

Drytech White Tank System

Key References

Structures in contact with water or liquids in general



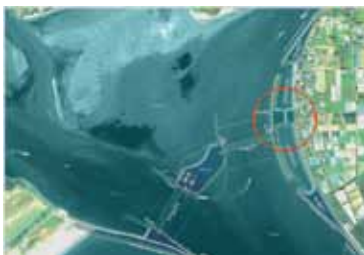
Marine-powered air conditioning system, Savona, Italy

The two storeys of the Città del Mare's underground car park, which is exposed to a 5-metre water head, were also constructed using the Drytech White Tank Waterproofing System. Contractor: Meraviglia Spa, Bulgarograsso Consulting Engineer: Design Studios Technion Srl & Ellevi, Lecco.



Car park below sea level, Genoa, Italy

The conversion of the industrial port area included the construction of a residential complex called Borgo Alla Marina. 200 high-quality apartments, each with a mooring space and garage, overlooking the new tourist port. Underneath the buildings and square, below sea level, the project includes a covered residents' car park, created using the Drytech White Tank System.



Waterproof caissons MOSE, Venice, Italy

Drytech created the waterproof caissons (at the centre of the circle in the photo) for the lock at the centre of the small harbour at the mouth of Lido Treporti. The lock allows small boats to pass through when the MOSE floodgates are raised to counter the high water phenomenon afflicting Venice. This creates a different water level between the water inside and outside the lagoon.



Prefabricated waterproof tanks, Loano, Italy

The fuel tanks for the service station in the new tourist port of Loano were built on shore by PB Lavori Marittimi Srl of Ancona using the Drytech White Tank System. Prefabricated tanks are more practical to construct and offer higher quality results, considering that casting under water often produces honeycombing, irrespective of the skill and care taken by underwater operators.



Maritime Station, Salerno, Italy

The futuristic Maritime Station in Salerno, Naples has been projected by the well-known Iranian architect Zaha Hadid. Due to its central position close to the Amalfi Coast, Capri Island and the archeological sites of Paestum and Pompei the port is having an important impact on the mediterranean cruise traffic. Drytech has realized the whole watertight underground structure with its White Tank System.



Sea Port, Loano, Italy

The new Sea Port Project in Loano, Genoa foresees 1'200 new boat spaces and 1000 new parking lots, where of 400 are built under the sea level. Drytech realizes a surface of 6'500 m² and 1'200 m² of walls with the Drytech White Tank System. DRYset crack-inducing units were fixed in the whole floor slab, 4 meters under the sea level.

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Pumping Plant, Campione d'Italia, Enclave Italy

Realization of a pumping plant completely interred under the level of the lake and close to it.

Inside the plant a collecting tank has been realized with the Drytech White Tank System, facing walls with numerous pipes.



Hydroelectric Plant, Ruppoldingen, Switzerland

2,400 m² of Drytech White Tank to construct the penstock tunnel and the turbine chamber with a waterproof structure exposed to 2.4 bar pressure.



Hydroelectric Plant, Bremgarten, Switzerland

1,390 m² of waterproof structures, constructed with the Drytech White Tank System for the dam pillars, the turbine chambers and the control centre.



Hydroelectric Plant, Münchenstein, Switzerland

1,250 m² of waterproof structures constructed with the Drytech White Tank System for waterproofing the turbine chamber, the penstock tunnel, and the control room.



Thermal Baths, Vals, Switzerland

A rather complicated project due to numerous penetrations and the construction system used for the particularly fine walls: created with natural stone walls acting as disposable formwork.

Special solutions were adopted for penetration of the movement joints by through pipes.



Public Swimming Pool, Mönchengladbach, Germany

A new family pool has opened up its doors in 2005 in the Nordrhein-Westfalen county. Drytech was appointed to provide the White Tank System for the waterproofing of this huge structure.

The pool area contains various pools, channels, water fall, slides, diving boards, water toys (boat with water canon, climbing wall, etc.) and relaxing facilities.

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Park Hotel and SPA Waldhaus, Flims, Switzerland

The 5-star Grand hotel Waldhaus offers its guests only the best. This philosophy has been applied also for the renovation and construction work, planned and projected by the architect Fontana & Partner AG, Flims. Drytech White Tank was used for the SPA's waterproof structures and the underground car park.



Water Park Wassenberg, Nordrhein-Westfalen, Germany

180 tons of concrete for the waterproofing of the underground level and creation of tanks using the Drytech White Tank System. The numerous penetrations can be effectively waterproofed thanks to the DRYset sleeves. Due to the optimization of the Drytech Engineering a reduction of 15 tons of reinforcement bars was possible.



Hanging Swimming Pool, Lugano, Switzerland

This glamorous hanging pool in exposed concrete with a glass wall overlooking Lake Lugano is the emblem of White Tank, which in this case enhances the pure lines of the design created by Quaglia, the architect.



Private Swimming Pool, Breganzona, Switzerland

Pool with exposed concrete surface, built using the Drytech White Tank System: single structure in waterproof concrete, waterproofed at critical points (joints, penetrations and shrinkage cracks).



Swimming Pool overlooking Lake Lugano, Switzerland

Infinity pool encompassed within a garden pond with a fountain. The structure, created using the Drytech White Tank System, was finished in stone.



Hanging Swimming Pool, Locarno, Switzerland

This home, with a hanging pool designed and planned by the Engineer Bonalumi, is surrounded by woodland located above Ascona and overlooks Lake Maggiore. The swimming pool takes up part of the top floor and offers a view of the entire lake, from the Swiss side to the north to the Italian side to the south. The underground part has also been realized with the Drytech White Tank.

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Key References

Infrastructure / Tunnels



Olympiapark Underground Railway Station, Munich, Germany

The Olympiapark underground railway station in Munich was built using the top down technique and waterproofed with the Drytech White Tank System, which adapts perfectly to the characteristics and restrictions connected with this type of construction technique.

30,000 m² of waterproof diaphragm was created, in addition to that required for the bottom concrete bed, to waterproof this new, 700-metre long, Line 3 station.



Comet Metro Copenhagen, Denmark

Comet Metro was designed as a cut and cover for the stations and TBM for the running tunnels on a ground water table of 20 m. The original design called for bentonite membranes which did not succeed in sealing the tunnels. The elastic acrylic resin was then injected to seal all the cracks and joints. For the new works DRYset injection channels were fixed.



Cut and Cover Tunnel, N2 Motorway, Basel, Switzerland

Flughafenstrasse and St. Johann cut-and-cover, 4-lane motorway tunnels, built in 3 stages using the top-down system, with a total length of 560 metres. The water table can vary by up to 1.5 metres in just 2 hours.

Flughafenstrasse	St. Johann	Junction
walls: 4,700 m ² , 80 cm thick	walls: 4,300 m ²	walls: 900 m ²
concrete bed: 6,000 m ²	40-80 cm thick	40-80 cm thick
concrete bed: 7,500 m ²	concrete bed: 6'000 m ²	concrete bed: 1'500 m ²



Cut and Cover Tunnel, Rail 2000, Heriswil-Thunstetten, Switzerland

Injections into base slab to prevent ingress of water through floor slab. Construction with White Tank Systems and injection of elastic acrylic resin due to capillary action of the groundwater lead to water seeping in through the side walls up to 2 m above the ground slab.



Access Tunnel East Rail to IFC Building, Hong Kong, China

Cut and cover tunnel for KCRC Railway in Kowloon, Hong Kong. Waterproofing injections with elastic acrylic resin of cracks and joints in tunnel walls and vault ceiling.



SMART Access Tunnel, Kuala Lumpur, Malaysia

Road and flood relief tunnel in one circular tunnel located on different levels. The design was developed to cater for extreme flooding when the road is closed to traffic during the flood period.

All concrete sections were designed and built using DRYset injection channels. The approach ingress and egress tunnels were built as a cut and cover tunnel with injection of the joints and cracks.

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Key References

Infrastructure / Tunnels



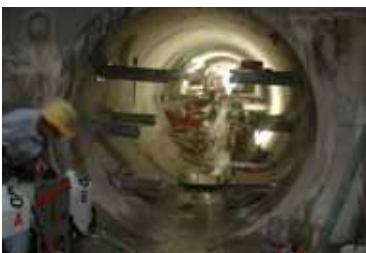
Submersible Tunnel Rostock, Germany

Major river crossing in Rostock designed as a submersible tunnel which was cast in situ next to the crossing. During construction the embankment and locks between the river and the dry dock leaked and flooded the works. Elastic acrylic resin was injected into the lock seal to create a watertight barrier so that the dry dock could be dewatered and construction works continue.



Storebaelt Tunnel, Copenhagen, Denmark

Fire broke out in the tunnel in 1997 which caused severe cracking in the tunnel and consequent leakage. The cross passages and running tunnels where corrosion had set in place blocking the safety doors to the cross passages and water seepage onto the electrical equipment are 20 m above sea level. The cut and cover sections of the tunnel were successfully injected with elastic acrylic waterproof resin.



Service Tunnel, Sydney, Australia

The Burrows Road Service Tunnel was built as a pipe jacked tunnel for a 132 KV Main Transmission Supply Tunnel for Energy Australia. Drytech joints and sealing systems were chosen to seal the interface joints between the tunnel and shafts saving considerable time in construction in a safety critical and sensitive location.



CTRL Thames Tunnel, London, England

Tunnel built with diaphragm walls with ground slab joint details and sealed as a White Tank structure with injection channels between adjacent floor slab pours and the diaphragm wall floor slab joint. Environmentally friendly and non corrosive resin injections were made.



Midfield Dock Zurich Airport, Kloten, Switzerland

Construction of the waterproof structure of the new runway centre terminal Mid-Field Dock of Zurich Airport and the underground connection tunnels. The Drytech System allowed the construction of the diaphragm walls with casting steps as long as up to 30 meters without expansion joints and concrete beds with thicknesses of up to 1 meter, by casting from 800 to 1,000 m³ of concrete per day.

Drytech White Tank System

Key References

Basements / Public buildings



Opera House "La Scala", Milan, Italy

The renovation and enlargement project planned by architect Mario Botta included waterproofing the 18-metre deep stage pit with 850 m² of concrete bed and 2,500 m² of walls.

The Drytech White Tank System was chosen for a series of advantages: it guaranteed a solution to the problem of waterproofing the tie rods of the load-free concrete bed: it saved 3 months of site days.



Grand Casino, Basel, Switzerland

The Grand Casino in Basel, an architectural highlight at the Euroairport was realised in 21 months as a cube construction with 9 floors (5 underground) with a modern backlit glass façade that is lightened in red at night and multi-coloured according to the sense-perception during the day. The floor space incl. car park for 280 cars consists in 16'500 m², and volume of 60'000 m³.



Muba Exhibition Tower, Basel, Switzerland

28 floors in 28 weeks. The tower symbol of the Basel Messe is also the emblem of the most advanced construction techniques. For the rapid progress of the tower the basement level had to endure tension and structural movements resulting from rapid changes in loads. The Drytech White Tank System has been chosen due to the flexibility of its waterproofing resin, that adapts to movements of joints and fissures.



Playhouse Theatre, Basel, Switzerland

Connected to the city theatre with a 40 m tunnel. The concrete-steel construction is dominated by the variable auditorium and the high open stage tower. The first underground level contains the scene storage room of 6 m high and enables the movement of the scenery through the tunnel. The total floor space consists in 24'350 m². Engineering company: WGG Schnetzer Puskas, Basel.



St. Jakob Tower Stadium, Basel, Switzerland

The tower, 1.5 meters thick by 9'000 m² of surface, inaugurated in 2008, was one of the symbols of EURO 2008. Over 70 meters high and with two underground levels, the latter were constructed with the Drytech White Tank System.



Palazzo Mantegazza, Lugano, Switzerland

White Tank System on all five floors of the underground car park of Palazzo Mantegazza, located 15 metres away from the lake and exposed to an 18.8 metre water head.

The underground level was created using the underpinning process with suspended formwork: the Level 0 floor slab is cast, leaving openings through which to excavate down to the Level -1 floor slab. Then the formwork previously used for the Level 0 floor slab is lowered and, when Level -1 is reached, the new floor slab is cast. And so on down to Level -5.

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Key References

Basements / Public Buildings



Hospital S. Anna, Como, Italy

At 55,000 m², the new S. Anna hospital in Como has the largest White Tank concrete bed in Europe. The structure will open in 2010, four years after the building site opened. Mr Mola was the engineer responsible for the structural design of this hospital in Como, which was built by Consorzio SANCO. The two underground levels that will also house the operating theatres are exposed to a 2-metre water head.



European Institute of Oncology, Milan

Creation of underground rooms in the National Institute of Oncology in Milan. Thanks to the Drytech White Tank System, the concrete bed was cast directly onto the diaphragm.

Picture: Existing structure and, in the lower part, the diaphragm.



Campus of Science, Novartis, Basel, Switzerland

The latest building of Novartis is called „Campus of Science“ and is built on the ex-production area on a surface of 20 hectares for 10'000 employees. The total project includes a University Complex for Life Sciences with a development span until 2030 and an estimated investment of CHF 2 billions. Waterproofing systems by Drytech White Tank.



Palazzo Donini, Lugano, Switzerland

An automated garage was built with the White Tank System with a watertight concrete slab and diaphragm with a water head of 8.5 metres (the building is 50 metres away from the edge of the lake). The system saved 3 months of time and, thanks to the single structure of the White Tank, 2 extra parking places were obtained compared to those foreseen in the initial design using traditional waterproofing techniques.



Ex-Michelin, Trento, Italy

Ex-Michelin area, Trento. The design created by the architect Renzo Piano foresees a variety of uses for the area including homes, offices, shops, cultural spaces and recreational areas. An area of 10 hectares in which residential buildings will be joined by public buildings designed to enhance the area's attractiveness. The Science Museum: emblematic building of the new neighbourhood (© Renzo Piano Building Workshop RPBW).



Casale Group Building, Lugano, Switzerland

Creation of two underground levels to be used as garage space in an office building, with a waterproof structure of 2,400 m², exposed to water stagnation caused by excavation in rock.

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Key References

Basements / Public Buildings



Ferrari Museum, Modena, Italy

A masterpiece by the Czech architect Jan Kaplicky. Foreseen inauguration in 2011. Drytech is constructing the basement of the museum with a White Tank of 5'850 m². Thanks to the Drytech crack inducers the casting can proceed much faster because the sizing of the step is no longer subject to the physical and chemical properties of the concrete.



Shopping Mall "Centro Ovale", Chiasso, Switzerland

The shopping mall foresees a total commercial area of 9,000 m² with 60 shops on 5 floors. The first 2 underground levels are destined for 500 parking lots, using the Drytech White Tank System.

The roof will be realized in self-supporting precompressed shotcrete.



Fondazione Molo, Lugano, Switzerland

In the centre of Lugano, a prestigious building with offices, shops and a multi-storey car park. Waterproofing of the underground levels using the Drytech White Tank System, for a total of 2,380 m².



Office Building, Lugano, Switzerland

Two-level underground garage, created using the Drytech White Tank System, with a water table level 1 metre above the concrete bed. The system cannot be damaged because waterproofing is done from within, after casting.



Underground Parking, Shopping Center, Camerlata Como, Italy

Creation of a 3-level underground car park, with a concrete bed of 14,000 m², exposed to a 2-metre water head. The concrete bed was created in 10 weeks using DRYset crack-inducing units for formwork. The waterproof concrete walls were cast directly against the diaphragm.



Piazza Castello Car Park, Lugano, Switzerland

Two-level underground car park in the city centre: 5,800 m² of waterproof structure exposed to a water head of 4.5 metres. Adopting the Drytech White Tank System saved a considerable amount of time: the system involves a single structure serving both waterproofing and structural functions, and because waterproofing activities can be carried out simultaneously with other activities on site, meaning that waterproofing can be quite literally struck off the work schedule.

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Key References

Basements / Residential Buildings



Forum Apartment Block, Locarno, Switzerland

The Forum apartment block in Locarno is located on the town's lakeside promenade. The underground level, used for utilities and parking, was built using the Drytech White Tank System and has a total waterproof structure of 4,080 m², exposed to a maximum water head of 5 metres.



Residence San Gottardo, Lugano, Switzerland

The exclusive apartments in Lugano with lake view made a waterproofing of 6 floors built against the mountain and an underground garage for a total of 3,380 m² necessary.



Villa Sassa, Lugano, Switzerland

Residential apartments built next to the well-known hotel & spa Villa Sassa in Lugano. Waterproofing with the White Tank of 4 underground floors built against the hill, for a total of 4,250 m².



Apartment Blocks Weiherfeld West, Rheinfelden, Switzerland

Large project, close to Basel and in the middle of nature, containing apartment blocks and two-family houses with garden. A water head of 1.50 m made the application of the Drytech White Tank System indispensable. The waterproof structure of underground floors and car park is totally sized of 5'450 m² concrete bed and 970 m² walls.



Private Villas, Riehen, Switzerland

At the outskirts of Basel, on hill-side prime location, 6 futuristic detached houses with parking garages were built by the architect Kunz & Partner, Basel. Planning and waterproofing project realised by Drytech AG, Arisdorf.



Apartment Blocks Birsigpark, Oberwil, Switzerland

At the outskirts of Basel, on hill-side prime location, 25 apartments in 2 blocks are realized with the "Minergie" certified energy-saving standard. Drytech has realized 1,250 m² of floor-slab and 550 m² of walls of the underground level with the White Tank System.

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Key References

Special constructions



Anti-seismic Construction: New anti-seismic homes for those made homeless by the earthquake, L'Aquila, Italy

To guarantee the anti-seismic nature of the property, the perimeter wall was not fixed to the concrete floor slab. A sliding joint was therefore created between the concrete floor slab and the wall, which was waterproofed with injections of DRYflex resin. DRYflex is an elastic, expanding gel that waterproofs by pressure and therefore adapts to any structural movement, ensuring that the joint remains watertight. Due to the Drytech White Tank System the whole work schedule could have been accelerated.



Refuse Incineration Plant, Basel, Switzerland

The modernised incineration plant in Basel is equipped with the most effective purification flue gas system and is therefore able to burn also hazardous waste without endangering of the environment. In 2008 the first Swiss quality label "naturemade basic" for refuse incineration has been given to the incineration plant in Basel.