

# New product system for surface functionalization and pressureless borehole injection

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The pore structure of cement-bound materials, as well as autoclaved aerated concrete (AAC) are an entrance gate for water and substances dissolved in it, which can have a damaging effect on the material or the building structure. Sealing products often aim to protect the materials and building structure by closing the surface and thus closing the access to the pore structure of the materials. Many materials, especially cement-bound building materials, however, require the diffusion-controlled exchange of moisture with the environment in order to prevent drying out. The new product CEMsil SC-I from BPA GmbH, Germany, can functionalize the surface hydrophobically and at the same time keep the surface open to diffusion. The decisive factor for this is the composition of different silanes and siloxanes with a very high active ingredient content of 80%.

BPA GmbH has been manufacturing and dealing with high-quality product systems for building waterproofing for many years. Joint and surface sealing systems in particular for different areas of application and load classes are the focus of the family-owned company.

Innovations and new solutions for customer and market requirements are a driving force behind product developments at BPA. In addition to innovations, the company also focuses on continuous optimization of the product portfolio and quality, with particular attention to aspects of sustainability and environ-



Fig. 1: CEMsil SC-I tubular bag

mental protection.

In the construction industry, new building materials are always being used, new building material combinations and new manufacturing processes are used which are intended to increase the quality of the structure. At the same time, the building owner's demands on the use, durability and safety of the structures are increasing, so that the costs for construction measures are rising continuously. In addition, there are new specifications or regulations from authorities, which make the entire planning and implementation of a new building more complicated. If a conversion or renovation of an existing building is planned and implemented, other aspects from the area of monument preservation can turn the building measure into a highly scientific project.

Simple and practical solutions for many areas of application are therefore a good starting point for innovative products and applications. With CEMsil SC-I (Fig. 1), BPA GmbH is launching a new WTA e.V. certified product in different container types and sizes that can be used as an impregnating agent for preventive surface protection of mineral building materials against moisture and wetness or as an injection agent for depressurization Borehole injection against uprising damp.



Jens Glowacky, Dr. rer. nat. studied mineralogy at Justus Liebig University of Giessen. After his PhD work in the field of construction chemistry, surface functionalization and technical mineralogy at the Karlsruhe Research Center he did his post-doc time at the Karlsruhe Institute of Technology (KIT) in the Institute of Concrete Structures and Building Material Technology (IMB) and the Materials Testing and Research Institute (MPA Karlsruhe). This was followed by positions in the building materials and paint industry as laboratory manager and research and development manager. At last he moved to BPA GmbH, where he is responsible for operational and laboratory management as well as the development and innovation of mineral products.

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It is a cream-like agent based on coordinated alkylalkoxysilanes and siloxanes. The creamy consistency means that the contact time between the product and the material to be protected is sufficient to allow the necessary chemical reactions to take place, which enables permanent polysiloxane formation for surface protection. This is also the main advantage



*Fig. 2 & 3: AAC functionalized with CEMsil SC-I on the left and no treatment on the right with water on top*



compared to comparable, low-viscosity systems. By-products that occur at the same time during the reaction help to bring the active substances deeper into the material structure or the pore structure and, in doing so, demonstrably displace any pore water that may be present. As a result, the functionalization effect is not only limited to the surface, but is also effective up to a depth of 30 mm, depending on the pore structure and size.

**Figs. 2 and 3** show an autoclaved aerated concrete block with CEMsil SC-I (left side) and without functionalization (right side). You can clearly see how the water droplets stand on the functionalized surface, which we really repel and how the untreated side

of the autoclaved aerated concrete soaks up the water. The in-depth effect of the hydrophobization ensures at the same time that the effect persists over a longer period of time and that its effect is not lost due to dust, ozone or nitrogen oxides being deposited, as is the case with purely superficial systems.

With CEMsil SC-I, due to its creamy consistency and depth effect, a horizontal barrier against rising damp can be demonstrably and safely built up. For this purpose, 12 mm drill holes are made at regular (12 cm) intervals and filled with the functionalizing cream. The material absorbs the active ingredients and forms a uniform barrier layer through reactive transport in the borehole environment.

The development of the new product system has now been completed and the market launch has begun. High-quality new buildings, infrastructure structures, exposed concrete and the renovation of mineral building materials are being approached as target markets. ●

See here a video about the new product CEMsil SC-I from BPA GmbH. Simply scan the QR-code with your smartphone.



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