WACKER

CREATING TOMORROW'S SOLUTIONS

VINNAPAS®

ADHESIVES I POLYMER BINDERS I ASIA PACIFIC & INDIA

PRODUCT OVERVIEW VINNAPAS® DISPERSIONS

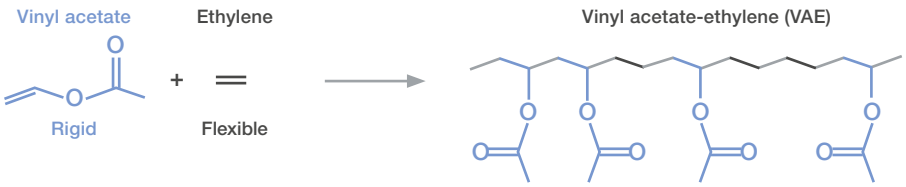
VINNAPAS® VAE –
THE HIGH-PERFORMANCE SOLUTION

Success in the adhesives market often depends on choosing the right binder. VINNAPAS® vinyl acetate-ethylene (VAE) technology offers outstanding benefits in terms of performance,safety and versatility.

VINNAPAS® VAE dispersions are water-based co- and terpolymers mainly based on vinyl acetate and ethylene as comonomers.

Ethylene contributes permanent flexibility to the VAE polymer. No external plasticizer is thus necessary in VAEs.

Two Monomers Creating Best-in-Class Performance



Polymer Properties Provided by Ethylene:

- Softness (T_g approx. -125 °C)
- Non-polar, hydrophobic
- Permanent flexibility
- High saponification resistance
- Form ideal copolymers with vinyl acetate

Vinyl Acetate:

- Hardness (T_g approx. 32 °C)
- Polar, hydrophilic
- Rigid

VAE Copolymer and Terpolymer Dispersion Properties:

VINNAPAS® VAE dispersions can be formulated into adhesives that provide outstanding benefits:

- Excellent adhesion to a wide variety of substrates
- High heat resistance
- Very fast setting
- Excellent machinability and re-emulsification properties
- Very good cost / performance ratio
- T_g range from approx. -35 °C to approx. 30 °C, depending on ethylene content

Diverse Applications

VINNAPAS® VAE dispersions can be formulated into adhesives for various applications:

- Paper packaging (e.g. food packaging, envelope manufacturing, film lamination onto paper)
- Wood (e.g. film lamination onto wood, 3D membrane pressing, EPI systems)
- Flooring installation (e.g. textile flooring, flexible coverings)
- Car interiors (e.g. door paneling)
- Tapes & labels

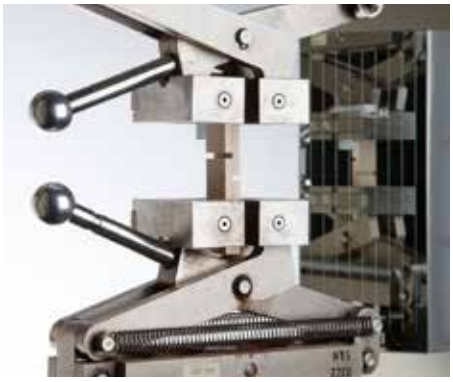
YOUR QUALITY CHOICE – MADE EASY

Our VINNAPAS® dispersions are specially designed to address the continuously changing needs of the modern adhesives industry, offering up-to-date solutions for the latest end-user requirements and market trends.

VINNAPAS® dispersions set the industry benchmark in product quality, performance and reliability. With our product portfolio you benefit from:

- Consistently high quality
- Greater than 80 years experience in vinyl acetate based dispersion technology
- Properties such as adhesion, heat resistance, bonding to a wide range of different substrates, fast setting speed, high wet tack, reliable machinability, and broad formulation possibilities

Technical Support



WACKER is one of the most research-intensive chemical corporations worldwide. Our VINNAPAS® grades for adhesives applications are produced in five manufacturing plants across Europe, the Americas, China and the Asia-Pacific region. To support adhesives manufacturers, we also operate dedicated state-of-the-art adhesives laboratories and technical centers around the globe, where we carry out extensive tests to develop formulations for new products or optimize those of existing products.

VINNAPAS® Product	Technical Data[1]								Product Benefit	Performance Attributes																								VINNAPAS® Product
										Paper Packaging								Wood to Wood				Film to Wood				EPI		Flooring Installation				Textile Lamination & Synthetic Leather		Tapes & Labels			Car Interiors	
	Product Source	Base Polymer[2]	Solids Content (DIN EN ISO 3251) (± 1%)	Viscosity BF 20 at 25 °C at 20 rpm [mPa s] (ISO 2555)	pH (ISO 976)	Glass Transition Temperature Onset Point [°C] (approx.)	Minimum Film-Forming Temperature (MFFT) (DIN ISO 2115) [°C] (approx.)	Film Surface	Stabilizing System[3,4]		Adhesion (for e.g. film to paper)	Cohesion / Heat Resistance	Setting Behavior	Roller / Wheel Application	Nozzle Application	Cleanability	Water Resistance	D3 (EN 204) ≥ 2 N/mm²	D4 (EN 204) ≥ 4 N/mm²	Watt 91 (EN 14257) [N/mm²] (approx.)	Low Wood Discoloration	Setting Behavior	Adhesion	Water Resistance	Heat Resistance	Setting Behavior	D3 in EPI Formulations (15% MDI)	D4 in EPI Formulations (15% MDI)	Workability	Overall Adhesion	Heat Resistance	Setting Behavior	Adhesion	Workability	Tack	Shear Resistance	Adhesion	Suitability	
VINNAPAS® Products VAE Technology (Copolymers and Terpolymers)																																		VINNAPAS® Products VAE Technology (Copolymers and Terpolymers)
VINNAPAS® EP 645	Korea	VAc-E	55	5,000 – 10,000	4 – 6	5	0	Tack-free	PVOH	Good compatibility with PUD and acrylic. Modified VAE for difficult-to-bond substrates, with good wet tack, setting speed and machinability.	●●	●●	●●	●●	●	●●	●●				●●	●	●●●	●●			●	●●	●●●	●●	●●	●●				●●●	**VINNAPAS® EP 645**
VINNAPAS® EP 6411	Korea	VAc-E	50	4,000 – 6,000*	4 – 6	3**	0	Slightly tacky	PVOH	Preferably for bonding films and paper. high heat resistance, good adhesion to various plastic surfaces, permanently flexible adhesive joints, fast setting and good machine running characteristics.	●●	●●	●●	●●●	●	●●●	●●				●●	●●	●●	●●			●	●●	●●●	●						●●	**VINNAPAS® EP 6411**
VINNAPAS® EP 6420	Korea	VAc-E	55	3,500 – 5,500*	4 – 6	2**	0	Slightly tacky	PVOH	Universal binder for paper packaging applications / film-to-wood lamination. Especially suitable for nozzle (HHS) applications.	●●	●●	●●	●●●	●●●	●●●	●				●●	●	●●	●●			●	●●	●●●	●							**VINNAPAS® EP 6420**
VINNAPAS® EP 701K	Korea	VAc-E	55	2,000 – 4,000	4 – 6	-10**	0	Tacky	PVOH	Excellent adhesion to difficult-to-bond surfaces. Suitable for laminating films (polyester, polyethylene terephthalate, polyvinylidene chloride and polystyrene) to coated or uncoated papers.	●●●	●	●●	●●	●	●	●●				●●●	●●	●	●●			●●	●●●	●	●●							**VINNAPAS® EP 701K**
VINNAPAS® EP 705A	Korea	VAc-E	55	1,900 – 2,800	4 – 6	0	0	Slightly tacky	PVOH	Universal binder for paper packaging applications / film-to-wood lamination.	●●	●●	●●	●●●	●	●●	●●				●●	●	●●	●●			●	●●	●●●	●							**VINNAPAS® EP 705A**
VINNAPAS® EP 705K	Korea	VAc-E	55	2,900 – 3,900	4 – 6	0	0	Slightly tacky	PVOH	Universal binder for paper packaging applications / film-to-wood lamination. Especially suitable for nozzle (HHS) applications.	●●	●●	●●	●●●	●●	●●	●●				●●	●	●●	●●			●	●●	●●●	●							**VINNAPAS® EP 705K**
VINNAPAS® EP 706	Korea	VAc-E	55	3,500 – 4,500	4 – 6	0	0	Slightly tacky	PVOH	Universal binder for paper packaging applications / film-to-wood lamination.	●●	●●	●●	●●●	●●	●●	●●				●●	●	●●	●●			●	●●	●●●	●							**VINNAPAS® EP 706**
VINNAPAS® EP 706K	Korea	VAc-E	55	4,400 – 5,400	4 – 6	0	0	Slightly tacky	PVOH	Universal binder for paper packaging applications, film-to-wood lamination and textile lamination. A high-viscosity version of VINNAPAS® EP 706. Especially suitable for nozzle (HHS) applications.	●●	●●	●●	●●●	●●	●●	●●				●●	●	●●	●●	●●	●●	●	●●	●●●	●	●	●					**VINNAPAS® EP 706K**
VINNAPAS® EP 707K	Korea	VAc-E	55	1,300 – 2,000	4 – 6	0	0	Slightly tacky	PVOH	Low viscosity with rapid setting speed and flexibility. Excellent elongation and water resistance.	●●	●●	●●	●●	●	●●	●●●				●●	●	●●	●●			●●	●●	●●	●							**VINNAPAS® EP 707K**
VINNAPAS® EP 709	Korea	VAc-E	55	2,700 – 3,700	4 – 6	7	0	Slightly tacky	PVOH	Excellent cohesion strength and water resistance. Excellent compatibility with inorganic fillers. Good bonding to hard surfaces.	●●	●●	●●	●●●	●	●●	●●●				●●	●	●●	●●			●●	●●	●●●	●							**VINNAPAS® EP 709**
VINNAPAS® EP 724	Korea	VAc-E	55	1,500 – 2,500	4 – 6	19	4	Tack-free	PVOH	Excellent tensile & cohesion strength and heat resistance. Blending with PVAc homopolymers yields better initial bonding strength, setting speed and water resistance.	●●	●●●	●●	●●●	●	●●	●				●●	●	●●	●●	●●●	●●	●	●●	●●●	●							**VINNAPAS® EP 724**
VINNAPAS® EP 736	Korea	VAc-E	60	3000 - 6000	5 - 8	10	2	Tack-Free	PVOH and ST	High solid binder with excellent bonding to wood substrates. High heat and water resistance.	●●	●●	●●	●●	●●	●	●●●	●●	●●	●●●	●●●	●●	●●	●●	●●●	●●●										**VINNAPAS® EP 736**
VINNAPAS® EP 760	Korea	VAc-E	60	2,000 – 3,000	4 – 6	0	0	Slightly tacky	PVOH	High-solids VAE with an excellent balance of cohesion and adhesion. Stronger bond and faster setting compared to standard products.	●●	●●	●●	●●●	●	●●	●●				●●	●	●●	●●	●●●	●●	●●	●●	●●●	●●	●●	●●					**VINNAPAS® EP 760**
VINNAPAS® 920	USA	VAc-E	55	800 – 2,000	4.2 – 5.2	-20	0	Tacky	PVOH	A carboxylated VAE. Excellent flow, wet-out and adhesion to various difficult-to-bond surfaces.	●●●	●	●●	●●	●	●	●●				●●●	●●	●	●			●●●	●●	●●	●●●			●●	●●	●●		**VINNAPAS® 920**
VINNAPAS® 320 KR	Korea	VAc-E	55	1,800 – 2,700	4 – 6	14	3	Tack-Free	PVOH	Excellent adhesion to coated paper surfaces and some plastic films. Unique compatibility with both fully and partially hydrolyzed polyvinyl alcohol.	●●	●●	●●	●●●	●	●●	●				●●	●	●●	●●			●	●●	●●●	●							**VINNAPAS® 320 KR**
VINNAPAS® EAF 68	Germany	VAc-E-A	58 – 62	4,500 – 9,500*	4 – 5	-35**	0	Tacky	ST	Pressure-sensitive emulsion designed for high-shear resistance. Excellent adhesion to difficult-to-bond substrates, such as OPP, PET and UV coatings, very good cohesion.	●●●	●	●	●	●	●	●				●●	●	●	●●			●●●	●●●	●●●	●●●			●●●	●●●	●●	●●●	**VINNAPAS® EAF 68**
VINNAPAS® 6300	USA	VAc-E	63	600 – 1,500	4.3 – 5.3	0	0	Slightly tacky	PVOH	High solids content and carboxylic acid functionality create unique physical properties, such as excellent metal and film adhesion, wide-ranging compounding flexibility, and alkaline, aqueous clean-up. High solids content provides good setting speed.	●●●	●	●●	●●	●	●●	●				●●	●	●	●●													**VINNAPAS® 6300**
VINNAPAS® 7000	USA	VAc-E	70.5	1,200 – 2,700	4.5 – 5.5	-3	0	Slightly tacky	PVOH	Highest-solids VAE with fastest setting speed. High filler loading and high adhesion.	●●	●●	●●●	●●	●	●●	●●●				●●●	●●	●●●	●●●													**VINNAPAS® 7000**
VINNAPAS® Products PVAc Technology																																		VINNAPAS® Products PVAc Technology
VINNAPAS® DPN 15	Germany	VAc	52	12,000 – 18,000*	2.5 – 3.5	28**	5	Tack-free	PVOH	D3 1C wood adhesive.								Yes	No	> 7	●	●●●														**VINNAPAS® DPN 15**
VINNAPAS® DPN 16	Germany	VAc	52 ± 2	10,000 – 14,000*	2.5 – 3.5	28**	5	Tack-free	PVOH	D3 1C wood adhesive, reduced discoloration.								Yes	No	> 7	●●	●●●														**VINNAPAS® DPN 16**
VINNAPAS® DPN 17	Germany	VAc	48	9,000 – 13,000*	2.5 – 3.5	28**	4	Tack-free	PVOH	D3 1C wood adhesive, longer open time.								Yes	No	> 7	●	●●●														**VINNAPAS® DPN 17**
VINNAPAS® DPX 271	Germany	VAc	46 ± 2	6,000 – 14,000*	5 – 7	30**	5	Tack-free	PVOH	D3 1C wood adhesive, low formaldehyde, discoloration-free.	●	●●●	●●	●	●	●●	●●	Yes	No	5	●●●	●●●	●	●●	●●●	●●											**VINNAPAS® DPX 271**

1 These figures are intended as a guide only and should not be used in preparing specifications.

2 VAc = Vinyl acetate
A = Acrylic ester
E = Ethylene

3 PVOH = Polyvinyl alcohol
ST = Surfactant

4 All products produced without the use of APEO surfactants

Legend for performance attributes
●●● Excellent ●● High ● Medium

* BF 20 at 23 °C at 20 rpm
** Midpoint
*** Technical specifications provisional

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7248en

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