WATERPROOFING OF SWIMMING POOLS AND PAINTING WITH EPOXY COATING

RELATED MATERIALS

AQUAMAT-ELASTIC  Two-component, highly flexible, waterproofing cement-based slurry
EPOXYCOAT-S  Two-component epoxy coating suitable for swimming pools
DUROCRET-PLUS  Fiber-reinforced, polymer-modified, cementitious repair mortar
EPOXYPRIMER-500  Two-component, water-based epoxy primer
ADIPLAST  Polymer latex for multiple improvements of mortars
AQUAMAT-ADMIX  Crystalline waterproofing admixture
PLASTIPROOF  Plasticizing/water-reducing admixture for concrete
FIBERGLASS MESH  Fiberglass mesh for reinforcing waterproofing layers
SM-14  Special solvent for epoxy coatings

NATURE OF THE PROBLEM – REQUIREMENTS

A usual and affordable way to prepare the final surface of a swimming pool is to paint it with a special paint, such as an epoxy coating. This is a technically efficient solution that is clearly more affordable than overlaying with ceramic tiles.

The choice of using epoxy coating affects significantly the selection of the means for waterproofing the pool, since it sets specific requirements for the waterproofing to be carried out.

So, in this case, the waterproofing layer is applied prior to the epoxy coating and must have the following properties:

- It must provide effective waterproofing.
- It must be sufficiently flexible, particularly at the bottom of the pool, which is especially subjected to stress from expansions/contractions (mainly due to the influence of solar radiation), when the pool is empty.
- It must bond strongly to the substrate and resist the probable negative pressure developed (for instance, when the pool is emptied and there is a periodic or permanent water table in the surrounding area).

The epoxy coating to be used must have the following properties:

- Flexibility, in order to withstand cracking caused by possible expansions/contractions.
- Resistance to water and chemicals that may be present in the pool water (e.g. chlorine).
- Weather resistant.

SOLUTION

The primary requirement is that the supporting frame of the pool must have been calculated properly so that it can effectively withstand hydrostatic pressure.

To successfully meet the waterproofing requirements of the pool, the application of AQUAMAT-ELASTIC two-component, highly flexible, waterproofing cement-based slurry to the walls and bottom of the pool is necessary. The waterproofing layer created by using AQUAMAT-ELASTIC provides the following:

- Effective waterproofing.
- Strong bonding to the substrate and high resistance.
- High flexibility.
- Long-term duration.
- Resistance even to negative pressures, thus keeping the pool safe from both leaks and water ingress.
Moreover, during the concreting of the swimming pool's frame, the addition of PLASTIPROOF waterproofing admixture to the concrete at a ratio of 0.2-0.5% of cement weight is recommended. The addition of AQUAMAT-ADMIX crystalline admixture at a ratio of 0.8-1.0 kg per 100 kg of cement is also recommended.

The requirements of resistance to chemicals that the coating must satisfy are successfully met by the application of EPOXYCOAT-S epoxy coating. This is a two-component epoxy system that displays resistance to friction. Furthermore, it is especially resistant to a variety of chemicals, such as diluted acids, alkalis, petroleum products, some solvents, water, sea water, and weather effects.

**APPLICATION**

I. **Substrate preparation**

1. Thorough cleaning of grease residue, deshuttering agents, dust, loose material, etc., from the surface.
2. Loose particles should be cleaned from existing cavities in the concrete.
3. Form wires and spacers should be cut to a depth of 3 cm.
4. Existing construction joints should be opened in a V-shape, towards the inside, along their entire length, to a depth of 2-3 cm.
5. The above areas should be well dampened and filled with DUROCRET-PLUS polymer-modified cementitious repair mortar. Alternatively, when fast work is required, filling can be done with RAPICRET rapid-setting, polymer-modified repair mortar. Consumption of DUROCRET-PLUS: 25 kg for filling a surface of 30-40 m² (indicative consumption for a usual concrete wall surface).

If the swimming pool’s frame has an uneven substrate

In this case, the surface of the walls and bottom of the swimming pool is smoothed by the application of a strong cement mortar. This process is carried out as described below:

Preparation of a strong cement mortar (cement : sand = 1:2.5) reinforced with ADIPLAST (5-10% of the cement weight), in order to smoothen the substrate along the surface of the swimming pool, at a thickness of 2-3 cm. Application of a bonding layer (spatterdash) reinforced with ADIPLAST polymer latex (cement : sand : ADIPLAST : water = 1:1:0.25:0.25) to walls of the swimming pool, in order to reinforce the cement mortar’s bonding, must take place. The bonding layer is applied as usual and after its hardening (at least 1 day) follows the application of the cement mortar. Application of a bonding layer reinforced with ADIPLAST polymer latex (cement : sand : ADIPLAST : water = 1:1:0.5:0.5) (fresh on fresh) to the bottom of the swimming pool, in order to reinforce the bonding of the cement mortar, must take place. The viscous mortar mix with the above mentioned ratio is applied to the properly prepared area with a brush, at a thickness of approximately 2 mm.

At the intersection of the walls and bottom of the swimming pool, and where walls meet, it is recommended that a groove be formed during the application of the cement mortar, in order to facilitate the subsequent application of the waterproofing layer and the epoxy coating.

At least 21-28 days after the application of the cement mortar, time required for its hardening, AQUAMAT-ELASTIC can be applied.

If the pool’s frame has an even substrate

In this case, the application of a strong cement mortar is not required. AQUAMAT-ELASTIC waterproofing membrane is applied directly to the smooth substrate.
II. Waterproofing with the two-component, highly flexible waterproofing slurry AQUAMAT-ELASTIC

1. The content of the 25 kg bag (component A) of AQUAMAT-ELASTIC is added to the 10 kg of liquid (component B) under continuous stirring, until a uniform, viscous mixture is formed, suitable for brush application. A low speed mixer (300 rpm) should be used for mixing.

2. The walls and bottom of the pool should be brushed with 4 layers of AQUAMAT-ELASTIC. The final layer of AQUAMAT-ELASTIC must be pressed with a smooth trowel while is still fresh in order to achieve a smooth finish. Each layer should be applied after the previous one has dried. The final layer, which has been applied with a brush, can be directly pressed with a smooth spatula (American type) for a smooth finish. In order to avoid cracking, each layer should not be more than 1 mm thick. Consumption: 4 kg/m² in total. At wall-to-wall and wall-to-bottom intersections, it is recommended to reinforce AQUAMAT-ELASTIC with fiberglass mess tape, approximately 10 cm wide. The reinforcing strip should be placed immediately after the first layer of AQUAMAT-ELASTIC is applied and while still fresh. After drying of this layer, two or three similar layers of AQUAMAT-ELASTIC should follow.

III. Priming with the two-component, water-based epoxy primer EPOXYPRIMER 500 and painting with the two-component epoxy coating EPOXYCOAT-S

1. At least 4-7 days (depending on the weather conditions) after the application of AQUAMAT-ELASTIC and provided the surface of the bottom and walls of the swimming pool is completely dry (moisture < 4%), priming with EPOXYPRIMER 500 should follow. Components A (resin) and B (hardener) are packaged in two separate containers, having the correct predetermined mixing ratio by weight. The content of component B is added to component A. Mixing of the two components should take place for about 5 minutes, using a low speed mixer (300 rpm). EPOXYPRIMER-500 can be thinned up to 30% with water. It is important to stir thoroughly the mixture near the sides and bottom of the container, to achieve uniform dispersion of the hardener. Consumption of EPOXYPRIMER 500: about 200 g/m², depending on the absorbency of the substrate.

2. After the primer has dried, and within 24-48 hours of its application, the swimming pool should be painted with EPOXYCOAT-S epoxy coating. Components A (resin) and B (hardener) are packaged in two separate containers, having the correct predetermined mixing ratio by weight. The whole quantity of component B is added to component A. Mixing of the two components should take place for about 5 minutes, using a low speed mixer (300 rpm). It is important to stir thoroughly the mixture near the sides and bottom of the container, to achieve uniform dispersion of the hardener. EPOXYCOAT-S may be applied as is or diluted up to 5% by weight with SM-14 special thinner with a brush, roller or airless gun in at least two layers. The second layer should be applied after the first one has dried, but within 24 hours of its application. Consumption of EPOXYCOAT-S: 200-300 g/m² per layer.

REMARKS

- If plastic spacers have been used, FLEX MS-45 sealant should be used to seal the inside of the spacers, to a depth of 3-4 cm, and at a later stage DUROCRET-PLUS should be used to fill the gap around them, to a depth of 2-3 cm.
- The fresh AQUAMAT-ELASTIC layer must be protected from high temperatures, rain and frost.
- Due to cement content, the product reacts with water forming alkaline solutions, thus is classified as irritant.
- Special attention must be paid to the proper placement of the “special components” of the swimming pool, such as lights, water inlets and outlets, etc., which are vulnerable elements as far as waterproofing is concerned.
- Working time of epoxy systems decreases when ambient temperature rises.
- Bonding between successive layers may be severely affected by moisture or dirt.
• Epoxy layers should be protected from moisture for 4-6 hours after application. Moisture may whiten the surface or/and make it sticky. It may also disturb hardening. Faded or sticky layers in parts of the surface should be removed by grinding or milling and laid again.
• In case the waiting time between the applications of successive layers is longer than expected or old floors are to be overlaid again, the substrate should be thoroughly cleaned and ground before applying the new layer.
• Filling of swimming pool with water can take place after 7 days from the application of EPOXYCOAT-S.
• EPOXYCOAT-S contains solvents. Measures for good ventilation should be taken when applying indoors.
• Please consult the safety instructions written on the packaging before use.
• For further directions on the application of the above mentioned materials, please refer to the attached Technical Datasheets.
Waterproofing of swimming pools and painting with epoxy coating
A) If the pool’s frame has an uneven substrate

1. CONCRETE
2a. SPATTERDASH
2b. BONDING LAYER
3. LEVELING MORTAR
4. AQUAMAT-ELASTIC
5. EPOXYPRIMER 500
6. EPOXYCOAT-S

Waterproofing of swimming pools and painting with epoxy coating
B) If the pool’s frame has an even substrate

1. CONCRETE
2. AQUAMAT-ELASTIC
3. EPOXYPRIMER 500
4. EPOXYCOAT-S