WACKER

CREATING TOMORROW'S SOLUTIONS

CONSTRUCTION I FACADES

SUSTAINABILITY IS FEASIBLE: FACADES

HOW DO WE WANT TO LIVE TOMORROW?

Architecture is always about projecting into the future. When we build, we shape not only the environment, but also our lives and the lives of future generations. The construction industry has always been concerned with sustainable development.

Accepting Responsibility

Resource depletion and growing environmental impact are asking new questions of the construction industry. What is all this building activity costing us? What will it cost future generations? Which resources have we the right to consume? These are questions which we are asking ourselves, and we invite you to join us on our search for the answers.

Re-Appraising Quality of Life

If there is one thing that WACKER has learned during its 80 years in the construction chemicals business, it is this: by working together, we can come up with solutions. We can compensate for shortages by enhancing quality. We can produce sustainable architecture for the long-term betterment of our lives, without detriment to upcoming generations.

Developing Solutions Example: Facades

Believe it or not, we already have answers – in our heads and on the drawing board. What are they? We believe we can best illustrate them with reference to facades, because not only are facades the most visible aspect of architecture, but they also offer fantastic scope for sustainable building.

Together, let us fashion our living space and quality of life. Talk to us!

Contents

HOW CAN WE ACHIEVE THIS?

Construction chemicals are the enablers that turn visions into reality – in this connection we need only mention economical thin-bed tile adhesives and low-emissions plasters. It is therefore fitting that enabling sustainable development is the guiding principle by which WACKER's laboratories operate.

Choose the best! Only WACKER is all of the following:

- A global leader in polymer binders for construction materials
- One of the largest silicone producers in the world
- Close to you – with local, expert staff
- Capable of providing individual technical assistance in our 14 technical centers around the globe

Our comprehensive portfolio, wealth of experience and comprehensive service will help you find the optimal solution for your specific application.

Picture it yourself
with our image film:
www.wacker.com/construction

Construction chemicals are often added in small amounts to building products, such as mortar and paints. Yet, they are frequently the enablers that imbue products with the very properties that open up entirely new possibilities. Consequently, they offer vast innovation potential. WACKER is well positioned to tap this potential through its large portfolio and comprehensive service support.

Unique in the World: Two Chemical Platforms

WACKER is the only global chemical company to have two time-tested technology platforms. We are both global leader in polymeric binders and one of the largest silicones producers in the world. This broad product portfolio in organic and inorganic chemistry enables us to recommend and develop platform-independent solutions that are perfectly tailored to customer needs.

Expertise that Pays Off

Our expertise in hybrid products stems from our deep understanding of organic and inorganic chemistry. A particular strength of ours is in giving advice: we can tell you from experience, for example, which silicone additive is compatible with which polymeric binder and we can alert you to any interactions that may arise.

Exemplary Service around the World

We realize that the closer we are to an application, the better we can adapt our products to it. Accordingly, we have established a global network of over 100 local subsidiaries and sales offices, along with 14 technical centers. Our native-speaker experts are eager to advise and assist, e.g. with adapting formulations to local raw materials or climates, testing your products for compliance with standards and tapping into new application areas.

The Inspiration: Knowledge

All this is backed up by the unique program which WACKER ACADEMY has offered to customers for some years now. With branches in ten locations, WACKER ACADEMY provides training programs and seminars directed specifically at the construction industry. And it acts as a platform for sharing information with construction experts around the world.

Our Product Brands:

ELASTOSIL®

ETONIS®

GENIOSIL®

HDK®

SILRES®

VINNAPAS®

For more information, visit www.wacker.com/construction

WE CAN SHAVE 70% OFF ENERGY COSTS

Buildings around the world consume 40% of primary energy and generate 33% of carbon emissions. Consumption of heating energy could be slashed by up to 70% through the use of effective thermal insulation. Construction chemicals from WACKER improve thermal insulation in different kinds of systems.

Learn about the structure of an exterior thermal insulation composite system: www.wacker.com/etics

Example: External Thermal Insulation Composite Systems (ETICS)

ETICS are among the most widely employed wall-insulation systems. VINNAPAS® polymeric binders are used to ensure:

- Better adhesion of the insulation panel to the substrate
- Optimized flexibility and impact resistance
- Water-repellency, especially for plaster and paint

SILRES® BS silicone resin binders are responsible for the breathability and water-repellency of silicone resin emulsion paints. By preventing the ETICS from becoming saturated, they enable it to keep providing insulation. VINNAPAS® polymer powders and dispersions are used to provide optimum levels of cohesion, adhesion and flexibility.

Example: Protection against Damp

Damp not only damages building facades, but also diminishes their insulation properties. A moisture content of five percent, for example, is enough to lower the insulation properties of a brick wall by up to 50 %. SILRES® BS products added to silicate and silicone resin emulsion paints confer water repellency by reducing the extent of capillary water adsorption, without compromising their water-vapor permeability (ability to breathe).

Example: Waterproofing of Insulation Materials

Silicate-based inorganic materials make almost perfect insulation materials. They provide basic properties, such as

- Non-flammability
- Flame retardancy
- Mold resistance
- Breathability

However, all silicate-based materials are hydrophilic to a greater or lesser extent. And because construction and insulation materials have a high pore volume, they tend to have high levels of capillary water adsorption (between thirty and several hundred percent). This can be prevented by hydrophobic treatment of the insulation materials with SILRES® BS. This silicone emulsion is free of solvents and can be diluted with water. It orients itself on the surface of the coating, making it water-repellent.

Example: Facade Waterproofing

CENUSIL® and ELASTOSIL® silicone sealants reliably prevent heat loss through facades and generally have a longer service life than organic sealants.

Our Product Brands:

CENUSIL®

ELASTOSIL®

SILRES®

VINNAPAS®

For more information, visit www.wacker.com

WE CAN LENGTHEN RENOVATION CYCLES

When New York's Guggenheim Museum, built in 1959, was renovated in 2012, it was found that a total of 11 coats of plaster had been applied over the years. With raw materials, additives and binders from WACKER, plasters can now be enhanced so much that even inner-city buildings do not have to be renovated as frequently.

How a silicone-resin network works:
www.wacker.com/silres-bs

Example: Mineral Plasters

Modifying mineral plasters with VINNAPAS® polymeric binder allows them to bond permanently to critical substrates that are otherwise difficult to coat. The binder also renders plaster more flexible, enabling it to accommodate stresses from movement or thermal expansion and contraction. Not only is cracking prevented but the plaster is stronger and will not spall off under physical impact. Specialty VINNAPAS® H polymer powders and VINNAPAS® HD dispersions also make plaster much more water repellent. The VINNAPAS® H grades lower the capillary water adsorption of mineral plaster without altering the system's water-vapor permeability.

Example: Silicone Resin Plasters

Water is one of the greatest enemies of plaster and structures. Frequent driving rain, for example, not only damages plaster, but the moisture can also penetrate through plasters into the building fabric and trigger mildew formation. Silicone resin plasters based on SILRES® silicone resins form an extremely durable silicone-resin network on mineral surfaces and in mineral-base coatings. The outcome is capillary water-repellency: the water runs off in little beads, yet the pores remain open to diffusion. Silicone resin plasters based on SILRES® thus offer a number of advantages:

- Very low water absorption
- High breathability
- Outstanding weathering resistance
- Simple and fast processing
- Freedom from solvents
- Absence of chalking

Our Product Brands:

SILRES®

VINNAPAS®

For more information, visit www.wacker.com

WE CAN ACHIEVE ZERO EMISSIONS

Today's visionaries are often tomorrow's innovators. So, at WACKER, we never stop doing research. And we always get results. Examples are VAE copolymer and terpolymer dispersions and dispersible polymer powders as well as highly reactive, silane-terminated polyethers which greatly lower emissions from building materials and paints and so contribute to healthy living.

For more on construction adhesives and sealants not classified as hazardous substances, visit www.wacker.com/geniosil

Example: Exterior Paints

To help with the formulation of primers and exterior paints, WACKER has developed specialty VINNAPAS® dispersions based on vinyl acetate-ethylene (VAE) that do not contain alkylphenol ethoxylates (APEOs). The dispersions are used to formulate low-VOC paints which have no solvent or plasticizer content, but combine high resistance to dirt pick-up and good weathering properties with an excellent price/performance ratio.

Example: α-Silanes

WACKER has developed special silane-terminated polymers that form functional bridges between organic polymers and inorganic materials. They are so reactive that they are used to formulate construction foams that are free of isocyanate as well as adhesives and sealants that are free of tin, solvents and plasticizers.

Example: Solvent-Free Silicone Additives

In SILRES® BS 168, WACKER also offers silicone paint additives that are simply admixed in the form of solvent-free, water-thinnable emulsions. They make processing easier and boost beading, ease of cleaning, leveling, wetting and coating durability. Additional solvents are unnecessary.

Our Product Brands:

GENIOSIL®

SILRES®

VINNAPAS®

For more information, visit www.wacker.com

WE CAN PRESERVE INSTEAD OF TEAR DOWN

“Reduce, Reuse, Recycle” is the theme of the German pavilion at the 13th Venice Biennale. From an ecological point of view, it is nearly always preferable to preserve existing building stock than to tear it down and rebuild. WACKER offers numerous solutions for building refurbishment that will last for generations.

Example: Masonry Damp-Proofing

Preservation of old buildings is growing in importance for reasons of cultural heritage and the need for healthy indoor climates, including effective thermal insulation. Damp walls lead to damaged masonry, plaster and paintwork, make rooms unusable and promote mildew that is harmful to health. Walls can be damp-proofed by installing a horizontal barrier. Chemical damp-proofing is a proven method for creating such a barrier and involves injecting a liquid into the masonry. Silicone microemulsion concentrates from WACKER's SILRES® BS series of products are used for this purpose. These highly effective and environmentally sound solutions provide lasting protection against rising damp and offer several advantages: preservation of precious building fabric, better indoor climate and lower consumption of heating energy. Long-term studies and numerous reference objects testify to the efficacy of this treatment.

Example: Stone Strengthening

Natural stone that is starting to crumble due to water and weather damage can be restored to its original strength with WACKER SILRES® BS OH 100, without compromising its ability to breathe.

Example: Concrete Repairs

Good concrete repairs are achieved with polymer-modified mortars. Specialty VINNAPAS® polymer powders and dispersions are supplied by WACKER for this purpose. These greatly strengthen adhesion to both old concrete and steel, allowing compliance with current standards. They also increase deformability and flexural strength, lower the modulus of elasticity, and enhance ease of processing and wetting properties.

Example: Brickwork

Roof tiles and brick walls tend to effloresce after several years if they have not been impregnated. Salts leave ugly white streaks behind and, along high-traffic thoroughfares, dust literally eats into facades. However, if a facade has been impregnated with SILRES®, the water will roll off the walls. The walls continue to breathe and are more durable as a result. Furthermore, because the protective effect occurs deep within the pores of the brickwork, it is not only permanent but also does not change the appearance of the surface in any way.

Example: Waterproofing

Future damage can be permanently averted by treatment with SILRES® BS silicone products. They can be used to waterproof concrete, natural stone, limestone, bricks, aerated concrete and sand-lime bricks. And they are suitable for providing added water-repellent protection to facades that have already been coated with mineral plaster or paint.

Our Product Brands:

SILRES®

VINNAPAS®

For more information, visit www.wacker.com

WE CAN
SAVE ON MATERIAL

Less is more. Less building material translates to less consumption of primary energy and resources. It also translates to less transport and reduced carbon emissions. More efficient building materials are the key here.

Example: Tile Adhesives

The technical properties of tile adhesives benefit so much from the addition of VINNAPAS® polymer powders that the adhesives can be applied in thin beds. This generates significant savings not only on materials – up to 15 times less material is needed – but also on time and costs on site. Carbon emissions are slashed because less material is produced and transported. In addition to yielding these savings on materials, the recommended VINNAPAS® grades for ceramic tile adhesives comply with various eco labels and environmental standards that govern the final mortar formulation.

Example: Powder Paints

Powder paints score points for their elegant, matt hue and their durability. They are also produced in an environmentally sound manner without the addition of solvents or plasticizers. VINNAPAS® polymer powders extend the durability of powder paints and reduce water uptake. Furthermore, they optimize the hiding power, adhesion and coverage of powder paints, thereby ensuring that less paint is needed.

Our Product Brands:

VINNAPAS®

For more information, visit www.wacker.com

WE CAN
REINVENT BUILDING

Wavy concrete, walls of light, walls of plants: it is up to us to shape the future. As one of the most research-intensive chemical companies in the world, we are the ideal partner to help you with this.

For more on modifying concrete with ETONIS®, visit www.wacker.com/etonis

Example: Wavy Concrete

Concrete is a brittle building material. But it can be rendered much more flexible by adding ETONIS® modifying agent from WACKER. This improves the deformability, strength and adhesion to such an extent that it opens up the possibility of creating concrete embedded composite (CEton) elements, i.e. textile-reinforced fiber-composite parts based on concrete with an aluminum core. The Roca Gallery designed by Zaha Hadid in London was made with curved, undulating construction elements, created by B & T (Bau & Technologie), which are just 60 millimeters thick and weigh only 50 kg/m^2.

Example: Walls of Light

LEDs make an ideal energy-saving light source outdoors. With an average lifetime of 50,000 hours, they last much longer than energy-efficient lamps, have a high light efficiency, and do not contain poisonous mercury. New LUMISIL® silicone elastomer from WACKER now makes it possible for the first time to fabricate optical lenses for LEDs on the semiconductor itself. This makes the whole manufacturing process significantly more efficient and cost-effective. At the same time, the LEDs are 15 percent brighter, are more heat resistant and provide greater protection against environmental effects.

Example: Objects Cast in Concrete

ELASTOSIL® M mold-making compounds are ideal for casting concrete in different forms because they faithfully reproduce the details of almost all shapes and structures. The resultant parts and objects possess all the good properties of concrete while opening up a whole new world of stunning aesthetics. From replicas of damaged elements through to totally new design ideas.

Our Product Brands:

ELASTOSIL®

ETONIS®

LUMISIL®

VINNAPAS®

For more information, visit www.wacker.com

WE CAN ALWAYS LEARN MORE

Sustainability is a global objective that can only be reached if we all pull together.

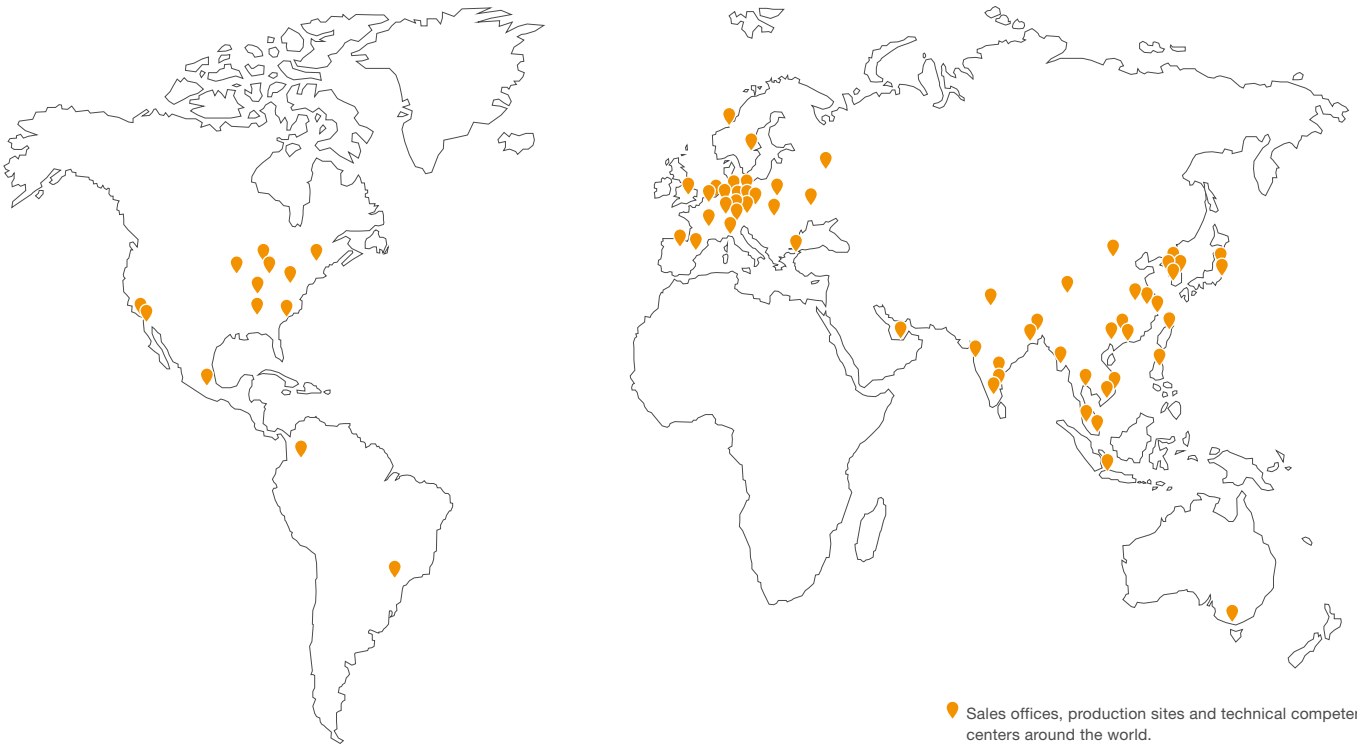
Example: Knowledge Networking
If we are to tread new paths, we must grow in knowledge. Armed with this insight, WACKER has created a platform that is unique in the market: the WACKER ACADEMY. This training and expertise center offers building professionals all around the world training in topics of specific relevance to the construction industry. From “Basics of Polymer Chemistry” to “Energy-Efficient Facades.” But it does more than teach theoretical and practical knowledge. It provides experts with an opportunity to share information and engage in networking. Across every continent. WACKER ACADEMY currently has branches in Brazil, China, Germany, India, Indonesia, Korea, Russia, USA, and the UAE.

Example: Innovation
WACKER ranks among the pioneers of modern chemistry. In the “Consortium für elektrochemische Industrie,” we have an outstanding basic research facility that dates back more than 100 years. Its own research is augmented by applications-specific research carried out in the five business divisions. We also work globally with leading universities and research institutes and are also actively involved in the development of norms and standards. Consequently, we keep on learning and keep on stimulating innovation. As an example, we received the 2011 Construction Sealants New Innovation Award of Frost & Sullivan for developing the alpha-silanes. These products make it possible to produce construction foams that are free of tin and isocyanate and so do not require classification as hazardous substances.

Example: Applications Support
Applications support specifically aimed at the construction industry is provided by eleven WACKER technical centers. These adapt customer-specific formulations to locally available raw materials, help to develop new products and carry out batteries of tests to national and international standards. The technical centers boast the latest equipment and avail of the expertise of regional native-speaker experts who in turn have access to the knowledge accumulated by the entire Group over the decades. This is especially important for testing the feasibility of sustainable solutions for the construction industry and for putting them into practice.

For more information, visit www.wacker.com/wacker-academy

EXPERTISE AND SERVICE NETWORK ON FIVE CONTINENTS



Sales offices, production sites and technical competence centers around the world.

WACKER is one of the world's leading and most research-intensive chemical companies, with total sales of €6.21bn. 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 26 production sites, 23 technical competence centers, 14 WACKER ACADEMY training centers and 52 sales offices in Europe, North and South America, and Asia – including a presence in China. With a workforce of some 14,400, 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 competence 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 reliable service and comprehensive information 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 2021.

WACKER

Wacker Chemie AG
Hanns-Seidel-Platz 4
81737 Munich, Germany
www.wacker.com/contact

www.wacker.com

Follow us on:

6988e/11.22 replaces 6988e/03.13