WACKER

CREATING TOMORROW'S SOLUTIONS

VINNAPAS®

ADHESIVES I POLYMER BINDERS I MEA

# PRODUCT OVERVIEW VINNAPAS® DISPERSIONS

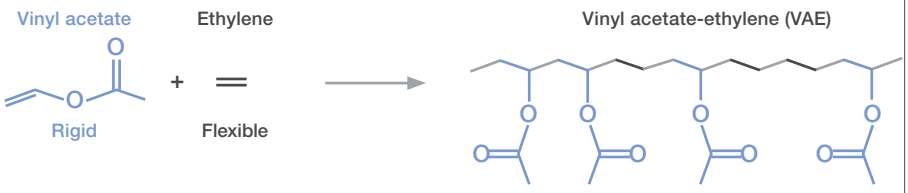
# VINNAPAS® VAE –
# THE HIGH-PERFORMANCE SOLUTION

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

# PRODUCT OVERVIEW

| VINNAPAS® Product | Technical Data[1] | | | | | | | | Product Benefit | Performance Attributes | | | | | | | | | | | | | | | | | | | | | | | | VINNAPAS® Product |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Paper Packaging | | | | | | | | Wood to Wood | | | | | Film to Wood | | | | Flooring Installation | | | | Tapes & Labels | | | Car Interiors | |
| | Base Polymer[2] | Solids Content (DIN EN ISO 3251) (± 1%) | Viscosity BF 20 at 23 °C at 20 rpm [mPa s] (ISO 2555) | pH (ISO 976) | Glass Transition Temperature Midpoint (Germany) / Onset Point (Korea) [°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 | Workability | Overall Adhesion | Heat Resistance | Setting Behavior | Tack | Shear Resistance | Adhesion | Suitability | |
| **VINNAPAS® Products Acrylate Technology – Product Source: Germany** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **VINNAPAS® Products VAE Technology (Copolymers and Terpolymers) – Product Source: Germany** |
| **VINNAPAS® AF 875** | A | 59 – 61 | 3,500 – 6,500 | 3.8 – 5.5 | -60 | 0 | Very tacky | ST | Ready-to-use polymer binder for pressure sensitive adhesive. | | | | | | | | | | | | | | | | | | | | | ●●● | ●● | ●●● | ●● | **VINNAPAS® AF 875** |
| **VINNAPAS® Products VAE Technology (Copolymers and Terpolymers) – Product Source: Germany** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **VINNAPAS® Products VAE Technology (Copolymers and Terpolymers) – Product Source: Germany** |
| **VINNAPAS® EAF 67** | VAc-E-A | 58 – 62 | 7,000 ± 2,500 | 4 – 5 | -35 | 0 | Tacky | ST | Low $T_g$ grade for flooring adhesives or tapes & labels. | ●●● | ● | ● | ● | ● | ● | ● | | | | | | ●● | ● | ● | ●● | ●●● | ●●● | ●● | ●●● | ●●● | ●● | ●●● | ●●● | **VINNAPAS® EAF 67** |
| **VINNAPAS® EAF 68** | VAc-E-A | 58 – 61 | 7,000 ± 2,500 | 4 – 5 | -35 | 0 | Tacky | ST | Low $T_g$ grade for flooring adhesives with excellent dimensional stability. | ●●● | ● | ● | ● | ● | ● | ● | | | | | | ●● | ● | ● | ●● | ●●● | ●●● | ●●● | ●●● | ●●● | ●●● | ●● | ●●● | **VINNAPAS® EAF 68** |
| **VINNAPAS® EF 8860** | VAc-E | 56 – 58 | 1,500 ± 1,000 | 4 – 5 | -10 | 0 | Slightly tacky | ST | Medium-soft binder for flooring adhesives with good plasticizer resistance and high cohesion. Water resistant glue line. | ●● | ● | ● | ● | ● | ● | ● | | | | | | ●●● | ● | ● | ●● | ●●● | ●● | ●●● | ●● | | | | | **VINNAPAS® EF 8860** |
| **VINNAPAS® EP 1** | VAc-E | 49 – 51 | 9,000 ± 3,000 | 4 – 5 | 1 | 0 | Slightly tacky | PVOH/ST | Good compatibility with PUD. | ●● | ●● | ●● | ●●● | ● | ●●● | ●●● | | | | | | ●● | ●● | ●● | ●● | ● | ●● | ●● | ● | | | | | **VINNAPAS® EP 1** |
| **VINNAPAS® EP 11** | VAc-E | 49 – 51 | 5,000 ± 1,000 | 4 – 5 | 3 | 0 | Slightly tacky | PVOH | Universal binder for paper packaging and high cohesion. | ●● | ●● | ●● | ●●● | ● | ●●● | ●● | | | | | | ●● | ●● | ●● | ●● | ● | ●● | ●●● | ● | | | | ●● | **VINNAPAS® EP 11** |
| **VINNAPAS® EP 14** | VAc-E | 54 – 56 | 5,500 ± 1,500 | 4 – 5 | 3 | 0 | Slightly tacky | PVOH | Universal binder for paper packaging applications / film-to-wood lamination. | ●● | ●● | ●● | ●●● | ● | ●●● | ●● | | | | | | ●● | ●● | ●● | ●● | ● | ●● | ●●● | ● | | | | | **VINNAPAS® EP 14** |
| **VINNAPAS® EP 17** | VAc-E | 59 – 61 | 3,800 ± 1,000 | 4 – 5 | 3 | 0 | Slightly tacky | PVOH/ST | Good compatibility with PUD. | ●● | ●● | ●● | ●● | ● | ● | ● | | | | | | ●● | ● | ●● | ●● | ● | ●● | ●●● | ● | | | | ●●● | **VINNAPAS® EP 17** |
| **VINNAPAS® EP 400** | VAc-E | 54 – 56 | 2,400 ± 400 | 4 – 5 | 5 | 0 | Slightly tacky | PVOH | Universal binder for paper packaging applications / film-to-wood lamination. | ●● | ●● | ●● | ●●● | ●● | ●●● | ● | | | | | | ●● | ● | ●● | ●● | ● | ●● | ●●● | ● | | | | | **VINNAPAS® EP 400** |
| **VINNAPAS® EP 401** | VAc-E | 54 – 56 | 2,500 ± 800 | 4 – 5 | -7 | 0 | Slightly tacky | PVOH | Universal binder for paper packaging applications / film-to-wood lamination. Higher adhesion level compared to VINNAPAS® EP 400. | ●●● | ●● | ●●● | ●●● | ●● | ●●● | ● | | | | | | ●● | ● | ●● | ●● | ● | ●● | ●●● | ● | | | | | **VINNAPAS® EP 401** |
| **VINNAPAS® EP 441** | VAc-E | 53 – 57 | 4,000 ± 1,000 | 4 – 5 | 5 | 0 | Slightly tacky | PVOH | Universal binder for paper packaging applications / film-to-wood lamination. Especially suitable for nozzle (HHS) applications. | ●● | ●● | ●● | ●●● | ●●● | ●●● | ● | | | | | | ●● | ● | ●● | ●● | ● | ●● | ●●● | ● | | | | | **VINNAPAS® EP 441** |
| **VINNAPAS® EP 8010** | VAc-E | 58 – 61 | 6,000 ± 2,000 | 4 – 5 | -10 | 0 | Slightly tacky | PVOH/ST | Excellent adhesion to various difficult-to-bond surfaces. | ●●● | ●● | ●●● | ●● | ● | ●●● | ●● | | | | | | ●●● | ●● | ●● | ●● | ● | ●●● | ●● | ● | | | | ●●● | **VINNAPAS® EP 8010** |
| **VINNAPAS® EP 8041** | VAc-E | 51 – 55 | 4,000 – 10,000 | 4 – 6 | -8 | 0 | Slightly tacky | PVOH | Universal binder with low formaldehyde for paper packaging applications / film-to-wood lamination. Especially suitable for nozzle (HHS) applications with high adhesion level. | ●●● | ●● | ●● | ●●● | ●●● | ●●● | ● | | | | | | ●● | ● | ●● | ●● | ● | ●●● | ●● | ● | | | | | **VINNAPAS® EP 8041** |
| **VINNAPAS® Products PVAc Technology – Product Source: Germany** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **VINNAPAS® Products PVAc Technology – Product Source: Germany** |
| **VINNAPAS® DP 500** | VAc | 48 – 52 | 35,000 ± 5,000 | 4.5 – 5.5 | 33 | 14 | Tack-free | PVOH | Very low sedimentation, excellent plasticizer response. | ● | ●●● | ●● | ●● | ● | ●●● | ● | No | No | 5 | ●●● | ●●● | | | | | | | | | | | | | **VINNAPAS® DP 500** |
| **VINNAPAS® DP 600** | VAc | 58 – 62 | 35,000 ± 6,000 | 4 – 5.5 | 33 | 14 | Tack-free | PVOH | Very low sedimentation, excellent plasticizer response. | ● | ●●● | ●● | ●● | ● | ●●● | ● | No | No | 5 | ●●● | ●●● | | | | | | | | | | | | | **VINNAPAS® DP 600** |
| **VINNAPAS® DPN 15** | VAc | 51 – 53 | 15,000 ± 3,000 | 2.5 – 3.5 | 28 | 5 | Tack-free | PVOH | D3 1-component wood adhesive. | | | | | | | | Yes | No | >7 | ● | ●●● | | | | | | | | | | | | | **VINNAPAS® DPN 15** |
| **VINNAPAS® DPN 16** | VAc | 50 – 54 | 12,000 ± 2,000 | 2.5 – 3.5 | 28 | 5 | Tack-free | PVOH | D3 1-component wood adhesive, reduced discoloration. | | | | | | | | Yes | No | >7 | ●● | ●●● | | | | | | | | | | | | | **VINNAPAS® DPN 16** |
| **VINNAPAS® DPN 18** | VAc | 42 – 44 | 10,000 – 20,000 | 2.5 – 3.5 | 28 | 5 | Tack-free | PVOH | D3 1-component wood adhesive, longer open time. | | | | | | | | Yes | No | >7 | ● | ●● | | | | | | | | | | | | | **VINNAPAS® DPN 18** |
| **VINNAPAS® DPX 271** | VAc | 44 – 48 | 10,000 ± 4,000 | 5 – 7 | 30 | 5 | Tack-free | PVOH | D3 1-component wood adhesive, low formaldehyde, discoloration-free. | ● | ●●● | ●● | ● | ● | ●● | ●● | Yes | No | 5 | ●●● | ●●● | ● | ●● | ●●● | ●● | | | | | | | | | **VINNAPAS® DPX 271** |
| **VINNAPAS® Products VAE Technology (Copolymers and Terpolymers) – Product Source: Korea** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **VINNAPAS® Products VAE Technology (Copolymers and Terpolymers) – Product Source: Korea** |
| **VINNAPAS® EAF 7012** | VAc-E-A | 56 – 58 | 1,500 ± 1,000 | 4 – 5 | -10 | 0 | Slightly tacky | ST | Medium-soft binder for flooring adhesives with good plasticizer resistance and high cohesion. Water resistant glue line. | ●● | ● | ● | ● | ● | ● | ● | | | | | | ●●● | ● | ● | ●● | ●●● | ●● | ●●● | ●● | | | | | **VINNAPAS® EAF 7012** |
| **VINNAPAS® EP 645** | VAc-E | 54 – 56 | 5,000 – 10,000 | 4 – 6 | 5 | 0 | Tack-free | PVOH | Good compatibility with PUD and acrylics. Modified VAE for difficult-to-bond substrates, with good wet tack, setting speed and machinability. | ●● | ●● | ●● | ●● | ● | ●● | ●● | | | | | | ●● | ● | ●●● | ●● | ● | ●● | ●●● | ●● | | | | ●●● | **VINNAPAS® EP 645** |
| **VINNAPAS® EP 6411** | VAc-E | 49 – 51 | 4,000 – 6,000 | 4 – 6 | 3 | 0 | Slightly tacky | PVOH | Universal binder for paper packaging and high cohesion. | ●● | ●● | ●● | ●●● | ● | ●●● | ●● | | | | | | ●● | ●● | ●● | ●● | ● | ●● | ●●● | ● | | | | | **VINNAPAS® EP 6411** |
| **VINNAPAS® EP 6420** | VAc-E | 54 – 56 | 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** | VAc-E | 54 – 56 | 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** | VAc-E | 54 – 56 | 2,350 ± 450 | 4 – 6 | 0 | 0 | Slightly tacky | PVOH | Medium softness, for adhesives generally. | ●● | ●● | ●● | ●●● | ● | ●● | ●● | | | | | | ●● | ● | ●● | ●● | ● | ●● | ●●● | ● | | | | | **VINNAPAS® EP 705A** |
| **VINNAPAS® EP 705K** | VAc-E | 54 – 56 | 2,900 – 3,900 | 4 – 6 | 0 | 0 | Slightly tacky | PVOH | Universal binder for paper packaging applications / film-to-wood lamination. | ●● | ●● | ●● | ●●● | ●● | ●● | ●● | | | | | | ●● | ● | ●● | ●● | ● | ●● | ●●● | ● | | | | | **VINNAPAS® EP 705K** |
| **VINNAPAS® EP 706** | VAc-E | 54 – 56 | 4,000 ± 500 | 4 – 6 | 0 | 0 | Slightly tacky | PVOH | Medium softness, high viscosity, for adhesives generally. | ●● | ●● | ●● | ●●● | ●● | ●● | ●● | | | | | | ●● | ● | ●● | ●● | ● | ●● | ●●● | ● | | | | | **VINNAPAS® EP 706** |
| **VINNAPAS® EP 706K** | VAc-E | 54 – 56 | 4,000 – 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 ® EP 706. | ●● | ●● | ●● | ●●● | ●● | ●● | ●● | | | | | | ●● | ● | ●● | ●● | ● | ●● | ●●● | ● | | | | | **VINNAPAS® EP 706K** |
| **VINNAPAS® EP 707K** | VAc-E | 54 – 56 | 1,650 ± 350 | 4 – 6 | 0 | 0 | Slightly tacky | PVOH | Medium softness, adhesives and construction. | ●● | ●● | ●● | ●● | ● | ●● | ●●● | | | | | | ●● | ● | ●● | ●● | ●● | ●● | ●● | ● | | | | | **VINNAPAS® EP 707K** |
| **VINNAPAS® EP 760** | VAc-E | 59.5 – 61.5 | 2,500 ± 500 | 4 – 6 | 0 | 0 | Slightly tacky | PVOH | Medium softness, high solids. | ●● | ●● | ●● | ●●● | ● | ●● | ●● | | | | | | ●● | ● | ●● | ●● | ●● | ●● | ●●● | ●● | | | | | **VINNAPAS® EP 760** |

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

*Glass transition temperature measured at midpoint

**VINNAPAS® eco:**
The majority of VINNAPAS® grades that contain vinyl acetate can be certified as VINNAPAS® eco according to the mass balance approach. For more information on the mass balance approach and available VINNAPAS® eco grades, please visit www.wacker.com.

# 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
- 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.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