



CASE HISTORY BOOK





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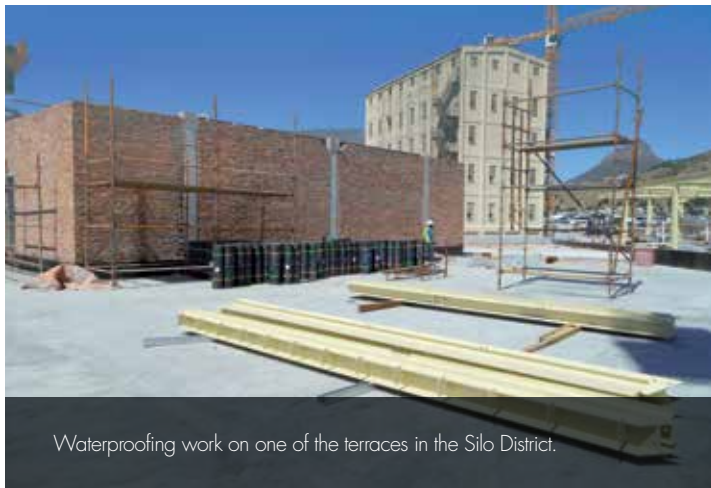
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# CAPE TOWN SILOS

INNOVATIVE WATERPROOFING PRODUCTS  
FOR REDEVELOPING A FORMER INDUSTRIAL AREA



Waterproofing work on one of the terraces in the Silo District.



The foundations for Silo 1 from above.

Polyglass products are used for waterproofing the 6 floors.

Polyglass, a Mapei Group's subsidiary, supplied branded waterproofing products for the foundations and roofs of a prestigious redevelopment project in the Silo District in Cape Town, South Africa. This monumental project, inaugurated on the 22nd of September 2017, is an excellent example of the conversion of an industrial area, in this case the historical industrial port area and waterfront in Cape Town. Work on the Grain Silo got underway in 2013 when the owners of the Victoria & Alfred Waterfront Holdings were looking for a suitable destination for this imposing, symbolic structure that had been a feature of the city skyline for decades. Since the start of the 1990's, this former warehouse dating back to 1921 with its imposing 57-m-high structure, had been the capital's commercial centre and a supply, storage and export hub for the wheat grown and harvested in the country. Consisting of 42 concrete silos located near the historic Victoria & Alfred Waterfront area of the city, it now attracts up to 100,000 visitors every day.

The new Grain Silo, which is situated inside the Silo District, was created thanks to the collaboration between Victoria & Alfred Waterfront Holdings and Jochen Zeitz, a German manager and owner of one of the world's most prestigious collections of contemporary African art.

Development of this project was awarded to the Heatherwick design studio from London, which came up with a plan to redevelop the structure and create a home for the Zeitz Museum of Contemporary Art Africa (Zeitz MOCAA), the biggest museum in the world for contemporary African art.

**The Grain Silo complex extends over an area of 9,500 m<sup>2</sup>, 6,000 of which are used for 80 art galleries, a rooftop sculpture garden, storage areas, bookshops, reading rooms and bars. The top 6 floors are set aside for rooms for The Silo Hotel.**

Heatherwick design studio decided to conserve the industrial character and memories of the building by highlighting the geometric forms of the concrete silos and embellishing them with modern materials.

The Silo District includes an entire area of 80,000 m<sup>2</sup> made up of various new structures: Silo 1 is a commercial building and the head offices of Allan Gray (a major South African investment company), Silos 2 and 3 have 31 and 79 apartments, respectively, Silo 4 is home of the first Virgin Classic Health Club in the province, Silo 5 has been turned into office space and, lastly, Silo 6 has been converted into the Radisson RED Hotel. The complex itself has won numerous awards (six SAPOA, or South African Property Owners Association awards, and three Best Overall awards) for its excellence in the real estate sector, commercial profitability, aesthetics, innovative design, functionality and environmental sustainability.

## WATERPROOFING AT DIFFERENT LEVELS

Because of the particular forms involved and the sheer size of the project, the designers specified the use of high-quality products that would guarantee durability, elasticity and excellent mechanical properties. The best solution to comply with all these requirements was a waterproofing system made up of products from the **REOXTHENE® and ADESO® lines**. These products have been available on the South African market for more than ten years and have already been used for a number of important projects. What is more, EVOLIGHT S and SPIDER P have also been awarded Agrément South Africa certification (No. 2017/557 and No. 2018/574, respectively) for waterproofing non-combustible substrates, such as flat or sloping (<60°) roofs, terraces, balconies and various other types of roofs, foundations and retaining walls. The intervention by Polyglass involved all the waterproofing work at different levels in numerous buildings of the district: from the roofs of the buildings to external piazzas, and from terraces to structures below ground level for the underground car parks.

For the paved roofs with a heavy protective layer, the waterproofing system was made up of a double layer of **3 mm and 4 mm EVOLIGHT S** membrane.

For the green roofs and the structures below ground level for the underground car parks, on the other hand, a different two-layer system was adopted, this time with a first layer of EVOLIGHT S and a second layer of **4 mm ANTIRADICE LIGHT P**. These membranes are part of the REOXTHENE® line and are made from the latest generation of distilled bitumen-based compound with ultralight technology, and a high percentage of polymers to guarantee several advantages, including a higher level of durability over the years. ANTIRADICE LIGHT P is a dual-function, plastomeric membrane: apart

from waterproofing structures, it is also resistant to root penetration and is certified as compliant with EN 13948 standard. **EVOLIGHT S** and **ANTIRADICE LIGHT P** are also recommended for use on foundations to prevent rising damp.

Another waterproofing product used for the roofs was **SPIDER P**, a plastomeric membrane from the ADESO® line which, thanks to its self-adhesive backing, can be installed without using heat or a blow-torch. SPIDER P has excellent dimensional stability, mechanical properties and is easy to work with on site.

By using Polyglass membranes, the structures of this ambitious redevelopment project in the Silo District will remain protected against water infiltrations for years.

### TECHNICAL DATA

**Project purpose:** Cape Town, South Africa

**Intervention:** waterproofing roofs and underground structures

**Client:** Victoria & Alfred Waterfront Holdings (Pty) Ltd

**Site:** Cape Town, South Africa

**Products used:** Evolight S, Antiradice Light P, Spider P

**Year of the intervention:** 2017

**For further information see**  
[www.polyglass.com](http://www.polyglass.com)



Application of a REOXTHENE® membrane in one of the silos.



The map view of the new Silo District in Cape Town.

# A NEW CARPARK IN THE NEW ISHO DISTRICT

ONE OF THE TALLEST IN THE COUNTRY, DESIGNED IN THE FORM OF A SPIRAL,  
THE CARPARK PROVED TO BE A REAL CHALLENGE FROM A CONSTRUCTION POINT OF VIEW

Timisoara is the largest city in western Romania and has been designated 2023 European capital of culture. Over the last few years, it has become much more appealing for business and tourism sector and this has led to numerous backers investing in urban redevelopment projects and the conversion of dozens of buildings of architectonic value in the oldest neighbourhoods of the city, as well as the construction of completely new neighbourhoods. This is the context behind the creation of the Isho redevelopment project of a former industrial area: a new multi-functional district consisting of residential complexes, areas for leisure activities, shopping facilities and office spaces. Isho includes 1,200 apartments, offices, a hotel, an extensive range of cultural and sports services and a multi-storey carpark, all within a just short walk of the old part of the centre of Timisoara.

## THE CARPARK PROJECT

One of the tallest in the country, the new carpark – with a fully-automated intelligent system to manage the availability of parking spaces – has played a key role in improving traffic conditions in one of the most congested parts of the city.

From a construction point of view, the work proved to be a real challenge: it was designed in the form of a spiral, with 700 parking spaces over 9 levels and a continuous ramp system. The internal height at each level is quite limited which meant it was not easy to find suitable equipment to apply and compact the hot asphalt on the ramps leading to each of the levels.

The low ceilings also created problems for the delivery of the asphalt around the site: in fact, because there was not enough space available for the dumper trucks to reach the various levels, they had to offload the material on the ground floor.

The tender for supplying building materials for the work was awarded to the Mapei Group, who beat their competitors by being the only company that could guarantee the availability of material from stock and provide suitable equipment for its application and constant support for the teams working on site.





## WATERPROOFING THE RAMPS

The design of the ramps specified the application of a layer of hot asphalt applied directly over a bituminous membrane manufactured and supplied by Polyglass Spa, a subsidiary of the Mapei Group from Ponte Piave (Province of Treviso, Italy).

The product chosen in this case was 5 mm thick **POLYBOND HP P** elastomeric-plastomeric (PlastomerPolymer Bitumen) waterproofing membrane.

Made from a special distilled bitumen compound modified with a high percentage of special polymers such as POLYPROPYLENE (APP) and POLYOLEFIN (APAO), with the addition of special anti-ageing additives that provide blends with superior performance characteristics, **POLYBOND HP P** has excellent performance properties since it is made from a special distilled bitumen compound modified with a high percentage of special polymers such as POLYPROPYLENE (APP) and POLYOLEFIN (APAO), with the addition of special anti-ageing additives.

The membrane is manufactured according to standards set by NAT® technology, an innovative production system which controls the ageing process of the polymeric matrix of bitumen membranes.

**POLYBOND HP P** has a spunbond polyester nonwoven carrier stabilized with glass strands parallel to the machine direction. The carrier gives great tensile strength (in all directions) and puncture resistance, with excellent dimensional stability.

The adhesion promoter employed for the membrane was **POLYPRIMER**, a bituminous primer containing oxidized bitumen and a mix of technical quick drying solvents, which blocks dust and porosity in the application surface enabling the membrane to be applied quickly.

An enormous amount of PlastomerPolymer Bitumen membrane – around 20,000 m<sup>2</sup> – was used in the construction of this spectacular structure that has helped improve the architectonic impact of the city and make Isho the best-served neighbourhood in Timisoara regarding parking spaces.

## TECHNICAL DATA

**Project purpose:** carpark project

**Intervention:** application of waterproofing membrane on the ramps

**Client:** Mulberry Development

**Site:** Timisoara, Romania

**Products used:** Polyprimer, Polybond HP P

**Year of the intervention:** 2020

**For further information see**  
[www.polyglass.com](http://www.polyglass.com)



# HOTEL FRUŠKE TERME

47000 SQUARES OF LUXURY MADE  
USING MAPEI'S PRODUCTS AND SOLUTIONS



Banja Vrdnik, one of the newest accommodation facilities in Serbia, is located on the southern slopes of Fruška Gore, only 20 km from the city of Novog Sada. The first mention of the settlement of Vrdnik dates back to 1315. Long before the development of the thermal area, the village was known for its brown coal mine. Vrdnik is a popular tourist destination in Serbia, well-known for its cultural and historical monuments, its healing thermal water, its natural beauty and the temperate climate. A new era of the development of thermal area was marked last year by the opening of Fruške Terme. The luxurious complex covers 47000 m<sup>2</sup>, has eight swimming pools with thermo-mineral water, a modern conference hall, a health wellness center, a spa and wellness center, as well as many other facilities for a comfortable and luxurious stay in as many as 216 rooms.

The pool complex and the spa and wellness center are the heart of the project. The design of the pool area consists in a mix of indoor and outdoor pools combined with additional attractive facilities, including an outdoor infinity pool which offers a splendid view of the surrounding nature.



## HYDRO ISOLATION OF THE COMPENSATORY TANK

The hotel's pools are deck level pools, that means that water line is in level with the edge of the pool and spills over into an overflow channel, which is located along the circumference of the pool, and further gravitationally into the compensation tank, from where is taken again for purification and treatment.

The drop layer at the bottom of the tank's compensator has been made with a hydraulic binder, a separating layer under which a thermal insulation layer of extruded polystyrene has been placed. The cement screed has been made in a minimum thickness of 4 cm.

**POLYDREN PP 300**, a nonwoven geotextile polyethylene, has been used as a regulating layer between the substrate and the final membrane.

**MAPEPLAN WT**, a synthetic waterproofing membrane in PVC-P, has also been installed through the lining by hot air welding. It is a certified membrane completely safe for use in pool systems because it is suitable also for drinking water; thanks to the nature of the product and the installation procedure the tanks can be filled immediately after at the end of the works.

## WATERPROOFING OF FLAT ROOFS

The flat roof surfaces on the building have been designed to be walkable.

Before waterproofing, a layer of POLYPRIMER was applied to favor the adhesion of the membranes and to stop dusting and saturate the porosity of the substrate. Then was layed POLYVAP RADONSHIELD P-AL, a prefabricated elastomeric-plastomeric waterproofing vapour control membrane offering excellent performances. Made from a special distilled bitumen compound modified with a high percentage of special polymers such as POLYPROPYLENE (APP) and POLYOLEFIN (APAO), with the addition of special anti-ageing additives that provide blends with superior performance characteristics. POLYVAP RADONSHIELD P-AL has a stabilized polyester nonwoven composite carrier laminated with aluminum foil that gives tensile strength in all directions, as well as good dimensional stability and excellent water vapour transmission resistance properties. For the insulation were used two layers of polystyrene panels of 12 cm each protected by a separation layer of POLYDREN PP 300.

MAPEPLAN B 15, a synthetic membrane in PVC-P, has been installed as the main



waterproofing layer. The membrane is easy to weld with hot air, is flexible even at low temperatures (-25°C), is resistant to microorganism, roots and UV radiation, so there is no need for an additional protection if it is used as a final coating layer. Other products, in addition to the PVC-P membranes on the roof, have been used to complete the system. The products used are respectively: drainage profiles, outlets and metal sheets. **MAPEPLAN D15** has been used for the detail processing. The work on the roof terraces continued after the control of the welded joints. Ceramic tiles have been selected as finishing tiles, that cannot be laid directly on the PVC-P membrane. So, a separating layer of 300 g geotextile **POLYDREN PP 300** has been installed beforehand and then a cement screed, in a minimum thickness of 4-5 cm, has been laid over. Ceramic tiles have then been glued to the substrate prepared. Artificial grass was chosen as final covering on some roof surfaces; it has been laid directly on the PVC -P membrane.

#### **FLAT ROOF WITH INTEGRATED PHOTOVOLTAIC SYSTEM**

The construction of a garage equipped with solar panels was part of the project: the solar power plant provides 30% of the building's power needs by supplying the complex with electricity energy. Before installing the solar panels the garage was waterproofed using **MAPEPLAN M 18**. **MAPEPLAN M 18**, in addition to the basic function of protection from atmospheric events, meets the criteria related to the installation and successful operation of a solar power plant. Some of these criteria were related to:

- mechanical resistance that would allow the movement along the membranes during the installation and maintenance of a photovoltaic system;
- high solar reflection index (SRI), which favorably affects the efficiency of the photovoltaic cells;
- resistance to wind (lifting);
- functionality and durability;
- easy installation.

**MAPEPLAN M** has been selected considering characteristics and dimensions of the roof surface. White coloured membranes increase the efficiency of photovoltaic cells, reducing the heating of the building and the cooling costs in the summer months.

The **MAPEPLAN M 18** membranes have been placed over the separating layer of non-woven geotextile and fastened mechanically to the supporting structure. The membranes have been laid with a mutual overlap of approximately 12 cm and have been welded with warm air in the overlap areas. The thermofusion allows a perfectly "flat" appearance of the welded surfaces.



## **TECHNICAL DATA**

**Project purpose:** carpark project

**Intervention:** application of waterproofing membrane on the ramps

**Client:** Mulberry Development

**Site:** Timisoara, Romania

**Products used:** Polyprimer, Polybond HP P

**Year of the intervention:** 2020

**For further information see**  
[www.polyglass.com](http://www.polyglass.com)



# HOTEL BELLEVUE

MAPEI WATERPROOFING SYSTEMS FOR COMPLETE PROTECTION OF BALCONIES, TERRACES AND FLAT ROOFS

The island of Lošinj is the perfect choice for a healthy and active vacation in any season and is an ideal solution for high-class hotels. Therefore, in November 2013, work began on the reconstruction and extension of the Hotel Bellevue. Extremely short deadlines required constant and prompt support of the Mapei technical team in all construction phases.

More than 10.000 m<sup>2</sup> of **MAPEPLAN** was installed and more than 10.000 m<sup>2</sup> of **MAPELASTIC** was used for waterproofing.

Work on the flat roof began with polypropylene geotextile 300 g/m<sup>2</sup> which was laid on the roof, and then **MAPEPLAN TB 1.5** synthetic TPO membrane was laid on it. **MAPEPLAN TB** was freely laid with 8 cm wide folds, welded with hot air. The membrane was then raised 15 cm to the attic and the geotextile was re-laid on the membrane as previously described. In that way, the synthetic TPO membrane **MAPEPLAN TB** was used as a waterproofing and as a vapor barrier in the inverted roof system. Outflows from the green roof jardinières were accomplished with **MAPEPLAN TPO** side drains which were welded to the membrane.

A cement screed applied to the primary waterproofing was protected from atmospheric influences with two layers of **MAPELASTIC** which, thanks to the high content of quality synthetic resins, remains permanently elastic in all environmental conditions, UV stable and resistant to chemical aggression and salts, characteristic to the coastal area.

**MAPENET 150**, laid in the first layer of **MAPELASTIC**, provided it additional flexibility. Finally, another layer of geotextile and ballast, i.e. a layer of gravel, was placed on it.

The same described system with **MAPEPLAN B 15** membrane, was installed on the roof of the restaurant, kitchen, beach bar and indoor pool.

After the reconstruction, Hotel Bellevue became the first five-star hotel on the island of Lošinj.





## TECHNICAL DATA

**Project purpose:** new building construction

**Intervention:** roof waterproofing

**Site:** Mali Lošinj, Croatia

**Products used:** Mapeplan TB 15, Mapeplan B 15,  
Mapeplan TD 15, Mapeplan T metal sheet, Mapeplan T collar

**Year of the intervention:** 2014

**For further information on products visit**  
[www.polyglass.com](http://www.polyglass.com)



# BABINA RIJEKA AND PEHARE VIADUCTS

**POLYGLASS WATERPROOFING MEMBRANES WERE SUCCESSFULLY USED AS CONSTRUCTION MATERIALS FOR IMPORTANT INFRASTRUCTURES**



Polyglass SpA has been operating on the Bosnian market for more than 15 years. Polyglass modified polymer-based bituminous waterproofing membranes are synonymous with quality and are now considered reference products for the country's installation companies and professionals working in the waterproofing sector. But it's not only waterproofing membranes that have made their mark; specific products aimed at the bridge and viaduct sectors have also been successfully launched on the Bosnian market. In fact, numerous road decks have been protected over the last few years with Polyglass membranes, particularly **POLYBOND HP**.

## STRATEGIC INFRASTRUCTURES FOR THE COUNTRY'S GROWTH

The 5C Pan-European Corridor is a strategic project for the entire Eastern Europe and, once completed, it will link Budapest to the Croatian port of Ploče on the Adriatic coast, passing through the whole of Bosnia-Herzegovina and the Bosnian capital, Sarajevo, along the way. The new highway (Autoput A1 – E73) is of primary importance for a country characterised by mountain ranges, narrow valleys, numerous rivers and small villages dotted all around the country, and still not very well connected to one another. Modern communications infrastructures, therefore, are an important driver behind the economic and social growth of this country. The bypass around Zenica, approximately 60 km from Sarajevo, was one of the most challenging stretches from an engineering and construction point of view; along just 8 km of road, two tunnels, four viaducts and a bridge had to be built.

The Babina Rijeka viaduct, which was constructed on the Donja Gračanica-Drivuša section/Klopče-Donja Gračanica sub-section of the motorway, crosses the Babina valley and is the highest deck ever built until now along the 5C Corridor: 120 m above the River Babina.

The viaduct is made up of two parallel buildings: the left one is 389.2 m long and the right one is 380.74 m long. Each building has three spans supported by one pillar at each end and two central pillars. The height of the two central pillars range between 60 m and 80 m, with a central span of around 165 m. The pillars are anchored in round, reinforced concrete, 18 m-deep wells measuring 12 m in diameter at the base, while their top ends are elastically constrained to the superstructure. The superstructure is made up of a 6.5 m wide reinforced concrete caisson prestressed in a longitudinal direction, with a box-like section that can be varied in height. The width of the upper part of the deck is 13.76 m. The Pehare viaduct was also built along the same stretch of motorway and is also made up of two separate structures: the building on the left is 429.95 m long and the one on the right is 420 m long. The size and position of the pillars was dictated by the geological characteristics of the soil and the local road network. In fact, a part of the geological

landscape coincides with a particularly unstable area subject to landslides, while the other part does not suffer from any stability problems. The width of the upper part of the deck is 11.70 m, not including the concrete safety barrier.

A membrane designed for bridges and viaducts

Polyglass SpA took part in the construction of this important infrastructure by supplying the 5 mm plastomeric bituminous membrane **POLYBOND HP**, a product specifically designed for bridges and viaducts and compliant with EN 14695 standard (Reinforced bitumen sheets for waterproofing of concrete bridge decks and other trafficked areas of concrete).

The concrete deck was initially treated with **MAPEFLOOR I 914**, two-component epoxy protective coating for concrete, supplied by the Group's Slovenian subsidiary Mapei d.o.o., and then broadcast with quartz sand.

The next step was to apply the membrane using the traditional torching technique. The special bituminous compound formulation combined with the optimum mechanical parameters offered by the internal reinforcement, consisting of spun-bonded stabilized polyester, make the product suitable to receive paving of hot asphalt with the use of pavers and rollers.

**POLYBOND HP** and **MAPEFLOOR I 914**, were approved by the Federal Ministry of Spatial Planning (document number: UPI/03-19-275/20) before the installation.

During the application several pull-out tests were carried out on site with very good results about the adhesion of the product onto the concrete load-bearing structure.

## TECHNICAL DATA

**Project purpose:** new viaduct on the A1- E73 highway

**Intervention:** supplying waterproofing membranes

**Client:** JP Autoceste FBiH

**Site:** Zenica, Bosnia-Herzegovina

**Products used:** Polybond HP P

**Year of the intervention:** 2020

**For further information see**  
[www.polyglass.com](http://www.polyglass.com)



# KRUTH-WILDENSTEIN DAM

A MONUMENTAL WORK OF CIVIL ENGINEERING REPAIRED IN RECORD TIME



The Kruth-Wildenstein Dam, built in the 1960's in the Haut-Rhin region in France, forms a reservoir with 12 million m<sup>3</sup> of water for mainly agricultural and industrial use and is of vital importance to all the businesses and activities in the region. Signs of structural instability started to appear in 2019 and a sudden slip in the upper waterproofing layer forced the owners into having to programme urgent maintenance work. The international tender, issued by the Haut-Rhin Region, was awarded to CEA (Cooperativa Edile Appennino) from Central Italy.

## REPAIR WORK

The tight schedule was dictated by the urgent need to allow local businesses to continue operating, which in the meantime had been put into enormous difficulties due to the dam being out of service. In order to carry out the repair work on the entire waterproofing layer, the reservoir had to be completely emptied and more than 10,000 tonnes of specially designed mixes were required.

Polyglass was involved in the project through the supply of the hot-poured, bituminous elastomeric plastomeric sealant **POLYSTRADA SEALANT**, which was used to block the infiltrations of water and reduce the structural instability.

When carrying out work on road paving, sealants are often used to both finish off and seal particular areas of the paving and to form elastic joints in gaps between different areas of asphalt to enable them to work together. For this particular case, it was adopted to serve a much more specific application: to seal a working joint on a dam wall.

The excellent elasticity of the sealant limits the risk of it detaching from the treated walls to a minimum and allows it to follow any expansion in the structure, while its high penetration capacity guarantees that it reaches deep down into the joint. The only other possible alternative would have been to carry out a much more costly and time-consuming intervention.



**POLYSTRADA SEALANT** was used to form the joints between the waterproof main body of the dam, made from asphalt, and the reinforced concrete structure. The material was hotpoured around the perimeter – into a 27 cm high by 2 cm wide channel on both the inside and the outside of the raised concrete kerb – for a total length of over 1 km. It was then left to cool down until it completely filled the gap between the two bodies. The **POLYSTRADA SEALANT** was applied using a machine that heats and melts the bitumen briquettes and then pours the material through 40 m-long tubes. To overcome the 33° slope of the dam wall, the material was applied in consecutive pours until the joint was completely filled.



A close-up look of the application of POLYSTRADA SEALANT.



POLYSTRADA SEALANT ensures perfect sealing of cracks and joints, which is one of the most effective measures in terms of road and infrastructure maintenance.

## TECHNICAL DATA

**Project purpose:** maintenance work

**Intervention:** waterproofing roofs and underground structures

**Client:** Haut-Rhin Regional Council

**Site:** Haut-Rhin, France

**Products used:** Polystrada Sealant


**Year of the intervention:** 2020


**For further information on products visit**  
[www.polyglass.com](http://www.polyglass.com)



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