

WATER-TIGHT MEMBRANE

Technical Field

The invention is based on a water-tight membrane that comprises a barrier layer and a composite layer, which is arranged on one side of the barrier layer, according to the introductory clause of the first claim.

The invention is further based on a molded part that comprises a water-tight membrane, a water-tight molded part, as well as a method for sealing bases.

Prior Art

To seal bases against water penetration, water-tight membranes are known in the construction industry. For example, US 4065924 describes a barrier layer that is connected to a composite layer, whereby the barrier layer is arranged on the base, and the composite layer ensures the bond with the poured concrete by its being permeated by the poured concrete.

The drawback of such seals is, however, that the barrier layer can become detached from the composite layer, and voids can form between them. In addition, the bond between the barrier layer and the composite layer cannot be caused completely by production or the composite layer is not completely permeated with the poured concrete. This can all result in voids, which can propagate liquids. In the case of a leak in the barrier layer, caused for example by ingrowing roots, material fatigue or by tensile or

shearing forces, penetrating water can affect the barrier layer by these interconnecting voids. As a result, on the one hand, large areas are affected by penetrating water, and, on the other hand, the exact localization of the leak is difficult.

Presentation of the Invention

Embodiments of the present invention seek to improve a water-tight membrane of the above-mentioned type to the extent that the expansion of the voids along the barrier layer and thus the size of the areas affected by the penetrating water can be minimized.

According to a first aspect of the invention, there is provided a water-tight membrane that comprises: a barrier layer, a composite layer, which is arranged on one side of the barrier layer, characterized in that a sealant is arranged intermittently between the composite layer and the barrier layer.

The core of the invention is thus that in a water-tight membrane that comprises a barrier layer and a composite layer, a sealant is arranged intermittently between the composite layer and the barrier layer.

The advantages according to embodiments of the invention, i.a., can be seen in that the sealant between the composite layer and the barrier layer impedes or prevents the barrier layer from being affected in the case of a leak in the barrier layer. In particular, voids that are formed between the composite layer mixed with concrete and the barrier layer are interrupted by the sealant. As a result, the size of areas affected by penetrating water is limited. The damage by the penetrating water is thus limited to a smaller area, and the point of damage can thus be more easily localized. This is especially advantageous, for example, for eliminating the point of damage with a crack injection.

It is especially suitable when the sealant is arranged in a meshlike manner. Such a meshlike arrangement is advantageous in that, as a result, a wide variety of mesh cells is provided, any individual one of which is surrounded by sealant. In the case of water

penetrating, in the case of a leak in the barrier layer in such a mesh cell, the sealant along the mesh cell would impede the propagation outside of the mesh cell, whereby the connecting mesh cells further impede, in particular prevent, the propagation of the liquid.

It is also advantageous when the sealant partially penetrates the composite layer. As a result, voids in the composite layer through which liquids can propagate are interrupted by the sealant.

According to another aspect of the present invention, there is provided a molded part that comprises a water-tight membrane according to the first aspect, and a layer that consists of insulation material.

According to another aspect of the present invention, there is provided a water-tight molded part that comprises a barrier layer, a composite layer, which is arranged on one side of the barrier layer, as well as a sealant that is intermittently arranged between the composite layer and the barrier layer according to the first aspect, wherein the barrier layer consists of a water-tight insulation material.

According to another aspect of the present invention, there is provided a method for sealing bases comprising the steps: i) installation of a water-tight membrane according to the first aspect on a base, whereby the barrier layer of the water-tight membrane is directed against the base, ii) application of liquid concrete on the composite layer of the water-tight membrane.

Short Description of the Drawing

Below, based on the drawings, embodiments of the invention are explained in more detail. The same elements are provided with the same reference numbers in the various figures. The direction of flow of the media is indicated with arrows.

Here:

Fig. 1 shows a cross-section through a barrier layer that is connected to a composite layer from the prior art.

Fig. 2 shows cross-sections through water-tight membranes before liquid concrete is added to the composite layer.

Fig. 3 shows cross-sections through water-tight membranes that are connected with concrete. The sealant prevents the propagation of penetrating liquid into the

void between a composite layer mixed with concrete and a barrier layer.

Fig. 4 shows perspective diagrammatic visualizations of arrangements of the sealant of the water-tight membrane according to the invention.

Fig. 5 shows perspective diagrammatic visualizations of the containment of the propagation of penetrating water by sealant that is arranged like a mesh in a water-tight membrane.

Fig. 6 shows a perspective diagrammatic visualization of a molded part that comprises a water-tight membrane and a layer of insulating material.

Fig. 7 shows a perspective diagrammatic visualization of a water-tight molded part.

Only the elements that are essential for the immediate comprehension of the invention are indicated.

Means of Executing the Invention

Figure 1 shows a cross-section through a barrier layer that is connected to a composite layer from the prior art. The detachment of the composite layer from the barrier layer or an incomplete permeation of the composite layer with concrete can lead to voids along the barrier layer. In the case of a leak, penetrating water can affect the barrier layer over large areas by interconnecting voids. If one of these voids is connected to a crack in the concrete layer, the penetrating water can penetrate the concrete through this crack. In this case, the discharge point of the water does not give any indications regarding the location of the leak.

Figures 2a to 2d show water-tight membranes 1 according to the invention, comprising a barrier layer 2 and a composite layer 3, which is arranged on one side of the barrier layer, and a sealant 4 that is arranged intermittently between the composite layer and the barrier layer.

As sealants 4, all materials are relevant that are suitable to reduce or to prevent the passage of liquids 10, in particular water, through the above-mentioned voids 11 along the barrier layer 2.

It is also advantageous that the sealant 4 is stable in the alkaline pH range, in particular produced by the concrete 7, and can experience its sealing function. It is also advantageous when the sealant has a great resistance to possible additives of the penetrating liquid 10 in the case of a leak 9 in the barrier layer 2. Such additives are typically salts, in particular in the case of salt-water-containing ground water, calcium hydroxide, sulfur-containing compounds, as well as solvents.

The sealant 4 is advantageously a thermoplastic or a thermoplastic elastomer. Thermoplastic elastomers have the advantage that the sealant thus has a good elasticity relative to horizontal and vertical shifts, in particular shifts of the barrier layer 2 and the composite layer 3. A good elasticity of the sealant prevents a cracking or detachment of the sealant and thus a failure of the seal.

In this document, plastics that combine the mechanical properties of vulcanized elastomers with the processibility of thermoplastics are defined as thermoplastic elastomers. Typically, such thermoplastic elastomers are block copolymers with hard and soft segments or so-called polymer alloys with corresponding thermoplastic and elastomer components.

Preferred thermoplastics and thermoplastic elastomers are selected in particular from the group that consists of polyethylene (PE), low-density polyethylene (LDPE), ethylene/vinyl acetate copolymer (EVA), polybutene (PB); thermoplastic elastomers based on olefins (TPE-O, TPO) such as ethylene-propylene-diene/polypropylene copolymers; cross-linked thermoplastic elastomers based on olefins (TPE-V, TPV); thermoplastic polyurethanes (TPE-U, TPU) such as TPU with aromatic hard segments and polyester soft segments (TPU-ARES), polyether soft segments (TPU-ARET), polyester and polyether soft segments (TPU-AREE) or polycarbonate soft segments (TPU-ARCE); thermoplastic copolyesters (TPE-E, TPC) such as TPC with polyester soft segments (TPC-ES), polyether soft segments (TPC-ET) or with polyester and polyether soft segments (TPC-EE); styrene block copolymers (TPE-S, TPS) such as styrene/butadiene block copolymers (TPS-SBS), styrene/isoprene block copolymers (TPS-SIS), styrene/ethylene-butylene/styrene block copolymers (TPS-SEBS), styrene/ethylene-propylene/styrene block copolymers (TPS-SEPS); and thermoplastic copolyamides (TPE-A, TPA).

Additional advantageous sealants 4 are sealants that are selected from the group that consists of acrylate compounds, polyurethane polymers, silane-terminated polymers and polyolefins.

Preferred acrylate compounds are in particular acrylate compounds based on acrylic monomers, in particular acrylic and methacrylic acid esters.

The term “polyurethane polymer” comprises all polymers that are produced according to the so-called diisocyanate polyaddition method. This also includes those polymers that are almost or completely free of urethane groups. Examples of

polyurethane polymers are polyether polyurethanes, polyester polyurethanes, polyether polyureas, polyureas, polyester polyureas, polyisocyanurates, and polycarbodiimides.

It is also advantageous if the sealant 4 is a contact adhesive and/or a melt adhesive. This ensures a good bond and good adhesion of the sealant to the barrier layer 2, or to the composite layer 3, and thus prevents the detachment of the sealant and thus a failure of the seal.

Contact adhesives and melt adhesives are generally known to one skilled in the art and are described in CD Römpp Chemie Lexikon, Version 1.0, Georg Thieme Verlag, Stuttgart.

It is also advantageous when the sealant 4 contains swelling substances, which expand to a multiple of their volume upon contact with water, typically between 200 – 1000% of the original volume. In addition to the volume enlargement, certain swelling substances can also react chemically with water. Examples of such swelling substances are swelling substances that are based on polyurethane, in particular silane-modified polymers, which cure by moisture to form an elastic product. Another example of a swelling substance is bentonite-butyl rubber.

Advantageously, swelling substances are swelling substances that react in a delayed manner with water owing to a coating, so that in particular during the contact with wet concrete, the swelling substances do not swell or swell only a little and remain capable of swelling for the case where liquid 10, in particular water, runs behind the water-tight membrane 1. Because of the swelling of the swelling substances in the case the water-tight membrane 1 is affected, the sealant 4 can be pressed more strongly against the barrier layer 2 and/or the composite layer 8 that is mixed with concrete; in addition,

voids 11 are reduced by the volume expansion of the swelling substance. Both contribute to reducing - and in particular preventing - the passage of water through the voids 11 along the barrier layer 2.

The sealant 4 is preferably arranged in a surface structure and/or like a mesh.

Such a surface structure is depicted in, for example, Figures 4a and 4e, whereby in this connection, the term “surface structure” refers to the arrangement and design of the material in the space and not the surface composition of the material.

The individual surfaces can have any size and shape and may or may not be arranged uniformly. The advantage of an arrangement in a surface structure is, on the one hand, that the production is simpler, in particular when the individual surfaces are arranged uniformly and have the same shape and surface. On the other hand, because of a large surface area, a good bond and good adhesion of the sealant 4 on the barrier layer 2 or on the composite layer 3 are ensured, which in turn reduces the risk of the sealant 4 detaching and thus of the seal failing.

A meshlike arrangement of the sealant 4, whereby the sealant forms the mesh lines 12, is shown in, for example, Figures 4b, 4c and 4d. The meshlike arrangement may or may not be structured. A meshlike arrangement, in particular a structured meshlike arrangement, is advantageous in that as a result, less sealant 4 is required compared to an arrangement in a surface structure. Another advantage is that by the meshlike arrangement, a wide variety of mesh cells 13 is provided, any individual one of which is surrounded by sealant 4. In the case of a liquid 10 penetrating such a mesh cell 13, the sealant 4 along the mesh cell 13 would impede and in particular prevent the propagation outside of the mesh cell, whereby the connecting mesh cells further impede,

in particular prevent, the propagation of the liquid 10. This is shown by way of example in Figure 5, whereby the density of the section lining corresponds to the amount of penetrating liquid 10.

The sealant 4 can penetrate partially, as shown in Figure 2b, or else completely, as shown in Figure 2c, into the composite layer 3, in particular when the composite layer 3 is a porous material. The sealant 4 also cannot penetrate the composite layer 3 at all, as is shown in Figure 2a.

In the case that the sealant 4 completely penetrates the composite layer 3, it may be advantageous in particular that the composite layer 3 has a larger thickness than the sealant 4. As a result, the sealant does not penetrate the thickness of the composite layer completely, which can have the advantage that the sealant does not reach the surface of the side of the composite layer 3 that faces away from the barrier layer 2. Such a sealant 4, in particular when it is a permanently sticky sealant, can be disadvantageous during the rolling on and off of the water-tight membranes 1, during transport and in walking on the water-tight membrane before the application of concrete 7.

In particular, the sealant can penetrate 4.0 – 80%, preferably 5 – 50%, and in particular 10 – 30% of the thickness of the composite layer 3.

This is advantageous in particular in that as a result, a better bond and better adhesion of the sealant to the composite layer is produced. In addition, as a result, areas of the composite layer, in particular near the barrier layer 2, which are slightly permeated with concrete 7 and are thus likely permeable to penetrating liquid 10, can be sealed.

The sealant 4 therefore preferably has a stability that allows the penetration into the composite layer 3, but it penetrates the composite layer only partially, typically less

than 80% of the thickness of the composite layer. Stability is defined in this document as the resistance of the sealant 4 to flow-off.

Parts of the composite layer 3 can be connected directly to the barrier layer 2, in particular where there is no sealant 4 between the composite layer and the barrier layer.

“Directly connected” is defined as no further layer or substance being present between two materials and the two materials being directly connected to one another or adhering to one another. At the transition between the two materials, the two materials can be present mixed in one another.

The composite layer 3 can essentially be arranged securely on the barrier layer 2. This can be carried out in particular in that in production, the water-tight membrane 1, the composite layer 3 and the barrier layer 2 are directly connected to one another by heat treatment, by pressure, by physical absorption, or by any other physical application of a force. In particular, this has the advantage that no chemical bond of barrier layer and composite layer by means of adhesives is necessary, which has an advantageous effect on the production costs of the water-tight membrane 1. In particular, the composite layer and the barrier layer can be connected to one another by lamination. By lamination, a stronger bond between the composite layer, in particular when it is a non-woven material, and the barrier layer can be achieved. In addition, the bond quality in the production of water-tight membranes by lamination is subject to more reliable and fewer fluctuations in the production parameters than in the case of the bond by adhesives.

There is also the possibility, however, to connect the composite layer 3 and the barrier layer 2 to one another by adhesive.

In addition, it is advantageous when the barrier layer 2 and/or the composite layer 3 is/are a flexible plastic layer.

On the one hand, this has the advantage that the barrier layer 2, or the composite layer 3, thus has good elasticity relative to horizontal and vertical shifts. On the other hand, this allows an economical production and a good resistance to weathering, in particular against low temperatures and moisture. In addition, flexible plastic layers, in particular when the barrier layer and the composite layer consist thereof, allow the rolling-on of the water-tight membrane 1, which facilitates the transport and the installation of the water-tight membrane to the base 6.

The barrier layer 2 can consist of all materials that also ensure an adequate sealing even at high liquid pressures.

It is thus advantageous when the barrier layer 2 has a high resistance against water pressure and shows good values in tear propagation tests and perforation tests, which is especially advantageous in the case of mechanical stress on construction sites.

It is especially advantageous when the barrier layer 2 is a thermoplastic layer, preferably a polyethylene layer. This leads to a high capability of withstanding environmental influences.

The barrier layer 2 is preferably selected from materials that consist of the group that consists of polyethylene with high density (HDPE), polyethylene with medium density (MDPE), polyethylene with low density (LDPE), polyethylene (PE), polyethylene terephthalate (PET), polystyrene (PS), polyvinyl chloride (PVC), polyamides (PA), ethylene vinyl acetate (EVA), chlorosulfonated polyethylene, thermoplastic polyolefins (TPO), ethylene-propylene-diene rubber (EPDM) and mixtures thereof.

The barrier layer 2 can have a thickness of 0.1 – 5 mm, in particular 0.5 – 2.5 mm, and preferably 0.8 – 1.5 mm.

By surface treatments such as, for example, corona treatment, fluorination and flame impingement of the barrier layer 2, the adhesion of the composite layer 3 and the sealant 4, in particular the sealant, can be improved.

It may further be advantageous that the barrier layer 2 have a coating for increasing the radon sealing on the side that faces away from the composite layer 3. Such a coating is typically a metal coating, in particular a coating that consists of aluminum. It is also advantageous to put on the coating to increase the radon sealing in addition to a plastic layer to protect the coating from mechanical damage. For example, a barrier layer that consists of polyethylene with low density (LDPE) can have a coating that consists of aluminum on the side that faces away from the composite layer 3, whereby the coating in turn has an additional layer that consists of polyethylene with low density (LDPE) on the side that faces away from the barrier layer.

It is also advantageous when the barrier layer 2 has an embossing 5, in particular a gridlike embossing with grooves 14, for receiving sealant 4, as is shown in, for example, Figures 2d and 4d. This has the advantage in particular that an improved bond and better adhesion of the sealant with the barrier layer result by an increase of the contact surface area between the barrier layer 2 and the sealant 4, which in turn reduces the risk of the sealant detaching and thus of the seal failing.

In addition, the bond between the barrier layer and the composite layer can be improved in the areas near the sealant; in particular it can be made through-going.

A gridlike embossing 5 with grooves 14 allows a gridlike arrangement of the sealant 4 with the advantages as they were mentioned previously.

Also, embossing 5 with pockets 15 is possible, as is shown in Figure 4e, and in production, the water-tight membrane 1 - relative to a gridlike embossing with grooves 14 - is connected into the pockets with the advantage of the simpler application of the sealant 4.

The embossing 5 can typically have a depth of 0.1 – 10 mm, preferably 0.5 – 5 mm, and the distance between the grooves 14 or pockets 15 can be 0.5 – 30 mm, preferably 1- 10 mm.

The composite layer 3 can consist of all materials, in particular those that are readily penetrated by liquid concrete 7 and that form a good bond with the hardened concrete 7.

In this document, the term “composite layer” is defined as a layer that can ensure the bond with the poured concrete 7.

The composite layer 3 can thus participate in an essentially secure bond with concrete 7, when said concrete is brought into contact with the composite layer before its hardening.

It is advantageous when the composite layer 3 consists of a porous material. A porous structure is conducive to the elasticity of the composite layer; it can thus tolerate better tensile and shearing forces. In contrast, it results in good uptake of liquid concrete and thus in a good bond with the liquid as well as the hardened concrete 7. This can be advantageous in particular in the case of large surface tilt angles so that the concrete does not slide on the composite layer.

Preferably, the composite layer 3 is a fiber material. In this entire document, fiber material is defined as a material that is built up of fibers. The fibers comprise or consist of organic or synthetic material. In particular, these are cellulose, cotton fibers, protein fibers or synthetic fibers. As synthetic fibers, primarily fibers that consist of polyester or a homo- or copolymer of ethylene and/or propylene or rayon can preferably be mentioned. In this connection, the fibers can be short fibers or long fibers, spun, woven or non-woven fibers or filaments. In addition, the fibers can be straightened or elongated fibers. In addition, it may be advantageous to use fibers that are different - both in geometry and in composition – with one another.

In addition, the fiber material comprises intermediate spaces. These intermediate spaces are built up by suitable production methods. The intermediate spaces are preferably at least partially open and allow the penetration of liquid concrete.

The element that is built up from fibers can be produced by the most varied methods known to one skilled in the art. In particular, elements are used that are a cloth, fabric, or knit fabric.

The fiber material can be a loose material that consists of spun fibers or filaments, whose cohesion in general is given by the adhesion that is specific to the fibers. In this connection, the individual fibers can have a preferred direction, or they can be undirected. The element that is built up from the fibers can be mechanically solidified by needling, meshing or by swirling by means of tight water jets.

A felt or non-woven material is especially preferred as fiber material.

Such layers that consist of fiber materials offer the same advantages as were previously mentioned for porous materials, and they have low production costs. In

addition, as well as the porous materials, they have the advantage that they can be arranged essentially securely on the barrier layer 2 by heat treatment, by pressure, by physical adsorption or by any other physical application of a force, as was previously mentioned.

In addition, fiber materials can generally be produced very uniformly, by which a comparable penetration with concrete 7 can be achieved.

It is also advantageous when the composite layer 3 can protect the sealing material 4 and in particular the barrier layer 2 from mechanical stress. In particular when the water-tight membrane 1 is laid and before and during the application of the liquid concrete, it can result in excessive mechanical stress, for example in walking on the water-tight membrane, by the laying of armoring iron or with the installation of liquid concrete. It is therefore advantageous when the composite layer 3 has a certain surface weight and thus has a certain pressure resistance against mechanical stress.

Advantageously, the composite layer 3 is a thermoplastic material, and the material is selected from the group that comprises polyethylene with high density (HDPE), polyethylene terephthalate (PET), polystyrene (PS), polypropylene (PP), polyvinyl chloride (PVC), polyamide (PA), and combinations thereof.

In addition, the composite layer 3 can have a thickness of 0.5 – 30 mm, preferably 2 – 10 mm.

The water-tight membrane 1 can be produced in any manner. In particular, the water-tight membranes can be produced on commercially available machines. The water-tight membranes can be produced in a single process step as a continuous product, for example by extrusion and/or calendering and/or lamination, and can be rolled up, for

example, on rollers. The mass temperature in the extruder or calender can lie in a range of 100°C - 200°C, preferably 120°C - 170°C, and in particular 130°C - 150°C, preferably during the extrusion and/or the calendering and/or the lamination.

The sealant 4 can be poured through slotted nozzles onto the barrier layer 2, typically shortly before the connection of the barrier layer with the composite layer 3. It is advantageous that the sealant 4 has a composition and a stability that are compatible with the temperatures of the production of the water-tight membrane 1.

In particular, the composite layer 3 is connected to the barrier layer 2 by lamination, typically shortly after the sealant 4 was applied to the barrier layer or at the same time.

In addition, the invention comprises a molded part 16 that comprises a water-tight membrane 1, as it was previously described, and a layer that consists of insulation material 17.

The insulation material, in particular heat- and/or sound-insulating material, is typically foamed polystyrene, foamed polyurethane, mineral wool or foam glass or combinations thereof.

The layer that consists of insulation material 17 typically has a thickness of 1 – 50 cm.

Typically, the molded part 16 is a prefabricated part element, in particular a plate, as it is shown in Figure 6. Such a molded part is advantageous to the extent that insulation material and water-tight membrane 1 can be applied in an operating step. Such molded parts are especially suitable for water-permeable insulation materials, whereby the barrier layer 2 prevents liquids from advancing.

In addition, the invention comprises a water-tight molded part 18 that comprises a barrier layer 2, a composite layer 3, which is arranged on one side of the barrier layer, as well as a sealant 4, arranged intermittently between the composite layer and the barrier layer, whereby the barrier layer consists of a water-tight insulation material.

The water-tight insulation material corresponds to the above-described insulation material with the stipulation that the insulation material is water-impermeable. The layer that consists of water-tight insulation material 19 typically has a thickness of 1 – 50 cm.

The composite layer 3 and the sealant 4 of the water-tight molded part 18 correspond to the composite layer and the sealant as they are mentioned for the water-tight membrane 1.

Typically, the molded part is a prefabricated part element, in particular a plate, as it is shown in Figure 7. The water-tight molded part 18 offers the same advantages as were previously mentioned for the molded part 16.

In addition, the invention comprises a method for sealing bases 6, comprising the steps:

- i) Application of a water-tight membrane 1 as previously mentioned on a base 6, whereby the barrier layer 2 of the water-tight membrane is directed against the base,
- ii) Application of liquid concrete 7 on the composite layer 3 of the water-tight membrane 1.

In this document, liquid concrete is defined as concrete 7 before hardening. The concrete 7 can be part of a structure, in particular a structure that is above or below

ground level, such as, for example, a building, garage, tunnel, dump, watershed, embankment, or an element for the industrialized building.

The liquid concrete 7 is usually poured in and/or on the composite layer 3 and can penetrate into the composite layer. It is especially advantageous when the liquid concrete completely permeates the composite layer. After the concrete hardens, typically an essentially secure bond between the hardened concrete 7 and the composite layer 3 is formed and thus forms the water-tight membrane 1, in particular when the concrete in its liquid state has completely permeated the composite layer.

It is also advantageous, however, when the liquid concrete does not completely permeate the composite layer. After the concrete hardens, a part of the composite layer 3 that faces the barrier layer 2 is formed, and said composite layer 3 is not permeated by concrete 7, which thus has a greater elasticity relative to horizontal and vertical shifts, in particular shifts of the barrier layer and composite layer, than the concrete-permeated part of the composite layer 8. The higher elasticity of the composite layer that is not permeated by concrete can counteract the cracking or detachment of the sealant 4 and/or the barrier layer 2. In addition, cracks in the concrete 7 can thus be better bridged over.

In this case, the base 6 may or may not be horizontal. In addition, it can be earth, a structure or a formwork. Typically, the base is a vertically-positioned formwork that is made of wood or steel beams. The base can also be insulation material.

Typically, the method contains in addition a step for fastening the water-tight membrane 1 to the base 6. This step takes place in particular after the water-tight membrane is installed on the base, typically by mechanical fastening and/or cementing.

In addition, the invention comprises the use of a water-tight membrane 1 as was previously mentioned for sealing bases 6.

Of course, the invention is not limited to the embodiments that are shown and described.

Reference Symbol List

- 1 Water-Tight Membrane
- 2 Barrier Layer
- 3 Composite Layer
- 4 Sealant
- 5 Embossing
- 6 Base
- 7 Concrete
- 8 Composite Layer Mixed with Concrete
- 9 Leak
- 10 Liquid
- 11 Void
- 12 Mesh Line
- 13 Mesh Cell
- 14 Groove
- 15 Pocket
- 16 Molded Part
- 17 Layer that Consists of Insulation Material
- 18 Water-Tight Molded Part
- 19 Layer that Consists of Water-Tight Insulation Material

Claims

1. Water-tight membrane that comprises:
a barrier layer,
a composite layer, which is arranged on one side of the barrier layer,
characterized in that a sealant is arranged intermittently between the composite layer and the barrier layer.
2. Water-tight membrane according to Claim 1, wherein the sealant is a thermoplastic or a thermoplastic elastomer.
3. Water-tight membrane according to one of the preceding claims, wherein the sealant is selected from the group that consists of acrylate compounds, polyurethane polymers, silane-terminated polymers and polyolefins.
4. Water-tight membrane according to one of the preceding claims, wherein the sealant is a contact adhesive and/or a melt adhesive.
5. Water-tight membrane according to one of the preceding claims, wherein the sealant is arranged in a surface structure and/or like a mesh.
6. Water-tight membrane according to one of the preceding claims, wherein the sealant penetrates 0 – 80%, preferably 5 – 50%, and in particular 10 – 30% of the thickness of the composite layer.
7. Water-tight membrane according to one of the preceding claims, wherein parts of the composite layer are connected directly to the barrier layer.
8. Water-tight membrane according to one of the preceding claims, wherein the barrier layer and/or the composite layer is/are a flexible plastic layer.

9. Water-tight membrane according to one of the preceding claims, wherein the barrier layer is a thermoplastic layer, preferably a polyethylene layer.

10. Water-tight membrane according to one of the preceding claims, wherein the barrier layer has a thickness of 0.1 – 5 mm, preferably 0.5 – 2.5 mm, and in particular 0.8 – 1.5 mm.

11. Water-tight membrane according to one of the preceding claims, wherein the barrier layer has an embossing, in particular a gridlike embossing for receiving sealant.

12. Water-tight membrane according to one of the preceding claims, wherein the composite layer consists of a porous material.

13. Water-tight membrane according to one of the preceding claims, wherein the composite layer is a fiber material, in particular a felt or a non-woven material.

14. Molded part that comprises a water-tight membrane according to one of Claims 1 -13, and a layer that consists of insulation material.

15. Water-tight molded part that comprises a barrier layer, a composite layer, which is arranged on one side of the barrier layer, as well as a sealant that is intermittently arranged between the composite layer and the barrier layer according to one of Claims 1 – 8 and 11 – 13, wherein the barrier layer consists of a water-tight insulation material.

16. Method for sealing bases comprising the steps:

- i) Installation of a water-tight membrane according to one of Claims 1 -13 on a base, whereby the barrier layer of the water-tight membrane is directed against the base,

- ii) Application of liquid concrete on the composite layer of the water-tight membrane.