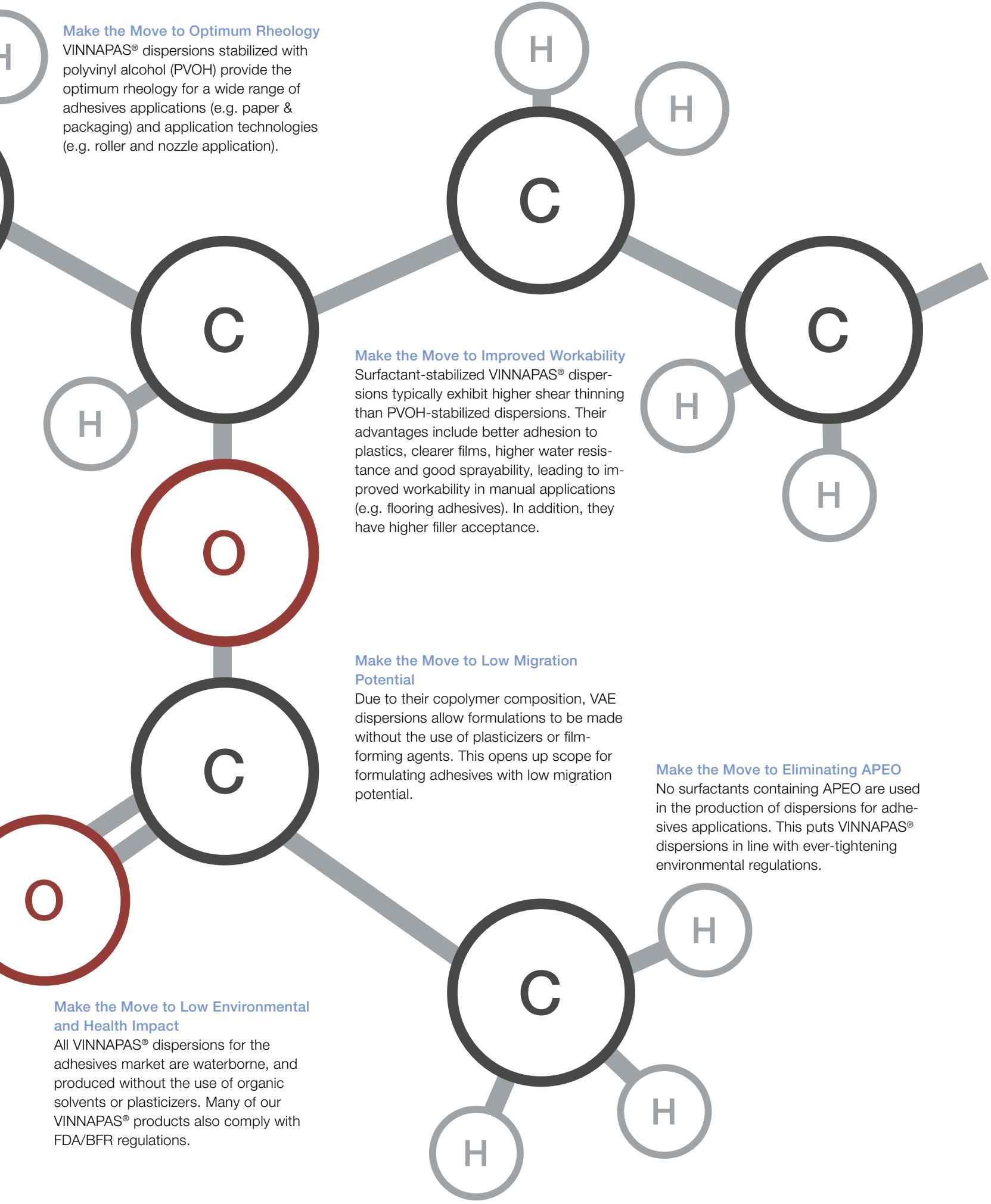


ADHESIVES | POLYMER BINDERS | ASIA PACIFIC & INDIA

FORMULATING THE FUTURE – WITH VINNAPAS® DISPERSIONS FOR ADHESIVES



Make the Move to Optimum Rheology

VINNAPAS® dispersions stabilized with polyvinyl alcohol (PVOH) provide the optimum rheology for a wide range of adhesives applications (e.g. paper & packaging) and application technologies (e.g. roller and nozzle application).

Make the Move to Improved Workability

Surfactant-stabilized VINNAPAS® dispersions typically exhibit higher shear thinning than PVOH-stabilized dispersions. Their advantages include better adhesion to plastics, clearer films, higher water resistance and good sprayability, leading to improved workability in manual applications (e.g. flooring adhesives). In addition, they have higher filler acceptance.

Make the Move to Low Migration Potential

Due to their copolymer composition, VAE dispersions allow formulations to be made without the use of plasticizers or film-forming agents. This opens up scope for formulating adhesives with low migration potential.

Make the Move to Eliminating APEO

No surfactants containing APEO are used in the production of dispersions for adhesives applications. This puts VINNAPAS® dispersions in line with ever-tightening environmental regulations.

Make the Move to Low Environmental and Health Impact

All VINNAPAS® dispersions for the adhesives market are waterborne, and produced without the use of organic solvents or plasticizers. Many of our VINNAPAS® products also comply with FDA/BFR regulations.

WACKER: FUTURE-BOUND SINCE 1938

WACKER is a leading supplier of vinyl acetate-ethylene copolymers and terpolymers (VAE) and polyvinyl acetate homopolymers (PVAc). Our dispersions for waterborne adhesives are trademarked under the brand name VINNAPAS®. WACKER is globally renowned for its expertise in polymer dispersions and its innovative edge in the business.

Leading The Way

WACKER is one of the most research-intensive chemical corporations worldwide. Recent developments in VINNAPAS® extend the range of applications beyond those of traditional adhesives, such as paper & packaging, wood working and flooring, to new markets, such as automotive adhesives.

Key Facts about WACKER

- R&D rate: 3.9 percent
- New-product rate (NPR): 22.7 percent
- About 5,500 active patents worldwide, with 2,400 patents pending

1938

Industrial-scale production of polyvinyl acetate dispersions starts at our Burghausen site in Germany: VINNAPAS® H 60 is a polyvinyl alcohol-stabilized dispersion for wood glue.

1955

WACKER develops the first copolymer dispersions that minimize the need for plasticizers.

1960

The development of VAE technology marks a new era and is an important milestone in the history of dispersions.

1980

WACKER develops VINNAPAS® VAE terpolymer grades for flooring applications.



2015

Let's continue discovering the innovation trail with you.

2013

Production capacity increases to 90,000 metric tons per year, almost doubling total capacity and making the plant complex one of the biggest of its kind in South Korea.

2012

WACKER opens a regional competence center in Seoul. The competence center brings together R&D activities, applications technology and the WACKER ACADEMY. In the same year, the technical center in Singapore is expanded to include dispersion applications.

2008

With the acquisition of Air Products Polymers, WACKER starts local production of vinyl acetate-ethylene dispersions in Ulsan, South Korea, to meet the increasing demands of the Asian adhesives market.

2011

WACKER expands the local technical center in Mumbai, India, to include dispersions applications.

2004

WACKER Korea launches its first VAE dispersions without formaldehyde donors; these become the industry standard from that point on.

1996

Wacker Chemicals Korea is founded with a subsidiary in Seoul, South Korea.



We Support You Around the Globe





BECAUSE GLOBAL IS LOCAL

WACKER today is a global player in the polymeric binders market. We have come so far because we have always been close to our customers and their markets, establishing subsidiaries and providing experts in our focus regions.

Global Expertise

WACKER is present with some 100 subsidiaries and sales offices in all key regions. Our VINNAPAS® grades for adhesives applications are produced in five manufacturing plants across Europe, the Americas, China and the Asia-Pacific region. We also maintain an extensive, global network of R&D, process and analytical expertise that can provide additional support for our customers.

With Local Focus

Although global in scope, we are local in focus thanks to our in-depth understanding of local market needs and emphasis on close relationships with our customers. We offer you technical support through technical centers in all key regions. Their laboratories are designed to assist you with applications as well as in developing new systems and formulations. The WACKER ACADEMY offers market-specific product training and interdisciplinary seminars.

With 90,000 mt/a production capacity for VAE dispersions at our Ulsan plant, WACKER is strengthening its position as the world's largest manufacturer of VAE dispersions. In addition, our Seoul R&D center is fully set up with state-of-the-art equipment and technology to support regional product development. As a result, WACKER can respond quickly and efficiently to market demands.





PRESSURE-SENSITIVE ADHESIVES

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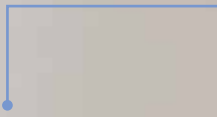
WOOD-TO-WOOD AND FILM-TO-WOOD ADHESIVES

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VERSATILITY MEETS EFFICIENCY

Featured Solutions

Excellent adhesion

The excellent adhesion of VINNAPAS® VAE dispersions makes them an ideal base for adhesives for a variety of difficult surfaces within paper & packaging. Examples of these are envelope windows, folded boxes, and film lamination to paper.

Food safety

Thanks to their copolymer composition, our VINNAPAS® VAE dispersions can be used to formulate plasticizer-free paper & packaging adhesives with low migration potential that comply with European legislation on food-contact materials.

Reliability and clean machinability

VINNAPAS® VAE dispersions are suited to a broad range of paper & packaging adhesives for all types of application technologies. VINNAPAS® EP706K and EP706 are especially versatile due their compatibility with both roller and nozzle technology.

Featured Applications

Envelopes

Envelopes have changed dramatically in style and uses, and are now made not only with paper but also with specialized substrates. VINNAPAS® dispersions are vital for ensuring that envelopes made with such materials do not fall apart.

Folded boxes

VINNAPAS® dispersions offer the strong adhesion/cohesion balance, low temperature flexibility, good wetting and setting speed necessary to make these packaging applications possible.

Bags

VINNAPAS® VAE dispersions offer adhesives manufacturers the necessary balance of setting speed, adhesion, heat resistance and strength for complex multi-wall bags.

Bookbinding

VINNAPAS® dispersions offer the necessary balance of adhesive and cohesive strength, along with great flexibility and the desired rheological properties.



PAPER & PACKAGING ADHESIVES

VINNAPAS® dispersions are used to formulate a wide range of paper & packaging adhesives. They are notable for their strong adhesion to a large number of substrates, very high heat resistance, excellent machinability and high formulation versatility.

Benefits:

- Broad adhesion and heat resistance spectrum
- Excellent adhesion to a wide range of different substrates, including low-energy substrates, such as PET and PS
- High setting speed
- Reliable, clean machinability
- Formulation versatility
- Formulation of adhesives compliant with food-contact regulations
- Outstanding nozzle compatibility
- Suited to various application technologies

Please note: The benefits stated above are a summary of those possible. Not every individual product can fulfill all the benefits stated.

Applications:

- Paper and cardboard packaging
- Case and carton packaging
- Film-to-board lamination
- Tube winding and honeycomb
- Envelopes
- Bags
- Folded boxes
- Bookbinding

ESTHETICS AND FUNCTIONALITY

Featured Solutions

Strong and durable

We offer a diverse portfolio of binders that generate strong, durable bonds in formulations for wood adhesives and industrial wood-processing adhesives. For example, VINNAPAS® DPX 271 dispersion is a water-resistant, low-formaldehyde binder that can bond sensitive woods without producing discoloration.

Featured Applications

Whether used for bonding wood for furniture, veneers, wood flooring, doors and windows or for laminating wood to film or coated paper, VINNAPAS® dispersions possess an extraordinary range of properties that will ultimately improve the functionality and performance of the end-product.

Wood adhesives D2 to D4

High-performance PVAc dispersions provide reliable, water-resistant adhesion. They make ideal solutions for humid and damp areas (e.g. basements and bathrooms) as well as for exterior applications involving direct water contact (e.g. windows). The culmination of 70 years of expertise and development, VINNAPAS® dispersions have water-resistance levels that can be adjusted to match the specific application areas of the respective wood-based materials.

Vinyl, film and paper lamination

Thanks to their good adhesion to impregnated paper, PVC and other plastic film, VINNAPAS® VAE dispersions can be used to wet-laminate decorative plastic film to chipboard, MDF and hardboard. The high cohesion of VINNAPAS® VAE dispersions imparts high green strength to formulations with, e.g., polyurethanes for heat-sealing and vacuum-forming applications.



WOOD- TO-WOOD AND FILM- TO-WOOD ADHESIVES

VINNAPAS® dispersions possess an extraordinary range of properties for wood and furniture adhesives that are designed to perform to the highest standards. Their outstanding properties include water, heat and creep resistance.

Benefits:

Wood adhesives D2 to D4

- Excellent water and heat resistance
- Fast setting speed
- DPX Technology
 - No hardener required
 - Ultra-low formaldehyde level of < 5 ppm
 - Discoloration-free

Film-to-wood applications

- Good overall properties especially for impregnated paper or PVC lamination
- Excellent adhesion to PVC film for wet lamination
- Excellent adhesion to difficult substrates
- Very high setting speed

Please note: The benefits stated above are a summary of those possible. Not every individual product can fulfill all the benefits stated.

Applications:

- Wood and wood-processing adhesives D2 to D4, e.g. for furniture, wood flooring, veneers, windows, doors
- Vinyl, film and paper lamination to wood materials



HIGH PERFORMANCE, LOW EMISSIONS

Featured Solutions

In general, VINNAPAS® VAE copolymer and terpolymer dispersions are the preferred products for formulating flooring adhesives for a wide range of flexible floor coverings. In particular, our VINNAPAS® EP701 provides high initial tack coupled with outstanding cohesion and dimensional stability when used in flooring adhesives.

Featured Applications

Whether in offices, schools, hospitals or residential housing, modern flooring must be rugged, long-lasting, easy to clean and pollutant-free, and at the same time have low emission values. Our VINNAPAS® copolymer and terpolymer dispersions can be used to formulate flooring adhesives for wood, PVC, rubber, linoleum, cork and textiles that comply with European regulations and labeling requirements.



FLOORING ADHESIVES

VINNAPAS® VAE co-polymer and terpolymer dispersions are recommended for flooring adhesives due to their combination of performance advantages and environmental benefits. They are ideal for a wide variety of flexible floor coverings.

Benefits:

- Formulation compatibility
- Long-lasting, highly durable bonding
- Strong adhesion to various substrates
- High cohesive strength
- Outstanding workability
- Excellent dimensional stability

Please note: The benefits stated above are a summary of those possible. Not every individual product can fulfill all the benefits stated.

Applications:

Textile flooring and flexible floor coverings

- PVC
- Rubber
- Linoleum
- Cork
- Textile

PRESSURE-SENSITIVE ADHESIVES

Specific VINNAPAS® dispersions are used in the formulation of pressure-sensitive adhesives (PSAs), either by themselves or in blends with acrylates.

Benefits:

- Excellent balance between tack and cohesion
- Excellent adhesion to a variety of surfaces

Please note: The benefits stated above are a summary of those possible. Not every individual product can fulfill all the benefits stated.

Applications:

- Industrial and DIY tapes
- Paper labels





AUTOMOTIVE ADHESIVES

VINNAPAS® VAE copolymer and terpolymer dispersions can serve in a wide variety of high-performance adhesives for car interior applications, including film-to-board lamination, PSA labels and textile lamination.

Benefits:

- Excellent balance of tack, adhesion and heat resistance
- Low fogging potential

Please note: The benefits stated above are a summary of those possible. Not every individual product can fulfill all the benefits stated.

Applications:

- Door paneling
- Headliners
- Parcel shelves
- Trunks
- Dashboards

EXPERTISE AND SERVICE NETWORK ON FIVE CONTINENTS



• Sales offices and production sites, plus 21 technical centers, ensure you a local presence worldwide.

WACKER is one of the world's leading and most research-intensive chemical companies, with total sales of €4.83 billion. Products range from silicones, binders and polymer additives for diverse industrial sectors to bioengineered pharmaceutical actives and hyperpure silicon for semiconductor and solar applications. As a technology leader focusing on sustainability, WACKER promotes products and ideas that offer a high value-added potential to ensure that current and future generations enjoy a better quality of life based on energy efficiency and protection of the climate and environment.

Spanning the globe with 5 business divisions, we offer our customers highly-specialized products and comprehensive service via 25 production sites, 21 technical competence centers, 13 WACKER ACADEMY training centers and 48 sales offices in Europe, North and South America, as well as in Asia – including a presence in China. With a workforce of some 16,700, we see ourselves as a reliable innovation partner that develops trailblazing solutions for, and in collaboration with, our customers. We also help them boost their own success. Our technical centers employ local

specialists who assist customers worldwide in the development of products tailored to regional demands, supporting them during every stage of their complex production processes, if required. WACKER e-solutions are online services provided via our customer portal and as integrated process solutions. Our customers and business partners thus benefit from comprehensive information and reliable service to enable projects and orders to be handled fast, reliably and highly efficiently. Visit us anywhere, anytime around the world at: www.wacker.com



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