Concrete repair, Waterproofing & Technical solutions

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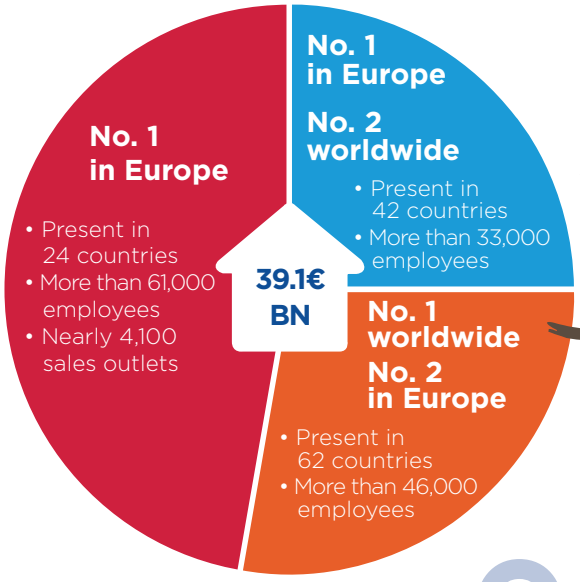

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Saint-Gobain Weber is the world leader in industrial mortars

10,000 people

in **60 countries** worldwide

supported by almost **200 production units**

Weber Middle East

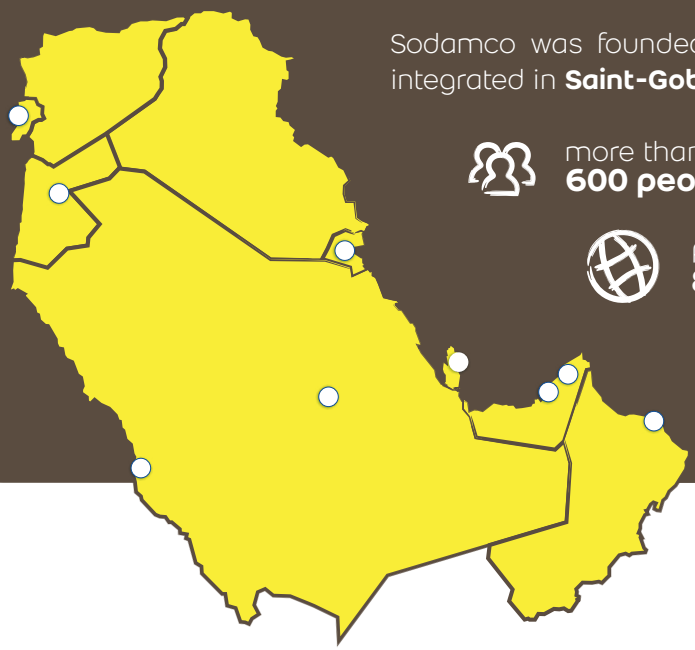
Sodamco was founded in 1984 and was integrated in **Saint-Gobain Weber** in 2012.

SODAMCO

more than **600 people**

present in **8 countries** in the Middle East

7 production units



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Index

Concrete repair solutions

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Application	Product	Non-shrink	Thixotropic	Highly Fluid
Superficial and cosmetic repair				
Pinholes Treatment of superficial damage	**weberep 360 FFR**			
Structural repairs				
Repair mortars	**weberep 331 TX /weberep 331 HCS**	**X**	**X**	
	weberep 332 FR	**X**	**X**	
Corrosion protection	**weberep 370 PF/weberep 501 ZRP**			
Reinforced concrete jacketing				
Anchoring and surface preparation	**weberep 405 BFX / 505 ASF**			
	webertec bond / epo bond			
Jacketing grout	**webertec 301 /webertec 301 HCS (up to 10 cm)**	**X**		**X**
	webertec MC1/webertec 311 MC (up to 30 cm)	**X**		
Crack repairs				
Deep cracks injection	**weberep epo 650 i/ weberep epo 660 i**	**X**		**X**
Superficial cracks	**weberep 360 FFR**			
Epoxy surface lining and repairs				
Patching and lining	**weberep epo 412 CRY**	**X**		
	weberep epo 440 LR	**X**		
Thick repairs	**weberep epo 420 SC**	**X**		
	weberep epo 410	**X**		
Pile Head Repair	**webertec epo 450 PC**	**X**		
Jointing of Precast Panels	**webertec 301 PC**	**X**		**X**
Manholes Frames	**weberep 314 RD**	**X**		
Bedding of machines and bridge bearings	**webertec 302 HF**	**X**		
	weberec 430 GRT Plus	**X**		
Re-bars anchoring	**webertec 405 BFX/505 ASF**	**X**		

Product selector guide

High Early Strenght	Fast setting	Expansive	Corrosion Protection	Smoothness	High Aborasion Resistance	Chemical Resistance
				x		
x				x		
			x			
			x			
			x			
	x					
				x		
						x
						x
				x		x
	x					x
	x					x
		x				
x	x					
x		x				
					x	x
	x					x

Identifying the damage
Type of damage

- Concrete is a composite material that consists essentially of a combination of fine and coarse aggregates bonded with a paste resulting from the portland cement hydration.
- The distress of the reinforced concrete is a result of the presence of three simultaneous factors: interconnected porosity, presence of water or moisture and exposure to agressive agents.
- Concrete can be damaged by many processes, that are divided into 4 types: physical, chemical, mechanical and application damage.

Physical damage

Physical damage occur due to fire, water leakage, shrinkage, abrasion or freeze /thaw cycles.

Chemical damage

Chemical damage occur due to carbonation, chloride, sulfate attack or Alkali Silica reaction

Mechanical damage

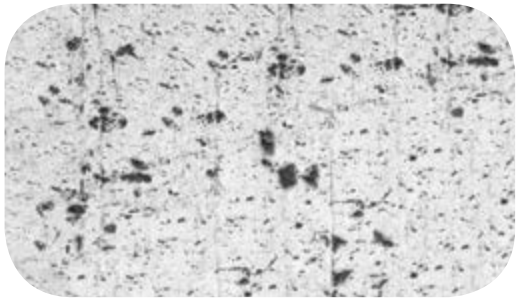
Mechanical damage occur due to movements, overloads or impact.

Application damages

This type of damage can be related to lack of concrete vibration during the pouring, wrong water/cement ratio, lack of demolding agents, insufficient curing...etc.

Honeycombs are formed because of a lack in concrete vibration and low malleability.

Pinholes result from inconvenient water/cement ratio and / or lack of shutter release oil.



Different types of cracks can appear after demolding and setting of the new concrete.

Identifying the damage
Concrete diagnosis

If the concrete is not designed and applied properly, steel reinforcement may be corroded, could increase in volume and push the concrete to crack and delaminate and consequently provoke further deterioration.

They are 3 methods to identify damage in concrete:the visual inspection, the physical inspection and the quantitative inspection.

Visual inspection

Weathering

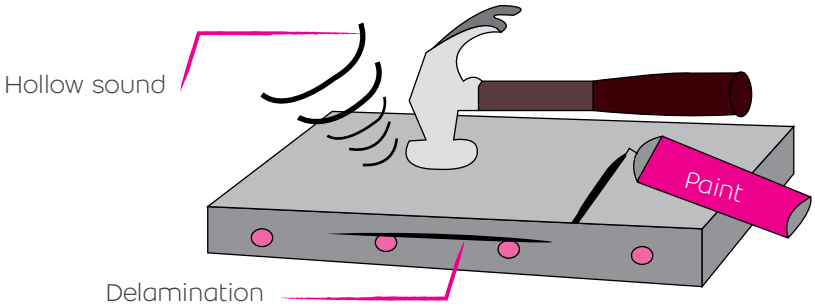
Corrosion

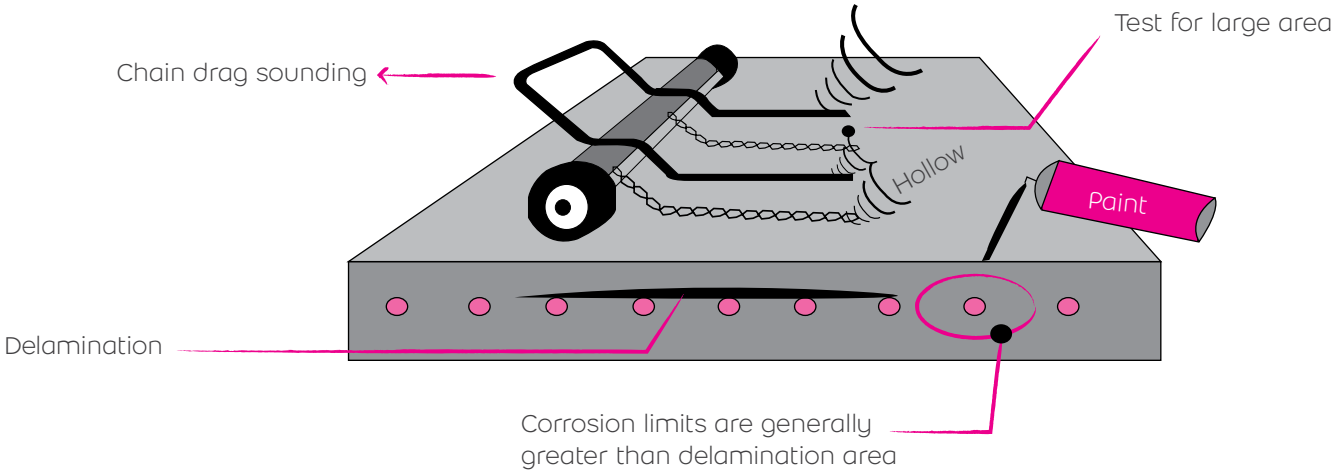
Segregation

Cold joints

Cracks

Physical inspection





Steps after damage identification

1- Defected areas should be delimited using a marker pen by drawing a line around the perimeter of the damaged area.

2- Break out the marked areas using a light jack hammer until reaching sound concrete.

3- If sound concrete is reached before reaching steel bars, then the repair will be restricted to the concrete surface itself.

4- If sound concrete is not reached, breaking of concrete should continue until the steel reinforcement bars appear.

5- If steel reinforcement bars are found corroded, breaking should continue beyond the corroded part until reaching sound steel re-bars

Quantitative inspection

• Compressive strength test

In order to assess the compressive strength, samples are taken from the concrete and tested.

From fresh concrete, samples are molded into cylinders that are crushed upon 1, 7 and 28 days. For old concrete, samples are taken by coring cylinders out of the element in question.

Low compressive strength is explained by high porosity, making the concrete vulnerable to carbonation and chloride diffusion.

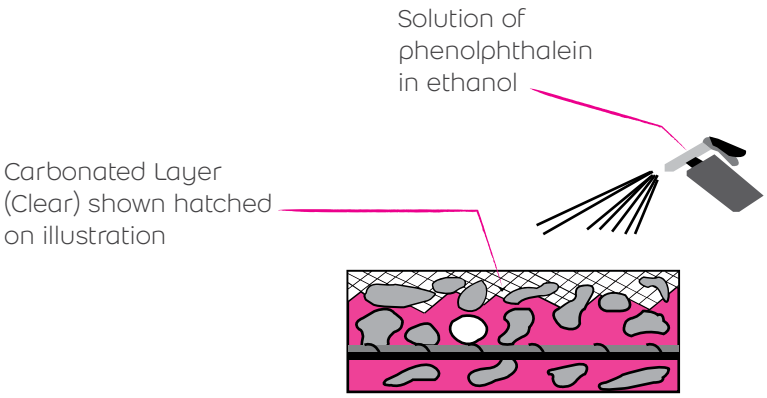
By all means, the minimum compressive strength should be determined by the stuctural engineer.

Coring Test

• Carbonation depth test

Exposed concrete may be attacked by carbon dioxide present in the air. CO_2 reacts with the free lime present in the concrete to form water and calcium carbonate, harmful to the reinforcing steel.

The measurement of carbonation depth using phenolphthalein solution is carried out by spraying the solution on the surface of the concrete. Surfaces with pH below 10 (carbonated) will have no change in color, with a pH above 10 the color of concrete will change to a pink color.



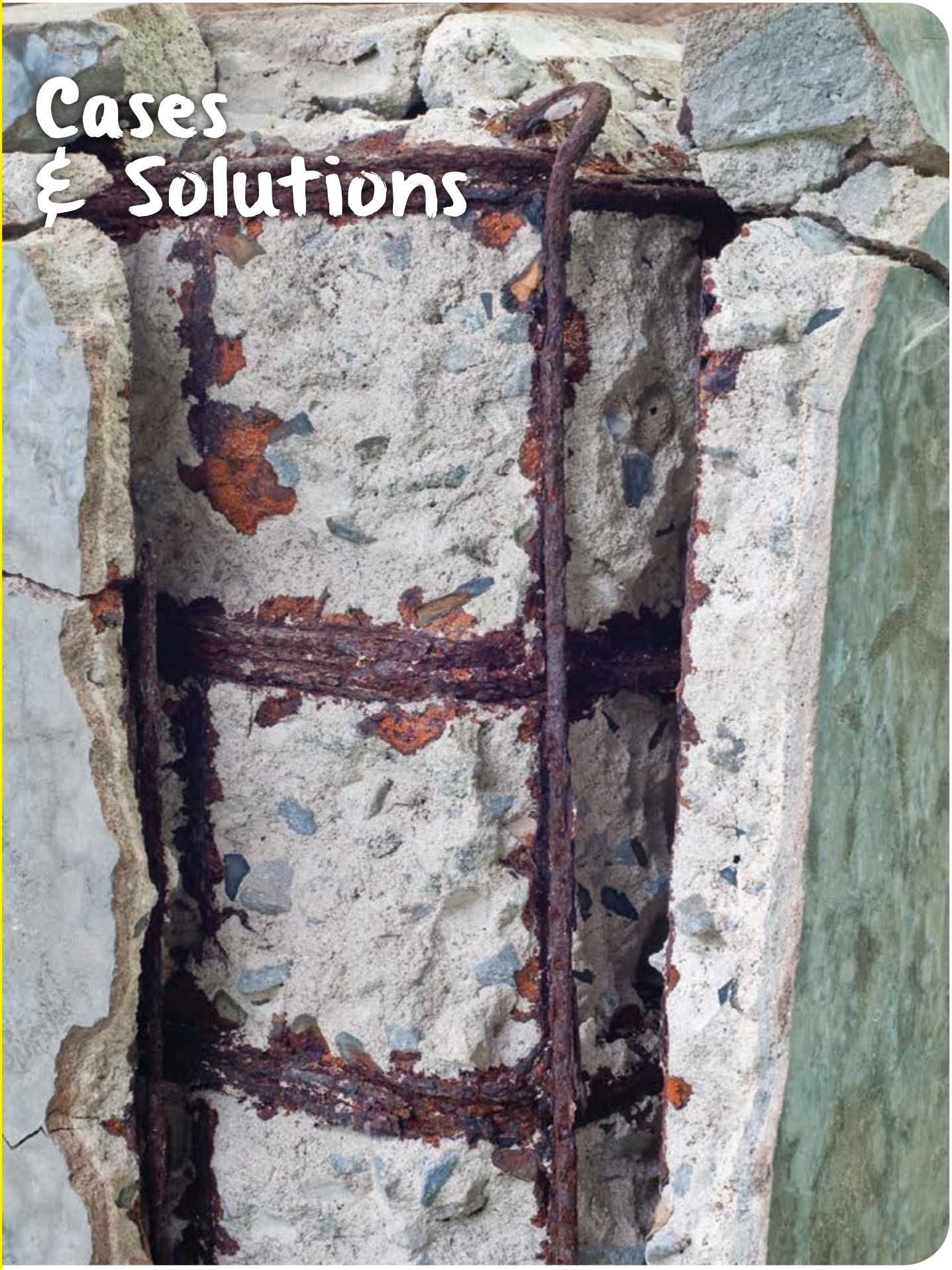
• Chloride diffusion test

Concrete exposed to the sea is extremely vulnerable to chloride ions diffusion.

Chlorides are acid air borne gases. Once they reach the steel reinforcement, in the presence of oxygen, they destroy the passivity of the steel and provoke corrosion.

Colorimetric method is a quick and simple method to measure the penetration depth of chloride by spraying a silver nitrate solution.

Cases & Solutions



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Case & Solution 1

Repair of cracks in reinforced concrete

Causes of concrete distress

Cracks are the most frequent signs of concrete problems. A crack is a linear fracture in the concrete caused by tensile stresses exceeding the concrete tensile strength.

Cracks in the plastic phase of concrete

- There are cracks that develop in the plastic phase of the concrete such as **plastic shrinkage cracks** due to insufficient early curing and loss of water by fast evaporation.
- **Plastic settlement cracks** appear when the concrete consolidation is restrained by the steel bars.

Cracks in the hardened phase of concrete

- Some cracks develop in the hardened state of the concrete such as **drying shrinkage crack**, due to insufficient movement control and Thermal Shrinkage.
  Cracks develop in massive concrete due to sudden drop in ambient temperature as compared to the heat generated by the concrete.
- Other types of cracks can develop occasionally, in cases such as freeze and thaw cycles, Alkali silica reaction or structural distress. Some of them run linear and deeper through the thickness of the member and others are short in different directions while they remain on the surface.

However all above cracks, if left without treatment, will make the concrete vulnerable and will lead to steel corrosion and further deterioration.

Before undertaking any repair, a field investigation and structural analysis should be completed in order to establish the causes of the cracks. Cracks are divided into dry cracks and Wet cracks. In this section, we are treating the linear dry cracks only; wet cracks will be treated in the waterproofing section.

Solution A: Repair of deep cracks

Recommended products

weberep epo 412 CRY

+

weberep epo 650 i

or

weberep epo 660i

Repair using injection

Linear Dry Cracks in reinforced concrete should be strengthened and consolidated using **weberep epo 660 i**. It is a low viscosity 2-component epoxy injection resin capable to fill the full depth of the crack. For narrow cracks, with width below 0.5 mm, use the very low viscosity epoxy resin **weberep epo 650 i**.
The following steps should be observed:

- All cracks should be fully dry.
- Injection surface packers should be placed with equal distance between them.
  Clean thoroughly the surface of the crack and seal each packer using **weberep epo 412 CRY**, an epoxy adhesive.
- The same adhesive **weberep epo 412 CRY** should be used to seal the whole surface of the crack to play the role of capping in order to prevent the **weberep epo 650/660 i** from escaping during injection.
- The work process requires the use of an injection device that could be manual, pneumatic or electrical. The injection starts from the lowest packer and stops when **weberep epo 650 i** appears from the next packer.
- Close the same packer with its nipple and inject it with **weberep epo 650/660 i**. Continue working the same until all the sealed packers are injected.
- Remove capping by scrapping and grinding.

Repair using a replacement mortar

- Remove concrete until reaching the bottom of the crack, at least 1 cm from each side of the crack.
- Cracks up to 5 cm deep can be repaired using thixotropic mortars **weberep 331 TX**.

Solution B: Repair of superficial cracks

Recommended products

weberep 360 FFR

- Widen the crack using a thin cutting saw
- Remove dust by air blowing and dampen crack with water before application
- Using a trowel, apply **weberep 360 FFR** to the surface until a smooth and velvet-like finish is obtained.
- Continue spreading until a smooth finish is obtained.

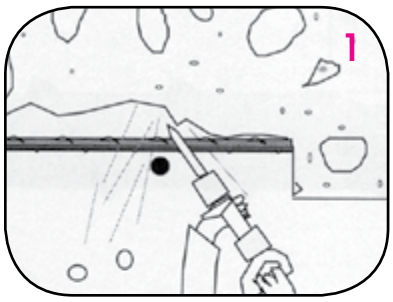
Case 2

Repair of damage with exposed steel reinforcement

Surface preparation

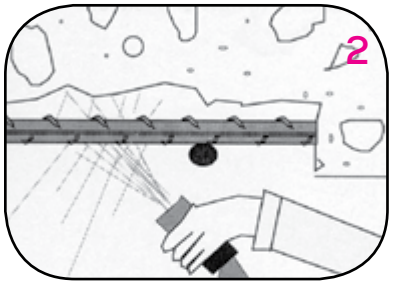
Before undertaking any concrete repair, care should be taken to fix props and supports around the location to be repaired, especially in the surroundings of damaged columns and beams.

The following surface preparation is recommended:



Step 1:

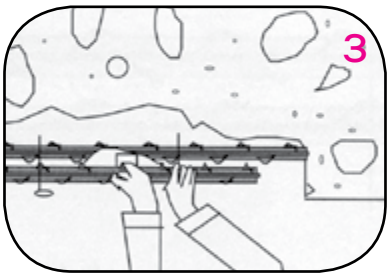
- By using a marker pen, delimit the area of damage.
- Break beyond the delimited area until reaching sound concrete and steel.
- With a jack hammer, saw-cut 2 cm deep in 90° angle the perimeter of breaking, in order to avoid feather edges.
- All weak, damaged and easily removable concrete should be chipped away. If the re-bars are only partially exposed after all unsound concrete is removed, it may not be necessary to remove additional concrete to expose the full circumference of the reinforcement. When the exposed reinforcement steel has loose wrap, corrosion or is not well bonded to the surrounding concrete, the concrete removal should continue until a clear space of 15 to 25 mm is created behind the reinforcing steel.



Step 2:

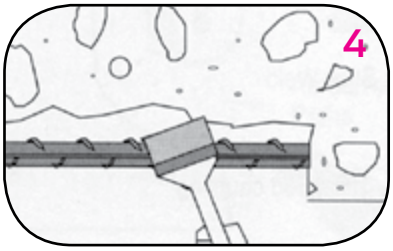
- Clean steel reinforcement with mechanical wire-brushing or by sand blasting.

- In case the reinforcing bars are corroded and have lost more than 25% of their diameter, they have to be cut and removed.



Step 3:

- In such event, removed steel bars should be replaced with new steel bars of the same diameter either by respecting the overlap length or by welding 100 mm length to the existing steel



Step 4:

- Remove dust by air blowing and wash with clean water to achieve a Surface Saturated Dry (SSD) substrate.

Solution 2

Repair of damage with exposed steel reinforcement

Protection of steel reinforcement against corrosion

After all necessary preparation, steel reinforcement should be protected against corrosion with a highly alkaline product **weberep 370 PF** or a zinc rich product that delays the aggressive elements attack on steel, like **weberep 501 ZRP.**

Repair mortar application

Recommended products

Steel protection *Filling mortar*

weberep 370 PF **weberep 501 ZRP** **weberep 331 TX** **weberep 331 HCS**

weberep 331 TX is a thixotropic, non-shrink repair mortar, fiber reinforced and polymer modified. The powder is mixed with the proper amount of clean water using an appropriate electrical mixer until a homogeneous paste is obtained.

weberep 331 TX can be applied for thickness up to 5 cm in one coat. For repairs of higher thickness, refer to the case of reinforced concrete jacketing.

For higher compressive strength, it is recommended to use **weberep 331 HCS** instead of **weberep 331 TX**. Proper curing should be performed.

for smooth finish repairs , **weberep 332 FR** is recommended up to 2 cm thickness.

After its initial setting, the repair product should be cured by applying high efficiency curing compound **weberad cure WT** or **weberad cure Y40**.

Case 3
Superficial and cosmetic repairs

Surface preparation

Shallow damages in old concrete may occur by contamination. As previously mentioned in the Concrete Diagnosis, it may also occur due to accidental impacts, abrasion, erosion or freeze / thaw cycles.

In the freshly casted concrete, superficial damage are revealed as honeycombs with exposed aggregates, pinholes or surface imperfections.
In case of honeycombs, imperfections are chiseled until sound concrete is reached. Then, the surface should be cleaned from dirt, dust, paint and laitance by grinding or air blowing. Surface should be dampened with water to surface saturated dry prior to any repair.

In case of pinholes, surface should be dampened with water to surface saturated dry prior to cementitious repair. In case of using epoxy based products for repair, water should not be used on the surface in any circumstance. The area should be grinded in order to get rid of laitance, paint or any covering material, and then should be cleaned with an air blower.

Solution 3
Superficial and cosmetic repairs

Solution A: Pinholes and cosmetic defects

Recommended products

weberep 360 FFR

weberep 360 FFR a premixed coating composed of very fine fillers and modified polymers. When mixed with clean water, using an electrical mixer, it turns into a smooth paste. Applied to surface with a trowel, it provides a smooth and velvet-like finish that adjusts superficial irregularities with a thickness up to 3 mm.

Solution B: Honeycombs

Recommended products

weberep 350 NSG

+

weberad cure WT

or

weberad cure Y 40

Honeycombs are formed when the concrete aggregates are exposed (but no exposed steel) with a thickness up to 10 mm. In case of defects exceeding 20 mm; it is considered as a case of deep damage repair.
Use **weberep 350 NSG**, a polymer modified non-shrink mortar to be mixed with the proper amount of clean water (according to TDS) until a homogeneous paste is obtained.
Then apply by pressing with a trowel until cavities are fully filled. In case a compressive strength between 30 MPa and 50 MPa is requested, it is recommended to use **weberep 332 FR** instead.
After its final setting, the repair product should be cured, either in the traditional way or by applying **weberad cure WT** or **weberad cure Y 40**.

Case 4

Epoxy surface lining and repairs

Surface preparation

The surface preparation of horizontal elements aims to eliminate all defections and assure horizontality of the slab or element.

The surface should be grinded to put out the slab level; and then cleaned from dust, grease or any other material that could prevent the adhesion of the repair product. Where the element has a small differentiation in leveling, grinding would be enough for the leveling. In case of bigger slope difference, it is recommended to use a scarifying machine before grinding the surface.

Solution 4
Epoxy surface lining and repairs

Recommended products

Patching and lining

weberep epo 412 CRY

or

weberep epo 440 LR

+

Thick repairs

weberep epo 420 SC

or

weberep epo 410

Solution A: Patching and lining

The case of patching and lining often happens with concrete floors in parking area or in any public and industrial areas designed to receive coatings or thin flooring.
Repair of such damages should be observed as follows, depending on the repair dimensions:

- Small defects or imperfections:
  For local repairs up to 3 mm by layer, Use **weberep epo 412 CRY**, a solvent free, 2-component epoxy paste and fairing coat. To reprofile slab over the hole area, filling pinholes and honeycombs, use **weberep epo 400 RS.**

Solution B: Thick repairs

- Defects above 10 mm thickness:
  After the surface has been prepared, in the case of smooth surfaces, prime the concerned area with **weberfloor eposilplus** (primer and sealer).Allow to cure for a maximum of 24 hours before applying the mortar. Use **weberep epo 420 SC**, a solvent free 3-component epoxy based mortar capable to fill damaged patches in concrete slabs. Due to its high strength and bonding power, **weberep epo 420 SC** will resist medium to heavy load traffic.
  Mix first mechanically the 2 epoxy parts until a homogeneous mix is obtained.
  Pour slowly the 3rd part (fillers) while mixing thoroughly until reaching a thick flowable mortar.
  Apply **weberep epo 420 SC** by pouring onto the required area to patch. Level it properly with a steel float.

Concrete stair steps as well as lateral faces of expansion joints are frequently damaged, representing feather edges. Re-instating the proper shape can be achieved using **weberep epo 410**.
weberep epo 410 is a solvent free epoxy mortar composed of 3 components (2 parts epoxy and 1 part fillers) capable to repair the edges due to its high bonding and strength properties.
Mix first mechanically the 2 parts epoxy until a homogeneous mix is obtained. Pour slowly the 3rd part of filler while mixing thoroughly until reaching a thick paste.
Apply the mix with a spatula and wait for a while. Before hardening, smoothen the surface with a steel float in order to re-instate the original shape.

Case 5
Reinforced concrete jacketing

Introduction

Concrete jacketing is needed to increase bearing load capacity following a modification of the structural design or to restore structural design integrity due to a failure in structural member. This technique is used on vertical surfaces such as walls, columns and other combinations such as beam sides and bottoms.

Recommended products

webertec bond **webertec epo bond** **weberanc 405 BFX** **weberanc 505 ASF** **webertec MC1**

Solution 5
Reinforced concrete jacketing

Surface preparation

Before undertaking any enlargement, the following steps should be observed:
- Initial concrete substrate should be repaired
- All cracks should be treated.
- All weak, damaged and easily removable concrete should be chipped away
- Clean any corroded steel by abrasion or replace any damaged steels bars
- Apply **webertec bond** acrylic base adhesive or **webertec epo bond** epoxy based adhesive by brush or roll on the existing hardened concrete

Installation of reinforcement or steel bars

The material to be used for anchoring steel bars in concrete should be capable to bond the steel bar without pulling when the load is applied.

We recommend the use of **weberanc 405 BFX**. It is a pure epoxy anchoring resin supplied in one kit of 2-component cartridges linked together with one single head.
weberanc 505 ASF is the recommended product for seismic grade applications.
It is applied as follows:
- Drill hole to correct diameter and depth (Refer to data sheet).
- Clean the drilled hole thoroughly using wire-brush and remove all dust using a manual air blower.
- Inject the **weberanc 405 BFX** starting the back on the hole (discard the first 3 triggers until the mix has even color).
- Install the rebar or thread slowly with a rotating motion until resin is overflowed on the surface. Rotate again and remove any excess of **weberanc 405 BFX** immediately.

Formwork placement

Formwork is best attached directly to the concrete surface with expansion anchors or standard form ties.
All anchors should be preloaded to prevent slippage during placement.
In some applications, shoring or scaffolding can be used to support the formwork.
For slab soffits, forms should be constructed to fit tightly against existing concrete surfaces. Placement opening or chutes are required to place the material behind vertical forms.

Pumping application

The placement of material into the formed cavity depends on the geometries. Vertical surfaces start at the lowest point.
Arrange ports for pumping line attachments with spacing of 900 to 1200 mm in grid form.
Continue pumping even after material occurs from adjacent ports to expel air.
When the flow is without intrusion of air, the pump is temporarily shut off, the port closed off, and the pump line connected to the adjacent port that has seen flow. The sequence is continued until the cavity is filled.
We recommend the use of **webertec MC1.** It is a pumpable, self compacting micro concrete in one bag.

Curing and Protection

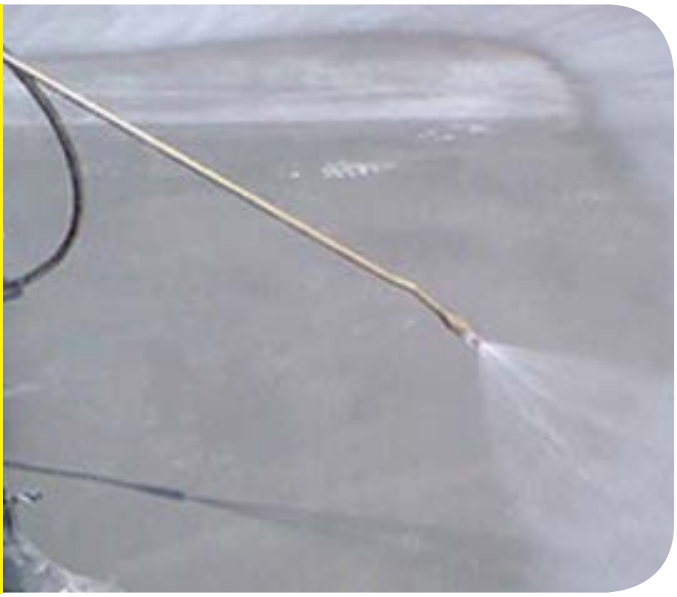
Recommended products

weberad cure WT

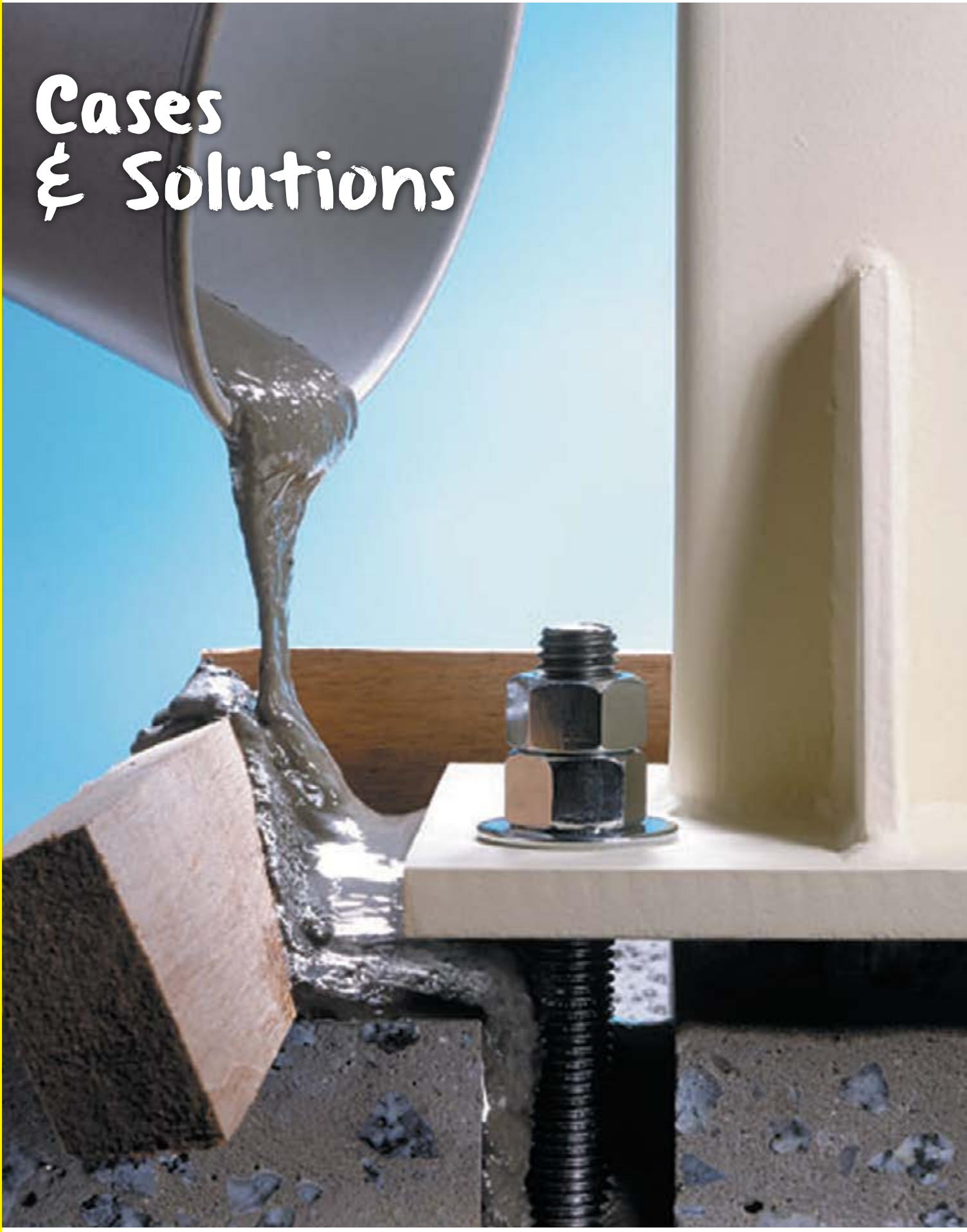
or

weberad cure Y 40

Curing is recommended immediately after removal of framework, by applying a curing compound **weberad cure WT** or **weberad cure Y40.** The repaired area should be protected with polyethylene sheet against drying due to wind or fast evaporation.



Cases & Solutions



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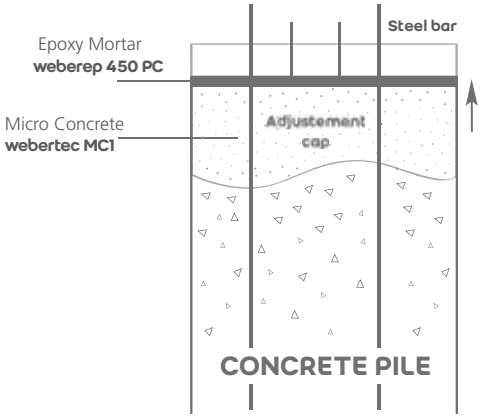
Case & Solution 1
Pile capping

This application is for repairing the pile head and to provide leveled and high strength capping, In the construction site and after finishing the piles work, the pile head exists normally with an un-even finishing and in order to continue with the construction work to the second stage and make a concrete slab, the pile head should be treated and on then add to the cap high concrete strength.



Recommended products

webertec MC1 + **webertec epo 450 PC**

The cement and epoxy base products are ideal for this application. The pile head is to be treated before applying any of concrete repair products and the following steps are to be considered:

Preparation of the surface

Remove dust, oil and any remainders by using fresh water only; all substrate must be sound and clean. All damaged and week concrete must be removed. The concrete should be at least 28 days old.

Shuttering

The shuttering should be done on all sides of the pile and within enough heights to reach the slab level required (100 -200 mm). After damping the shutter with fresh water, the pile is ready for two steps of applying concrete repair product cement base and the epoxy one as final layer.

Adjustment cap

For the cap adjustment **webertec MC1** the single component micro-concrete is to be used. Afterwards, mix the component(s) together with fresh water. The mixed products should be poured in the shattering with thickness of 50-150 mm. Flow ability characteristic of the product will enable a self-leveling action and the help with steel trowel is always recommended. The finished product is to be covered with polyethylene sheet for 24 hours before applying the second step of the system.

Final cap

For the final cap, **webertec epo 450 PC** (the three components epoxy-based product) is to be used. After mixing the three components together and in order to obtain a uniform epoxy mortar, add the graded aggregates (part C) to the epoxy fluid while mixing for 2 to 3 minutes. One full kit should be mixed and the application should be carried out in in a fast manner. The mixed product is to be poured on a dry surface in the shattering with thickness of 10 - 50 mm, on top of **webertec MC1**. The flow ability characteristic of the product will allow a self leveling action and the help with steel trowel is always recommended.
The finished product will be set within 2 – 5 hours.

Case 2

Bedding of machine plates and bridge bearings

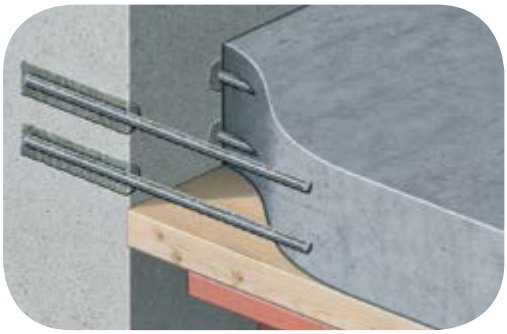
Machinery and structures which have precise tolerances for alignment or require uniform support cannot be placed directly on finished concrete surfaces, therefore grout is poured and plays the role of a load transfer material between machine or bridge bases and their foundations.

The support provided by a grout is the Effective Bearing Area. This can be affected by grout leakage, unlevelled plate, shrinkage of grout, inadequate mixing of grout, wrong placement method, poor grout flow or entrapped air voids. EBA can lead to point loading on the grout which in turn can result in cracking and crumbling of the grout under the baseplate. This could have disastrous consequences on the machine.

Bedding application problems

Voids in the grout

The support provided by a grout is the Effective Bearing Area. This can be affected by grout leakage, unlevel plate, shrinkage of grout, inadequate mixing of grout, wrong placement method, poor grout flow or entrapped air voids. It can result in cracking and crumbling of the grout under the baseplate.



Cracks in the grout around the baseplate

Cement grouts rely on expansion to provide the non-shrink properties required of a precision bearing grout. This expansion needs to be confined under the baseplate, but if allowed to expand freely, the grout may crack due to shrinkage. This cracking is often seen where a cement grout has not been finished properly. Epoxy grouts are not affected as much as they have low inherent shrinkage.

Grout not flowing under the baseplate

Rapid installation of machinery is essential. A grout with poor flow will slow down the process. Some inferior epoxy grouts are cut back with diluents to improve flow but this can lead to excess shrinkage. Weber-Sodamco grouts have been developed to give good flow without any undesirable side-effects.

Solution 2

Bedding of machine plates and bridge bearings

Recommended products

webertec 302 HF

or

webertec epo 430 GRT Plus

Substrate preparation

Thoroughly scab the foundation, clean the area between the foundation and machine base-plate, as well as the anchor holes. Build a solid leak-proof formwork. Saturate the concrete foundation with water for at least few hours prior to pouring **webertec 302 HF**. Remove all residual water. When using **webertec epo 430 GRT Plus**, make sure the substrate is dry.

Mortar preparation

The slurry or mortar is obtained by mixing **webertec 302 HF** with water. The amount of water used varies according to the workability required. Add the powder to the water and mix for 3 minutes. To ensure a homogeneous and uniform mix, an electric mixer must be used. For the preparation of **webertec epo 430 GRT Plus**, mix the resin and the hardener separately. Add the resin to the hardener then mix. Afterwards, add the filler progressively while mixing.

Product application

Pour **webertec 302 HF or webertec epo 430 GRT Plus** continuously, in one direction to avoid air pockets (by gravity, loading, pumping, and injection). The choice of installation method depends on the grouting thickness and the length of the machine. The grouting thickness must be between 3 and 6 cm for a pure mortar. When using **webertec 302 HF**, larger thickness may be filled by a micro-concrete with the addition of 3/8 aggregate. Once **webertec 302 HF** starts to set, apply on its surface:

- A curing compound.
- Or, if the configuration and the tightness of the forms allow it, pour 1 to 2 cm of cool water over the surface and leave it there until removal of form fixing.

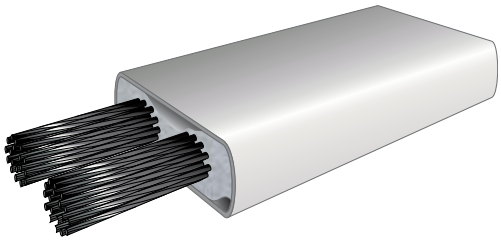
Case 3

Grouting & protection of post tensioned cables

A major concern with existing bridges and some post-tensioned floors has been quality of grout and protection of tendons. A properly grouted duct will protect tendons from corrosion by providing an alkaline environment around and between the tendons. However, such factors with the grout as poor flow, segregation, air entrapment combined with procedural problems such as maintaining pumping pressure, protection of end plates and correct choice of ducting have led to many challenges facing the industry.

Voids in ducts

The best way to ensure complete filling of the ducts and hence protection of the tendons is to use a top quality grout **webertec 303 HFG**. The favored option is to use a combined colloidal mixer and pump with a constant pressure monitoring system. This ensures a steady flow of grout with a measured quantity of water without segregation and without air entrainment.

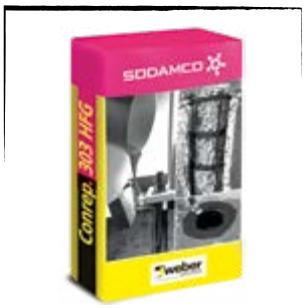


Post tensioned cables

Solution 3

Grouting & protection of post tensioned cables

Recommended products



webertec 303 HFG

webertec 303 HFG is a ready to use, free flowing, and blended cementitious powder. It requires only the addition of water in a high shear mixer, to produce a free flowing grout.
webertec 303 HFG is a high strength, highly fluid, controlled expansive grout with superior dynamic load stability. It has been designed for grouting post tension cable. **webertec 303 HFG** provides corrosion protection for highly stressed steel cables, rods and many other systems. This unique shrinkage compensating system in **webertec 303 HFG** guarantees controlled positive expansion in all directions.
The positive expansion of **webertec 303 HFG** remains constant throughout the life of the grout.

Mixing

Mix 20 kg **webertec 303 HFG** with 6 to 6.8 liters of cool potable water. Depending on the quantities to be prepared, a drill and paddle can be used for small applications or a high shear mixer and slow speed agitator for large applications, place into the mixer most but not all of the required water. Start mixer, then slowly add **webertec 303 HFG** and continue mixing after all lumps have disappeared, add remaining water. Continue to mix for a total of 3 to 5 minutes or to uniform consistency. Mix only the amount of grout that can be placed in 20 to 30 minutes.
Do not mix by hand. Ideal application temperature is between + 5°C and + 35°C. If the application temperature is higher than 35°C, make sure to use cool water to keep the mixed grout temperature below 30°C.

Injection

Place the **webertec 303 HFG** in accordance with guide specification for post-tensioning structures. Contact our technical department for more details.

Case 4

Repair of manhole covers & grids

Road ironwork such as manhole covers, road gullies and duct covers need to be bedded with a resilient mortar to prevent the unit rocking or breaking up under traffic loading. Often the reinstatement of ironwork is done within traffic possessions under temporary roadworks and the time to reinstate is a critical factor.

Constraints

The road needs to be rapidly set back to traffic, to avoid a too long traffic interruption

Ceiling of manholes should be quickly efficient, to resist to the weight of cars passing over it.
A traditional site-mixed sand/cement bedding mortar will crack and crumble under traffic loads, resulting in premature failure of the cover and frame.

The final aspect of the manhole is important and it should be integrated in the road design

Substrate preparation

Break and cut 10 cm around the manhole at a 90 degrees angle

Clean dust and other materials, remove traces of oil, grease, etc... by brush or air-blowing

Humidify the area where the mortar will be laid.
It should be wet but not waterlogged.

Solution 4
Repair of manhole covers & grids

Recommended products

weberep 314 RD

Application

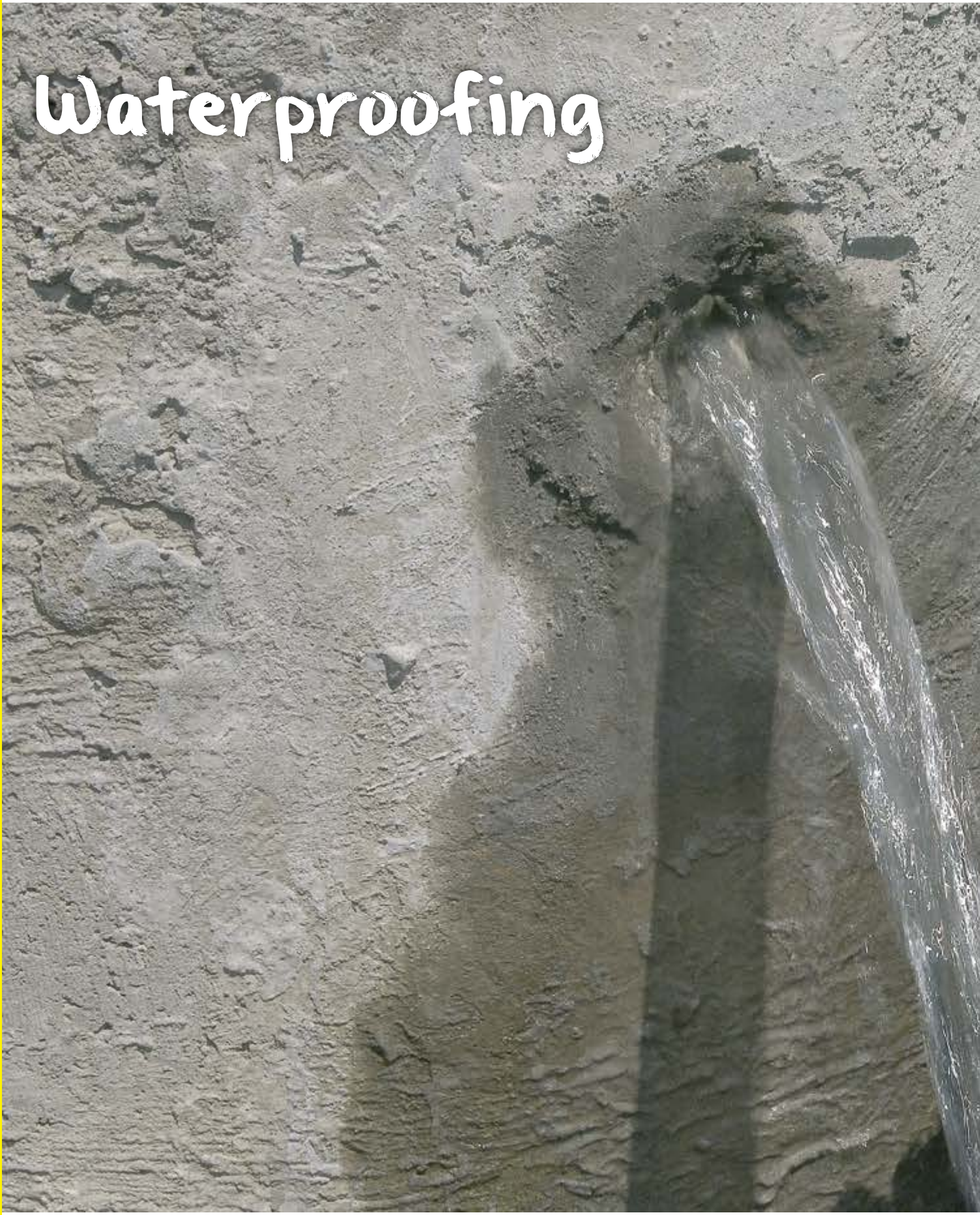
Mortar preparation
Prepare a plastic consistency mortar by mixing a 25 kg bag of **weberep 314 RD** with 4 to 5 liters of clean water. Mixing must be done for at least 3 minutes until a homogeneous paste is obtained. Do not mix it with another hydraulic binder (cement, lime or gypsum) or an admixture.

Mortar application
weberep 314 RD must be used within 10 minutes (at 30°C) from mixing. Re-mixing with an extra amount of water is not recommended.
Apply **weberep 314 RD** on the substrate. The thickness under the frame should be at least 3 cm. Ideal application temperature is between + 5°C and + 35°C. If the application temperature is higher than 35°C, make sure to use cool water to keep the mixed mortar temperature below 30°C.

Placing the frame
Place the frame and adjust it to road level (the grid/manhole should be perfectly adjusted and integrated in the road to avoid deterioration of the grid/manhole and to avoid damaging the cars when passing on it. Do not use wedges (metal, wood...)

Finishing
Fill the gap between the frame and the road with **weberep 314 RD** with a trowel. Then Finish with a float and level the mortar to road level, to have a perfect flat finish.
After Application, protect the surface during setting time (up to 1 hour) with a properly secured plastic sheet.

Waterproofing



weber
SAINT-GOBAIN

Waterproofing solutions

Surface preparation before waterproofing

Recomended products

weberep 331 TX | **weberep 332 FR** | **weberep epo 412 CRY** | **weberdry 150 BLC**

Preparation of horizontal surfaces

- Substrate should be sound, clean, and free from dirt, dust, paint and laitance.
- Loose parts should be removed while damaged parts should be repaired using a non shrink mortar like **weberep 331 TX**
- All 90° angles should be chamfered by making a 50x50 mm mortar angle fillet using a non shrink mortar like **weberep 331 TX**
- A groove of 2x2 cm should be made around all pipes and penetrations through the slab.
- Those grooves should be filled with a fast-setting expanding plugging mortar, **weberdry 150 BLC**.

Corner chamfered with **weberep 331 TX**

Preparation of vertical surfaces

- In order to be waterproofed, vertical elements should be free from dust, laitance and oil. They should also be plane, and smooth.
- Honeycombs should be repaired by chiseling in order to remove the laitance and filled with a non shrink thixotropic mortar **weberep 331 TX**
- Tie rod holes should be filled using **weberep 332 FR** for diameter < 20 mm or **weberep 331 TX** for above, and then patched using epoxy paste **weberep epo 412 CRY**
- Protruding steel bars should be cut slightly deeper than the surface and patched using epoxy paste **weberep epo 412 CRY**.
- Make groove of 2x2 cm around all pipes and penetrations through the slab.
- Fill those grooves with a fast setting expanding plugging mortar, **weberdry 150 BLC**

Products selector guide

Products selector by scope of use

Area to waterproof	Product to be used
Foundations	**Biflex PL** **Biplas PL** **weberdry SSP 50** **weberdry RBE** **weberdry 130 PR Grey/White** **weberdry 110 FX** **weberdry 370 BPU** **weberdry RBV** **weberdry crystal**
Structural leakage (needs injection)	**weberdry 600 i** **weberdry 610i** **weberep epo 650 i** **weberep 660i** **weberdry epo 660 i**
Wet areas (bathrooms, kitchens...)	**weberdry 110 FX** **weberdry 130 PR Grey/White** **weberdry 210 AFC** **weberdry 360 PU/390 PU/370 BPU**
Exposed roofs & terraces	**Biflex SL** **Biplas SL** **weberdry 350 PU** **weberdry 360 PU**
Accessible roofs & terraces	**Biflex PL** **Biplas PL** **weberdry 350 PU** **weberdry 360 PU**
Façades	**weberdry 132 WB (stones)** **weberpas deco 340** **weberstone proof** **weberdry protect**
Façades under stone cladding	**weberdry RBE** **weberdry 130 PR grey/white** **weberdry crystal**
Planted Areas	**Biflex PL anti-root** **weberdry 110 FX**

Case 1

Sealing of construction &/or expansion joints

Expansion joints and construction joints (swellbar & PVC waterstock)

Recommended products

weberdry waterstop

or

weberdry swellbar

or

weberdry swellbar RB

PVC **weberdry waterstop** are recommended to stop leakage positively through construction and expansion joints in concrete structures. They are required whenever concreting is to be made in 2 phases (between slab and slab or slab and wall or wall and wall).They are installed within the reinforcing steel before concreting. During concreting, one part is immersed in concrete while the other is kept free until the second phase of concreting takes place. They are made of flexible PVC and are available in different sizes and types.

Swellable waterstops are recommended for construction joints. They are present in two types:

weberdry swellbar is a mix of bentonite and butyl rubber, and **weberdry swellbar RB** is a swellable waterstop in pure rubber. They have the ability to expand in presence of water. The expansion process is slow in time.

It starts after 4 hours, hence enabling the concrete to set.

They are present in different sizes, depending on the degree of protection required.

Swellbar (SQ type) joint sealant are developed for use in both fresh and sea water.

Application of swellable waterstops and PVC waterstops

- Uneven wet surfaces should be even, and hardened rough surfaces should be smoothened with the appropriate grinding machine, to install the swellable waterstops.
- Use steel nails for fixing, a 25 to 30 cm interval is necessary between nails.
- PVC **weberdry waterstop** are tied to the reinforcement steel bars with steel wires through the holes in the perforations in the waterstop.
- Overlap joints in the strips should be made at least 75 mm. Butt-joined is also acceptable but has to be carefully stuck down with mastic.

Sealants for joint width smaller than 30 mm

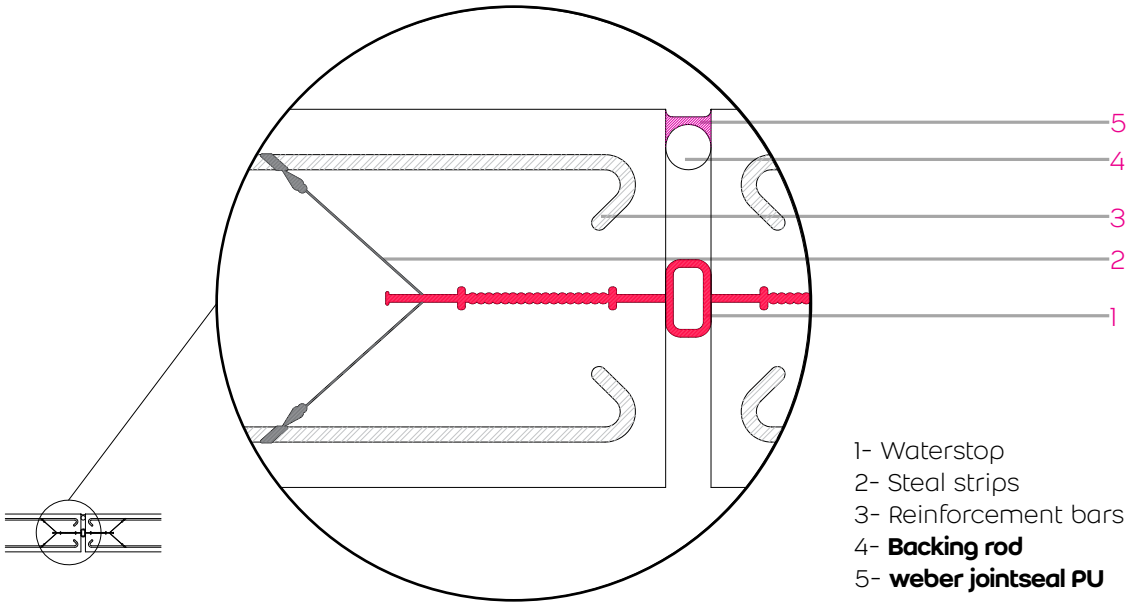
Recommended products

weber jointseal PU

weber jointseal PU is a reliable low modulus polyurethane joint sealant, allowing a high degree of elongation after stretching.
It recovers its performances and it is resistant to climatic ageing, rain, salt haze, ozone, ultra-violet rays and atmospheric corrosion.

Product application

- The edge of the joint to be treated should be free from laitance, dirt, oil and grease.
- Using a grinding disc or any abrasive tool, clean the lateral surface of the joint
- Insert inside the joint a flexible backing rod having a diameter 5 mm bigger that the joint's width.
- Place the backing rod at a depth not exceeding the joint's width.
- Insert the sealant inside the dispenser gun and start filling the prepared joint.
- While filling use a knife to press fully the sealant on the lateral surface of the joint.
- Finish the surface of filling with the bottom curvature of a spoon dipped into a soap detergent.



Sealants for joint width greater than 30 mm

Recommended products

Horizontal and vertical applications

weber seal PS 1000 GG (Gun grade)

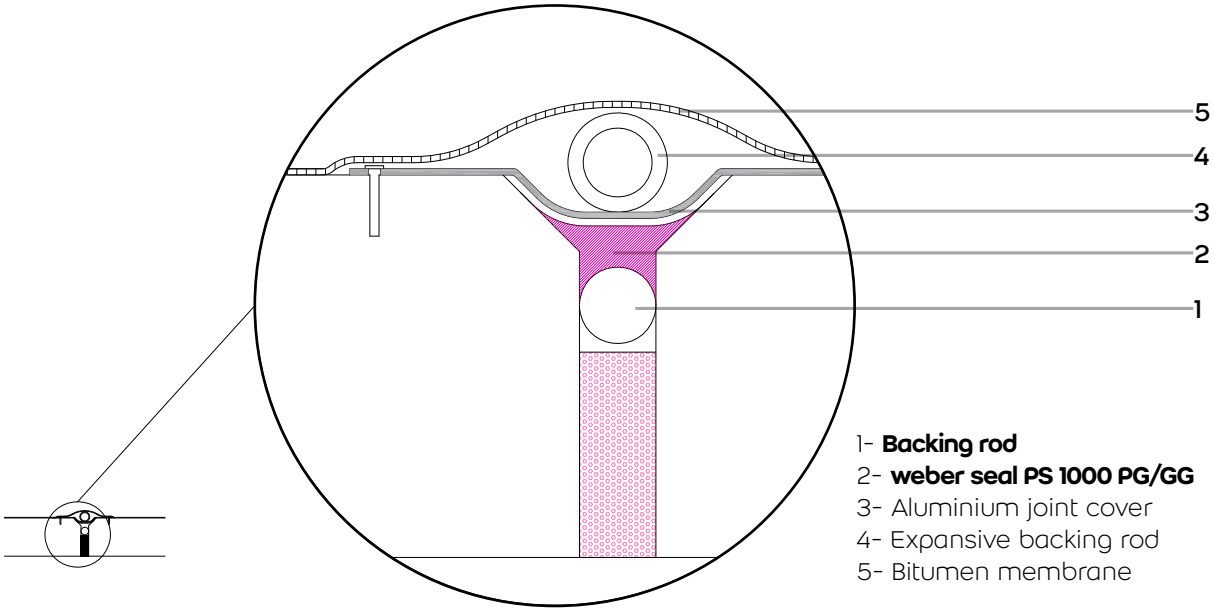
Horizontal applications

weber seal PS 1000 PG (Pouring grade)

weber seal PS 1000 GG/PG is a two part polysulphide high grade synthetic rubber sealant processing outstanding resistance. It is specially used in areas subject to heavy foot and vehicle traffic where abrasion resistant, flexible sealant is required.
weber seal PS 1000 GG/PG two part polysulphide can be supplied in pouring grade (PG) or gun grade (GG) for sealing horizontal and vertical joints.

Product application

- The edge of the joint to be treated has to be free from laitance, dirt, oil and grease.
- Using a grinding disc or any abrasive tool clean the lateral surface of the joint
- Insert inside the joint a flexible backing rod having a diameter 5 mm bigger that the joint width.
- Place the backing rod at a depth not exceeding the joint width.
- For horizontal applications, pour **weber seal PS 1000 PG** in the joint, or for **weber seal PS 1000 GG**, insert the sealant inside the dispenser gun and start filling the prepared joint. In vertical applications, it is hard to handle the pouring of **weber seal PS 1000 PG**, it is recommended to use **weber seal PS 1000 GG** for workability reasons.
- While filling, use a knife to press fully the sealant on the lateral surface of the joint. Finish the surface with the bottom curvature of a spoon dipped into a soap detergent.



1- **Backing rod**
2- **weber seal PS 1000 PG/GG**
3- Aluminium joint cover
4- Expansive backing rod
5- Bitumen membrane

Case 2
Raft foundations

Waterproofing of raft foundations

Waterproofing of immersed underground structures requires permanent dewatering during the execution phase and continues until the pressure caused by the weight of the concrete structure exceeds the hydrostatic pressure exerted by the water table.
The type of foundations designed for such structures is most of the time raft foundation with or without piles, or a combination of raft and pile caps, depending on the bearing capacity of the soil.
In such cases, the waterproofing is called tanking as it envelops completely the structure from the bottom to the water table level and preferably to the ground floor level. The waterproofing of the vertical part will start only when the full foundation raft/pile caps are casted.

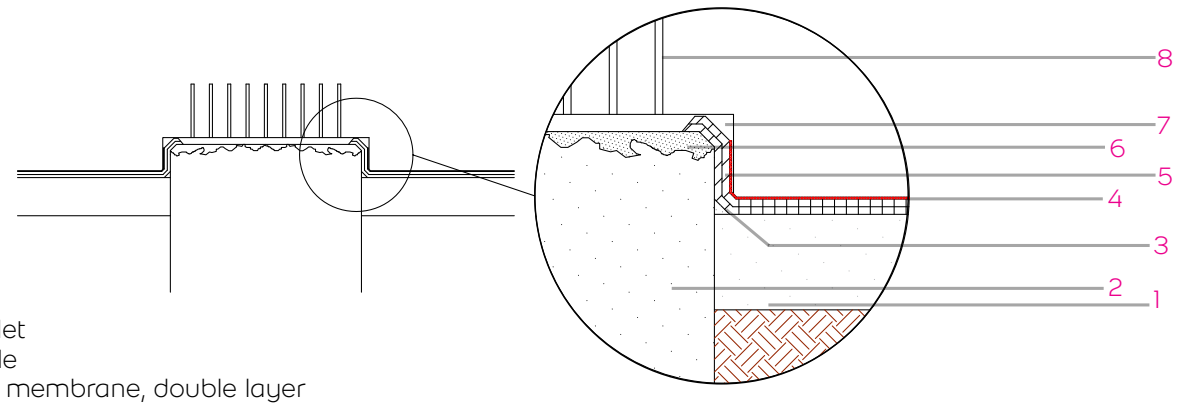
Pile head waterproofing

Recommended products

webertec 311 MC | **webertec MC1** | **weberdry prime WB** | **Biflex PL** | **webertec epo 450 PC**

Product application

The head of the pile should protrude by 20 cm higher than the blinding level.
First, repair the pile head to provide a levelled and high strength capping.
Then finish pile capping with an epoxy mortar.



1- Blinding
2- Pile
3- Angle fillet
4- Geotextile
5- Bitumen membrane, double layer
6- Concrete repair, **webertec 311 MC** or **webertec MC1**
7- Pile capping, **webertec epo 450 PC**
8- Reinforcement bars

Horizontal part of tanking under foundation

Recommended products

Biflex PL 4 mm

+

Geotextile white PET

+

weberfloor 600 SCR

or

weberfloor easy 625

Waterproofing of the horizontal area under foundation should receive 2 layers of SBS waterproofing membrane **Biflex PL** 4 mm loosely laid on the blinding and extended vertically to the full thickness of the raft and/or the pile cap, the 2 layers of SBS are protected with a **Geotextile white PET** layed on top of the double membrane.

Product application

The surface of the blinding should be dry, smooth, plane and free from any obstacle that might puncture the waterproofing membrane.

- Lay the first layer of **Biflex PL** 4 mm over the blinding.
- Torch apply only the overlaps of 10 cm and end laps of 15 cm.
- Lay the second layer of **Biflex PL** 4 mm over the first layer and fully torch it while unrolling. The second layer should stagger the first layer in such a way that the center of the second layer should coincide over the overlap of the first layer.
- Extend the 2 layers of waterproofing membranes **Biflex PL** 4 mm vertically to the full thickness of raft / pile cap and exceed by 20 cm above level in order to overlap with the vertical part of tanking behind the structural walls.

Protection

Lay horizontally one layer of **Geotextile white PET** (250 g/m²) and cast a protection screed **weberfloor 600 SCR** or **weberfloor easy 625** on horizontal parts and **Proboard** on vertical parts.

Case 3
Waterproofing of retaining walls

A- Accessible areas

In order to be able to manipulate and apply the waterproofing system on retaining walls, workers need a sufficient space. When this factor is available, the presence or absence of a water table will guide us into choosing the proper waterproofing system.

A-1 In the presence of a water table

When a water table is present in the soil, pumping is a must in order to lower the tables level under the level of the waterproofing to be executed.While execution, waterproofing is held continuously until the finishing of works.

Bituminous membrane

Recommended products

weberdry prime WB + **Biflex PL** + **Aluminium flashing** + **weber jointseal PU + Gun or weber jointseal PU MC** + **Proboard**

When the structural wall is casted and the waterproofing is applied directly on the structural wall after casting, this is called external tanking.

Product application

- As mentioned previously, substrate should be clean and repaired. After correspondent steps have been respected, the waterproofing job can begin
- Primer: Apply **weberdry prime WB** a bituminous primer coat at the rate of : 150 to 250 g/m²
- Reinforcing Corner strip: Apply at all angles using a torch, a strip of plain bituminous membrane, **Biflex PL** of 200 mm girth.
- Unroll from top to bottom the first layer of **Biflex PL 4 mm** while torching to the wall.
- Adjacent rolls should be unrolled and torched to the wall in a way to have at least 100 mm overlapping in the length direction and 150 mm in the width direction.
- Torch apply each roll by melting its bottom face and laying it on the concrete surface. Make sure that overlapped parts are fully melted and bonded.
- Seal the edge of the overlap by melting and pressing using a trowel.
- Overlap the first layer of the vertical part with the first layer extended from the horizontal part.
- Torch apply the second layer of the vertical part fully to the first layer.
  The 2 layers should be staggered in a way that the center of the second layer should coincide with

the overlap of the first layer.

- Seal the edge of the overlap by melting and pressing using a trowel.
- Overlap the second layer of the vertical part with the second layer extended from the horizontal part.

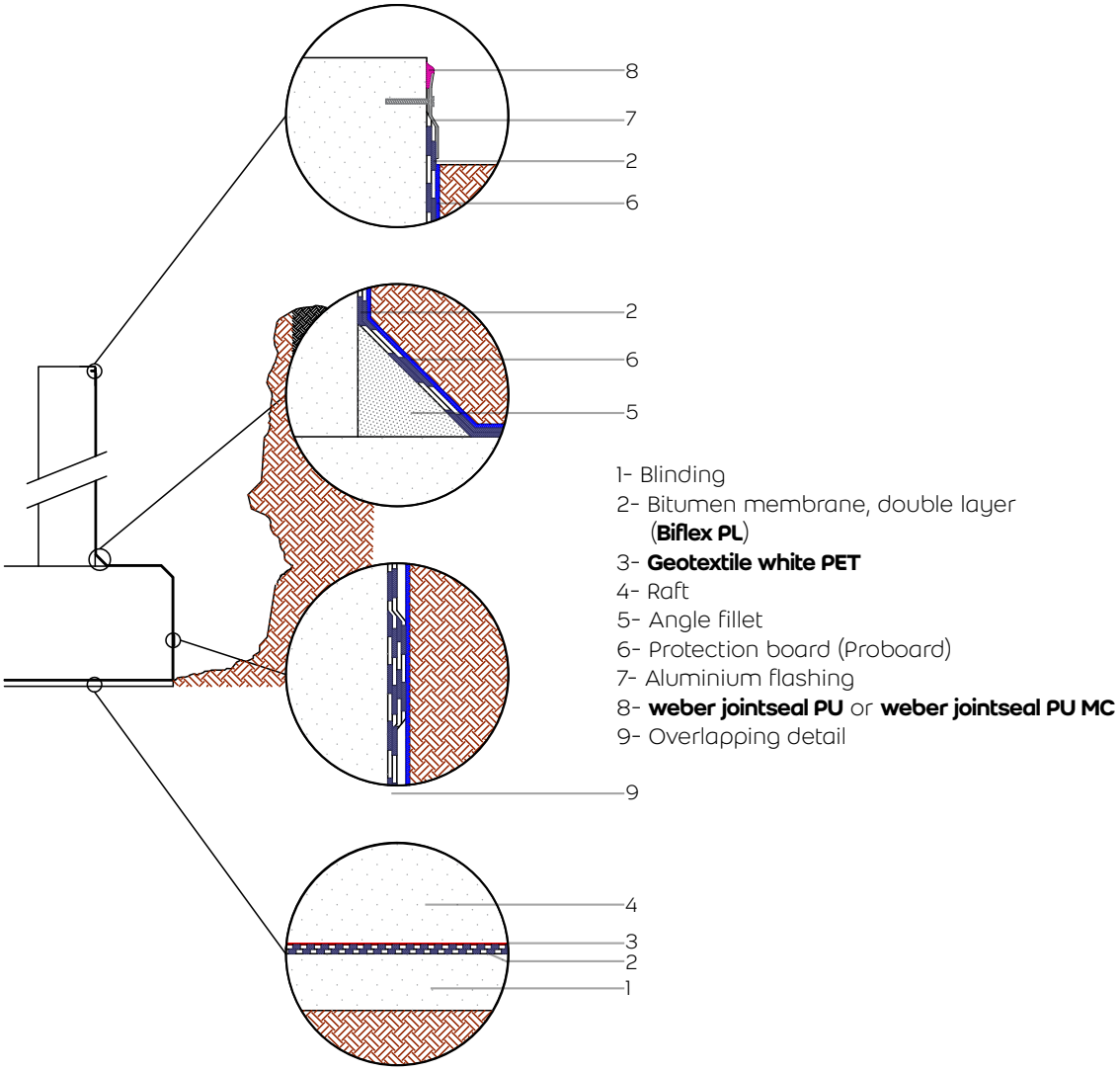
Waterproofing end detail

- Continue torching until the whole surface area is covered and the skirting is raised at least 10 cm above the final finish level.
- Fix the top of the skirting using screws and washers by the mean of an aluminum strip of 10 cm width (aluminum flashing) cut and bent to profile.
- Fill the groove provided in the aluminum flashing with polyurethane sealant "**weber jointseal PU**" or "**weber jointseal PU MC** " in order to completely seal the top of the skirting.

Protection

All vertical parts should be protected by building block-works in order to avoid damages during backfilling.

Waterproofing of accessible areas



1- Blinding
2- Bitumen membrane, double layer (**Biflex PL**)
3- **Geotextile white PET**
4- Raft
5- Angle fillet
6- Protection board (Proboard)
7- Aluminium flashing
8- **weber jointseal PU** or **weber jointseal PU MC**
9- Overlapping detail

A-2 In the absence of a water table

Moisture is always present in soils. In this case three waterproofing systems can be applied as moisture barriers, in the absence of water table.

1- Bituminous membrane (Refer to A1)

2- Polyurethane liquid membranes

Recommended products

weberep 331 TX + **weberdry prime 310 PU** + **weberdry 360 PU** + **weber jointseal PU or weber jointseal PU MC**

Surface preparation

All surfaces should be clean, dry, free from grease, oil or dust. Remove all loose material. Moisture content should not exceed 5 %. New concrete should be at least 28 days old.
All cracks and expansion joints should be sealed with **weber jointseal PU** or **weber jointseal PU MC** at least 2 days before application of **weberdry 360 PU**.

Product application

Brittle substrate must be primed with **weberdry prime 310 PU**.
On stable, sound and well prepared concrete surfaces, **weberdry 360 PU** diluted with 5 % of xylene may be used as a primer coat.
The prime coat should be left to dry for 2 to 3 hours.
Apply the first layer of **weberdry 360 PU** by roller, brush or airless spray with a film thickness of 0.5 mm. Do not apply more than 0.5 mm / layer. Equipments and tools are to be cleaned with xylene before polymerization.

3- Cementitious membrane

Recommended products

weberep 331 TX + **weberep 350 NSG** + **weberdry 110 FX**

Surface preparation

Remove dust, oil and any remaining non-adherent particules using grinders and fresh water. The substrate must be sound and clean. Honeycombs should be edged and then repaired with **weberep 350 NSG**, large holes and defections must be chiseled and repaired with **weberep 331 TX**. Cracks are treated and laped with either **weberep 331 TX** or **weberep 350 NSG** depending on their sizes.

Product preparation

Mix the two components of **weberdry 110 FX** using a mechanical mixer in order to obtain a creamy coating which is applied by brush.

Product application

Apply the first layer of **weberdry 110 FX** with sufficient thickness to plug pores, cracks and holes at 1 kg/m².
Apply second and third layers in the proportion of 0.5 to 1 kg/m².
Always allow to dry between a layer and the other. All reinforced with a 20 cm wide **fiberglass mesh** between the first and second layer.

B-Inaccessible areas

In some cases, areas behind retaining walls are inaccessible what makes it impossible to apply the waterproofing system on the retaining wall, rather apply it on the vertical surface of the excavation, after it has been shotcreted.

Bituminous membrane on anchored shotcrete

Recommended products

weberdry prime WB +

Biflex PL +

Aluminium flashing +

weber jointseal PU + Gun or weber jointseal PU MC +

Proboard

When the space between excavation and structural wall is too narrow and the waterproofing is applied on the excavation side before casting the structural wall, this is called internal tanking.

Surface preparation

Recommended products

weberep 331 TX +

weberep epo 412 CRY +

weberdry 150 BLC

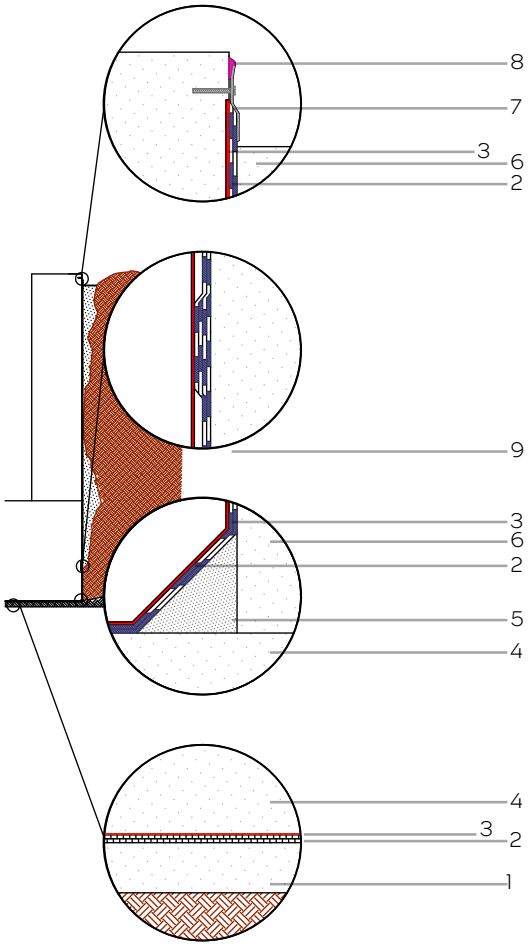
Excavation walls on which waterproofing membrane is to be applied should be stable, solid and plane surface.
Stability is insured either vertically before excavation, by anchoring piles/secant piles/diaphragm wall or horizontally during the excavation phases by casting temporary beams anchored inside the soil with inclined postensioning cables.
Solid and plane surface is obtained by shotcreting the whole vertical surface or by building straight blockworks.

The following preparation should be observed:
- Voids or Honeycombs should be filled using non shrink mortar **weberep 331 TX**
- Protruding anchors should be cut and filled with epoxy mortar **weberep epo 412 CRy**
- Source of water leakage should be stopped by plugging instant setting mortar **weberdry 150 BLC**

Product application

- Prepare the surface as mentioned in surface preparation.
- Primer: Apply **weberdry prime WB**, a bituminous primer coat at the rate of 150 to 250 g/m²
- Reinforcing Corner strip: Apply at all angles using a torch, a strip of plain bituminous membrane, **Biflex PL** of 200 mm girth.
- Unroll from top to bottom the first layer of **Biflex PL** 4 mm while torching to the wall.
- Adjacent rolls should be unrolled and torched to the wall in a way to have at least 100 mm overlapping in the length direction and 150 mm in the width direction.
- Torch apply each roll by melting its bottom face and laying it on the concrete surface. Make sure that overlapped parts are fully melted and bonded.
- Seal the edge of the overlap by melting and pressing using a trowel.
- Overlap the first layer of the vertical part with the first layer extended from the horizontal part.
- Torch apply the second layer of the vertical part fully to the first layer. The 2 layers should be staggered in a way that the center of the second layer should coincide with the overlap of the first layer.
- Seal the edge of the overlap by melting and pressing using a trowel.
- Overlap the second layer of the vertical part with the second layer extended from the horizontal part.
- Extend the 2 layers of waterproofing membranes by 20 cm above the finished level.

Waterproofing of inaccessible areas



1- Blinding
2- Primer
weberdry prime WB
Bitumen membrane, double layer
(**Biflex PL**)
3- **Geotextile white PET**
4- Raft
5- Angle fillet
6- Shotcrete
7- Aluminium flashing
8- **weber jointseal PU** or **weber jointseal PU MC**
9- Overlapping detail

Case 3
Negative side waterproofing

Cracked structures

Recommended products

weberdry 600 i + **weberep 610 i**

For instant leakage stopping, a PU injection foam is recommended.
weberdry 610 i is a low viscosity water reactive polyurethane injection composed of a resin component and a catalyst. To stop leakage and form a permanent elastic membrane, inject **weberdry 600 i** , a flexible water sealing 2 component polyurethane resin that reacts with water to form a hydrophobic seal.
weberdry 600 i reacts in wet or dry cracks and joints. When **weberdry 600 i** comes in contact with water, it reacts into a flexible seal.

Product application

Drill a hole in the concrete at 45 degree angle in order to intersect the crack or the leaking construction joint.

- Place the bore packer inside the hole and tighten firmly in order to prevent the resin from escaping. The distance between each packer should not be more than the thickness of the structural member. The injection bore packer is designed with non-return valve in order to prevent resin from escaping during injection.
- Injection bore packers should be placed and distant equally.
- The injection requires the use of an injection device.
  Mix the 2 components of **weberdry 610 i** and place in the container reserved in the injection machine.
- Place the nozzle of injection hose inside the bore packer nipple.
- Start injection and continue while the **weberdry 610 i** is transformed into foam.
- Stop injection when the pressure gauge reaches 75% of its highest value.
- Remove the injection hose and shift to next bore packer and restart injecting **weberdry 610 i**.
- When all the bore packers are injected, repeat the same process using **weberdry 600 i**.

Stuctures exposed to negative hydrostatic pressure

Recommended products

weberdry crystal + **weberdry 150 BLC** + **weberep 331 TX**

Surface preparation

- Surfaces to be treated must be thoroughly inspected. The concrete surface must be cleaned and free from oil, grease, paint, loose dust, mud and laitance.
  Horizontal surfaces should not have curing agents or hardeners applied prior to the application of **weberdry crystal**.
- Honeycombs should be hacked off to expose the concrete. All dripping and loose particles should be removed, clean surface with water before repairing.
- Ensure all concrete surfaces are hosed down with water as moistures must be present in the capillaires prior to the application of **weberdry crystal**. New concrete must be at least 3 days old before it should be treated.
- Do an angle fillet of 25 mm x 25 mm at all junctions between slabs and walls with **weberep 331 TX**, after making a V groove on all these junctions.
- If surfaces are too smooth, the concrete should be acid etched lightly sandblasted or waterblasted.
- In case of water leakage, an injection is performed through the leaking craks or plugging mortar into leaking holes.

Product preparation

Mix each 25 kg of **weberdry crystal** with approx 7.5 liters of cool water and stir thoroughly for at least 3 minutes into a flowable thick consistant slurry. The mixture should be used within half an hour, after which time it will start to thicken. Never add extra water to restore workability.

Product application

- After insuring that the surface is moist without being visibly wet, apply **weberdry crystal** using a brush or broom with fine bristles.
- 2 coats at 0.5 kg/m² per coat are normally required. The coats are installed in 2 passes.
- When the first applied coat is in tacking condition, the second coat is applied with a counter cross application to the first.
- Hose down the entire surface of the treated area twice a day for at least one day.
- Protect it from sunlight, frost, wind and rain for 5 to 7 days.

Case 4
Waterproofing of wet areas

Depending on the area of use and the level of flexibility required Weber-Sodamco recommends 3 different waterproofing systems:

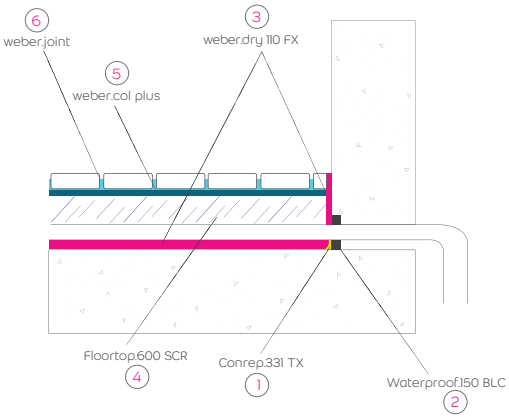
A-Flexible cementitious waterproofing

Recommended products

weberdry 110 FX

weberdry 110 FX is a 2-component flexible cement based waterproofing composed of one bag of powder and one pail of polymer liquid. Once applied and fully dry, **weberdry 110 FX** can receive directly the tile adhesive for fixing tiles.

- Prepare the surface as mentioned in surface preparation
- Mix the 2 components of **weberdry 110 FX** thoroughly until a homogenous mix is obtained.
- Let is rest for 2 minutes and apply by roller or paint brush the first coat by starting around angles and pipes penetrations.
- Reinforce those angles and pipe penetrations with fiberglass laid on the wet applied coat.
- Allow to dry and apply a second coat by roller or paint brush making sure to cover the entire area.



Cementitious waterproofing

B-Acrylic waterproofing

Recommended products

weberdry gum

+

weber band

weberdry gum is a ready to use acrylic base yellow-colored paste that turns into a durable.
weberdry gum is designed for under tile use in demanding internal & external waterproofing applications that do not experience water pressures.
Properly applied, cures to form a durable, elastic seamless, and odorless membrane that will not re-emulsify once it has fully cured even if continually immersed in water. It has a good resistance to

alkalis, salt solutions & diluted acids, non hazardous composition with excellent strength & flexible characteristics.

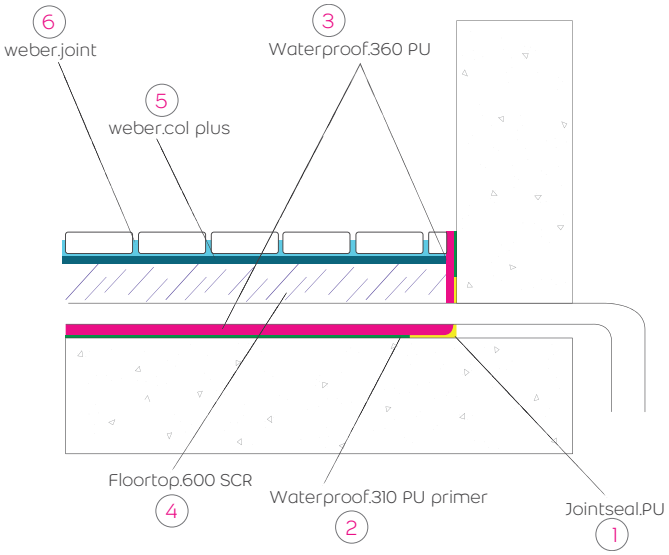
- Mix thoroughly the content of the pail until an homogenous yellow liquid is obtained.
- Apply the first coat by roller, starting around the corners and pipes penetration.
- While the first coat is still tacky, apply strips of weber band around corners and pipes penetrations.
- Once the first coat is cured, apply the second coat to cover the entire area.

C-Polyurethane waterproofing

Recommended products

weberdry prime 310 PU **weberdry 360 PU or weberdry 390 PU**

weberdry 360 PU is a one component, liquid applied waterproofing that turns into a seamless membrane once cured.
When applied, **weberdry 360 PU** creates a continuous watertight seal.
It has excellent adhesion to almost any surface: concrete, metal, bitumen membranes, acrylic paints.
It keeps outstanding performances for a very long period. **weberdry 360 PU** maintains its properties with a service temperature from -30°C to +90°C.
weberdry 390 PU is a black one component liquid applied waterproofing that turns into a seamless membrane once cured.
weberdry 390 PU remains highly and permanently elastic, used for long lasting waterproofing.



Polyurethane waterproofing

Case 5
Waterproofing of exposed roofs

Recommended products

weberdry prime WB + **Biflex SL** or **Biplas SL** + **Aluminium flashing** + **weber jointseal PU + Gun or weber jointseal PU - MC**

As mentioned previously, the substrate should be clean and repaired. After correspondent steps have been respected, the waterproofing job can begin.

1- Waterproofing with bituminous sheet membranes

Biflex SL is a SBS modified bituminous membrane, torch applied, recommended for use in regions where temperatures might drop below +5°C.
Biplas SL is an APP bituminous membrane, torch applied, recommended for use in hot to moderate regions. They are reinforced with 180 g/m² of polyester and have their surface slated with mineral aggregates. They are supplied in rolls of 10 m length and 1 m width.

Care should be taken for the stacking of materials on the roof. The rolls should be dispersed uniformly. They should be stored standing up. Any horizontal stacking of bituminous membranes on top of each other, might damage the materials, especially under sun heat.

Product application

- Prepare the surface as mentioned in the "surface preparation" paragraph.
- Primer: Apply **weberdry prime WB**, a bituminous primer coat at the rate of 150 to 250 g/m²
- Reinforcing Corner strip: Apply at all angles, using a torch, a strip of plain bituminous membrane, **Biflex PL** or **Biplas PL** of 200 mm girth.
- Horizontal membrane (**Biflex SL** or **Biplas SL**): Unroll the first roll at the lowest area starting from the drain location.
- The second roll as well as the following ones should be unrolled in a way to have at least 100 mm overlapping in the length direction and 150 mm in the width direction.
- Torch apply each roll by melting its bottom face and laying it on the concrete surface. Make sure that overlapped parts are fully melted and bonded.
- Seal the edge of the overlap by melting and pressing using a trowel.
- Continue torching until the whole surface area is covered and the skirting is raised at least 10 cm above the final finish level.
- Fix the top of the skirting using screws and washers by the mean of an aluminum strip of 10 cm width (Aluminum flashing) cut and bent to profile.

*N.B. In case of double bituminous membrane waterproofing system the first layer should be **Biplas PL** or **Biflex PL**.*

- Fill the groove provided in the aluminum flashing with a polyurethane sealant, **weber jointseal PU**, or **weber jointseal PU - MC** in order to completely seal the top of the skirting.

N.B. For enhanced protection, 2 layers of waterproofing membranes are recommended: ***Biplas PL*** *or* ***Biflex PL*** *as first layer topped with* ***Biplas SL*** *or* ***Biflex SL*** *for exposed roofs. Make sure that the middle of the 2nd layer will come on top of the first layer's overlapping.*

2- Waterproofing with polyurethane liquid membranes

Recommended products

weberdry prime 310 PU **weberdry 350 PU**

weberdry 350 PU are 1-component liquid applied liquid membranes made of polyurethane, specially designed for UV resistance. Once cured, they form a flexible, resilient and seamless waterproofing membrane.
They maintain their properties with a service temperature from -40°C to +90°C.

Product application

- Prepare the surface as mentioned in surface preparation.
- Apply one coat of primer **weberdry prime 310 PU** before application of **weberdry 350 PU**.
- Application of **weberdry 350 PU**
- Mix thoroughly the content of the pail before starting application.
- Apply by roller a strip of 10 cm wide over all cracks and corners.
- While it is still tacky un-roll 10 cm wide fiberglass over the wet strip.
- Apply the first coat by roller or appropriate airless spraying gun over the entire horizontal area at the rate of 1 kg/m².
- Once the first layer is dry and not later than 24 hours, apply a second coat at the rate of 1 kg/m²
- Extend the application over the skirting by 10 cm above the finished level.

Case 6

Waterproofing of accessible roofs & terraces

1-a Waterproofing with bituminous sheet membranes

Recommended products

weberdry prime WB | **Biflex PL** | **Biplas PL** | **Aluminium flashing** | **weber jointseal PU + Gun**

Biflex PL is a SBS modified bituminous membrane, torch applied, recommended for use in cold regions where temperatures might drop below 5°C
Biplas PL is an APP bituminous membrane, torch applied, recommended for use in hot to moderate regions. They are reinforced with 180 g/m² of polyester and have a plane surface.
They are supplied in rolls of 10 m length and 1 m width.

Care should be taken for the stacking of materials on the roof. The rolls should be dispersed uniformly. They should be stored standing up. Any horizontal stacking of bituminous membranes on top of each anothers, might damage the materials, especially under sun heat.

Product application

- Prepare the surface as mentioned in surface preparation.
- Primer: Apply **weberdry prime WB**, a bituminous primer coat at the rate of: 150 to 250 g/m²
- Reinforcing Corner strip: Apply at all angles, using a torch, a strip of plain bituminous membrane, **Biflex PL** or **Biplas PL** of 200 mm girth.
- Horizontal membrane **(Biflex PL** or **Biplas PL**): Unroll the first roll at the lowest area starting from the drain location.
- The second roll and the following ones should be unrolled in a way to have at least 100 mm overlapping in the length direction and 150 mm in the width direction.
- Torch apply each roll by melting its bottom face and laying it on the concrete surface. Make sure that overlapped parts are fully melted and bonded.
- Seal the edge of the overlap by melting and pressing using a trowel.
- Continue torching until the whole surface area is covered and the skirting is raised at least 10 cm above the final finish level.
- Fix the top of the skirting using screws and washers by the mean of an Aluminum strip of 10 cm width (aluminum flashing) cut and bent to profile.
- Fill the groove provided in the aluminum flashing with Polyurethane sealant "**weber jointseal PU**" in order to completely seal the top of the skirting.
- Protection:
  - Second layer of bituminous membrane should be slated
  - Or lay **Geotextile white PET** above which you will spread a gravel bed of minimum 5 cm.

*N.B. For enhanced protection, 2 layers of **Biflex PL** or 2 layers of **Biplas PL** are recommended. Make sure that the middle of the 2nd layer will come on top of the first layer's overlapping.*

1-b Waterproofing with polyurethane liquid membranes

Recommended products

weberdry prime 310 PU **weberdry 360 PU**

weberdry 360 PU is a 1-component liquid applied liquid membrane made of polyurethane specially designed for waterproofing of roofs which will be protected with tiles or screed. Once cured, it forms a flexible, resilient and seamless waterproofing membrane.
They maintain their properties with service temperature from -30°C to + 90°C.

Product application

- Prepare the surface as mentioned in surface preparation and prime with **weberdry prime 310 PU**.
- Mix thoroughly the content of the pail of **weberdry 360 PU** before starting application.
- Apply by roller a strip of 10 cm wide over all cracks and corners.
- While it is still tacky un-roll 10 cm wide fiberglass over the wet strip.
- Apply the first coat by roller or appropriate airless spraying gun over the entire horizontal area at the rate of 1.0 kg/m².
- Once the first layer is dry and not later than 24 hours, apply a second coat at the rate of 1 kg/m². Extend the application over the skirting by 10 cm above the finished level.

2- Protection

2-a Soft protection

Recommended products

Geotextile white PET

+

Gravel 5 cm

A protection is called soft when gravels or pebbles are spread over the horizontal waterproofing membranes to an average thickness of 5 cm. (to be applied only for rooftops lower than 15 m height) An underlay of **Geotextile white PET** should precede the spreading of gravels in order to avoid puncturing of the waterproofing membranes placed underneath and separate it from the gravels / ballast.

2-b Hard protection

Recommended products

webercol floor

+

weber jointseal PU + Gun

or

weber jointseal PU MC

+

Fiberglass mesh

A protection is called hard when the waterproofing membrane is covered with tiles. There are two ways to proceed with hard protection:

- Loosely laid tiles are concrete tiles of sizes around 40x40 cm and 3 to 4 cm thick. They are laid loose over the soft protection described above.
- Mortar laid tiles are tiles laid over a bed of cement mortar like **webercol floor** (Carromortar) range, eliminating the gravels described in the soft protection while keeping the geotextile as separation and protection layer.
- Expansion joint of 2 cm wide should be provided in bays of 3x3 m and filled with **weber jointseal PU** or **weber jointseal PU MC**.

N.B. In case of hard protection it is recommended to replace the Primer of the horizontal area with a separation layer made of Fiberglass mesh. Hence, torching of membrane will occur only over the overlaps in order to provide a fully independent system.

2-c Thermally insulated roofs and terraces (Inverted roofing system)

Recommended products

Geotextile white PET

+

XPS board

In case of thermal insulation is required, use extruded polystyrene (XPS) of thickness depending on the amount of thermal conduction (U-value) designed.
In all cases the XPS boards of a density around 30 to 35 kg/m³ have to be used. They are laid and staggered over the waterproofing membrane.
An underlay of **Geotextile white PET** should precede the laying of XPS in order to play the role of separation layer.

Case 7
Waterproofing of façades

Recommended products

weberjoint perfect or weberjoint deco + **webercal stone (Stone.fix)** or **weber jointseal PU + Gun or weber jointseal PU - MC** + **Weberdry 132 WB** or **weberdry protect**

1- Natural stone façades

Joints between stones

- Mortar filled joints between natural stones should be checked. Cracked joints or loose parts should be removed and replaced with ready to use filling mortar **weberjoint perfect** or **webercal stone** of a color to architect's choice.
- All joints surrounding windows and doors should be filled with **weber jointseal PU**, or **weber jointseal PU - MC** a polyurethane sealant.
- Wash the area to receive the water repellent with a water jet to remove all dust, laitance, or any foreign materials.

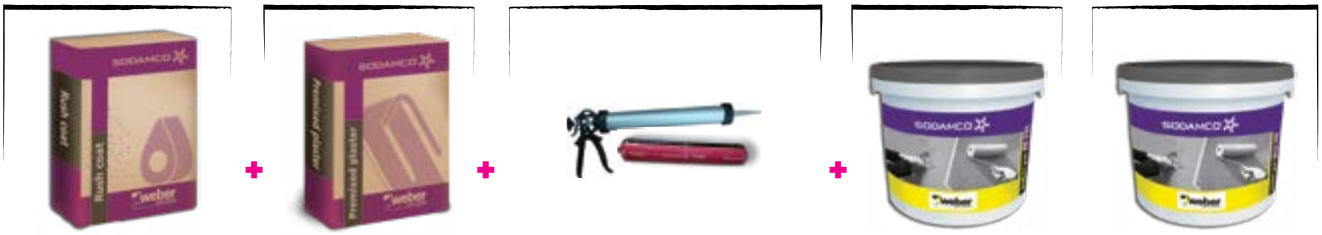
Application of a water-repellent product on the stones

weberdry 132 WB is a ready-to-use surface waterproofer made of siliconate, intended to leave a colorless, hydrophobic coat on inorganic construction materials. The product has a strong penetration into the material because of its low molecular weight.

- Allow the washed surface to dry for 2 to 3 days.
- Apply first coat of **weberdry 132 WB** or **weberdry protect** by roller on the entire area to cover, and within a limited period of time (10 to 30 min) depending on ambient temperature.
- If the first coat is fully absorbed by the pores, apply a second coat. If not, stop application.
- If the second coat is fully absorbed by the pores of the surface apply a third coat. If not stop application.
- The second and third coat must be applied before the previous layer is totally dry (wet on wet).
- Continue until the complete surface has absorbed **weberdry 132 WB** or **weberdry protect**. Do not overcoat.

N.B. Substrate should be put through all necessary tests, substrate should be porous, not treated or manipulated with and dry while application.

Recommended products



Premixed rush coat + **Premixed plaster** + **weber jointseal PU + Gun or weber jointseal PU - MC** + **weberpas PR 339** **weberpas deco 340**

2- Plastered facades

weberpas deco 340 is a highly elastic (400% elasticity) semi-fluid acrylic paste rich in polymer resins. Applied in a thick coat, it provides a flexible waterproof coating for pitched roofs & facades, allowing the product to follow the tension / expansion cycles of the substrate.
weberpas deco 340 shows an exceptional resistance to extreme weather conditions.
weberpas deco 340 forms a protective and decorative membrane with permanent elasticity and excellent adhesion. It is non-toxic and environmentally friendly. It is supplied in 5 and 18 kg plastic pails. Different colors are available.

Surface preparation

- Make sure that the plaster on the facade is sound and free from cracks, oil or laitance.
- Scroll a metal piece (hammer or chain) over the plastered façade in order to check the presence of any blistering.
- Using a marker pen, surround the area where an hollow sound is heard.
- Break the marked area and re-plaster, using the appropriate Weber-Sodamco premixed plaster product, after application of the premix rush coat product for the correspondent substrate.
- Cracks wider than 1 mm should be cut, opened and filled with **weber jointseal PU**, or **weber jointseal PU - MC** a flexible polyurethane sealant.
- Cracks smaller than 1 mm should be reinforced with fiberglass tape.

Product application

- Prime the substrate by applying **weberpas PR 339** evenly, using a brush, roller or small broom, at least one day before application of **weberpas deco 340**.
- Stir thoroughly before and during the use of **weberpas deco 340**.
- Apply the first coat of **weberpas deco 340** using a cotton roll.
- Apply a second coat, in the same way as the first one.
- Apply third coat if necessary.
- Thinning is unnecessary, but if required to obtain desired application properties, a small amount of clean water not more than 0.5 liter/ 18 Kg pail may be added.

Case 8
Waterproofing of planted areas

Recommended products

weberdry prime WB

+

Biflex PL antiroot 4 mm

+

Geotextile white PET

+

weber jointseal PU or weber jointseal PU - MC + Gun

+

Aluminium flashing

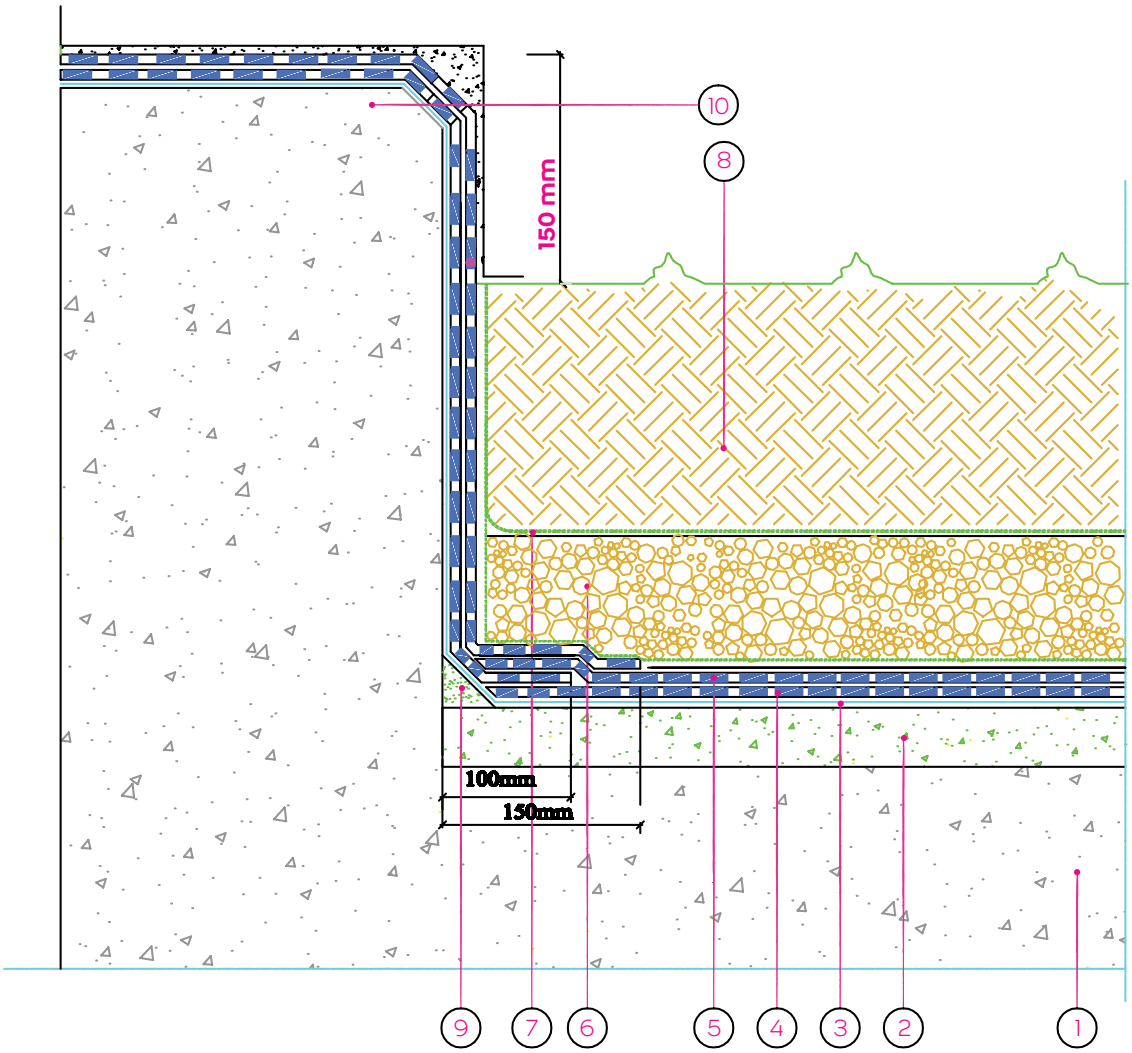
Surface preparation

As mentioned previously, substrate should be clean and repaired. After correspondent steps have been respected, the waterproofing job can begin.
Biflex PL antiroot 4 mm is a 4 mm thick, waterproofing membrane torch applied made of SBS Bitumen modified with anti-root additives. It is reinforced with 180 g/m² of non woven polyester. It is supplied by rolls of 10 m x 1 m.

Product application

- Prepare the floor and wall surfaces as mentioned in surface preparation
- Apply one coat of bituminous primer:
  weberdry prime WB, at a rate 150 to 250 grs/m².
- Fully torch the first layer of **Biflex PL antiroot** 4 mm with 100 mm side lap and 150 mm end lap.
- Fully torch the second layer with staggered joints above the first layer of **Biflex PL antiroot** 4 mm as well.
- Apply one layer of a **Geotextile white PET** of 200 to 250 grs/m².
- Lay a bed of Pebble round gravels of 100 mm thickness.
- Apply another layer of **Geotextile white PET** of 200 to 250 grs/m².
- Fix the top of the membrane skirting using screws and washers by the mean of an Aluminum strip of 10 cm width (aluminum flashing) cut and bent to profile.
- Fill the groove provided in the aluminum flashing with Polyurethane sealant "**weber jointseal PU**" in order to completely seal the top of the skirting.

Detailed waterproofing system for planted areas



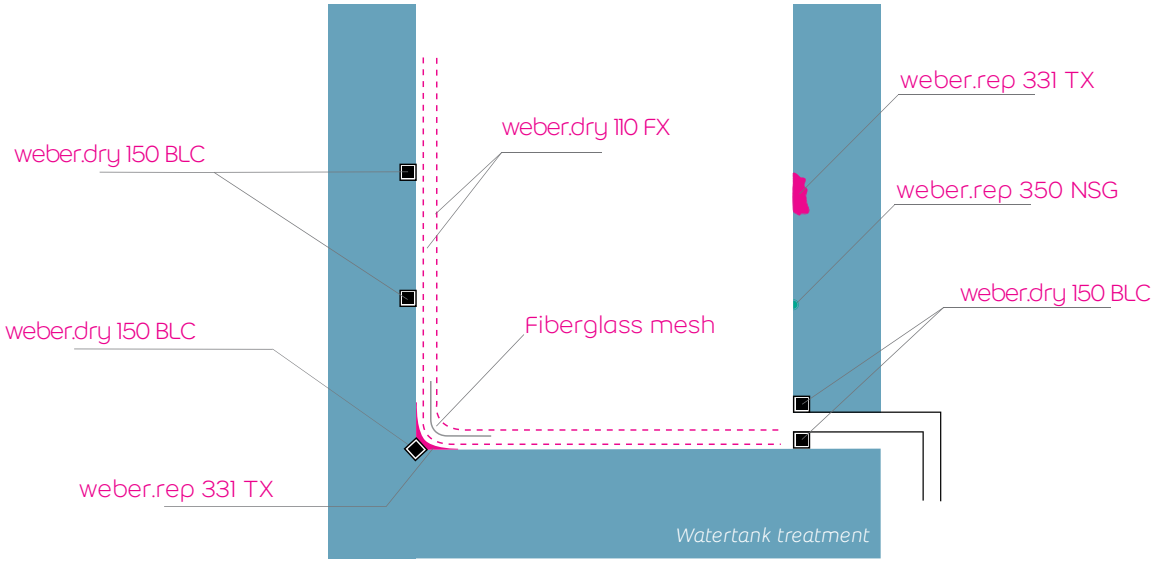
1- Concrete deck
2- Screed to slope, 100 mm average thickness
3- One coat of bituminous primer type : **weberdry prime WB** at a rate of 250-300 grs/m²
4- First layer of root-resistant waterproofing membrane self-protected with green slate granule type: **Biflex PL anti-root** 4 mm
5- Second layer of root-resistant waterproofing membrane self-protected with green slate granule type : **Biflex PL anti-root** 4 mm
6- Draining layer - gravels 25/25
7- Filter layer, non-woven **Geotextile white PET**
8- Sweet soil of 300 mm thick minimum
9- Angle filler 50 mm x 50 mm type **weberep 331 TX**
10- Concrete upstand

Case 9
Watertank treatment

Recommended products

weberep 331 TX + **weberdry 150 BLC** + **weberep 350 NSG** + **Fiberglass mesh** + **weberdry 110 FX**

This case/solution is valid for drinking and non-drinking water tanks either with new or old concrete. In both cases, a waterproofing system needs to be applied in order to protect the concrete and prevent any leakage of the contained liquid.



Surface preparation

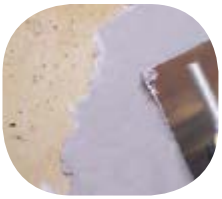
Remove dust, oil and any remaining particles using grinders and fresh water only. The substrate must be sound and clean.

Presence of holes

Mostly in new built watertanks, holes will appear caused by molding or else. Such holes must be clean and damp. Use **weberdry 150 BLC** - a fast setting plugging mortar and keep it moist for a period of 15 min. If any cracks are present, they can be treated the same way.

Honeycombing

In some new built watertanks, honeycombing may be found after concrete pouring or pumping. Honeycombing areas must be cleaned by removing all damaged concrete and existing laitance. Damp the concerned areas with water and use **weberep 350 NSG** for filling the cracks.



Big holes and damaged concrete

In the case of large holes or damaged concrete in old or new water tanks, all damaged areas must be chiseled, cleaned and damped with fresh water. **weberep 331 TX** is to be applied in one or two layers depending on the depth of holes.

Joints treatment

All joints between vertical walls and the ground must be treated by creating a groove of 2 cm depth and 2 cm width and reconstitute on the 90° corner an angle curve form in an appropriate thickness with a non-shrink thixotropic mortar like **weberep 331 TX**, at least 3 days before the application of **weberdry 110 FX**. In case it is impossible to have a curve form, open a groove of 2 x 2 cm or 3 x 3 cm, clean it and damp it with fresh water then fill it with **weberdry 150 BLC**.

Waterproofing layers

After ensuring that all the above steps have been maintained, the watertank is ready to receive the final product, **weberdry 110 FX**, a cementitious waterproofing membrane.

Apply the 1st layer of **weberdry 110 FX** with sufficient thickness (1 kg/m²) with a brush or a roller :

- Fix 20 cm width of **Fiberglass mesh** on all corners, joints and cracks while the waterproofing layer is still wet
- When dry, apply the 2nd and 3rd layer of **weberdry 110 FX** in proportion of 0.5 - 1 kg/m²
- Application should be in two to three crossed layers with a minimum thickness of 2 mm.

Case 10
Waterproofing of swimming pools

Recommended products

weberdry 150 BLC | weberep 331 TX | weberpremix fiber | weberdry 110 FX | webercol flex | weberepox easy | weberjoint perfect

Surface preparation

Remove dust, oil and any remaining particles using grinders and fresh water only. The substrate must be sound and clean.

Presence of holes

Mostly in new built watertanks, holes will appear caused by molding or else. Such holes must be clean and damp. Use **weberdry 150 BLC** - a fast setting plugging mortar and keep it moist for a period of 15 min. If any cracks are present, they can be treated the same way.

Honeycombing

In some new built watertanks, honeycombing may be found after concrete pouring or pumping. Honeycombing areas must be cleaned by removing all damaged concrete and existing laitance. Damp the concerned areas with water and use **weberep 350 NSG** for filling the cracks.

Big holes and damaged concrete

In the case of large holes or damaged concrete in old or new water tanks, all damaged areas must be chiseled, cleaned and damped with fresh water. **weberep 331 TX** is to be applied in one or two layers depending on the depth of holes.

Joints treatment

All joints between vertical walls and the ground must be treated by creating a groove of 2 cm depth and 2 cm width and reconstitute on the 90° corner an angle curve form in an appropriate thickness with a non-shrink thixotropic mortar like **weberep 331 TX**, at least 3 days before the application of **weberdry 110 FX**. In case it is impossible to have a curve form, open a groove of 2 x 2 cm or 3 x 3 cm, clean it and damp it with fresh water then fill it with **weberdry 150 BLC**.

PLASTERING

The substrate of the concrete walls must be aligned in order to have the tiles fixed therefore plastering work is to be applied after repairing work. Apply one coat of **weberpremix key coat** on thickness of 2 to 6 mm manually or by using a Tyrolienne spraying device. For a better curing, keep spraying water twice a day. After 3 days of the curing process, apply one single layer of **weberpremix fiber**. Thickness can reach 15 mm and carry additional 3 days of curing. In case more thickness is required to achieve the alignment, then

scratch the finishing coat and apply another one following the previous steps.

FLOORING SCREED

The concrete floor has to be aligned as well, by using floor screed **weberfloor 600 SCR**. Mix 50 kg of **weberfloor 600 SCR** with 5.5 liters of fresh water and pour the mixed product onto the floor and spread it with a steel trowel for a thickness up to 50 mm. Control joints in the existing substrate should be respected. For large areas, joints should be created every 25 m². Avoid fast drying in case of hot temperature or wind by regular curing process.

Waterproofing layers

After assuring that all the above steps have been maintained, the swimmig pool is ready to receive the final product in the cement waterproofing system, **weberdry 110FX** - the flexible high performance product is to be used in 3 layers:

• 1st layer with sufficient thickness 0.5kg/m²:

- Use a brush or a roller.
- Fix 20 cm width of fiber mesh on all corners, joints and cracks while the waterproofing layer is still wet.

• When dry, apply the 2nd and 3rd layer in proportions of 0.5-1 kg/m²

It is recommended that the tiling start one week from the application of **weberdry 110 FX.**When needed flood test on **weberdry 110 FX** can be carried out prior tiles fixing. Allow one week curing before flood test.

Tiling

Walls and floor of the swimming pool are ready to receive the final step of this system. The tiles are to be fixed by using **webercol flex** as follows:

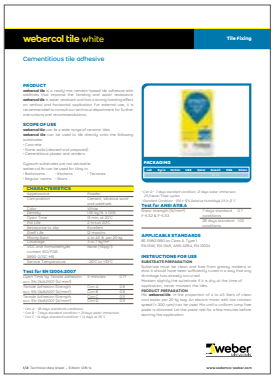
- Mix the two components of **webercol flex** by pouring the powder in the liquid progressively while stirring the liquid. An electric mixer with low rotation speed (< 300 rpm) can be used. Mix until a uniform lump free paste is obtained.
- Apply **webercol flex** evenly on the substrate. Use a notched trowel to have the required thickness. Apply the tiles on the substrate and press them firmly, while making sure that the paste does not slip from the tile sides. **webercol flex** can also be applied on the back of tiles to ensure full adhesion on the entire surface.

Grouting

After the fixation of tiles, all the area must be cleaned with fresh water and kept untouched for 24 hours in order to allow the tiling to be set, then all the tiles joints should be filled with **weberepox easy** or **weberjoint perfect**. Apply **weberepox easy** or **weberjoint perfect** with a rubber spatula into the joints by filling all the gaps. Remove surplus grout with a damp sponge. Use the product within its pot life,after mixing. When the grout is dry, clean the tiles with a dry cloth.

Useful Documents & Safety

Technical data sheets (TDS)

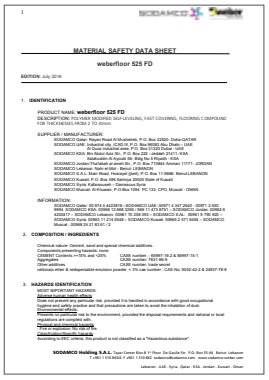

webercol tile white

Tile Fixing

Cementitious tile adhesive

- Product description
- Scope of use
- Technical characteristics
- Surface preparation
- Product preparation
- Application
- Packaging
- Storage

Material Safety Data Sheets (MSDS)


MATERIAL SAFETY DATA SHEET

weberfloor 525 FD

- Identification
- Composition
- Hazards
- First-aid measures
- Handling and storage
- Physical and chemical properties
- Ecological information

Personal Protective Equipment

It is suggested that the following list of equipment is adopted as a minimum requirement

- Protective overalls
- Good quality gloves
- Googles
- Face mask
- Safety boots
- Safety jacket

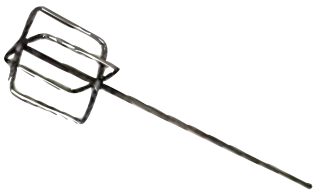
Note

- **Before use, always refer to product Technical Data Sheet and instructions written on the packaging**
- **Use only clean potable water to mix products**
- **Keep tools and equipment clean and in good condition**

Tools & Equipment

Preparation Equipment

Marker chalk or pen
Disc cutter
Brush to remove rust from steel bars
Drill
Electric/pneumatic breaker or hammer and chisel
Wire brush



Mixing Equipment

Mixing equipment
- Mixing bucket
- Measuring jug
- Mixer with low speed drill

Application Equipment

- Formwork
- Pouring equipment
- Normal gun for **weberep 435 ANC**
- Special gun for **weberanc 405 BFX**
- Pumping machine
- Injection machine + injectors
- Brush for protection reinforcement product **weberep 370 PF**
- Steel trowel
- Cleaning sponge

TILE FIXING

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