

Budapest

Ferenc Puskás Stadium

WATERPROOFING MATERIALS, RESIN FLOORS AND BUILDING SOLUTIONS FOR ONE OF HUNGARY'S LARGEST SPORTS STADIUMS

The new stadium in Budapest, dedicated to the footballer Ferenc Puskás, is a monumental structure worthy of the legendary status of this Hungarian champion. Rebuilding work on the remains of the old stadium, which started in 2017 and was completed in 2019, was one of the largest ever investments in Hungary for a sports complex: 190 billion Forints (around 610 million Euros) to build a stadium, which has a capacity of 67,000 and was used to host some of the 2020 UEFA championship matches.

The stadium is made up of a structure with 38 forty-metre high steel and reinforced concrete pylons. Two cement mixing units were installed directly on site to actually construct the load-bearing structure, each one with a maximum daily output of 1,200 m³ of concrete. Every day, the site had a workforce of 1,500 and 21 cranes, all working at the same time.

Waterproofing at 360°

Mapei played a key role in the construction of the new stadium, supplying products for various areas and applications, such as MAPEFILL MF 610 expansive grout to anchor the large pylons of the

load-bearing structure.

But it was with all the waterproofing applications that Mapei really made its mark, proposing specific solutions for each of the specific problem areas. For example, for the surfaces below ground level exposed to water under pressure from the subsoil, and for the surfaces on the ground floor exposed to moisture from the ground, technology had to be employed that would guarantee excellent water-tightness while forming a tough bond with the substrates. For this reason, for this part of the work, 10,000 m² of surfaces were sprayed with PLASTIMUL 2K SUPER and PLASTIMUL 1K SUPER PLUS two-component, solvent-free, highly flexible, low-shrinkage, thixotropic bituminous emulsions. For the reinforced concrete masonry below ground level, on the other hand, the preference went to PLANISEAL 88 one-component osmotic mortar, with excellent adhesion to the substrate for complete waterproofing, even in the presence of negative pressure.

For the water storage tanks and the bathrooms, the product employed was MAPELASTIC FOUNDATION, a two-component, flexible, cementitious mortar ideal for waterproofing concrete surfaces subjected to positive and negative water pressure. The possibility of applying the product either manually or by spray using a rendering machine was a deciding factor in choosing this product. For the plant service rooms, a quick, effective and reliable waterproofing solution was needed, one that could guarantee excellent tensile strength, tear strength and elongation capacity, as well as long-term resistance to leaking between the various levels of the structure, including in the case of cracked piping. Which is why the PURTOP SYSTEM was used, which consisted of the application of a coat of PRIMER SN two-component, epoxy primer on the substrate, a broadcasting of quartz sand over the primer and then application of PURTOP 400 M two-component, hybrid polyurea membrane. The surfaces were then treated

Problems and solutions

Products from various Mapei product lines had to be used to build this complex, imposing structure, but it was the waterproofing products that played a particularly important role. Different types of products that complied to perfection with the specific needs and requirements of the project and which helped overcome various challenging problems encountered on site. These included products from the PLASTIMUL line, the PURTOP system and products from the MAPELASTIC family, with each of them used in different areas and for different needs.



ABOVE. The Ferenc Puskás stadium was rebuilt and completed in 2019 and can now host 67,000 spectators.

BELOW. To build the structure, a workforce of 1,500 and 21 cranes worked together every day on site, along with two cement mixing units to produce the concrete.

with PRIMER P3 two-component polyurethane primer and covered with two coats of MAPECOAT TC aliphatic polyurethane finish.

To ensure sound installation of ceramic tiles on around 42,000 m² of substrates in the bathrooms, showers, kitchens and changing rooms, the surfaces were first waterproofed with MAPELASTIC AQUADEFENSE membrane and MAPEBAND rubber tape after treating them with PRIMER G and levelling them off with ULTRAPLAN RENOVATION. The ultra-quick-drying properties of MAPELASTIC AQUADEFENSE were a crucial factor in opting for this product because it made application that much easier, even when the surrounding temperature was particularly low.

Installation of ceramic wall coverings and resin floors

Ceramic tiles were installed in various areas of the stadium (bathrooms, changing rooms and kitchens) using the adhesives KERAFLEX LIGHT S1, distributed on the Hungarian market by Mapei Kft., and ADESILEX P9. The joints were grouted with KERACOLOR FF FLEX (a mortar distributed on the Hungarian market by Mapei Kft.), while the expansion joints were sealed with MAPESIL AC. MAPEFLOOR PARKING SYSTEM HE, a multi-layered polyurethane system with excellent physical and mechanical characteristics that provides surfaces with long-lasting protection, was used for the floors in the VIP stand and in the business and





LEFT. The emulsions PLASTIMUL 2K SUPER and PLASTIMUL 1K SUPER PLUS were used to waterproof the structures below ground level exposed to ground water under pressure and for the surfaces on the ground floor exposed to moisture coming from the ground.

RIGHT. Application with a rake of MAPEFLOOR PU 410, one of the components of the MAPEFLOOR PARKING SYSTEM HE used to create resin flooring in the stands and on the external (north and south) access ramps to the stadium.

press boxes, as well as on the external ramps (north and south) that provide access to the stadium. The system consisted of the application of a coat of PRIMER SN followed by the polyurethane binders MAPEFLOOR PU 400 LV and MAPEFLOOR PU 410 and, to finish, the two-component, aliphatic, top-coat MAPEFLOOR FINISH 451. Between each layer of the system, the surfaces were broadcast with various grades of quartz sand, according to the type of material applied and their particular function within the layered system.

Concrete repair in the museum

The only part of the old Puskás stadium left standing in the new stadium was a tower, which was converted into a museum dedicated to sport.

Specific restoration products had to be used on the tower to repair the old concrete, such as MAPEFER 1K anticorrosion mortar for the reinforcement rods, MAPEGROUT 430 thixotropic mortar to repair the surfaces of damaged concrete, PRIMER 3296 to consolidate the screeds and PLANITOP 550 mortar, which is distributed on the Hungarian market by Mapei Kft., to create a tough, even surface on the old stairs.



Find out more
PURTOP 400 M

TECHNICAL DATA

Ferenc Puskás stadium, Budapest (Hungary)

Period of construction: 2017-2019

Period of the Mapei intervention: 2017-2019

Intervention by Mapei: supplying products for waterproofing, anchoring, installing ceramic tiles, laying resin floors, repairing concrete

Owner: Hungarian Football Federation

Main contractors: Magyar Építő PLC-Záév PLC Consortium, Épkar

PLC, WHB LLC

Design: György Skardelli

Resin flooring contractors: SpecTech LLC

Waterproofing contractor: Akvaszig LLC

Concrete repair contractor: Tipox Betontechnika LLC
Contractor for the installation of ceramic tiles: Stukkó LLC Ratskó-Bau LLC, Dominó LLC

Mapei distributor: BNF Department Store

Mapei coordinators: Gergely Garay, Zsolt Dunai, István Jankovits,

Zsolt Marton, Ervin Horváth, Mapei Kft. (Hungary)

MAPEI PRODUCTS

Waterproofing: Purtop 400 M, Planiseal 88, Plastimul C, Plastimul 1K Super Plus, Plastimul 2K Super, Mapelastac Foundation, Mapelastac Aquadefense, Mapeband, Mapenet 150

Laying resin floors: Primer SN, Quartz 0.5, Quartz 0.9, Quartz 1.2, Mapefloor PU 400 LV, Mapefloor PU 410

Concrete repair: Mapefill MF 610, MapegROUT

430, Mapefer 1K, Planitop 550*
Preparing substrates: Primer 3296, Ultraplan Renovation, Primer SN, Primer P3
Installing ceramic tiles: Keraflex Light S1*, Keracolor FF Flex*, Mapesil AC, Adesilex P9
Anchoring: Mapefill MF 610

*These products are manufactured and distributed on the Hungarian market by Mapei Kft.

For further information on products: mapei.com and mapei.hu



PURTOP[®] SYSTEM

Purtop System, spray-applied polyurea membranes for **rapid waterproofing and protection** of any type of structure: from roofs, including those accessible to vehicles, to bridge and viaduct decks and hydraulic structures in general, for a **rapid, long-lasting solution**.

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