KÖSTER
Waterproofing Systems

EXTERNAL BASEMENT WATERPROOFING

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The information contained in this brochure are non-binding and do not release the applicator from his responsibility for the correct application under consideration of the specific conditions of the construction site and for the final results of the construction process. The valid standards for testing and installation, acknowledged rules of technology as well as our technical guidelines have to be adhered to at all times.

External basement waterproofing

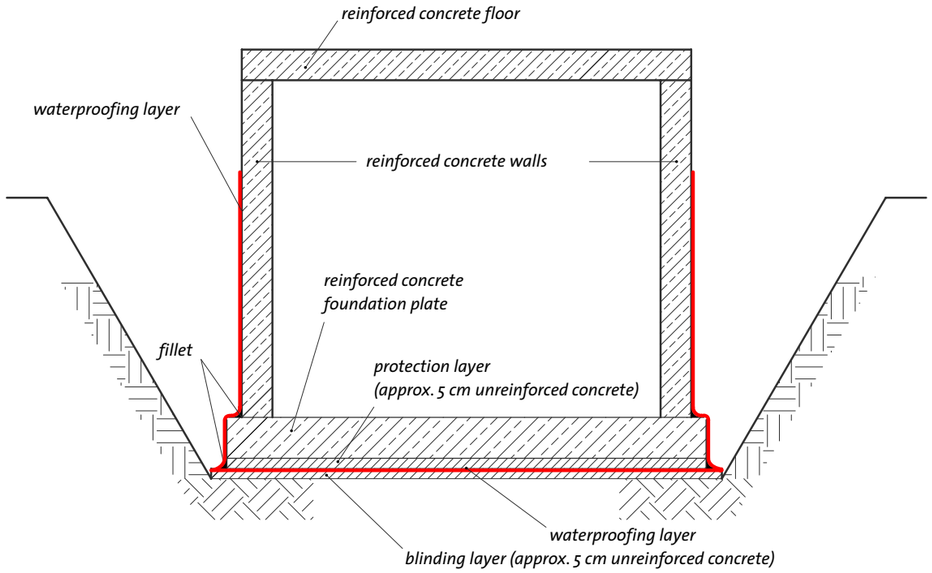
The less space that there is available in metropolitan regions, the more construction is done below grade. Basements are used as inexpensive living and storage rooms and parking space is moved underneath apartment or commercial buildings. Many cities are located close to rivers or the sea. Very often the ground water table is high and waterproofing of below grade / below water table building elements is essential for the usability of these structures.

Below grade waterproofing is the core discipline of any waterproofing specialist. About 80% of the damages in construction are directly or indirectly linked to problems caused by moisture. In contrast a reliable protection against moisture can typically be achieved for less than 5% of the total construction cost. Waterproofing does not only protect buildings but investments. That is why a high quality waterproofing is so important.

What is positive side waterproofing?

External basement waterproofing is a so called positive side waterproofing, which means that the waterproofing material is applied to that side of the construction which is or will be in direct contact with water. An example would be the positive side waterproofing applied to the outside of a basement wall or on the inside of a tank.

External basement waterproofing



The KÖSTER solutions for positive side waterproofing

For each case the best solution: A number of factors influence the selection of a waterproofing system, such as characteristics and condition of the substrate, the construction site, and the environmental conditions. A waterproofing material must be suitable for the substrate and be able to withstand the load condition which it will be exposed to. If a substrate is in danger of cracking, the waterproofing material must have crack bridging properties. If the substrate is wet, only materials can be used that can tolerate wet substrates. The following table will give an overview of the range of waterproofing materials which KÖSTER provides.

Product name	KÖSTER Deuxan® 2C	KÖSTER Deuxan® Professional	KÖSTER NB 1 Grey / NB 2 White
Material class	rubberized bitumen thick film	rubberized bitumen thick film	cementitious crystallizing slurry
Temperature range for application	+5 °C to +35 °C	+5 °C to +35 °C	+5 °C to +30 °C
Consumption approx.	4 - 6 kg / m²	4 - 6 kg / m²	2 - 4 kg / m²
Layers	2 + primer	2 + primer	2 / no primer (W)
Colour	black	black	grey / white
Solvent-free	yes	yes	yes
Certification for potable water	-	-	yes
Can be plastered over	-	-	++
Crystallizing properties, penetrates into substrate	no	no	yes
Mode of application	trowelable	sprayable	brushable / sprayable
Suitable for negative side waterproofing	as so called "sandwich-waterproofing"	as so called "sandwich-waterproofing"	yes
Waiting time until backfilling	> 24 hours	> 24 hours	> 48 hours
Price per m² *2	**	**	*
Cost of application per m²	**	*	*** manual / * spray application
Simplicity of application	++	++	++
Substrate			
Masonry	++	++	++
Cementitious plaster	++	++	++
Concrete	++	++	++
Polystyrene	++	+	not suitable
Old bitumen membranes / coats	++	+	not suitable
Moisture condition of the surface	dry or slightly damp	dry or slightly damp	dry or wet
Performance			
Waterproof against max. load condition	pressurized water	pressurized water	pressurized water
Time until rainproof	approx. 8 h / 1*	approx. 8 h / 1*	approx. 8 h
Chemical resistance	good	good	good
Tested to be radon proof	yes	yes	-
Permeability to vapor diffusion	low	low	high
UV-resistance	not long term resistant	not long term resistant	long term resistant
Abrasion resistance	-	-	++
Crack bridging	++	++	-
Embedding of a mesh	possible	possible	-

Product name	KÖSTER NB Elastic Grey / White	KÖSTER KSK SY 15
Material class	elastic cementitious coating	cold self-adhesive membrane
Temperature range for application	+5 °C to +35 °C	+5 °C to +35 °C
Consumption approx.	3.6 - 4.5 kg / m²	1.10 m² / m²
Layers	2 / no primer (W)	1 + primer
Colour	light grey / white	black
Solvent-free	yes	yes
Certification for potable water	-	-
Can be plastered over	+	-
Crystallizing properties, penetrates into substrate	no	no
Mode of application	brushable / sprayable	hand-application
Suitable for negative side waterproofing	as so called "sandwich-waterproofing"	as so called "sandwich-waterproofing"
Waiting time until backfilling	> 48 hours	no waiting time
Price per m² 2*	**	*
Cost of application per m²	*** manual / * spray application	**
Simplicity of application	++	+
Masonry	++	++
Cementitious plaster	++	++
Concrete	++	++
Polystyrene	+	+
Old bitumen membranes / coats	not suitable	++
Moisture condition of the surface	dry or wet	dry
Performance		
Waterproof against max. load condition	pressurized water	pressurized water
Time until rainproof	approx. 8 h	immediately
Chemical resistance	good	good
Tested to be radon proof	- / yes	yes
Permeability to vapor diffusion	medium	very low
UV-resistance	long term resistant	not long term resistant
Abrasion resistance	+	-
Crack bridging	++	++
Embedding of a mesh	possible	-

1 The final layer of polymer modified bitumen thick film sealants can be made rainproof by spraying KÖSTER BE Rainproof onto the fresh coating*
2 lower * medium ** higher ****

W Wetting is sufficient (substrate should be moist). In case of highly absorbent substrates prime with KÖSTER Polysil® TG 500.

Rubberized bitumen thick films: KÖSTER Deuxan® 2C and Deuxan® Professional

- *easy and seamless application, even on moist surfaces, crack bridging*
- *suitable for large and small areas even with many details*
- *low requirements on the substrate*

Crystallizing waterproofing system: KÖSTER NB 1 Grey

- *cementitious, crystallizing waterproofing*
- *penetrates into the surface and becomes integral part of it*
- *also for negative side waterproofing*
- *wear resistant*
- *self-healing properties*

Crack bridging cementitious waterproofing: KÖSTER NB Elastic

- *crack bridging*
- *easy and seamless application, excellent in combination with KÖSTER NB 1 Grey*
- *even on areas which are exposed to sunlight*
- *resistant to foot traffic*

Cold self adhesive membranes: KÖSTER KSK AW 15 / KÖSTER KSK SY 15

- *fast, reliable, with uniform layer thickness*
- *crack bridging even at very low temperatures*
- *excellent for waterproofing of concrete slabs*
- *large areas can be waterproofed quickly*
- *no drying time*

Rubberized Bitumen Thick Films

Advantages

- *crack-bridging up to 2 mm*
- *easy to apply*
- *no joints - seamless application*
- *according to DIN 18195*
- *easy control of the layer thickness*
- *easy leveling of uneven substrates*
- *low demands on safety compared to hot bitumen*
- *reinforcing mesh can be embedded*

Description

KÖSTER Deuxan® is a fiber reinforced, two-component waterproofing compound consisting of a rubberized bitumen emulsion with additives. No special tools are necessary for application as opposed to the application of hot bitumen. Application is easy even in detail, e.g. around pipe penetrations, inner and outer corners, wall-floor junctions, etc. Complies with the DIN 18 195 (German standard for external basement waterproofing).

Application of KÖSTER Deuxan® 2C

The KÖSTER Deuxan® bucket has an insert which contains a bag with the powder component. The powder component is slowly mixed into the bitumen component using a slow rotating stirring device. Mixing time is 3 minutes.

The first layer of KÖSTER Deuxan® is applied, in this case by trowel. Surface profiles and unevenness up to a depth of max. 5 mm are filled with a scraped layer of KÖSTER Deuxan® 2C.

KÖSTER Glas Fibre Mesh is embedded into the first fresh layer of KÖSTER Deuxan®. Generally, a mesh has to be embedded in areas which are in danger of cracking. When waterproofing against pressurized water, KÖSTER Glass Fibre Mesh has to be embedded in the whole area.

The second layer of Deuxan® is applied shortly after the first layer of KÖSTER Deuxan®.

In case of pressurized water the second layer is not applied before the first layer has fully cured. We recommend applying a sample of the material with linearly changing thickness to a brick and to store that brick on the construction site. The wedge can then be cut to check how far it has cured in different depths.

Spray application - KÖSTER Deuxan® Professional

KÖSTER Deuxan® Professional is similar to KÖSTER Deuxan® 2C but specifically designed for spray application with a suitable spraying device. Spray application provides a very high productivity which makes it attractiv for professional contractors and for larger objects. It requires knowledge of the pump and the spraying process. The spraying equipment has to be tested and fine tuned before commencing work.

Cementitious, crystallizing waterproofing system: KÖSTER NB 1 Grey

Description

KÖSTER NB 1 Grey contains active ingredients which penetrate into the substrate, crystallize, and thereby create an insoluble barrier which will retain its function as long as the substrate itself remains sound. Because of its penetrating and crystallizing properties, KÖSTER NB 1 Grey can successfully be used on both the inside and the outside (positive and negative side waterproofing) of structures with equally good results. A white version, KÖSTER NB 2 White, is also available.

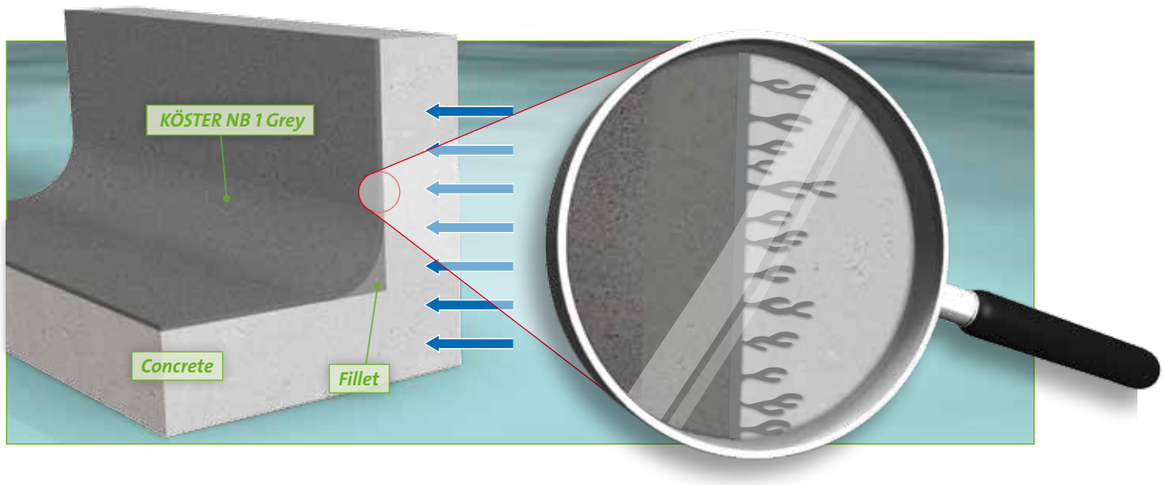
By adding 20% KÖSTER SB Bonding Emulsion to the mixing water, the bonding of KÖSTER NB 1 Grey and flexibility are improved. This also has a positive effect on curing, since it protects the fresh coating from drying out too fast.

The active ingredients of KÖSTER NB 1 Grey lead to a waterproofing crystallization in mineral substrates, also in case of high moisture contents in the wall.

KÖSTER NB 1 Grey does not contain any corrosion promoting ingredients which can negatively affect the reinforcement steel.

Advantages

- *penetrates into the substrate and creates a chemical and mechanical bond that will last as long as the wall itself*
- *crystallizing waterproofing system*
- *suitable for drinking water applications*
- *abrasion resistant*
- *for mineral substrates such as concrete and brick walls*
- *open to water vapor diffusion*
- *self healing properties: contains permanently active ingredients which can seal subsequent micro cracks*
- *suitable for moist surfaces*
- *easy to apply*
- *fast*
- *safe*
- *no joints*
- *also suitable for negative side waterproofing*



Application

One bag (25 kg) of KÖSTER NB 1 Grey is mixed with 8 l of water. The water is placed in a mixing container of sufficient size.

Alternatively one bag can be mixed with:
- 8 l of KÖSTER NB 1 Flex or
- 6 l water + 2 kg KÖSTER SB-Bonding Emulsion

Both additives raise the ability of KÖSTER NB 1 Grey to retain water and lead to a plastification of the material.

The powder is added in portions while continually mixing using a slowly rotating electrical mixer with a suitable mixing paddle. Mixing time is 3 minutes.

KÖSTER NB 1 Grey is applied using a coarse brush.

Make sure to brush up and down as well as left and right in order to close all pinholes.

Crack bridging cementitious coating: KÖSTER NB Elastic

Advantages

- *for mineral substrates such as concrete and brick walls*
- *crack bridging up to 2 mm*
- *resistant to foot traffic*
- *ideal for balconies and terraces*
- *suitable for moist surfaces*
- *easy to apply*
- *fast*
- *safe*
- *no joints*
- *open to water vapor diffusion*
- *together with NB 1 Grey suitable for negative side waterproofing*
- *cement based system*
- *ideal in combination with KÖSTER NB 1 Grey, e.g. on wallfloor junctions, corners etc. where crack bridging is required*

Description

KÖSTER NB Elastic is an elastic and wear-resistant coating which can bridge cracks of up to 2 mm. The material is available in white or grey. KÖSTER NB Elastic is widely used on concrete or masonry surfaces. Ideal in combination with KÖSTER NB 1 Grey in all areas where crack bridging is required. Excellent for waterproofing terraces and balconies.

Application

Pour the liquid component completely into a clean mixing container.

The powder component is slowly mixed into the liquid component in portions using an electrical mixer. Mixing time is 3 minutes.

Application of the first layer of KÖSTER NB Elastic grey to the wall with brush or trowel. KÖSTER Flex Fabric is embedded in the first layer.

Application of the second layer of KÖSTER NB Elastic grey.

Cold self adhesive membrane: KÖSTER KSK membrane

Advantages

- cold-applied, self-adhesive
- no hot-air or propane-flame welding necessary
- uniform waterproofing layer
- one layer solution
- immediate waterproofing effect / no drying time
- great flexibility
- fast application due to 1.05 m membrane width
- universally applicable
- crack-bridging
- solvent-free
- laminated on the top side with a highly tear-resistant foil, thus highly resistant against perforation
- highly resistant to aging
- self-sealing in case of small damages
- high seam resistance against water pressure and water vapor

Description

KÖSTER KSK membrane is a cold self-adhesive rubber bitumen waterproofing membranes with a double laminated, highly tear resistant polyethylene foil on top. It's highly flexible, immediately waterproof, crack-bridging and resistant to driving rain. The waterproofing membrane is suitable for the waterproofing of basements and basement slabs. For application between +5 °C and +35 °C use KÖSTER KSK SY 15.

Application

After priming the substrate, fillets are installed at the wall-floor junction.

Fillets can be made of either KÖSTER Repair Mortar or alternatively with the cold self-adhesive KÖSTER KSK Triangular Ribbon.

After that, the membrane is applied to inside and outside corners.

The area is waterproofed with the membrane. Membranes must overlap by approx. 10 cm.

Use a roller to firmly press the membranes onto the substrate.

The edges of the membrane are sealed with KÖSTER KBE Liquid Film.

If no separate base waterproofing is installed, the upper edge of the waterproofing layer has to end approx. 30 cm above grade. In order to achieve an attractive visual appearance, the upper edge of the membrane can be covered with the cold self-adhesive KÖSTER Butyl Fix-Tape Fleece. This tape can be plastered over.

Finished waterproofing with KÖSTER KSK

A special solution for repair cases: Curtain injection with KÖSTER PUR Gel

In cases where an existing basement is leaking and the soil surrounding the building cannot be excavated, the waterproofing has to be done from the inside. With KÖSTER PUR Gel it is possible to create an exterior waterproofing layer by injecting through the wall from the inside into the surrounding soil, (curtain injection). KÖSTER PUR Gel reacts with the mixing water to form an elastic, crack bridging waterproofing layer.

Waterproofing of joints

Cold-, expansion-, and construction joints are necessary to permit movement in a building. Sealing joints in construction elements means to seal them permanently, elastically, form stable and UV- resistant. This allows future movements of the construction member without causing any damage. Normal Construction joints up to 35 mm can be sealed with KÖSTER Joint Sealant FS. For wider joints (like dilation joints) we recommend KÖSTER Joint Tapes.

Surface preparation

All surfaces have to be prepared before they receive a waterproofing layer. In most cases the substrate preparation determines the quality of the system. Surface preparation in waterproofing can not be overestimated. Usually the surface has to be taken off or cleaned until a solid substrate is reached, leveled and primed.

The substrate has to be sound, solid, free of bonding inhibiting agents such as grease and oil, separating substances and loose parts. In corners concave fillets have to be installed.

In repair cases

If the substrate is cracked, the cracks can be injected with KÖSTER Injection systems as outlined in the KÖSTER brochure "Crack Repair and Crack Injection Systems". Moving joints have to be waterproofed separately, e.g. using KÖSTER Joint Tape or KÖSTER Joint Sealant FS. Active leakages have to be stopped before any area waterproofing can be applied.

For cementitious waterproofing it is necessary to remove old existing coatings as well as soil or residues from the building process such as cement lime on the surface of the concrete.

Cleaning the surface

All coating residues, form work release oil and any other contaminants which might adversely affect the bonding have to be removed. The surface must be stripped down to its base structure, (removal of residues and efflorescence). Depending on the case high pressure water jetting or sandblasting may be required.

Levelling the surface

On mineral substrates, holes smaller than 5 mm can be closed e. g. using KÖSTER NB 1 Grey. When using KÖSTER Deuxan® as area waterproofing material, irregularities in the substrate can be levelled by applying a scraped layer before the waterproofing layers.

All holes wider or deeper than 5 mm have to be filled using KÖSTER Repair Mortar. Gravel nests, break outs, construction joints and other areas which are susceptible to leaking or which are difficult to coat must be opened up and filled with KÖSTER Repair Mortar.

Priming the surface

The main objective of a primer is to facilitate bonding between the substrate and the waterproofing layer. Without primer, a waterproofing layer may separate from the substrate. Therefore, in many cases the primer is an essential part of the waterproofing system. For cementitious waterproofing materials like KÖSTER NB 1 Grey, a polymer and silicate based primer (KÖSTER Polysil® TG 500) is used, whereas for the bituminous waterproofing materials additional bitumen based primers can be used.

Some primers provide extra value. For example KÖSTER Polysil® TG 500 hardens the substrate, reduces the capillary action, and reduces the movement of salts in the substrate.

The following table shows the different available primers together with their usage.

Waterproofing Material	*KÖSTER Deuxan® 2C / Professional*	*KÖSTER Deuxan® 2C / Professional*	*KÖSTER NB 1 / NB 2 KÖSTER NB Elastic Grey / White*	*KÖSTER NB 1 / NB 2 KÖSTER NB Elastic Grey / White*
Primer	***KÖSTER Polysil® TG 500***	***KÖSTER Bitumen Primer***	***KÖSTER Polysil® TG 500***	***Prewetting***
Basis	*polymer silicate based*	*bitumen*	*polymer silicate based*	*water*
Temperature range	*+2°C to +30°C*	*+2°C to +30°C*	*> + 5 °C*	*> + 5 °C*
Consumption approx.	*100 - 250 g / m²*	*150 - 200 ml / m²*	*100 - 250 g / m²*	*to saturation*
*Price per m² 1**	*****	****	*****	-
Substrate				
Masonry, low absorbent	+	+	+	+
Masonry, absorbent	++	+	++	+
Masonry, highly absorbent	++	+	++	++
Lime cement plaster	++	+	++	-
Cementitious plaster	++	+	++	+
Porous concrete	++	+	++	++
Concrete, low absorbent	++	+	++	+
Concrete, absorbent	++	+	++	+
Concrete, highly absorbent	++	+	++	++
Plastics	-	-	-	-
Aluminum	-	-	-	-
Polystyrene	-	-	-	-
Old bitumen membranes / -coats	-	++	-	

Waterproofing Material	*KÖSTER KSK SY 15*	*KÖSTER KSK SY 15*	*KÖSTER KSK SY 15*
Primer	***KÖSTER KSK Primer SP***	***KÖSTER KBE Liquid Film***	***KÖSTER KSK Primer BL***
Basis	*polymer resin, contains solvents*	*highly flexible, polymer modified bitumen emulsion*	*polymer modified bitumen emulsion*
Temperature range	*-10 °C to +30 °C*	*+ 5 °C to +35 °C*	*+5 °C*
Consumption approx.	*100 - 200 ml / m²*	*250 g / m²*	*250 - 400 g / m²*
*Price per m² 1**	****	****	*
Masonry, low absorbent	++	++	+
Masonry, absorbent	++	++	++
Masonry, highly absorbent	++	+	+
Lime cement plaster	+	+	+
Cementitious plaster	++	++	++
Porous concrete	++	+	+
Concrete, low absorbent	++	+	+
Concrete, absorbent	++	++	++
Concrete, highly absorbent	++	+	++
Plastics	*no priming*	*no priming*	*no priming*
Aluminum	*no priming*	*no priming*	*no priming*
Polystyrene	++	++	-
Old bitumen membranes / -coats	-	-	-

1 lower * medium ** higher ****

++primer is ideally suitable for substrate

+ primer is suitable for substrate

- primer not suitable

Installing fillets with KÖSTER Repair Mortar

Many waterproofing defects occur in the wall-floor junction. There, two areas connect at a 90° angle. If the connected areas move against each other, for example due to differing thermal expansion of the wall and the floor slab, the motion is focused in that 90° connection causing very high stresses to the waterproofing layer. In order to allocate these stresses to a larger surface the wall floor junction is rounded out by installing a concave fillet. This reduces the impact on the waterproofing layer considerably.

To install a fillet, KÖSTER Repair Mortar is the material of choice. The leg length of the fillet is usually 4–6 cm. A fillet made of KÖSTER Repair Mortar can be covered with any waterproofing material including bitumen thick films. Before the installation of a fillet, prime the substrate with KÖSTER NB 1 Grey.

A concave fillet in the wall-floor junction with KÖSTER Repair Mortar

Protection of the waterproofing layer

Back filling of the construction pit and settlement of the ground over time are frequent sources of damage to the waterproofing layer. Usually the material used to backfill the construction pit does not consist of clean sand but contains coarse aggregates. During backfilling, these aggregates can be pushed into the waterproofing layer and damage it. For this reason the installation of a protective layer is required.

KÖSTER SD Sheet 3-400 protects the waterproofing and provides a drainage for residual water.

XPS boards completely bonded with KÖSTER Deuxan®

Protective layers ideally combine three functions: mechanical protection, drainage, and a decoupling or gliding layer. The KÖSTER SD Sheet 3-400 consists of three layers. The mechanical protection is provided by the main layer, a HDPE dimple sheet. Facing the soil, a fleece is attached to the dimples of the dimple sheet in order to maintain the drainage function. The third layer on the backside of the dimple sheet facing the waterproofing layer is a LDPE foil.

This gliding layer between dimple sheet and waterproofing layer prevents damages due to backfilling or settling of the ground. Alternatively, other systems like XPS boards, which provide other benefits such as thermal insulation, may be used.

On concrete slabs, a protection layer of screed is often used to prevent mechanical damages from subsequent building activity.

Quality control

High quality waterproofing solutions require high quality application. This must be taken very seriously. A waterproofing system application is not complete without quality control. Compared to the cost of failure during the use of a building, quality control is a very low cost, high return measure in construction.

Quality control for waterproofing systems includes:

- *frequent measuring of wet layer thickness during application*
- *control of consumption*
- *optical examination of the surface during and after application, and during curing of the material*
- *testing if the waterproofing layer has fully cured before backfilling*
- *measuring the dry layer thickness on a reference sample stored in the construction pit*
- *documentation of the work, (written protocol, photos)*
- *use of method statements including check lists for all work steps*

A good documentation helps the contractors to improve the quality of their work and reduces risk. For the owner the documentation is helpful for future reference and to receive a full warranty.

Weather conditions during application

Here are some important tips regarding weather conditions:

Rain

Rain may wash away liquid waterproofing materials. Especially waterproofing materials that are based on bitumen emulsions need the evaporation process for curing and therefore have to be protected from rain. Application of KÖSTER Rain Proof is one option. Other liquid products applied have to be protected from being washed off. KÖSTER KSK Membranes are rainproof immediately after application.

Sun

Sun and high temperatures can result in shorter reaction times of any liquid waterproofing material and thus reduces the pot life and the time available for application. In that case less material is mixed at once in order to apply the waterproofing before curing. The sun can also prematurely dry out cementitious materials so that wetting becomes necessary. It is always preferable to work in the shade. In extreme cases the work has to be carried out before sunrise or after sunset. KÖSTER offers HT ("high temperature") versions of several products.

Wind

Wind can increase water evaporation drastically, especially in combination with high temperatures. Cementitious waterproofing materials need a certain water / cement ratio to cure completely. Pre-watering of the substrate and wetting of the applied waterproofing material may be necessary. Strong winds can also cause problems with spray application.

Frost

By frost a material containing water such as a bitumen thick film must not be applied because it will freeze and thereby be destroyed. Be careful with any kind of emulsions, sealing slurries, water based primers, etc. Only when environmental temperatures are above +5 °C, the cold self adhesive membrane KÖSTER KSK SY 15, together with the water free primer KÖSTER KSK Primer SP is the ideal solution.

How to waterproof a concrete slab

A concrete slab is ideally waterproofed from underneath: A blinding layer is installed, on top of it a waterproofing layer, then a gliding layer, e.g. two layers of polyethylene foil, and finally a protection layer in order to not destroy the waterproofing layer with subsequent building activity.

Waterproofing with KÖSTER KSK Membranes

Waterproofing with KÖSTER Deuxan®

For the waterproofing of a slab cementitious systems, bituminous liquid applied systems, or membranes can be used. KÖSTER KSK membranes have the advantage that one can immediately continue work after installing the membrane. In basements it is important to connect the horizontal and vertical waterproofing, (floor to wall), completely.

How to waterproof pipe penetrations

While a wall area may be easy to waterproof, a pipe and cable penetration is not. The main problems that occur with pipe and cable penetrations are possible movements of the pipes or cables, and that materials passed through pipe and cable penetrations have very different characteristics, (polymers, concrete, metal etc.). The waterproofing solution has to be plastic, (as opposed to "elastic"), so that movements can be absorbed and bonding to a wide variety of materials is possible. Sometimes a cable may have to be removed or a new cable routed. The KÖSTER KB-Flex 200 System provides the solution for this problem even if it is a repair with active water ingress.

A PU-Foam is injected in order to have a backing for the KÖSTER KB-Flex 200.

Then KÖSTER KB-Flex 200 is filled into the void using the KÖSTER Special Caulking Gun.

The pipe penetration is now waterproof. In order to protect the waterproofing the area around the pipe or cable is plugged with KÖSTER KB-Fix 5.

How to waterproof pile heads

The three major challenges to waterproofing pile heads are: Firstly, during the vibration of the concrete sometimes small gaps between the reinforcement steel and the concrete are generated. This can lead to leakages later on. The waterproofing has to solve this. Secondly, the piles are the foundation of a building which means the waterproofing on the pile head has to resist high compression. Thirdly, it is important to connect the area waterproofing well to the pile head waterproofing. Here the steps of waterproofing of a pile head are shown.

Removing protrusions, cleaning the pile head

Installing a fillet and smoothing the area with KÖSTER Repair Mortar

Waterproofing of the pile head with KÖSTER NB 1 Grey

Connection of the area waterproofing (KÖSTER Deuxan®) to the pile head waterproofing

Time and costs of waterproofing

When talking about the cost of waterproofing, it is important to calculate the total cost involved and not only the cost per kg of the waterproofing material. Time is a key factor which influences the costs of waterproofing. The total time needed for waterproofing involves the factors surface preparation time, application time, curing time between the different work steps, and time for quality control. Different materials require different surface preparation which leads to differences in cost. The more elaborate the surface preparation, the more expensive it is. Different modes of application require more or less time. Spray application is faster than manual application, single layer systems are faster than two or more layer systems. Hand application may on the other hand be better to control and therefore more secure. For smaller areas, manual application with a trowel or brush is most economical whereas on bigger areas it may well be worth using spraying equipment such as the KÖSTER Variojet.

What does “crack bridging” mean?

Crack bridging waterproofing means that the waterproofing system remains intact even though the substrate has cracked. Often, “crack bridging” is confused with “elastic”. A material may be elastic but not waterproof when stretched. It may also be waterproof at first but not able to withstand water pressure.

Corners and pipe penetrations are among the areas which are considered to be at high risk of cracking. When a substrate cracks, the flanks of the crack move against each other, thus stressing the elastic waterproofing which was applied to the substrate. Even elastic waterproofing materials can reach the limits of their elasticity if the crack width becomes too great or crack movement is frequent enough. Therefore it makes sense to take preventive measures in such areas to avoid damage to the waterproofing. When using liquid applied waterproofing materials, KÖSTER Glass Fibre Mesh can be embedded into the first fresh layer of the waterproofing. This ensures that the waterproofing layer is not damaged even if the substrate cracks. If the substrate cracks, the mesh will keep the waterproofing layer over the crack from tearing.

1. Elastic but not crack bridging: The waterproofing layer does not withstand the permanent water pressure.

2. Crack bridging waterproofing: In this case due to elasticity and layer thickness. The waterproofing layer withstands permanent water pressure.

3. Crack bridging due to an embedded mesh. The mesh separates the top waterproofing layer from the crack and helps significantly to withstand permanent water pressure.

KÖSTER Product Range

1. *External basement waterproofing*
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For further information, please contact:

KÖSTER Waterproofing Systems

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