.

Product	Solid [%]	Solvent	Viscosity [mPa.s]/20°C	pH content
VaraTan PUD 1163	30	Water	max. 5,000	7.5 – 8.5

It can also be used in high-quality furniture coatings, where fast drying and high blocking resistance are also required.



VaraTan PUD 1199 is an aqueous polyurethane dispersion for use in paints and coatings application or related in the textile and adhesives industry.

VaraTan PUD 1199 can be used to produce very elastic coating films with an elongation break point of 250%. In addition to interesting haptic properties, the film is also characterised by very good water resistance. VaraTan PUD 1199 is characterized by very high flexibility combined with very good tensile strength properties. The product also exhibits very good water resistance.

VaraTan PUD 1199 is suitable for all applications where the described properties are desired. The product is also suitable as a blending component, e.g. in combination with acrylate and acrylate copolymer dispersion.

Product	Solid [%]	Solvent	Viscosity [mPa.s]/20°C	pH content
VaraTan PUD 1199	30	Water	max. 1,000	6.5 – 8.5

VaraTan PUD – acrylate hybrid systems VARENA additive recommendation A widely used method in the development of coating formulations is the combination of polyurethane and acrylate dispersions. By mixing them, positive properties of both binder classes can be combined in many cases. For example, hardness and blocking resistance can be increased by combining softer acrylates with harder polyurethane dispersions in order to create a more resistant coating film (cf. diagram 1).

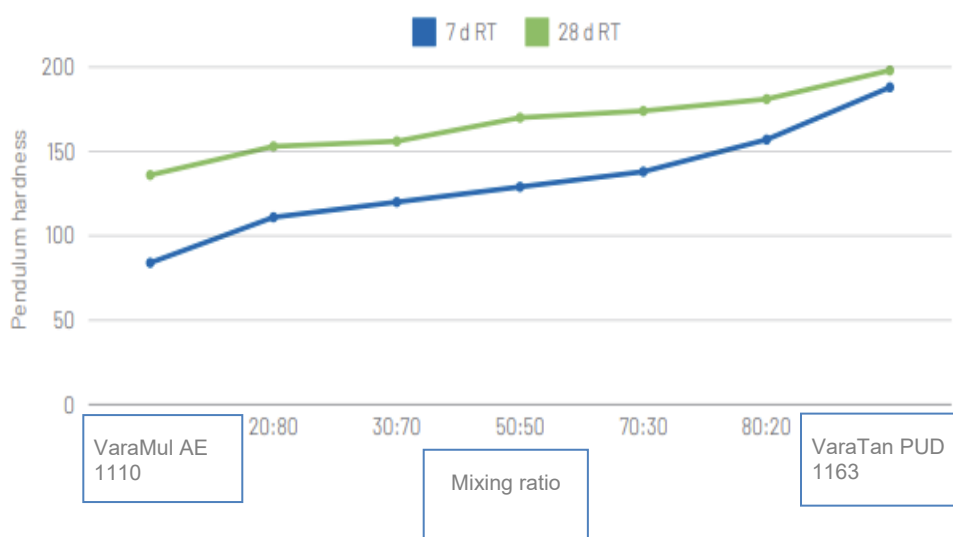


Diagram 1: Hardness development (pendulum hardness according to König in s) after mixing VaraMul AE 1110 with VaraTan PUD 1163 in different ratios

Conversely, even very brittle and hard acrylic coatings can be made more flexible by cleverly combining them with elastic polyurethane dispersions without negatively affecting the blocking resistance (cf. diagram 2).

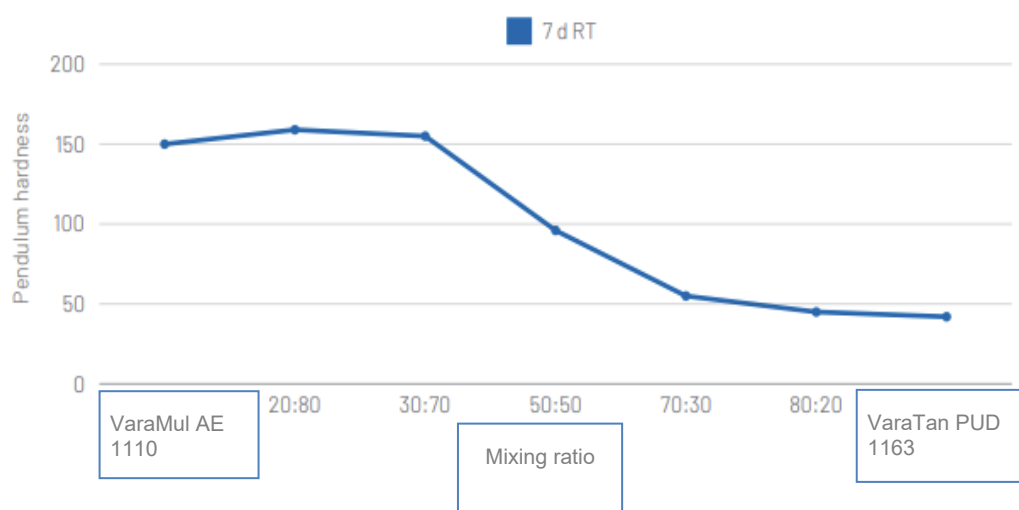


Diagram 2: Hardness development (pendulum hardness according to König in s) after blending VaraMul AE 1110 with VaraTan PU 1163 in different ratios

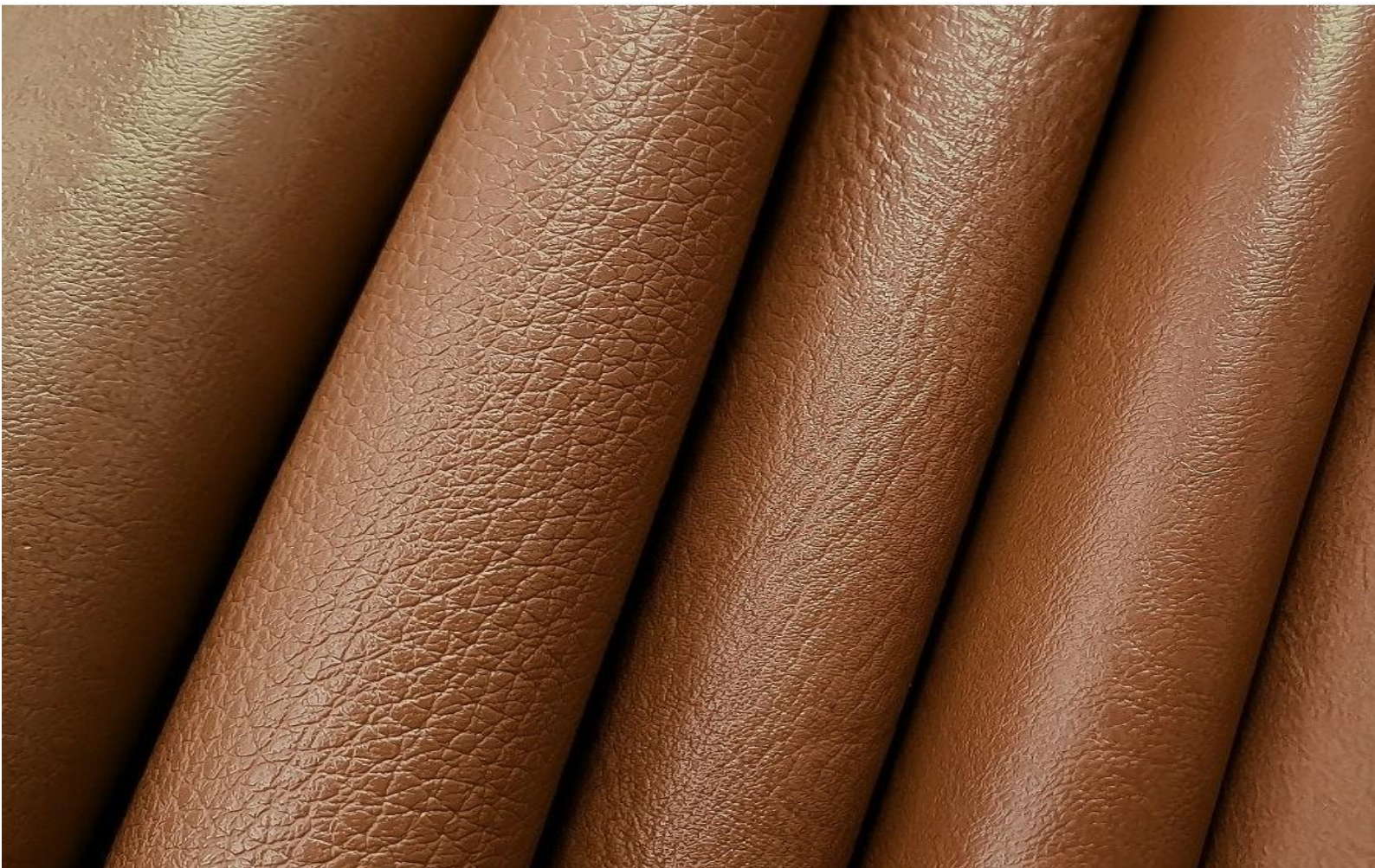
Product	Monomer	Supply Form [%]	pH value	MFFT [C°]	Viscosity [mPa.s]/20°C	Main uses and characteristics
VaraMul AE 1110	Pure acrylic	45 in water	8.0-9.0	39	max. 500	Self-crosslinking acrylic polymer for the formulation of aqueous furniture lacquers with good resistance against household chemicals.



SYNTHORA additive recommendation

In particular, the following additives can be used in formulations with the VaraTan PUD

Appearance	Function	Property
FoamStop AQUA 223	Defoamer	100% silicone compound. Prevents foaming during the production and processing of coatings.
WetCore 341	Substrate wetting agent	Highly effective silicone-based wetting additive. Improves substrate wetting and flow properties.
SlipSil 555	Surface modification	High-molecular-weight silicone-containing surface additive. Improves smoothness, scratch and abrasion resistance.
WetDisperse 840 W	Dispersing agent	High-performance polymeric dispersant. For universal use in direct grinds or pigment concentrates for all pigment types.
DEUREX S 3001 W	Matting agent	A water-based emulsion of silica. Acts as a water repellent, anti-blocking agent, matting agent, rub & scratch resistance and slip agent.



VARENA CHEMICAL is a global company in the intermediates, coating, adhesives, inks and composite and solid surface resins, thermoset compounds, gel-coats and niche specialties and specialty additives for coatings and inks.

VARENA CHEMICAL is known for its superior quality and impressive range of products and with its excellent distribution network it can provide first-class service to customers whatever their market. Customer Service and Technical Service teams are renowned for their customer focus, offering the best service even after products have left manufacturing.

The group strives to keep customers satisfied, assisting them in producing premium quality products every time they use its products.



Product innovation is important for the group's business and it's the reason for which it constantly works with customers to find solutions to problems.

Introducing new or improved products ensures that **VARENA CHEMICAL** continue not only to deliver what the market wants and needs, but also when it is wanted and needed.



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