WACKER

CREATING TOMORROW'S SOLUTIONS

VINNAPAS®

PRIMIS®

CONSTRUCTION & PAINTS I POLYMER BINDERS I EMEA

POLYMER DISPERSIONS AND POWDERS FOR ARCHITECTURAL COATINGS

The way we build defines the way we live – as individuals, families and societies – today as well as tomorrow.

Let’s work together to make the most of that responsibility – for present and future generations.

WACKER – WE'RE HERE FOR YOU

WACKER is a global chemical company with over 100 years of history and a leading portfolio of solutions for the construction, coatings and paint industries. From our beginnings in Burghausen, Germany, we have been continously developing for decades to become an active partner across the EMEA region. Our subsidiary in Dubai was established in 1999; in 2002, the technical center and a WACKER ACADEMY followed. The technical center in Moscow opened its doors in 2003 and was soon accompanied by a WACKER ACADEMY here, too.

Count on Us!

We Give Our Best

Why do something halfheartedly if you can do it right? To us, quality is not about choosing between an expensive or economic solution. VINNAPAS® polymer binders significantly improve the cost-performance ratio of construction materials.

We Act Locally

Topography, climate and culture make architecture local by nature. That is why we are local, too. With sales offices, production sites, technical centers and native experts around the globe, we work globally with customers and authorities to develop local solutions.

We Value Sustainability

In construction, resources are needed for building and maintenance work. Our R&D specialists and application chemists focus on finding answers that conserve resources throughout the entire lifespan of a building.

We Improve Standards

Quality of life should not be a privilege. We strive to develop and enable solutions that are in balance with human, environmental and economic demands.

We Keep Inventing

WACKER is one of the most research-intensive companies in its field.
We invite you to challenge us with your questions and ideas.

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

Polymer binders have revolutionized the construction and paint industry more than once. WACKER has been a key player in this development.

1920s
WACKER begins researching polymer binders.

1938
Poly (vinyl acetate) dispersion production begins on an industrial scale.

1949
VINNAPAS® makes dispersion-based paints possible.

1957
WACKER is the first to produce a free-flowing dispersible polymer powder by spray drying.

1960
WACKER develops dispersions based on vinyl acetate-ethylene (VAE).

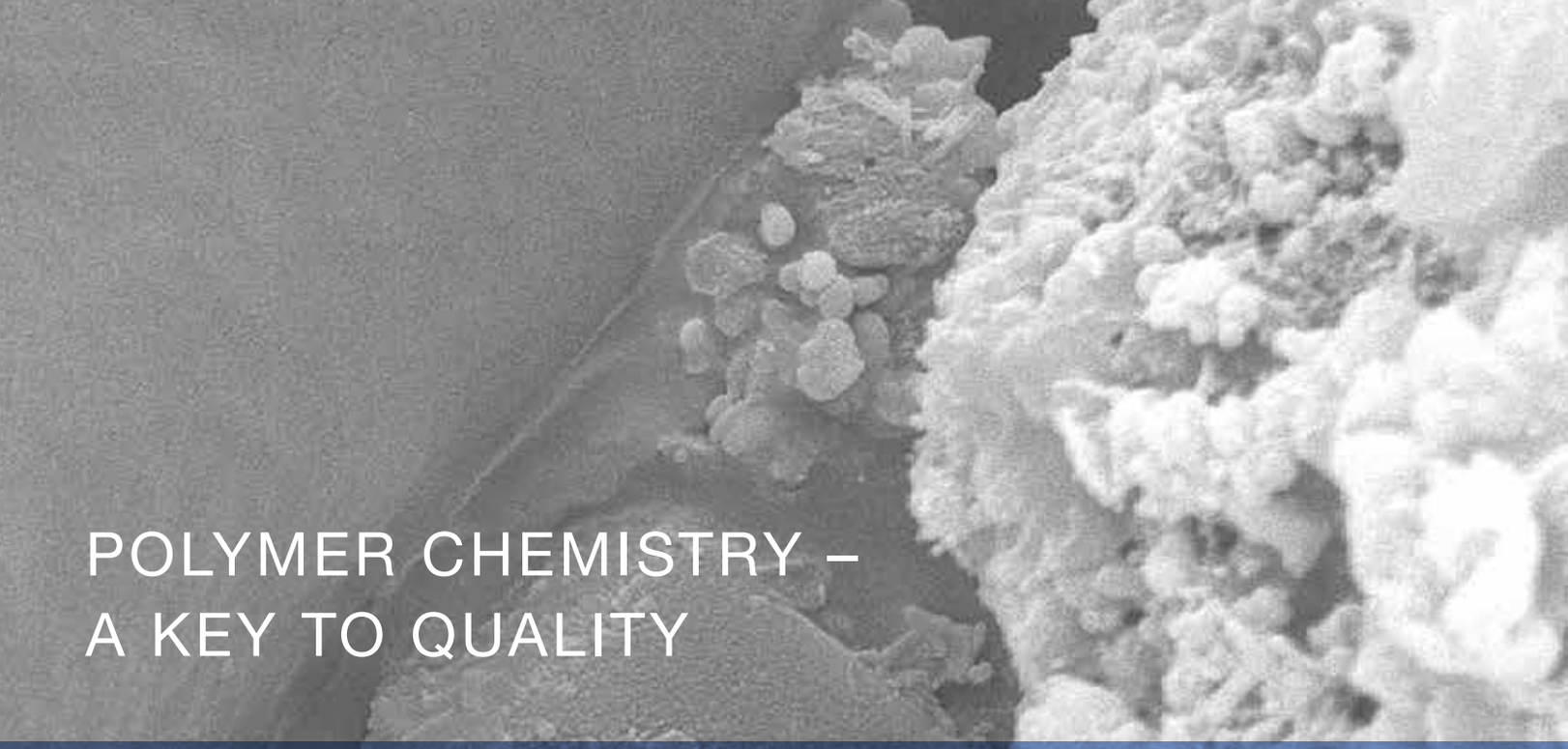
1964
WACKER develops the first terpolymer dispersion with vinyl chloride.

1985
The first dispersible powders based on VAE are manufactured.

2008
WACKER takes control of its APP joint venture by acquiring the share held by Air Products and Chemicals – strengthening its global position and market leadership in all key markets.

2015
WACKER introduces its high performance dispersion product line PRIMIS®.

2017
WACKER showcases its expansion of the PRIMIS® product line of easy-to-clean/stain-resistant wall and flooring solutions at the European Coatings Show.



POLYMER CHEMISTRY – A KEY TO QUALITY

Polymer binders enhance two critical characteristics of all mortars and coatings: adhesion and flexibility. They ensure the quality of buildings and prolong their life expectancy while reducing material consumption. At the same time, they increase creative freedom by making it possible to combine a wide variety of construction materials.

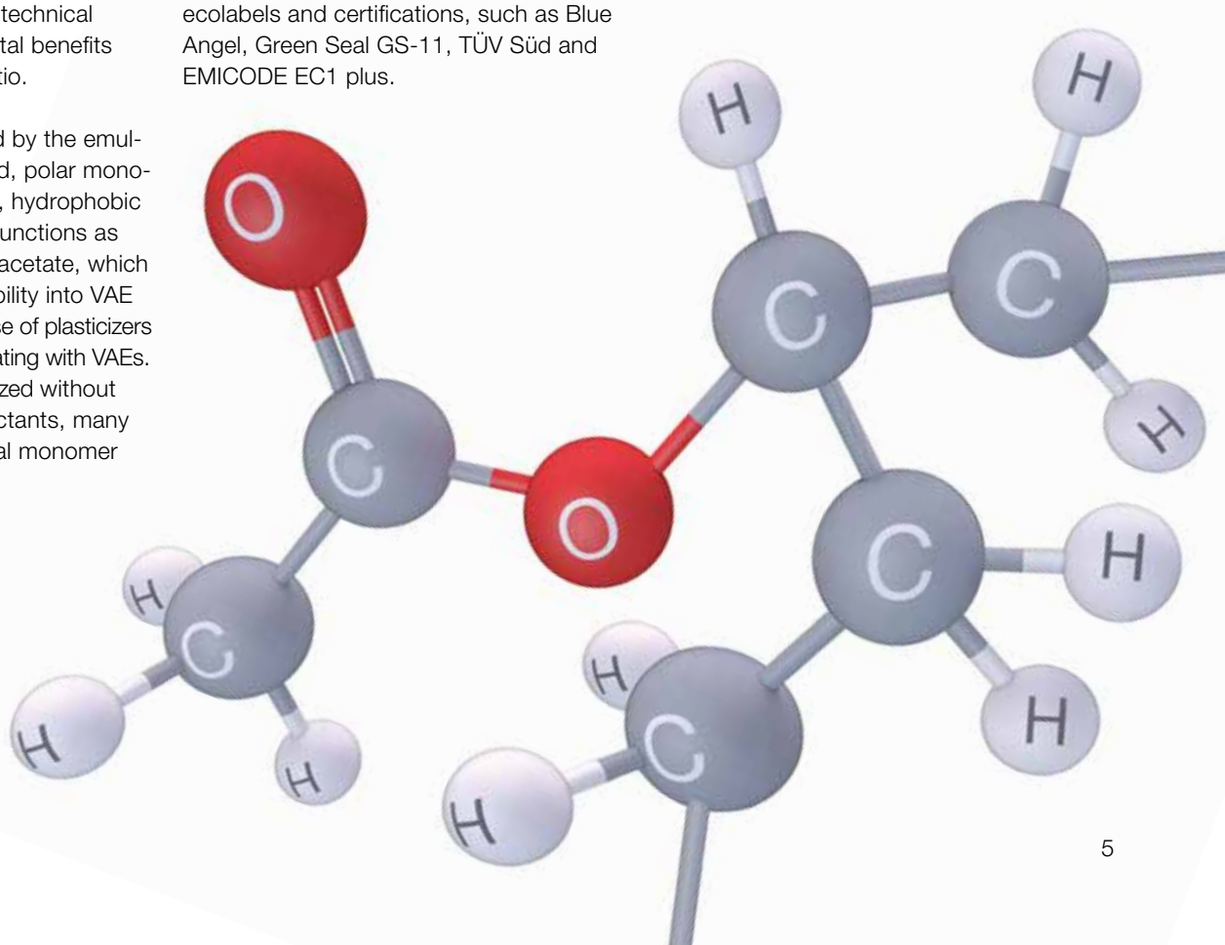
Vinyl Acetate-Ethylene (VAE) – Serving the Megatrends of Today and Tomorrow

VINNAPAS® dispersions are co- and terpolymers based on vinyl acetate, ethylene and other monomers. Vinyl acetate-ethylene (VAE), in particular, combines technical performance with environmental benefits at an attractive cost-in-use ratio.

VAE dispersions are produced by the emulsion polymerization of the hard, polar monomer vinyl acetate and the soft, hydrophobic monomer ethylene. Ethylene functions as an optimal flexibilizer for vinyl acetate, which incorporating permanent flexibility into VAE polymers. Consequently, the use of plasticizers can be minimized when formulating with VAEs. In addition, all grades are stabilized without the use of APEO-based surfactants, many of them also show low residual monomer content (<500 ppm).

Compliance with Strict Labels

With our cutting-edge VINNAPAS® VAE binders, the construction and paint industries are equipped to meet stringent governmental regulations, as well as the requirements of internationally recognized ecolabels and certifications, such as Blue Angel, Green Seal GS-11, TÜV Süd and EMICODE EC1 plus.



WACKER SERVICES – YOUR COMPETITIVE EDGE

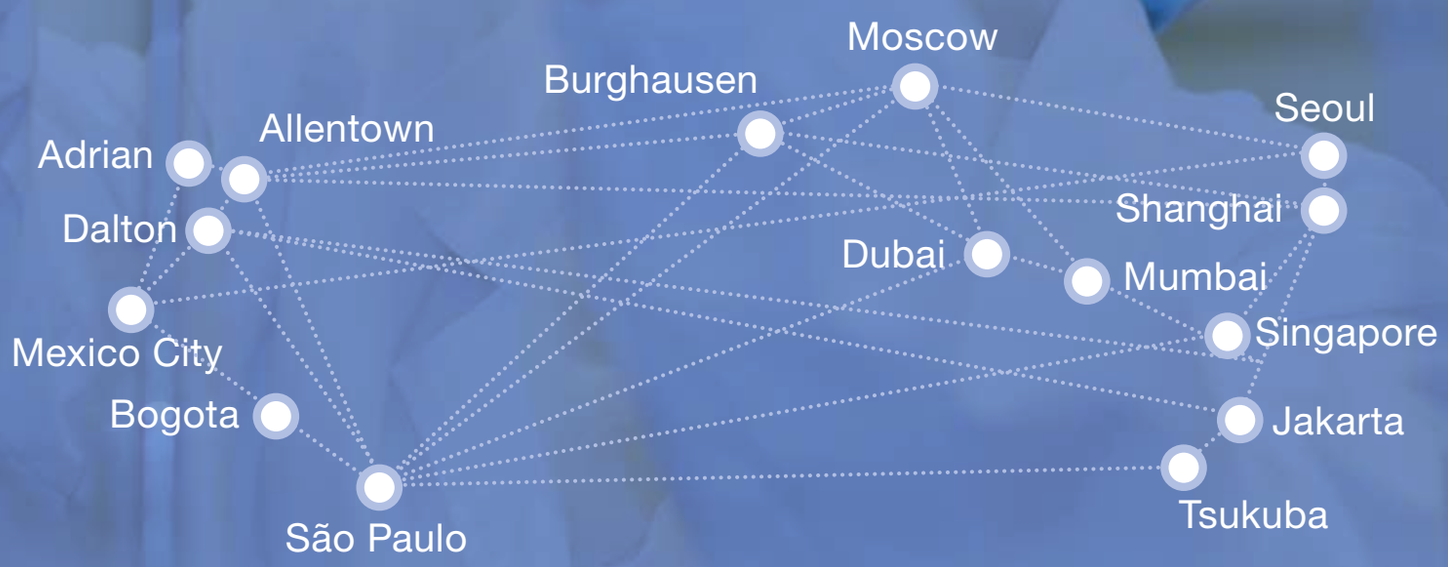
In our decades of working with polymer binders, we have learned a lot about their specific chemistry – and even more about their markets. We bring that knowledge to you at our technical centers and WACKER ACADEMY.

Do You Want Your Products to Meet New Requirements?
Our technical center helps to optimize your formulation.

Are You Looking for New Business Ideas?
At your WACKER ACADEMY, we organize innovation workshops that are relevant to markets.

Do You Want to Enhance Your Product with a VINNAPAS® Polymer?
At your WACKER ACADEMY, we offer training in polymer chemistry and its application fields such as architectural coatings or mortar formulations.

WACKER ACADEMY and Technical Centers Worldwide

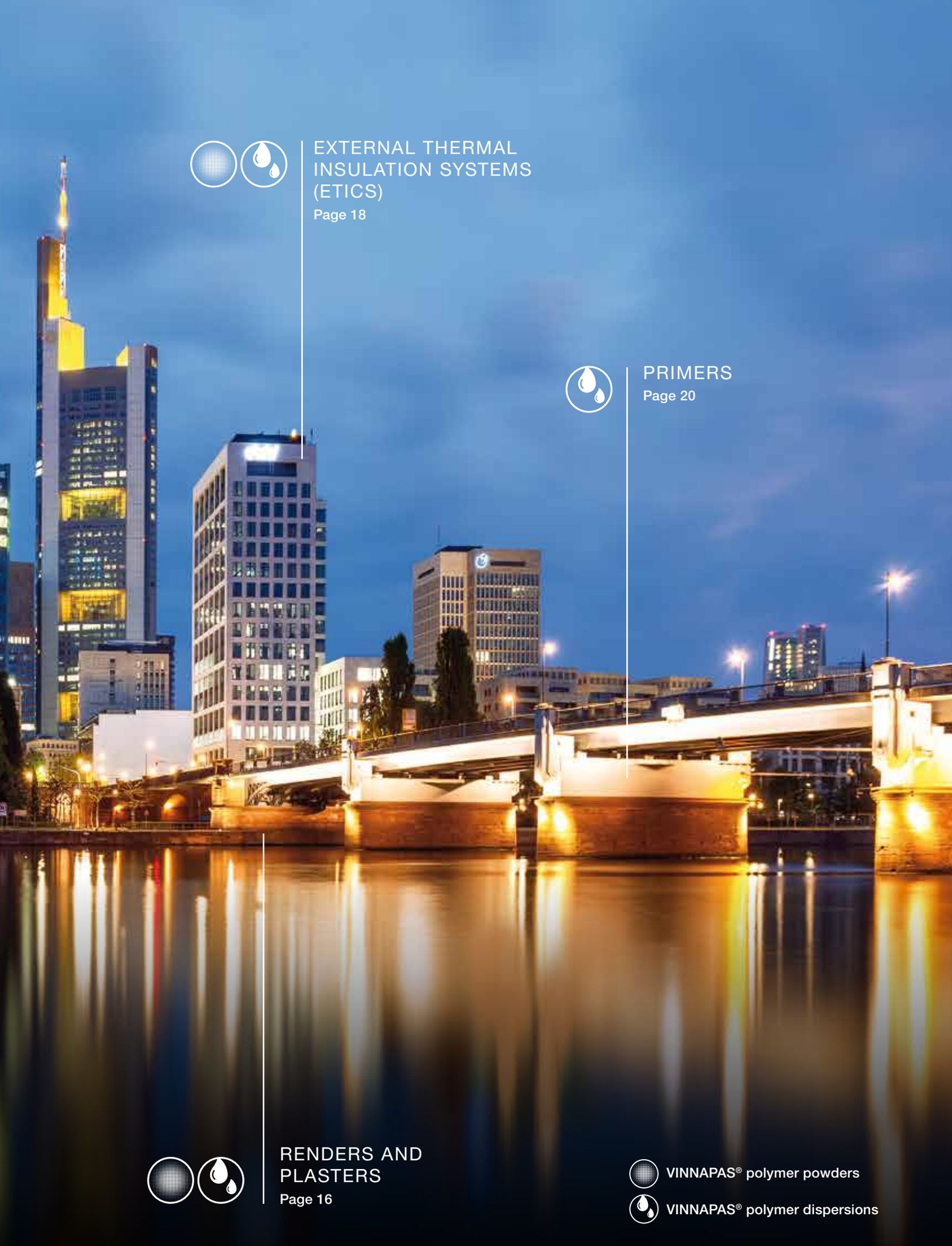


A VARIETY OF CONSTRUCTION APPLICATIONS

SPECIALTY, INTUMESCENT AND FIRE-RESISTANT PAINTS
Page 14

INTERIOR PAINTS
Page 10

EXTERIOR PAINTS
Page 12



EXTERNAL THERMAL INSULATION SYSTEMS (ETICS)

Page 18

PRIMERS

Page 20

RENDERS AND PLASTERS

Page 16

VINNAPAS® polymer powders

VINNAPAS® polymer dispersions

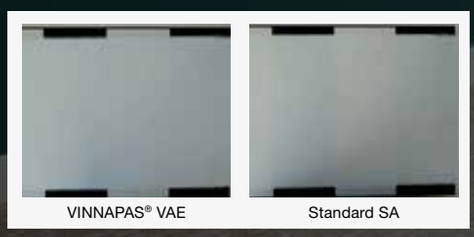
The Benefits of Hydro-Plastification

Today's challenge is to reduce VOCs without compromising performance. VINNAPAS® VAE dispersions enable low-VOC paints via "hydroplastification": water takes the role of an internal flexibilizer, enhancing the coalescence of the polymer particles. They thus exhibit excellent film-forming characteristics without the addition of coalescing agents or solvents – even at temperatures below 5 °C. The resulting benefits: cost savings due to the reduction of unnecessary solvent or coalescing agents, a minimized odor profile and therefore the achievement of strict ecolabel requirements such as chamber measurements and total VOC (TVOC) restrictions.

Excellent Hiding Power and Scrub Resistance

VINNAPAS® VAE dispersions exhibit excellent scrub resistance and hiding power, thus contributing to the performance and cost effectiveness of paints. Their excellent hiding power makes it possible to reduce the amount of titanium dioxide while still achieving the same contrast ratio at a given spreading rate compared to conventional styrene acrylics and other technologies. In addition, specific VINNAPAS® VAE dispersions have been optimized to offer blocking behavior and high gloss retention – key features for silk and semi-gloss paints.

VAE-based paints exhibit proper film formation even at low temperatures compared to styrene acrylic-based paints, which require the addition of plasticizers or solvents for film formation at low temperatures. In the picture above, film formation is tested with a temperature gradient: the whiter the sample, the worse the film formation. VAE performs down to 0 °C with no solvents added.



Comparison of hiding power of a VINNAPAS® VAE and a standard styrene acrylic (SA). The black background is much more noticeable in the SA sample compared to the VAE.

INTERIOR PAINTS

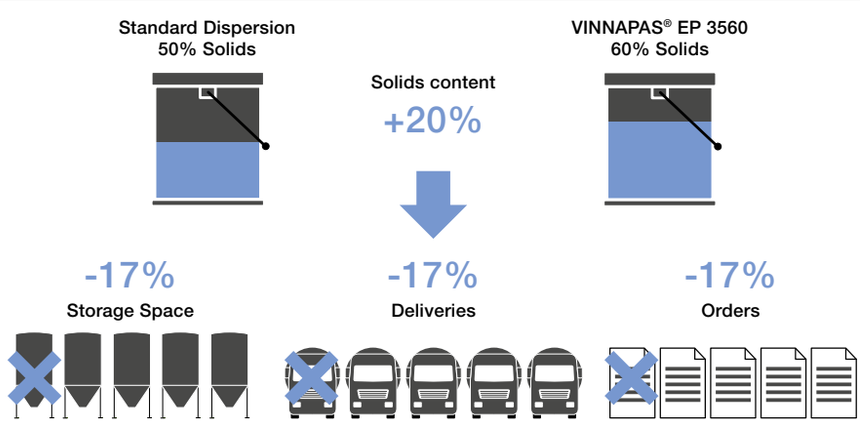
VINNAPAS® dispersions are used to formulate high-performance interior paints with a low to very low VOC content (<1g/l) and low odor for a variety of gloss levels. VAE technology offers the perfect combination of performance and environmental benefits at an attractive cost. PRIMIS® dispersions can be used as co-binders to enhance selected performance properties.

Featured Solutions

VINNAPAS® EP 3560 – WACKERS New Solution for Higher Supply Chain Efficiency with Optimized Emmission Profile

VINNAPAS® EP 3560, our highly versatile interior paint binder, has a solids content of 60% and can be formulated across a broad range of PVC levels. Compared to standard binders with 50% solids content, this leads to a variety of effciency benefits in the supply chain and production. In addition, we have optimized its emmission profile to meet tomorrow's environmental regulation standards.

Higher Solids Content Leads to Higher Supply Chain Efficiency



PRIMIS® SAF 9000 for Highly Stain Resistant Paints

PRIMIS® SAF 9000 is a high-performance co-binder to improve stain resistance and easy-to-clean properties in interior paints. It can be used to reduce the impact of a variety of household stains including coffee, ketchup and text markers.

Stain removal test using a paint modified with PRIMIS® SAF 9000.

PERFORMANCE BENEFITS

- High formulation versatility for a variety of PVC levels
- Production advantages such as reduced silo space when using grades with a higher solid content
- Excellent scrub resistance
- Very good hiding power
- Very good touch-up properties
- Good response to thickening agents
- High compatibility with slurries

ENVIRONMENTAL BENEFITS

- No solvents or coalescents needed
- Produced without APEO surfactants
- Low to very-low-VOC formulations possible (<1 g/l)
- Low to very-low-odor coatings possible

ECONOMICAL BENEFITS

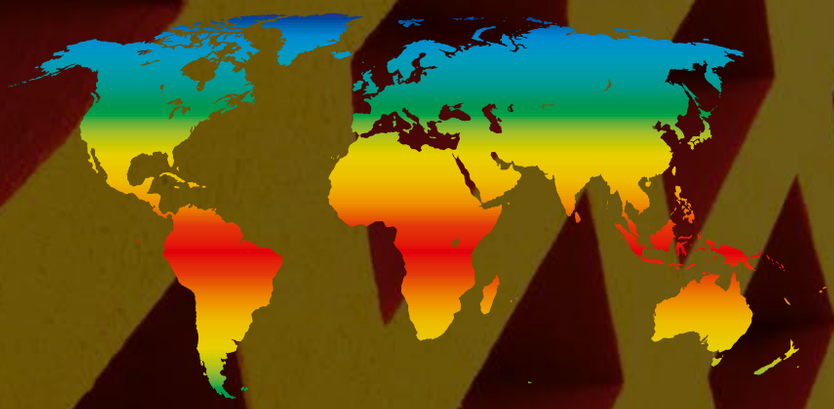
- Favorable cost-in-use ratio
- Potential savings by using less titanium dioxide due to excellent hiding power

APPLICATION SPECTRUM

- Paints, textured coatings and plasters
- From matt to semi-gloss and gloss finishes
- White, pastel or deep color paints

Always a Perfect Fit

Our portfolio offers solutions for any climatic condition …



… and across all quality segments

For the entry level and mid-range segments, we offer VINNAPAS® dispersions for various degrees of

- Water resistance
- Mechanical strength
- Exterior weathering behavior
- Resistance to dirt pick-up

For the high-end segment, PRIMIS® AF 1000 combines organic and inorganic components, thus providing

- Very low dirt pick-up
- Very high color stability, even for sensitive organic pigments
- Reduction in snail trails / water soluble additives (e.g. emulsifier) leaching
- Excellent durability even when exposed to harsh conditions

along with standard requirements such as:

- High water resistance
- High mechanical strength

EXTERIOR PAINTS

PRIMIS® and VINNAPAS® dispersions are an attractive alternative to conventional acrylic- and styrene acrylic-systems for outdoor applications. Paints formulated with PRIMIS® and VINNAPAS® dispersions extend the longevity of houses by protecting the substrate.

Featured Solutions

VINNAPAS® EAF 730 – The Best of Several Technologies

The novel binder is based on VAE-co-acrylate core-shell technology. This combination ensures high blocking resistance, excellent color stability, very low dirt pick-up, very good saponification resistance and excellent hydrophobicity.

VINNAPAS® Grades for Low Flammability

VINNAPAS® dispersions based on terpolymers containing vinyl chloride (VC) inherent low flammability for flame-retardant formulations that match Fire Class B under EN 13501-1.

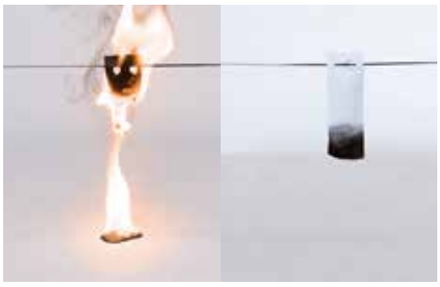
PRIMIS® Grades Used As High Performance Additives

For exterior paints, two high-performance additives can enhance your paint: PRIMIS® SAF 9000 is used as a co-binder to reduce snail trails, also known as water soluble additives (e.g. emulsifier) leeching. PRIMIS® KT 3000 is an additive that makes it possible for paints and plasters to be applied at temperatures of 6 °C or below.

Color Stability Test After 57 Months of Exterior Exposure

Test panels, top row: VINNAPAS® EAF 730
Test panels, bottom row: acrylics

Flammability Test



Standard SA | **VC-based VINNAPAS® dispersion**

Rain test of a VINNAPAS® based paint enhanced with PRIMIS® KT 3000 used to prevent damage from early rain.

PERFORMANCE BENEFITS

- High formulation versatility for a variety of PVC levels
- Very low dirt pick-up
- Excellent color stability (even with organic pigments)
- Good water repellency
- Good water-vapor permeability
- Excellent compatibility with pigment pastes
- Ideal workability and applicability
- High to very high durability

ENVIRONMENTAL BENEFITS

- No solvents or coalescents needed
- Produced without APEO surfactants
- Formulation of very-low-VOC paints possible (<1 g/l)

ECONOMICAL BENEFITS

- Favorable cost-in-use ratio

APPLICATION SPECTRUM

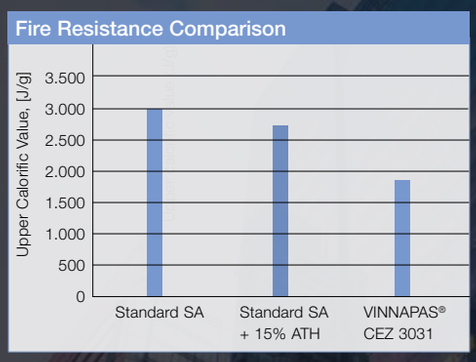
- Exterior masonry paints
- Textured or structured coatings
- Silicone resin emulsion paints
- Silicate paints
- Lime paints
- Pastel or deep color paints
- Elastomeric or crack-bridging systems

Protecting Steel Against Fire

When exposed to fire, unprotected steel skeleton frames in high-rise buildings bend and collapse within five to ten minutes. Intumescent fire protection coatings are used to protect such steel girders in order to gain time for evacuation. The coating is usually applied one to four millimeters thick and, when subjected to heat, foams to tens of hundreds of times its original thickness, thus protecting the steel girders against the heat from the fire for a longer time period.

Fire Resistance Without Additives

Fire-resistant paints based on vinyl-chloride-(VC) containing VINNAPAS® terpolymers improve fire-retardant effectiveness due to the self-extinguishing properties of VC binders and thus exhibit an inherent fire-retarding effect without the addition of fire-retarding agents or additives.



The graph shows the inherent fire resistance of VINNAPAS® CEZ 3031 in comparison to standard styrene acrylics (with or without flame retardancy additive ATH) in a base coat. The lower the calorific value the better the fire resistance and burning behavior.

SPECIALTY, INTUMESCENT AND FIRE-RESISTANT PAINTS

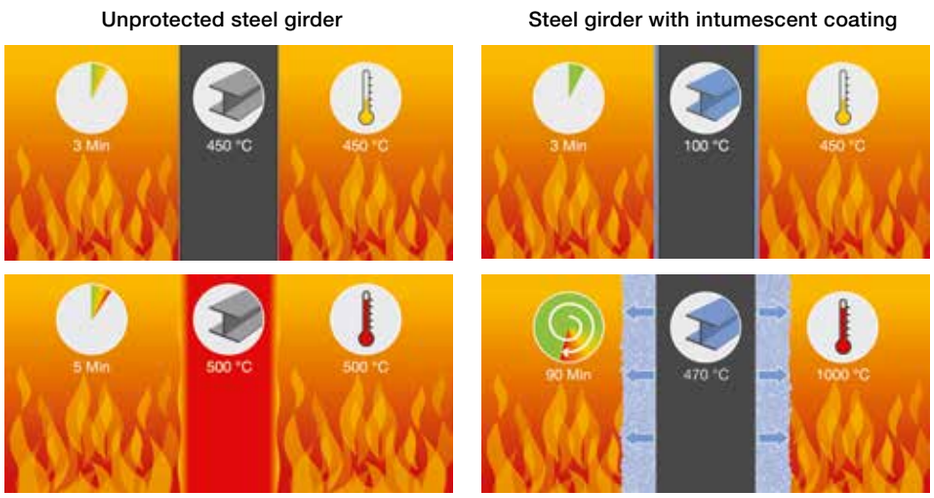
VINNAPAS® dispersions are used in a wide variety of specialty applications, including roof paints, oil-resistant coatings, substrate preparation, and joint compounds. Used as binders in intumescent or fire-resistant paints, they are essential components in the event of a fire.

Featured Solution

Intumescent Coatings

VINNAPAS® EZ 3067 and VINNAPAS® EZ 3112 are the perfect choice for water-based intumescent coatings as they enable the right amount of foaming and expansion, as well as providing long-term foam stability. At the same time, the adhesion and strength of the intumescent coatings improve, so that the protective layer firmly adheres to the substrate and forms a temporary heat barrier. Without the binder, the foam layer would be too brittle, thus leading to insufficient adhesion to the steel substrate. Furthermore, both grades are highly suitable for very-low-VOC and very-low-odor formulations.

Intumescent Coatings Protect by Generating an Efficient Insulation Layer in Case of Fire



Intumescent coatings protect steel structures by forming a protective layer up to 120 minutes, thus keeping the temperature of the steel girders below 500 °C.

PERFORMANCE BENEFITS

for Intumescent Coatings:

- Excellent foam development that provides high expansion factors for coatings with a low dry film thickness (DFT)
- Good adhesion to steel beams
- Excellent compatibility with intumescent coating additives
- Long shelf life of intumescent coating even under difficult climatic conditions

for Fire-Resistant Coatings:

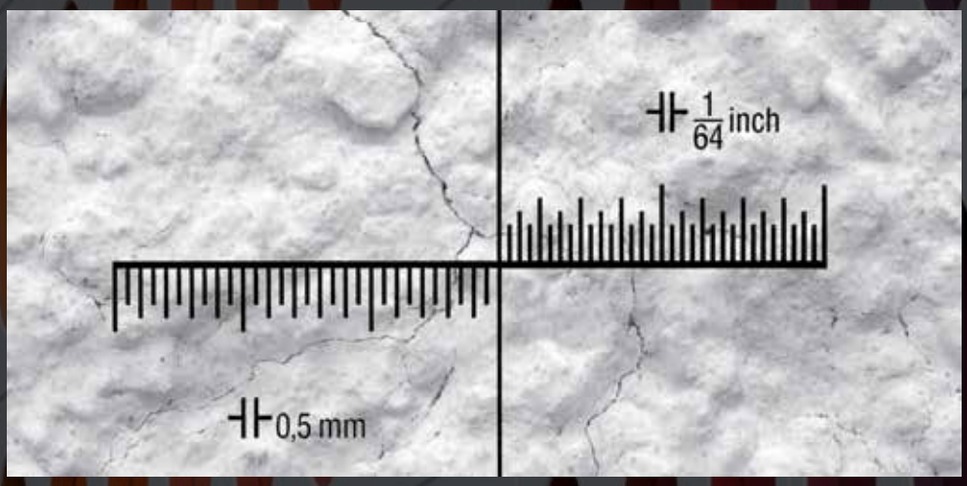
- Inherently fire retardant due to special monomers
- Solutions for different levels of fire retardance available
- Broad range of applications – exterior and interior

ENVIRONMENTAL BENEFITS

- No solvents or coalescents needed
- Produced without APEO surfactants
- Low to very-low-VOC formulations possible (<1 g/l)
- Low to very-low-odor coatings possible

APPLICATION SPECTRUM

- Fire-resistant, water-based paints or systems
- Intumescent, water-based paints or systems
- Specialty paints, such as roof paints, oil-resistant coatings, substrate preparation, and joint compounds



Improved Impact Resistance
By improving the cohesion and flexibility of the hardened mortar, VINNAPAS® provides plasters with an improved impact and crack resistance. This can be shown by performing an impact test (see picture on the right).

RENDERS AND PLASTERS

VINNAPAS® polymer binders improve the quality and increase the life expectancy of renders and plasters. They enhance adhesion as well as flexibility and prevent weathering damage.

Featured Solutions

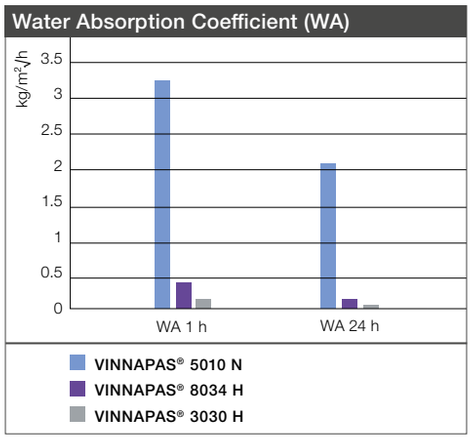
Improved Hydrophobicity
VINNAPAS® H polymer powders and selected dispersions provide water repellency, protecting the substrate and improving durability.

Flame Retardancy
Using selected VINNAPAS® powder and dispersion grades makes it possible to achieve high flame-retardancy.

Improved Esthetics
VINNAPAS® imparts very good weather-ability with low dirt pick-up and high color stability.

Improved Impact Resistance
By improving the cohesion and the flexibility of the hardened mortar, VINNAPAS® gives plasters improved resistance to impacts and cracks.

Long-Lasting Effects
VINNAPAS® polymer technology ensures long-lasting effects such as water repellency.



Coefficient of water absorption [kg/m²√/h] according to ISO 15148 – lime-rich formulation, 1.0% DPP.

GENERAL BENEFITS

- Improved adhesion to a variety of different substrates
- Improved hydrophobicity

APPLICATION SPECTRUM

- Indoor walls
- Facades

Tested for All Climates

Our technical centers in Burghausen (GER) and Moscow (RUS) are equipped with climatic chambers which allow entire wall systems to be tested by simulating weathering cycles with heat, rain, cold and other conditions.
These walls tested according to EOTA (European Organisation for Technical Approval) make it possible for us to predict the weatherability and life expectancy of specific ETICS in different climate zones.

EXTERNAL THERMAL INSULATION SYSTEMS (ETICS)

VINNAPAS® polymer binders improve the characteristics of mortars applied in ETICS, creating a stable and flexible bond between the various layers. They especially enhance the adhesion of mortar on various types of exterior insulation panels used in ETICS.

Featured Solutions

Energy Efficiency

Worldwide, buildings consume 40% of primary energy and generate one-third of greenhouse gas (GHG) emissions. At the same time, buildings offer the greatest potential for reducing these emission at the lowest cost. Still today, energy consumption in buildings can be reduced by 30% to 80% using proven and commercially available technologies[1].

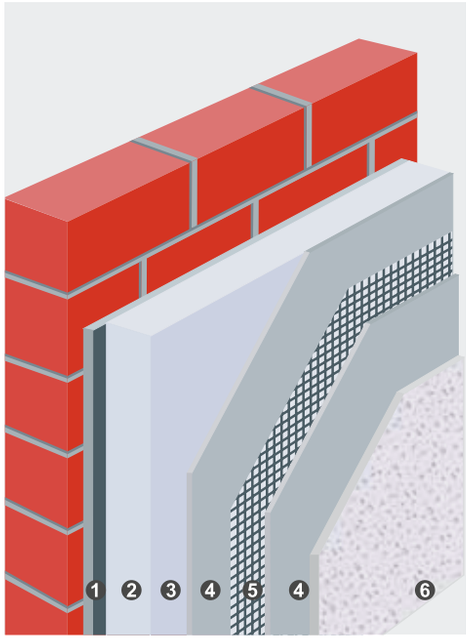
Suitable for Old and New Buildings

ETICS are among the most successful methods for insulating walls from the outside, thus achieving substantial energy savings, among other advantages. Brickwork, concrete, stucco and plaster, wood and just about all other substrates can easily be fitted with ETICS. This means the systems can be used for both for renovation work and in new buildings. In addition, the outer shell can be designed individually, using plasters, paints, skim coats or tiling, for example.

VINNAPAS® polymer powders and selected dispersions with flexible ethylene segments boost the performance of ETICS by offering very good tensile adhesion strength particularly to different insulation materials (organic, mineral, biological-based), very high impact strength, and improving the workability of mortars.

Improved Indoor Climate for All Climates

Facades fitted with ETICS act as heat shields: they keep out the cold and keep in the heat or vice versa. Thus insulated walls also improve the indoor climate by reducing the temperature differences between indoor air and wall surfaces.



Composition of ETICS

1 Masonry
2 Adhesive – cementitious dry mortar containing VINNAPAS® binders
3 Insulation material
4 Base coat – cementitious dry mortar containing VINNAPAS®
5 Glass-fiber mesh
6 Top coat – plaster and coating modified with VINNAPAS®

GENERAL BENEFITS

- Stable bond between insulation board, embedding mortar and wall
- Increased impact resistance in the embedding mortar
- Improved water repellency and weatherability in the top coat can be achieved by the use of VINNAPAS® H powders

APPLICATION SPECTRUM

- Adhesive mortar
- Base coat (embedding mortar)
- Top coat

[1]Data: United Nations Environment Programme

PRIMERS

GENERAL BENEFITS

- Good impregnation due to high penetration into pores
- Excellent barrier properties
- Low and uniform absorbency
- Good adhesion even on critical substrates
- Bridging of small cracks
- Long open time
- Good consolidation of construction surfaces

APPLICATION SPECTRUM

- Adhesion-promoting layer
- Barrier layer for migration protection
- Construction surface consolidation

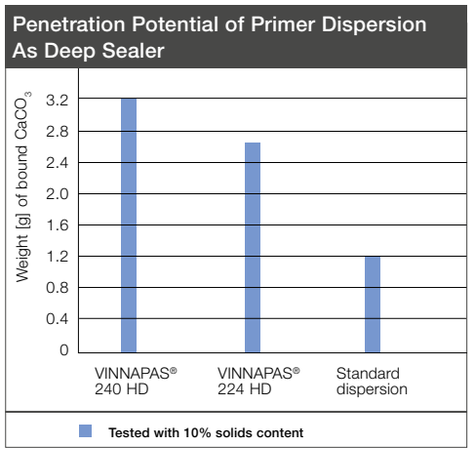
VINNAPAS® dispersions improve the properties of primers, so providing the basis for optimal performance of subsequent layers.

Featured Solutions

Improved Stability

Primers are essential to ensure long-term stability of layered building systems. VINNAPAS® dispersions provide excellent adhesion to a variety of substrates. VINNAPAS® dispersions with small particle sizes are available for open-pore substrates such as concrete, cement and gypsum plasterboards. They ensure good penetration into the surface, thus consolidating the substrates and controlling their absorbency. In outdoor applications, hydrophobic VINNAPAS® dispersions ensure high water repellency and good barrier properties.

VINNAPAS® dispersions are suitable for formulating primers with or without the use of fillers such as sand or pigments.



VINNAPAS® dispersions with fine particle size are especially suited as deep sealers.

SIX GOOD REASONS TO BUY FROM WACKER

At WACKER, we believe in building and maintaining close partnerships with our customers, to achieve success together. Today and tomorrow. Talk to us!

Decades of Experience

- 75 years as market leader in VAE polymer dispersions
- 60 years as a leader in polymer powders

Diversified Portfolio

- Products for different performance profiles and different market segments
- Tailor-made products for local markets
- Innovative products for new applications

Constant High Quality

- Worldwide production in accordance with uniform standards and specifications

Powerful Customer Support

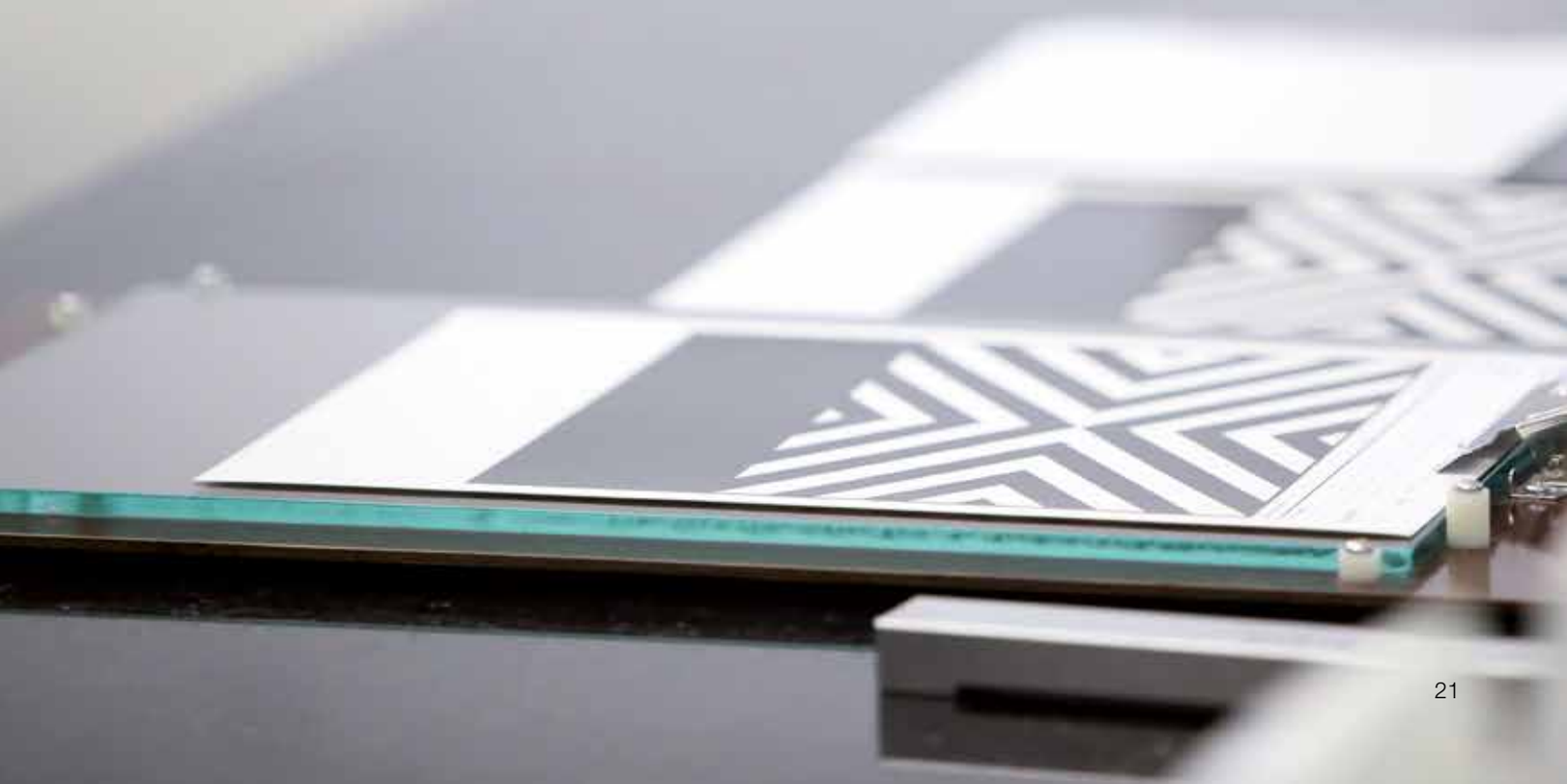
- Testing and technical support at technical centers
- Training and collaboration at WACKER ACADEMIES
- Different solutions for ordering, packaging and transport
- Fast and flexible delivery

Strong R&D

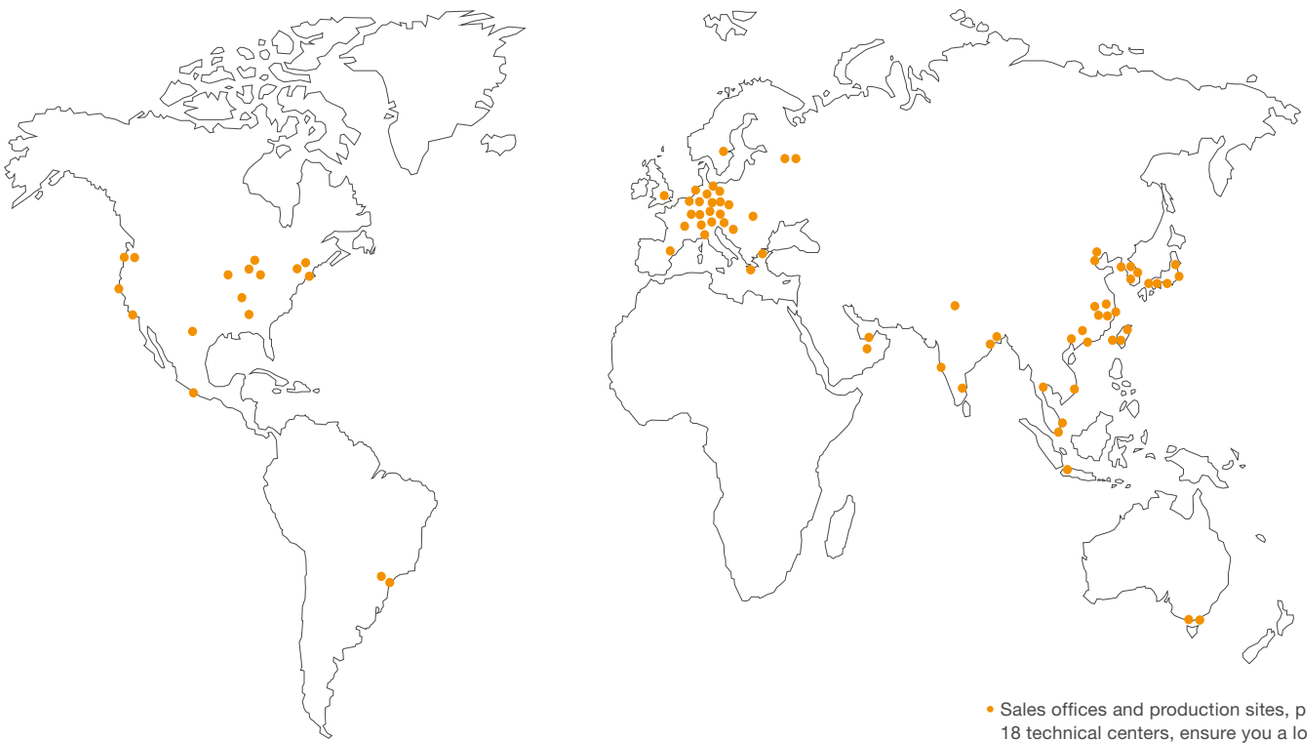
- Over 100 years of R&D
- Over 3% of sales spent on R&D (in 2016)
- 5,300 patents granted
- Collaborations with more than 40 academic institutions
- Global presence

Committed to Values

- Sustainability is our company philosophy
- We live up to our social responsibility as corporate citizens



EXPERTISE AND SERVICE NETWORK ON FIVE CONTINENTS



• Sales offices and production sites, plus 18 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 €4.6 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 4 business divisions, we offer our customers highly-specialized products and comprehensive service via 23 production sites, 18 technical competence centers, 13 WACKER ACADEMY training centers and 48 sales offices in Europe, North and South America, and Asia – including a presence in China. With a workforce of some 13,450, 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**

All figures are based on fiscal 2016.

Find more information at:
www.wacker.com/move

WACKER

Wacker Chemie AG
Hanns-Seidel-Platz 4
81737 München, Germany
Tel. +49 89 6279-1741
info@wacker.com

Wacker Chemicals Middle East FZE
Dubai Silicon Oasis
Dubai, United Arab Emirates
Tel. +971 4 709-9999
info.dubai@wacker.com

www.wacker.com
www.wacker.com/move

www.wacker.com/socialmedia

The data presented in this medium are in accordance with the present state of our knowledge but do not absolve the user from carefully checking all supplies immediately on receipt. We reserve the right to alter product constants within the scope of technical progress or new developments. The recommendations made in this medium should be checked by preliminary trials because of conditions during processing over which we have no control, especially where other companies' raw materials are also being used. The information provided by us does not absolve the user from the obligation of investigating the possibility of infringement of third parties' rights and, if necessary, clarifying the position. Recommendations for use do not constitute a warranty, either express or implied, of the fitness or suitability of the product for a particular purpose.

7480e/02.18 replaces 7480e/11.17