PERMANENT POOL WATERPROOFING (NEW CONSTRUCTION) WITH PENETRON® INTEGRAL CAPILLARY WATERPROOFING



PENETRON® ADVANCED WATERPROOFING & PROTECTION SYSTEMS

1. Pool construction and permanent concrete protection and waterproofing using PENETRON ADMIX® P, integral crystalline admixture.



PENETRON ADMIX® P is a waterproofing integral crystalline admixture, designed for use with standard and low CFP cements, such as pozzolanic, blast furnace slag cement, etc. It is in powder form and the mixing ratios vary between 0.8 – 1%, by cement weight. Provided that the weight measurements are accurate, the consumption of 0.8% by weight of cement of PENETRON ADMIX® P is sufficient and secure quantity. The product can be added directly, in its powder form, in the Ready-Mix Plant, in the aggregates (dry aggregates, before adding water, usually on the transport belt) or even in the mixer (for this application PENETRON ADMIX® P SOLUBLE BAGS are highly recommended). Also, the product can be added in the Ready-MixTruck, but it must be diluted in the water, prior to mixing. Mix PENETRON ADMIX® P with water, using a mixing drill. The mixture is then poured into the truck and mixed for at least 5 minutes, after the last portion of PENETRON ADMIX® P, at high speed, to ensure even distribution in the concrete mixture. For better convenience, PENETRON ADMIX® P mixing with water can be carried in batch operations. Mix 20 lb (9 kg) PENETRON ADMIX® P (1/2 of the 18 kg bag) with 25 lb (11.5 kg) water in the special formulated with volume tape Mixing Drum of 6 gal (23 Lt) of PENETRON® company, mixing for about 1 minute.

Example

Indicatively, for concrete mixture with cement content 300 kg-cement/m^3, 3 kg/m^3 PENETRON ADMIX® P are required (mixing ratio 1% by cement weight). If the drum is 9 m^3, then 3 kg x 9 m^3 = 27 kg PENETRON ADMIX® P are needed, that is three “halves” of 9 kg, and so three Mixing Drums of 6 gal (23 Lt) are needed.



The prepared concrete mixtures must meet the appropriate slump standards, for easier and better formatting avoiding honeycombed areas. The use of certified superplasticizer with the waterproofing integral crystalline admixture is highly recommended, for even better performance, based on the best workability and overall highest quality concrete, so as to reduce the cost of any subsequent repairs. The superplasticizer is added in the Ready-Mix Plant or in the Ready-MixTruck. Then the prepared concrete mixture, with PENETRON ADMIX® P, is ready to be cast.

2. Waterproofing of cold joints with the use of water expanding strips PENEBAR® SW.

PENEBAR® SW 45 RAPID (rapid expansion) water expanding strips or PENEBAR® SW 55 (slow expansion) are recommended for cold joint waterproofing. PENEBAR® SW 55 is highly recommended for cold joint waterproofing at moist environment (or liquid environment as in a pool construction), or, when rain is forecasted. PENEBAR® PRIMER is used as a primer of water expanding strips, for maximum bonding on the concrete surface and as a water barrier of the substrate. PENEBAR® SW is applied, when the primer is not “tacky”, usually half to one hour,

since its application. At rare application, when the substrate is damp, the use of slow expansion water expanding strip is recommended, using a metal perforated strap fastening, instead of the primer, width 3/64'' (10 mm) (in 10-meter rolls), positioned along on the surface of the strip and fixing it each 9.8'' - 11.8'' (25 - 30 cm), with appropriate concrete nails.



PENEBAR® SW Type B is used for concrete element of width up to 7.8'' (20 cm) (4-meter rolls, 25 x 9 mm intersection), while PENEBAR® SW Type A is used for concrete element of width above 20 cm (5-meter rolls, 25 x 19 mm intersection). For concrete element above 15.7'' – 19.7'' (40 – 50 cm), two parallel expansion strips can be used, at a distance of approx. 30 cm between them. PENEBAR® SW expanding strips must be covered with 4 – 5 cm width reinforced concrete. To connect two expanding strips, their edges must be cut at 45° angle and then bring them together with adequate pressure. Overlapping of the expanding strips must be avoided.



3. Repairing and waterproofing of honeycombed areas, tie holes and pointing applications, with the crystalline waterproofing system of the liquid applied PENETRON® and the repairing PENECRETE MORTAR® and repair of cracks with running water with the crystalline waterproofing rapid set waterplug PENEPLUG®.

Cracks, honeycombed and spalled areas, of new or existing concreting, should be routed out with mechanical means, to remove dirt, loose materials and aggregates. Tie holes must be repaired, as follows. Areas should be chiseled back to sound concrete, by mechanical means and an area of 1.4'' (35 mm) around them and ¾'' – 1.2'' (20 -30 mm) in depth. Metal formworks must be sawcut in ¾'' (20 mm) in depth. Wooden formworks must be removed completely or routed out at a reverse wedge of 1.2''x1.2''x1.6'' (30 x 30 x 40 mm). Clean honeycombed or spalled areas and holes with excess water, to remove loose materials and moisten the surface to a dull dampness, which is prerequisite for the application of the liquid applied integral crystalline waterproofing coating PENETRON® and crystalline waterproofing mortar PENECRETE MORTAR®. When the



concrete is damp, with no wet sheen on the surface, apply a slurry coat of PENETRON®, at a mixing ratio of 5 part PENETRON® powder to 3-3.5 parts of water (by volume), on the areas to be patched or repaired and 2/5" (10 mm) around them. While PENETRON® coating is still "green" (tacky), mix PENECRETE MORTAR® with adequate amount of water, until the desired consistency is achieved [usual mixing ratio is 4.5 parts of PENECRETE MORTAR® to 1 part of water (by volume)] and filling the cracks and spalled areas. When PENECRETE MORTAR® has set, but is still moistened, apply a second layer of PENETRON® slurry coat, on the repaired areas.



The water leaking cracks can be sealed with the rapid-setting crystalline waterproofing plug PENEPLUG® (mix with minimum water until the texture is as dry-earth). For a better application of PENEPLUG®, cracks should be routed out with mechanical means, up to ¾'' – 1.2'' (20 -30 mm) in width, in a conical shape, for better anchoring of the rapid setting plug, during the application. Cold joints can be treated in a similar way, by cutting on both sides of the joint with mechanical means and creating a wedge, 1.2'' (3 cm) in width. Next, rapid setting plug PENEPLUG® is applied.

In the case of equipment installation or piping, after the pool construction, that need round sealing/waterproofing, the use of the appropriate circumferential application PENEBAR® SW is recommended (the recommended type is the control-expanding PENEBAR® SW 55 TYPE B or sometimes the half of the Type 55 B). PENEBAR® SW is placed in a depth at least approx. 2'' (5 cm) and covered with the rapid-setting crystalline waterproofing plug PENEPLUG®.

NOTE: The circumferential cavity for the PENEBAR® SW expanding strip application, which will be covered with PENEPLUG®, must be routed out at a reverse wedge for better anchoring of the mortar.

4. Application of a bonding layer and roughcasting / cementitious mortar to cover the concrete elements and for smoothing the walls and the bottom of the pool.

At first, a bonding layer is applied on the concrete elements, prior to the application of the cementitious screed for filling. As a bonding layer, can be applied either the acrylic resin PENETRON® ACRYLIC BONDCRETE™, undiluted, and indicative coverage of 199.7 ft^2/gal (4.9 m^2/Lt) or spatterdash, which consists of a mixture of 1 part of cement and 2-3 parts of sand (by volume) diluted in an aqueous solution of 1 part of acrylic resin PENETRON® LATEX and two parts of water (by volume).

Then, «drivers» are cast prior to roughcasting/cementitious mortar application. «Drivers» and roughcasting consist of 1 part of cement and 3 parts of sand (by volume) diluted in an aqueous solution of 1 part of acrylic resin PENETRON® LATEX and two or three parts of water (by volume). The addition of polypropylene fibers is highly recommended, to avoid cracking. The cement percent of both the mixtures is 400-500 kg/m^3. PENETRON ADMIX® P (0.8 – 1%) can be added as well. Provided that the weight measurements are accurate, the consumption of 0.8% by weight of cement of PENETRON ADMIX® P is sufficient and secure quantity.

NOTE: In all previous application, avoid the use of limestone.

5. Finishing cementitious screed layer (fine or grater).

After the application of the cementitious mortar (roughcasting) on the walls and bottom surface of the pool for smoothing, follows, most of the times, a fine layer of cementitious screed with fine-grade aggregates and thorough finishing. This application is important especially when a polyurethane coating for pools is applied (PENECOAT™ POOL).

This fine finishing cementitious screed layer consists of common materials, such as fine graded sand and quartz aggregates and high cement concentration. (>400 kg/m^3). Alternatively, PENETRON® TOP FINISH FINE, finishing topping cement mortar with polymers and fine graded quartz aggregates, can be applied, in indicatively consumption 8.4 lb/ft^2 per inch thickness (1.6 kg/m^2 per mm thickness), usually in grey or white color. The use of the acrylic resin PENETRON® ACRYLIC BONDCRETE™, as a primer, is recommended.

6. Waterproofing of the concrete surface with the conventional systems SEALCOAT™ FLEX or SEALCOAT™ ELASTIC.



In most applications with ceramic tiles as a finishing layer, the waterproofing of the surface, prior to tile application, is recommended. The two component liquid-applied waterproofing coating SEALCOAT™ FLEX [flexible system of 50 lb (22.68 kg) PENETRON® SEALCOAT diluted in 8.8 lb (4 kg) PENECRYL™ ELASTIC and 6.6 lb (3 kg water)] or SEALCOAT™ ELASTIC [elastic system of 50 lb (22.68 kg) PENETRON® SEALCOAT diluted in 26.5 lb (12 kg) PENECRYL™ ELASTIC] can be used, regarding the demands of the application, that is crack bridging of capillary cracks. Apply uniformly a slurry coat of SEALCOAT™ FLEX or SEALCOAT™ ELASTIC, with a nap roller. The next day apply a vertical second layer. The coverage is approx. 0,4 lb/ft^2 (2 kg/m^2) in two layers, for SEALCOAT™ FLEX and approx. 0.5 lb/ft^2 (2.5kg/m^2) in two layers, for SEALCOAT™ ELASTIC. Furthermore, the SEALCOAT™ SYSTEMS can be reinforced with a fiberglass grid between layers (mesh 5x5 mm). In that type of application, place the grid on the first layer, while wet, and fully cover the grid with the second layer, on the next day. The use of fiberglass grid is expected to increase the total coverage of the system up to approx. 0.6 lb/ft^2 (3 kg/m^2) in 2 layer.

In order to place ceramic tiles on top of SEALCOAT™ SYSTEMS, use an appropriate FLEX type adhesive paste for pool application.

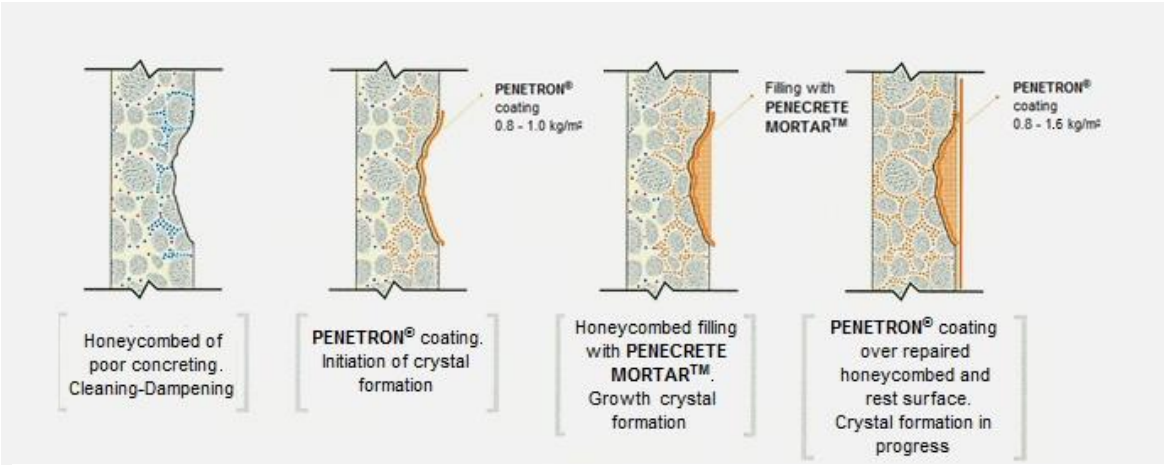
7. Coating – Final surface finishing with the protective pool coating PENECOAT™ POOL.

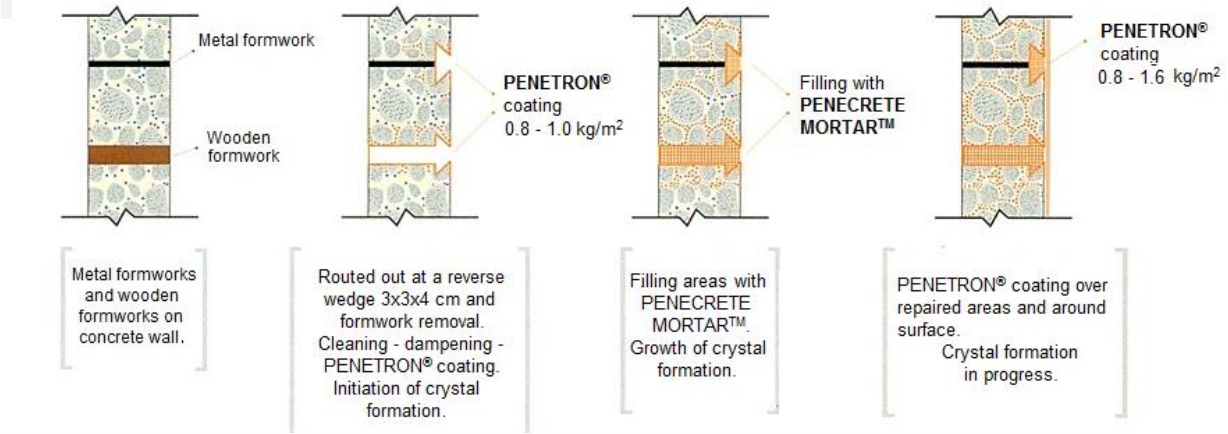


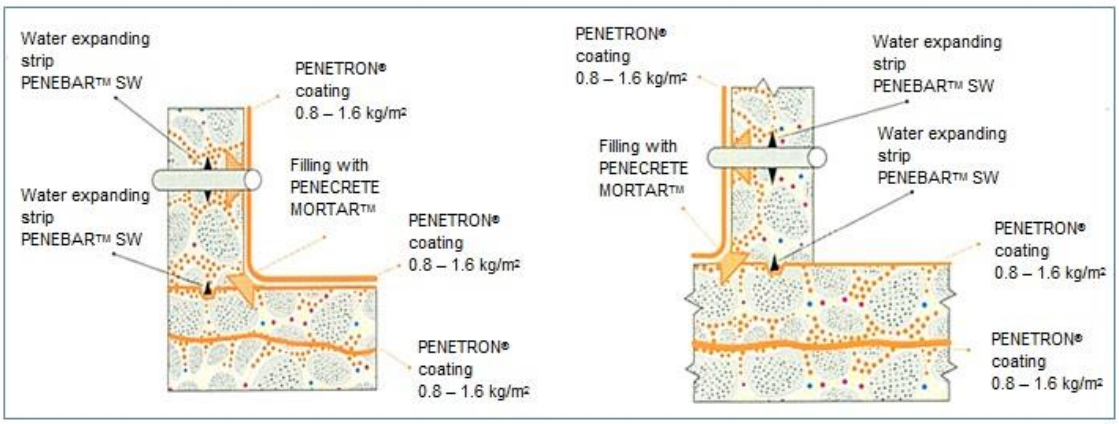
Besides the common final surface pool coatings, such as tiles, terrazzo, granite, etc., the aliphatic polyurethane protective coating PENECOAT™ POOL, can be also used, in two or three layers, with indicative coverage of 0.04 lb/ft^2 (0.2kg/m^2) per layer. In that case, no SEALCOAT™ SYSTEMS are applied, but the PENECOAT™ POOL is applied directly to the final surface finishing.

TECHNICAL PROPOSITION

A schematic description of repaired services with PENETRON® integral crystalline waterproofing system of PENETRON INTERNATIONAL LTD is depicted below:







The description texts mentioned above are not subject of a case study, but technical propositions, according to our best of knowledge and based on our experience and knowledge up to date. For more information, regarding the safe use, treatment and storage of our products, contact PENETRON HELLAS and refer to the *Product Data Sheet* and *Material Safety Data Sheet* of every product you use.

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