WACKER

CREATING TOMORROW'S SOLUTIONS

VINNAPAS®

VINNOL®

ADHESIVES & SEALANTS I POLYMER BINDERS I LATIN AMERICA

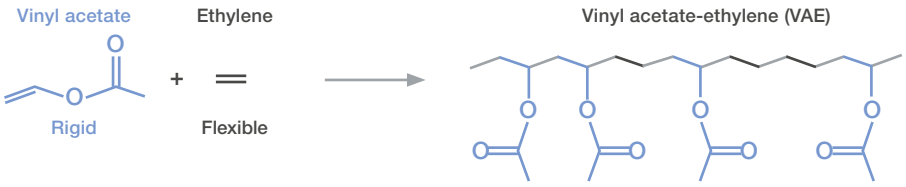
PRODUCT OVERVIEW VINNAPAS® AND VINNOL® DISPERSIONS

MAKE THE MOVE TO VINNAPAS® VAE:
THE HIGH-PERFORMANCE SOLUTION

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

Vinyl acetate-ethylene (VAE) dispersions are copolymers produced by the emulsion polymerization of hard, polar vinyl acetate monomer and soft, hydrophobic ethylene monomer. Ethylene gives 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 and sealants 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. 23 °C, depending on ethylene content

Diverse Applications

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

- Paper & Packaging (e.g. food packaging, envelope manufacturing, film lamination onto paper)
- Wood (e.g. film lamination onto wood)
- Flooring (e.g. textile flooring, flexible coverings)
- Automotive (e.g. door paneling)
- PSAs (e.g. paper labels)
- Sealants (e.g. painter's caulk, intumescent caulk, HVAC mastic)

VINNOL® dispersions are based on VC (vinyl chloride) – a monomer known for its inherent fire retardancy. VC can be easily polymerized with ethylene and vinyl acetate monomer to form co- and terpolymers. Aside from being fire retardant, VINNOL® dispersions are ideal for specialty applications thanks to their hydrophobicity and other properties.

VINNAPAS® and VINNOL® are registered trademarks of Wacker Chemie AG.

For more information on VAE technology, visit: www.wacker.com/move

YOUR QUALITY CHOICE
MADE EASY

Our VINNAPAS® dispersions are specially designed to address the continuously changing needs of the modern adhesives and sealants 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
- 70 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

VINNAPAS® Plus Dispersions

VINNAPAS® Plus dispersions are select, cutting-edge solutions for more-advanced, high-end applications.

+ They not only complement the overall VINNAPAS® portfolio, but also meet the criteria for use in high-end applications

+ Exceptional properties and performance (e.g. excellent adhesion to difficult-to-bond substrates) enable adhesives and sealants producers to create solutions for particularly challenging applications

For more information on the VINNAPAS® value classes, visit: www.wacker.com/value-classes

PRODUCT OVERVIEW

Product	Technical Data[1]								Product Benefit	Performance Attributes															Product
										Paper & Packaging							Film to Wood				Wood Adhesives	Caulks & Sealants	Flooring	PSA	Automotive	
	Base Polymer[2]	Solids Content (DIN EN ISO 3251) (± 1%)	Viscosity* [mPa s]	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	PVC Adhesion	Water Resistance	Heat Resistance	Setting Behavior	Suitability	Suitability	Suitability	Suitability	Suitability	
VINNAPAS® Products VAE Technology (Co- and Terpolymers) – Poly(Vinyl Alcohol)-Protected Grades																									**VINNAPAS® Products VAE Technology (Co- and Terpolymers) – Poly(Vinyl Alcohol)-Protected Grades**
VINNAPAS® 315	VAc-E	54 – 56	1,800 – 2,700	4 – 5	17	5	Tack-free	PVOH	Elevated adhesion to coated paper surfaces, high wet tack, rapid setting speed and compatible with partially hydrolyzed poly(vinyl alcohol).		●●●	●●	●●●	●	●●	●					●●				**VINNAPAS® 315**
VINNAPAS® 323	VAc-E	54 – 56	1,300 – 2,300	5 – 6	23	5	Tack-free	PVOH	Superior adhesion, water resistance and setting behavior compared to plasticized homopolymers. Compatible with fully and partially hydrolyzed poly(vinyl alcohol).		●●●	●●	●●●	●	●●	●●					●●				**VINNAPAS® 323**
VINNAPAS® 400	VAc-E	54 – 56	1,800 – 2,700	4 – 5	0	0	Slightly tacky	PVOH	Balanced adhesive properties, such as adhesion, rapid setting speed, exceptional machinability, high heat resistance and PEI compatibility.	●	●●	●●	●●●	●●●	●●	●	●●	●	●●	●●●	●●				**VINNAPAS® 400**
VINNAPAS® 400 H	VAc-E	54 – 56	3,100 – 4,400	4 – 5.5	0	0	Slightly tacky	PVOH	A high-viscosity version of VINNAPAS® 400 dispersion that is designed to improve the yields of a formulated adhesive without sacrificing performance.	●	●●	●●	●●●	●●●	●●	●	●●	●	●●	●●	●●				**VINNAPAS® 400 H**
VINNAPAS® EF575	VAc-E	54 – 56	200 – 850	4 – 5	0	0	Slightly tacky	ST	Designed for construction or paper-to-paper applications. Carboxyl functionality enhances adhesion to a wide range of substrates.	●	●●	●		●	●●	●●					●●●				**VINNAPAS® EF575**
VINNAPAS® EP4600	VAc-E	62.5 – 64	200 – 800	6 – 7.5	5	0	Slightly tacky	PVOH / nonionic	Low-viscosity profile that allows for high filler loading. Good adhesion to a wide variety of film substrates and fast setting speed.	●	●●	●●●	●	●●	●●●	●●	●●●	●	●●	●					**VINNAPAS® EP4600**
VINNAPAS® EP6300	VAc-E	62 – 64	600 – 1,500	4.3 – 5.3	0	0	Slightly tacky	PVOH / nonionic	High-solids and carboxylic acid functionality create unique physical properties, such as excellent metal and film adhesion, a wide range of compounding flexibility and alkaline aqueous cleanup.	●●●	●	●●	●●	●	●●	●	●●●	●	●	●●	●					**VINNAPAS® EP6300**
VINNAPAS® EP7000	VAc-E	69.5 – 71.5	1,200 – 2,700	4.5 – 5.5	-3	0	Slightly tacky	PVOH / nonionic	VAE with highest solids content , and superior wet tack and rapid setting speed. Low-temperature heat-sealability and excellent water resistance.	●●	●●	●●●	●●	●	●●	●●●	●●●	●●	●●●	●●●	●●		●		●●	**VINNAPAS® EP7000**
VINNAPAS® 401	VAc-E	54 – 56	1,300 – 2,200	5 – 6.5	-15	0	Slightly tacky	PVOH	Excellent adhesion and machining properties for high-speed packaging and converting applications.	●	●●	●●	●●●	●●●	●●	●	●●	●	●●	●●	●					**VINNAPAS® 401**
VINNAPAS® 920	VAc-E	54 – 56	800 – 2,000	4.5 – 6	-20	0	Tacky	PVOH / nonionic	Carboxylic acid functionality combined with low T_g enables excellent adhesion to metallized and polymeric films.	●●●	●	●●	●	●	●	●●	●●●	●●	●	●	●			●●	●	**VINNAPAS® 920**
VINNAPAS® 320KR	VAc-E	54 – 56	1,800 – 2,700	4 – 6	14	3	Tack-free	PVOH	Excellent adhesion to coated paper surfaces and some plastic films. Compatible with fully and partially hydrolyzed poly(vinyl alcohol).	●●	●●	●●	●●●	●	●●	●	●●	●	●●	●●	●●					**VINNAPAS® 320KR**
VINNAPAS® EP705A	VAc-E	54 – 56	1,900 – 2,800	4 – 6	0	0	Slightly tacky	PVOH	Universal binder for paper & packaging applications / film-to-wood lamination.	●●	●●	●●●	●●●	●	●●	●●	●●	●	●●	●●						**VINNAPAS® EP705A**
VINNAPAS® EP706	VAc-E	54 – 56	3,500 – 4,500	4 – 6	0	0	Slightly tacky	PVOH	Universal binder for paper & packaging applications / film-to-wood lamination.	●●	●●	●●●	●●●	●●	●●	●●	●●	●	●●	●●						**VINNAPAS® EP706**
VINNAPAS® EP706K	VAc-E	54 – 56	4,400 – 5,400	4 – 6	0	0	Slightly tacky	PVOH	Universal binder for paper & packaging applications / film-to-wood lamination. A high-viscosity version of VINNAPAS® EP706. Especially suited to nozzle (HHS) applications.	●●	●●	●●	●●●	●●	●●	●●	●●	●	●●	●●						**VINNAPAS® EP706K**
VINNAPAS® EP724	VAc-E	55	1,500 – 2,500	4 – 6	19	4	Tack-free	PVOH	Excellent tensile & cohesion strength and heat resistance. Blending with PVAc homo-polymers yields better initial bonding strength, setting speed and water resistance.	●●	●●●	●●	●●●	●	●●	●	●●	●	●●	●●	●●					**VINNAPAS® EP724**
VINNAPAS® EP760	VAc-E	59 – 61	2,000 – 3,000	4 – 6	0	0	Slightly tacky	PVOH	High-solids VAE with an excellent balance of cohesion and adhesion. Stronger bonds and faster setting compared to commodity products.	●●	●●	●●	●●●	●	●●	●●	●●	●	●●	●●			●			**VINNAPAS® EP760**
VINNAPAS® EP645	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® EP645**
VINNAPAS® EP701K	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® EP701K**
VINNAPAS® EP6420	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® EP6420**
VINNAPAS® EP 11	VAc-E	49 – 51	4,000 – 6,000	4 – 5	3**	0	Slightly tacky	PVOH	Specially designed for cigarette / tipping applications.	●●	●●	●●	●●●	●	●●●	●●	●●	●●	●●	●●						**VINNAPAS® EP 11**
VINNAPAS® EP 14	VAc-E	54 – 56	4,000 – 7,000	4 – 5	3**	0	Slightly tacky	PVOH	Universal binder for paper-packaging applications / film-to-board lamination.	●●	●●	●●	●●●	●	●●●	●●	●●	●●	●●	●●						**VINNAPAS® EP 14**
VINNAPAS® EP 17	VAc-E	59 – 61	2,800 – 4,800	4 – 5	3**	0	Slightly tacky	PVOH/ST	Good compatibility with PUD.	●●	●●	●●	●●	●	●	●	●●	●	●	●●					●●●	**VINNAPAS® EP 17**
VINNAPAS® EAF 68	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 with very good cohesion.	●●●	●	●	●	●	●	●	●●●	●	●	●●		●●●	●●	●●	●●●	**VINNAPAS® EAF 68**
VINNAPAS® DPX 271	VAc	46 ± 2	10,000 ± 4,000	5 – 6	30**	5	Tack-free	PVOH	D3 1C wood adhesive, low formaldehyde, discoloration-free.	●	●●●	●●	●	●	●●	●●	●	●●	●●●	●●	●●●					**VINNAPAS® DPX 271**
VINNOL® Products VC Technology (Co- and Terpolymers) – Surfactant-Protected Grades																									**VINNOL® Products VC Technology (Co- and Terpolymers) – Surfactant-Protected Grades**
VINNOL® 728	VAc-E-VC	52 – 54	100 – 500	5 – 6.5	0	0	Slightly tacky	Anionic	Tremendous elongation of greater than 1000%, with good recovery.	●			●	●	●●●	●●●					●●●				**VINNOL® 728**
VINNOL® 4514	E-VC	49 – 51	25 – 150	7 – 9	12	14	Tack-free	Anionic	Inherently flame retardant and forms films at room temperature.	●	●		●	●	●●●	●●●					●					**VINNOL® 4514**
VINNOL® 4530	E-VC	49 – 51	25 – 500	7 – 9	29	34	Tack-free	Anionic	Inherently flame retardant with high level of stiffness and tensile strength. Dry film offers highest water, alcohol, grease and MVTR barrier properties of the VC grades.	●	●●		●	●	●●●	●●●				●	●					**VINNOL® 4530**

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

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

3 PVOH = Polyvinyl alcohol
4 All products produced without the use of APEO surfactants

* PVOH grades: Brookfield RVF#3 at 20 rpm
VC grades: Brookfield LVF#2 at 60 rpm
**Glass transition temperature measured at midpoint

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

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7325e/07.17 replaces 7325e/10.15

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