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#### In full bloom – the Wilhelma water lily pool

The Stuttgart Wilhelma is unique in many respects. The only zoological and botanical garden in Germany has a long history that stretches back to the 19th century. In addition to more than 1,000 species of animal, the Wilhelma also houses around 7,000 plant species in its historical park and greenhouses. And some of them have found a very special place. Located in the centrepiece of the site, the Moorish Garden, is a 650-square-meter water lily pond. Since the beginning of 2013, the listed pool has been bathing in new splendour thanks to a complete restoration. The result is a spotless, heated pool for a noble blossom.

Review: After more than half a century, by the end of 2012, it was no longer possible to put off the restoration. Helmut Gekeler from the technical department of the Wilhelma called in the specialists who gave the large pool a makeover in the space of five months — including a break over the winter. Under the expert supervision of PCI Technical Specialist Erhard Kuttler and PCI Applications Engineer Peter Scharping, three regionally based building contractors worked on repairing the water lily pond. The plants had to be removed before the work could begin. This revealed a pool that was neither functional nor aesthetic. First of all, the concrete surfaces were cleaned with high pressure water jets of over 800 bar. After cleaning, the restoration experts coated the walls of the pool with a PCC putty, the PCI Nanocret FC fibre-reinforced concrete smoothing compound. This operation sealed the walls on the inside of the pond. The seal cracks

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in the floor area had to be sealed by impregnation using PCI Apogel F injection resin. Then a new smooth and faultless screed was laid. The construction professionals used the PCI Repahaft mortar bonding agent to bond the new screed permanently with the substrate. The installers laid the screed, manufactured from gravel sand and PCI Novoment Z3 fast setting screed cement, in the still damp bonding course to create a functional surface for the water lily pond. Before they could put the listed capstones back in their original positions, they had to re-profile the rim of the basin. This was done by mixing the PCI Bauharz epoxy binder with the correct grain size quartz sand. Last but not least – the grouting. For better adhesion of the joint sealing compound the restoration specialists worked with PCI Elastoprimer 110 wash primer. PCI Escutan TF was used to grout the spaces between the blocks of natural stone. Thanks to the tested materials from PCI Augsburg GmbH and the expertise of the contractors, the pool has turned out to be attractive and stable enough to meet the additional demands placed on it.

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#### Object data

Object:	Water lily pool in the Wilhelma Zoological and Botanical
	Gardens
Location:	Stuttgart
Completion year:	2013
Task:	Restoration of the water lily pool
Object size:	650 m <sup>2</sup>
Products used:	PCI Nanocret FC
	PCI Apogel F
	PCI Repahaft
	PCI Novoment Z3
	PCI Bauharz
	PCI Durapox NT
	PCI Elastoprimer 110
	PCI Escutan TF
Owner:	Wilhelma – The Zoological and Botanical Gardens,
	Stuttgart
Processing company:	Wamser GmbH, Wegebau und Außenanlagen
	Firma Estrich Bossert GmbH
	Beton-Sanierungs-Technik GmbH, Waschek Betoning.
	(VDB), Filderstadt
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#### Bilder:



Noble pants: water lilies are extremely popular. They are a special and beautiful flower. Blue water lilies can only be found in tropical waters. The Stuttgart Wilhelma houses this unusual species in its Moorish Garden. The water lily pool was renovated between the end of 2012 and the beginning of 2013.

Picture credit: Wilhelma Stuttgart



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Approximately 9,000 animals across more than 1,000 species and about 7,000 different plant species and varieties thrive in Germany's only zoological and botanical garden. The park dates back to the 19th century. Today, around two million guests visit the Wilhelma every year.



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The water lily pond is the centrepiece of the Stuttgart Wilhelma. The Moorish Garden houses around 40 species and varieties of this noble plant, the sight of which is enjoyed by visitors from May to October. The basin has been bathing in new splendour since spring 2013. Picture credit: PCI Augsburg GmbH

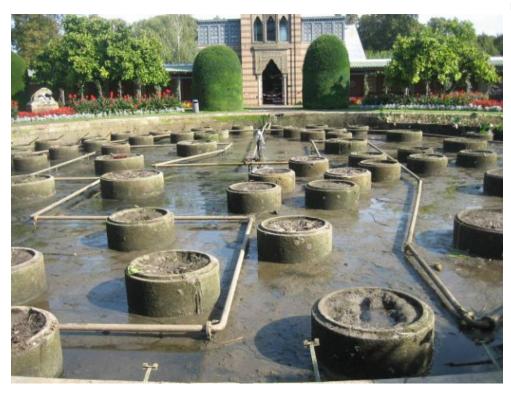
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Drained: the water and plants had to be temporarily removed in order to renovate the roughly 650-square-meter large basin in the Wilhelma. They found a good shelter in the heated pools of the plant cultivation area.

Picture credit: Wilhelma Stuttgart

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Defects such as cracks and a concave floor which had been scoured away by water over the years were revealed after the pool was emptied.



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To ensure the subsequent layers bonded well, the concrete surfaces had to be cleaned and roughened by high pressure water jets. This was an effective means of removing loose parts and dirt.

Picture credit: PCI Augsburg GmbH

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After the substrate had been prepared with the high pressure water jets, the restoration specialists got to work on the inner edge of the pool. The surfaces were first moistened slightly to prevent the three-to four-millimetres thick PCI Nanocret FC fibre-reinforced concrete smoothing compound from drying out.



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The construction professionals applied PCI Nanocret FC fibrereinforced concrete smoothing compound to the approximately 160square-meter walls of the water lily pond to even out the surface. Picture credit: PCI Augsburg GmbH

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The PCI Nanocret FC fibre-reinforced concrete smoothing compound is particularly easy to handle after the addition of water, as the putty then becomes supple and malleable. Important for application in a water pool: PCI Nanocret FC is water-resistant and weather-resistant. Picture credit: PCI Augsburg GmbH

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Once the bonding course had been created with the PCI Repahaft mortar bonding agent, the construction professionals laid the new screed on the surface. They worked the screed made of PCI Novoment Z3 fast setting screed cement and screed gravel sand into the bonding course applying a wet-on-wet procedure.

Picture credit: PCI Augsburg GmbH

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Smooth result: the new screed was carefully evened out. This was helped in the water lily pool by the long, one-hour processing time. Although the visitors to the Wilhelma don't see the smooth finish on the bottom of the pond, it is important for ensuring a permanently intact and sealed substrate.



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Creating the bonding course, applying the quick-setting screed in a wet-on-wet procedure and smoothing it out – thanks to perfect team work, the construction professionals succeeded in giving the lily pond in the Moorish Garden of the Wilhelma Stuttgart a flawless new surface. The PCI Novoment Z3 binding agent used to coat the screed is ideal for use in the pool. The product is perfectly suited for permanently moist applications and is also particularly temperature resistant.



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To prevent water leaking from the pool, the construction professionals re-profiled the rim of the basin. The installers used the PCI Bauharz epoxy binder with quartz sand in a ratio of one to ten to prepare the rim of the basin for the listed capstones. PCI Bauharz is waterproof and resistant to weather and frost.

Picture credit: PCI Augsburg GmbH

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Mix thoroughly for a good result: the dual-component PCI Durapox NT reaction resin binder must be handled exactly according to the instructions. The base and hardener component are therefore blended intensively in the specified mixing ratio for at least three minutes, until a uniform colour is achieved. The construction professional then fills a sufficiently large bucket with the mixed binder and mixes in quartz sand.



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When working with PCI Durapox NT the substrate must be clean, dry, load-bearing and flat. The construction professionals therefore dried out the substrates using a blowtorch.



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The construction professionals used Durapox NT to replace the capstones on the rim of the water lilly pond basin. First the professionals applied a thin contact layer to the underside of the stones and the rim of the basin. This ensured a professional finish and that the stones keyed well with the substrate.



Photo credit: PCI Augsburg GmbH

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The construction professionals placed the 100-kilogram capstones around the rim of the basin. They wedged the blocks to prevent them from slipping.

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The crowning glory for the water lily pond: the construction professionals grouted the spaces between the blocks of natural stone with PCI Escutan TF. The polyurethane joint compound is ideal for the pond as it is water-tight and resistant to pressurised water. It also does not become brittle over time and is resistant to the weather and root growth. For an overall aesthetic finish, the visible grout was produced by mixing it with a special travertine additive.

Picture credit: PCI Augsburg GmbH

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The restoration of the water lily pond was worth it: the restored, listed capstones stand out, giving the plants a special, becoming border.

Picture credit: PCI Augsburg GmbH



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#### About PCI

PCI Augsburg GmbH is part of the business unit Construction Chemicals of BASF and leader in the tile laying materials sector for specialist firms in Germany, Austria and Switzerland. In addition, the company supplies product systems for waterproofing, concrete protection and repair, as well as a complete product range for the soft flooring sector. PCI employs a staff of about 800 and generated sales of over €200 million net in 2012. Further information about PCI on the Internet under <a href="https://www.pci-augsburg.de">www.pci-augsburg.de</a>.

BASF is the world's leading chemical company: The Chemical Company. Its portfolio ranges from chemicals, plastics, performance products and crop protection products to oil and gas. We combine economic success, social responsibility and environmental protection. Through science and innovation we enable our customers in almost all industries to meet the current and future needs of society. Our products and system solutions contribute to conserving resources, ensuring healthy food and nutrition and helping to improve the quality of life. We have summed up this contribution in our corporate purpose: We create chemistry for a sustainable future. BASF posted sales of about €78.7 billion in 2012 and had more than 113,000 employees as of the end of the year. BASF shares are traded on the stock exchanges in Frankfurt (BAS), London (BFA) and Zurich (AN). Further information on BASF is available on the Internet at www.basf.com.

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