

Building instructions with polyester resin

Holidays at home

Having your own swimming pool or swimming pond in the garden is a dream for many. A pool in the house or on the roof terrace - with a few helpers, our good advice and the necessary material, this dream can be realized. In the morning, after getting up, go for a swim..... if it is too hot in the afternoon, do not go to a crowded swimming pool. Instead, they simply jumped into their own pool and cooled off.

Fulfil your dream of having your own pool or swimming pond.

We will be happy to advise you.

Step by step to your own pool or swimming pond

with polyester resin, reinforcing fibres and topcoat



We will also be happy to prepare an offer for you.

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1. Swimming pool - noble and heatable



1.1 The advantages

Swimming pools have a consistent, germ-free water quality because you can positively influence it at any time .

If you want to have your bathing water germ-free and don't want to share it with fish, newts and water striders, you can swim in the clear pool water.

With a heating system, the pool water can be brought to the desired feel-good temperature. So the fun can already begin when the sun is not yet at its full power in April, but it is already nice and warm during the day

With the right lighting, the pool is a real eye-catcher, and it is really wonderful to step into the illuminated pool on a nice warm evening.

In a swimming pool, you can make pretty much anything possible. From massage jets, to whirlpool seats, to counter-current systems. Even the design can be flexibly designed with curves, reclining options or stairs. Anything is possible!

To make the swimming pool childproof, a roller cover can be attached. Thus, the water does not cool down so quickly. Transparent material allows a clear view.

With the right equipment, nothing stands in the way of bathing pleasure, such as a surface vacuum cleaner or an overflow channel, and cleaning can also be automated with special robots.

1.2 The Cons

Depending on the design, a longer construction period is required for a pool.

Many years of studies have shown that you need to maintain a pool more often than a swimming pond.

Furthermore, you have to expect higher water consumption, the water must occasionally be partially drained and replaced by fresh water.

A large, covered and well-tempered pool can be expensive.

The maintenance effort for a pool facility is usually higher than for a pond.

Before the start of the season, a pool must be thoroughly cleaned. Afterwards, only the right technology with a sand filter system, surface extractor or overflow channel ensures that the water remains clean.

2. Swimming pond - idyllic and chemical-free



2.1 The advantages

Swimming ponds are usually natural - without the addition of chemicals, which in turn benefits people, plants and possibly also the animals living in them.

Furthermore, a swimming pond is always a botanical eye-catcher in the garden.

And numerous animals also like to seek its proximity, such as dragonflies, butterflies, frogs, etc.

Water striders ensure that mosquitoes do not multiply in the pond, as they are simply eaten. A swimming pond also requires less maintenance than a pool and significantly less time for cleaning, as this is done by the plants and microorganisms. Once a year, the water of the bathing area is sucked out, and the plants have to be cut back.

In addition, the swimming pond offers numerous design variants that appear less sterile than a pool facility.

The trend is clearly moving away from geometrically straight lines to natural shapes that fit into the garden.

If the swimming pond is harmoniously fitted into the garden, it is a very beautiful eye-catcher all year round.

The swimming pond equipment or the swimming pond requirements are also quite manageable.

2.2 The disadvantages

A swimming pond requires more space than a pool, as you have to plan for a regeneration zone with plants. Together with the microorganisms, these ensure natural cleaning.

Only about a third of the swimming pond can be used as a bathing area.

It is difficult to heat the water, which is why you can use a swimming pond far less than a pool.

Even with solar absorbers, a pond cannot be kept warm so evenly.

A cover and thus a safety barrier for small children is hardly possible with a swimming pond.

As a child safety device, there is only the option of blocking off the bathing area or fencing off the entire swimming pond.

Cleaning cannot be automated as with a pool.

Swimming pond or swimming pool?

What suits me better? - Pure nature or elegance?

In the end, your personal preferences will probably be the deciding factor.

Now it's time to weigh up all the arguments...

... and then: Have fun swimming

3. The preliminary considerations

To build a pool or swimming pond, certain points should be considered in advance so that they can enjoy it for a long time and no unpleasant surprises appear.



3.1 How big should the pool be?

From a water volume of 100 cubic meters, a building permit is required in Germany.

A pool with a diameter of 8 meters and a water depth of 1.5 meters, for example, has a volume of 75 cubic meters and is therefore not subject to approval. If you are not sure, you can inquire at your responsible building authority.

3.2 Does the location provide enough sun?

To ensure that the water warms up to a pleasant temperature in the morning, it should be oriented to the southeast. This means that it is exposed to solar radiation for the longest time. In the case of a pool, there should be no trees in the immediate vicinity.

3.3 Are there existing electricity and water pipes nearby?

In order to avoid new laying of electricity and water pipes, it makes sense to plan the location of the pool near existing pipes.

When laying the water pipes, there must be a slight slope to the pool. This prevents water from remaining in the pipes when emptying the pool and freezing at sub-zero temperatures. A burst water pipe would be inevitable and you would have high repair costs.

3.4 What is GRP?

GRP is the abbreviation for glass fibre reinforced plastic and is a fibre-plastic composite made of continuous glass fibres and polyester or epoxy resins. The glass fibers serve as mechanical reinforcement, while the resin must be chosen depending on the application.

4. Why with composites?

- Cost-effective and durable
- High resistance of the hardened material
- UV and frost resistant
- RAL colour available
- Extremely resilient (break, impact, tread resistant)
- seamless processing
- Expandable at any time
- No wrinkling as with a foil
- Easy to clean
- No trouble with roots
- freely configurable shape
- More durable than any film
- Older pools can be reworked



5. The primer with Beckocoat

- Our Beckocoat is a glossy polyurethane resin that is suitable for floor sealants, wood coatings and concrete impregnations (inside)
- is used here as a primer on concrete or wood in pool pond construction
- Very good adhesion to wood, metal, concrete, GRP, etc.
- Low viscosity
- Good impregnation properties
- Good chemical resistance

Processing:

- Application temperature from 18°C
- Cures without sticking
- 1-component (hardens in the air), without hardening process!



6. The Laminating Resin / Polyester Resin PHD-DIEPAL 2130 BT

- for manual lay-on and fibre spraying processes
- is a medium-reactive, cobalt-pre-accelerated, thixotropic, unsaturated polyester based on orthophthalic acid
- Curing takes place at room temperature with the addition of a ketone peroxide such as **MEKP Hardener DD-MP1**
- is equipped with a peroxide indicator that confirms the addition of hardener by changing color from blue to neutral
- has excellent impregnation properties. The thixotropic setting prevents the resin from running off on vertical surfaces. The pre-acceleration results in a relatively long gelling time in combination with a relatively low temperature peak at normal curing time. The low temperature peak allows a laminate build-up of up to 8mm in a single operation
- is preferably used for the production of tanks, boats, body and industrial components by hand laying down and fiber spraying
- The polyester resin should be stirred thoroughly before use
- Application temperature from 18°C
- Processing time (at 20°C) is between 25-40 minutes (depending on the hardener addition)
- Hardener addition of 1.3 - 2.4%
- **hardens sticky, so there is no need for sanding between the individual layers**



7. Reinforcement fibres (glass fibre mat or biaxial glass scrim)

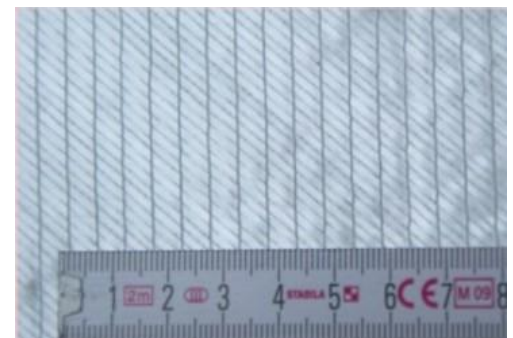
Fiberglass mat

Our glass fibre mats consist of 50mm long E-glass fibres that are provided with a powder or emulsion binder. They are characterized by excellent impregnation properties, uniform basis weight and good drapability and are therefore particularly suitable for the manual application process and for pressing processes. They are intended for processing with polyester resin. With a resin consumption of 0.8 - 1 kg/m², a laminate thickness of approx. 0.7 mm is achieved.



Biaxial glass fabrics

Our biaxial glass fabric consists of two glass fibers sewn together, parallel to each other at an angle of -45°/+45°, which achieves a very high strength. It is mainly used in the manufacture of components in which high tensile forces act in the direction of the fiber, such as wind turbines.



It can be ideally fitted into components, has good drapability and the advantage that the scrim can be re-draped, which is ensured by the movability of the fibres. A particularly good feature is that you can laminate a beautiful smooth surface with the glass scrim. The scrim is processed with polyester and epoxy resin, with a resin consumption of approx. 0.4kg/m², a laminate thickness of approx. 0.5mm is achieved.

8. The surface fleece

It is used to improve the surface finish, impact and abrasion resistance of polyester laminates enormously. It is used to reinforce fine layers and to cover structures in polyester laminates made of glass fibers. It causes the resin to harden without bubbles. It also has very good chemical and weather resistance.



9. The final coat with Topcoat ST

- DIEPAL Topcoat ST is a transparent topcoat based on a pre-accelerated polyester resin consisting of a combination of neopentyl glycol with isophthalic acid, slightly thixotropic.
- This polyester resin has very good resistance to hot water and chemicals and tack-free curing.
- Very suitable for finishing GF-UP mouldings that are exposed to water and chemicals, e.g. boats, coatings, swimming pools.
- The topcoat is transparent and can be dyed with our color pastes.
- Stir the individual components well before use. Add the hardener to the base and stir in carefully.
- Topcoat is applied with a brush or lambskin roller.
- 2% methyl ethyl ketone peroxide (MEKP) should be used as a hardener, whereby the dosage should not be less than 1% and not more than 3%. Recommended application quantity: 500-850g/m² for a topcoat layer thickness of 0.4-0.7mm
- The processing temperature (topcoat, substrate and ambient temperature) should be at least 20°C
- When applying the polyester resin topcoat, direct sunlight should be avoided, otherwise the paraffin leakage may interfere. This causes the surface to under-harden and, subsequently, when exposed to chemicals (e.g. water), to hydrolytic degradation of the UP resin (formation of a white coating).
- Processing time (at 20°C) of approx. 15 minutes
- Do not mix more than can be applied within the pot life.



10. Color paste

- is highly concentrated
- for coloring synthetic resins
- for fine coating and casting resins
- Addition quantity of 5-15%



11. Tools

- Mixing vessels (plastic buckets or cups)
- Syringe (measure the amount of hardener)
- Stirring Bars
- Disposable gloves
- Brushes
- Vent Roller
- Rolling mills and
- Scissors
- Cutter
- Acetone or styrene
- Sun protection (parasol, gazebo or tarpaulin)
- Protective suit
- Safety Glasses
- Mask



IMPORTANT!!

Do not work in direct sunlight. It is best to set up a parasol or a cheap pavilion from the hardware store. If resin hardens on or in the tool, it is very difficult and can usually only be removed mechanically. Therefore, make sure to wash out tools you use to process resin in acetone or styrene from time to time.



Step by step to your own pool or swimming pond

Before you begin, check that all materials are in place.

(see also list of materials page 14)

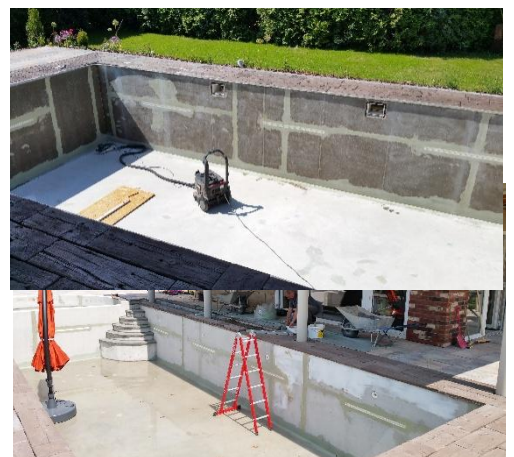
12. Excavation

12.1 in pond construction

After you have decided what your pond should look like, you can start excavating the earth. After excavation, you should level the edge of the pond. Now a base course with lean concrete, mortar or screed can be applied. The thickness of the base course should be approx. 3-5 cm. For complicated areas, you can also apply the edge more heavily. Try to make the edge round, it should be at least 50 mm wide and protrude 100 mm into the ground. Avoid sharp edges and heels, it will make it easier to process the GRP later. You should also make sure that fiberglass material pulls out of the corners in a similar way to wallpaper, so you should compensate for sharp corners with a wooden throat. After the edge is finished, you can now plaster the pond from top to bottom. As soon as the concrete begins to set, it can be swept off and leveled with a hand brush, roughening and leveling the surface. After the drying time (about 30 days), you can start with the actual coating.

12.2 in pool construction

In pool construction, it is more the case that straight shapes are desired. Then you should shell the pool after excavating the earth. You can do this with concrete formwork blocks or with classic wooden formwork. Do not use types of concrete that contain water-repellent ingredients. However, walls can also be completely bricked. It is important to make sure that you avoid 90° corners. These tend to pull out of the corners, just like wallpaper when wallpapering. The surface should now be evenly level. Then the brick walls do not have to be completely plastered. It is sufficient if you only rework the joint areas or other unevenness.



You can save a lot of money and time if you try to be very precise during these important preparations. The surface should be as smooth as possible, this is the only way to save time and money. Because if you pay attention to it, laminating will be easier and you will use less resin. The finished substrate must now be dry, free of dust and grease.

13. The connections

Plan the built-in parts (skimmers, inlet nozzles, possibly floor drain and lighting).
Be aware of any additional seals.



14. The primer

The concrete is now thinly coated with our **Beckocoat**, approx. 150g/m² should be applied. Stir the Beckocoat carefully and process with a brush or a nylon polyamide roller. Start with an area of **3-4 m²**. They will increase over time. The Beckocoat can be walked on after 30 to 60 minutes. Now our polyester resin should be applied within 4 to 5 hours. If you have applied more and have not been able to laminate for a few days, you should sand these areas and coat them again with Beckocoat.



15. The laminate

For this we recommend:

- our polyester (laminating resin) PHD-DIEPAL 2130 BT

In addition: MEKP hardener, glass fibre mat 450g/m² or alternatively biaxial glass fabric 450g/m².

You can laminate your pool/pond with a two-layer or a three-layer coating. When deciding which coating is best for you, you should assess your floor or substrate.

Two-layer coatings are sufficient for solid substrates.

Here you can find the materials for two- and three-layer coatings:

	Two-layer coating			Three-layer coating
Fabric	Fiberglass Mat	Fiberglass Mat	Biaxial-Glasgelege	Fiberglass Mat
1 layer	300g/m ²	450g/m ²	450g/m ²	300g/m ²
2 Layer	300g/m ²	450g/m ²	450g/m ²	300g/m ²
3 Layer				225g/m ²
Glass surface fleece	28g/m ²	28g/m ²	28g/m ²	
Resin quantity	1.6 – 2.0kg	2.0 – 2.5kg	0.8 – 1.0kg	2.3- 2.9kg

The glass surface fleece does not count as a third load-bearing layer, it is a very thin non-woven fabric.

When coating with our resin, we recommend the following procedure:

You can apply the first layer of resin to the sculptural Beckocoat. To do this, resin and hardener should now be carefully mixed.

Please make sure to regularly wipe the bottom and side walls of the mixing cup with a stirring stick so that the resin and hardener are really well mixed together.

Please **never mix more than 3.0 kg** containers. Especially at temperatures above 20 °C, the container reacts more quickly. You can increase the reaction time by adding less hardener. You can find information on this in our data sheets. It is also possible to work with a retardant (inhibitor). By adding this retarder to the resin, the processing time can be extended many times over without affecting the curing time. With the addition of 0.2% inhibitor, the processing time is roughly doubled. With the addition of 0.5% inhibitor, the processing time is approximately quadrupled. The information can vary depending on the reactivity of the resin types used and should always be worked out in advance in self-tests!

At the beginning, brush an area of approx. 1m² generously with the mixture. Familiarize yourself with the work steps. With later routine, you can also make larger areas. Now place a layer of fiberglass mat and soak it with resin from top to bottom. The fiberglass mats should be torn off in roll widths between 40 and 60 cm. If the mat is sufficiently soaked with resin, you can use a vent roller to roll the air that is in places in the laminate out of the laminate from the inside to the outside. Proceed slowly and evenly. In the event that an air bubble is very unruly, prick it with a nail, knife or a sharp object. This allows the air to escape from the laminate. Now we can start with the second layer. It should always be offset from the first. The second layer is first rolled, so it absorbs the excess resin of the first layer. Now again in the places where the resin is not sufficient, brush with it and roll up. If it happens that the situation tears down you, you can repair it. A piece of fiberglass mat (two-layer) is placed, which is at least 5 cm larger on all sides than the area to be repaired.



After the second layer, the glass surface fleece can be started, it is placed on top and carefully rolled. It forms a beautiful and smooth surface on the laminate. Due to its size, a pond may not be completed in one day. Carefully bleed the last mat and then let it harden. You can then start again at this point. Before starting, sand a 15 cm wide edge with coarse sandpaper and eliminate the sanding dust. Coat the surface with resin, then place a fiberglass mat again and continue working as described above. After this layer is complete, you can start with the surface finish.

16. The final coating

Before the final coating, the surface must be roughened (sandpaper 120 grit), cleaned and dry. The final coat has very good water and chemical resistance, even at higher temperatures. It can be dyed into different RAL shades with our colour paste. The polyester resin topcoat is applied with a brush or lambskin roller. Methyl ethyl ketone peroxide (MEKP) should be used as a hardener, whereby the dosage should not be less than 1% and not more than 3%. Recommended application quantity: 500-850 g/m² for a topcoat layer thickness of 0.4-0.7 mm. The processing temperature (topcoat, molded part and room temperature) should be at least 20°C. When applying Topcoat, direct sunlight should be avoided, otherwise paraffin leakage may interfere. This causes the surface to under-harden and, subsequently, when exposed to chemicals (e.g. water), to hydrolytic degradation of the UP resin (formation of a white coating). After completion, the pool/pond should be able to outgas for about two weeks, at an average temperature of 20 °C. After that, we ask you to wash the pool/pond thoroughly.



This information corresponds to our current knowledge and experience. However, we pass them on without obligation. They are intended to provide information about our products and their possible applications and therefore do not have the meaning of assuring certain properties of the products or their suitability for a specific purpose and are not complete instructions for use. We reserve the right to make changes in the context of technical progress and operational development. The use and processing of our products on the basis of our instructions is beyond our influence and is the sole responsibility of the user. The user is not exempt from checking the suitability and possible applications for the intended purpose.

We are grateful for suggestions for improvement and information on errors.

17. Our checklist for your project

	Quantity/Number	✓
Budget, how much can it cost?		☐
Larger than 100 cubic meters, building permit required		☐
Choice of location / free to build / sunny / not too close to trees and bushes		☐
Electricity and water supply nearby?		☐
Plan filter system (note circulation capacity)		☐
Planning a shaft for the filter system at the swimming pool		☐
Create a pipe trench to the filter site, pay attention to the slope		☐
Where to put the excavated earth?		☐
Sufficient sun protection for the construction period!		☐
Plan access to stairs or ladders, edging		☐
Plan installation parts (skimmers, inlet nozzles, possibly floor drain and lighting)		☐
Planning a shower and shower basin		☐
Pool cover (canopy, solar film or mesh cover)		☐
Consider safety especially for children (safety fence, water quality)		☐
Materials:		☐
Lean concrete for the base course thickness 3 – 5 cm		☐
Possibly concrete formwork blocks or wooden formwork at the pool		☐
Primer: Polyurethane resin Beckocoat or G4		☐
Laminating resin PHD-DIEPAL 2130 BT + MEKP hardener or Allnex		☐
Reinforcement fibres: glass fibre mat or biaxial glass scrim		☐
Glass surface fleece		☐
Finishing coat: Topcoat ST + MEKP hardener		☐
Paint paste for finishing coat		☐
Tools-Tools:		☐
Concrete mixer or mixing bucket		☐
Excavator or shovel		☐
Wheelbarrow		☐
Spirit level or leveling device		☐
Mixing vessels (plastic buckets or cups)		☐
Dosing syringe (measuring the amount of hardener)		☐
Stirring Bars		☐
Disposable gloves		☐
Brushes		☐
Laminating rollers		☐
Vent Roller		☐
Rolling mills and		☐
Cutter		☐
Acetone (for cleaning the tools)		☐
Inhibitor		☐
Abrasives		☐
Safety Glasses		☐
Sun protection (parasol, gazebo or tarpaulin) IMPORTANT!		☐

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