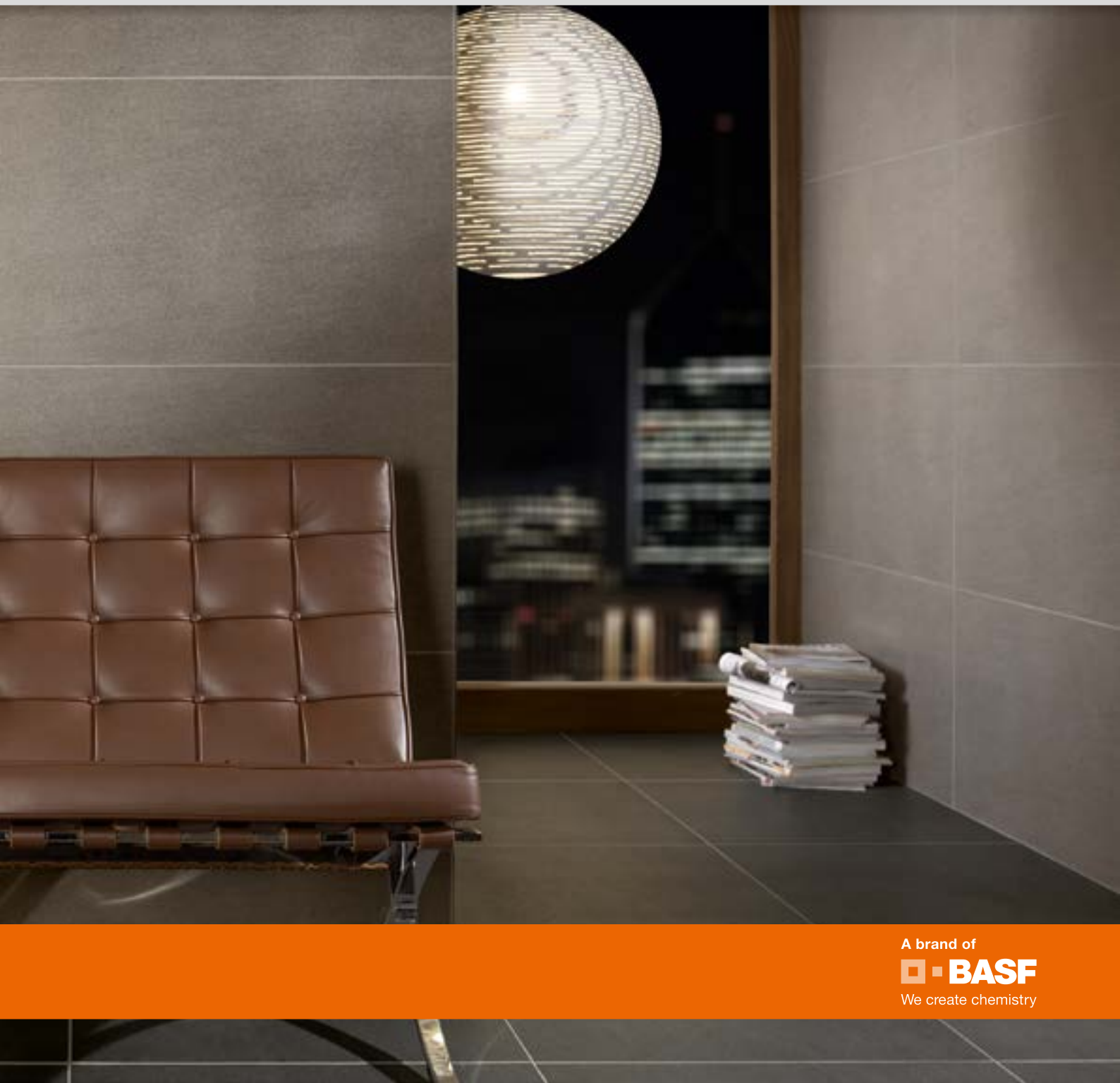
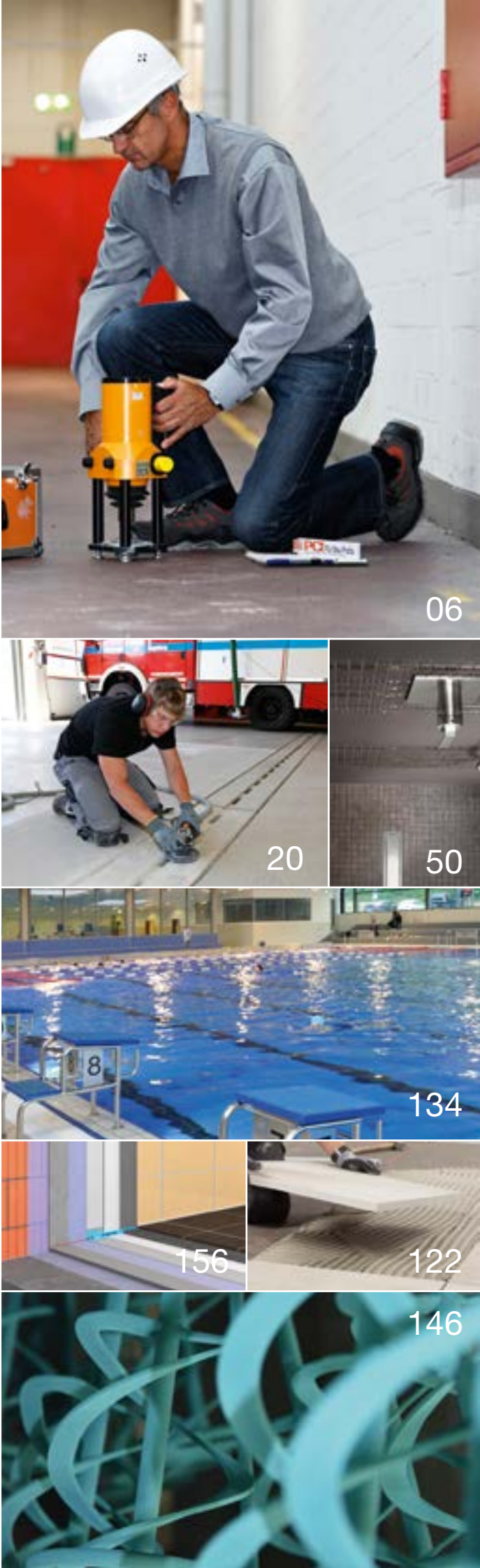


# PCI Tiling and Natural Stone Technology

Systematic product and application solutions





## You have the challenges, we have the solutions

This is our new tiling and natural stone system brochure. It provides a comprehensive overview of the wide variety of product and system solutions available for the laying of tiles and natural stones. It is also intended to help sales advisers in construction material distributors find the best solution for their customers faster and more effectively.

The brochure is also intended as a work of reference for tiling contractors in their everyday work. For this reason, we have included a number of practical tips. Our Technical Service experts explain how to deal with the special features of different substrates in practice, from inspection and preparation through to system application, with a view to obtaining the perfect substrate for tiling. They also deal intensively with the requirements of the applicable codes and standards and explain their significance and their relevance for practical work.

The standard requirements and the tasks faced in practice are the basis for our intelligent, high-performance laying systems. But what makes these systems intelligent? We have compiled the individual system components in such a way that they offer greater performance, greater laying convenience and greater value for both tiling contractors and their clients. This is the performance claim of **SmartSystemSolutions**.

To give you a better overview and to make it easier for you to find the information you need, we have divided this brochure into three main parts, “**The perfect substrate**”, “**Waterproofing and laying**” and “**Systems**”. You will also find a table of contents on the next page.

**We hope that you enjoy  
reading this brochure.**

### PCI systems

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# The perfect substrate



# Inspecting the substrate

## Inspecting the substrate

Before tiles are laid on a wall or floor, the substrate must be inspected and assessed. The surfaces should be inspected visually and, if necessary, mechanical tests should be carried out. Frequently, the absorption behaviour of the substrate needs to be modified. If water is absorbed too rapidly, the strength of the tile adhesive may be affected and the adhesion of the tiling may be impaired. The surface must be dry, sufficiently level and free from dust and grease. Any substrates which release large quantities of sand or chalk particles must be removed.

### Visual inspection

The visual inspection carried out before starting work can answer a number of different questions, for example what materials have been used on the wall and floors, whether there are different substrates or any damage or impairments. If the substrate is moist or has been laid recently, a CM measurement must be carried out.

### Scratch test

During the scratch test, scratches are made on the surface using a metal object in a grid configuration. The softer the surface, the lower is its bearing capacity and the more extensive is the substrate preparation work required (for further details, see page 20).

### Wetting test

A wetting test can be used to assess the absorption behaviour of the substrate. If water is rapidly absorbed by the surface, it is normally necessary to apply a primer in order to regulate the absorption behaviour (for further details, see page 24).

### Wiping test

Especially in the case of plaster surfaces, it is recommended to carry out a wiping test by wiping over the surface with a hand or a dry sponge. If significant quantities of material are removed by wiping, the surface will need to be consolidated (for example, using PCI Gisogrund®) or renewed (for example using PCI Pericret®).

### Hammer tap test

Large areas of the surface are tapped with a hammer. A high tone indicates a firm substrate while a “hollow” sound indicates areas with inadequate bonding (for further details, see page 17).

## Inspection obligations

Under VOB, Part C (the German standard conditions for construction contracts) the contractor is obligated to carry out an inspection to determine whether the substrate is free from defects and ready for tiling.

This test must not be based solely on sensory perceptions but must be carried out using appropriate tools. The inspection need only cover the substrate concerned and not the entire structure. The contractor is, at most, under an obligation to ask questions about possible damage to the substructure under the substrate.

## Test methods

Identification of substrate on floor and wall

Levelness in accordance with the example of DIN 18202

Readiness for tiling/residual moisture

Strength

Foreign matter

Cracks/expansion joints

### Tip:

It is best to assess the workmanship of a screed about 3 to 7 days after it has been laid. During this period, the screed should preferably be inspected jointly by the screed contractor and the tiling contractor.





# Different types of screed – identification and properties



## Cementitious screed

(CT cementitious screed in accordance with DIN EN13813)

- Reaction if acid (phosphoric acid) is applied – foaming
- Insensitive to moisture, can be used indoors and outdoors
- Section sizes 30 – 40 m<sup>2</sup>, edge lengths 6 – 8 m
- Deformation or formation of concave areas possible during drying
- Joints required at door openings, protruding corners and changes in cross-section



## Calcium sulphate screed

(CA calcium sulphate screed in accordance with DIN EN 13813)

- No reaction if acid (phosphoric acid) is applied
- Insensitive to moisture, for indoor use, not in contact with soil
- Section sizes 100 m<sup>2</sup> with underfloor heating, edge length 10 m, and 200 m<sup>2</sup> without underfloor heating
- No formation of concave areas at joints or edges
- Joints required at door openings, protruding corners and changes in cross-section



## Magnesite screed

(MA magnesite screed in accordance with DIN EN 13813)

- Very smooth, hard surface
- Glossy, often coloured surface
- Larger areas without joints, frequently in industrial facilities
- Sensitive to continuous exposure to moisture



## Synthetic resin screed

(SR synthetic resin screed in accordance with DIN EN 13813)

- Grainy structure
- Insensitive to moisture and waterproof (depending on mixing ratio), can be used indoors and outdoors
- Large areas without joints
- Very high chemical resistance
- Can withstand temperatures up to about 80 °C (can be tested using flame)
- Joints at door openings, protruding corners and changes in cross-section



## Mastic asphalt screed

(AS mastic asphalt screed in accordance with DIN EN 13813)

- Rough mineral surface with silica sand rubbed in
- Dark grey to black colour
- Thermoplastic material, can be identified by flame
- Insensitive to moisture and waterproof, for indoor and outdoor use
- Can be exposed to loads immediately after laying (following cooling)



## Heated screed

(in accordance with German standard DIN 18560)

- In most cases, screed laid on thermal insulation (hammer tap test, sounds hollow)
- Test points for humidity measurements (CM measurements) must be available
- Expansion joints required between surfaces with different types of heating and at edges



## Screed on thermal insulation

(in accordance with German standard DIN 18560)

- Hammer tap test: sounds hollow
- Uniform layer thickness
- Expansion joints at rising building components



## Screed on isolating layer

(in accordance with German standard DIN 18560)

- Hammer tap test: sounds solid
- Uniform layer thickness
- Expansion joints at rising building components



## Bonded screed

(in accordance with German standard DIN 18560)

- Hammer tap test: sounds solid
- Variable layer thickness possible
- Joints in surface only over movement joints, large sections possible
- Perimeter joints required at rising building components



## Prefabricated screed

- Slab-like screed elements
- Fibre cement slabs (insensitive to moisture)
- HR foam supporting elements (insensitive to moisture)
- Gypsum fibre board (moisture-sensitive)

## Different types of wall – identification and properties



### Concrete

- Normally tight, smooth surface
- Hard and scratchproof
- Low water absorption



### Masonry/cellular concrete

- Joints visible
- In some cases highly absorbent
- Levelling compound normally required



### Cement/lime plaster

- Normally applied rough
- Relatively absorbent
- Insensitive to moisture
- Good strength values
- Usually releases sand



### Gypsum plaster

- Bright, fine-grained surface structure
- Highly absorbent
- Sensitive to moisture
- Moderate strength
- Releases sand



### Plasterboard

- Smooth surface
- Absorbent
- Sensitive to moisture
- Visible joints between panels



### Gypsum fibreboard

- Bright, dense, strong surface
- Moderately absorbent
- Sensitive to moisture
- Visible joints between panels



### Cement fibreboard

- Visible joints between panels
- Insensitive to moisture, low water absorbency
- Bright, dense, strong surface



### HR foam supporting elements

- Normally with a dark, structured surface
- Slightly absorbent
- Insensitive to moisture
- Visible joints between panels

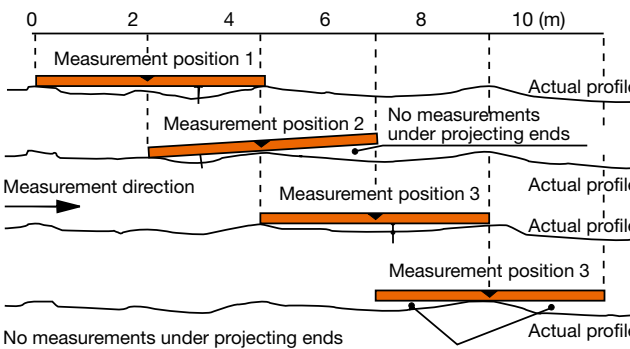




# Inspecting levelness in accordance with the requirements of DIN 18202

The levelness tolerances for screeds are laid down in table 3, line 3, of DIN 18202. This table indicates the tolerances on the levelness of finished floors including screeds for direct use, screeds for laying floor coverings, floor coverings, tiling and coverings applied using trowels or bonded using adhesives. Over a measurement distance of 1 m, the levelness tolerance must not exceed 4 mm, or 3 mm in the case of “more stringent requirements”. Over a measurement distance of 4 m, the deviation must not exceed 10 mm. In this case, it is always important to make the measurement between two high points on the floor. Measurements made with the end of the measurement board out of contact with the surface are not acceptable.

## Measurement points on screeds



Excerpt from DIN 18202	Maximum deviations in mm over measurement distances in m				
	0.1 m	1 m	4 m	10 m	15 m
Finished flooring, including screeds for direct use, screeds for laying floor coverings, floor coverings, tiling and coverings applied using trowels or bonded using adhesives	2 mm	4 mm	10 mm	12 mm	15 mm
Finished flooring to meet <u>more stringent requirements</u> , including screeds for direct use, screeds for laying floor coverings, floor coverings, tiling and coverings applied using trowels or bonded using adhesives	1 mm	3 mm	9 mm	12 mm	15 mm

## EXPERT'S TIP

# Large tiles and flags pose very high requirements for substrates

The levelness tolerances specified by DIN 18202 for substrates on which ceramic tiling or natural stone coverings are to be laid, corresponding to a deviation of 3 mm/m, may already cause problems when laying “large” tiles, that is tiles with an edge length of 60 cm or more. In view of the long edges which are normally relatively “sharp” – especially in the case of rectified material – high spots may occur if the surface is not precisely levelled. Specialist information sheet 03 of ZDB (the Central Association of the German Construction Industry) of May 2010 therefore states that it may be necessary to use a smoothing layer or to lay the tiles in a medium adhesive bed.

This means that the requirements of DIN 18202 may be inadequate in practice to ensure durable, secure tiling with large tiles. In such cases, we recommend that the wall and floor surfaces concerned should be precisely levelled and smoothed.

Professionals use the tried and tested products PCI Periplan® (floor levelling compound) and PCI Nanocret® FC (smoothing compound for walls). Tiles and flags can already be laid on both products after a few hours. For wall surfaces, the new PCI Flexmörtel® S1 tile adhesive is recommended. On floors, tiles may be laid using flowable adhesives such as PCI Nanoflott® light and PCI Rapidflott® as well as the new flexible tile adhesive PCI Flexmörtel® S2, which features high deformability as well as outstanding adhesive tensile strength values. PCI Flexmörtel® S2 can also be used for tile laying with a flowable consistency.

Theoretically, it is not necessary to use the buttering-floating method (i.e. application of mortar to the back of the tile) if flowable adhesive is used. However this only applies if an absolutely level tile with a very low profile on the back is used. For this reason, the professional associations still recommend that the back of tiles from a size of about 0.25m² upwards should be “buttered” before laying for safety reasons.

When laying tiles in a medium adhesive bed, levelling is not required. In this case, we recommend the medium bed adhesive PCI Carrament® which should be mixed with the additive PCI Lastoflex® to obtain greater flexibility before it is applied.

**Important:** At any rate, the additional work should always be taken into consideration when issuing enquiries or making proposals. The greater the care taken with smoothing and levelling work, the easier it will be to lay the tiles. Careful smoothing and levelling ensures the best possible results.



Hans-Peter Schmied  
PCI Applications Technician



Substrate preparation for the laying of large tiles and flags on floors and walls.



## Read more:

You will find more on the points to be observed with large tiles and flags in “Our Advice” No. 21 at [www.pci-augsburg.de/download](http://www.pci-augsburg.de/download).



## Inspecting readiness for laying and residual moisture

The residual moisture level may be determined by various different methods. Depending on the method used, a relatively accurate indication of the residual moisture level of the substrate is provided. Electronic measurement procedures are becoming more and more accurate and also offer the advantage of “non-destructive” testing, but they are not yet recognized by the courts. The CM method is currently the only generally recognized method for determining the

residual moisture level of a screed. However, this method is unfortunately not non-destructive and therefore calls for additional repair work after the measurement has been made. In each individual case, a specialist must decide on the best method to be used. In accordance with ZDB requirements, an additional charge may be made for moisture measurements. You will find further information on the following pages.

### Residual moisture – heated screed

In line with the interface coordination procedure for heated and cooled screeds, designers, heating system, screed and tiling contractors should determine the number and location of measurement points together. We recommend that agreement should be reached with the screed contractor on the position of markings to ensure that the heating system is not damaged by any measurements.

### Polyethylene film measurement

After the surface of the screed has been cleaned and vacuumed, a piece of polyethylene film with an area of about one square metre is fixed in place using silicone. The underfloor heating system is then heated up. If condensation forms under the film, heating must continue. If there is no condensation, the heated screed is apparently free from moisture and ready for tiling. However, a test of this type is no substitute for a CM test; it only gives an indication of the presence of residual moisture in the substrate.

### Electronic measurement methods

Electronic measurements are normally used to obtain a rapid indication of residual moisture in the substrate. Precise measurements using these instruments are only possible if the technician has considerable experience. For this reason, measurements of this type are not recognized by the courts. Comparison measurements using a CM measurement unit are therefore essential.



Source: DNS-Denzel Feuchte-Messtechnik

### The CM method

The CM method is used to measure the residual moisture of a screed and to determine whether it is ready for tiling. This method is destructive but it is also one of the most precise measurement methods available for use on screeds. The basic procedure for a CM measurement is described below.

Important: In the case of heated screeds, samples must only be taken from the points marked by the screed laying contractor. If sampling points have not been marked, you should always contact the screed or heating system contractor.

The following **key points** must always be taken into consideration for sampling:

- The sample must be taken rapidly to avoid loss of moisture.
- Always wear work gloves.
- The sample must not be prepared in sunlight or a draught.
- The sample must be crushed, if possible in a plastic bag. It should not be crushed too fine as further crushing takes place in the CM unit; the particle size required is about 5 mm. Excessive crushing results in the application of too much heat to the sample.

Before making any measurements, the following **preparations** must be made:

- If no sampling points have been marked, suitable sampling points should be identified using electronic measurement methods.
- Inspect the CM measurement unit to make sure that there are no leaks.
- Fill the steel balls into the CM unit.
- Prepare the scales.
- Make sure that tools such as a hammer, a dish and spoons are available.
- Complete the test report (with information on location, date, type of screed, air and soil temperature).

#### Performance of test

- As a general principle, it is important to ensure that samples are taken over the entire cross-section of the screed.
- Crush the sample material in the dish.
- Weigh the sample
  - calcium sulphate screed: 100 g
  - magnesite screed: 50 g
  - cementitious screed: 50 g

- Then fill the sample material into the CM unit. Empty the glass vial with calcium carbide into the unit, holding the CM unit in an inclined position.
- Read off the cylinder temperature on the thermometer and note it in the test report.
- Close the CM unit and shake it vigorously until the reading on the pressure gauge rises.
- Shake the unit in a circular and up-and-down motion to ensure that the sample material is thoroughly mixed. Leave the unit standing for about 1 minute and then start to crush the sample material by vigorous up and down shaking. Hold the cylinder in a vertical position. Depending on the crushing of the sample before the test, this stage takes between 1 and 3 minutes. After leaving the unit to settle for about 2 minutes, the sample material is then further processed by up-and-down movement and finally circular mixing movements for about 1 to 2 minutes. A constant pressure is established after a waiting time of about 8 to 12 minutes.
- The moisture level is indicated directly by the pressure gauge or can be converted into CM % using the table supplied with the unit. If the pressure indicated by the pressure gauge is less than 0.2 bar, a check measurement should be made using a sample with a higher sample weight (the next in the series). If the pressure indicated is above 1.5 bar, the measurement should be repeated with a lower sample weight (the next in the series).
- The final stage is to check and note the final temperature. The CM unit must then be opened and cleaned.



#### When using PCI products, the following values apply:

##### Cement screed

- As soon as the screed can be walked on (usually after 3 days) with PCI Flexmörtel® S2
- ≤ 4.0 CM % with PCI Flexmörtel® S1
- After 28 days and ≤ 4.0 CM % with all other PCI tile adhesives

##### Anhydrite screed/anhydrite flowable screed

< 0.5 CM %

##### In combination with PCI Pecilastic® U

< 2 CM %

Number of CM measurements (excerpt from DIN 18365):

- For a surface area of up to 100 m², 1–2 measurements must be made
- For a surface area of up to 200 m², 1–3 measurements must be made
- In the case of multi-storey buildings, measurements must be made for each storey

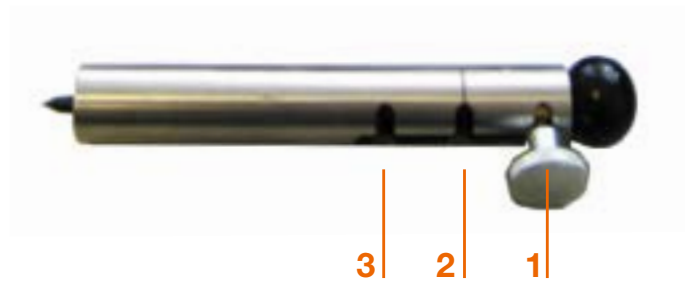




## Strength testing

### Grid scratch test

The strength of the surface should be tested using a grid scratch test. Ideally, the surface should be scratched to produce an equally spaced grid. The depth of each scratch should be equal to its width. There should be no significant chipping at the points where scratches cross.



#### Settings of the hardness tester

##### Setting 1

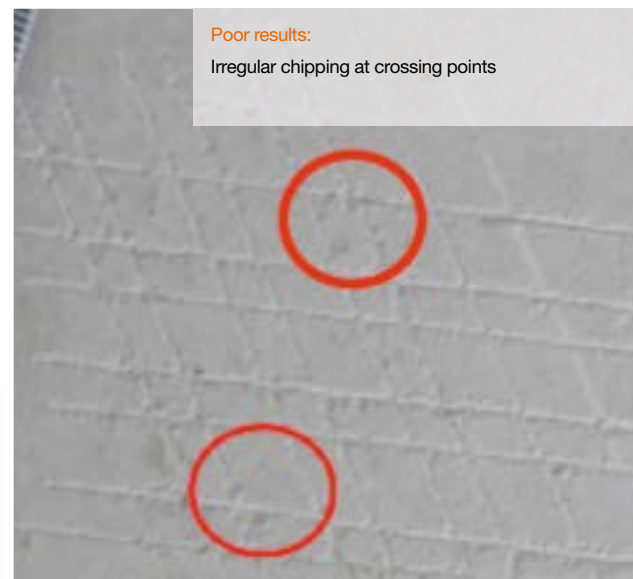
Setting for living areas where castors are not used

##### Setting 2

Setting for living areas where castors are used

##### Setting 3

Setting for commercial or industrial areas subject to heavy loads (forklift trucks, lifting trucks, etc)



### Inspection for voids

Tap the surface using a hard implement such as a hammer. Voids are indicated by a hollow sound. Any voids which are found must be repaired using a suitable repair mortar such as PCI Nanocret® R2.



### Hammer tap testing

Frequently, a substrate may be insufficiently strong as a result of sintered layers. These layers can easily be identified by hammer tapping. Any sintered layers and soft material under these layers must be removed and the holes in the surface must be repaired using suitable repair mortar.

Professional testing using a rebound hammer for non-destructive concrete testing: the rebound hammer (or Schmidt Hammer) is a non-destructive testing tool which can be used for making point measurements of the compressive strength of concrete (DIN EN 12504-2:2001). Inspection with a rebound hammer gives a rapid overview of the condition of the concrete structure, also at points where core samples for laboratory analysis cannot be taken for structural or technical reasons (for example in confined spaces).



## Foreign matter

### Wetting test

The purpose of a wetting test is to determine whether the substrate is contaminated with materials such as oils, formwork lubricants or residues of old adhesive which could impair adhesion. For this purpose, a little water is poured onto the surface. If the water forms droplets that roll off the surface, this indicates that the surface will not provide adequate adhesion. Contaminated surfaces may be cleaned using suitable cleaning agents such as PCI Entöler. In the case of persistent contamination, it may be necessary to remove the contaminated material and to repair the surface using suitable repair mortars such as PCI Nanocret® R2.

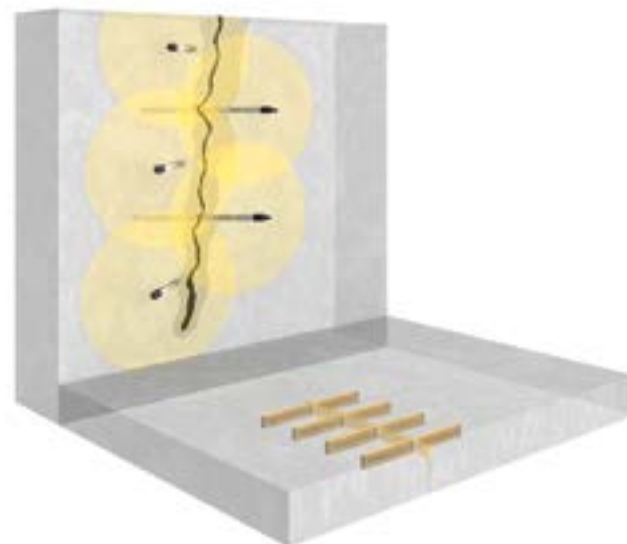






## Repairing cracks in the substrate

It is often necessary to repair cracks in the substrate before any laying work can be carried out. The first step is to find out whether the crack is still moving. In the case of an active crack, the cause of the crack must be identified and eliminated. Generally, it is recommended to repair the cracks with a firmly bonding material such as PCI Apogel® F. Otherwise there is a risk that the cracks in the substrate may continue into the floor covering. The following comments focus on cracks in the screed.



### Possible causes of cracks in screeds:

- Inadequate screed thickness
- Cracks caused by shrinkage either as a result of water addition during setting (early cracking) or during curing
- Failure to provide expansion joints, unfavourable shapes or screed sections which are too large
- Cracks caused by temperature differences and/or draughts
- Incorrect mixing ratios of cement and aggregate
- Exposure of screed to loading too soon after laying
- Errors in screed laying (inadequate compaction – voids in screed)

### EXPERT'S TIP

PCI Apogel® F

## Firm bonding of cracks

Any cracks in horizontal surfaces with a width of more than 0.2 mm should be widened to at least 6 mm and opened up to a depth of about one third to one half of the depth of the screed using a milling cutter. In addition, grooves with a width of about 8 mm (and a length of 10 to 15 cm) should be cut at right angles to the crack on both sides of the crack. Following the cutting work, all loose material and substances that could impair adhesion must be vacuumed out of the cracks and the cracks should then be filled with PCI Apogel® F two-component injection resin. Screed ties are then inserted into the fresh injection resin. The cracks and the grooves must then be filled with PCI Apogel® F until they are saturated. We recommend that silica sand should be mixed with the injection resin. In order to ensure good adhesion to the tiling, a generous quantity of 0.3–0.8 mm silica sand should be scattered over the repaired cracks.



### Note:

Dummy joints must also be firmly bonded using resin before starting the laying work.



Thomas Ast  
PCI Technical Service



Grooves must be cut at right angles to the crack in preparation for the insertion of screed ties.



Insertion of screed ties in the grooves (loose material must be vacuumed out before the ties are inserted).



The mixed injection resin must be poured into the cracks and grooves. The resin must then be smoothed to be flush with the surface and dry silica sand must be scattered over the repaired cracks and grooves.



## Preparing the substrate

Renovation and modernization projects often involve the replacement of old coverings and paintwork by new tiling. This chapter deals with the methods which can be used for substrate preparation.

### Preparation methods

Milling

Grinding

Sandblasting

Stripping

Centrifugal/shot blasting

High-pressure/very-high-pressure water jetting



An ideally prepared substrate with exposed granular structure without any dirt or other material which could impair adhesion.

## Milling

Milling tools are often used for preparing concrete and screed surfaces. The objective is to remove layers which are insufficiently strong and to reach a layer with adequate bearing capacity. If the surface is especially rough, it is recommended that it should initially be milled and then shot-blasted to remove any damage to the granular structure possibly caused by milling.

By the way: mastic asphalt (AS) screeds cannot be milled as a result of their thermoplastic properties. However, these substrates can be ground in a dry process using suitable diamond grinding wheels.



## Grinding

Diamond grinding wheels can be used for roughening and removing layers from mineral substrates, natural stone, tiles, coatings and concrete surfaces. Only very little material is actually removed (roughness between 0.5 and 1.0 mm) and the surfaces are smoothed. This method is especially well-suited for removing old paint, coatings or adhesives. With tools of this type, it is even possible to work on corners, edges and other inaccessible areas.



## Sandblasting

Various processes can be used. In sandblasting, sand is blown onto the surface at extremely high speed using compressed air. This either removes the surface layer or cleans the surface for future processing. Depending on the surface concerned, either dry sandblasting or wet sandblasting is used. Sandblasting can be used in a targeted way in order to ensure that lower layers of the substrate are not damaged or destroyed.

### Note:

When working on metal surfaces such as stainless steel tanks, glass beads are used as the blast cleaning material.

# Stripping

Fitted carpets installed with strong adhesives can be removed using a special stripping machine. These machines are designed to tackle adhesives which are very difficult to separate from the substrate. The front of the machine is equipped with a blade which is pushed under the carpet and loosens it. The carpet should be cut into strips which are slightly narrower than the blade on the machine. When using a stripping machine, it is best to start work at a joint in the carpet.



# Centrifugal/shot blasting

This method is especially well-suited for use on level surfaces. It is extremely cost-effective as it causes little dust and no post-treatment is needed. A centrifuge is used to blast solid blasting agents (steel shot or granulates) onto the surface and the rubble is removed with a vacuum cleaner. In an air flow separator, dust and other foreign matter are separated from the blasting agent. Any blasting agent residue remaining on the surface may be collected using a magnetic roller. This method is not suitable for moist or wet surfaces.



Magnetic roller for collecting blasting material residue

# High-pressure/very-high-pressure water jetting

Water jetting is a very effective way of removing surface layers, for example on concrete. Special nozzles on automatic equipment delivering high pressures (500 to 2,000 bar) and appropriate jetting speeds ensure the rapid, safe and precise removal of loose layers. As this is a “cold” process, there is no sparking and no thermal reactions occur. Concrete is removed without vibration and there is therefore no risk of stress cracking in material which is to remain in place. For example, high-pressure water jetting is well-suited for use in swimming pools.





# Priming and levelling the substrate

## Why are priming and levelling so important?

Primers are high-performance elements of tiling systems and there are many good reasons for using them. Of course, a primer can only be beneficial if it is applied in accordance with the relevant instructions. In other words, the correct quantity of primer must be used and it must be allowed sufficient time for setting and curing. Under these conditions, primers bring considerable benefits. This chapter describes the most commonly used types of primer and gives an overview of the applications in which they should be used.

## What are the functions of the primer within a tiling system?

Primers can be used for binding dust, for modifying the absorption behaviour of the substrate, for protecting the substrate, for enhancing adhesion, for improving the strength of the substrate or for isolating the tiling system from moisture in the substrate.

## Types of primer

In general terms, there are two main types of primer – dispersion-type primers and synthetic resin primers.

### Dispersion-type primers

These primers mainly consist of polymers or synthetic resins dissolved in water. Depending on the absorbency of the substrate and the concentration of the dispersion, it may be possible or even necessary to dilute the primer with water before it is applied. Some dispersion-type primers include additional fillers to improve the mechanical properties of the surface. There are also special primers that react especially fast (for example PCI Gisogrund® Rapid), ensuring faster progress with a construction project.

### Synthetic resin primers

Synthetic resin primers are mainly based on two-component epoxy resins or one-component or two-component polyurethanes. In the case of the two-component systems, precise mixing is essential as each of the building bricks in the basic component must be combined with its counterpart to ensure hardness. Mixing errors result in problems with hardening. Synthetic resins effectively prevent moisture penetration and are often used as capillary barriers. In order to ensure good mechanical adhesion to the primer, silica sand must be scattered over the primer while it is still wet.



## EXPERT'S TIP

# Primers are extremely effective if they are used properly

## General information on primers

If dispersion primers such as PCI Gisogrund® or PCI Gisogrund® 404 are too severely diluted or the quantity of primer applied is inadequate, they will not achieve the intended results. Adequate time must also be allowed for drying. Puddle formation during primer application must be avoided in order to ensure that the entire surface dries in a homogenous way and there are no areas with insufficient adhesion which could result in voids under the tiling.

## Gypsum substrates

The purpose of priming is to protect the substrate against the moisture and alkalinity of the fresh tile adhesive in order to prevent ettringite formation.

## Non-absorbent substrates

It is important to clean or degrease the substrate or, if necessary, to grind it, before the primer is applied. For bonding agents on non-absorbent substrates such as old tiling (e.g. PCI Gisogrund® 303) it is also important to ensure that the primer is allowed to cure properly so that it can function reliably and support the tiling.



Christian Reimann  
PCI Technical Service



Primers perform a very important function within a tiling system. The more care you take in the application of the primer, the better and more reliable the final result will be.



When a dispersion primer is still fresh, the fine polymer particles are dispersed in the water.



The solution enters the capillaries and pores in the substrate but the polymer particles are still dissolved.

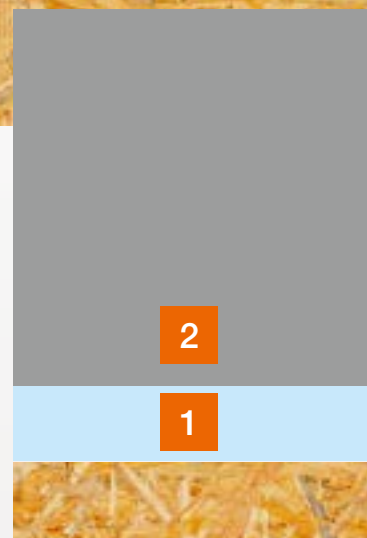


The water is removed from the primer by evaporation and absorption by the substrate; the particles begin to form a film.



The primer has completely dried and forms a continuous film.





#### 1 Primer

**PCI Gisogrund® 404**  
Special wash primer



#### 2 Levelling compound

**PCI Periplan® Extra**  
Special levelling compound



In combination with

**PCI Armiermatte GFM**  
Glass fibre reinforcement



If required

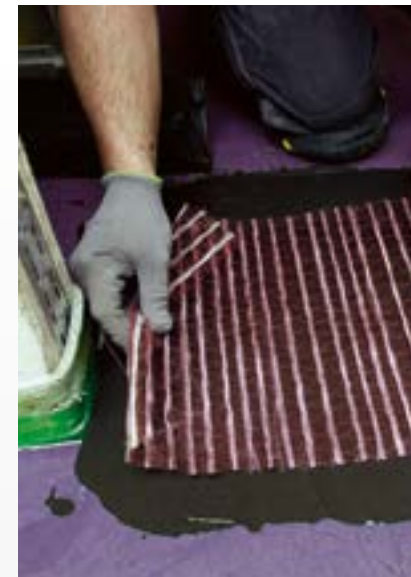
**PCI Armiermatte GFS**  
Glass fibre reinforcement



## Reinforcement of wooden surfaces and processing of composite substrates

Wood is a living material and is subject to deformation (swelling and shrinkage) when exposed to moisture or water vapour, in contrast to ceramic tiling. However, wood or chipboard surfaces can be covered with tiles and flags in indoor applications provided that they are properly prepared. Frequently, consolidation or reinforcement using the methods described below is required.

Before tiling is laid on wooden or composite substrates, it is recommended that the surface should be reinforced using glass fibre membranes or mats (for example PCI Armiermatte GFM/GFS) laid in a material such as PCI Periplan® Extra to provide extra strength. This approach converts critical substrates into solid, firm substructures for tiling. On wooden substrates, a layer of PCI Periplan® Extra with a thickness of at least 10 mm must be applied.



Insert strips of PCI Armiermatte GFS into the fresh levelling compound.



PCI Armiermatte GFS following the removal of the backing film.



Cut the strips of PCI Armiermatte GFM to size using scissors and position them on the primed substrate.



Apply a layer of PCI Periplan® Extra with a thickness of at least 10 mm.



Distribute using a smoothing trowel (not a squeegee!) ...



... and use a suitable spiked roller for aeration.





## Perfect preparation of composite substrates on walls

Composite substrates on walls and floors are especially common in modernization and refurbishment projects. This example shows how you can proceed with tiling without having to remove the substrate.

The first step is to check the strength of the substrate. If it is sufficiently strong, it can be levelled using PCI Pecidur® high-resistance foam supporting elements. These elements are available in different thicknesses. They must be bonded into place using a tile adhesive (such as PCI Flexmörtel® S1). Impact or threaded dowels provide additional mechanical fastening. This approach ensures simple, fast handling. After the boards have been installed, tiles can be laid immediately.

### 1 Primer

**PCI Gisogrund® 404**  
Special wash primer



### 2 Adhesive

**PCI Flexmörtel® S1**  
Flexible tile adhesive



**Wall:**  
**PCI Pecidur®**  
HR foam supporting elements



Cut the PCI Pecidur® elements to size using a utility knife.



Apply tile adhesive to the back of the elements using a notched trowel. In the case of severe irregularities, large blobs may also be applied.



Position the PCI Pecidur® element and tap it into place.



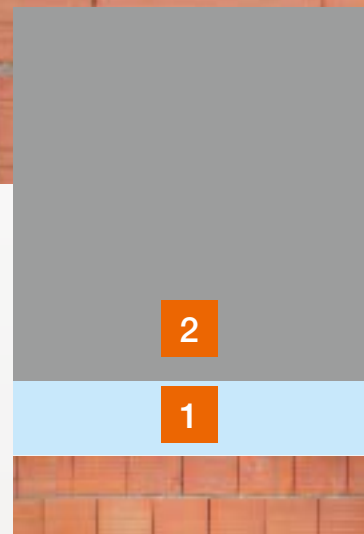
Smooth any joints and edges using tile adhesive. If necessary, glass fabric sheeting such as PCI Gewebbahn may be inserted into the adhesive.



After the adhesive has dried, drill holes for the dowels (about five dowels per square metre).



Finally, tap the impact dowels into place.



## Masonry

If tiles are to be laid directly on masonry, the surface must be perpendicular and level in accordance with the requirements of DIN 18202. However, masonry is often not sufficiently level and must therefore be levelled by plastering or the application of levelling compounds such as PCI Pericret® or PCI Nanocret® R2.

Minor irregularities can normally be smoothed out using PCI tile adhesives. However, suitable boards must be used for levelling irregular cellular concrete surfaces. As a general principle, the masonry must be sufficiently dry, firm and clean and the joints must be properly filled to allow tiling.

### 1 Primer

**PCI Gisogrund®**  
Wash primer/  
protective primer



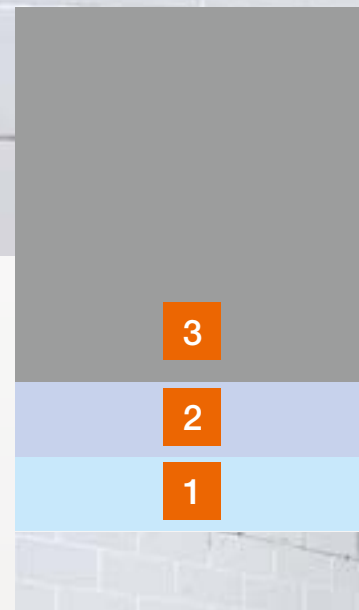
or

**PCI Gisogrund® 404**  
Special wash primer



### 2 Levelling compound

**PCI Pericret®**  
Levelling mortar



## Old tiling and adhesive residues

Tiling over an old tiled surface is a quick and easy method of installing a covering for a modernization project. On floors, it is essential to make sure that sufficient height is available and that any height differences between the surface to be covered and neighbouring surfaces can be safely accommodated. It is essential to make sure that the old tiling is firmly bonded to the substrate. Any tiles which are not firmly seated must be removed and any gaps or holes must be filled with mortar (such as PCI Pericret®). Before the new tiles are laid, the surface must be thoroughly cleaned and, if necessary, degreased using cellulose thinner or ground down. The special wash primers PCI Gisogrund® 303 and PCI Gisogrund® 404 ensure optimum adhesion of the new tiling.

### 1 Primer

**PCI Gisogrund® 303**  
Special wash primer



or

**PCI Gisogrund® 404**  
Special wash primer



### 2 Levelling compound

**PCI Periplan® fein**  
Levelling compound

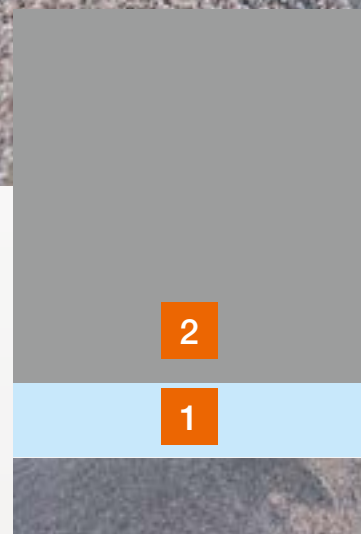


### 3 Levelling mortar

**PCI Pericret®**  
Levelling mortar  
for floors and walls







#### 1 Primer

**PCI Gisogrund®**  
Wash primer/  
protective primer

or

**PCI Gisogrund® 404**  
Special wash primer

#### 2 Levelling compound

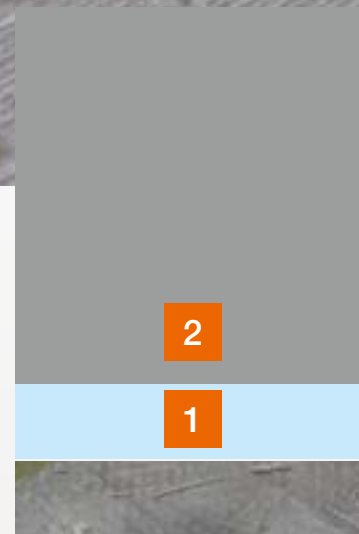
**PCI Periplan® Extra**  
Levelling compound for  
wooden floors



## Mastic asphalt

Mastic asphalt screeds are regarded as a problem-solver and are often used for small areas in modernization projects. Sometimes, larger areas of mastic asphalt screed are found. However, the high price of this material means that its market share is very low (less than 3%). Thanks to its plastic properties, mastic asphalt provides good protection against impact sound (internal insulation), and can accommodate structural deformation without cracking. In order to improve adhesion, silica sand should be scattered on mastic asphalt screeds. Otherwise, the surfaces can be prepared using a diamond grinder. Surfaces should be primed using PCI Gisogrund® or PCI Gisogrund® 404 before tiles are laid.

Our tip for natural stones: you should inform the client in advance that staining may occur if marble and other natural stones sensitive to staining are laid on mastic asphalt. In such cases, we recommend that the substrate should be isolated using PCI Epoxigrund 390 epoxy resin primer.

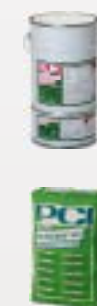


#### 1 Primer

**PCI Epoxigrund 390**  
Special primer

#### 2 Levelling compound

**PCI Periplan® fein**  
Levelling compound

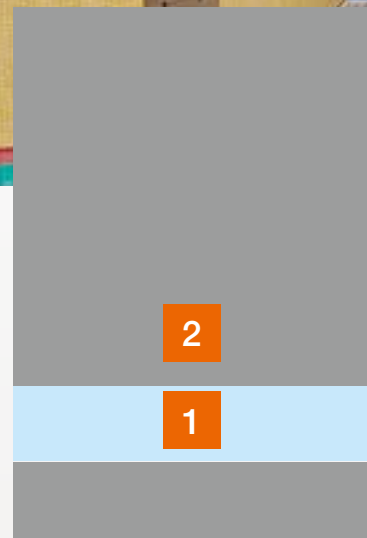


## Old adhesive residues

Ceramic tiles and flags can be laid on adhesive residues of tiles or PVC or linoleum floor coverings without any problems, provided that the adhesive residues are firmly bonded and waterproof. Firm adhesive residues may remain in place and can be primed using PCI Gisogrund® 404. However, the surfaces will normally need to be levelled using a fine levelling compound (such as PCI Periplan® fein).

If the adhesive residues are water-soluble (for example sulphite lye adhesives), the surface must be primed using PCI Epoxigrund 390 isolating epoxy resin primer.





## Steel

When working on metal surfaces, it is important to remember that distortion and vibration may occur. In practice, the special primers PCI Gisogrund® 303 and PCI Epoxigrund 390 have proved to be very effective. In areas with minimal deformation, it is best to use PCI Periplan® Extra for levelling the steel surface.

**Tip:** If the metal surface is sufficiently level, the tiles can be laid directly on the surface without a levelling compound using PCI Collastic® reaction resin tile adhesive.

### Shipbuilding/Construction:

#### 1 Primer

**PCI Gisogrund® 303**  
Special wash primer



or

**PCI Epoxigrund 390**  
Special primer



#### 2 Levelling compound

**PCI Periplan® Extra**  
Special levelling compound



PCI Nanofug® Premium

## Premium through and through



### All the benefits at a glance

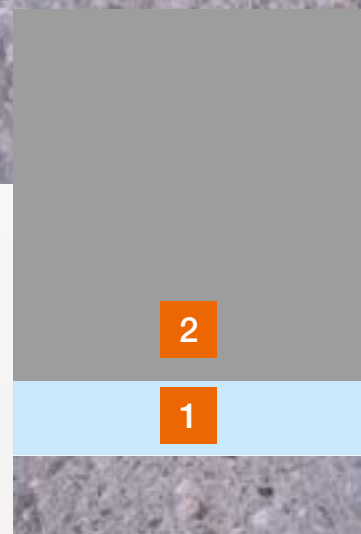
- **easyworking**  
The packaging, consistency and setting speed of PCI Nanofug® Premium make for pleasant and efficient working.
- **waterdropeffect**  
The fine surface texture means that water just rolls off the joint. During cleaning, any dirt particles are simply removed from the surface.
- **easytoclean** effect  
Dirt cannot become encrusted and is easier to remove.
- **resistance** effect  
The structure and composition of PCI Nanofug® Premium mean that acid household cleaning products cannot attack the joint.
- **protection** effect  
The special formulation of the joint grout and the alkalinity of the materials used protect the joint against attack by certain mould fungi and bacteria.

The multi-use flexible joint grout PCI Nanofug® Premium is the latest addition to the successful PCI Nano line. For this new joint grout, PCI has continued the development of the smart technology used for the other products. This means that PCI Nanofug® Premium features a wide range of positive characteristics. Especially the combination of higher setting speed, smooth consistency and convenient processing times makes PCI Nanofug® Premium a real all-rounder.

But the cured joint itself also has a number of advantages. It is easy to clean and resists attack by mould and bacteria. Acid cleaning products cause less damage to PCI Nanofug® Premium than to conventional cementitious joint grouts.

Convenient processing and satisfied customers make joint grouting a pleasant experience.





### 1 Primer

**PCI Gisogrund®**  
Wash primer/  
protective primer

or

**PCI Gisogrund® 404**  
Special wash primer

### 2 Levelling compound

**PCI Pericret®**  
Levelling mortar

or

**PCI Nanocret® R2**  
Light repair mortar



## Concrete

Concrete shrinks during the curing process. Depending on the age of the concrete, different tile adhesives may be needed. For example, DIN 18157, Part 2, calls for the use of deformable dispersion-based tile adhesives such as PCI Bicolit® Classic or PCI Bicolit® Extra 28 days after the concrete has been laid. In addition, recently laid concrete surfaces (more than 28 days after laying) may also be titled using the high-performance, highly deformable tile adhesive PCI Flexmörtel® S1. If waterproofing (such as PCI Seccoral® 2K Rapid) is applied in wet areas, it provides an additional flexible layer, allowing the use of deformable cementitious thin-bed adhesives.

After three months, the shrinkage process of concrete components has already progressed to the point where tiles may be laid using polymer-modified cementitious adhesives.



Remove burrs and irregularities using a hand-held milling tool.



In order to regulate the absorption behaviour, slightly moisten the substrate or prime it with PCI Gisogrund® or PCI Gisogrund® 404 depending on the individual application.



Level the surface using PCI Pericret® or alternatively PCI Nanocret® R2.



**Tip:** Apply diluted PCI Seccoral® 2K Rapid as a primer using a roller. You will find further information in the section "Reliable waterproofing of substrates" from page 40 onwards.

Waterproofing and laying

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# Waterproofing and laying



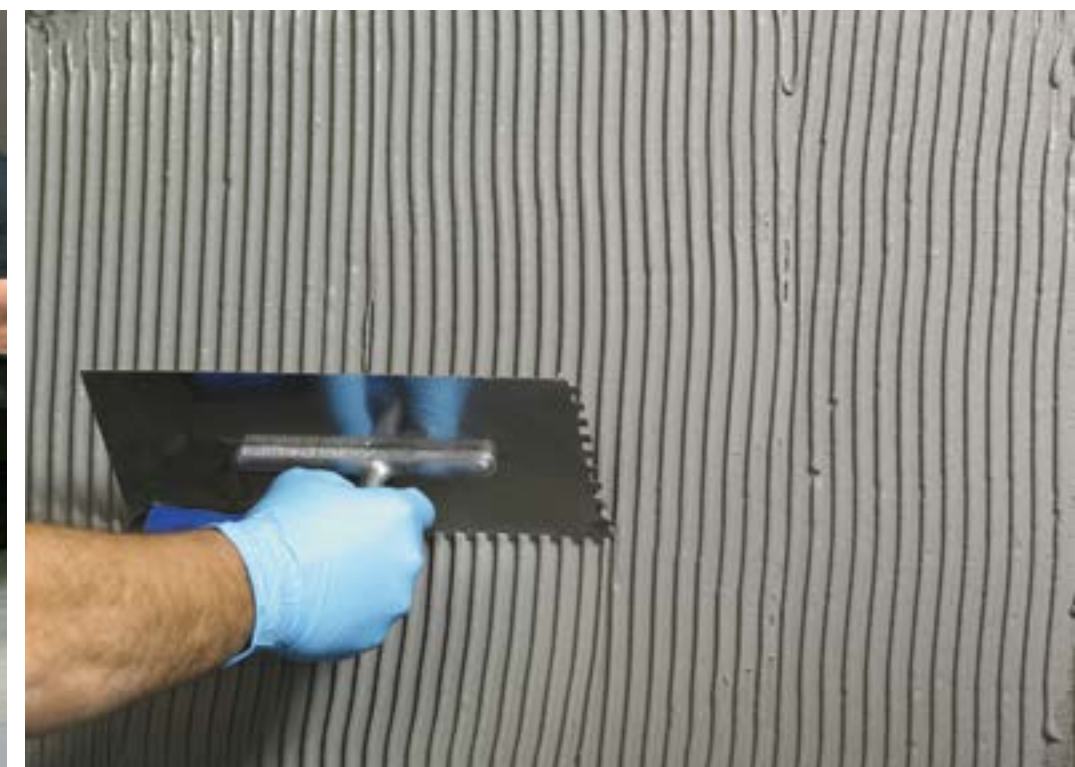
## Reliable waterproofing and tiling

### Why is waterproofing needed?

Tiles and natural stone floor and wall coverings exposed to spray water in the showers and bathrooms of homes, hospitals and facilities for the aged and disabled, as well as wet rooms in industrial applications require waterproofing to protect the substrate against moisture. Waterproofing work and materials in areas subject to severe stress, such as public and commercial buildings, are dealt with in Construction Regulation List A, Part 2, No. 2.50 published by Deutsches Institut für Bautechnik. For work in private homes, the requirements of

ZDB (German Construction Confederation) code of practice „Hinweise für die Ausführung von Abdichtungen im Verbund mit Bekleidungen und Belägen aus Fliesen und Platten für den Innen- und Außenbereich“ (Advice for the Installation of Waterproofing Bonded to Cladding and Coverings of Tiles and Flags in Interior and Exterior Applications) must be followed.

This chapter deals with the reliable waterproofing of substrates and refers to the applicable standards.





# DIN 18195-5: Waterproofing of buildings – waterproofing in wet rooms



## Definition of “wet room”

In Part 1 of the revised version of DIN 18195 which appeared from 2011, “wet room” was defined as follows for the first time on the basis of the drainage required: “Interior room where so much water occurs as a result of its use that a floor drain is required for removal. Bathrooms in dwellings which do not have a floor drain are not wet rooms”.

This easy to understand definition is different from earlier definitions under which a room with 60–80 % relative humidity was defined as a moist room and a room with an average relative humidity of more than 80 % was defined as a wet room. DIN 18195 states that it applies to wet rooms with a floor drain. The requirements are defined in greater detail in Part 5 of the standard. In Section 7.2 of Part 5 there is a small but important reference to bathrooms without a floor drain but which have moisture-sensitive surrounding components.

In this context, it is necessary to consider the phrase “as a result of its use” in more detail as the definition of wet room has given rise to discussions among specialists. Opinions differ as to whether a room which has a floor drain which is not used is also a wet room. However, the ZDB code of practice “Bonded waterproofing” does not differentiate rooms with regard to the type of use and always assumes that rooms are subject to the most severe exposure. In the case of a dispute, it will therefore be a matter for the expert witness to decide the level of exposure to which a room is subject.

## Exposure classes

As the degree to which a room is exposed to water makes a considerable difference, DIN 18195-5 distinguishes various exposure classes. Section 7 of DIN 18195-5 defines “moderately exposed surfaces” and “severely exposed surfaces” as follows:

### Moderately exposed surfaces include:

- Balconies and similar surfaces in dwellings; floors and walls of wet rooms in dwellings exposed directly to spray water – if they are not adequately protected against the penetration of moisture by other measures, the fitness for use of which shall be demonstrated.

- In the case of domestic bathrooms without a floor drain but with surrounding components sensitive to moisture (e.g. wood, dry walls, steel structures), special consideration must be given to protection against moisture in design work. We will later refer to the moderately exposed area as the “non-regulated area”.

### Severely exposed surfaces include:

- ... floor and wall surfaces in wet rooms and in corridors in swimming pools, public showers, industrial kitchens and other industrial facilities severely exposed to service water and cleaning water.



## Exemption clause

For moderately exposed surfaces, Section 7.2 of DIN 18195, Part 5, includes the exemption clause “if they are not adequately protected against the penetration of moisture by other measures, the fitness for use of which shall be demonstrated.” This allows other possibilities of protection. In Annex 1 to DIN 18195, March 2011 edition, bonded waterproofing is directly indicated as waterproofing which is fit for use. There is no exemption clause of this type for severely exposed surfaces. As it is not possible to lay tiles directly on waterproofing in accordance with DIN 18195, the lack of an exemption clause for severely exposed surfaces would cause considerable problems for architects, engineers and users if it were not for the Guideline for European Technical Approval “Watertight covering kits for wet room floors and walls” (ETAG 022) and especially the Construction Regulation List of Deutsches Institut für Bautechnik in Berlin (DIBt).



# DIBt Construction Regulation List A, Part 2

## Exposure classes

The Construction Regulation List distinguishes exposure classes A, B and C as follows:

- **Exposure class A:** wall and floor surfaces severely exposed to service and cleaning water in wet rooms such as swimming pool surrounds and public showers
- **Exposure class B:** wall and floor surfaces in indoor and outdoor swimming pools with fill water which has drinking water properties
- **Exposure class C:** Wall and floor surfaces in commercial rooms, also with chemical exposure, e.g. car washes, industrial kitchens. Facilities where water-polluting substances as defined in Section 19g WHG (Water Resources Act) are handled are not included.

## Waterproofing materials

“Severely exposed surfaces” in accordance with the Construction Regulation List are also called “regulated areas”. The Construction Regulation List distinguishes three basic groups of bonded waterproofing materials: polymer dispersions, polymer/mortar combinations and reaction resins.



The waterproofing materials must have a specified minimum dry film thickness following curing. The relevant values are 0.5 mm for polymer dispersions, 2.0 mm for polymer / mortar combinations and 1.0 mm for reaction resins. In order to exclude the possibility of gaps in the coating, at least two layers are always applied.

# Summary

DIN 18195 provides for a possibility of waterproofing wet rooms in moderately exposed areas. However, tiles cannot be laid directly on the waterproofing materials defined in DIN 18195. It is always necessary to lay render or screed on the defined DIN waterproofing materials before tiles are laid. The materials listed in DIN are therefore not suitable for use as “bonded waterproofing”. The only exception, since July 2009, concerns materials for protection against water pressing from the inside in accordance with DIN 18195-7. In order to allow the general use of bonded waterproofing, we therefore take advantage of section 7.2 of DIN 18195-5 and the “exemption clause” which it includes: “if they are not adequately protected against the penetration of moisture by other measures, the fitness for

use of which shall be demonstrated.” There is no doubt that waterproofing systems with general approval certificates of the construction authorities issued by Deutsches Institut für Bautechnik (DIBt) are solutions which are fit for use.

For severely exposed areas, we use the Construction Regulation List. These areas are also referred to as “regulated areas”.

### General points to note:

- The degree of exposure is decisive.
- The architect or engineer must decide on the exposure class.

## Examples in the case of swimming pools and industrial kitchens

Swimming pools		
	Exposure class	PCI product
Bottoms and sides of pools	B	PCI Seccoral® 1K/2K Rapid
Pool surrounds	A	PCI Seccoral® 1K/2K Rapid
Showers, floors	A	PCI Seccoral® 1K/2K Rapid
Showers, walls	A	PCI Lastogum®, PCI Seccoral® 1K/2K Rapid
Changing rooms without direct floor drains		Waterproofing may not be required
Industrial kitchens		
Floors exposed to chemicals	C	PCI Apoflex® F
Floors only exposed to water	A	PCI Seccoral® 1K/2K Rapid
Walls exposed to chemicals (cookers in corners)	C	PCI Apoflex® W PCI Lastogum®
Other walls	A	PCI Seccoral® 1K/2K Rapid PCI Lastogum®
Areas without exposure to water or chemicals		No waterproofing required

### Work in accordance with VOB

However, contractors and construction supervisors must exercise caution at this point if waterproofing work is to be carried out under a contract based on the VOB conditions.

If the call for tenders refers to (VOB) ATV DIN 18336 “Waterproofing work”, without any further information on waterproofing, the contractor must carry out the

waterproofing work in accordance with DIN 18195 using materials in accordance with the standard. In most cases, DIN 18195 requires waterproofing with bituminous materials; tiles cannot be laid directly on these materials. For this reason, the contractor must obtain formal approval from the client before applying bonded waterproofing in accordance with the ZDB code of practice.

## Overview of exposure classes in accordance with ZDB code of practice and Construction Regulation List

Definition	Moderate exposure to non-pressing water	Severe exposure to industrial cleaning water	Coverings exposed to moisture	Sides and bottoms of swimming pools	Wall and floor surfaces in industrial areas with chemical exposure
	Indoors	Indoors, without tanks	Outdoors, without tanks	Indoors and outdoors	
ZDB exposure class	A0	A	B0	B	C
Construction Regulation List exposure class	Not regulated	A – walls B – floors	Not regulated	B	C
Examples	Private bathroom	Public swimming pool surrounds, public toilets	Balconies, terraces without substructure	Swimming pools	Industrial kitchens, car washes

ZDB code of practice: bonded waterproofing with claddings and coverings of tiles and slabs

Practical requirements:

As the title of the code of practice indicates, it deals with the proper application of waterproofing using liquid-applied bonded waterproofing materials. Liquid-applied materials have a liquid to pasty consistency and are normally applied using trowels, brushes or rollers.

These materials are divided into three groups:

- Polymer dispersions (D)  
PCI Lastogum®, white and grey
- Polymer/mortar combinations (M)  
PCI Seccoral® 1K, PCI Seccoral® 2K, PCI Seccoral® 2K Rapid
- Reaction resins (R)  
PCI Apoflex® W and F

However, it must be noted that not all materials may be used in all exposed areas, as the following tables show.

In the case of severe exposure (A), polymer dispersions may only be used on walls.

Exposure classes in the case of moderate exposure (area not regulated by the construction authorities)					
Exposure classes	Applications	Substrates	Waterproofing required	Type of waterproofing (standard)	Materials
A0	A0				
Moderate exposure to non-pressing water in indoor areas	Directly and indirectly exposed areas in rooms where service and cleaning water is not handled very frequently, such as bathrooms in homes and hotels, floors with floor drains in such applications	Moisture-insensitive substrates	Floors yes, walls not essential	<b>Waterproofing in combination with tiles and slabs:</b> <ul style="list-style-type: none"><li>• Wall and floor surfaces: products with ETA in accordance with ETAG 022, Part 1 with certificates for exposure class A</li></ul>	<ul style="list-style-type: none"><li>• Polymer dispersions</li><li>• Polymer/mortar combinations</li><li>• Reaction resins</li></ul>
		Moisture-sensitive substrates	Yes	<ul style="list-style-type: none"><li>• Wall and floor surfaces: products with ETA without guideline covering this application</li></ul>	
B0	B0				
Moderate exposure to non-pressing water in outdoor areas	Directly and indirectly exposed surfaces and outdoor areas, exposed to non-pressing water, e.g. on balconies and terraces (not over rooms that are used)	Only moisture-insensitive substrates	Yes	Waterproofing in combination with tiles and slabs	<ul style="list-style-type: none"><li>• Polymer/mortar combinations</li><li>• Reaction resins</li></ul>

Polymer dispersions may not be used in outdoor areas (B0) as these materials have low vapour diffusion values and no flexibility under cold conditions.

EXPERT'S TIP

Basic principles

- All surfaces with moderate or severe exposure to moisture in the course of their intended use must be waterproofed.
- In areas with severe exposure, all substrates must be insensitive to moisture.
- In areas with moderate exposure, moisture-sensitive substrates may be used with waterproofing.
- In the case of surfaces with floor drains, moisture-sensitive substrates must not be used
- With moisture-insensitive substrates in areas with moderate exposure, the waterproofing of walls is not absolutely necessary.



Exposure classes in the case of high exposure (area regulated by the construction authorities)					
Exposure categories	Applications	Substrates	Waterproofing required	Type of waterproofing (standard)	Materials
A	A				
High exposure to non-pressing water in indoor areas	Directly and indirectly exposed areas in rooms where service and cleaning water is handled very frequently or for long periods, such as surrounds of swimming pools and showers (public and private)	Only moisture-insensitive substrates	Yes	Waterproofing in combination with tiles and slabs: products with ETA in accordance with ETAG 022, Part 1 with certificates for exposure class A <ul style="list-style-type: none"><li>• Wall and floor surfaces: products with ETA without guideline covering this application</li><li>• Wall and floor surfaces: products with general certificate of approval by the construction authorities in accordance with Construction Regulation List A, Part 2, no. 1.10, exposure class A</li></ul>	<ul style="list-style-type: none"><li>• Polymer dispersions only for walls</li><li>• Polymer/mortar combinations</li><li>• Reaction resins</li></ul>
B	B				
High exposure to water continuously pressing from the inside in indoor and outdoor applications	Areas of containers exposed to water under pressure such as indoor and outdoor public and private swimming pools	Only moisture-insensitive substrates	Yes*	Waterproofing in combination with tiles and slabs: <ul style="list-style-type: none"><li>• Wall and floor surfaces: products with general certificate of approval by the construction authorities in accordance with Construction Regulation List A, Part 2, no. 1.10, with certificates for exposure class B</li><li>• Wall and floor surfaces: products with ETA without guideline covering this application</li></ul>	<ul style="list-style-type: none"><li>• Polymer/mortar combinations</li><li>• Reaction resins</li></ul>
C	C				
High exposure to non-pressing water in indoor areas, with additional exposure to chemicals	Directly and indirectly exposed areas in rooms where service and cleaning water is handled very frequently or for long periods, and limited exposure of the waterproofing to chemicals may occur, such as industrial kitchens and laundries	Only moisture-insensitive substrates	Yes	Waterproofing in combination with tiles and slabs: <ul style="list-style-type: none"><li>• Wall and floor surfaces: products with general certificate of approval by the construction authorities in accordance with Construction Regulation List A, Part 2, no. 1.10, also taking into consideration chemical exposure</li><li>• Wall and floor surfaces: products with ETA without guideline covering this application</li></ul>	<ul style="list-style-type: none"><li>• Reaction resins</li></ul>

\* If the tank is made from impermeable concrete, waterproofing is not absolutely necessary. If waterproofing is applied, it must be in accordance with the requirements of the Construction Regulation List and the applicable ZDB code of practice.



On which substrates can bonded waterproofing be used?

The ZDB code of practice also answers this question. For example, the table below shows that gypsum-based materials must not be used in areas of high exposure.

Exposure classes		A	A0	B	B0	C
Exposure		High	Moderate	High	Moderate	High
Areas of application		Directly and indirectly exposed areas in rooms where service and cleaning water is handled very frequently or for long periods, such as public and private showers	Directly and indirectly exposed areas in rooms where service and cleaning water is not handled very frequently, such as bathrooms in homes and hotels	Areas of containers exposed to water under pressure such as indoor and outdoor public and private swimming pools	Directly and indirectly exposed surfaces and outdoor areas, exposed to non-pressing water, e.g. on balconies and terraces (not over rooms that are used)	Directly and indirectly exposed areas in rooms where service and cleaning water is handled very frequently or for long periods, and limited exposure of the waterproofing to chemicals may occur, such as industrial kitchens and laundries
Substrates for moderate exposure A0, B0	Substrates for severe exposure A, B, C	Concrete in accordance with DIN 1045/DIN EN 206	DMR	DMR	MR	R
		Limestone plaster, mortar group P II CS III in accordance with DIN V 18550 and DIN EN 998-1, compressive strength 3.5 to 7.5 N/mm²	DMR	DMR	MR	R
		Lightweight limestone plaster, mortar group P II CS II in accordance with DIN V 18550 and DIN EN 998-1, compressive strength at least 2.5 N/mm²	DMR	DMR	MR	R
		Sand lime bricks with or without thin levelling layer	DMR	DMR	MR	R
		Cement plaster, mortar group P III CS IV in accordance with DIN 18550 and DIN EN 998-1, compressive strength at least 6.0 N/mm²	DMR	DMR	MR	R
		Cement plaster, mortar group P III CS IV in accordance with DIN 18550 and DIN EN 998-1 without addition of hydrated lime or lime flux, compressive strength at least 6.0 N/mm²		MR		
		Lightweight concrete hollow boards in accordance with DIN 18148, processed in accordance with DIN 4103 using hydraulic mortars	DMR	DMR		R
		Cementitious mineral panels	DMR	DMR		R
		Composite extruded or expanded polystyrene elements with mortar coating and fabric reinforcement	DMR	DMR		R
		Cellular concrete slabs in accordance with DIN 4166, processed in accordance with DIN 4103	DMR	DMR		R
		Gypsum plaster, mortar group P IV¹ in accordance with DIN 12859		DMR		
		Gypsum plaster board¹ in accordance with DIN 12859		DMR		
		Gypsum fibreboard in accordance with DIN EN 15283-2, gypsum boards in accordance with DIN 18180 and DIN EN 520¹		DMR		

1) With direct and indirect exposure in class A, moisture-sensitive substrates must not be used with bonded waterproofing.

Substrates for floor coverings

Exposure classes		A	A0	B	B0	C
Exposure		High	Moderate	High	Moderate	High
Areas of application		Directly and indirectly exposed areas in rooms where service and cleaning water is handled very frequently or for long periods, such as swimming pool surrounds and public and private showers	Directly and indirectly exposed areas in rooms where service and cleaning water is not handled very frequently, such as bathrooms in homes and hotels, floor surfaces with drains in such applications	Areas of containers exposed to water under pressure such as indoor and outdoor public and private swimming pools	Directly and indirectly exposed surfaces and outdoor areas, exposed to non-pressing water, e.g. on balconies and terraces (not over rooms that are used)	Directly and indirectly exposed areas in rooms where service and cleaning water is handled very frequently or for long periods, and limited exposure of the waterproofing to chemicals may occur, such as industrial kitchens and laundries
Substrates for moderate exposure A0, B0	Substrates for severe exposure A, B, C	Concrete in accordance with DIN 1045/DIN EN 206	MR	DMR	MR	R
		Cement screed in accordance with DIN 18560	MR	DMR	MR	R
		Mastic asphalt screed in accordance with DIN 18560	MR	DMR		R
		Cementitious mineral panels¹²	MR	DMR	MR	
		Composite extruded or expanded polystyrene elements with mortar coating and fabric reinforcement¹²	MR	DMR		
		Gypsum fibreboard¹ in accordance with DIN EN 15283-2, gypsum board¹ in accordance with DIN 18180 and DIN EN 520		DMR		
		Calcium sulphate screeds in accordance with DIN 18560¹		DMR		

D = Dispersion waterproofing, for example PCI Lastogum®  
R = Reaction resin waterproofing, for example PCI Apoflex®

M = Mortar/polymer combination, for example PCI Seccoral® 1K/2 K Rapid

1) Without floor drain  
2) If floor drains are to be installed, elements with factory-installed floor drains and general construction test certificates must be used.

## Waterproofing: exposure class A, A0



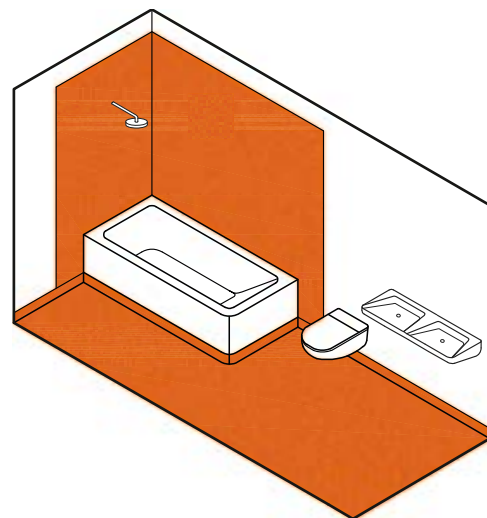




## Everyday challenges

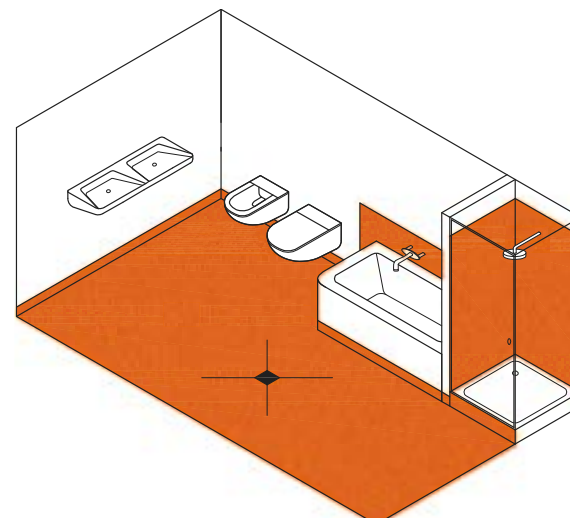
### Private bathroom with shower in bathtub (exposure class A0)

Areas to be waterproofed are shown in orange. As you can see, the washbasins do not need to be waterproofed. This point gave rise to considerable discussion in the past. The waterproofing of washbasins would mean that every private kitchen would need to be waterproofed around the sink. In this case, the shower is not enclosed: this means that water can reach the floor.



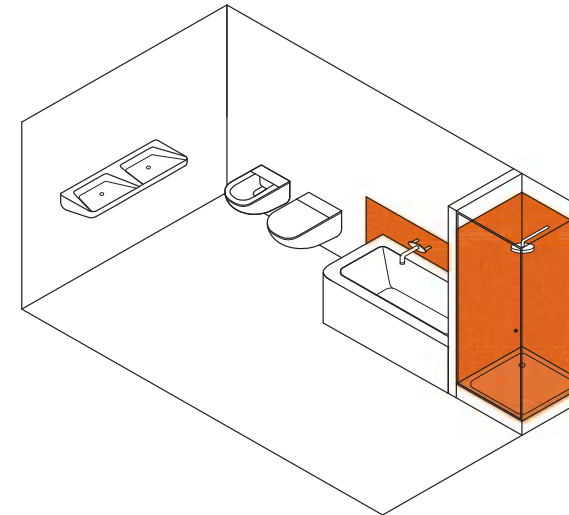
### Private bathroom with bathtub not used as shower, with floor drain (exposure class A0)

Shower with additional surround and floor drain. Because of the floor drain, the floor must be waterproofed.



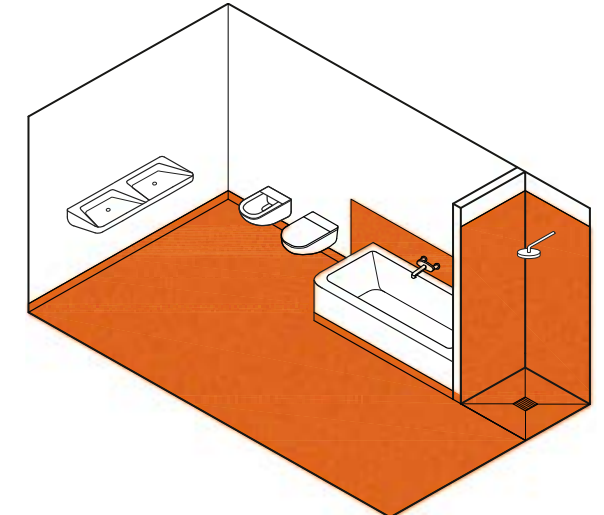
### Private bathroom, with bathtub not used as a shower, with separate shower equipped with effective spray water protection, moisture-sensitive floor (exposure class A0)

Enclosed shower. Waterproofing must be applied up to 20 cm higher than the water taps for the bathtub. However, there is some uncertainty connected with this application: is the shower always closed? It would be better to waterproof the entire floor surface.



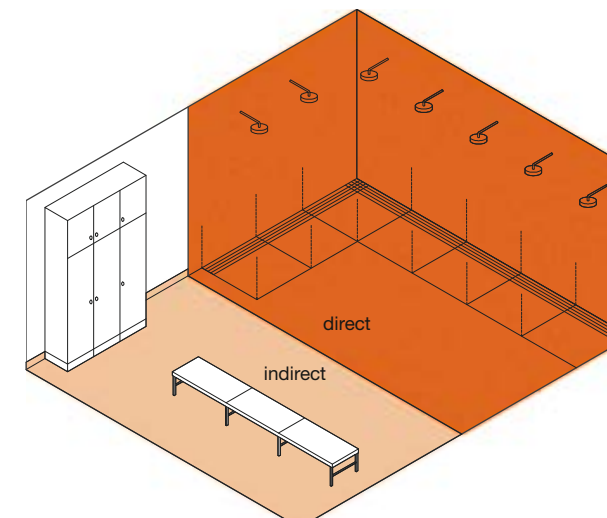
### Private bathroom with bathtub not used as shower and with floor drain in the shower area (exposure class A0)

Level-access shower without partitions. As a result, the floor must be waterproofed.



### Showers in sports facilities or swimming pools (exposure class A/A indirect)

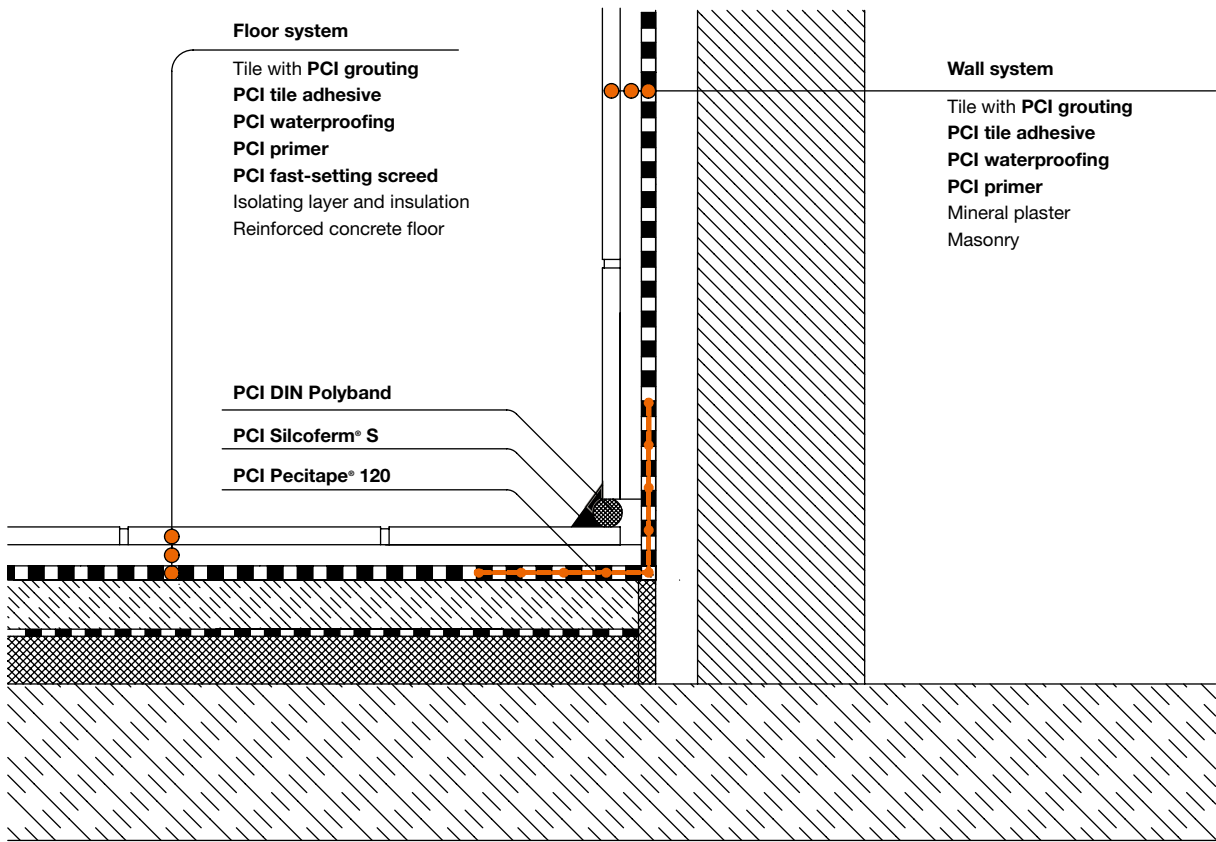
Communal showers without partitions, positioned next to the changing room. As a result, there may be discussions as to which area needs to be waterproofed.



# Detail – floor/wall transitions



Waterproofing and laying



**Bonded waterproofing materials must be selected in accordance with the exposure class**

**Exposure class A0/A**

Spray water protection on walls

- PCI Lastogum®, 2 layers with a total of 0.5 mm\*

**Exposure class A0/A**

Spray water protection on floor and wall

- PCI Seccoral® 1K/2K Rapid, 2 layers with a total of 2 mm\*

**Exposure class B0**

Outdoor areas

- PCI Seccoral® 1K/2K Rapid, 2 layers with a total of 2 mm\*

**Exposure class B0**

Pressing water, containers

- PCI Seccoral® 1K/2K Rapid, 2 layers with a total of 2 mm\*

**Exposure class C**

Water and aggressive chemicals

Wall surfaces

- PCI Apoflex® W, 2 layers with a total of 1 mm\*

Floor surfaces with a maximum slope of 3 %

- PCI Apoflex® F, 2 layers with a total of 1 mm\*

**Fast-setting screeds are selected in line with the time available for construction**

PCI Novoment® Z1/M1 plus  
PCI Novoment® Z3/M3 plus

**The primer depends on the waterproofing material and the substrate**

**Waterproofing with PCI Lastogum®**

- Gypsum-based substrate: PCI Gisogrund®
- Cementitious substrate:

PCI Gisogrund®, diluted 1:1 with water

**Waterproofing with PCI Seccoral® 1K/2K Rapid**

- Gypsum-based substrate: PCI Gisogrund®
- Cementitious substrate:

PCI Seccoral® 1K/2K Rapid, diluted with additional 10 % water

**Waterproofing with PCI Apoflex® F/W**

- PCI Epoxigrund 390, with sand scattered over wet primer

**The tile adhesive depends on chemical exposure and the laying system**

**Tiling with flexible, cementitious tile adhesives (walls and floors)**

- PCI Nanolight®
- PCI Flexmörtel® S1

**Tiling with flexible cementitious tile adhesives (especially floors) with thin-bed or flowable consistency**

- PCI Flexmörtel® S2

**Tiling with reaction resin tile adhesives**

- PCI Durapox® NT/NT plus

**The grouting material depends on chemical exposure**

**PCI Nanofug® Premium**

- Exposure to service and cleaning water, normal domestic detergents

**PCI Flexfug®**

- Exposure to water and outdoor applications

**PCI Durafug® NT**

- Exposure to service, cleaning and swimming pool water (not aggressive to concrete), industrial cleaning, occasionally acidic, steam jetting

**PCI Durapox® NT plus**

- Exposure to water and chemicals

## Proper application of waterproofing

The first step is to ensure that the substrate is firm, strong and clean. If applicable, the substrate must be primed in accordance with the technical data sheets. Gypsum materials must always be primed.

Before the waterproofing material is applied to the main surface, attention must be paid to critical details. These include:

- Transitions between walls and floors
- Penetration points
- Drains (single points and lines)
- Expansion joints and transitions to other building components
- Door openings

The requirements for all these critical details are stated in the ZDB code of practice for bonded waterproofing. The code of practice requires nonwoven fabric inserts or foils to be used above all perimeter joints, movement joints and at transitions to walls. Where possible, these are to be inserted as loops. In practice, it is difficult to create this type of loop. As PCI Pecitape® waterproofing tapes are extremely flexible, loops are not required. When positioning the waterproofing tape, it is important to ensure that no sound transmission paths are created. Please follow the instructions on the next two pages.

\* Dry film thickness





To prevent contact between the waterproofing material and the installation strip at the edge, we recommend that this area should be carefully covered when working on walls.



PCI Lastogum® is applied to the wall for bonding the waterproofing tape PCI Pecitape® 120.



The insulating strip at the edge remains dry.



PCI Lastogum® is applied to the floor.



It should look like this.



Insertion of the special inside corner PCI Pecitape® 90° I into the PCI Lastogum®.



Position PCI Pecitape® 120 to overlap the waterproofing corner...



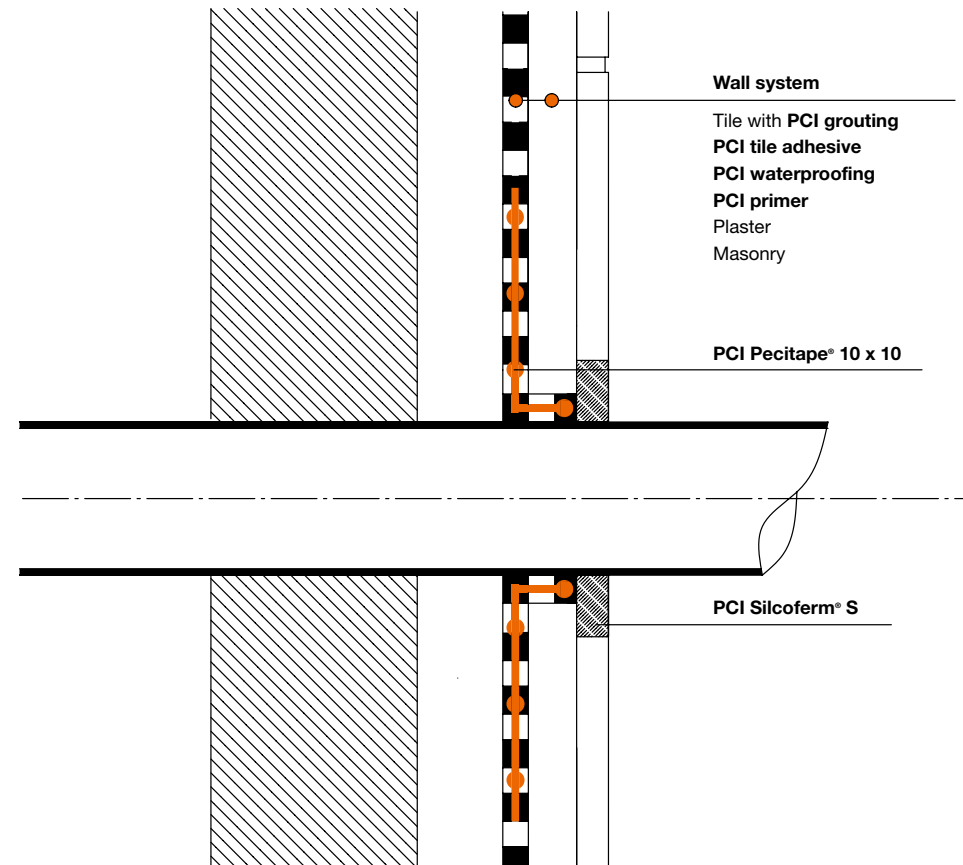
... and apply PCI Lastogum® to the areas with a fleece backing.



The same steps must be taken in the case of vertical inside corners.



## Detail – penetration points



Bonded waterproofing materials must be selected in accordance with the exposure class

### Exposure class A0/A

Spray water protection on walls

- PCI Lastogum®, 2 layers with a total of 0.5 mm\*

### Exposure class A0/A

Spray water protection on floor and wall

- PCI Seccoral® 1K/2K Rapid, 2 layers with a total of 2 mm\*

### Exposure class B0

Outdoor areas

- PCI Seccoral® 1K/2K Rapid, 2 layers with a total of 2 mm\*

### Exposure class B

Pressing water, tanks

- PCI Seccoral® 1K/2K Rapid, 2 layers with a total of 2 mm\*

### Exposure class C

Water and aggressive chemicals

- PCI Apoflex® W, 2 layers with a total of 1 mm\*
- PCI Apoflex® F, 2 layers with a total of 1 mm\*

The primer depends on the waterproofing material and the substrate

### Waterproofing with PCI Lastogum®

- Gypsum-based substrate: PCI Gisogrund®, undiluted
- Cementitious substrate: PCI Gisogrund®, diluted 1:1 with water

### Waterproofing with PCI Seccoral® 1K/2K Rapid

- Gypsum-based substrate: PCI Gisogrund®, undiluted
- Cementitious substrate: PCI Seccoral® 1K/2K Rapid, diluted with about 10 % additional water

### Waterproofing with PCI Apoflex® F/W

- PCI Epoxigrund 390, with sand scattered over wet primer

The tile adhesive depends on chemical exposure and the laying system

### Tiling with flexible, cementitious tile adhesives (walls and floors)

- PCI Nanolight®
- PCI Flexmörtel® S1

### Tiling with flexible cementitious tile adhesives (especially floors) with thin-bed or flowable consistency

- PCI Flexmörtel® S2

### Tiling with reaction resin tile adhesives

- PCI Durapox® NT/NT plus

\* Dry film thickness



## Proper waterproofing of penetration points

As penetration points and fittings are normally located in the direct spray water zone, they are an especially important detail of bonded waterproofing. Special care must be taken to incorporate these details into the overall waterproofing system. For example, all fittings that penetrate the waterproofing must be equipped with a watertight connection using elastic sleeves. The pipe sleeve must surround the pipe itself and not the pipe plug, as is often seen on construction sites. If this is not possible because of the situation on site, the plumber must install an extension.

### Solution

Penetrating pipes with a diameter of ½" or ¾" may be waterproofed using PCI Pecitape® 10 x 10 sleeves. For larger diameters, individual waterproofing sleeves may be made up by specialists using the waterproofing membrane PCI Pecilastic® W. Please follow the instructions on the next two pages.



Examples of pipe penetration solutions.





Pipe penetration points with a diameter of more than ¾" may be waterproofed using PCI Pecitape® 42.5 x 42.5. As an alternative, waterproofing sleeves may be made from PCI Pecilastic® W.



Important: two layers of waterproofing must always be applied.



PCI Seccoral® 2K Rapid

## Waterproofing – fast as lightning



Sometimes, you really have to work fast. PCI's waterproofing slurry for use under ceramic coverings, PCI Seccoral® 2K Rapid, can already be covered with tiles or natural stone coverings after only four hours. Especially on modernization projects under severe pressure of time, speed is of the essence.

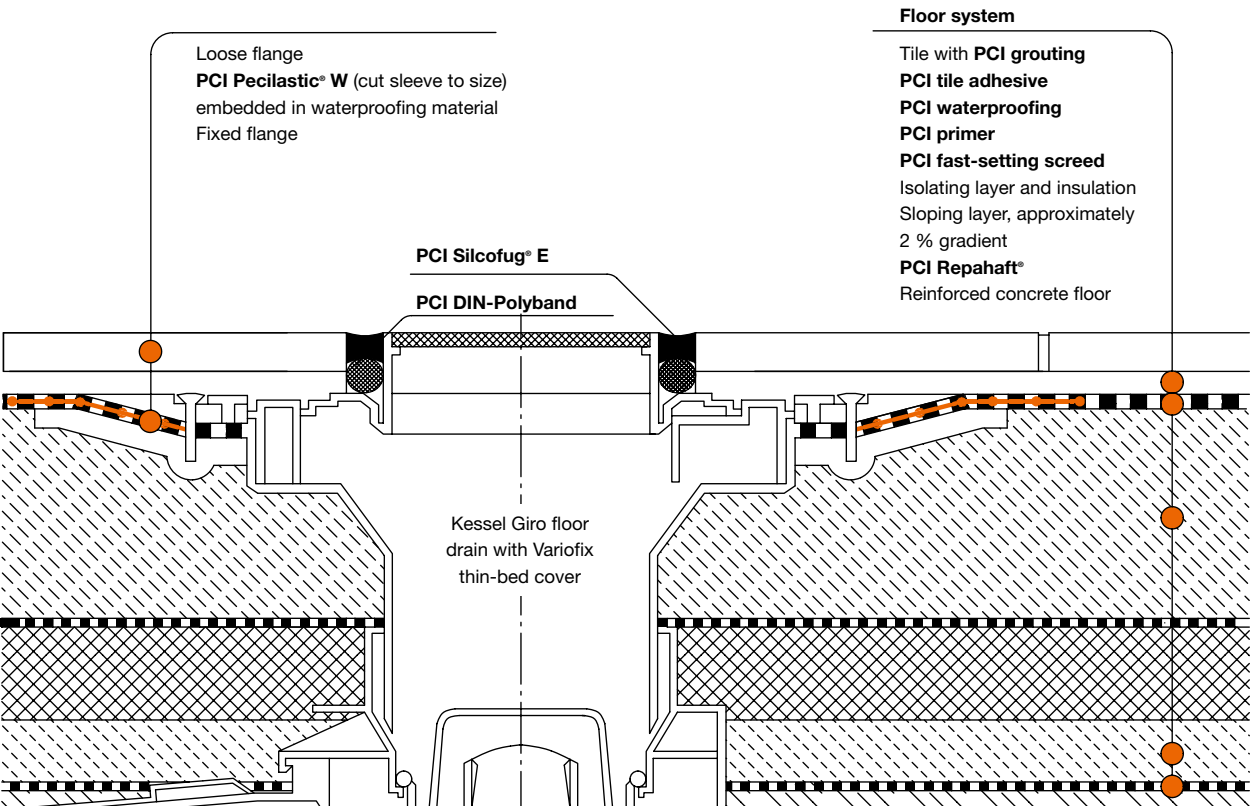
The two-component waterproofing slurry is approved by the construction authorities for waterproofing work in wet rooms and in swimming pools.

### PCI Seccoral® 2K Rapid

- Approved by the construction authorities for bonded waterproofing in areas with severe water exposure
- For flexible waterproofing under moderate exposure
- For the crack-bridging waterproofing of structures and for protection against water pressing from the inside under ceramic coverings in showers, swimming pools and therapy tools
- Extremely convenient application: low odour, supple material, long skin formation time but short setting time

Detail – floor drains

Connection to floor drain:  
Kessel Variofix thin-bed drain cover



Bonded waterproofing materials must be selected in accordance with the exposure class

- Exposure class A0**  
Moderate water exposure on floor
- PCI Lastogum®, 2 layers with a total of 0.5 mm\*
- Exposure class A**  
High exposure to water
- PCI Seccoral® 1K/2K Rapid, 2 layers with a total of 2 mm\*
- Exposure class C**  
Water and aggressive chemicals  
Floor surfaces with a maximum slope of 3 %
- PCI Apoflex® F, 2 layers with a total of 1 mm\*

Fast-setting screeds are selected in line with the time available for construction

- PCI Novoment® Z1/M1 plus
- PCI Novoment® Z3/M3 plus

The primer depends on the material of the drainage flange

- Stainless steel**
- PCI Elastoprimer 220 (degrease flange before applying!)
- PS (polystyrene), ABS, hard PVC**
- PCI Gisogrund® 303 or PCI Gisogrund® 404
- Polypropylene or polyethylene are not suitable. A sleeve must be flanged to these components by the manufacturer.

The tile adhesive depends on chemical exposure and the laying system

- Tiling with flexible, cementitious tile adhesives (walls and floors)**
- PCI Nanolight®
  - PCI Flexmörtel® S1
- Tiling with flexible cementitious tile adhesives (especially floors) with thin-bed or flowable consistency**
- PCI Flexmörtel® S2
- Tiling with reaction resin tile adhesives**
- PCI Durapox® NT/NT plus

\* Dry film thickness



Waterproofing can only be as good as the workmanship on critical details. Floor drains are especially important.

The careful connection of floor drains to bonded waterproofing is a key detail as different materials need to be connected to each other. It is especially important to have details on the properties and processing of the materials used. Otherwise, leaks may occur at a critical point in the floor structure.

Various types of floor drains are available. These may be equipped with a sleeve which has been flanged to the component by the manufacturer or with a bolted flange. As shown in the photographs on the following pages, this variant allows a combination of adhesive bonding and clamping. The waterproofing sleeve can therefore be attached to the floor drain in such a way as to allow proper functioning.

Please follow the instructions and requirements of the ZDB code of practice for the design and construction of drains and channels in combination with bonded waterproofing (AIV).



Variant-CR 142 floor drain cover from ACO Passavant





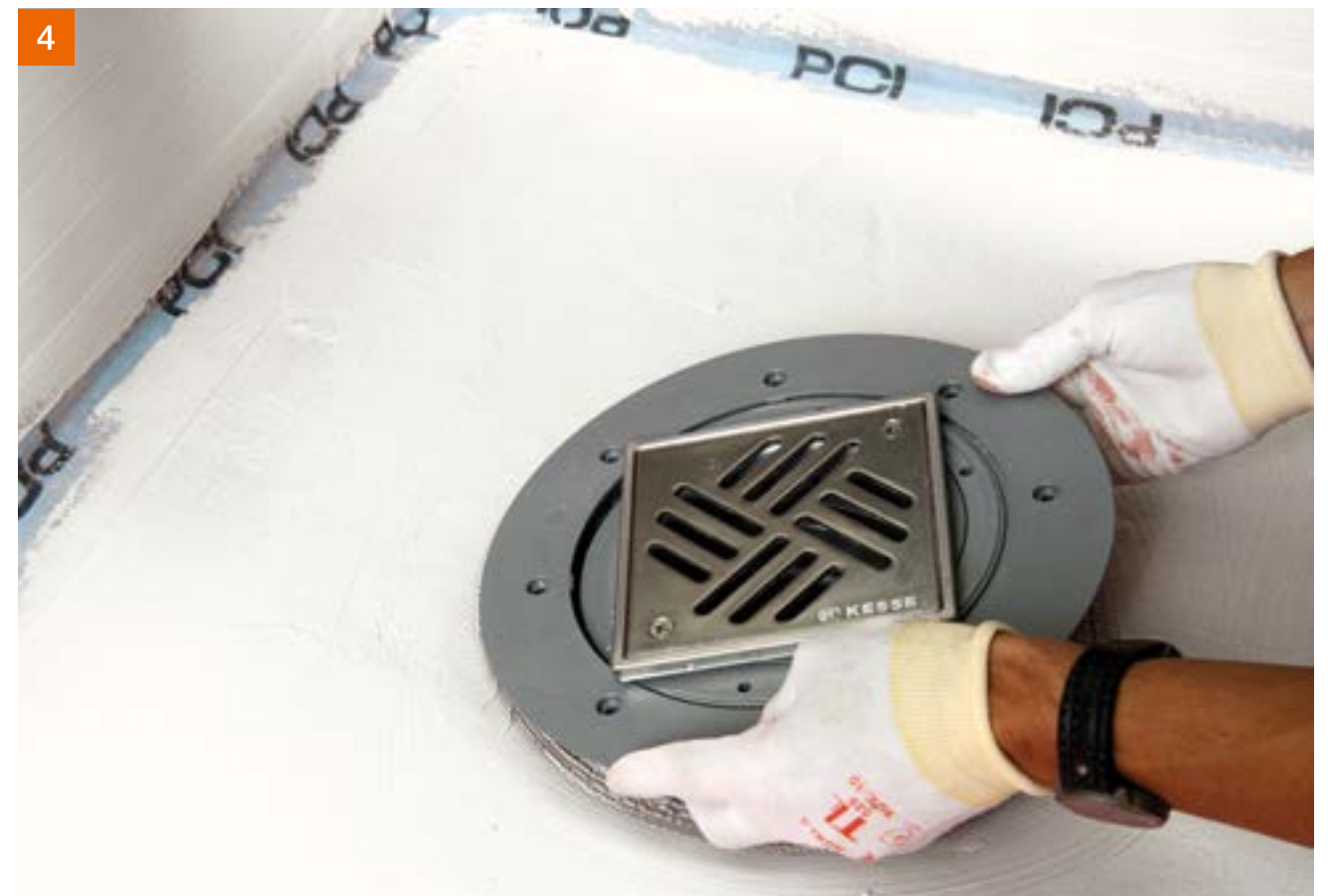
Priming of flange with PCI Gisogrund\* 303 or PCI Gisogrund\* 404.



Apply PCI Lastogum\* ...



... and press the fabric into place in accordance with the slope and bond it in place with PCI Lastogum\* (first layer).  
Apply second layer of PCI Lastogum\*, after waiting for about one hour.



Position clamping flange and bolt it in place.



## Detail – drainage channel



### Installation of a drainage channel

Normally, a floor drainage channel is installed, adjusted and then surrounded by mortar. After the mortar has cured, the channel must be connected to the bonded waterproofing. Depending on the material properties of the adhesive flange, it may be necessary to prime the flange, for example with PCI Gisogrund® 303 or 404. The adhesive flange should have a minimum width of 30 mm. In areas with severe exposure to water, it is generally recommended to use an epoxy resin primer such as PCI Epoxigrund 390. For connection to the bonded waterproofing, either a sleeve supplied by the manufacturer or sleeves made up from PCI Pecilastic® W waterproofing membrane may be used.

Further instructions are given in the ZDB code of practice on the design and construction of drains and channels in combination with bonded waterproofing, 2012 edition.



In areas with severe water exposure, the channel is embedded in epoxy resin mortar and then primed using PCI Epoxigrund 390 epoxy resin primer or PCI Elastoprimer 220. Kiln-dried silica sand must be scattered over the primer while it is still wet.



The connection flange must be primed with PCI Gisogrund® 303 or PCI Gisogrund® 404 in areas with moderate exposure or with PCI Epoxigrund in areas of severe exposure.



The remainder of the floor is primed with PCI Gisogrund®.





Apply PCI Lastogum® or PCI Seccoral® 2K Rapid as adhesive for the fabric supplied with the channel...



... embed the fabric in the adhesive...



... and cover it with a small amount of waterproofing material.



Finally include the drainage channel in the waterproofing of the surface. Two layers of waterproofing material must be applied.



Apply the second layer after waiting for about 1 hour.

PCI Nanolight®

## A state-of-the-art all-rounder



### PCI Nanolight®

- For almost any application: indoors, outdoors, walls, soffits, all substrates including cementitious screeds, gypsum fibre boards, mastic asphalt, OSB or chipboard, old PVC or ceramic coverings and even metal surfaces
- Suitable for repairs and levelling
- For all ceramic tiles
- Can be used for thin beds and medium beds up to a thickness of 15 mm
- Processing time about 90 minutes; nevertheless sets fast and hardens with low residual stress
- Very low emissions GEV EMICODE EC1 R, dust reduced

Since it was introduced, the light, flexible mortar PCI Nanolight® has been a popular and successful all-rounder. This product meets the requirements for class C2 TE S1 in accordance with DIN EN 12004 and is in accordance with the guidelines for flexible mortars. The main advantage of PCI Nanolight® is that it can be used on all substrates, on indoor and outdoor walls and floors, and for a variety of different ceramic tiles. PCI Nanolight® is an excellent choice for almost any application. It can even be used for terraces, swimming pools and industrial applications. Advanced nanotechnology and a specially adapted lightweight formulation give PCI Nanolight® outstanding product properties and a creamy consistency that allows fast, effortless working. The low-dust formulation makes this material easy to pour and mix, allowing interior renovation work without irritating dust. Despite the long processing time of about 90 minutes, the mortar can be fully loaded after only about 24 hours.





## For luxurious and individual shower solutions

Level-access showers are a standard feature of modern bathrooms. Apart from a more elegant appearance, these showers offer a number of benefits for users. As there are no barriers, it is easy to enter the shower, which makes everyday life more convenient not only for older people or people with disabilities.

Of course, level-access showers can be constructed by conventional procedures, with separate installation of the floor drain and a sloping screed. However, pre-fabricated elements offer a number of benefits which are explained on the following page. These packaged solutions provide a high degree of leeway for individual design at the same time as allowing fast, highly reliable installation work.

### PCI Pecidur®

#### Quick renovation with PCI Pecidur® HR foam supporting elements

The PCI Pecidur® HR foam supporting elements can be well combined with PCI Pecibord® substructure elements for use on floors, walls and soffits on sensitive substrates, e.g. in bathrooms. The elements are coated with a special

mortar and can be directly tiled or plastered over. The light weight allows easy handling. Prefabricated angle elements are available for corners and cladding of pipes and wires.

## Product characteristics shared by all PCI Pecibord® products

#### Tested

All PCI Pecibords® feature an integrated slope, a waterproofed top surface and a flange for a PCI Pecibord® floor drain that is already integrated in waterproofing or an integrated stainless steel drainage channel. They are in accordance with the requirements for exposure class A\* or A0 and can be used in accordance with the requirements of the Construction Regulation List. They have a general certificate of approval for use as waterproofing panels issued by the construction authorities.

#### System advantage

All PCI Pecibords® are compatible with the PCI products for reliable waterproofing and the laying of tiles, flags and natural stone coverings.

#### Convenience advantage

Using PCI Pecibord®, luxurious, level-access showers for public or private use can be installed easily, reliably and rapidly.

#### Time advantage

Compared with conventional screeds, the pre-fabricated elements ensure considerably faster progress with construction. Many steps are no longer required and there are no waiting times.

#### Environmental advantage

All PCI Pecibords® have a core of hard polystyrene foam produced by environmentally compatible processes and a glass-fibre-reinforced cementitious coating.

#### High stability

The outstanding quality of the EPS foam used ensures high compressive strength. PCI Pecibords® are therefore suitable for wheelchair service and can also be covered directly with small mosaic tiles.

#### Universal use

In view of the parameters which can be selected by users, these products offer an almost unlimited variety of sizes, shapes and drain positions. They can therefore be used for almost any project.

#### Handling advantage

The light weight of these products makes for easier handling. PCI Pecibords® can be processed with simple tools normally used on construction sites.

\* In accordance with the ZDB code of practice for bonded waterproofing with coverings and linings made from tiles and flags for indoor and outdoor use, 2012 edition.



**PCI Pecibord® Standard**  
A square board with central drain opening, available in three standard sizes.



**PCI Pecibord® P**  
Almost any shape is possible and the position of the drain can be determined individually.

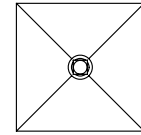


**PCI Pecibord® Linea L1**  
A board sloping in one direction to the drainage channel at the edge.



## PCI Pecibord® Standard

# Simple but effective



PCI Pecibord® Standard

A square board with central drain opening,  
available in three standard sizes.

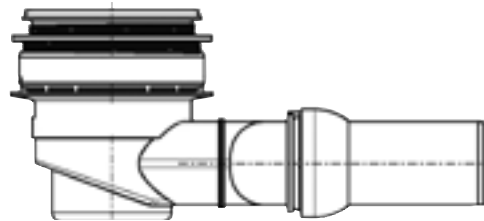
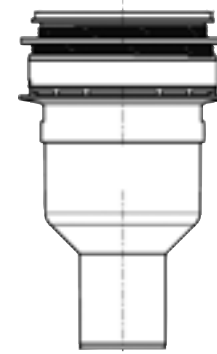


Level-access showers give any bathroom a feeling of spaciousness. More and more people appreciate the convenience of these solutions which create a completely different atmosphere.

PCI Pecibord® Standard substructure elements are available in three common square sizes, directly from stock. These boards are already an outstanding solution for most standard applications. As with all the other PCI Pecibord® products, there are no restrictions on tiling. Any tiles ranging from small mosaics to large natural stone flags can be used.

### The special features of PCI Pecibord® Standard

- Centred drain opening
- 3 square sizes
  - 900 x 900 mm
  - 1,000 x 1,000 mm
  - 1,200 x 1,200 mm
- Available ex works
- Top surface waterproofed, with integrated flange for floor drain
- 2 floor drains can be selected for different installation situations



### PCI Pecibord® Bodenablauf S floor drain

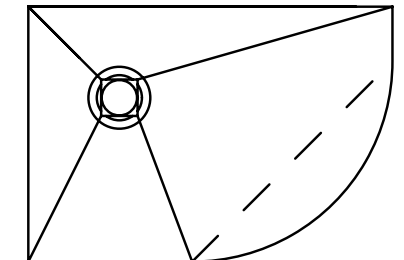
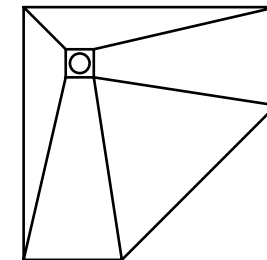
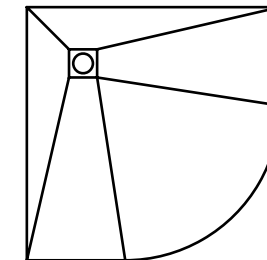
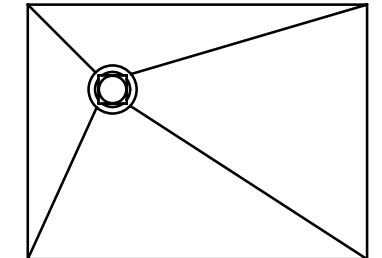
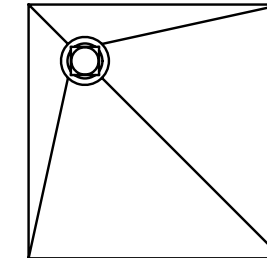
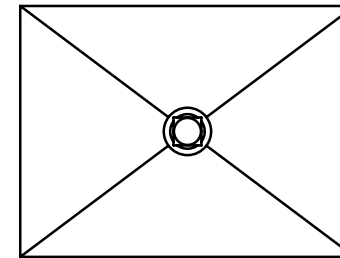
- For all PCI Pecibord® Standard and PCI Pecibord® P substructure elements except PCI Pecibord® LINEA
- With central, vertical drain opening
- With screwed attachment allowing infinitely variable height adjustment
- Incl. detachable air trap and stainless steel grating
- Discharge rate approx. 60 l/min

### PCI Pecibord® Bodenablauf W floor drain

- For all PCI Pecibord® Standard and PCI Pecibord® P substructure elements except PCI Pecibord® LINEA
- With ball joint on the horizontal drain opening for easier adaptation to site conditions
- With screwed attachment allowing infinitely variable height adjustment
- Incl. detachable air trap and stainless steel grating
- Discharge rate approx. 42 l/min

## PCI Pecibord® P

# Freedom up to 6.25 m²



### PCI Pecibord® P

Almost any shape is possible and the position of the drain can be determined individually.

PCI Pecibord® P is anything but a standard substructure solution. Within the size range from 900 x 900 mm to 2,500 x 2,500 mm, these boards can be used for almost any shape. And the floor drain can be installed in almost any position subject to a certain minimum spacing from the edge. This product can therefore be used for twin showers as well as showers with a quarter-circle or polygonal configuration.

### The special features of PCI Pecibord® P

- Almost any shape is possible (within the size range from 900 x 900 mm to 2,500 x 2,500 mm)
- Considerable leeway for individual creativity
- Almost any idea can be realized
- Top surface waterproofed, with integrated flange for floor drain
- 2 floor drains can be selected for different installation situations (see page 72)
- Tailor-made boards can be delivered within about 15 days of ordering

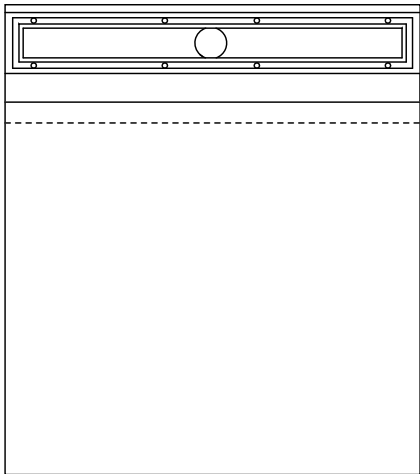


# Design right down the line

PCI Pecibord® Linea L1 substructure elements with drainage channels ensure spaciousness and modern elegance in any wellness area. The integrated drainage channels provide highly secure waterproofing. The TILE grating included in the delivery can even be tiled to match the remainder of the tiled surface.

**The special features of PCI Pecibord® Linea L1**

- Top surface waterproofed, with integrated stainless steel drainage channels available in five sizes from 650 to 1,150 mm
- With a slope in one direction – the ideal solution, especially for niches
- Available in sizes 900 x 900 mm (channel width 870 mm) and 1,000 x 1,000 mm (channel width 970 mm)
- Tailor-made boards can be delivered within about 15 days of ordering



PCI Pecibord® Linea L1  
Slope in one direction  
to drainage channel  
at edge

**Accessories**

A special grating is available for use with PCI Pecibord® Linea L1. This grating can be tiled directly and allows harmonious integration into the floor covering. If the TILE grating is installed on its back, the result is a minimalist, closed design.



TILE grating, tiled



TILE grating



Waterproofing and laying



# Installation steps



PCI Pecibord® may be installed on a pressure-resistant hard polystyrene foam panel glued in place over its entire area.



The drain is connected to the existing drain pipe...



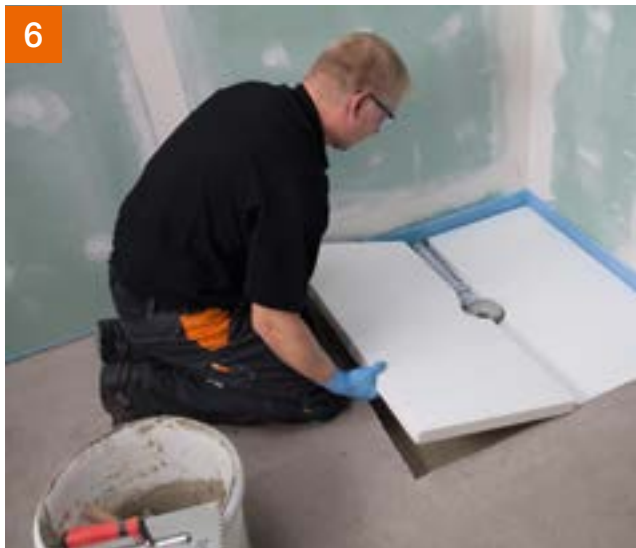
... and aligned.



A leak test is carried out before continuing work.



Hard polystyrene foam panels of appropriate thickness are used for levelling.



The panels are bonded to each other using an adhesive mortar such as PCI Flexmörtel® S1.

**Tip:** Height of screed structure – edge thickness of PCI Pecibord® – 5 mm for tile adhesive = thickness of EPS panels



Apply tile adhesive to bond the PCI Pecibord® to the substructure panel.



Apply a scratch coat to the substructure and the back of the PCI Pecibord®. Then comb on the adhesive.





Position the PCI Pecibord® and press it into place until the waterproofing ring neatly surrounds the floor drain.



Check the level using a spirit level and...



... screw the PCI Pecibord® firmly to the floor drain using a temporary plug. The temporary plug prevents any material from construction work from entering the drain.



Cut off the insulating strip at the edge to be flush with the top of the PCI Pecibord®.



Prime the screed at the transition to the board using PCI Gisogrund®.



**Tip:** Mask the edge of the sound-deadening insulating strip with adhesive tape to prevent any material from entering the gap.



Apply PCI Lastogum® as an adhesive for the waterproofing tapes...



... remove the adhesive tape...

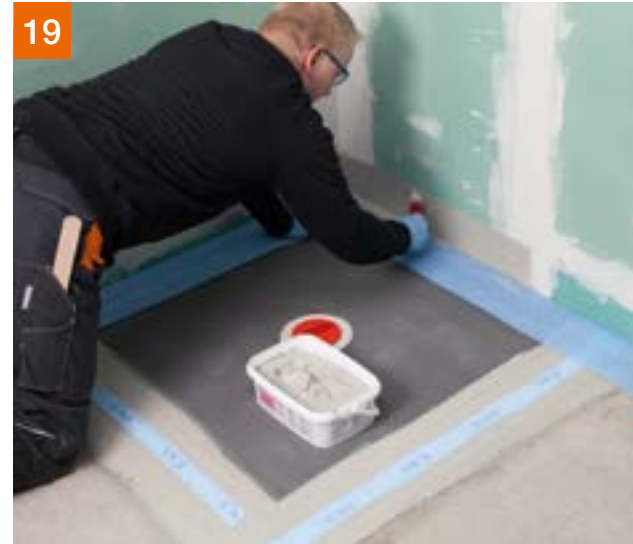


... position PCI Pecitape® 120 and press it into place ...





... and paint over the edges again with PCI Lastogum®.



Next step: Waterproofing of the wall/floor transitions.

**Tip:** To avoid the creation of noise transmission points, cover the wall/floor transition before applying PCI Lastogum® to the wall.



Paint over the edges again.



Finally, waterproof the surface.

Apply first layer of PCI Lastogum®, grey.



Remove the temporary barrier strip and apply PCI Lastogum® to the edge section.



Install PCI Pecitape I 90° (inside corner).



Position PCI Pecitape® 120 and press it into place.



After about one hour, apply the second layer of PCI Lastogum®, white.

## Comparison of membranes and liquid-applied waterproofing



## The classic: liquid-applied bonded waterproofing

Liquid or pasty bonded waterproofing materials may be applied using rollers, brushes or trowels. They are easy to apply, even to surfaces with difficult shapes and details. In combination with waterproofing tapes, sleeves and prefabricated parts that have been tested in the system, they represent a practical solution for waterproofing problems of all types which are ideal for application on site. However, there are a few basic principles that need to be followed.

### Multi-layer application for reliable waterproofing

At least two layers of liquid waterproofing agent must be applied. The objective is to ensure reliable waterproofing. Under site conditions, it is difficult to ensure the production of a layer of homogeneous thickness without any gaps if only one layer of material is applied. If two layers are carefully applied, it is possible to comply with the minimum dry film thickness requirements of DIBt (0.5 mm in the case of dispersion materials, 2.0 mm for polymer/cement mortar combinations and 1.0 mm for reaction resin waterproofing materials). This approach provides greater security for the contractor and the client.

## The alternative: bonded waterproofing with membranes

The use of waterproofing membranes may be an effective alternative. These membranes are produced with homogeneous thickness in a high-precision industrial process and minimize possible problems caused by inadequate manual application to the surface.

### Rapid application to surfaces, a little tricky with details

In addition, bonded waterproofing membranes with backing fabric on both sides are extremely resilient and can be used for all exposure classes, including exposure class C. There is another significant advantage: application is an extremely fast process. Membranes can be applied to a primed surface in only one step. If a fast-setting adhesive is used, ceramic tiles and natural stone coverings can be laid on the waterproofing within a very short space of time. In order to avoid problem areas, considerable care must be taken with joints between membrane strips as well as with details and transitions to waterproofing tapes and pre-fabricated components, wall/floor transitions and penetration points.

**Tip:** In the case of irregularly shaped objects and surfaces with a large number of penetration points, it may be appropriate to use a combination of membranes and liquid-applied waterproofing.

### Conclusion

Both types of bonded waterproofing may be used if they have an appropriate test certificate that confirms their suitability for the application or the exposure class concerned. However, contractors should expressly state that they plan to use a specific type of waterproofing in their proposals if this represents a deviation from the call for tenders.

Depending on the requirements of the individual project, it makes sense to select products in view of their specific benefits. In the final resort, the decisive factors are workmanship, commercial aspects and time management.

## Properties of waterproofing types at a glance:

### Liquid-applied waterproofing

- Easy handling, also for details
- Fast-setting variants make the use of these systems economical even for renovation
- Multi-layer application required

### Waterproofing membranes

- Fast progress is possible, but details may be a little tricky
- May offer benefits for small projects
- Homogeneous thickness guaranteed but strips need to be carefully bonded to each other



Liquid waterproofing materials must always be applied in at least two layers.



The overlapping area of membrane strips must be coated with a liquid waterproofing material (over a width of 5 to 10 cm). The next strip must then be positioned and carefully pressed into place during the open time of the liquid waterproofing material.



## Waterproofing: exposure class B



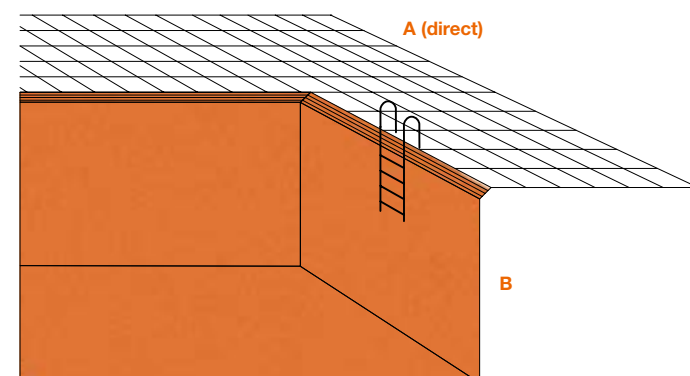




# Overview of swimming pool construction

Both new pool construction and refurbishment projects face very special requirements. In order to ensure that the result is a high-quality durable swimming pool, special attention must be paid to three critical points: the waterproofing of the pool, the design of the pool edge and coping and the proper integration of penetrating systems into the waterproofed surface. The **swimming pool system** offers the highest level of security (see page 182 ff.).

While the swimming pool itself is classed as exposure class B, the coping is classed as exposure class A.



## Regulations, codes and standards

Careful detailed design and good workmanship are essential in swimming pool construction to guarantee a fully functional pool for a long time. The following codes and standards provide assistance for design and construction:

### DIN EN 206-1

Concrete – Specification, performance, production and conformity

### DIN 1045

Concrete, reinforced and prestressed concrete structures

### DIN EN 12 004

Adhesives for tiles – Requirements, evaluation of conformity, classification and designation

### DIN 18 157

Execution of ceramic linings by thin mortar bed technique

### DIN 18 202

Tolerances in building construction

### KOK codes

Code of practice of the Swimming Pool Coordination Committee for swimming pool construction

### Construction codes

Codes for medical pool construction

### Safety regulations of public accident protection insurers

for swimming pools

### DIN 19 643-1

Treatment of water of swimming pools and baths – Part 1: General requirements

### DIN 4030

Assessment of water, soil and gases for their aggressiveness to concrete

### Codes of practice

of the German Swimming Pool Association

### ZDB code of practice

Ceramic coverings in swimming pools – design and construction

### Thermal Insulation Ordinance (WSVO)

### Energy Saving Ordinance (EnEV)

### Construction Regulation List

In accordance with the requirements of the Construction Regulation List, bonded waterproofing under tiles and slabs in areas with severe moisture exposure has required a general approval certificate issued by the construction authorities since April 2002. All approved waterproofing products must be marked with a “Ü” symbol.

Other criteria for the fitness for purpose of a swimming pool include:

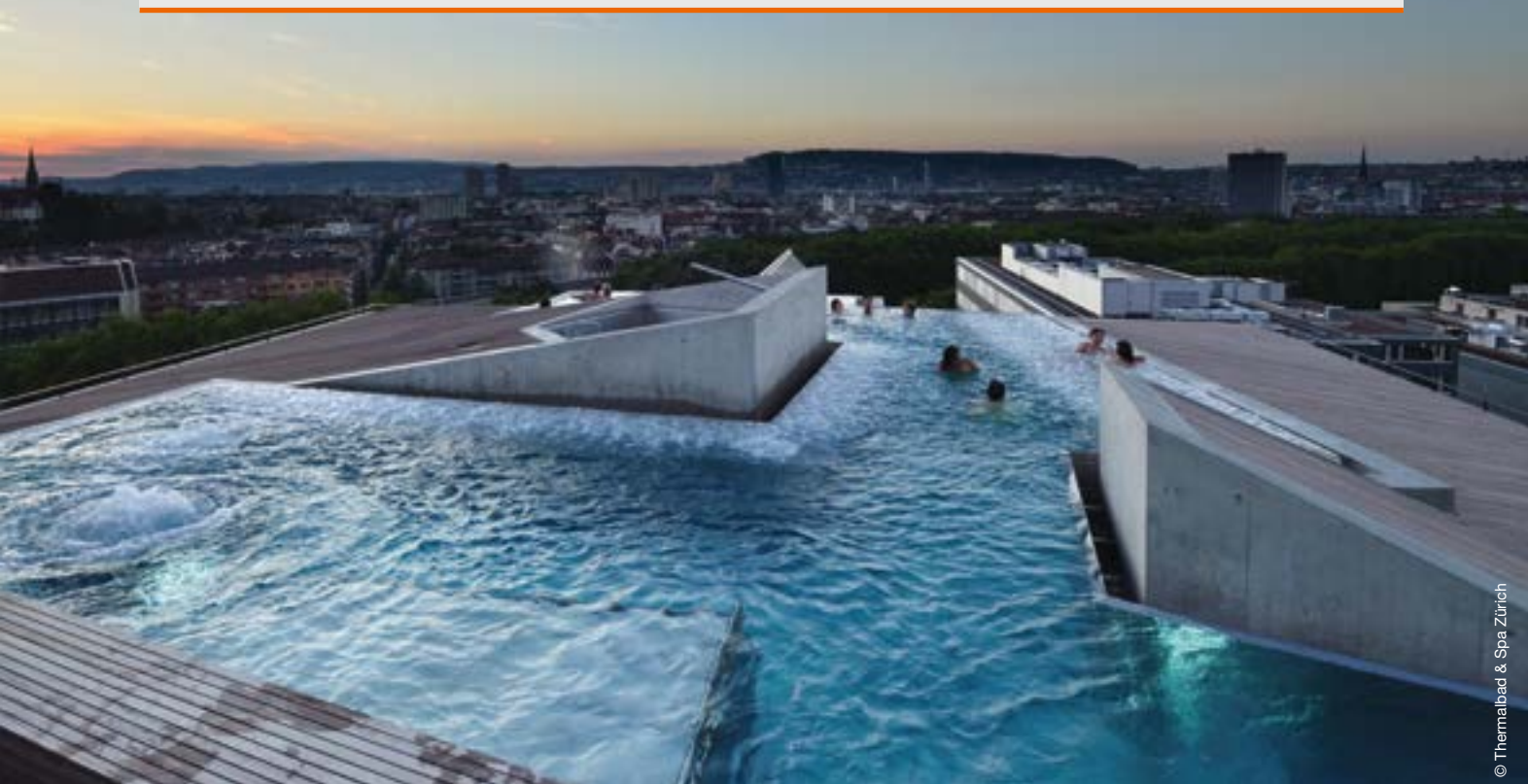
- A hydraulic system in accordance with the regulations
- Filter performance in accordance with the size of the pool
- Pool hygiene

A distinction is made between high and low pool edge systems and between pools for different purposes:

- Private pools
- Public pools
- Hotel pools
- Therapy pools
- Training and sports pools
- Adventure pools



## Reinforced concrete pools



© Thermalbad & Spa Zürich

## A popular swimming pool material

Most swimming pools are built using impermeable reinforced concrete. The material used is subject to stringent requirements. In accordance with the code of practice of ZDB (Central Association of the German Construction Industry), the width of shrinkage cracks must be limited to 0.15 mm or, if the ratio of water height to component thicknesses in excess of 5, to 0.10 mm. Crack edge displacement must be avoided. Expansion and movement joints are waterproofed using special movement joint tape resistant to pressing water which must be covered by concrete. The substrate must be absolutely level in order to prevent voids under the covering. It is recommended that the substrate should be roughened (for example by sandblasting or very-high-pressure water jetting) and levelled using PCI Pericret® (see pages 36/37). This also removes foreign matter such as formwork grease or cement slurry which may be detrimental to bonding.

Even though the concrete used is impermeable, it is still recommended to apply waterproofing to the pool and to details such as penetration points required for lighting, nozzles, etc. Special attention must be paid to workmanship at these points. In order to obtain a continuous waterproof surface, it is essential to apply bonded waterproofing, for example using PCI Seccoral® 2K Rapid special waterproofing slurry in combination with PCI Pecitape® for penetration points and corners. Bonded waterproofing also protects the pool against unsightly efflorescence. As bonded waterproofing severely reduces stress between the substrate and the tiling by isolating the tiling from the reinforced concrete substrate, the durability of the tiling is significantly improved. Under certain conditions, it is therefore possible to tile the pool at an earlier date.



© Tschuggen Grand Hotel, Arosa



## Pool edge and gutter systems

### Edges are of central importance

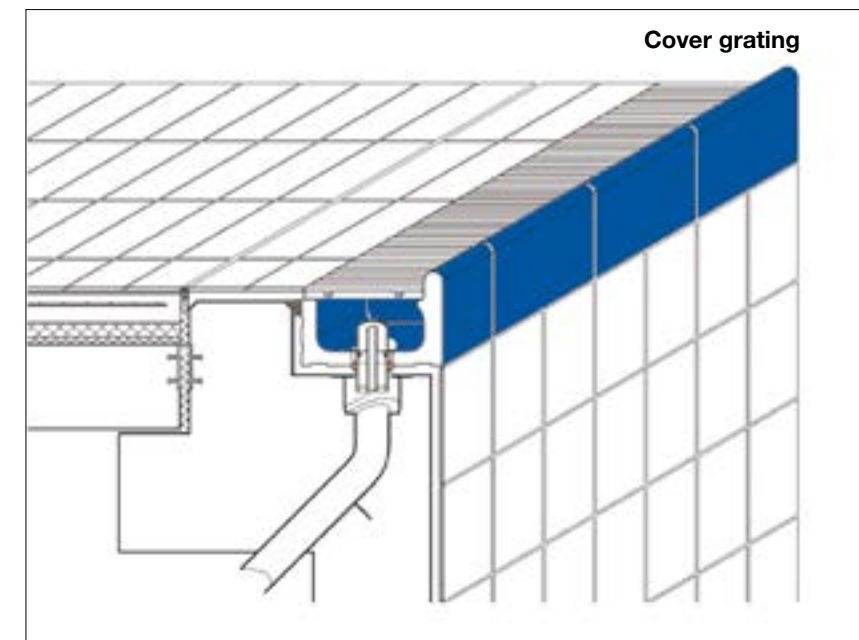
The selection of a pool edge system is a design decision that depends on the purpose and later use of the pool. A distinction is made between pool edge systems for high and low water levels. Therapy pools represent a design variant. (As regards the installation and waterproofing of gutter bricks, see pages 96 ff.) Further criteria which must be taken into consideration when selecting a pool edge system include:

- Overflow gutter surrounding the pool
- Avoidance of chlorine gas accumulations
- Good visibility of water surface for supervisory personnel
- Easy cleaning of gutters
- Rapid calming of water surface with Finnish pool edge system
- The cross section of the overflow gutter must be properly designed and sized

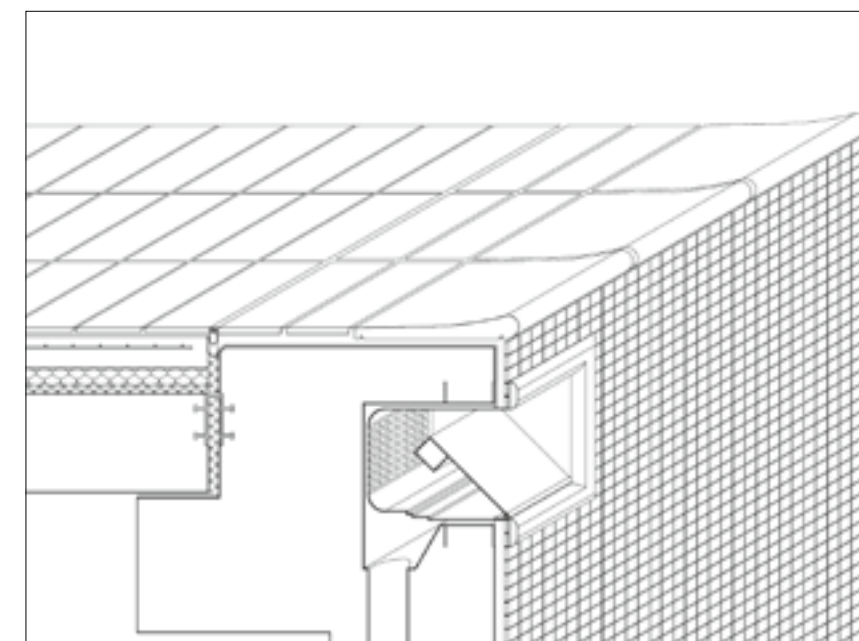


## Pool edge with low-level overflow system

Low-level pool edge systems are found on many competition pools constructed in the 1960s and 1970s. Skimmer systems are mainly used on private pools. The overflow gutter is located below the pool coping, which is not flooded by water. At the same time, markings or fasteners can also be positioned on the inside of the pool above the water level.



**Wiesbaden system, high-level:** large gutter tile with handhold, cover grating and SILENT W 2000 low-noise overflow. Suitable for many types of pool.



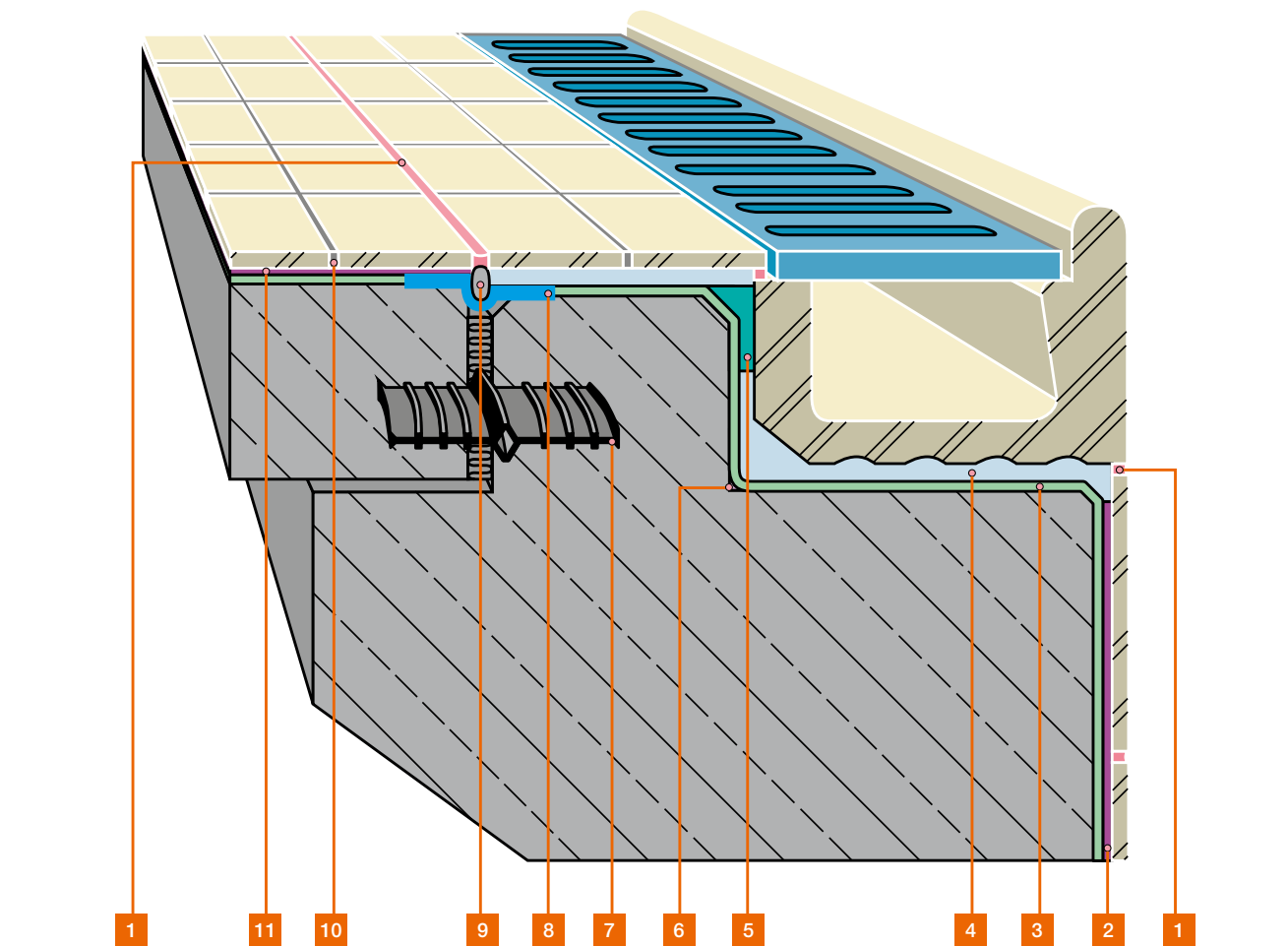
**Skimmer system** with Residence pool edge element



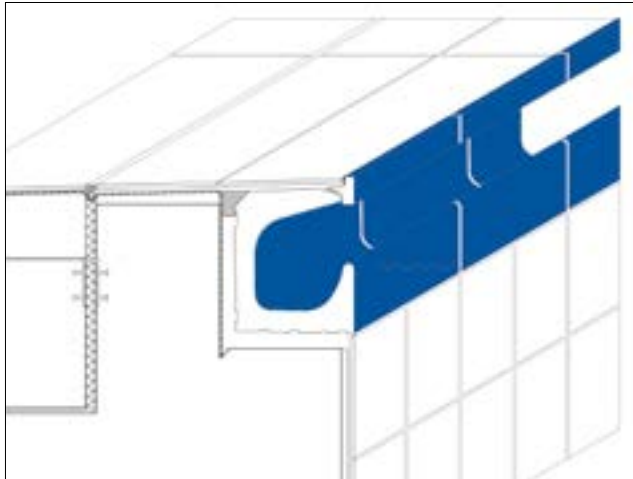
# Waterproofing of swimming pools with high water levels (example: “Wiesbaden” system)

In the case of high-level pool edge systems, the water level in the pool is flush with or higher than the pool coping. Depending on the design variant, the edge may form a handhold. The advantages of systems of this type include easier entry and exit, a better overview and continuous water overflow. Waves are also not reflected, which means that the water surface is calmer. In addition, there is no risk of chlorine accumulation above the water surface.

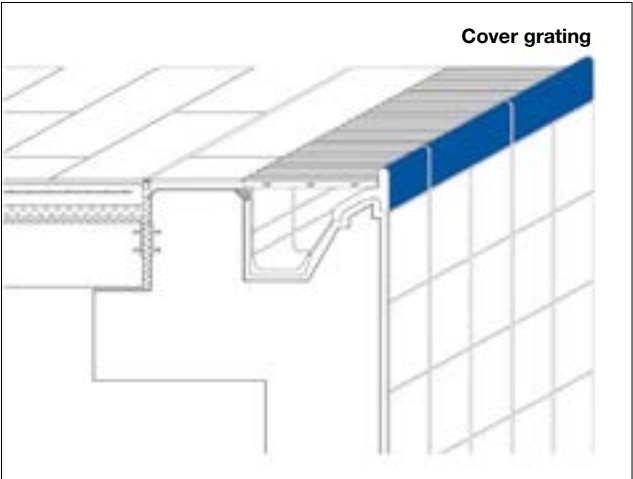
For pools with high water levels, special attention must be paid to the waterproofing of the pool edge (see pages 96/97). Decisions on waterproofing systems must already be taken in the design phase.



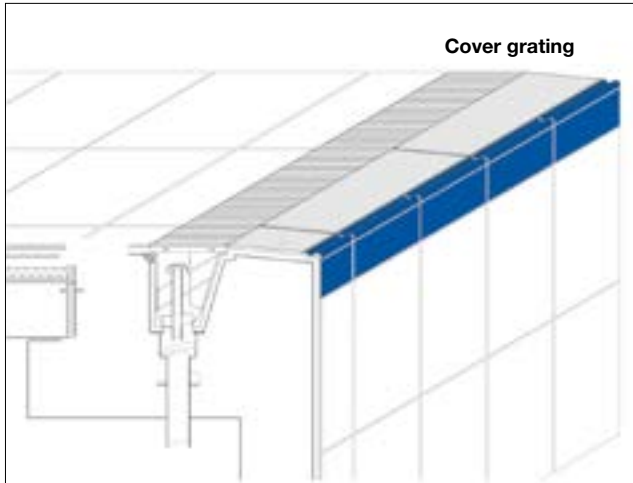
- |   |   |  |
|---|---|--|
| <div>1</div> <div>Flexible grouting with PCI Silcofug® E</div>  | <div>5</div> <div>Anti-capillary layer of PCI Apoten® + silica sand</div> | <div>10</div> <div>Rigid grouting, for example with PCI Durapox® NT/NT plus</div>              |
| <div>2</div> <div>Thin-bed mortar, for example PCI FT® Klebemörtel modified with PCI Lastoflex®</div> | <div>6</div> <div>Rounded corner made from PCI Repafix®</div>             | <div>11</div> <div>Thin-bed mortar, for example PCI Nanoflott® light/ PCI Flexmörtel® S1</div> |
| <div>3</div> <div>PCI Seccoral® 1K/ PCI Seccoral® 2K Rapid/ PCI Apoflex®</div>                        | <div>7</div> <div>Expansion joint sealing tape</div>                      |  |
| <div>4</div> <div>Thick-bed mortar</div>  | <div>8</div> <div>PCI Pecitape® 120/250</div>                             |  |
|   | <div>9</div> <div>DIN-Polyband</div>                                      |  |



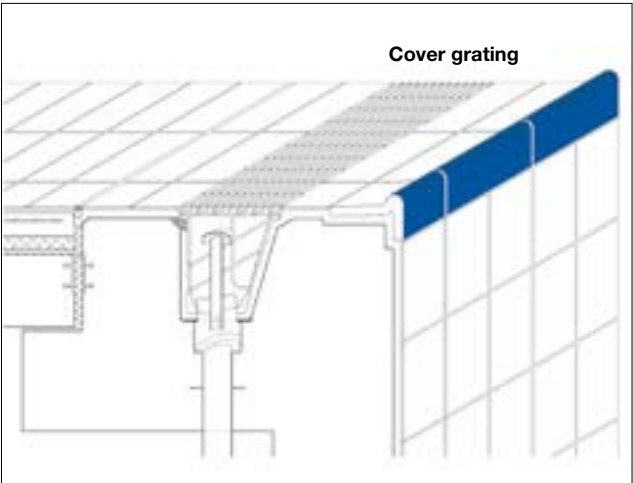
**Bamberg system:** large gutter tile with handhold, drain (diameter 75 mm), without grating. Suitable for many types of pool.



**Berlin System:** high overflow edge as handhold, covered gutter with "soft" entry. For public pools and refurbishment projects.



**Finland II system:** inclined, beach like pool edge with handhold, covered gutter with shell and SILENT 100 low-noise drain. Especially for sports and competition pools.



**Zürich system:** high overflow edge as handhold, covered gutter with shell and SILENT 100 low-noise drain. For public pools.



## Tiling of areas with high moisture exposure





# Laying gutter tiles



1

Gutter tiles must be laid without voids, for example using PCI FT® Klebemörtel + PCI Lastoflex® or PCI Durapox® NT plus. The epoxy resin adhesive has an anti-capillary effect and can be used for both thin-bed and medium-bed tile laying. If adhesive layers of more than 5 mm thickness are required, use PCI Carrament® or PCI Midiment®.



Apply scratch layer...



... and then comb on the adhesive bed.

# Installing a “Wiesbaden system” gutter

A Wiesbaden gutter has an edge which functions both as an overflow and as a handhold. The water level in the pool may be flush with the coping or even above the coping. The advantage of this design is that it provides an excellent overview and avoids any chlorine accumulations above

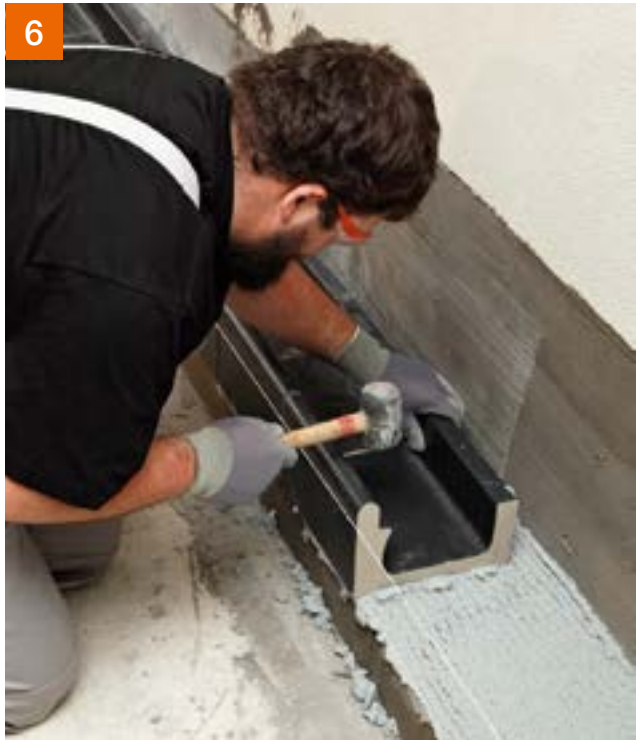
the pool. As with all overflow systems, the edge must be horizontal so that the water can overflow evenly. Deviations from the horizontal at the overflow edge must not exceed 2 mm.



Apply adhesive to back of gutter element...



... insert the element into the fresh adhesive...



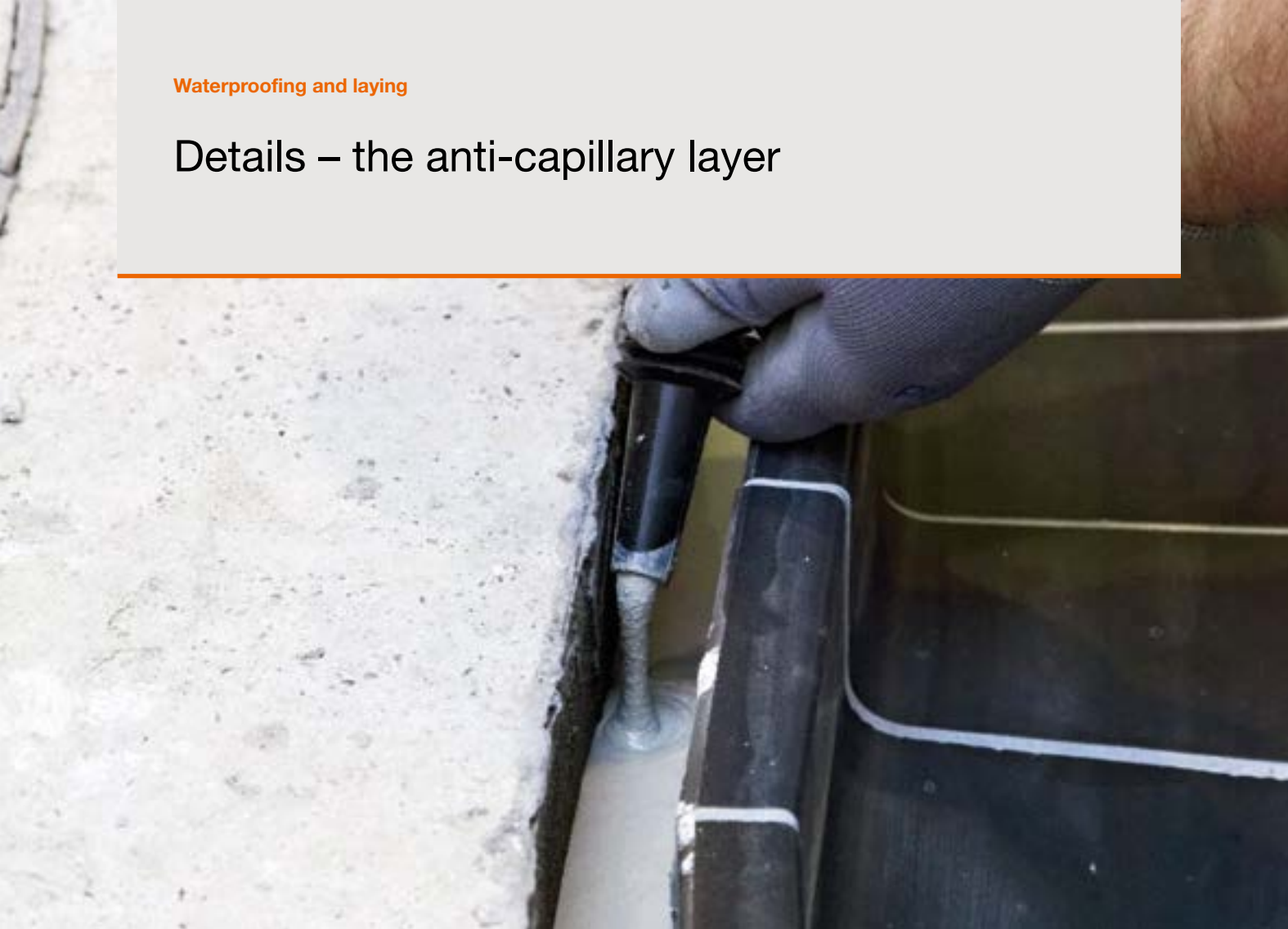
... and align it.



When the gutter elements have been positioned, they must be grouted, for example using PCI Durafug® NT or PCI Durapox® NT plus.



## Details – the anti-capillary layer



## A crucial detail

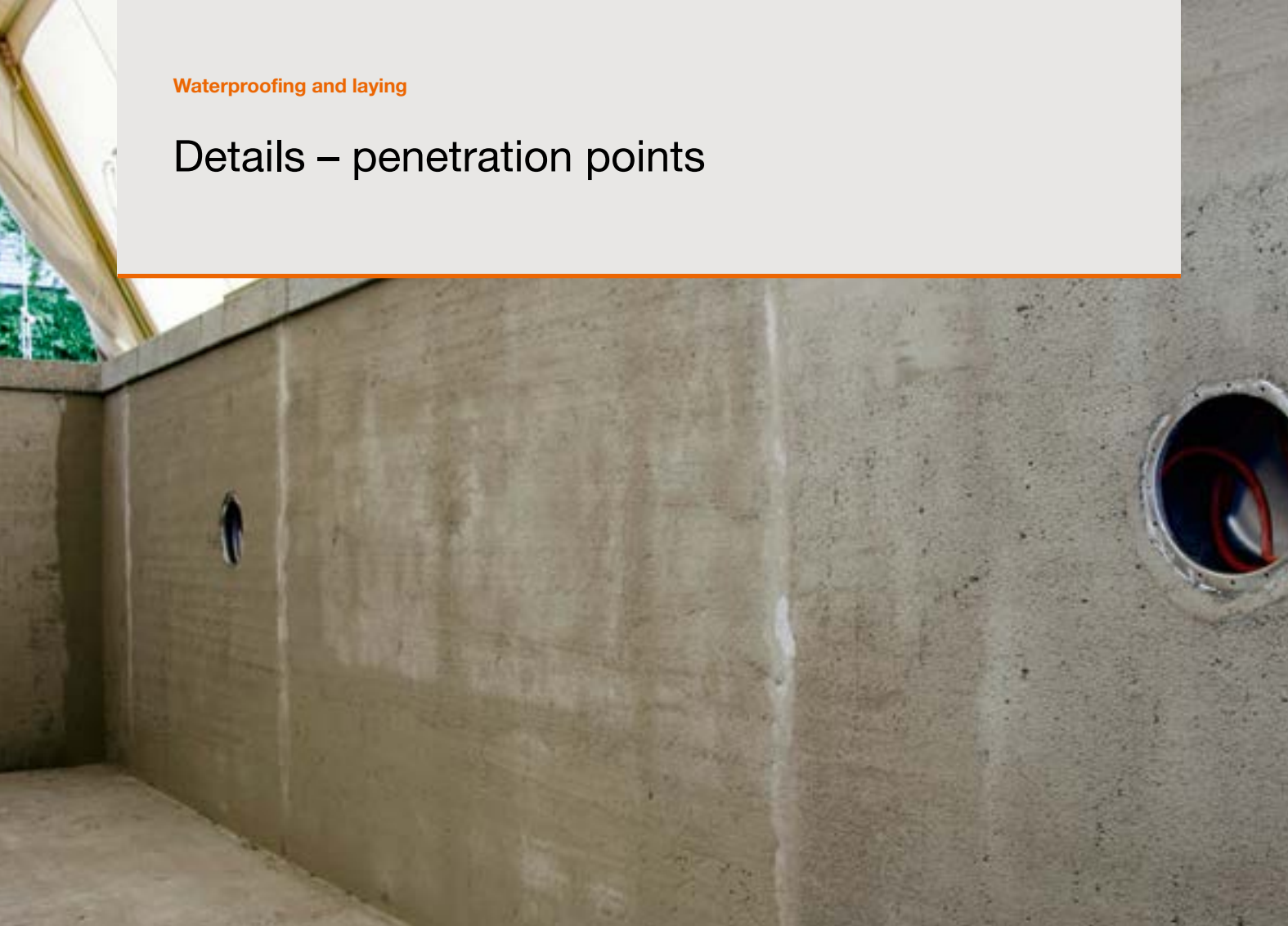
Especially with high water levels, an anti-capillary epoxy resin layer on the pool edge is a crucial detail. The anti-capillary layer, consisting of PCI Apoten® mixed with an equal quantity of 0.3–0.8 mm silica sand, is applied to be flush with the top edge of the overflow gutter or element. This prevents water from penetrating the pool coping as

a result of hydrostatic pressure. Without such an anti-capillary layer, water would reach the substructure of the pool coping, keeping it permanently moist (principle of communicating tubes). As a result, “overflow water” could lead to significant damage to the structure.





## Details – penetration points



### Penetration points – fittings

Fittings which penetrate the tiled surface must be integrated into the waterproofing of the surface using suitable flanges and/or sleeves. In accordance with the ZDB code of practice, such fittings must be equipped with a combination of loose and fixed flanges to ensure the durable, reliable and fully functional connection of the fitting to the bonded waterproofing system. The code of practice calls for flanges with a width of at least 50 mm. However, only very few manufacturers of water inlets, light units, etc offer products with such wide flanges. Our advice is that you should inform your client of this problem in writing.

Materials must be selected in accordance with the proposed water quality (for example thermal water, mineral water, brine or seawater). Suitable materials include stainless steel, bronze and gunmetal.

In deviation from the requirements of the ZDB code of practice, ABS and PVC fittings with adhesive flanges have also proved themselves in practice. However, these must be pre-treated in accordance with the manufacturer's instructions. Our recommendation is that the flange should be ground and primed using PCI Epoxigrund 390. A generous quantity of silica sand, 0.3–0.8 mm, must be scattered on the fresh primer.



Stainless steel fitting, flange width at least 50 mm.



Plastic fitting, pre-treated by manufacturer.



Stainless steel water inlet fitting.



Installation fitting for spotlight.



Inlet nozzle with flange.



Skimmer, private pool.



## Details – light unit



### A professional alternative solution: clamping flange with waterproofing sleeve

If fittings are not available with the flange width of at least 50 mm required by ZDB, PCI offers alternative solutions for the reliable connection of the fittings to the waterproofing system. You can agree on the solutions with your client as required. These two pages present an example of the reliable waterproofing of a light unit using an adhesive flange fabricated on site. The most important product used in this solution is PCI Pecilastic® W waterproofing membrane.

In the course of waterproofing work, the tiler found that the light units and various inlet nozzles were not equipped with flanges of the width required to allow reliable connection of the waterproofing sleeves to the waterproofing system by bonding to a polymer-modified waterproofing slurry. Following discussion with the manufacturer of the fittings, the following solution was selected:

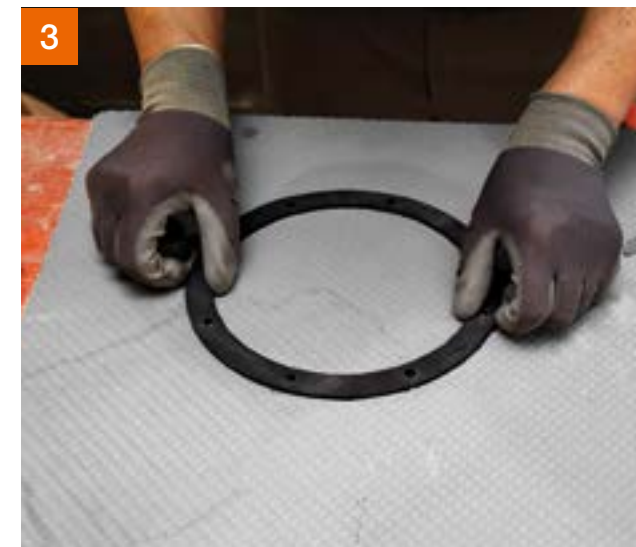
- The fittings were fitted with the available loose flanges complete with gaskets and bolts.
- The clamping flange with tightening sleeves made up on site was tested to ensure that it provided effective waterproofing. The results were positive.
- It was possible to establish a fully functional connection between the bonded waterproofing and the fittings, although the flange widths were not in accordance with the requirements of the code of practice.



A professional alternative solution: clamping flange with waterproofing sleeve.



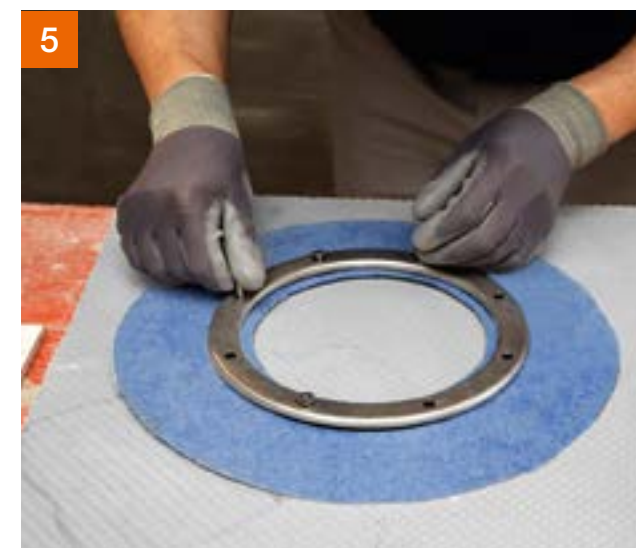
Know-how: in order to ensure easy and rapid assembly of the gasket / sleeve / gasket / flange / bolt combination, a template is prepared on the basis of the holes in the clamping flange.



The first gasket is placed in the correct position...



... followed by the prepared waterproofing sleeve, the second rubber gasket and the clamping flange.



The bolts are then inserted and the assembly can be turned over on a sturdy piece of cardboard.



The adhesive flange fabricated on site is now ready for installation.



# Waterproofing

## Preparation of substrate

See page 20 ff.

## Waterproofing

### PCI Seccoral® waterproofing system:

- PCI Seccoral® 1K or PCI Seccoral® 2K Rapid waterproofing slurry
- PCI Pecitape® 120; inlets, drains and fittings with fixed and loose flanges must be waterproofed using PCI Pecitape® 10 x 10/42.5 x 42.5. If necessary, fabricate waterproofing sleeve from PCI Pecilastic® W.

### PCI Apoflex® polyurethane waterproofing system

- Chemical-resistant reaction resin waterproofing system

The designer must always decide in advance whether an impermeable concrete pool is also to be equipped with bonded waterproofing. Among other benefits, bonded waterproofing provides effective protection against efflorescence.

In the case of impermeable concrete structures the 14-day filling test with chlorinated water required by the German Swimming Pool Association must be carried out immediately after the completion of the concreting work. Any leaks which may be identified must be filled using an injection resin such as PCI Apogel®. A filling test must then be carried out again to ensure that the pool is now waterproof.

If bonded waterproofing (for example with PCI Seccoral® 2K Rapid) is applied, the filling test should not be carried out until 3 to 7 days after the curing of the waterproofing layer.

Surge tanks are not normally equipped with ceramic linings, although this would be beneficial in terms of hygiene. However, waterproofing is still required, especially if the tank is used to retain brine or mineral water. In this case, it is recommended to use the chemical-resistant polyurethane waterproofing agent PCI Apoflex®.



Thorough wetting of the surface reduces the absorbency of the concrete and prevents water from the waterproofing material from being absorbed too fast.



PCI Seccoral® 2K Rapid may be applied using a roller or trowel. In the photo, a scratch coating of PCI Seccoral® 2K Rapid is being applied by roller.



Application of first coat of PCI Seccoral® 2K Rapid. Apply the waterproofing material using a notched trowel (6 mm)...



... and smooth the grooves down evenly.



For the waterproofing of edges (for example at transitions between walls and floors), PCI Seccoral® 2K Rapid is applied...



... and PCI Pecitape® Objekt waterproofing tape is inserted into the fresh waterproofing slurry and pressed carefully into place. PCI Seccoral® 2K Rapid is used to work over the edges of the waterproofing tape.



## Laying and grouting

### Laying

#### Vitrified ceramic tiles

- PCI FT® Klebemörtel + PCI Lastoflex®
- PCI Flexmörtel® or PCI Flexmörtel® S2
- PCI Nanolight®

#### Fully vitrified tiles and non-translucent mosaics

- PCI FT® Klebemörtel + PCI Lastoflex®
- PCI Flexmörtel® S1, PCI Nanolight®
- + PCI Nanolight® White
- PCI Durapox® NT/NT plus

#### Translucent glass mosaics

- PCI Durapox® NT/NT plus aged white

### Grouting

#### Chemical-resistant and water-impermeable (2–20 mm joint width)

- PCI Durapox® NT/NT plus

#### Mineral grout with increased durability (2–20 mm joint width)

- PCI Durafug® NT special cementitious joint grout

#### Movement and connection joints

- PCI Silcoferm® S or PCI Silcofug® E

\* In the case of highly transparent tones, the penetration of water under the glass tiles may result in dark shading.

3



Position and align the tiles. The buttering-floating method must be used.

1



Apply scratch coat of PCI FT® Klebemörtel mixed with PCI Lastoflex®.

2



Then comb on the adhesive.

4



The result is proper installation of the tile with virtually no voids.





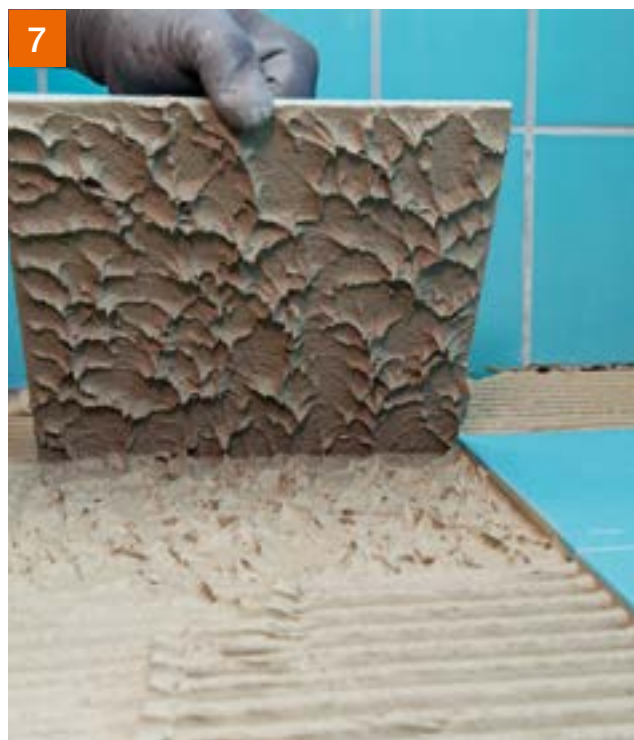
When laying the floor tiles,...



... the buttering-floating method must also be used.



... thoroughly remove the slurry from the surface,...



The tiles are in full contact with the adhesive bed.



The next day, the tiles must be grouted, for example using PCI Durafug® NT. Apply the grout as a slurry,...



... and finally pre-wash the surface and mop off the water.



## Pool coping



## Pool coping

Around a pool, floating cement screeds, often with underfloor heating, are normally used. A slope of at least 2% must be provided. Under the Construction Regulation List, pool coping is included in exposure class A for areas subject to severe moisture exposure. Prior to

laying, a bonded waterproofing product approved by the construction authorities, such as PCI Seccoral® 2K Rapid, must be applied. Both in public and in private applications, anti-slip ceramic coverings (assessment group B, barefoot wet area) must be used.



### Preparation of substrate

See page 20 ff.

### Waterproofing

- PCI Seccoral® 1K or PCI Seccoral® 2K Rapid waterproofing slurry
- PCI Pecitape® 120; inlets, drains and fittings with fixed and loose flanges must be waterproofed using PCI Pecitape® 10 x 10/42.5 x 42.5. If necessary, fabricate waterproofing sleeve from PCI Pecilastic® W.

### Laying

#### Vitrified ceramic tiles

- PCI FT® Klebemörtel + PCI Lastoflex®
- PCI Flexmörtel®, PCI Nanolight®

#### Fully vitrified tiles and non-translucent mosaics

- PCI FT® Klebemörtel + PCI Lastoflex®
- PCI Flexmörtel®, PCI Nanoflott®, PCI Nanolight®
- PCI Durapox® NT/NT plus

#### Translucent glass mosaics,

#### adhesive-bonded from the front\*

- PCI Durapox® NT/NT plus aged white

### Grouting

#### Chemical-resistant and water-impermeable (2–20 mm joint width)

- PCI Durapox® NT/NT plus, epoxy resin joint grout

#### Mineral grout with increased durability (2–20 mm joint width)

- PCI Durafug® NT special cementitious joint grout

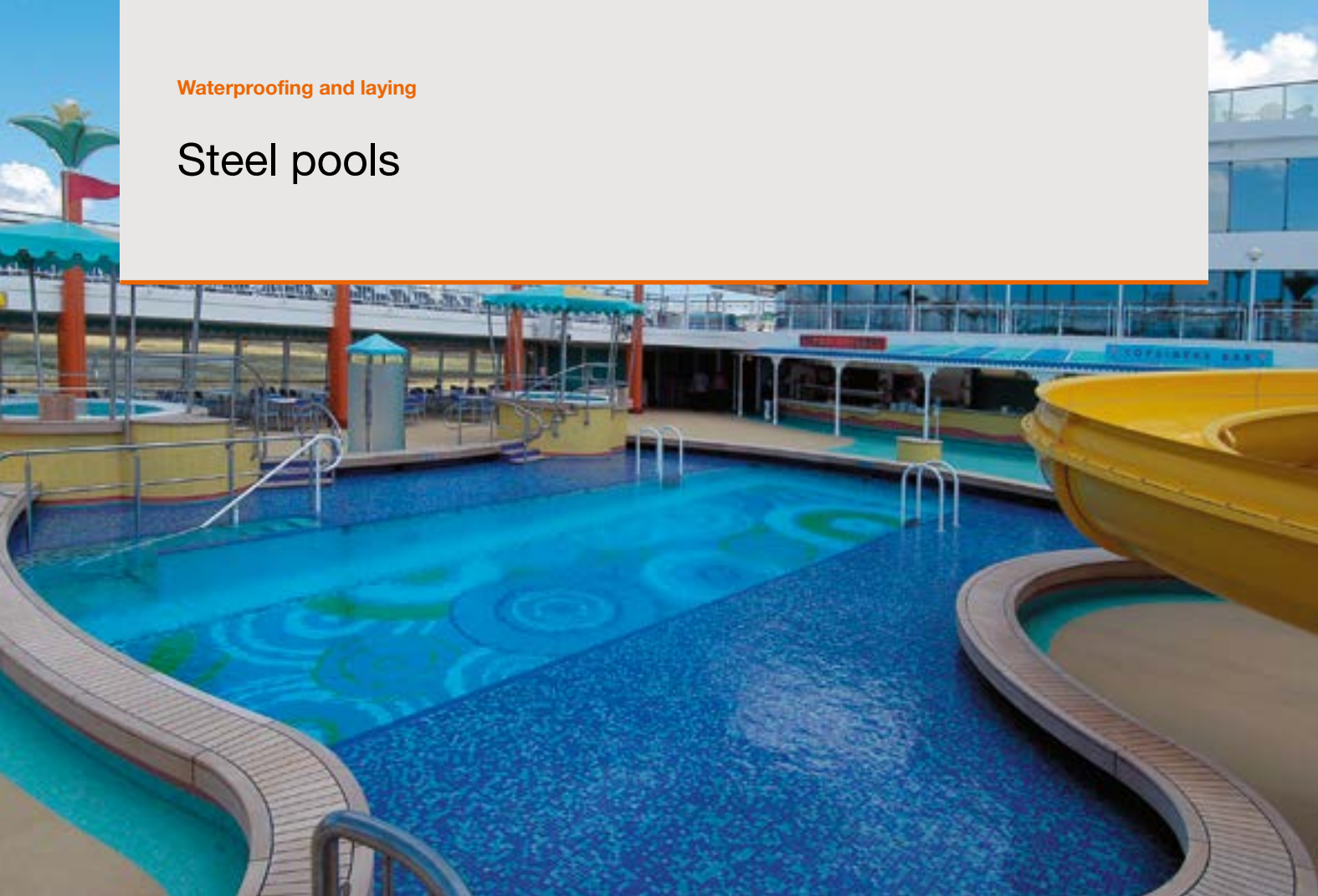
#### Movement and connection joints

- PCI Silcoferm® S or PCI Silcofug® E. To avoid adhesion to three edges, DIN-Polyband must be used.

\* In the case of highly transparent tones, the penetration of water under the glass mosaics may result in dark shading.



## Steel pools



## Substrates affected by vibration

Steel pools are often found on ships, where they are exposed to severe vibration and movement as a result of the torsion of the vessel. They may also be used as alternatives to reinforced concrete pools. In order to compensate for any deformation, highly flexible tile adhesives and joint grouts are required. PCI has developed special solutions for swimming pools on large ships. For this special field of applications, tiling contractors can use a wide range of products meeting the stringent requirements of the MED (Marine Equipment Directive).



Bayerischer Hof Hotel

## Polyester pools: padding pools and modular pools

Polyester is often used as a material for outdoor padding pools at leisure facilities and for modular pools intended for private use. The surface must be thoroughly ground and the grinding dust must be removed by vacuuming before any tiles are laid.



### Preparation of substrate

See page 20 ff.

### Laying

#### Waterproof and elastic

- PCI Collastic®, a two-component waterproof reaction resin with fast curing properties, is used as the tile adhesive.

### Waterproofing

- PCI Pecitape® 120 waterproofing tape, waterproofing sleeves and prefabricated corners are bonded in place using PCI Collastic®, a two-component waterproof reaction resin tile adhesive with fast curing properties.

### Grouting

#### Chemical-resistant and water-impermeable (2–20 mm joint width)

- PCI Durapox® NT/NT plus, epoxy resin joint grout
- **Movement and connection joints**  
PCI Silcoferm® S or PCI Silcofug® E



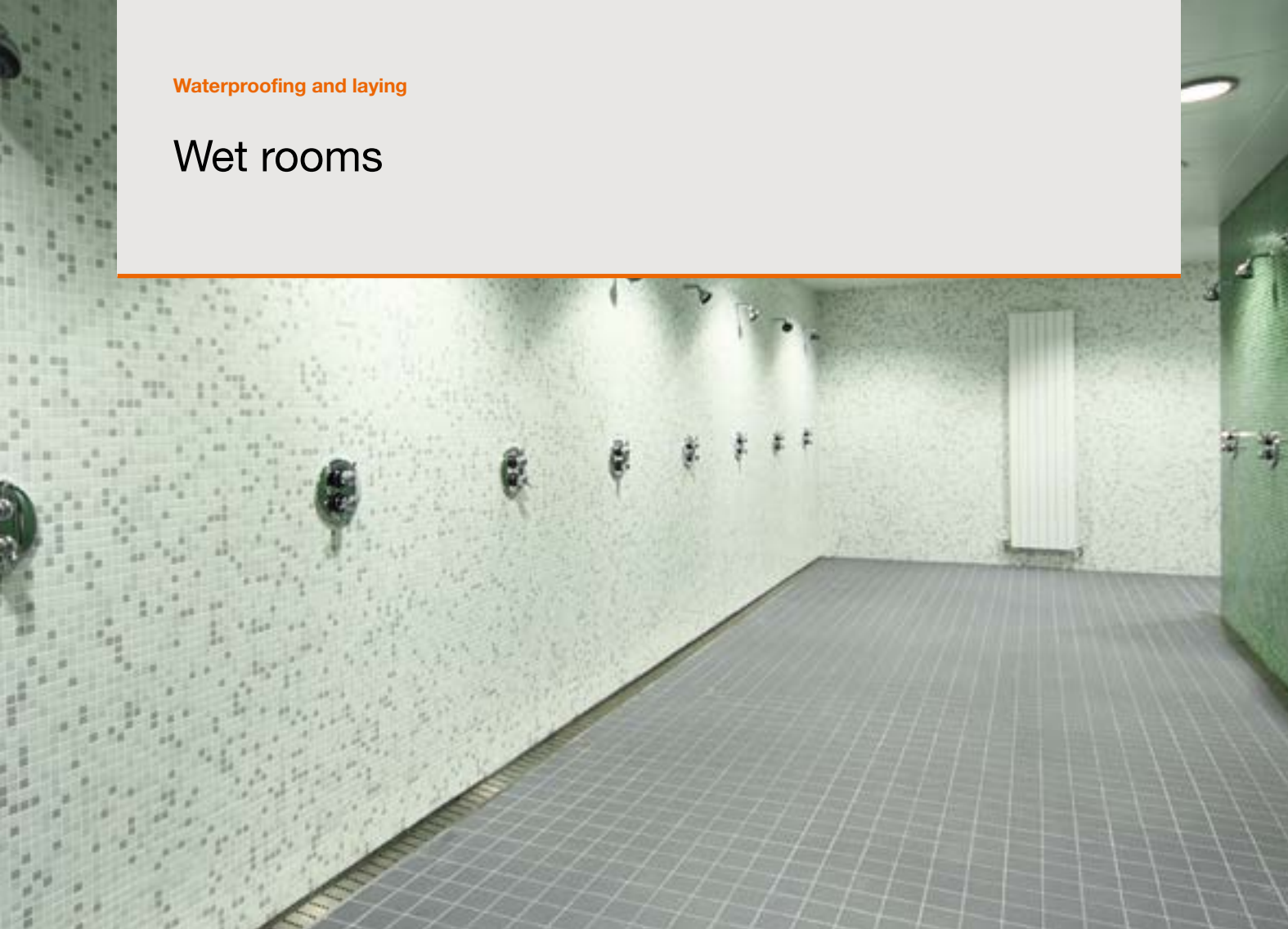
The flexible reaction resin tile adhesive PCI Collastic®...



... is used for the reliable laying of ceramic coverings on steel structures.



## Wet rooms



## Severe moisture exposure

Moisture exposure in rooms such as communal showers is enormous. At least 6 litres of water per minute flow out of a shower head. With 20 shower heads, up to 120 litres of water can pour down onto a relatively small area every minute. Apart from fast drainage, the waterproofing of walls and floors is particularly important. Before tiles are laid, waterproofing work in accordance with the requirements of the construction authorities must be carried out to prevent moisture damage to the structure.

In addition, spa facilities and leisure pools must reach high aesthetic standards. And, in the case of wet rooms in public use, hygiene is a major consideration.



### Preparation of substrate

See page 20 ff.

### Levelling

#### Floor

- PCI Novoment® M1 plus, in combination with PCI Repahaft®
- PCI Pericret® for layer thicknesses from 3–50 mm

### Waterproofing

#### Exposure class A (wall), A2 (wall and floor)

- PCI Lastogum® (wall) or PCI Seccoral® 1K or PCI Seccoral® 2K Rapid
- PCI Pecilastic® W flexible waterproofing membrane

### Laying

#### Wall and floor

- PCI Flexmörtel® S1 or PCI Nanolight®

#### Floor

- PCI Flexmörtel® S2 or PCI Nanoflott® light

### Grouting

#### From a joint width of 1 mm, water-repellent, dirt-repellent

- PCI Nanofug®, flexible joint grout or PCI Nanofug® Premium, flexible joint grout especially for fully vitrified and vitrified tiles

#### Chemical-resistant and water-impermeable (2–20 mm joint width)

- PCI Durapox® NT/NT plus, epoxy resin joint grout

#### Movement and connection joints

- PCI Silcoferm® S or PCI Silcofug® E

\* Acidic cleaning compounds may damage the joint grout. Neutral cleaning materials are very well-suited.



## Wellness areas



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## Wellness areas

In order to create a comfortable atmosphere, rest areas, changing rooms, benches with mosaic tiling, toilets and the cash desk area are often equipped with underfloor heating systems. In such areas, flexible tile adhesives such as PCI Flexmörtel® S1 or PCI Flexmörtel® S2 must be used for tiling.

Service rooms are normally dry rooms. In view of the electrical and electronic equipment such as pumps, blowers, metering systems etc installed here, these rooms should be dry and well-ventilated. Storage rooms for chemicals and detergents must be equipped with chemical-resistant coverings.

The ceilings of indoor swimming pools are also considered to be "neighbouring dry areas". In order to protect these thermally insulated ceilings against damage caused by condensation in the concrete (corrosion of reinforcement), the soffits are primed using PCI Wadian® special primer, which provides a barrier to water vapour diffusion.

### Preparation of substrate

#### Cement screeds

See page 20 ff.

### Waterproofing

- PCI Seccoral® 1K or PCI Seccoral® 2K Rapid waterproofing slurry
- PCI Pecitape® 120; inlets, drains and fittings with fixed and loose flanges must be waterproofed using PCI Pecitape® 10 x 10/42.5 x 42.5. If necessary, fabricate waterproofing sleeve from PCI Pecilastic® W.

### Laying

#### Wall and floor

- PCI Flexmörtel® S1 or PCI Nanolight®

#### Floor

- PCI Flexmörtel® S2 or PCI Nanoflott® light

### Grouting

#### Chemical-resistant and water-impermeable (2–20 mm joint width)

- PCI Durapox® NT/NT plus, epoxy resin joint grout
- From a joint width of 1 mm, water-repellent, dirt repellent**

- PCI Nanofug®, flexible joint grout or PCI Nanofug® Premium, flexible joint grout especially for fully vitrified and vitrified tiles

#### Mineral-based, deformable (2–10 or 3–15 mm joint width)

- PCI Flexfug®

#### Mineral-based, (2–20 mm joint width)

- PCI Durafug® NT

#### Movement and connection joints

- PCI Silcoferm® S or PCI Silcofug® E



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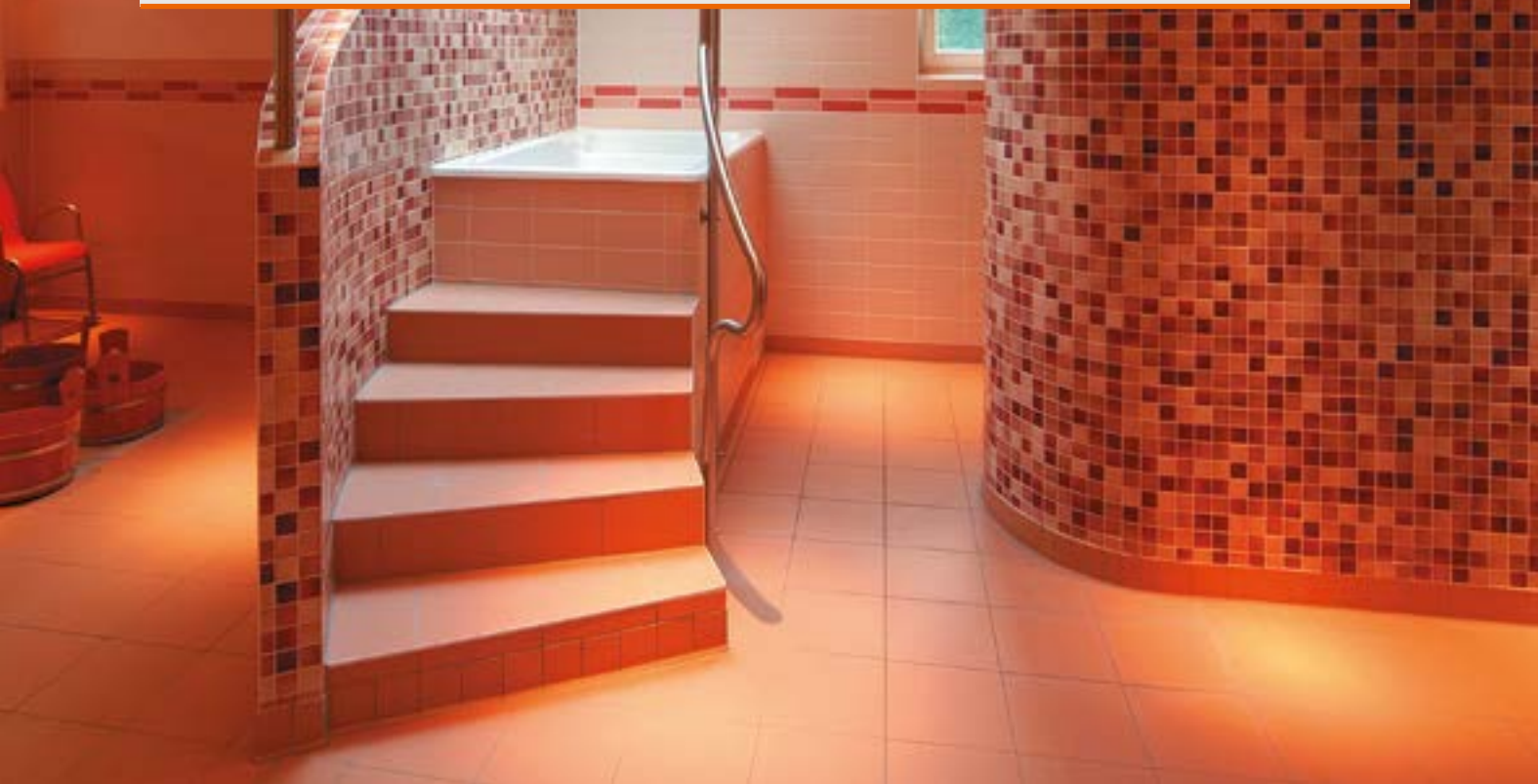
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## Steam baths



## Systems with water vapour barriers

Adventure pools are leisure facilities intended to offer visitors the highest levels of comfort and relaxation. Such facilities often include saunas and steam baths. In order to ensure a durable system, careful detailed design is essential. Depending on the substrate, bonded waterproofing products approved by the construction authorities such as PCI Seccoral® 2K Rapid need to be used on the floors and walls of a sauna or steam bath. If a water vapour barrier is needed, the flexible waterproofing membrane PCI Pecilastic® W or the reaction resin waterproofing membrane PCI Apoflex® may be used.



Careful design and construction are essential for a sauna to provide lasting pleasure.

### Preparation of substrate

#### Concrete substrate

See page 20 ff.

#### PCI Pécidur substrate/tile support elements:

- **Tip for private steam bath:** prime the substrate elements with PCI Gisogrund®, diluted 1:1 with water; after drying, apply two coats of PCI Wadian® special primer as a water vapour barrier
- **Tip for public steam bath:** prime the substrate with the waterproofing products PCI Pecilastic® W (sd value 80) or PCI Apoflex® W/F (sd value 100) to provide a water vapour barrier

#### Plastic substrates

- Roughening

#### Aluminium-backed elements

- Please contact Technical Service at PCI.

### Waterproofing

#### On cementitious substrates and foam glass elements

- PCI Seccoral® 2K Rapid
- PCI Pecitape® 120 and fittings (waterproofing sleeves and prefabricated corners) PCI Pecitape® 10 x 10/42.5 x 42.5. If necessary, fabricate waterproofing sleeve from PCI Pecilastic® W.

#### Alternative:

- PCI Pecilastic® W flexible waterproofing membrane

### Grouting

#### Chemical-resistant and water-impermeable (2–20 mm joint width)

- PCI Durapox® NT/NT plus, epoxy resin joint grout

#### From a joint width of 1 mm, water-repellent, dirt-repellent

- PCI Nanofug®, flexible joint grout or PCI Nanofug® Premium, flexible joint grout especially for fully vitrified and vitrified tiles

#### Mineral-based, (2–20 mm joint width)

- PCI Durafug® NT

#### Movement and connection joints

- PCI Silcoferm® S or PCI Silcofug® E





# The multi-use isolating membrane for all applications



### Applications

- For indoor and outdoor use
- Equally suitable for residential and industrial areas
- Ideal for wet areas with non-pressing water (moisture exposure classes A0 and A, floor)
- Can also be used on moisture-sensitive, absorbent substrates, absorbent mineral substrates, non-absorbent mineral substrates, recently laid cement screeds (minimum quality CT F4 ) and anhydrite screeds (residual moisture < 2 %)

### Product features

- Dimpled waterproofing membrane, thickness approx. 3.5 mm, supplied on 5 m rolls
- Waterproof – protects moisture-sensitive substrates
- Absorbs stress and compensates for temperature differences
- Also bridges cracks that develop later
- Can be worked on directly after laying: ceramic and natural stone coverings can be laid immediately after the membrane has been bonded in place
- Reduces ambient and impact noise levels of floor covering
- Membranes can be cut to size using a simple utility knife

PCI Pecilastic® U is a pressure-resistant dimpled waterproofing and isolating membrane for use under ceramic and mosaic tiles as well as natural stones. It can be used for almost any application.

The dimpled configuration allows relatively moist substrates such as anhydrite screeds to dry out after the membrane has been laid. A foil above the dimples seals the membrane off at the top. In combination with PCI Nanoflott® light and PCI Rapidflott®, PCI Pecilastic® U can also be used in commercial or industrial facilities with severe moisture exposure.

The dimples, which are filled with a pressure-resistant material and connected to each other by a flexible binder, absorb stress effectively. The membrane also reduces ambient and impact noise levels.

PCI Pecilastic® U is ideal for fast work. Immediately after it has been bonded in place, the ceramic or natural stone covering can be laid without any further levelling work. With fast-setting adhesives such as PCI Rapidflott®, smaller surfaces can even be completed within the space of a day.

### EXPERT'S TIP

## Good advice for swimming pools



Prof. Dr. Josef Felixberger  
Head of PCI Technical Service

In view of the technologies used and the stringent requirements faced by materials and components, swimming pools are among the most demanding projects for construction contractors. For everyone concerned, it is therefore extremely important that preliminary information, design, interfaces and construction should be very well coordinated. For projects of this type, you can rely on the quality of PCI products and services.

When the skeleton and fittings of the swimming pool have been installed, PCI products come into their own. At this stage, it is important to use the correct system components for bonded waterproofing and for the laying and grouting of the ceramic covering. Normally, the waterproofing and tiling of large surfaces do not present any major problems. In contrast, connections to fittings and penetrating components such as inlet nozzles, light pods and drains are extremely critical. The selection of materials to be used for waterproofing, tiling and grouting depends mainly on the conditions faced by the system.

### Water quality analysis

The water quality already needs to be considered in the design phase. Depending on the pH value, hardness and salt content of the water, cementitious systems may rapidly reach their limits. In these cases, it may be necessary to use two-component reaction resin systems. A decision on the system to be used can only be taken on the basis of a pool water analysis.

The PCI Technical Service department provides support for the assessment of water analysis. Existing analysis data can be processed or samples can be taken on site for analysis in the laboratories of PCI Augsburg GmbH. A recommendation on the waterproofing, tiling and grouting materials to be used is then made on the basis of the water hardness (calcium hardness), buffer capacity (acidity capacity) and pH value of the pool water.



### What additional support can PCI Augsburg GmbH offer?

- Bonded waterproofing, tiling and grouting products in accordance with Construction Regulation List
- Free-of-charge support from experienced advisors and field service personnel, also on site
- If necessary, demonstration of the correct use of products by specialist master craftsman
- If required, specific guarantee commitments for projects
- Detailed product data sheets and brochures



## Waterproofing: exposure class B0







# Secure and durable waterproofing for balconies and terraces

Ceramic tiles and slabs installed outdoors on balconies and terraces are exposed to wind and weather. Under the ZDB code of practice for bonded waterproofing, these applications are classed as surfaces with moderate exposure to non-pressing water (exposure class B0). However, the combination of frost and weather loads with water exposure has a significant impact on the entire structure. On balconies and terraces, a tiled surface will only be secure and durable if considerable attention is paid to details (wall/floor transitions, integration of fittings such as gutters and floor drains etc) and the tiles are laid with virtually no voids.

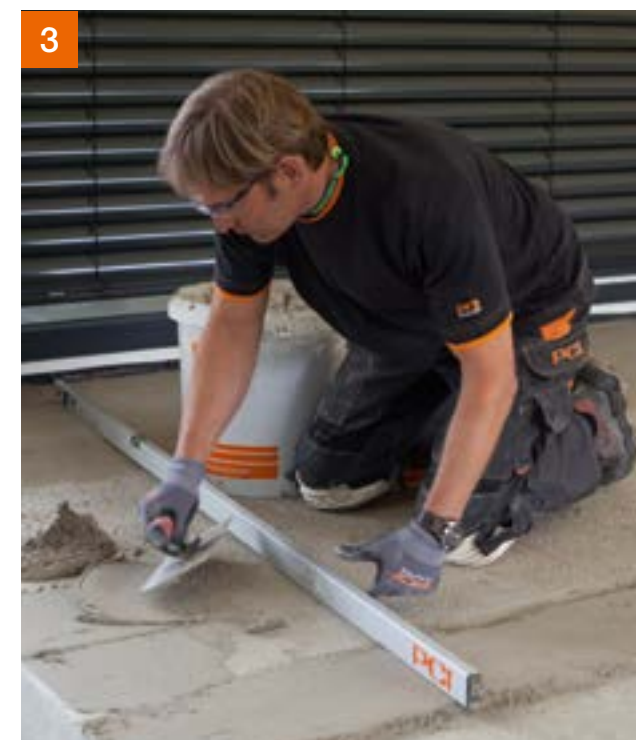
Generally, almost any type of ceramic tile can be used provided that the tiles are suitable for laying with thin-bed hydraulic mortars in outdoor applications and have proved to be frostproof and weather-resistant in practical use. For the craftsman, it is important to pay attention to the interaction between the type, colour and size of tiles and other factors including the width of the joints and the size of the sections between expansion joints.



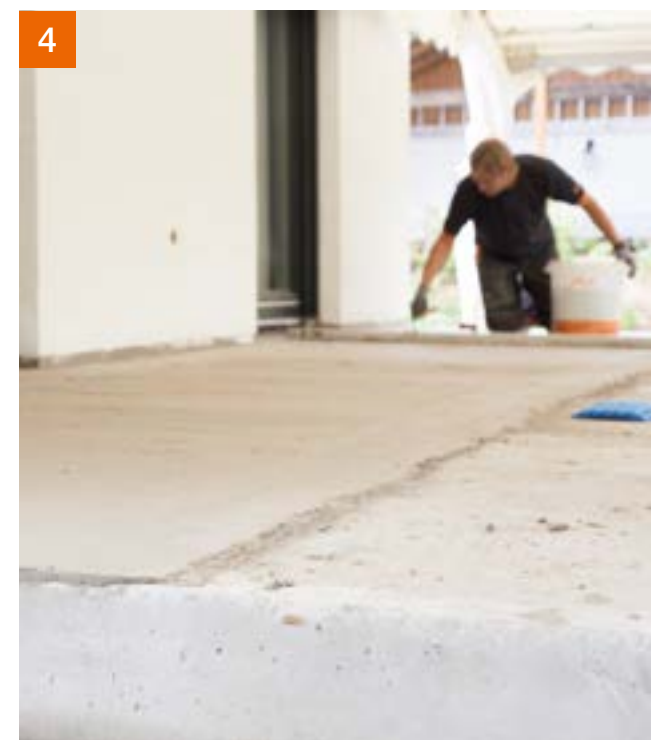
Preparation of substrate: removal of burrs.



Watering of substrate before levelling compound is applied.



Levelling with PCI Pericret® using a levelling board.



Surface levelled using PCI Pericret®.





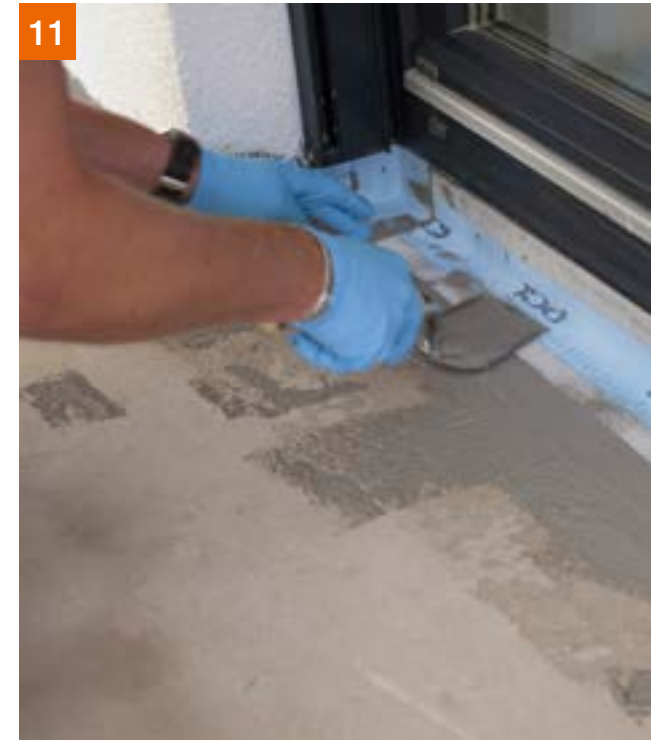
5 Terrace slab levelled with a slope using PCI Pericret®.



6 Detail: door seal with PCI Pecitape® WS. The area must be thoroughly cleaned before the product is applied.



10 Detail of wall connection: apply PCI Seccoral® 2K Rapid and insert outside corner.



11 Insert PCI Pecitape® 120 into PCI Seccoral® 2K Rapid.



7 Detail: door seal with PCI Pecitape® 120. The element must be ground and then cleaned with PCI Univerdünner.



8 Prime the element with PCI Epoxigrund 390...



9 ... and then scatter sand over the primer.



12 Apply first coat of PCI Seccoral® 2K Rapid using a lamb's wool roller.

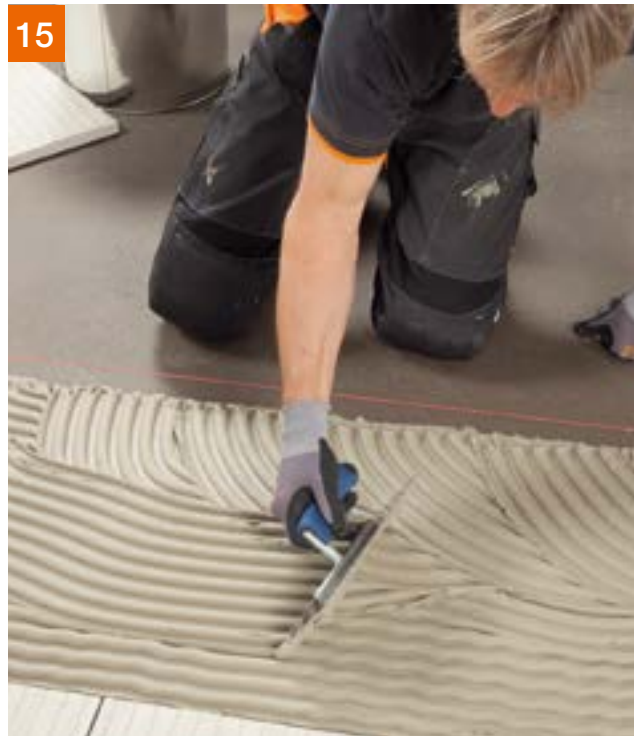


13 Apply scratch coat of PCI Seccoral® 2K Rapid.



14 Comb on PCI Seccoral® 2K Rapid using a 6 mm notched trowel and then smooth it over.





Lay adhesive bed of PCI Flexmörtel® S2/PCI Flexmörtel® S2 Rapid.



Apply scratch coat of PCI Flexmörtel® S2/PCI Flexmörtel® S2 Rapid to the back of the tile.



Grout the tiling with PCI Nanofug® Premium.



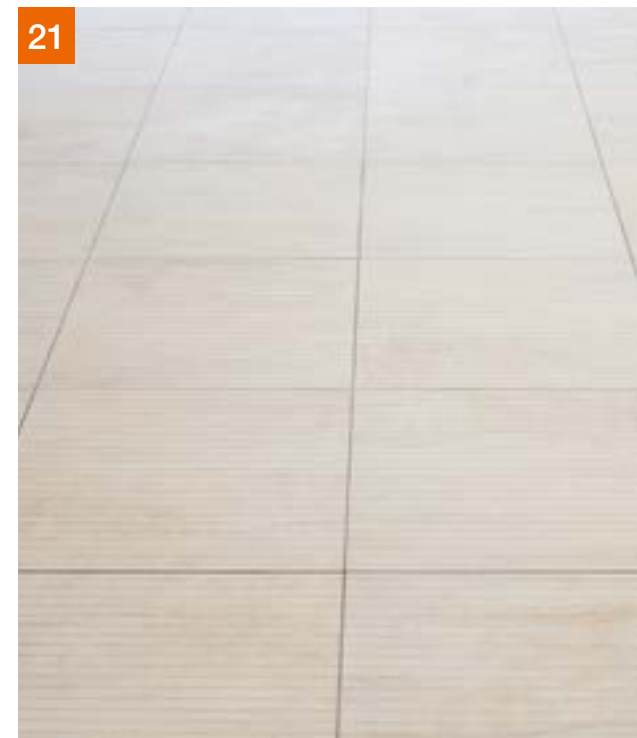
Wash the surface and sponge it off.



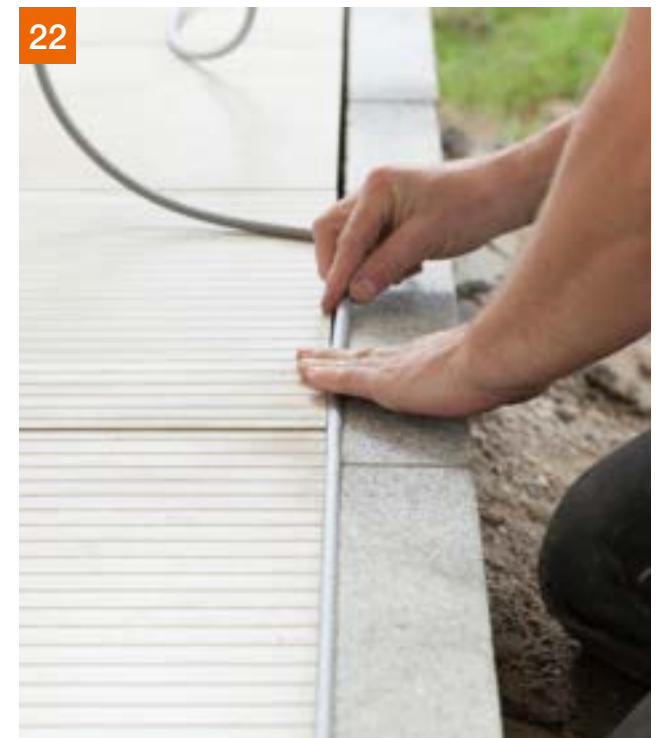
Insert the tile.



Press the tile into place. If necessary, tap the tile with a rubber hammer. Then align the tile.



The finished tiled surface, complete with grouting.



Then, insert strings for installation of silicone seal.



# Additional information: System II – balcony/terrace

23



Installation of silicone seal between tiling and plastic window using PCI Silcofug® E or PCI Silcoferm® S.

24



Installation of silicone seal using PCI Carraferm® for natural stone.

25



Apply smoothing compound such as PCI Glättmittel for easier smoothing of the silicone joint.

26

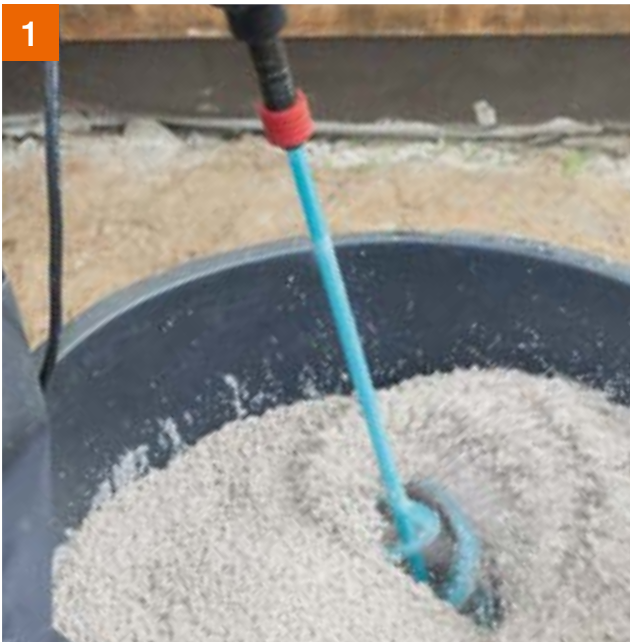


Then simply smooth the joints so that they are tidy.

**PCI System II – balcony/terrace with drainage and buffer function is suitable for all outdoor tiling and natural stone coverings.** In addition to the features of System I – balcony/terrace (see page 192 ff.), this system includes an epoxy

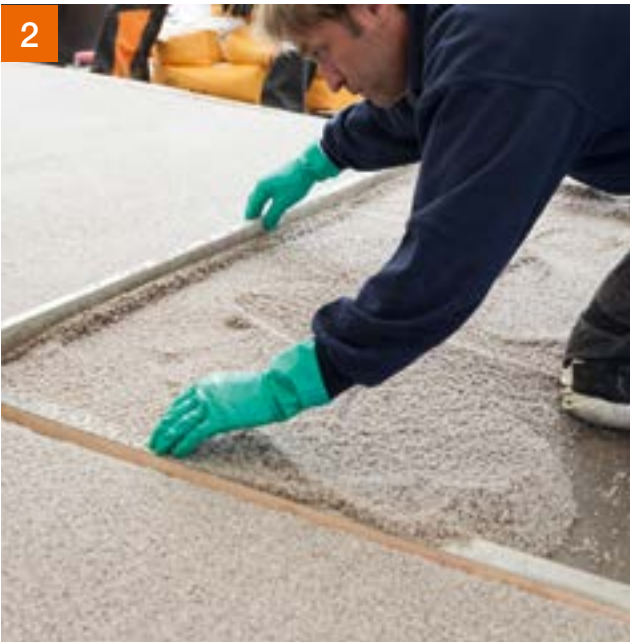
drainage mortar between the waterproofing and the tile adhesive, providing additional security. The epoxy drainage mortar carries any moisture away over the waterproofing layer, providing a moisture buffer with a long-term effect.

1



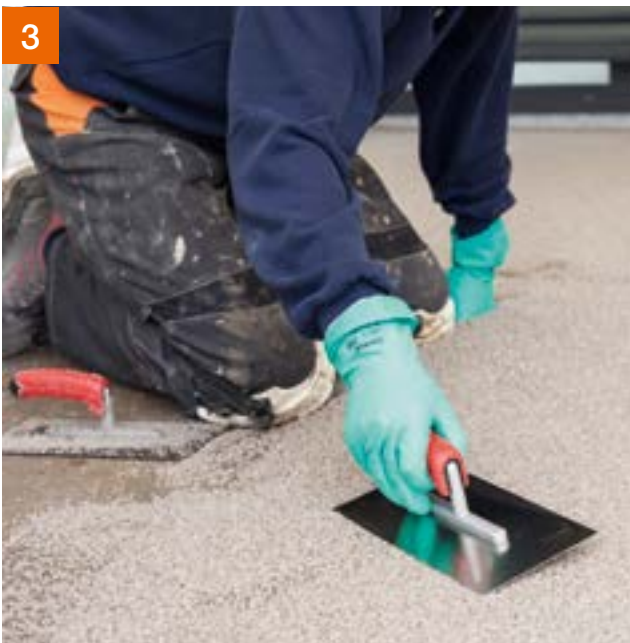
Mix a drainage mortar consisting of PCI Epoxigrund 390 and PCI Quarzsand DM 1 to 4 (silica sand).

2



Lay the mortar and level it using boards.

3



Smooth the drainage mortar.

4



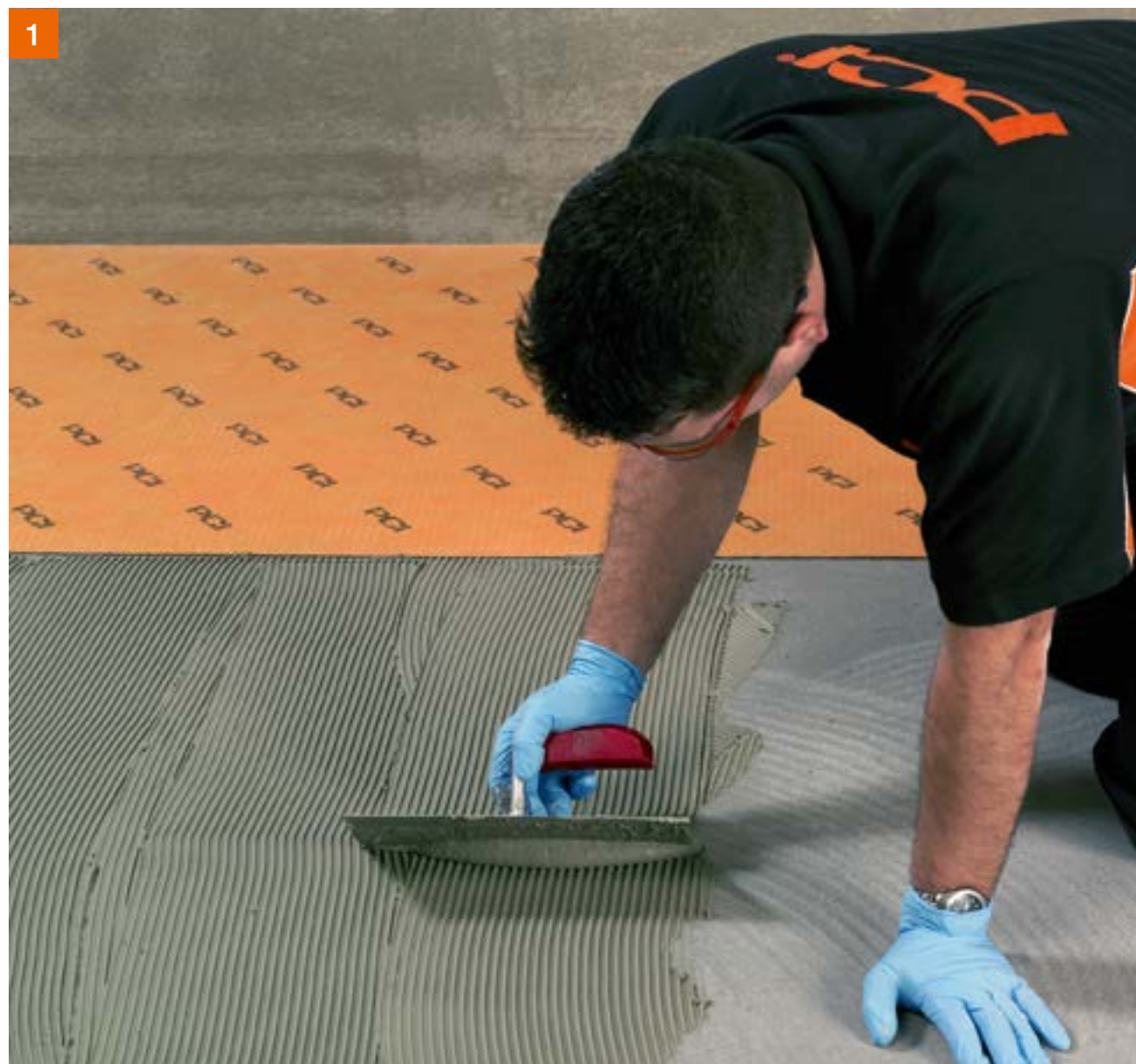
Apply PCI Flexmörtel® S2 Rapid as a scratch coat.



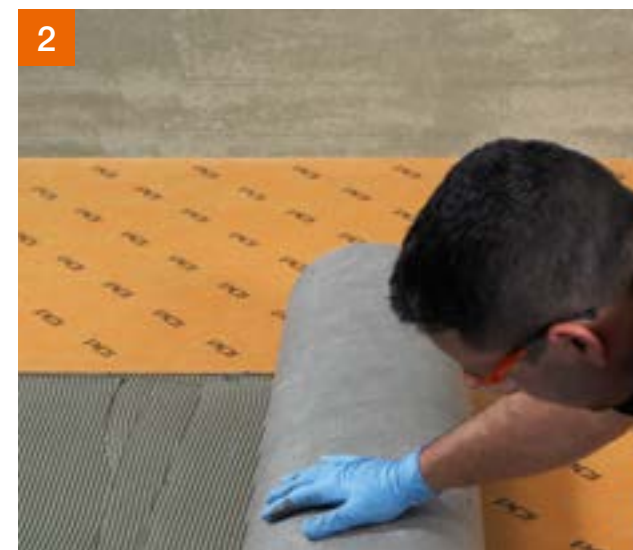
## Additional information: System III – balcony/terrace

**PCI System III – balcony/terrace with PCI Pecilastic® U waterproofing and isolating membrane is suitable for all outdoor tiling and natural stone coverings.** This system is intended for all users who prefer bonded waterproofing with membranes. Contractors appreciate the time benefits

offered by PCI Pecilastic® U. Tiles and natural stone coverings can be laid immediately after the membranes have been bonded in position, for example using PCI Flexmörtel® S2 or PCI Flexmörtel® S2 Rapid.



Apply PCI Flexmörtel® S2/PCI Flexmörtel® S2 Rapid tile adhesive for bonding the PCI Pecilastic® U waterproofing membrane in place.



Lay PCI Pecilastic® U on the fresh adhesive bed...



... and tap it into place.



Seal the transitions with PCI Seccoral® 2K Rapid...



... and PCI Pectape® 120.



Lay the tiles with PCI Flexmörtel® S2/PCI Flexmörtel® S2 Rapid.



## Waterproofing: exposure class C







# Meeting the most stringent waterproofing requirements

The hygiene requirements for industrial kitchens are so stringent that wet cleaning with detergents and disinfectants is needed. In addition to chemical cleaning compounds, high-pressure water and steam jetting is used to remove oils and greases. The floors of such areas therefore need direct floor drains. In addition, flooring systems are often exposed to high levels of mechanical stress. Tile laying systems for industrial kitchens therefore need to meet especially high performance and durability requirements. In industrial kitchens and similar facilities which are in operation round-the-clock, downtimes represent an enormous cost factor. Special care is therefore required in tiling work.

Only moisture-insensitive substrates are suitable. In applications like this, only reaction resin waterproofing agents such as PCI Apoflex® are approved for use. The selection of appropriate products is especially important. PCI's **industrial system** is a very high-performance system for substrate waterproofing and tiling in environments exposed to chemicals. This system is specially designed for tiling in commercial and industrial facilities where the floor covering may be exposed to severe chemical, thermal and mechanical stress. Possible applications include industrial kitchens, food industry plants, breweries, etc. Further information is provided from page 186 onwards.

## Product solutions from PCI

When selecting a bonded waterproofing product, it is always necessary to consider the type of exposure, site conditions and economic factors. The personal preferences of the contractor (liquid-applied or membrane) are also important. The table below shows the most important types of bonded waterproofing material and indicates special features:

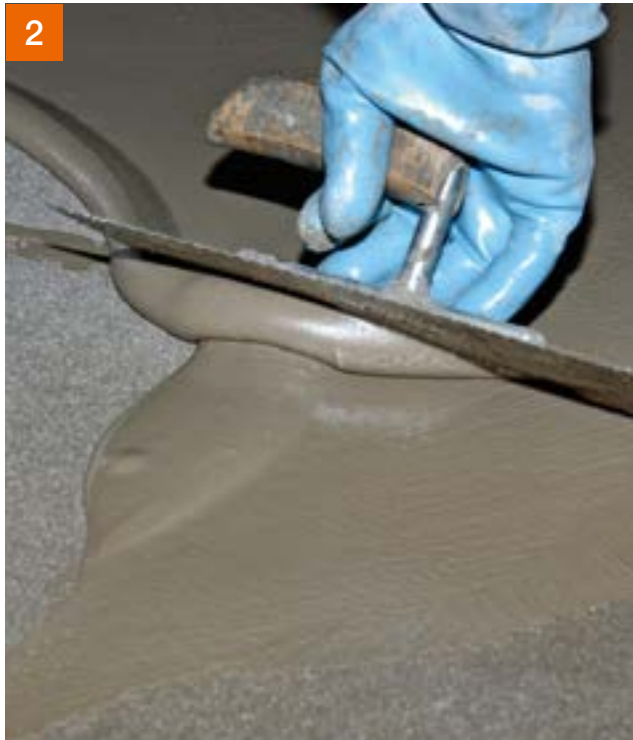
Technical properties	PCI Apoflex® F PCI Apoflex® W	PCI Pecilastic® U	PCI Pecilastic® W
Products			
Product features	2-component polyurethane system for areas exposed to chemicals	Fleece-backed waterproofing membrane with impact noise absorption properties for areas exposed to chemicals	Fleece-backed waterproofing membrane for areas exposed to chemicals
Processing	Liquid-applied product, available in wall and floor versions, applied using trowel or roller	Membrane bonded into place using a cementitious adhesive. May be used with epoxy resin or PCI Apoflex® with PCI Pecitape® 120 waterproofing tape	Membrane bonded into place using a cementitious adhesive. Epoxy resin or PCI Apoflex® for butt joints
Benefits	Easy to use, even with difficult shapes and details	Apart from allowing faster progress with construction, PCI Pecilastic® U also reduces ambient and impact sound, resulting in a pleasant atmosphere in the room	Can be applied in only one step to primed substrate and can be tiled over after a very short time if a fast-curing tile adhesive is used



# Industrial System



1 Prepare the substrate. Remove any loose or weak material and level surface. Prime with PCI Epoxigrund 390.



2 Apply two coats of PCI Apoflex®, wall or floor version, as a bonded waterproofing agent.



3 To provide a better mechanical bond to the PCI Apoflex® tile adhesive, scatter a generous quantity of silica sand.



4 Apply the first coat of PCI Apoflex® F.



5 Apply PCI Apoflex® before positioning the waterproofing tapes.



6 Insert a waterproofing tape such as PCI Pecitape® 120 or PCI Pecitape® Objekt and work over the tape.



7 Insert PCI Pecitape® 90° prefabricated element into the waterproofing layer ...



... and cover it generously with the waterproofing material.



Register now and secure a 12-year guarantee!

**PCI**<sup>®</sup>  
Für Bau-Profis



Then apply PCI Apoflex® again over the tapes.



Integrate fittings, drains, penetrating components, gutters and surge troughs into the waterproofing of the surface.



Apply PCI Epoxigrund 390 primer to critical details and transitions to fittings...



... and penetrating components.



PCI System I Balcony/Terrace

# Guaranteed security

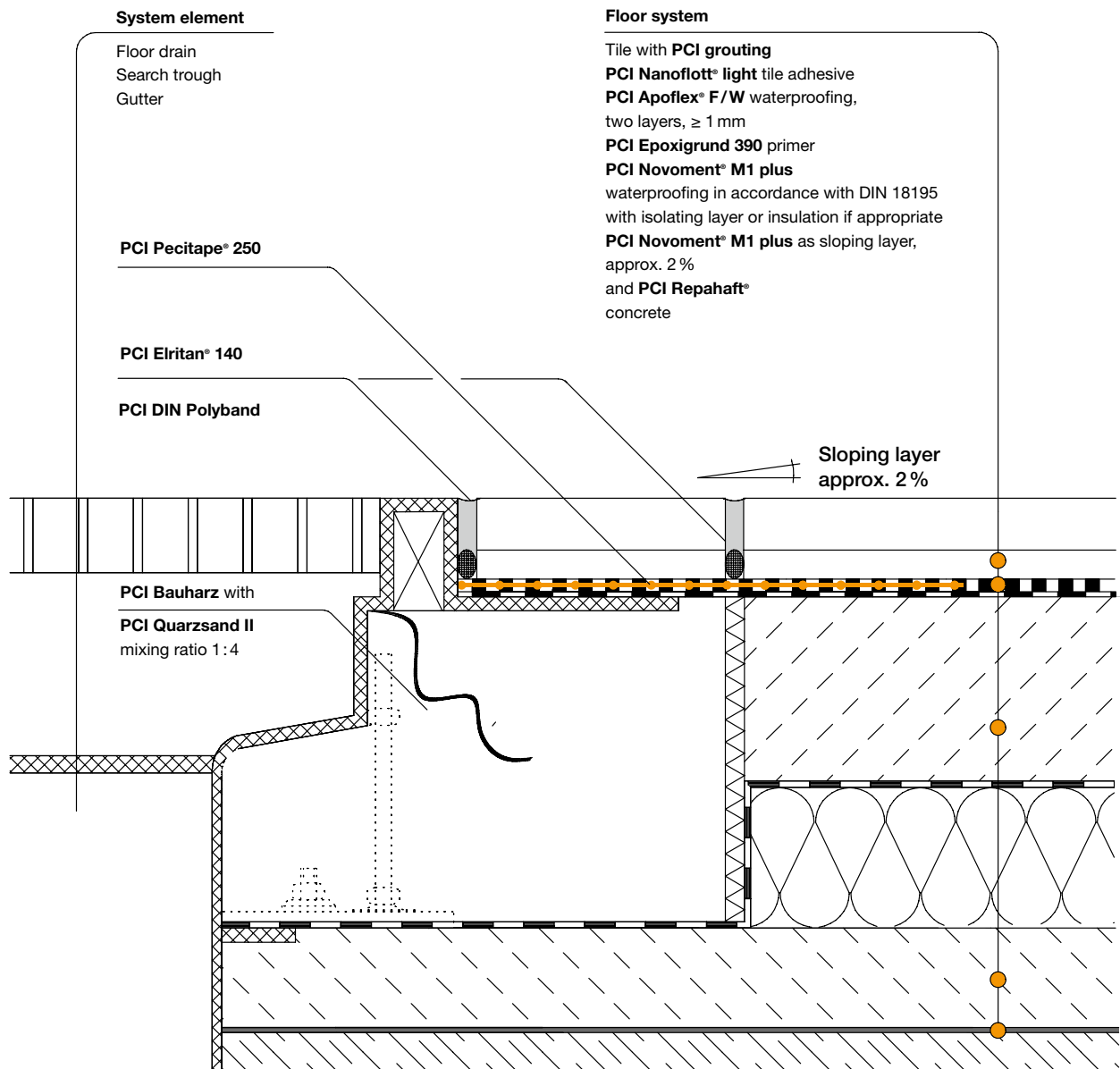
With the initiative for the secure tiling of balconies and terraces, PCI and its strong industrial partners offer certified specialist contractors a special service: a 12-year guarantee on tiling in outdoor applications. Just obtain certification for system I balcony/terrace and you can offer greater security in your business.

Full information at [www.pci-augsburg.de](http://www.pci-augsburg.de)

Waterproofing and laying



# Connection of floor drain with search trough and gutter – floor exposed to chemicals



## Direct floor drains: an extremely demanding detail

Floors in industrial kitchens are continually exposed to a variety of different liquids. These not only include cleaning agents and kitchen products but also aggressive oils, greases and acids from the foods which are handled. In applications like this, it is especially important to pay attention to the details and the integration of components.

Floor drains, pipes and gutters are essential components of a complex industrial kitchen as they supply water and also remove waste water from the kitchen.

These components “penetrate” parts of the building and the floor structure and must therefore be effectively integrated into the bonded waterproofing. For this purpose, special mortars based on epoxy resin (using binders such as PCI Bauharz) must be used.

In order to ensure optimum bonding, the stainless steel gutter must be clean and free from grease. Before it is positioned, the back of the gutter should be primed with PCI Epoxigrund 390 and silica sand (size 0.3–0.8 mm) should be scattered over the primer. This ensures outstanding adhesion to the waterproofing material.

### The grouting material depends on chemical exposure

#### PCI Nanofug® Premium

- Exposure to service and cleaning water, customary cleaning agents

#### PCI Flexfug®

- Exposure to water in outdoor areas

#### PCI Durafug® NT

- Exposure to service, cleaning and swimming pool water (not aggressive to concrete), industrial cleaning, occasionally acidic, steam jetting

#### PCI Durapox® NT plus

- Exposure to water and chemicals



# Connection of stainless steel penetrating components – floor exposed to chemicals

Penetrating components must be effectively integrated into the waterproofing system

### Challenges

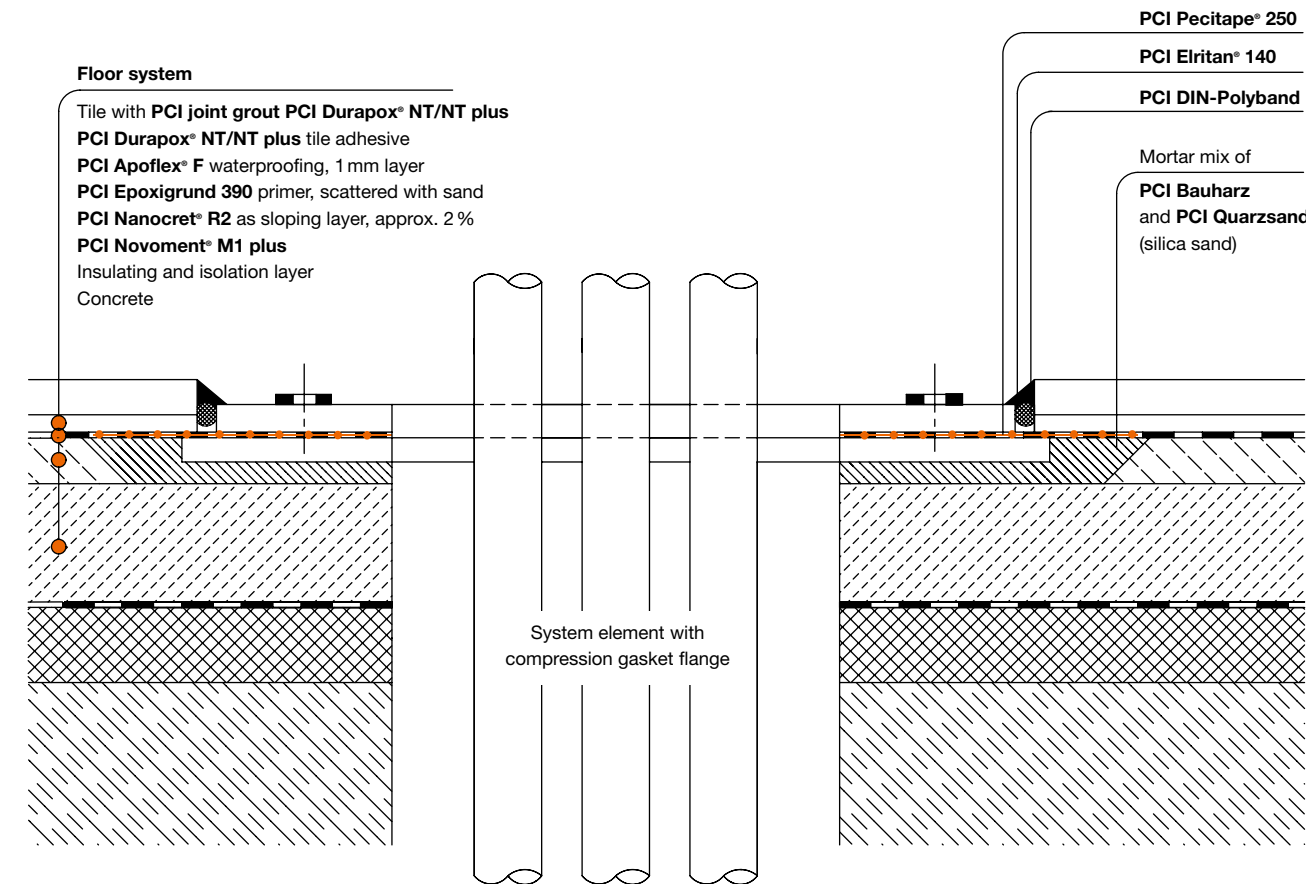
In commercial and industrial facilities such as large kitchens or production plants such as food and beverage filling plants, components which penetrate through the floor (power cables, water and waste water pipes, earthing systems) need to be protected and to be integrated into the waterproofing system. In order to ensure that the penetration points are effectively waterproofed, special pipe penetration fittings or combinations of several sleeves may need to be used on site as most of the pipes and cables concerned are made from or insulated with materials which do not allow adhesion (cable insulation, polypropylene or polyethylene pipes). They are also not equipped with flanges which can be embedded in the bonded waterproofing system.

The locations of pipe penetration points must already be planned during the design stage. Depending on the design and site conditions, the fittings required for these components must be agreed with the manufacturer. It may be necessary to fabricate special parts. Pipe penetration sleeves should be made from a material which allows adhesion, preferably stainless steel, and equipped with a flange for incorporation in the bonded waterproofing system. The flange should have a width of at least 50 mm. Inside the pipe sleeve, which must be welded to the flange in such a way as to be watertight, the pipes and cables can be guided safely through the floor structure.

### Tried and tested solutions

It is beneficial to reduce the thickness of the screed around the pipe entry point in order to allow the insertion of the pipe entry fitting complete with stainless steel flange. The area around the pipe entry can then be filled with PCI Durapox® NT/NT plus, epoxy resin mortar. The flange must also be fastened in place mechanically. Frequently, a generous gap in the screed is allowed around the entry point. This can then be filled effectively with an epoxy resin screed mixture consisting of PCI Bauharz + PCI Quarzsand II (silica sand) with a mixing ratio of 1:4.

At the pipe entry, the flange must be primed using PCI Epoxigrund 390 and PCI Quarzsand silica sand (size 0.3–0.8 mm) must be scattered over the primer. After allowing the material to cure for about 12 hours, two layers of PCI Apoflex® W bonded waterproofing material with a thickness of at least 1 mm are applied. At the transition between the metal flange/adhesive flange and the screed, PCI Pecitape® 250 waterproofing tape is embedded to provide reinforcement for the waterproofing material. PCI Apoflex® is then applied to cover the tape. The thin second layer of PCI Apoflex® F is brushed on the next day. While the material is still wet, a generous layer of PCI Quarzsand silica sand, size 0.3–0.8 mm, must be scattered over the surface to provide adequate mechanical bonding for the tiling.



The grouting material depends on chemical exposure

#### PCI Durafug® NT

- Exposure to service, cleaning and swimming pool water (not aggressive to concrete), industrial cleaning, occasionally acidic, steam jetting

#### PCI Durapox® NT plus

- Exposure to water and chemicals



The art of mixing

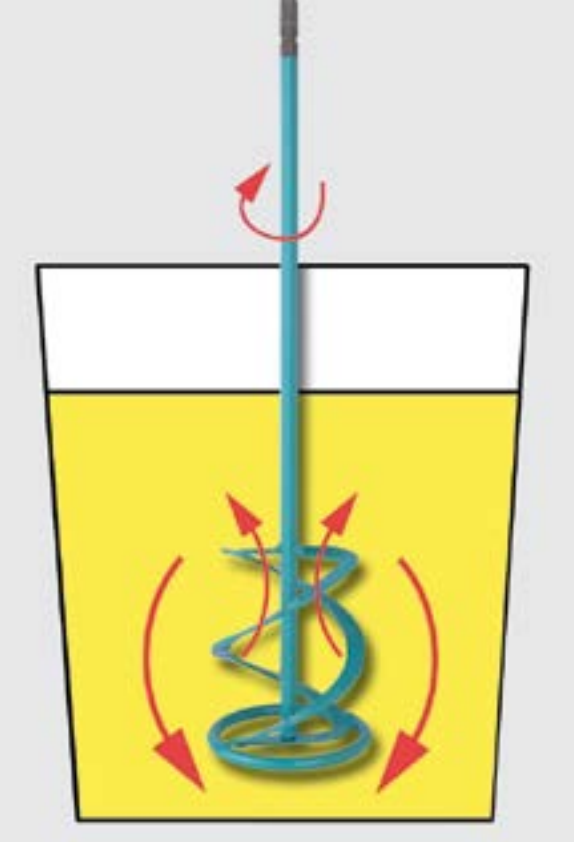
Stirred, not shaken

When processing construction chemicals, is essential to use the appropriate type of mixer and a suitable mixing container. The art of mixing starts with the selection of the appropriate mixing tool.

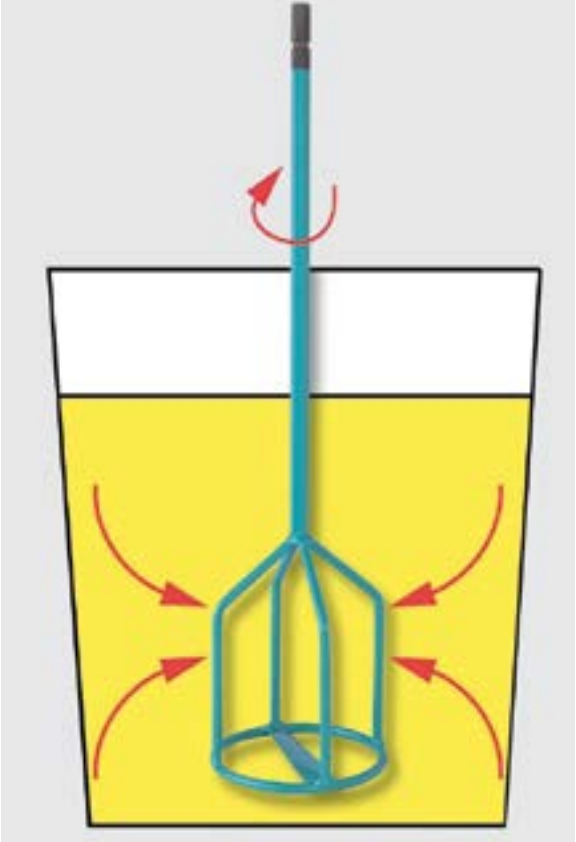
Special hand-held mixers, usually with two speeds, are the solution of choice for mixing construction products. Such equipment must have a rating of at least 1000 Watts for continuous operation. Electronic drills are normally only suitable for small quantities and relatively liquid materials.

The specific type of mixer has considerable impact on the results of mixing. Depending on the consistency and viscosity of the material processed, ribbon, basket, anchor and drill mixers may be used. For most construction projects, the ribbon mixer is the most appropriate type of mixer. It represents an all-rounder for the construction professional.

You will find detailed information on the processing of single-component, two-component and multi-component products in our publication “Our Advice No. 01”.



Mixing effect in a pail: ribbon mixer...



... and parallel mixer

Mixer			
	Collomix WK ribbon mixer Ø 10 – 16 cm	Collomix WK 70 or MM ribbon mixer for small quantities Ø 7 – 8.5 cm	Collomix basket mixer KR
Product/ Group			
Tile adhesives – cementitious, e.g. PCI Nanolight®, PCI Flexmörtel® S1, PCI Flexmörtel® S2, PCI Carralight® etc	<div>The all-round mixer for tiling work</div>		
Joint grouts – cementitious e.g. PCI Nanofug®, PCI Nanofug® Premium, PCI Carrafug®, PCI Rapidfug®			
Waterproofing slurry – cementitious e.g. PCI Seccoral® 1K, PCI Seccoral® 2K Rapid			
Smoothing compounds, – cementitious, e.g. PCI Periplan® products			
Repair mortars – cementitious, e.g. PCI Pericret®, PCI Nanocret® R2			
Screed mortars – cementitious, e.g. PCI Novoment® M1 / M3 plus, PCI Novoment® Z1 / Z3			
Reaction resin mortars PCI Durapox® NT / NT plus, PCI Collastic®			
Reaction resin mortars, primers and waterproofing compounds PCI Durapox® NT / NT plus, PCI Collastic®, PCI Epoxigrund 390/ Rapid, PCI Apoflex® W / F, PCI Apoten®, PCI Bauharz			



Systems

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# Systems



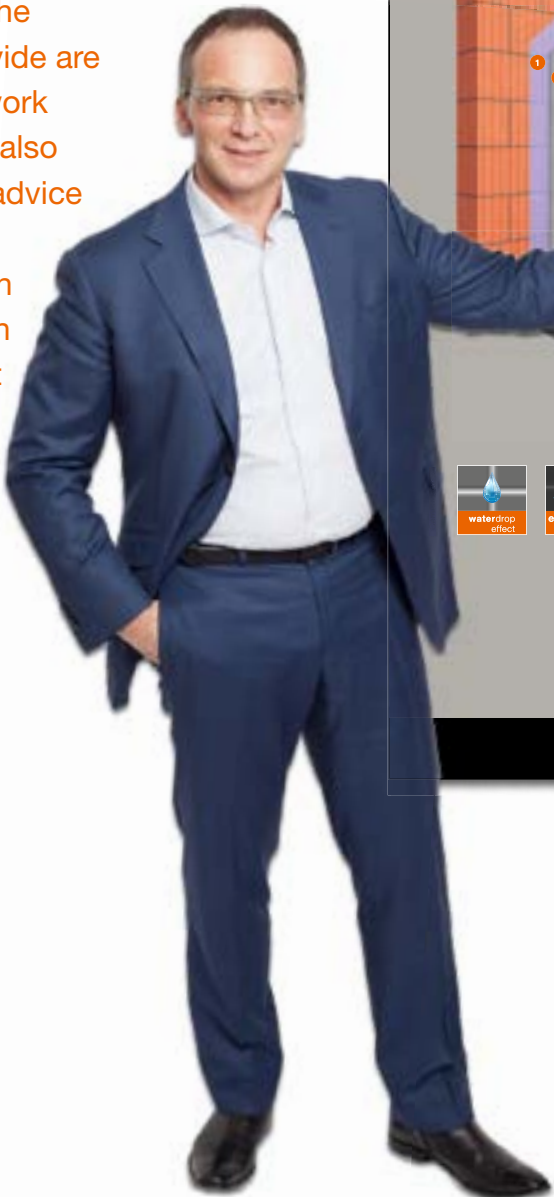
# Orientation and success

## Find solutions instead of searching for products

This section presents our smart systems in detail. Different requirements are taken into consideration in each area and our product systems offer the appropriate solution for more than 90 percent of challenges faced in everyday tiling work. Information on the installation of the various systems is given in the section on “Waterproofing and laying” (from page 38 onwards).

“Our systems and the information we provide are intended to make work easier for you. This also applies to product advice and selection. Our main emphasis is on reliable tiling work in a variety of different applications.”

Roger Costa  
Regional Marketing Manager  
D/A/CH and BeNeLux



**System structure in layers**  
Practical presentation of system structure with all relevant products

**Product recommendations and alternatives**  
A clear list of the products combined in the system, together with possible alternatives

**Systems**

Multi-use very low-emission tiling system for all indoor tiling

**Multi-use tiling system**

**Areas of application:**

- All ceramic tiles irrespective of weight and shape
- On all conventional and heated screeds
- Residential buildings, especially in bathrooms

**System benefits**

- Multi-use system
- Optimized for reliable, convenient working, especially on small and medium-sized surfaces
- All products feature very low emissions

**lowemission**

**waterdrop effect**

**easy to clean effect**

**resistance effect**

**protection effect**

**S1 TECHNOLOGY**  
CT ≤ 4% cm

**S2 TECHNOLOGY**  
CT ≥ 3 days

*“A complete low-emission system – that really is a tremendous advantage because it protects the health of contractors’ personnel and also benefits the client.”*

Klaus-Günter Theobald,  
Head of Marketing, PCI Europe

**Products**

1 Primer	PCI Glasgrund® 404 Special wash primer for absorbent and non-absorbent substrates		
2 Floor levelling compound	PCI Periplan® Floor levelling compound under top coverings		
3 Wall levelling compound	PCI Pericret® Levelling compound for floors, walls and soffits		
4 Waterproofing / waterproofing tapes and mouldings	PCI Lastogum® Waterproof, flexible protective coating under ceramic coverings in showers and bathrooms		
	PCI Pectape® 120 Special waterproofing tape system for waterproof corner and perimeter joints, plus waterproofing sleeves and inner/outer corner mouldings (not shown)		
5 Tile adhesive	PCI Nanofix® Multi-use flexible tile adhesive for all types of substrates and ceramic coverings	PCI Flexmörtel® S1 Flexible tile adhesive for all ceramic coverings	PCI Flexmörtel® S2 Highly flexible tile adhesive for all ceramic coverings
6 Joint grout	PCI Nanofug® Premium Multi-use flexible joint grout especially for fully vitrified and vitrified tiles		PCI Nanofug® Multi-use flexible joint grout especially for non-vitrified and vitrified tiles
7 Sealant	PCI SiloSeal® E Elastic joint sealant for indoor and outdoor use		

**PCI's (magic) fleece**

Joints that have been polished using PCI Fugenflies have a very smooth surface that is free from pores – ideal conditions for durably attractive joints.

**System benefits**  
Icons that can be understood intuitively present system benefits at a glance

**Additional practical tips**  
Tips placed at appropriate points offer practical advantages

## Systematic advice convinces clients

You can already use the systems when providing advice to your clients. The systems allow you to give a clear presentation of your services and to convince your customers that they will benefit from the best possible solution to their problems. Why not take advantage of this opportunity?

## Harmonized systems provide security

Customers appreciate a systematic approach because it gives them confidence. Nothing is left to chance and everything has been taken into consideration. This also applies to the PCI systems: well thought-out system solutions for all applications, consisting of high-quality PCI products, ensure easy product selection. Clear recommendations on system structures provide security in tiling work.

## Clear presentation provides good orientation

For each system, we have provided a summary that gives a clear presentation of individual steps and products in tables and diagrams. A brief description highlights the individual applications and the benefits of the system. The smart combination of products and the clear presentation offer security and confidence in everyday work. This approach ensures the best possible orientation within a wide product range, reliable working and optimum results.





© AGROB BUCHTAL

## The added value of a system approach

### Combinations with positive effects

The systems which we have developed take into consideration each individual step and include products with properties which are precisely adapted to each other. The benefits offered by each system are therefore greater than the benefits of its individual parts.

This applies both to the processing of our systems and to the use of the end product. Each of the systems has specific advantages. Apart from good orientation and reliable product selection and processing, each system offers additional benefits that are precisely tailored to the applications concerned.

For example, products with lightweight mortar technology feature a special combination of fillers that reduce the application force required. At the same time, they are especially efficient. The same applies to nano products. The underlying technology, complemented by special additives, has a positive impact on the relationship between setting

speed and processing time. Thanks to the nano links which form during curing, the end result is an especially stable material. If dust reduced products are included in the system, clean processing is possible. Low-emission products protect people against harmful fumes during laying and use. Our “multi-use tiling” system consists solely of low-emission products.

When a tiled surface is used, the joint grout is especially important as it determines the properties of the surface. Joint grouts can meet key hygiene requirements such as the reduction of mould formation and easy cleaning. Aspects such as impact noise reduction can also be taken into account within the system.

We have developed a number of different icons to represent the positive features of our systems. On the following pages, these icons are assigned to the various different systems in line with their properties.



**Showing dirt where to get off!**  
The fine surface texture allows easy cleaning. Dirt cannot become encrusted and is easier to remove.



**Rolling off!**  
If the water simply rolls off the surface, this has a very beneficial effect on hygiene. During cleaning, any dirt particles are simply removed from the surface.



**A tough performer!**  
The structure and composition of PCI Nanofug® Premium provide better protection against acid household cleaning products, which are often used to remove lime scale.



**Not here!**  
The special formulation of the joint grout and the alkalinity of the materials used protect the joint against attack by certain mould fungi and bacteria.



**Thumbs up!**  
In product development, PCI focused its attention not only on positive product characteristics but also on optimized application properties. The packaging, consistency and setting speed of the product make for pleasant and efficient working.



**No dust here!**  
Less dust on the construction site not only benefits the client but also makes work cleaner and easier for tilers.



**The lighter the better!**  
Products with light mortar technology offer convincing economics and efficiency. They are easier to use and perform better.



**Hear the difference!**  
Inadequate protection against impact and ambient noise makes for an unpleasant atmosphere. Noise stop helps improve the acoustics of a room.



#### SMARTSYSTEMSOLUTIONS

means the combination of selected individual products to form a smart system offering added value for architects, craftsmen and consumers. These combinations offer a solution for almost any problem.



#### SMARTMORTARSOLUTIONS

means products featuring smart properties and high-quality results for contractors. What is especially “smart” is that all the products are easy to apply.



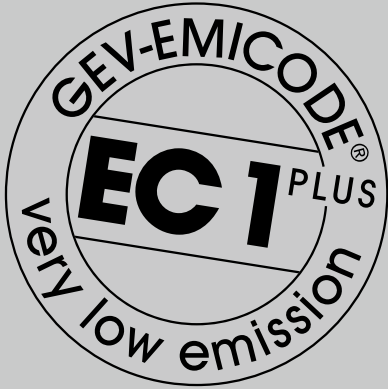
The benefits of healthy living

Whether your customer's project is a new building or the modernization of an existing building, the objective is to improve the home or building concerned. In terms of appearance, that will certainly be the case, but what about emissions and detrimental fumes from tiling materials? As buildings provide an increasingly tight seal and people spend more and more time indoors, this question has become increasingly relevant over the past few years. Nowadays, a healthy living environment is a top priority for many customers.

Tested quality

For PCI Augsburg GmbH, low emissions have been a key element in product quality for many years. We are well aware of our responsibility as a company active in the construction chemicals sector. You benefit from low-emission products in two ways. Firstly, the use of these products gives you a competitive advantage towards your customers. Secondly, you avoid damage to the health of personnel during tiling work.

If the logo includes an additional "R" (for "regulated"), this means that special precautions need to be taken during the use of a product. For example, it may be necessary to wear goggles or protective gloves. Further information is available at: [www.emicode.de](http://www.emicode.de)



Jürgen Baumann  
Head of Testing, PCI

Product name	Classification
<b>Injection resins</b>	
PCI Apogel® SH	EC 1 <sup>PLUS</sup> R
<b>Primers</b>	
PCI Gisogrund® Rapid	EC 1
PCI Gisogrund® 303	EC 1
PCI Gisogrund® 404	EC 1 <sup>PLUS</sup>
PCI Epoxigrund 390	EC 1 R
PCI Epoxigrund Rapid	EC 1 R
<b>Floor and wall levelling compounds</b>	
PCI Pericret®	EC 1 <sup>PLUS</sup> R
PCI Periplan®	EC 1 R
PCI Periplan® Extra	EC 1 <sup>PLUS</sup> R
PCI Periplan® fein	EC 1 <sup>PLUS</sup> R
PCI Periplan® Multi	EC 1 <sup>PLUS</sup>
<b>Isolating products</b>	
PCI Pecilastic®	EC 1 <sup>PLUS</sup>
PCI Polysilent® 4/7	EC 1 <sup>PLUS</sup>
PCI Polysilent® plus	EC 1
PCI Pecitape® Silent	EC 1 <sup>PLUS</sup>
<b>Bonded waterproofing products</b>	
PCI Lastogum®	EC 1 <sup>PLUS</sup>
PCI Pecilastic® W	EC 1 <sup>PLUS</sup>
PCI Pecitape® Objekt	EC 1 <sup>PLUS</sup>
PCI Pecitape® 90° A	EC 1 <sup>PLUS</sup>
PCI Pecitape® 90° I	EC 1 <sup>PLUS</sup>
PCI Pecitape® 42,5 x 42,5	EC 1 <sup>PLUS</sup>
PCI Pecitape® 120	EC 1 <sup>PLUS</sup>
PCI Pecilastic® U	EC 1
<b>Tile adhesives</b>	
PCI Carraflex®	EC 1 <sup>PLUS</sup>
PCI Carraflott® NT	EC 1 <sup>PLUS</sup>
PCI Carralight®	EC 1 <sup>PLUS</sup> R
PCI Carrament® grau	EC 1 <sup>PLUS</sup> R
PCI Carrament® weiß	EC 1 <sup>PLUS</sup> R
PCI FT® Klebemörtel	EC 1 R
PCI FT® Flex	EC 1 <sup>PLUS</sup> R
PCI Flexmörtel® S1	EC 1 <sup>PLUS</sup> R
PCI Flexmörtel® S1 Rapid	EC 1 R
PCI Flexmörtel® S2	EC 1 <sup>PLUS</sup> R
PCI Flexmörtel® S2 Rapid	EC 1 <sup>PLUS</sup> R
PCI Nanolight®	EC 1 R
PCI Nanoflott® light	EC 1 R
PCI Nanolight® White	EC 1 <sup>PLUS</sup> R
<b>Joint grouts</b>	
PCI Carrafug®	EC 1 <sup>PLUS</sup> R
PCI Nanofug®	EC 1 <sup>PLUS</sup> R
PCI Nanofug® Premium	EC 1 <sup>PLUS</sup> R
<b>Silicone sealants</b>	
PCI Silcoferm® S	EC 1 <sup>PLUS</sup>
PCI Silcofug® E	EC 1 <sup>PLUS</sup>



Low-emission systems

Of course, the use of any low-emission product is already an advantage, but we have gone a step further. In the development of systems which are mainly intended for use in the home, we have paid special attention to a healthy living environment. For example, all the products in the "multi-use tiling system" are classed at least as low-emission. You can

therefore be sure that you are offering your customer the best possible solution not only in terms of functionality and appearance but also in terms of health. You offer added value without additional cost. These systems are marked with the "lowemission" icon.



## Systems

Multi-use very low-emission tiling system  
for all indoor tiling

# Multi-use tiling system

## Good for everyone

The “multi-use tiling system” shows that “standard” does not necessarily mean “mediocre”. This system achieves the best possible results in a wide variety of everyday tiling applications.

### Where?

This system has been optimized for use in residential buildings, especially in **domestic bathrooms**. With this system, work on small and medium-sized construction sites is safe and convenient.

In addition, the system takes account of the latest requirements in this segment. It is also ideal for laying and grouting **large tiles and fully vitrified floor coverings**.

### Why?

All the individual products used in this system, and therefore the entire system, are classed as **low-emission** at least in accordance with EMICODE® EC1. There are no detrimental fumes either when the system is laid or for many years afterwards. The many functional features of the joint surface represent an additional benefit. They offer the customer **added hygiene and safety**.

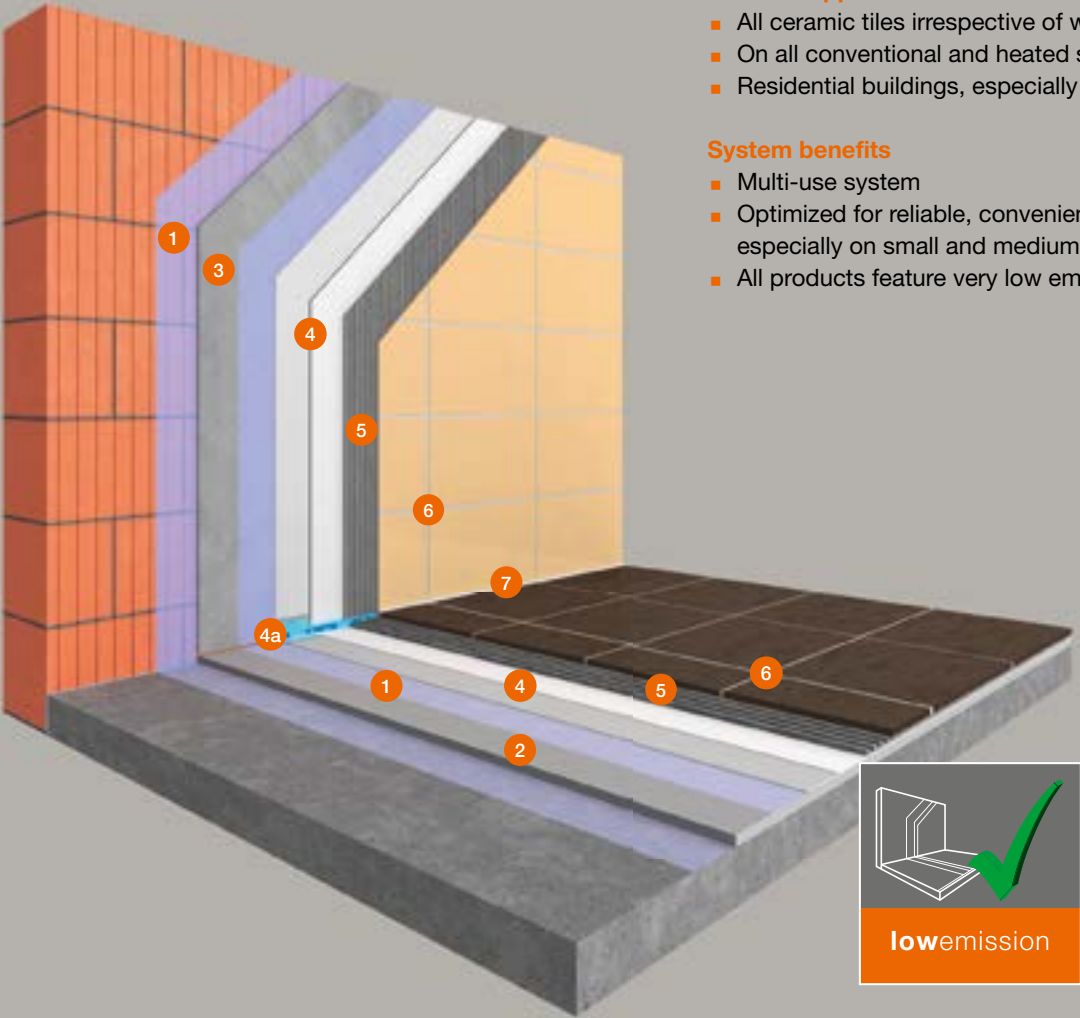




Systems

Multi-use very low-emission tiling system  
for all indoor tiling

Multi-use tiling system



Areas of application:

- All ceramic tiles irrespective of weight and shape
- On all conventional and heated screeds
- Residential buildings, especially in bathrooms























System benefits

- Multi-use system
- Optimized for reliable, convenient working, especially on small and medium-sized surfaces
- All products feature very low emissions

\* Cement screed



Products

1 Primer	  <b>PCI Gisogrund® 404</b> Special wash primer for absorbent and non-absorbent substrates
2 Floor levelling compound	  <b>PCI Periplan®</b> Floor levelling compound under top coverings
3 Wall levelling compound	  <b>PCI Pericret®</b> Levelling compound for floors, walls and soffits
4 Waterproofing / waterproofing tapes and mouldings	  <b>PCI Lastogum®</b> Waterproof, flexible protective coating under ceramic coverings in showers and bathrooms
	  <b>PCI Pecitape® 120</b> Special waterproofing tape system for waterproof corner and perimeter joints, plus waterproofing sleeves and inner / outer corner mouldings (not shown)
5 Tile adhesive	<b>PCI Nanolight®</b> Multi-use flexible tile adhesive for all types of substrates and ceramic coverings  
	<b>PCI Flexmörtel® S1</b> Flexible tile adhesive for all ceramic coverings  
	<b>PCI Flexmörtel® S2</b> Highly flexible tile adhesive for all ceramic coverings  
6 Joint grout	  <b>PCI Nanofug® Premium</b> Multi-use flexible joint grout especially for fully vitrified and vitrified tiles
	  <b>PCI Nanofug®</b> Multi-use flexible joint grout especially for non-vitrified and vitrified tiles
7 Sealant	  <b>PCI Silcofug® E</b> Elastic joint sealant for indoor and outdoor use

*“A complete low-emission system –  
that really is a tremendous advantage  
because it protects the health of  
contractors’ personnel and also  
benefits the client.”*

**Klaus-Gunter Theobald,**  
Head of Marketing, PCI Europe



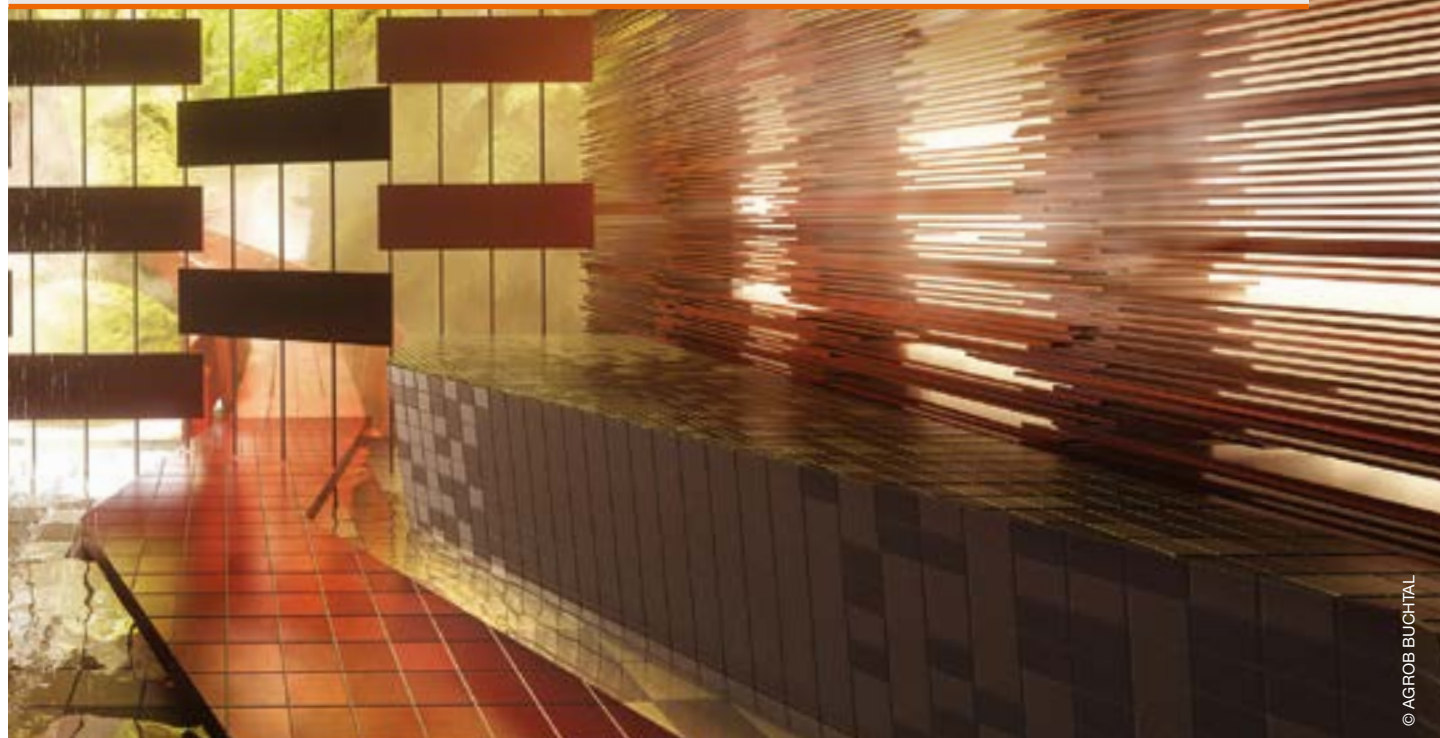
PCI’s (magic) fleece



*Joints that have been polished  
using PCI Fugenvlies have  
a very smooth surface that  
is free from pores – ideal  
conditions for durably  
attractive joints.*



## The ChromaPlural system: new colours for architecture



Design: ushitamborriello\_innenarchitektur\_szenenbild, Ushi Tamborriello, CH-Baden

Spa landscapes present demanding functional requirements e.g. as a result of changing temperatures or humidity. Above all, they need to create a convincing atmosphere. In this example, this is achieved by using colours and formats of the ChromaPlural system to enhance the perspective effect.

## The ChromaPlural system: new colours for architecture



**Werner Ziegelmeier,**  
Head of Public  
Relations



ChromaPlural is a completely redesigned ceramic tile system with colours and formats based on a modular structure and carefully matched to each other. This

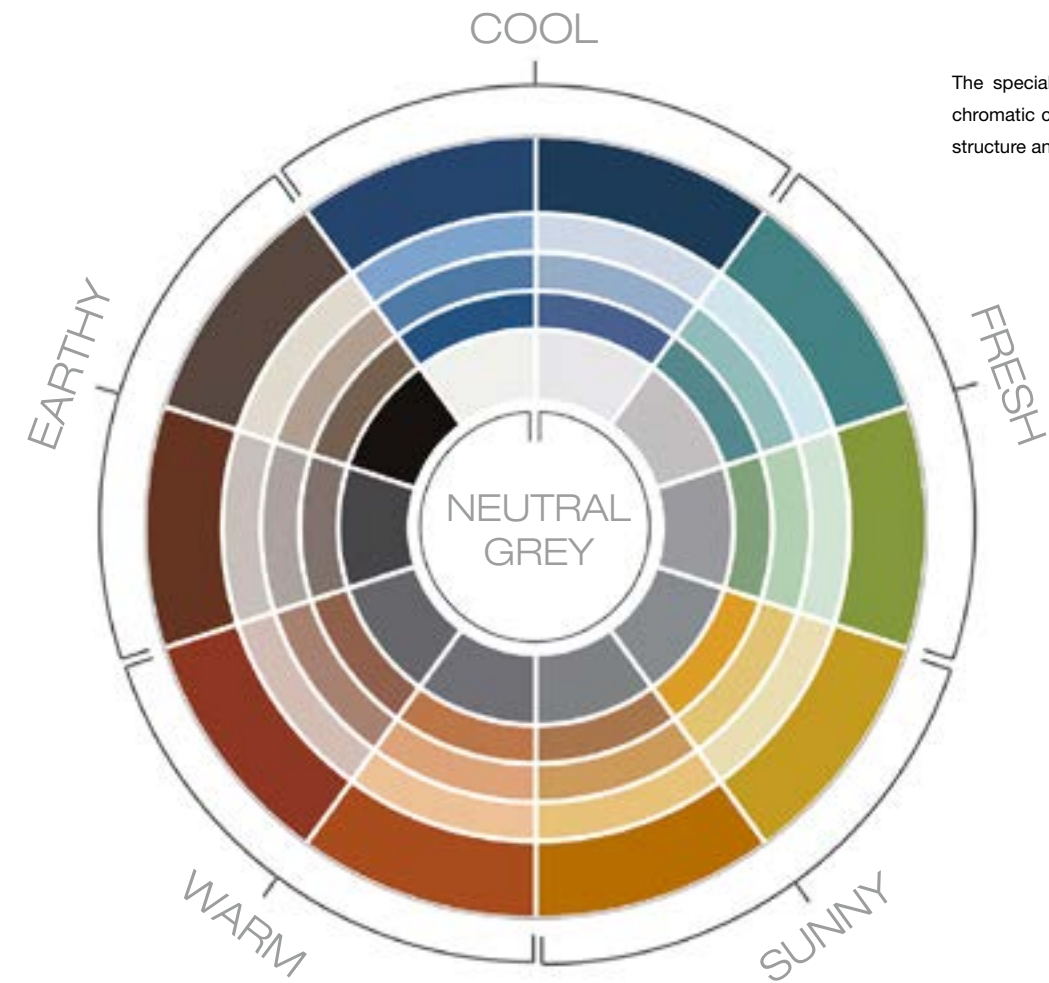
“modular ceramic system“ offers architects a high degree of design freedom for comprehensive concepts and at the same time supports the conclusive architectural use of colours, shapes and sizes.

AGROB BUCHTAL's two previous colour and format systems CHROMA and PLURAL PLUS have offered convenient use, a comprehensive product portfolio and a wide range of applications for many years. These two systems have now been combined to form one optimized system, ChromaPlural, which was launched at BAU 2015.

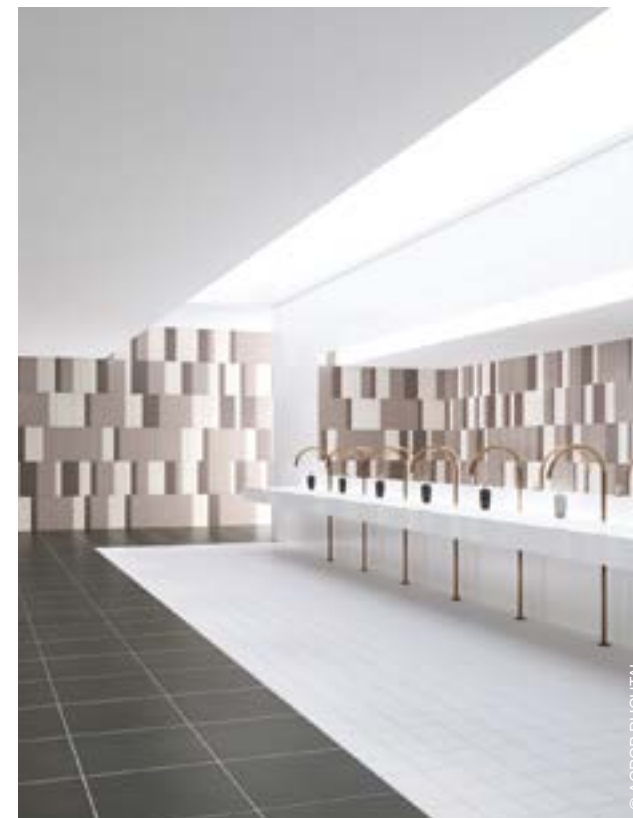
Contemporary architecture can now be realized even more consistently, for example thanks to the extended variety of formats: it covers a range from the 1x1 cm mosaic up to large formats such as 50x100 cm, permits laying with elegant narrow joints and comprises both octametric and decimal dimensions.

### A chromatic circle for design harmony

The new colour range, which was completely redesigned in cooperation with colour designer Peter Zoernack, is based on a clearly structured system and allows even greater precision in the realization of multi-coloured and monochrome designs. The system takes into account the characteristics of the ceramic material, and offers creative leeway for individual and harmonious combinations. This is already clear from the specially developed chromatic circle: its core contains ten colour sequences, each with light, medium and dark grading, ten corresponding vital “active shades“ and a neutral grey sequence, which comprises 10



The specially developed ChromaPlural chromatic circle demonstrates the clear structure and harmony of the system.



Design: 3deluxe, Matthias Sütterlin, D-Wiesbaden

Colour does not necessarily mean colourfulness: monochrome areas and rhythmic compositions create calm and vibrant areas.



Design: 4a Architekten GmbH, Martin Reimer, D-Stuttgart

This wall with shades from the FRESH colour sphere creates a cheerful, transparent atmosphere that is supported by the glass door and the ceiling light.



further nuances. The result is a total of 50 shades, which are subdivided into the colour spheres cool, fresh, sunny, warm, earthy and neutral. The name of each colour sphere indicates the general atmosphere which it can be used to create.

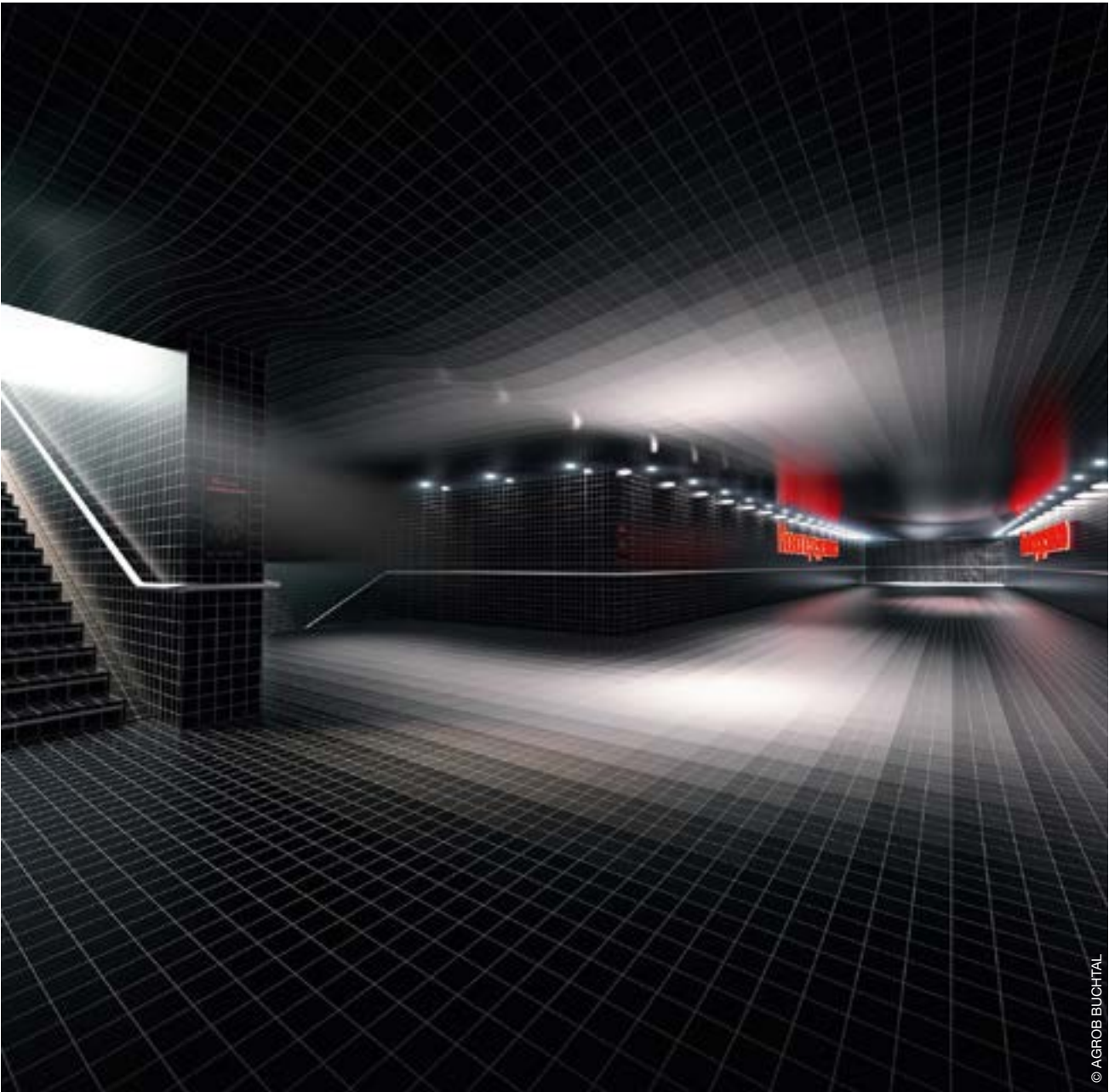
With its broad portfolio of colours, the new system is also suitable for a wide variety of applications. Typical examples are industrial and commercial areas, canteen kitchens, sanitary areas, tea kitchens, corridors, doctor's surgeries, operating theatres, ward bathrooms and other medical facilities, shops, changing rooms, foyers, decorative walls, facades, all types of swimming pools, public transport or representative buildings and many more. No matter how the colours are combined and arranged, the result always conveys a harmonious and well-balanced impression. The new system is completed by eight contrasting colours with

high-gloss glaze for the accentuation of smaller and larger areas. In addition, AGROB BUCHTAL can also produce tiles to special order for specific projects.

Coating for sustained added value

Like most of the AGROB BUCHTAL range, the new ChromaPlural system also features an HT (hydrophilic tile) coating (to the extent that this is technically feasible). This innovative solution gives ceramic tiles special features: they are extremely easy to clean, have an antibacterial effect without using chemical products and eliminate unwelcome odours as well as air pollutants. HT coatings save time and money, improve the room climate and make a significant contribution to environmental protection as a result of the reduced use of detergents.

www.chromaplural.com/www.agrob-buchtal.de



Design: NIO architecten, Maurice Nio, NL-Rotterdam  
Subtle shading plays a key role in the architectural use of colour. In this spectacular design, all the 10 shades of the neutral grey sequence have been used effectively to ensure a restrained interplay with light and red colouring.

The joint colour range:  
modern and diversified

The flexible joint grout PCI Nanofug® Premium also offers considerable leeway for creativity, with a total of 23 colours in four warmth classes. Five new colours give tilers an opportunity to play even more effectively with colour harmonies and contrasts in the future.

The new colours are in line with customers' wishes for natural surfaces and ensure that tiling is also a durable and hygienic option in applications where surfaces inspired by nature are to be used – also in wet rooms.

For perfection right down to the last detail, the elastic sealant PCI Silcofug® E is available in the same colours as PCI Nanofug® Premium.

Multi-use flexible joint grout  
**PCI Nanofug® Premium**  
especially for fully vitrified and vitrified tiles



Elastic joint sealant  
**PCI Silcofug® E**  
for indoor and outdoor use



PCI Nanofug® Premium and PCI Silcofug® E  
are available in attractive colours:

Neutral colours

Transparent no. 6 (PCI Silcofug® E only)	White no. 20	Silver grey no. 16	Basalt Nr. 19	Anthracite no. 47	Black no. 40

Cool colours

Pergamon no. 43	Light grey no. 23	Manhattan no. 18	Grey no. 21	Sand grey no. 22	Cement grey no. 31

Warm colours

Jasmin no. 11	Topas no. 44	Anemone no. 12	Bahama beige no. 02	Ochre no. 53	Caramel no. 03

Earth colours

Beige brown no. 52	Light brown no. 49	Intensive brown no. 51	Red brown no. 50	Mid-brown no. 05	Dark brown no. 41

Actual colours may deviate from these illustrations as result of the printing process.



## Systems

*Intelligent laying system for large tiles  
on screeds with movement joints*

### Multi-use tiling system System variant “equally spaced joints”



## Harmonious floor coverings

Big tiles and big surfaces mean big problems? Not with our system variant “equally spaced joints”. By adding products to the “multi-use tiling” system as needed, expansion joints which are required in the screed can be integrated into the joint pattern of the tiling.

### Where?

**Large modern tiles** are predestined for use on large surfaces. However, depending on the shape and size of the room, expansion joints must be provided in the screed. To date, it has also been necessary to include these joints in the tiled surface. The smart “equally spaced joint” system now offered by PCI allows expansion joints in **conventional and heated cement screeds** to be tiled over and integrated into the tiling pattern.

### Why?

The “equally spaced joint” system offers **more creative leeway** and means that the joint pattern is not affected by the expansion joints in the screed. There are three key elements in the system: PCI Apogel® Dübel screed dowels reduce movement at the expansion joints. PCI Pecilastic® U waterproofing and isolating membranes isolate the floor covering from the substrate. PCI Flexmörtel® S2 absorbs horizontal forces and ensures good adhesive tensile strength. By the way: all products are based on **low-emission formulations**.



Systems

Smart tiling system for large tiles  
on screeds with expansion joints

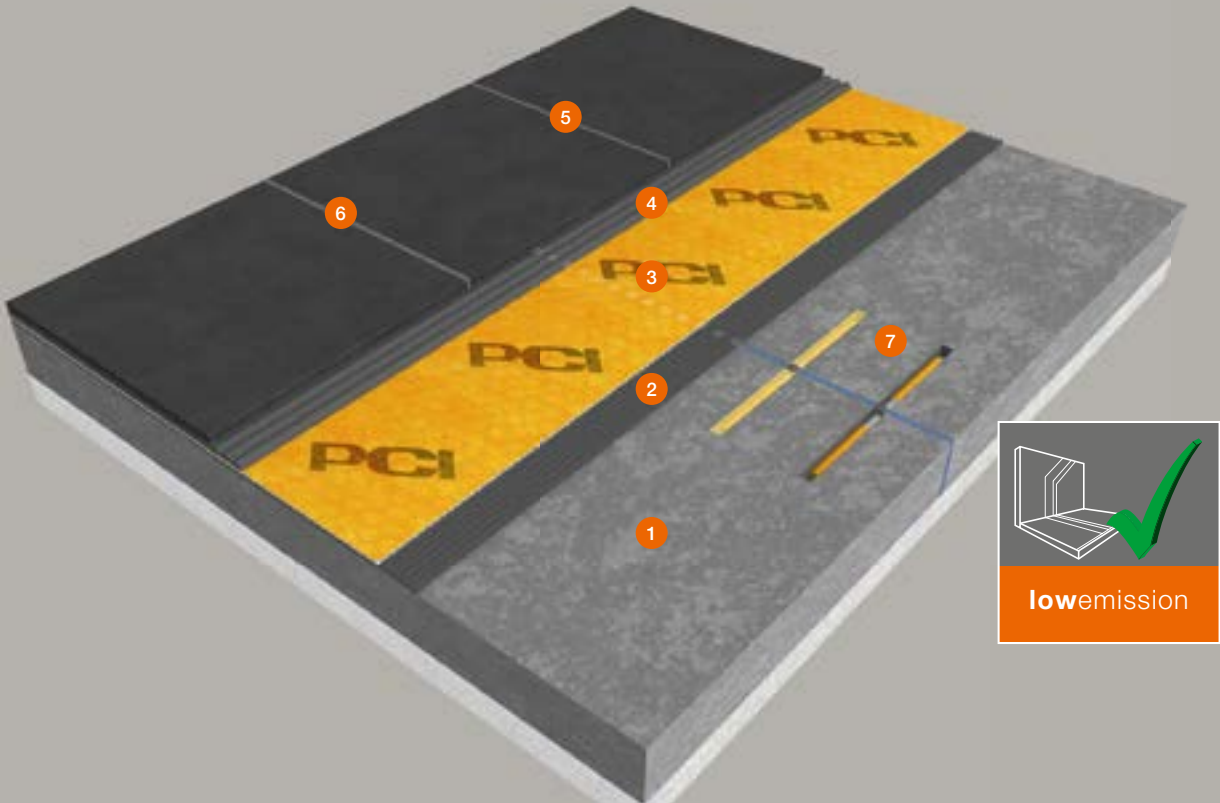
Multi-use tiling system  
System variant: “equally spaced joints”

Areas of application:

- All ceramic tiles in indoor applications, especially well-suited for large tiles
- On all conventional and heated cement screeds
- Residential and other buildings

System benefits

- Attractive joint pattern, especially with large tiles and slabs
- Greater leeway for creativity irrespective of tile size



\* Cement screed

waterdrop  
effect

easy to clean  
effect

resistance  
effect

protection  
effect

**S2**  
TECHNOLOGY  
CT\* ≥ 3 days

Products

1 Primer		<b>PCI Gisogrund® 404</b> Special wash primer for absorbent and non-absorbent substrates
2 Tile adhesive 4		<b>PCI Flexmörtel® S2</b> Highly flexible tile adhesive for all ceramic coverings
3 Waterproofing and isolating membrane		<b>PCI Pecilastic® U</b> Waterproofing and isolating membrane under ceramic, mosaic and natural stone coverings
5 Joint grout		<b>PCI Nanofug® Premium</b> Multi-use flexible joint grout especially for fully vitrified and vitrified tiles
6 Sealant		<b>PCI Silcofug® E</b> Elastic joint sealant for indoor and outdoor use
7 Silicate casting resin / screed dowels		<b>PCI Apogel® SH</b> Silicate casting resin for sealing cracks in screed plus silica sand 0.3–0.8 mm
		<b>PCI Apogel® Dübel</b> Screed dowels for the retroactive dowelling of screed joints

“Big tiles + big area = big problems?  
Thanks to our smart product system,  
the result is “Big tiles + big area =  
big leeway for creativity.”

Manfred Grundmann,  
PCI Managing Director, Sales





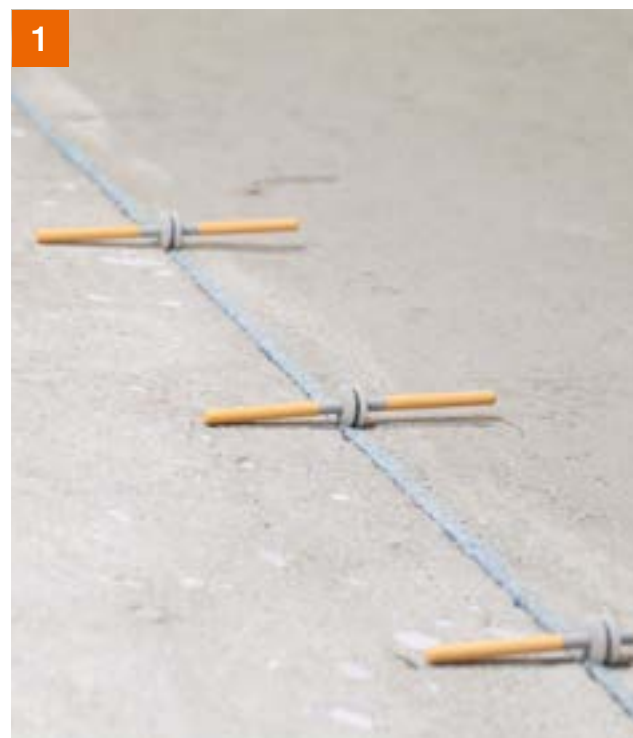
## Systems

Intelligent laying system for large tiles  
on screeds with movement joints

# Multi-use tiling system System variant “equally spaced joints”



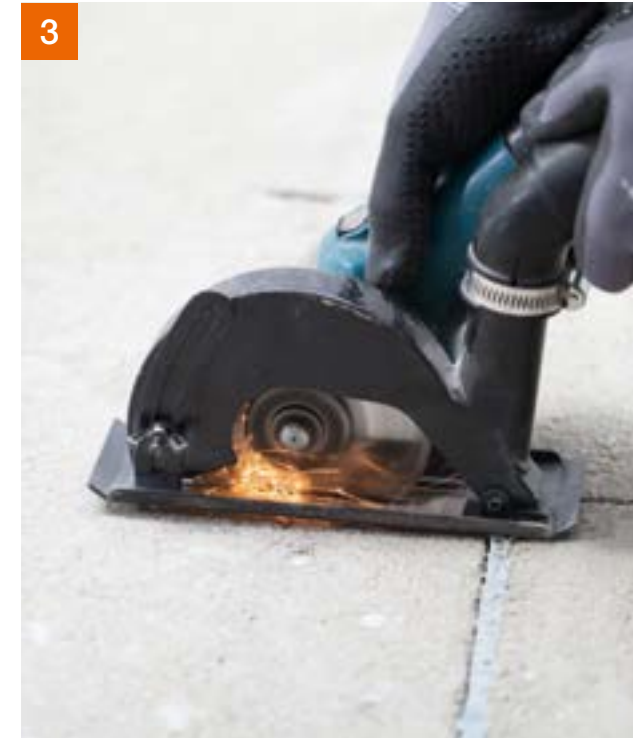
PCI Apogel® SH and PCI Apogel® Dübel screed dowels are the ideal combination for preventing vertical movements in the expansion joint with floating screeds and screeds laid on an isolating layer.



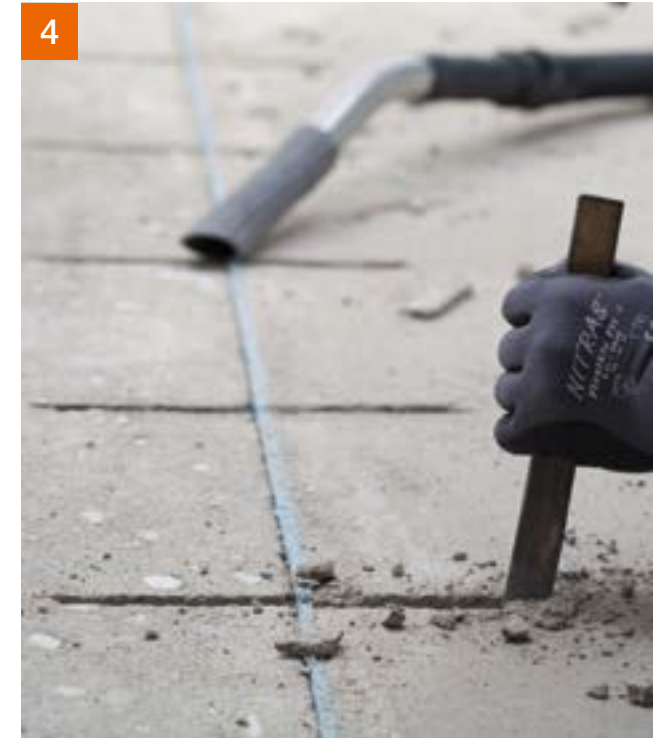
Dowels are placed at intervals of about 20 to 30 cm.



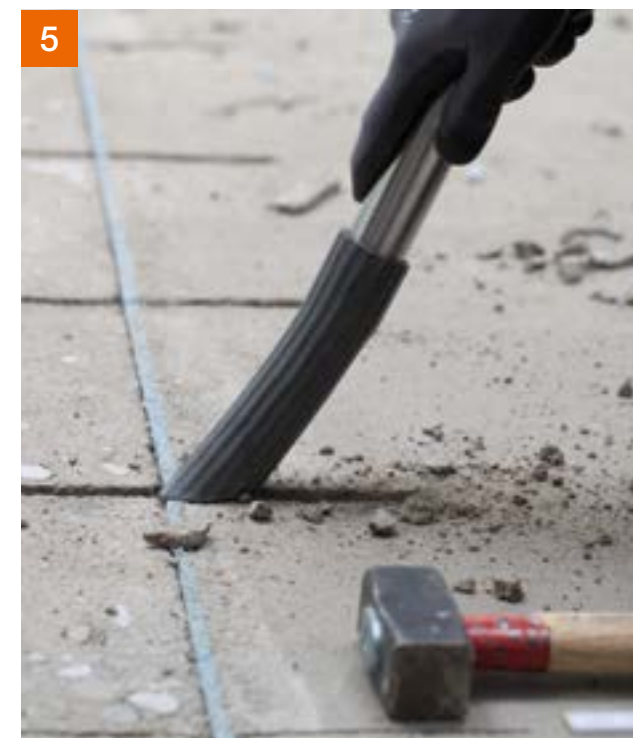
After the expansion joint has been cleaned,  
the position of the PCI Apogel® Dübel dowels is marked.



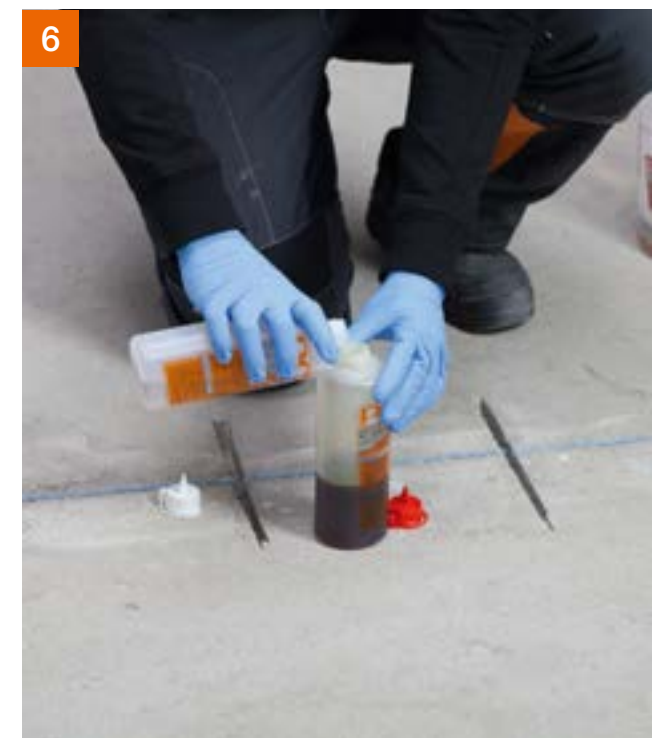
These areas are then cut using a milling cutter.



The groove is cut using a chisel...

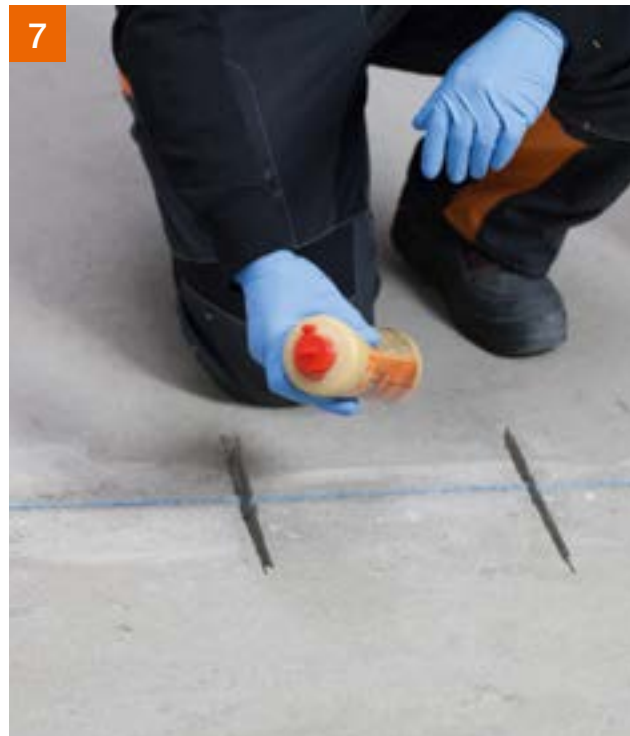


... and loose screed chippings are removed using an industrial  
vacuum cleaner.

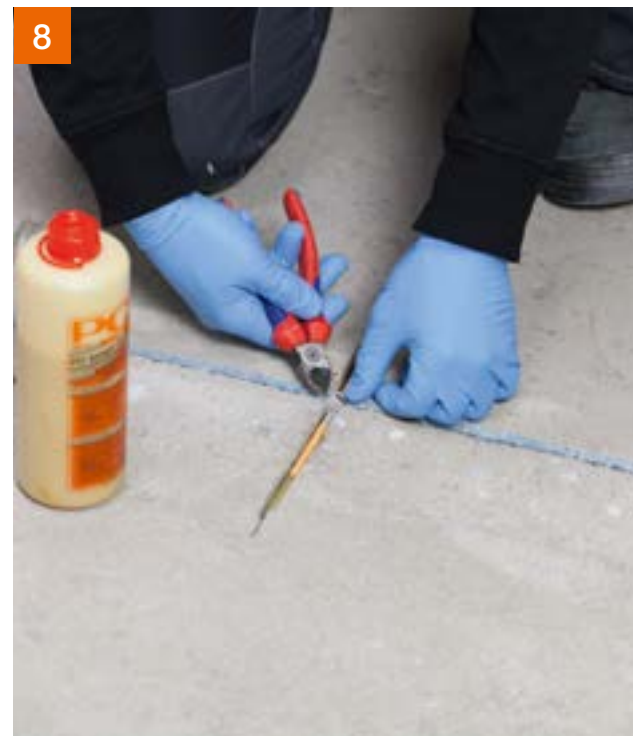


When the grooves have been prepared, the two components of  
PCI Apogel® SH are poured together...

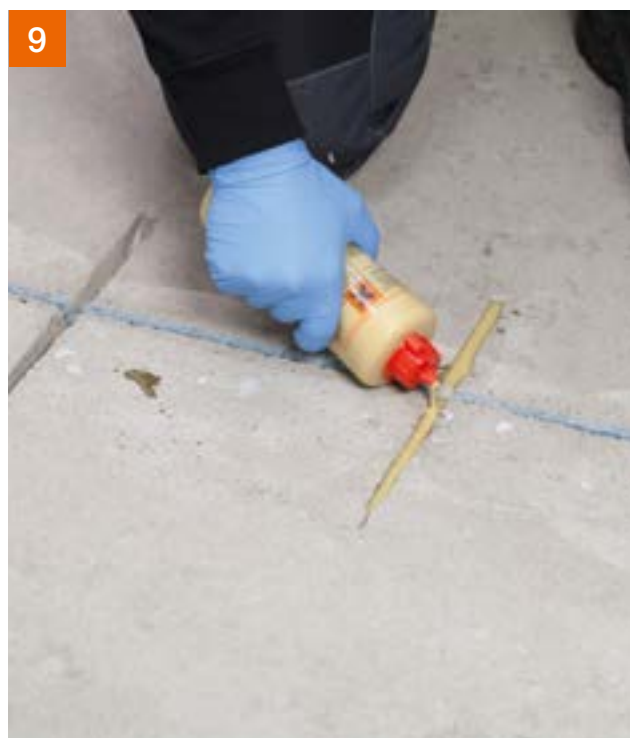




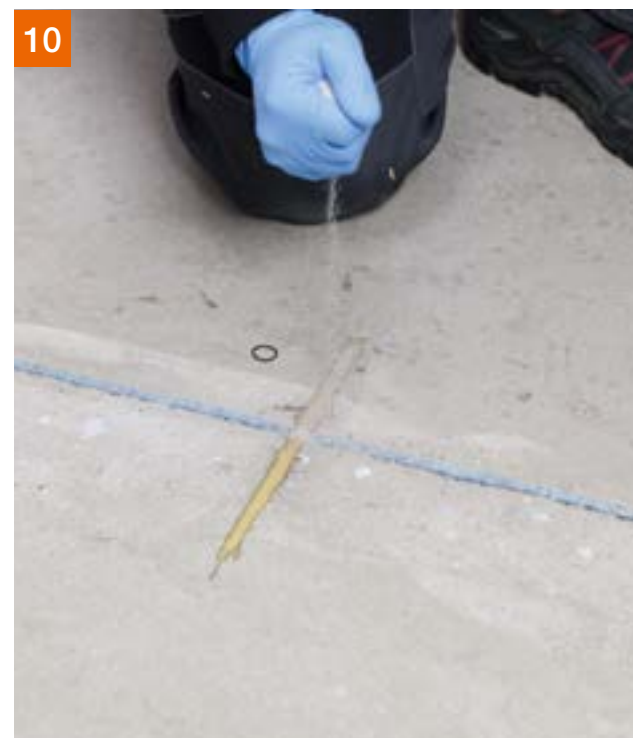
... and then thoroughly shaken for at least 20 seconds.



The PCI Apogel® Dübel dowel is placed in the groove and the tensioner ring is removed.



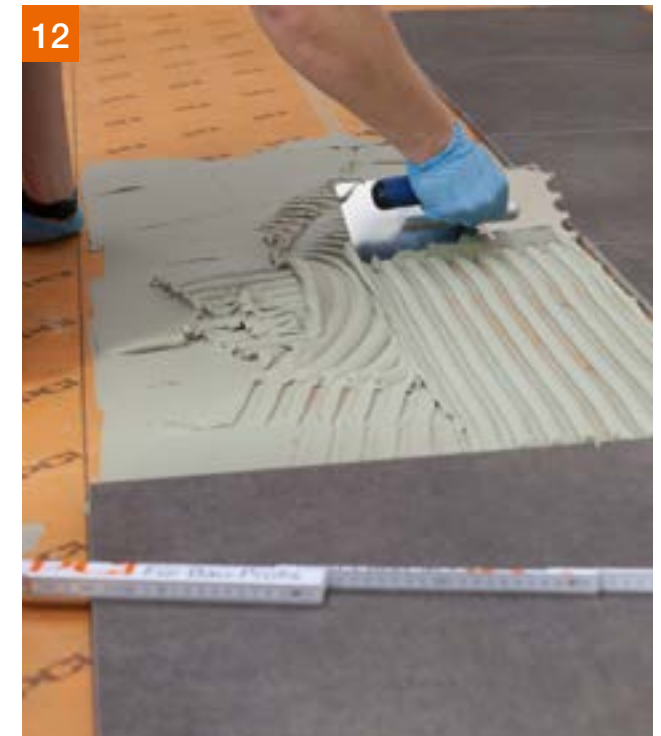
Then, the groove is filled completely with PCI Apogel® SH...



... and silica sand (0.3–0.8 mm) is scattered over the groove to ensure full coverage.



After about 40 minutes, PCI Pecilastic® U is applied to the screed as an isolating layer, using PCI Flexmörtel® S2 as the adhesive.



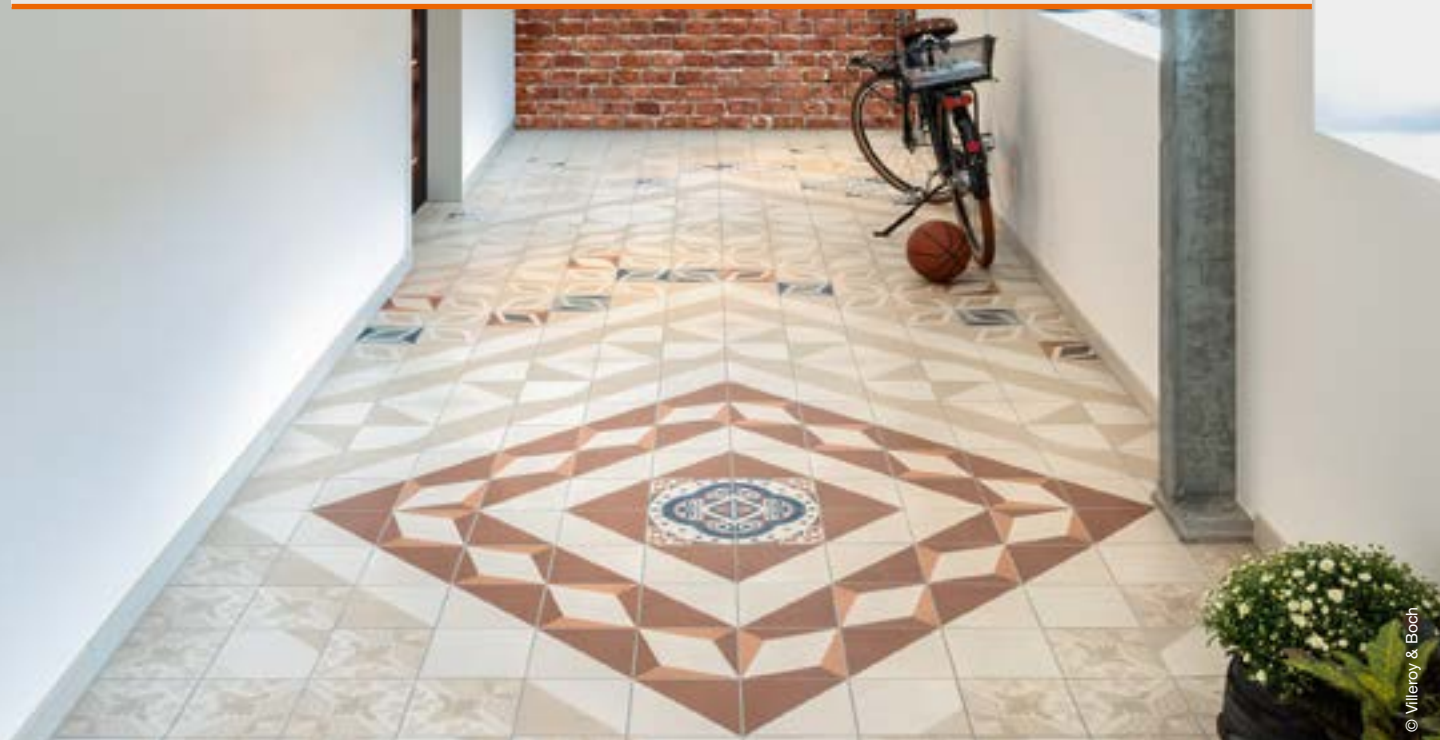
The floor tiles are also laid using PCI Flexmörtel® S2.



After the tiled surface has been grouted using PCI Nanofug® Premium, the tiling joint next to the expansion joint is sealed using PCI Silcofug® E. This joint does not need to be wider than the other joints in the tiling and blends into the harmonious joint pattern.

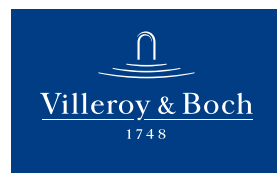


## Unlimited design possibilities – throughout the house



CENTURY UNLIMITED as a design element in hallways and entrances

# CENTURY UNLIMITED: one (tile series) for all (applications)



[www.villeroy-boch.com](http://www.villeroy-boch.com)

Tiles can be used as an extremely effective design element anywhere in the house. Walls and floors in bathrooms, kitchens and hallways are classical applications. Tiles are also popular in dining and living rooms, frequently in combination with underfloor heating for a comfortable warm feeling. But will the tiles you have chosen for the kitchen match those in the dining room and will tiles in the living room clash with those in the hallway? Wouldn't it be nice if the design could be continued in the bathroom? To ensure that the tiling design used throughout your house is both varied and harmonious, you need a comprehensive tile series that offers considerable design leeway – like the new CENTURY UNLIMITED collection. CENTURY UNLIMITED is a comprehensive modern system with colours, formats and decorations designed to allow a large number of individual solutions.

CENTURY UNLIMITED combines colours, formats and historically inspired decorations in a playful and unorthodox way, creating a fascinating mixture of old and new. The basic tiles, made from fully vitrified vilbostone, are available in eight colours: cream, beige, brown, cotto, light grey, mid-grey, dark grey and indigo. The series features a decoration system with a total of 27 different patterns which can be combined as required. The overall concept is rounded off by vitrified wall tiles that repeat the colours and decorations of the fully vitrified floor tiles in a restrained way.

**Ideal for bathrooms** – Tiles are sturdy and remain attractive even under severe conditions. Bathroom designs with a combination of CENTURY UNLIMITED tiles and decorative elements in indigo, light grey and mid-grey are timeless and modern. The expressive patterns on the wall are not only eye-catchers; they also divide the room into functional sections such as showers and washing areas.



The bathroom with light cream and beige colours is wonderfully warm and harmonious. The gentle colour scheme is interspersed with CENTURY UNLIMITED Wall decorative tiles with a multi-colour design which provide coloured accents on the wall like a random mosaic. The decorative elements interact with the beige, brown and cotto tones of the base tiles, allowing a variety of different combinations that are new and surprising.

**Perfect for kitchens** – Tiles are ideally suited for wet areas. Even grease and other difficult materials which are unavoidable in kitchens do not have an adverse impact on ceramic tiles and can easily be removed. In addition, tiles are attractive design elements for kitchens. Extravagant patterns can be created on walls and floors using tiles from the CENTURY UNLIMITED collection. For example, patchwork tiling on the floor brings harmonious colours into a modern kitchen with a white and grey colour scheme. Individual decorative tiles provide restrained touches of colour on the wall around the sink.

**Indispensable in the hallway** – It goes almost without saying that tiles are especially well suited for use in hallways. Strong, sturdy, easy-to-clean tiles are simply unbeatable in areas where people are always coming and going. They also allow a wide variety of attractive designs. For example, long, wide hallways of the type often found in old flats or lofts can be tiled generously with decorative elements. The decorative patterns of CENTURY UNLIMITED offer almost endless possibilities. Everything is possible: a classical mosaic, patchwork tiling, individual tiles to provide a touch of colour and a harmonious, coloured patchwork. In fact you can design a floor more or less as the mood takes you.

CENTURY UNLIMITED tiles are equally well-suited for classical entrances. In light beige with a decorative graded patchwork effect, floor tiles give a hallway an irresistible atmosphere of spaciousness.

**For attractive living and dining rooms** – In dining rooms, floors are subject to considerable wear and tear as a result of chairs moving backwards and forwards. This is no problem at all for high-quality vilbostone fully vitrified tiles from the CENTURY UNLIMITED series. Fantastic designs are also possible using decorative tiles on the wall. Graded designs with an expressive effect can turn an ordinary corner into something really special.





## Systems

Multi-use low-emission laying system  
for all natural stone floor coverings in indoor applications

# Multi-use natural stone system



## Full of character

The multi-use natural stone system was developed especially to meet the requirements of natural stone coverings. Natural stone coverings create floors that are full of character – thanks to irregular marking and inclusions, each floor is unique and makes a key contribution to the exclusive interior design of any building.

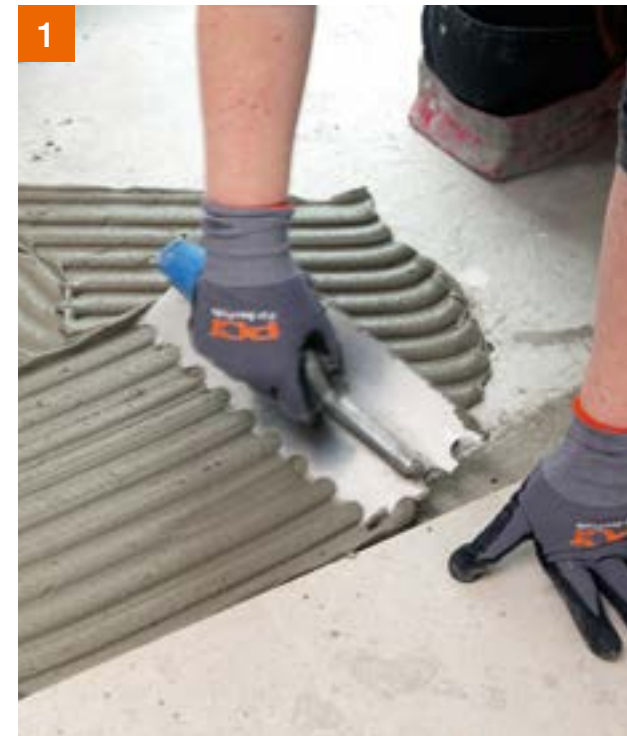
### Where?

The multi-use natural stone system can be used for laying almost all types of natural stone, securely and without discolouration. All the system components have been specially tailored to meet the requirements of this type of covering.

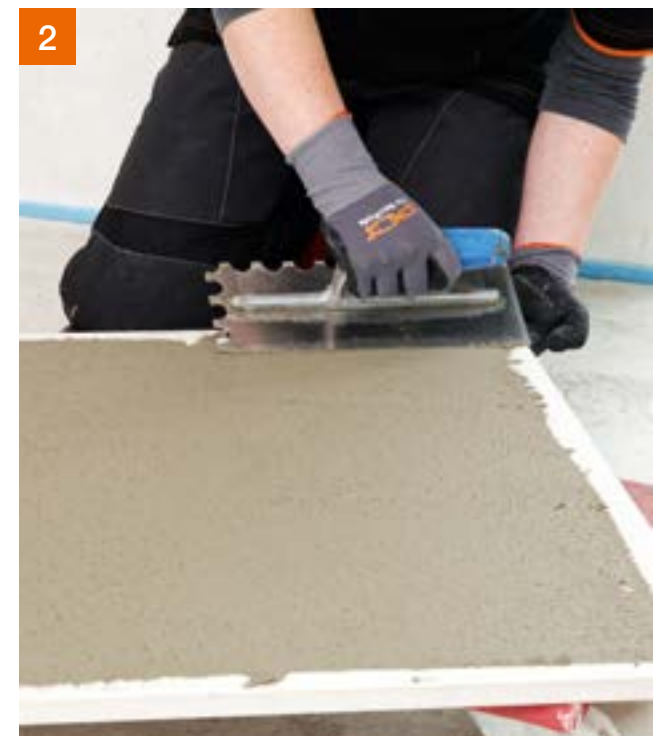
### Why?

The laying of natural stones calls for precise knowledge of the different properties of the covering material. Laying materials must also be precisely tailored to meet the special requirements of natural stone.

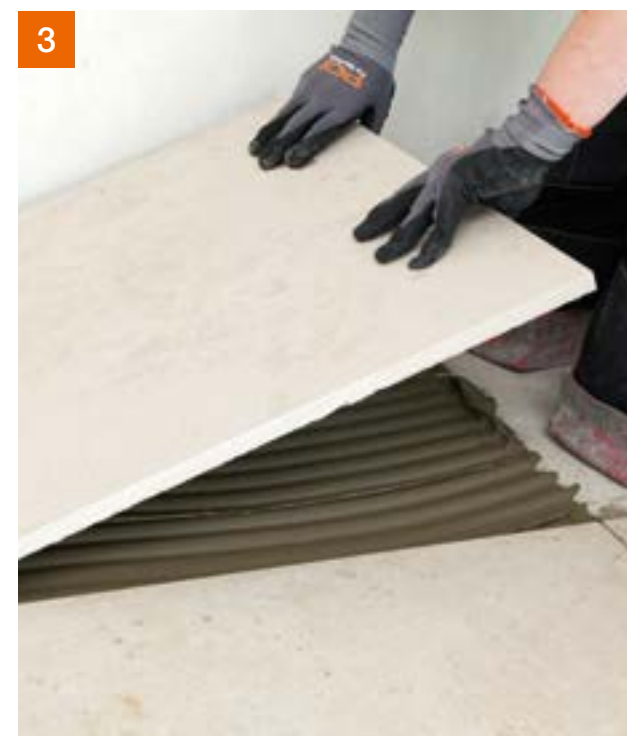
The PCI Carra product line has been especially developed for professional tiling contractors and takes into consideration all the special features of our natural stone materials. In particular, these products ensure that a durable bond is created (especially important in the case of magmatic and metamorphic rocks). They also prevent discolouration and efflorescence (for example in the case of sedimentary rock).



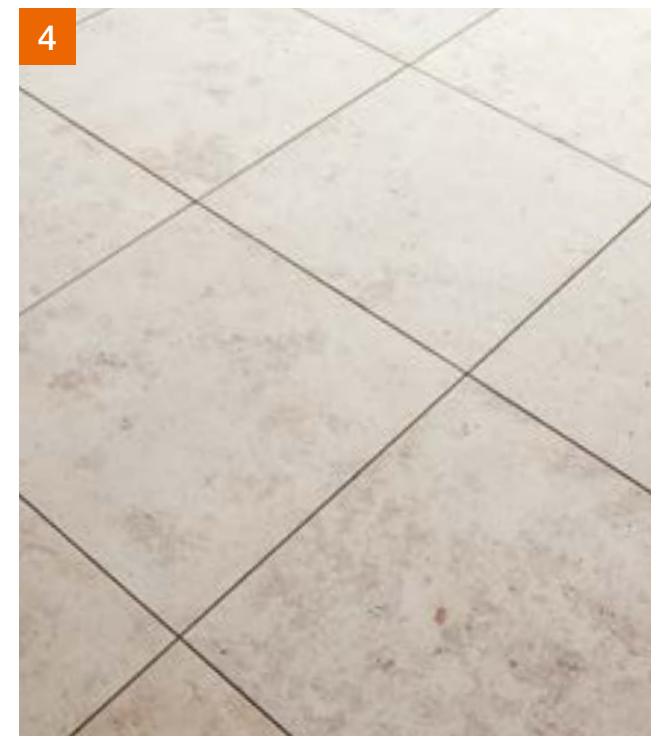
Application of natural stone adhesive (e.g. PCI Carrament®), using a trowel with medium-bed notches..



Application of a scratch layer to the back of the stone slab in order to ensure laying with virtually no voids.



Laying the natural stone slab; the slab is pushed backwards and forwards several times, at the same time, applying pressure.



Securely laid with the multi-use natural stone system.



Multi-use low-emission laying system  
for all natural stone floor coverings in indoor applications

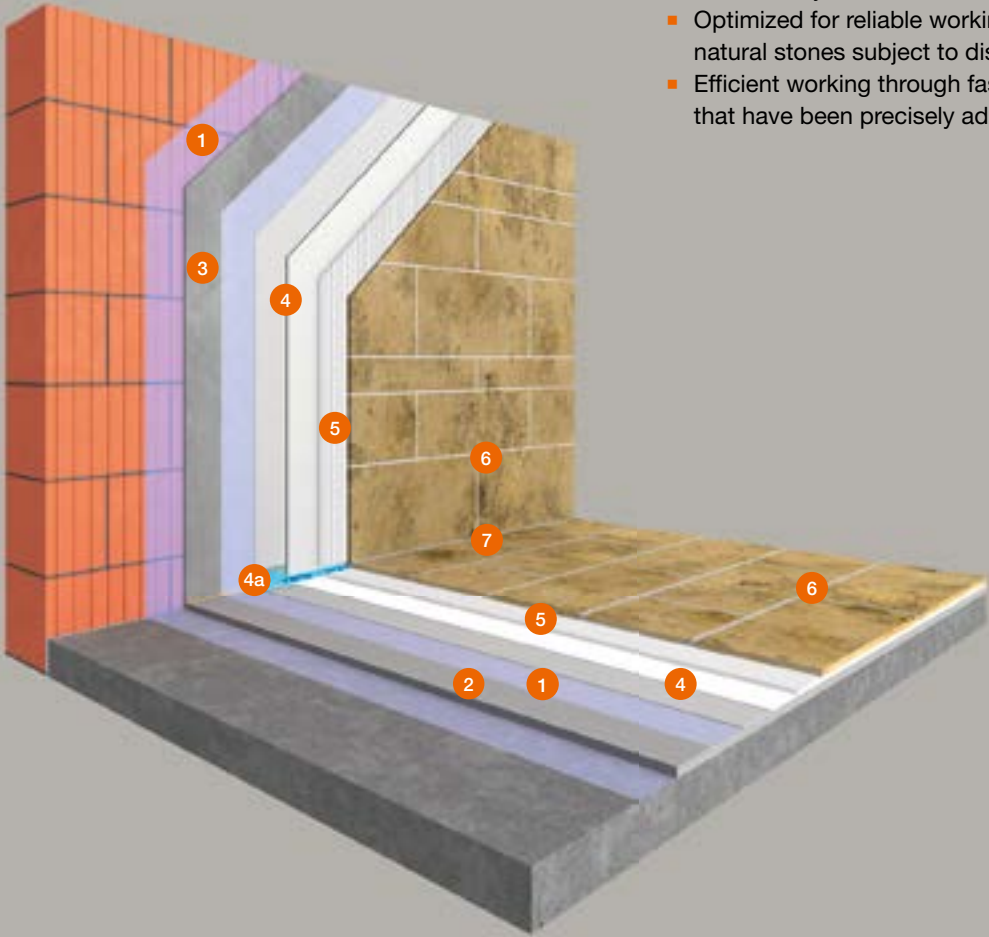
Multi-use natural stone system

Areas of application:












- Natural stone
- Indoor applications

System benefits

- Multi-use system
- Optimized for reliable working, especially for laying natural stones subject to discolouration
- Efficient working through fast system components that have been precisely adapted to each other



Products

1 Primer		<b>PCI Gisogrund® 404</b> Special wash primer for absorbent and non-absorbent substrates		<b>PCI Gisogrund®</b> Special wash primer for walls and floors
2 Floor levelling compound		<b>PCI Periplan®</b> Floor levelling compound under top coverings		
3 Wall levelling compound		<b>PCI Pericret®</b> Levelling compound for floors, walls and soffits		
4 Waterproofing / waterproofing tapes and mouldings		<b>PCI Lastogum®</b> Waterproof, flexible protective coating under ceramic coverings in showers and bathrooms		<b>PCI Pecitape® 120</b> Special waterproofing tape for waterproof corner and perimeter joints, plus waterproofing sleeves and inner / outer corner mouldings (not shown)
5 Natural stone adhesive	<b>PCI Carraflex®</b> Flexible thin-bed mortar for natural stones	<b>PCI Carrament®</b> Medium-bed mortar for natural stones	<i>Alternatively for floors, especially for large-size (&gt; 40 x 40 cm) and sensitive natural stones</i> <b>PCI Carraflott® NT</b> Thin bed, medium bed and flowable adhesive especially for sensitive natural stones	
				
6 Joint grout		<b>PCI Carrafug®</b> Special joint grout for natural stone slabs		
7 Sealant		<b>PCI Carraferm®</b> Silicone sealant for natural stones		



## Systems

System for the laying of  
glass tiles and glass mosaics

# Glass system



## Brilliant results

One of the major advantages of tiles is that colours can be used on walls and floors. Glass tiles play a special role in this context as this translucent material makes colours look brilliant. The glass system ensures that these tiles retain their attractive appearance in the long term.

### Where?

Glass tiles and mosaics are especially popular in **wellness and leisure facilities** as a result of their colour range and their fine gloss. As they are translucent, glass tiles pose special requirements for tiling products. The glass system takes the requirements of these main applications and the tile material itself into account.

### Why?

White tile laying and waterproofing products ensure that the tile colours remain **permanently brilliant** after laying. In combination with level-entry shower elements from the Pecibord family, which are designed for tiling over, these materials are particularly well-suited for areas where **comfort and wellness** are the top priorities.

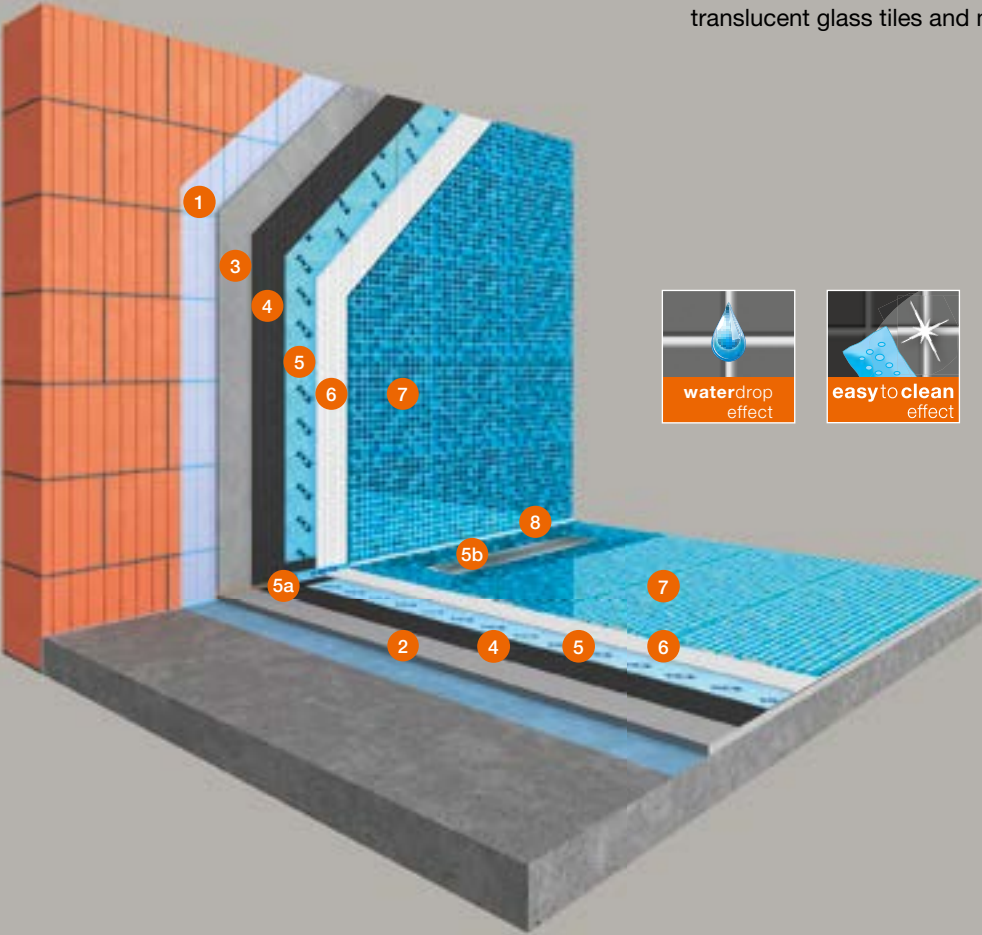


System for the laying of  
glass tiles and glass mosaics

Glass system

- Areas of application:
- Glass tiles and mosaics
  - Wellness and leisure areas

- System benefits
- Special system optimized for the laying of translucent glass tiles and mosaics



Products

1 Primer	 <b>PCI Gisogrund®</b> Special wash primer for absorbent and non-absorbent substrates		
2 Floor levelling compound	 <b>PCI Periplan®</b> Floor levelling compound under top coverings		
3 Wall levelling compound	 <b>PCI Pericret®</b> Levelling compound for floors, walls and soffits		
4 Tile adhesive (for bonding waterproofing membrane)	 <b>PCI Nanolight® White</b> Multi-use white flexible adhesive for all types of substrates and all ceramic coverings		
5 Waterproofing / waterproofing tapes and mouldings	<b>PCI Pecilastic® W</b> Flexible waterproofing membrane under ceramics and natural stones	<i>Alternative especially for translucent glass tiles and mosaics:</i> <b>PCI Lastogum®</b> Waterproof, flexible protective coating under ceramic coverings in showers and bathrooms	<b>5a PCI Pecitape® 120</b> Special waterproofing tape system for waterproof corner and perimeter joints, plus waterproofing sleeves and inner/outer corner mouldings (not shown)
6 Tile adhesives	<b>PCI Nanolight® White</b> (in dry areas) Multi-use white flexible adhesive for all types of substrates and all ceramic coverings	<b>PCI Nanolight® White + PCI Lastoflex®</b> (in wet areas such as communal showers and steam baths) Multi-use white flexible adhesive for all types of substrates and all ceramic coverings + polymer modified additive for mixing with PCI tile adhesives	<b>PCI Durapox® NT, NT plus</b> (in areas continuously exposed to water, especially with translucent glass tiles) Reaction resin binder for laying and grouting of ceramic coverings exposed to chemicals
7 Joint grout	 <b>PCI Nanofug® Premium</b> Multi-use flexible joint grout especially for fully vitrified and vitrified tiles		
8 Sealant	 <b>PCI Silcofug® E</b> Elastic joint sealant for indoor and outdoor use		



## Systems

System for laying tiles in areas  
with severe moisture exposure

# Swimming pool system



## A safe bet

Safety and security are top priorities in the construction of new swimming pools and the refurbishment of existing facilities. For projects like this, it is extremely important to select appropriate waterproofing and tiling systems. You can rely on our swimming pool system.

### Where?

For the **tiling of swimming pools**, special attention must be paid to three critical points in order to ensure a high-quality, durable covering: the waterproofing of the pool, the design of the pool edge for effective drainage and the laying and grouting of tiling in areas continuously exposed to water. The chemical and physical properties of the water pose special challenges for tiling materials.

### Why?

From perfectly level substrate preparation through to grouting, the swimming pool system includes all the components required for the **optimum waterproofing and durable, reliable tiling** of swimming pools and tanks subject to different conditions and water qualities. The system even ensures reliable tiling at critical points such as the pool edge and penetrations, for example for the installation of lighting. All the products used have the **general approval of the construction authorities**.



System for laying tiles in areas with severe moisture exposure

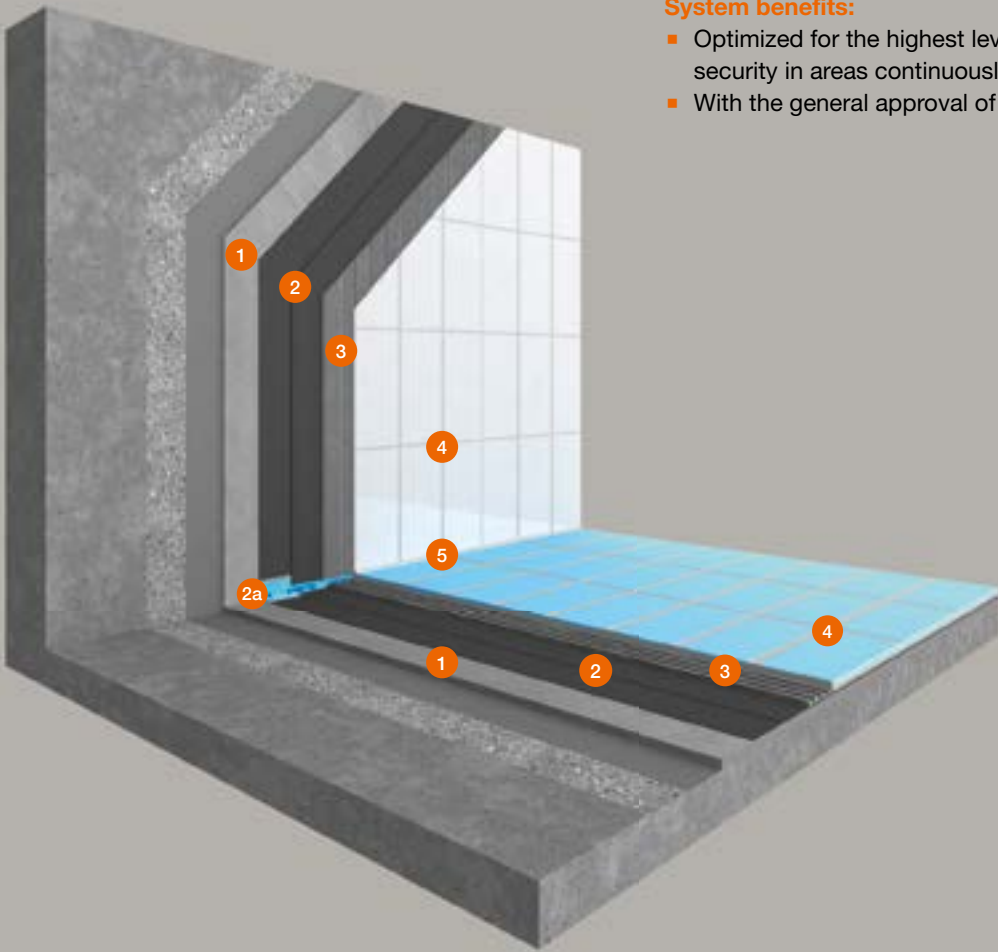
# Swimming pool system

Areas of application:

- Swimming pools
- Tiling of water tanks

System benefits:

- Optimized for the highest levels of waterproofing and security in areas continuously submerged in water
- With the general approval of the construction authorities



# Products

1	Levelling compound for floors and walls		<b>PCI Nanocret® R2</b> Light repair mortar, multi-use product for concrete structures and brickwork			
2	Waterproofing / waterproofing tapes and mouldings		<b>PCI Seccoral® 2K Rapid</b> Fast-setting special waterproofing slurry under ceramic tiles, and on outside basement walls and foundations	2a		<b>PCI Pectape® 120</b> Special waterproofing tape system for waterproof corner and perimeter joints, plus waterproofing sleeves and inner/outer corner mouldings (not shown)
3	Tile adhesives		<b>PCI FT® Klebemörtel + PCI Lastoflex®</b> Tile adhesive for non-vitrified tiles and vitrified tiles + polymer modified additive for mixing with PCI tile adhesives			<b>PCI Durapox® NT, NT plus</b> (especially with translucent glass tiles) Reaction resin binder for laying and grouting of ceramic coverings exposed to chemicals
4	Joint grout		<b>PCI Durafug® NT</b> Special cementitious joint grout for commercially used areas, swimming pools and potable water reservoirs			<b>PCI Durapox® NT, NT plus</b> (especially with translucent glass tiles) Reaction resin binder for laying and grouting of ceramic coverings exposed to chemicals
5	Sealant		<b>PCI Silcofug® E</b> Elastic joint sealant for indoor and outdoor use			

“The PCI name has always stood for product innovations and new developments. This also applies to swimming pool construction. Our swimming pool system is based on more than 65 years of experience.”

Prof. Dr. Josef Felixberger,  
Head of PCI Technical Service





## Systems

System for laying tiles in areas subject to severe chemical and mechanical stresses

### Industrial system



## High performance

Tiles have a number of advantages which make them ideally suited for industrial applications. However, they only come into their own with the PCI industrial system.

### Where?

The industrial system is specially designed for tiling in commercial or industrial facilities, especially in areas which may be subject to severe chemical, thermal and mechanical stress. Typical applications include industrial kitchens, food plants, breweries, etc.

### Why?

Especially waterproofing products, tile adhesive and joint grouts have been selected for use in areas exposed to chemicals. This system produces a waterproof, chemical-resistant covering that is highly resistant to wear and weather conditions. The fitness for purpose of the system is confirmed by the general approval of the construction authorities.



System for laying tiles in areas subject to severe chemical and mechanical stresses

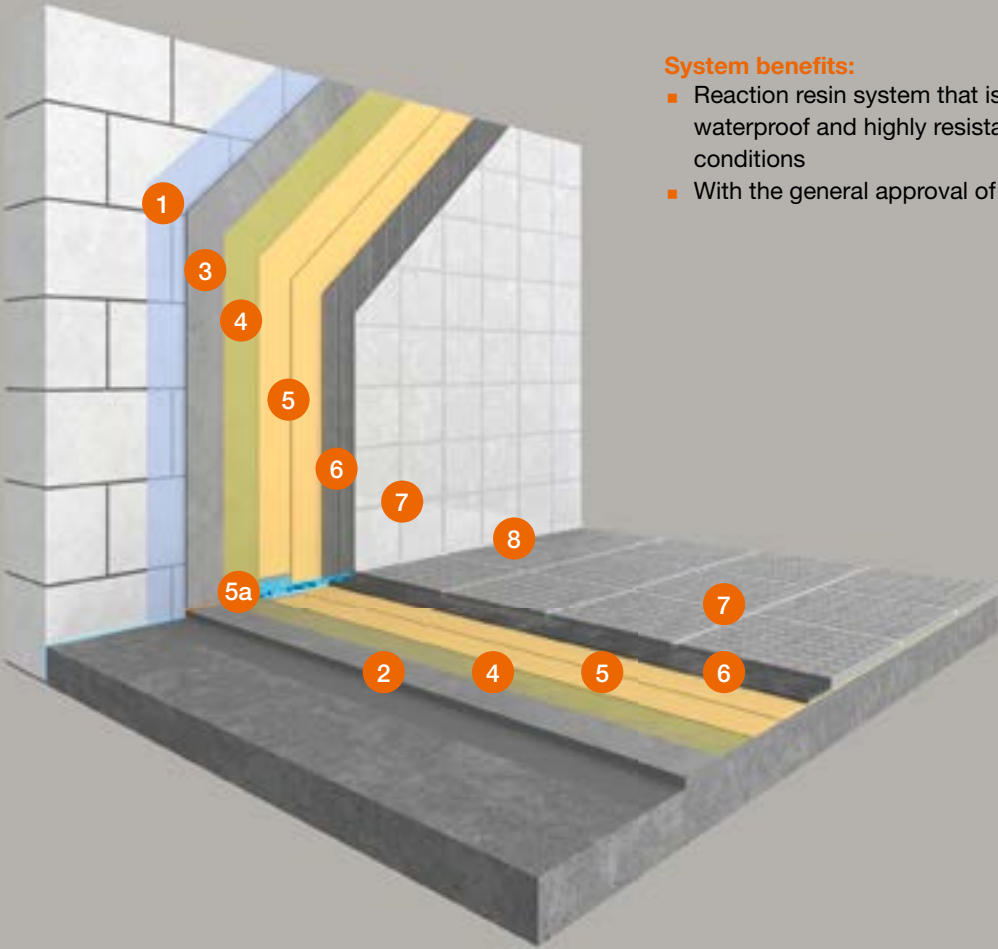
Industrial system

Areas of application:










- Tiling in commercial and industrial areas such as industrial kitchens, food plants and breweries
- Areas subject to severe chemical, thermal and mechanical stress

System benefits:

- Reaction resin system that is chemical-resistant, waterproof and highly resistant to wear and weather conditions
- With the general approval of the construction authorities



Products

1 Primer		<b>PCI Gisogrund®</b> Special wash primer for walls and floors
2 Levelling compound for floors		<b>PCI Nanocret® R2</b> Light repair mortar, multi-use product for concrete structures and brickwork
3 Levelling compound for walls		<b>PCI Pericret®</b> Levelling compound for floors, walls and soffits
4 Primer		<b>PCI Epoxigrund 390</b> Special primer on absorbent and non-absorbent substrates
5 Waterproofing / waterproofing tapes and mouldings	 	<b>PCI Apoflex®</b> Polyurethane waterproofing for areas exposed to water and chemical attack <b>5a PCI Pecitape® 120</b> Special waterproofing tape system for waterproof corner and perimeter joints, plus waterproofing sleeves and inner / outer corner mouldings (not shown)
6 Tile adhesive		<b>PCI Durapox® NT, NT plus</b> Reaction resin binder for laying and grouting of ceramic coverings exposed to chemicals
7 Joint grout		<b>PCI Durapox® NT, NT plus</b> Reaction resin binder for laying and grouting of ceramic coverings exposed to chemicals
8 Sealant		<b>PCI Elritan® 140</b> Polyurethane sealant for expansion joints in floors exposed to chemicals

*"In industrial kitchens, we need to protect the substrate from chemicals at the same time as installing a covering that will remain fit for the purpose for many years."*

Hans-Peter Schmied,  
PCI Technical Service





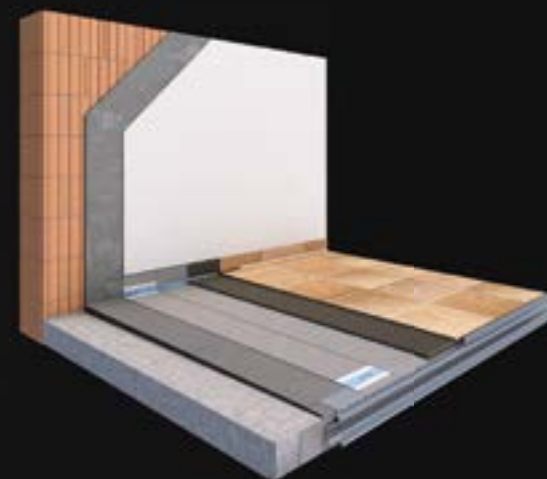
## Systems

Systems for laying tiles and natural stone coverings  
in outdoor applications

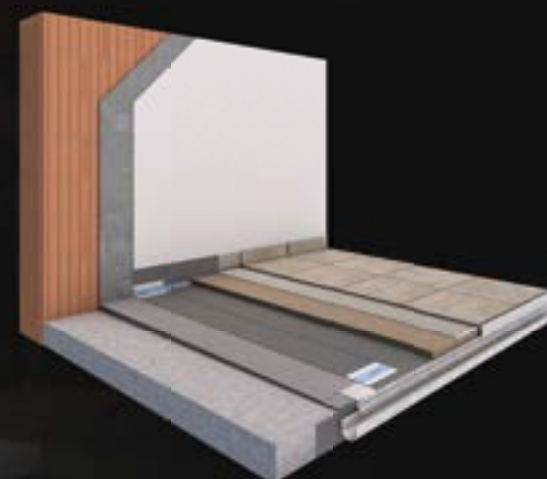
### Systems I, II and III – balcony/terrace



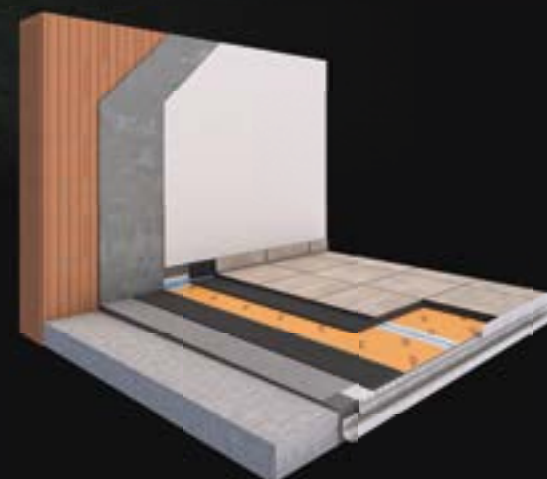
#### System I – balcony/terrace



#### System II – balcony/terrace



#### System III – balcony/terrace



## Three systems for outdoor use

People go out on their balcony to enjoy the sunshine but it can pose problems for the tiling. Sunshine, moisture and frost result in stress on joints, tile adhesives and waterproofing systems. With our balcony/terrace systems, you are on the safe side – guaranteed.

### Where?

The wide variety of **tiles** available, especially with natural stone or wood effects, and **natural stone coverings** can transform **any open-air seating area** into an individual oasis. If these tiles are properly laid using the balcony/terrace systems, the result is a durable covering that can withstand any weather effects it may face such as severe and abrupt temperature changes, rain and frost, without any problems.

### Why?

The products in the system have been specially optimized for **effective waterproofing and secure laying** in outdoor applications. Special product variants and system components ensure **efficient working, especially on small areas and at low temperatures**. Each of the systems has a different focus. System I is the right solution for most projects. In system II, supplementary system components such as the epoxy drainage mortar PCI Epoxigrund 390 provide an additional “moisture buffer”. In system III, PCI Pecilastic® U or PCI Pecilastic® W waterproofing membranes minimize the waiting time.



**Guaranteed security** – All specialist contractors who install the balcony/terrace system properly can benefit from a 5-year guarantee provided that they have concluded a liability agreement with PCI. An application for a liability agreement must be submitted to PCI using the appropriate form before work starts.

Under the initiative for the secure laying of tiles and slabs with the balcony/terrace system, PCI and strong industrial partners offer specialist contractors a special service: a 12-year guarantee for certified contractors using system I – balcony/terrace.

Trained, certified specialist contractors benefit from the 12-year guarantee in two ways: it convinces clients of the benefits of outdoor tiling and of the quality of the services performed.



System for laying all tiles and natural stone coverings in outdoor applications

System I – balcony/terrace

PCI system I – balcony/terrace, with tiles



Areas of application:

- For all tiles and natural stone coverings in outdoor applications

System benefits:

- For the highest levels of waterproofing and security in outdoor applications, in combination with PCI Seccoral® 2K Rapid
- For efficient working, especially on small areas or at low temperatures, when fast, reliable working is needed
- Low height – equally well suited for new buildings and renovation
- 5-year guarantee with proper application and 12-year guarantee for certified tiling contractors

PCI system I – balcony/terrace, with natural stone



“We want to offer our specialist contractors the highest level of security with a view to making progress in our sector.”

Thorsten Leppler,  
PCI Product Manager



Products

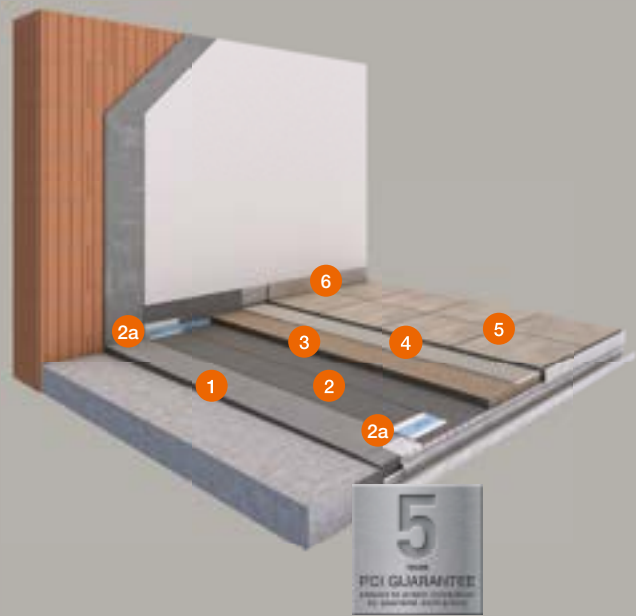
Substrate preparation and waterproofing				
1	Floor levelling compound		<b>PCI Pericret®</b> Levelling compound for floors, walls and soffits	
2	Waterproofing		<b>PCI Seccoral® 2K Rapid</b> Fast-setting special waterproofing slurry under ceramic tiles	<div>2a</div>  <b>PCI Pectape® 120 and mouldings</b> Special waterproofing tape system for waterproof corner and perimeter joints, plus waterproofing sleeves and inner/outer corner mouldings
With tiles				
3	Tile adhesive		<b>PCI Flexmörtel® S2</b> Tile adhesive for all ceramic coverings	 <b>PCI Flexmörtel® S2 Rapid</b> Highly flexible tile adhesive for all ceramic coverings
4	Joint grout		<b>PCI Nanofug® Premium</b> Multi-use flexible joint grout especially for fully vitrified and vitrified tiles	
5	Sealant		<b>PCI Silcoferm® S</b> Silicone joint sealant for all-purpose indoor and outdoor use	 <b>PCI Silcofug® E</b> Elastic joint sealant for indoor and outdoor use
With natural stone				
6	Natural stone adhesive		<b>PCI Carrament®</b> Medium-bed mortar for natural stone coverings	 <b>PCI Carraflott® NT</b> Thin bed, medium bed and flowable adhesive especially for sensitive natural stones
7	Joint grout		<b>PCI Carrafug®</b> Special joint grout for natural stone slabs	 <b>PCI Rapidfug®</b> Fast-acting flexible joint grout for vitrified tiles and fully vitrified tiles
8	Sealant		<b>PCI Carraferm®</b> Silicone joint sealant for natural stones	
Supplementary products				
	<b>PCI Gisogrund® 404</b> 	<b>PCI Gisogrund® 303</b> 	<b>PCI Elastoprimer 220</b> 	<b>PCI Epoxigrund 390 / Rapid</b> 



System for laying all tiles and natural stone coverings  
in outdoor applications

System II – balcony/terrace

PCI system II – balcony/terrace, with tiles



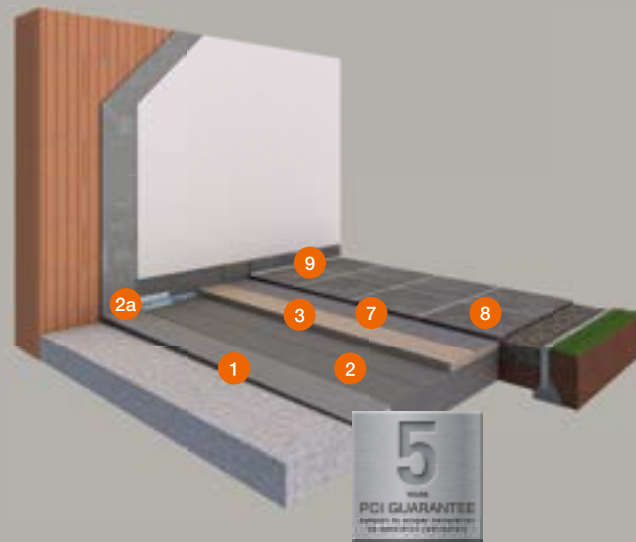
Areas of application:

- The balcony/terrace II system is used for laying tiles and natural stone coverings on balconies and terraces. This system includes an epoxy drainage mortar between the waterproofing layer and the tile adhesive, providing additional security.

System benefits:

- For the highest levels of waterproofing and security in outdoor applications, in combination with PCI Seccoral® 2K Rapid
- The epoxy drainage mortar allows any moisture penetrating under the tiles to drain away over the waterproofing layer, providing an effective long-term “moisture buffer”
- 5-year guarantee with proper application

PCI system II – balcony/terrace, with natural stone



Products

Substrate preparation and waterproofing				
1	Floor levelling compound		<b>PCI Pericret®</b> Levelling compound for floors, walls and soffits	
2	Waterproofing		<b>PCI Seccoral® 2K Rapid</b> Fast-setting special waterproofing slurry under ceramic tiles	
2a			<b>PCI Pectape® 120 and mouldings</b> Special waterproofing tape system for waterproof corner and perimeter joints, plus waterproofing sleeves and inner/outer corner mouldings	
With tiles				
3	Epoxy drainage mortar		<b>PCI Epoxigrund 390</b> Special primer on absorbent and non-absorbent substrates	
		+		<b>Quarzsand DM 1–4 (silica sand)</b> for epoxy resin drainage mortar on balconies and terraces
4	Tile adhesive		<b>PCI Flexmörtel® S2</b> Tile adhesive for all ceramic coverings	
				<b>PCI Flexmörtel® S2 Rapid</b> Highly flexible tile adhesive for all ceramic coverings
5	Joint grout		<b>PCI Nanofug® Premium</b> Multi-use flexible joint grout especially for fully vitrified and vitrified tiles	
6	Sealant		<b>PCI Silcoferm® S</b> Silicone joint sealant for all-purpose indoor and outdoor use	
				<b>PCI Silcofug® E</b> Elastic joint sealant for indoor and outdoor use
With natural stone				
7	Natural stone adhesive		<b>PCI Carrament®</b> Medium-bed mortar for natural stone coverings	
				<b>PCI Carraflott® NT</b> Thin bed, medium bed and flowable adhesive especially for sensitive natural stones
8	Joint grout		<b>PCI Carrafug®</b> Special joint grout for natural stone slabs	
				<b>PCI Rapidfug®</b> Fast-acting flexible joint grout for vitrified tiles and fully vitrified tiles
9	Sealant		<b>PCI Carraferm®</b> Silicone joint sealant for natural stones	



System for laying all tiles and natural stone coverings  
in outdoor applications

System III – balcony/terrace

PCI system III – balcony/terrace, with tiles



- Areas of application:**
- System III – balcony/terrace is used for laying tiles and natural stone coverings on balconies and terraces. This system includes waterproofing using PCI Pecilastic® U, which ensures rapid progress with construction.
- System benefits:**
- Optimized for the highest levels of waterproofing and security in outdoor applications, in combination with PCI Pecilastic® U
  - No need to wait for the waterproofing layer to cure – rapid progress with construction
  - Low height – equally well suited for new buildings and renovation
  - 5-year guarantee with proper application

PCI system III – balcony/terrace, with natural stone



Products

Substrate preparation and waterproofing			
1	Floor levelling compound	 <b>PCI Pericret®</b> Levelling compound for floors, walls and soffits	
2	Waterproofing	 <b>PCI Pecilastic® U</b> Waterproofing and isolating membrane under ceramic, mosaic and natural stone coverings	2a  <b>PCI Pecitape® 120 and mouldings</b> Special waterproofing tape system for waterproof corner and perimeter joints, plus waterproofing sleeves and inner/outer corner mouldings
With tiles			
3	Tile adhesive	 <b>PCI Flexmörtel® S2</b> Highly flexible tile adhesive for all ceramic coverings	 <b>PCI Flexmörtel® S2 Rapid</b> Highly flexible tile adhesive for all ceramic coverings
4	Joint grout	 <b>PCI Nanofug® Premium</b> Multi-use flexible joint grout especially for fully vitrified and vitrified tiles	
5	Sealant	 <b>PCI Silcoferm® S</b> Silicone joint sealant for all-purpose indoor and outdoor use	 <b>PCI Silcofug® E</b> Elastic joint sealant for indoor and outdoor use
With natural stone			
7	Natural stone adhesive	 <b>PCI Carrament®</b> Medium-bed mortar for natural stone coverings	 <b>PCI Carraflott® NT</b> Thin bed, medium bed and flowable adhesive especially for sensitive natural stones
8	Joint grout	 <b>PCI Carrafug®</b> Special joint grout for natural stone slabs	 <b>PCI Rapidfug®</b> Fast-acting flexible joint grout for vitrified tiles and fully vitrified tiles
9	Sealant	 <b>PCI Carraferm®</b> Silicone joint sealant for natural stones	



Service

Near to the customer

200

# Service



## Near to the customer

## Good advice is part of the service

### Fast, competent support

According to the PCI logo, PCI is "For the professional". Of course this means that our product range is tailored to the requirements of construction professionals. At the same time, this slogan indicates that we are there to serve you, our customers. We think of service in all our activities, from ensuring easy purchasing from well-structured shelves and rapid deliveries to the handling of our products and advice on products and processing. As our customer, you are not just a number but our customer number 1.

### An expert team

Every day, the members of our Technical Service Team devote their competence and expertise to PCI customers – so that you are always offered the best solution.





# Be successful with our expertise

Throughout Germany, more than 100 specialist advisers and application technicians are available to provide support with helpful product and processing suggestions over the telephone, in writing and in person. Our application technicians are civil engineers, master craftsman, tilers and skilled workers and work together in a team. All the team members contribute their specialist expertise to our everyday business. Team members benefit from continual advanced training, ensuring that we can live up to our demanding claims.

In addition, we organize a number of seminars to provide practical expert knowledge for architects, engineers, surveyors and construction workers. Our PraxisKNOW-HOW specialist seminars offer product and application training for craftsman and dealers. The PCI BauKONGRESS includes a number of practical presentations on topical themes and is intended for architects, engineers, surveyors and construction workers.

## PCI Technical Service (ATA)

- Application technicians
- Service technicians
- Secretaries
- Telephone advisers
- ATA offices
  - ATA South in Augsburg
  - ATA West in Hamm
  - ATA Central in Bad Homburg
  - ATA East in Lutherstadt Wittenberg
  - ATA North in Bremen
  - ATA Switzerland in Zürich
  - ATA Austria in Wiener Neudorf

## What services does the PCI Technical Service Department offer?

- Preparation of detailed solutions and bills of services for architects
- On-site personal advice for architects, engineers and contractors
- Written tiling and product recommendations for tiling and natural stone coverings, concrete refurbishment and protection, the waterproofing of buildings, landscape gardening etc
- Hotline for queries from distributors and contractors
- Assessment of water analyses for swimming pool construction
- Assessment of critical slabs and substrates
- Physical measurements (e.g. surface strength and residual moisture by the CM method)



## The PCI seminar system: 700 seminars with 20,000 participants per year

- A comprehensive range of technical seminars held in Augsburg, Hamm and Lutherstadt Wittenberg
- PCI BauKONGRESS: national events focusing on construction issues for architects, civil engineers and surveyors
- PCI Treffpunkt Dialog: technical seminars to support regional sales activities of our distributors
- PCI PraxisKNOW-HOW: practically oriented training on system solutions for tiling contractors, builders and landscape gardeners etc
- A wide range of training events for tilers held in cooperation with our distributors
- Courses with product-neutral content to provide support for vocational training establishments

## Practically oriented product trials

The Technical Service Department provides a key link between the Development Department and users of PCI products. Technical Service provides support for selected tiling contractors in practical trials of PCI products which are about to be launched on the market. This ensures that the products that are introduced have been thoroughly tried and tested.



# We keep you up-to-date

We provide useful and interesting information via a variety of different channels. Our professional information and communication media are intended to make your everyday work easier.

Our printed publications including brochures, PR material and the PCI magazin keep you up-to-date and provide useful information concerning the features and proper use of our products. You too can benefit from our expertise, read about PCI products and services and discover best practice examples.

Our online offering opens up a new dimension to service. Online tools for drafting calls for tenders or CAD drawings available for downloading are only a few examples of the comprehensive service we provide via the Internet. With our PCI app, PCI service is always available on your mobile phone.

## PCI App

Technical information on the product range can also be accessed from mobile devices. If you wish, key documents such as technical data sheets and safety data sheets can even be saved "offline" on the device.



## Brochures and leaflets

Our brochures and leaflets provide concise information on sales campaigns and special topics.



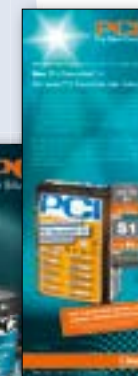
## PCI magazin

Our PCI magazin regularly takes you behind the scenes with reports, interviews, news and portraits. The main focus is on useful information on PCI products and services.



## PCI magazin app

You can also read our popular customer magazine online. The app includes a variety of supplementary material.



## Advertisements

We regularly publish advertisements with product information and application examples as well as references in specialist journals. Watch out for our advertisements.



## The Internet

News, basic details and useful information on PCI: whether you are looking for a product, your nearest PCI distributor or practically oriented text modules for calls for tenders, your first port of call should always be [www.pci-augsburg.de](http://www.pci-augsburg.de).











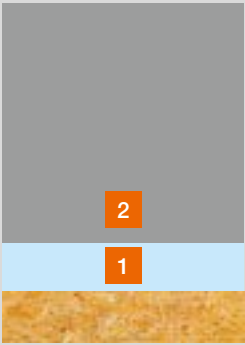
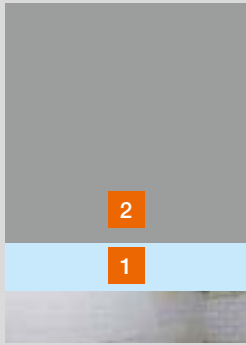
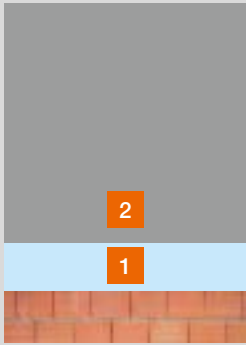
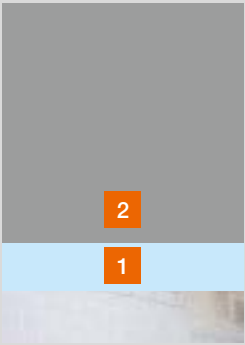
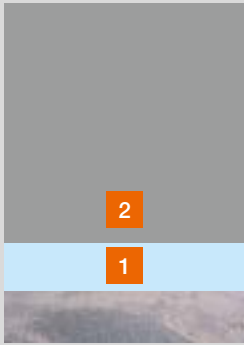
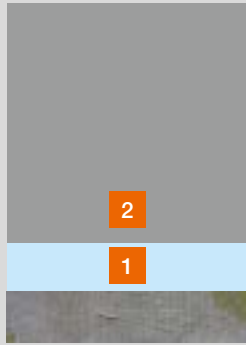
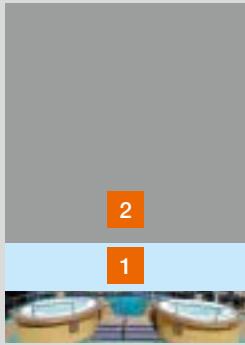
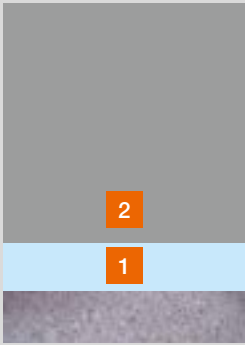
Quick finder

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# Quick finder

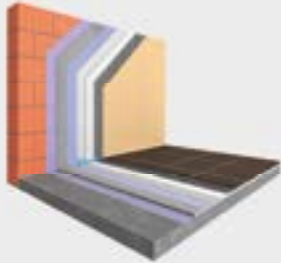

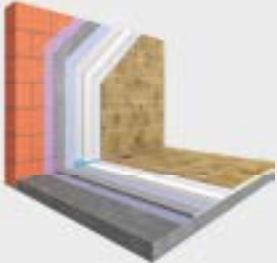
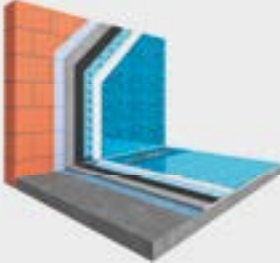
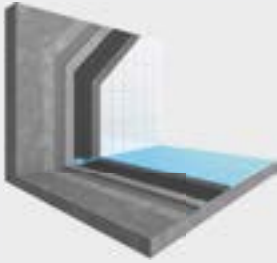
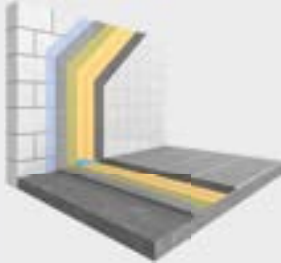
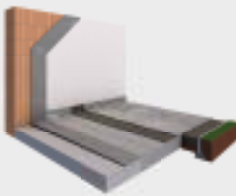
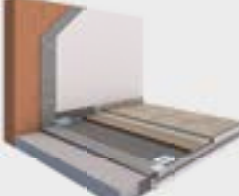


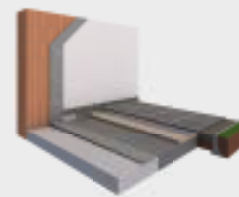



# Substrate preparation systems

	Wooden substrates	Mixed substrates on walls	Masonry	Old tiling and adhesive residue	Mastic asphalt	Old adhesive residues	Steel	Concrete
Substrate	 see page 26	 see page 28	 see page 30	 see page 31	 see page 32	 see page 33	 see page 34	 see page 36
System structure								
Products	<p><b>1 Primer</b></p> <p>PCI Gisogrund® 404 Special wash primer</p> <p><b>2 Levelling compound</b></p> <p>PCI Periplan® Extra Special levelling compound</p> <p>In combination with</p> <p>PCI Armiermatte GFM Glass fibre reinforcement</p> <p>If necessary</p> <p>PCI Armiermatte GFS Glass fibre reinforcement</p>	<p><b>1 Primer</b></p> <p>PCI Gisogrund® 404 Special wash primer</p> <p><b>2 Adhesive</b></p> <p>PCI Flexmörtel® S1 Flexible adhesive</p> <p>Wall:</p> <p>PCI Pecidur® HR foam supporting elements</p>	<p><b>1 Primer</b></p> <p>PCI Gisogrund® Wash primer/protective primer</p> <p>or</p> <p>PCI Gisogrund® 404 Special wash primer</p> <p><b>2 Levelling compound</b></p> <p>PCI Pericret® Levelling mortar</p>	<p><b>1 Primer</b></p> <p>PCI Gisogrund® 303 Special wash primer</p> <p>or</p> <p>PCI Gisogrund® 404 Special wash primer</p> <p><b>2 Levelling compound</b></p> <p>PCI Periplan® fein Levelling compound</p> <p><b>3 Levelling mortar</b></p> <p>PCI Pericret® Levelling mortar for walls and floors</p>	<p><b>1 Primer</b></p> <p>PCI Gisogrund® Wash primer/ protective primer</p> <p>or</p> <p>PCI Gisogrund® 404 Special wash primer</p> <p><b>2 Levelling compound</b></p> <p>PCI Periplan® Extra Levelling compound for wooden floorings</p>	<p><b>1 Primer</b></p> <p>PCI Epoxigrund 390 Special primer</p> <p><b>2 Levelling compound</b></p> <p>PCI Periplan® fein Levelling compound</p>	<p><b>1 Primer</b></p> <p>PCI Gisogrund® 303 Special wash primer</p> <p>or</p> <p>PCI Epoxigrund 390 Special primer</p> <p><b>2 Levelling compound</b></p> <p>PCI Periplan® Extra Special levelling compound</p>	<p><b>1 Primer</b></p> <p>PCI Gisogrund® Wash primer/protective primer</p> <p>or</p> <p>PCI Gisogrund® 404 Special wash primer</p> <p><b>2 Levelling compound</b></p> <p>PCI Pericret® Levelling mortar</p> <p>or</p> <p>PCI Nanocret® R2 Light repair mortar</p>










System overview

Systems	Multi-use tiling system	Equally spaced joint system	Multi-use natural stone system	Glass system	Swimming pool system	Industrial system	System I – balcony/terrace	System II – balcony/terrace	System III – balcony/terrace
	 see page 158	 see page 166	 see page 176	 see page 180	 see page 184	 see page 188	 see page 192	 see page 194	 see page 196
							 see page 192	 see page 194	 see page 196
System components									
Primer	PCI Gisogrund® 404 PCI Gisogrund®	PCI Gisogrund® 404 PCI Gisogrund®	PCI Gisogrund® 404 PCI Gisogrund®	PCI Gisogrund®		PCI Gisogrund® PCI Epoxigrund 390			
Floor/wall levelling compound	PCI Periplan® PCI Pericret®		PCI Periplan® PCI Pericret®	PCI Periplan® PCI Pericret®	PCI Nanocret® R2	PCI Nanocret® R2 PCI Pericret®	PCI Pericret®	PCI Pericret®	PCI Pericret®
Waterproofing/ waterproofing tapes and mouldings	PCI Lastogum® PCI Pecitape® 120	PCI Pecilastic® U	PCI Lastogum® PCI Pecitape® 120	PCI Pecilastic® W PCI Lastogum® PCI Pecitape® 120 PCI Pecibord® LINEA	PCI Seccoral® 2K Rapid PCI Pecitape® 120	PCI Apoflex® PCI Pecitape® 120	PCI Seccoral® 2K Rapid PCI Pecitape® 120	PCI Seccoral® 2K Rapid	PCI Pecilastic® U PCI Pecilastic® W
Tile adhesive/ epoxy drainage mortar	PCI Nanolight® PCI Flexmörtel® S1 PCI Flexmörtel® S2	PCI Flexmörtel® S2	PCI Carraflex® PCI Carraflott® NT	PCI Nanolight® White PCI Nanolight® White + PCI Lastoflex® PCI Durapox® NT/NT plus	PCI FT® Klebemörtel PCI Lastoflex® PCI Durapox® NT/NT plus	PCI Durapox® NT/NT plus	<b>TILE</b> PCI Flexmörtel® S2 PCI Flexmörtel® S2 Rapid  <b>NATURAL STONE</b> PCI Carrament® PCI Carraflott® NT	PCI Epoxigrund 390 Quarzsand DM 1–4 (silica sand) <b>TILE</b> PCI Flexmörtel® S2 PCI Flexmörtel® S2 Rapid  <b>NATURAL STONE</b> PCI Carrament® PCI Carraflott® NT	<b>TILE</b> PCI Flexmörtel® S2 PCI Flexmörtel® S2 Rapid  <b>NATURAL STONE</b> PCI Carrament® PCI Carraflott® NT
Joint grout	PCI Nanofug® Premium PCI Nanofug®	PCI Nanofug® Premium	PCI Carrafug®	PCI Nanofug® Premium PCI Nanofug®	PCI Durafug® NT PCI Durapox® NT/NT plus	PCI Durapox® NT/NT plus	<b>TILE</b> PCI Nanofug® Premium  <b>NATURAL STONE</b> PCI Carrafug® PCI Rapidfug®	<b>TILE</b> PCI Nanofug® Premium  <b>NATURAL STONE</b> PCI Carrafug® PCI Rapidfug®	<b>TILE</b> PCI Nanofug® Premium  <b>NATURAL STONE</b> PCI Carrafug® PCI Rapidfug®
Sealant	PCI Silcofug® E	PCI Silcofug® E	PCI Carraferm®	PCI Silcofug® E	PCI Silcofug® E	PCI Elritan® 140	<b>TILE</b> PCI Silcoferm® S PCI Silcofug® E  <b>NATURAL STONE</b> PCI Carraferm®	<b>TILE</b> PCI Silcoferm® S PCI Silcofug® E  <b>NATURAL STONE</b> PCI Carraferm®	<b>TILE</b> PCI Silcoferm® S PCI Silcofug® E  <b>NATURAL STONE</b> PCI Carraferm®
Supplementary products		PCI Apogel® SH PCI Apogel® Dübel							





Primers

Technical features	PCI Gisogrund®	PCI Gisogrund® Rapid	PCI Gisogrund® 303	PCI Gisogrund® 404	PCI Epoxigrund 390	PCI Epoxigrund Rapid	PCI Wadian®
Product							
Properties/ applications	Dispersion primer, may be diluted using water	Dispersion primer, ready for use	Dispersion primer, ready for use	Dispersion primer, may be diluted with water	Epoxy resin primer, two-component, low-viscosity	Epoxy resin primer, two-component, fast-curing, low-viscosity	Moisture barrier for chipboard, ready for use
	<ul style="list-style-type: none"><li>• For priming absorbent substrates, to protect overlying materials against rapid water absorption</li><li>• As a moisture barrier, for the consolidation and priming of gypsum plasters, gypsum boards, plasterboards, gypsum fibre boards, cellular concrete, concrete, asphalt, plaster and masonry, as a pre-treatment before tiling and wallpapering</li><li>• For priming concrete floors, cementitious, mastic asphalt and anhydrite screeds as well as prefabricated boards</li><li>• As a primer for gypsum and lime plaster on cellular concrete and brick work</li><li>• As a primer for PCI floor levelling compounds such as PCI Periplan®, PCI Periplan® fein and PCI Periplan® plus</li><li>• For indoor and outdoor use on walls and floors</li></ul>	<ul style="list-style-type: none"><li>• For extremely fast-setting priming of gypsum and lime plasters, gypsum boards, plasterboard and gypsum fibre boards, anhydrite screeds, cementitious screeds, concrete, cellular concrete, prefabricated boards, plaster and masonry prior to tiling</li><li>• For priming prior to the application of PCI floor levelling compounds such as PCI Periplan® and as a pre-treatment prior to the laying of tiles with PCI tile adhesives</li><li>• For indoor and outdoor use on walls and floors</li></ul>	<ul style="list-style-type: none"><li>• For the priming of dense, non-absorbent substrates such as terrazzo, ceramic tiles and slabs, glazed bricks, natural stones and artificial stones, substrates with remains of old adhesive, asphalt slabs or firmly adhering, ground PVC coverings</li><li>• Prior to the laying of tiles and slabs using PCI tile adhesives</li><li>• Can be worked over fast, no sticking after about 30 to 45 minutes</li><li>• High adhesive strengths, secure adhesion to overlying materials</li><li>• Resistant to moisture, can be tiled over directly with moderate moisture exposure if no waterproofing is required</li><li>• For indoor and outdoor use on walls and floors</li></ul>	<ul style="list-style-type: none"><li>• For PCI floor levelling compounds, such as PCI Periplan® Extra</li><li>• As a primer on absorbent and slightly absorbent concrete and cement screeds</li><li>• As a special primer on magnesite, mastic asphalt and anhydrite screeds, wood substrates and non-absorbent substrates such as ceramic tiles</li><li>• For indoor and outdoor use on walls and floors</li></ul>	<ul style="list-style-type: none"><li>• For PCI waterproofing materials and coatings as well as PCI floor levelling compounds</li><li>• As a primer for PCI Aposan® epoxy resin repair mortar and PCI Apoflex® waterproofing compound</li><li>• As a levelling compound or fine levelling compound, mixed with silica sand</li><li>• For indoor and outdoor use on walls and floors</li></ul>	<ul style="list-style-type: none"><li>• Fast-curing, can already be worked over after about 3.5 hours</li><li>• For PCI waterproofing, coating and levelling compounds</li><li>• As a primer for PCI Aposan® epoxy resin repair mortar and PCI Apoflex® waterproofing compound</li><li>• As a levelling compound or fine levelling compound, mixed with silica sand</li><li>• Suitable for use as a resin material for the closure of cracks in screeds</li><li>• For indoor and outdoor use on walls and floors</li></ul>	<ul style="list-style-type: none"><li>• For dry and moderately moist areas</li><li>• To prevent warping caused by moisture</li><li>• Solvent-free coating for cementitious substrates, providing a water vapour barrier</li><li>• Good adhesion to substrate and to tile adhesive</li></ul>
Consumption	Gypsum substrates, anhydrite, mastic asphalt and xylolite screeds, screeds with old adhesive residue: approx. 80–150 ml/m² (undiluted)	Gypsum substrates, anhydrite screeds, screeds with old adhesive residues: approx. 80–150 ml/m²	Approx. 90–130 ml/m² (consumption depends on the absorbency and structure of the substrate)	approx. 100–200 ml/m² (consumption depends on the absorbency and structure of the substrate)	approx. 300–500 g/m² (consumption depends on the absorbency and structure of the substrate)	approx. 300–500 g/m² (consumption depends on the absorbency and structure of the substrate)	with two coats: approx. 50–200 ml/m²
	Absorbent mineral substrates such as concrete, cementitious screed, lime plaster, cellular concrete, lime brick, etc First coat: approx. 100–200 ml/m² (200–400 ml diluted mixture, 1:1) Second coat: approx. 50–70 ml/m² (100–140 ml diluted mixture, 1:1)	Absorbent mineral substrates, for example concrete, cementitious screeds, lime plaster, cellular concrete, lime brick, etc approx. 50–150 ml/m²					
Colour	Blue	Pink	Light yellow	Violet	Transparent	Transparent	Yellow
	Solvent-free in accordance with TRGS 610. Very low emissions, GEV-EMICODE EC 2	Solvent-free in accordance with TRGS 610. Very low emissions, GEV-EMICODE EC 1	Solvent-free in accordance with TRGS 610. Very low emissions, GEV-EMICODE EC 1	Solvent-free in accordance with TRGS 610. Very low emissions, GEV-EMICODE EC 1 PLUS	Solvent-free in accordance with TRGS 610. Very low emissions, GEV-EMICODE EC 1 R	Solvent-free in accordance with TRGS 610. Very low emissions, GEV-EMICODE EC 1 R	







Levelling compounds

Walls












Technical features	PCI Pericret®	PCI Nanocret® R2
Product		
Applications	For indoor and outdoor use on floors, walls and soffits	For indoor and outdoor use on floors, walls and soffits
Layer thicknesses	Large areas 3–30 mm Chipped areas 3–50 mm	Large areas 3–30 mm Chipped areas 3–100 mm
Substrates	Lime and cement plaster, plasterboards and gypsum plaster, ceramic coverings, masonry, for the installation of PCI Pécidur® HR foam supporting elements	For filling chips and holes in screeds, concrete slabs, supports and balcony slabs. For filling pipe slits in concrete walls, voids between concrete and steel door frames, for levelling irregular concrete substrate in swimming pools, for levelling and smoothing steps, for re-profiling work and for rounding off inside corners
	Very low emissions, GEV-EMICODE EC 1 PLUS R	

Floors

Technical features	PCI Periplan®	PCI Periplan® Extra	PCI Periplan® fein	PCI Periplan® plus	PCI Periplan® Multi
Product					
Applications	For indoor use in dry areas, for levelling and repairing rough, irregular concrete floors, cement, anhydrite and mastic asphalt screeds and ceramic coverings. Also for heated screeds.	For indoor use, for levelling wooden plank floors, oriented strand boards (OSB), chipboards, mineral substrates, non-absorbent substrates, mastic asphalt. Suitable for warm water floor heating systems that require a thin bed.	For indoor use in dry areas, for levelling and repairing rough, irregular concrete floors, cement, anhydrite and mastic asphalt screeds and ceramic coverings. Also for heated screeds.	For indoor use, for bonded screeds allowing fast work-over on cementitious substrates, screeds on isolating or insulating layer, for heated screeds	For indoor use as a directly usable, flowable, wear-resistant cementitious floor levelling compound; for outdoor use under top coverings; for domestic, commercial and industrial buildings
Product properties	Can be pumped and processed using machines, free flowing, fast curing, low dust, level low-pore surface, “very low emission plus” classification	Fibre-reinforced, free flowing, low dust, fast curing, “very low emission plus” classification	Can be pumped and processed using machines, very free flowing, fast curing, level pore surface, “very low emission plus” classification	Can be worked over fast, dry mixture, polymer-modified, flowable and suitable for buffing, screed classification in accordance with DIN EN 13813: CT-C30-F6	Fibre-reinforced, can be pumped and processed using machines, faster working possible, highly flowable, easy working with low effort, cures without stress, screed classification in accordance with DIN EN 13813: CT-C40-F6-AR0,5
Layer thicknesses	2–30 mm  On mastic asphalt screeds: 2–10 mm	Under textile and elastic coverings: 3–60 mm  Under rigid floor coverings such as tiling and natural stone coverings: 10–60 mm	0.5–15 mm  Mastic asphalt screeds: up to 5 mm	In bonded system: 20–70 mm  On isolating layer: 35–70 mm  On insulating layer: 45–70 mm	3–40 mm
Consumption	approx. 1.6 kg of powder per m² and mm of layer thickness	approx. 1.6 kg of powder per m² and mm of layer thickness	approx. 1.6 kg of powder per m² and mm of layer thickness	approx. 2.0 kg of powder per m² and mm of layer thickness	approx. 1.6 kg of dry mortar per m² and mm of layer thickness
Curing time	For walking on: approx. 3 hours For loading: approx. 3 days Can be tiled over with ceramic tiles as soon as it can be walked on Can be covered with fitted carpets, plastic coverings or parquetry after about 3 days with a residual moisture level (CM) of 2 %	For walking on: approx. 3 hours Can be covered with ceramic coverings/textiles: approx. 1 day Vapour-tight coverings: approx. 3 days Parquetry: approx. 7 days with a residual moisture level (CM) of 2 %	For walking on: approx. 3 hours For loading: approx. 3 days Can be tiled over with ceramic tiles as soon as it can be walked on Can be covered with vapour-tight coverings after approx. 3 days with a residual moisture level (CM) of 3 %	For walking on: approx. 5 hours Can be tiled over after about 1 day; heated screeds Can be heated up after approx. 1 day	For walking on: after approx. 4 hours Can be covered with PCI sealing layer after approx. 24 hours with a thickness of 5 mm Can be fully loaded after approx. 7 days
Working time	approx. 30 minutes	approx. 30 minutes	approx. 30 minutes	approx. 50 minutes	approx. 30 minutes
	Very low emissions, GEV-EMICODE EC 1 PLUS R	Very low emissions, GEV-EMICODE EC 1 PLUS R	Very low emissions, GEV-EMICODE EC 1 PLUS R		Very low emissions, GEV-EMICODE EC 1 PLUS R















Tile adhesives

Application/substrate	Preparation of substrate	PCI Nanolight®	PCI Nanoflott® light	PCI FT® Flex	PCI FT® Klebemörtel	PCI Rapidlight®	PCI Flexmörtel®	PCI Flex-mörtel® S1	PCI Flex-mörtel® S1 Rapid	PCI Flex-mörtel® S2	PCI Flex-mörtel® S2 Rapid	PCI Carralight®	PCI Carraflex®	PCI Carrament®
Product														
Substrate														
Floors: concrete floors laid more than 1 month ago, concrete screeds laid more than 3 days ago, screeds with underfloor heating										■	■			
Cement screeds ≤ 4 % CM, screeds with underfloor heating								■	■	■	■			
Anhydrite and gypsum screeds ≤ 0.5 % CM, screeds with underfloor heating		■	■	■	■	■	■	■	■	■	■	■	■	■
Floors: concrete floors laid more than 6 months ago, concrete screeds laid more than 28 days ago, screeds with underfloor heating		■	■	■	■	■	■					■	■	■
Floors: concrete floors laid more than 3 months ago		■	■	■	■	■	■	■	■			■	■	■
Walls: concrete laid more than 6 months ago, cellular concrete, cement plaster, gypsum plaster	Prime gypsum plaster and cellular concrete with PCI Gisogrund®	■		■	■	■	■					■	■	■
Walls: plasterboard walls, gypsum fibre boards, concrete laid more than 3 months ago	Prime gypsum plaster and cellular concrete with PCI Gisogrund®	■		■	■	■	■	■	■	■ Concrete laid more than 1 month ago		■	■	■
Walls and floors: wood chip boards (thickness on floors at least 25 mm, on walls at least 19 mm), with screws at intervals of 40 cm	With PCI Wadian®	■ On PCI Lastogum®		■ On PCI Lastogum®		■ On PCI Lastogum®	■	■ On PCI Lastogum®	■ On PCI Lastogum®	■ On PCI Lastogum®	■ On PCI Lastogum®	■ On PCI Lastogum®	■ On PCI Lastogum®	
Walls and floors: old tiling	Thoroughly clean old tiling and prime with PCI Gisogrund® 303	■	■ Floors only	■		■	■	■	■	■	■	■	■	■
Especially for bathrooms and showers with gypsum substrates, cellular concrete etc	Prime with PCI Gisogrund®, waterproof with PCI Lastogum®	■	■ Floors only	■		■	■	■	■	■	■	■	■	■

■ Product suitable



Tile adhesives

Application / substrate	Preparation of substrate	PCI Nanolight®	PCI Nanoflott® light	PCI FT® Flex	PCI FT® Klebemörtel	PCI Rapidlight®	PCI Flexmörtel®	PCI Flex-mörtel® S1	PCI Flex-mörtel® S1 Rapid	PCI Flex-mörtel® S2	PCI Flex-mörtel® S2 Rapid	PCI Carralight®	PCI Carraflex®	PCI Carrament®
Product														
Application														
Walls and floors: concrete, screed, plaster	Remove old paint	■	■ Floors only	■	■	■	■	■	■	■	■ Floors only	■	■	■
Especially for cotto and concrete stone slabs		■		■		■	■	■	■	■	■			
Especially for natural stone such as marble, granite and porphyry												■	■	■
Especially for fully vitrified tiles		■	■ Floors only	■		■	■	■	■	■	■ Floors only			
Where can the product be used?		Indoors and outdoors on walls and floors	Indoors and outdoors on floors	Indoors and outdoors on walls and floors	Indoors and outdoors* on walls and floors	Indoors and outdoors on walls and floors	Indoors and outdoors on walls and floors	Indoors and outdoors on walls and floors	Indoors and outdoors on walls and floors	Indoors and outdoors on walls and floors	Indoors and outdoors, on floors	Indoors and outdoors on walls and floors	Indoors and outdoors on walls and floors	Indoors and outdoors on walls and floors
Classification in accordance with DIN EN 12004		C2 TE S1	C2 E S1	C2 TE S1	C2 T	C2 TE S1	C2 TE S1	C2 TE S1	C2 FT S1	C2 TE S2	C2 FE S2	C2 FT S1	C2 FT S1	C2 F
		Very low emissions, GEV-EMICODE EC 1 R, dust reduced	Very low emissions, GEV-EMICODE EC 1 R, dust reduced	Very low emissions, GEV-EMICODE EC 1 R	Very low emissions, GEV-EMICODE EC 1 R		Very low emissions, GEV-EMICODE EC 1 R	Very low emissions, GEV-EMICODE EC 1 PLUS R	Very low emissions, GEV-EMICODE EC 1 R	Very low emissions, GEV-EMICODE EC 1 PLUS R			Very low emissions, GEV-EMICODE EC 1 PLUS	

■ Product suitable      \* Modification with PCI Lastoflex® required



## The basics on tile adhesives



## The right adhesive for every application

As a result of the wide range of tiles and ceramic coverings and the applications in which they are used, tile adhesives face a variety of different requirements.

Apart from the end result – a firm bond to the substrate – the main focus is on aspects of processing and technical feasibility, such as flowable application and good non-sag properties. It is extremely challenging to combine all these features in a single product at an attractive price. In the tiling sector, three different binder systems are used depending on the individual application:

- Dispersion adhesives
- Reaction resin adhesives
- Cementitious adhesives

### Dispersion adhesives

Dispersion adhesives are single-component ready-to-use adhesives that are mainly characterized by easy handling. Dispersion adhesives are polymers dissolved in water with high adhesive performance and flexibility which cure by drying. These adhesives are used only on indoor walls. The curing time is too long for work on floors.

### Reaction resin adhesives

Reaction resin adhesives are the material of choice for special applications such as tiling on critical surfaces or in areas exposed to chemical attack by aggressive liquids.

On difficult substrates such as wood or steel which are continuously moving, polyurethane-based adhesives are mainly used. Apart from their high adhesive performance, these adhesives are extremely flexible, allowing the highly reliable laying of tiles on ships or in lifts where the substrate is always in motion.

Where chemical resistance is required, for example in industrial kitchens, fruit juice plants or laboratories, where the joint and the adhesive may be exposed to aggressive fluids, epoxy resin adhesives are used. While liquids with a very low pH value (acids) simply eat away cementitious joints on continuous exposure, epoxy resin joints and adhesives remain immune to attack.

### Cementitious adhesives

Polymer-modified, cement-bound adhesives are real all-rounders for use in thin-bed applications. The most remarkable thing about these adhesives is their versatility. A variety of different additives can be used to modify the properties of the adhesive. With this approach, adhesives can be formulated to obtain good non-sag properties for large-sized wall tiles, rapid curing at low temperatures or high adhesive strength and good flexibility. This even allows tiles to be laid on new cement screeds practically as soon as they can be walked on.

Adhesives with white cement are used for laying glass mosaics, glass tiles and translucent natural stone slabs. These prevent the discolouration or staining of the tiles.

Another special feature is the possibility of setting an adhesive to different consistencies. When laying natural stone or clinker slabs of different thicknesses, medium-bed adhesives are mainly used. The stable structure of these adhesives prevents the slabs from sinking into the adhesive bed under their own weight.

Flowable adhesives are a result of further developing the medium bed adhesives. The flowable adhesives are mainly used in areas where void-free laying is required or demanded, for example in outdoor application or on industrial floors exposed to heavy-duty mechanical loads.



# Classification of tile adhesives

## Classification of tile adhesives in accordance with the European standard and flexible adhesive designations

Thin-bed mortars for the laying of ceramic tiles and slabs must meet certain performance criteria. These are laid down in European standard EN 12004 (or ISO standard 13007, Part 1), which defines classes C1 and C2 (cementitious adhesives), D1 and D2 (dispersion adhesives) and R1 and R2 (reaction resin adhesives) as well as optional additional properties. EN 12002 defines designations S1 and S2 for cementitious adhesives.



### Cementitious adhesives

The adhesive strength classes C1 and C2 define adhesive tensile strengths (EN 12004). Class C1 lays down the minimum requirements for all cementitious tile adhesives, with a minimum tensile strength of 0.5 N/mm². In order to meet the requirements for class C2, thin-bed mortars must reach a tensile strength of at least 1 N/mm². The tensile strength tests for classes C1 and C2 are carried out in four different configurations.

### Transverse deformation

The transverse deformation of a cured cementitious thin-bed adhesive is measured on a defined strip of adhesive (specimen). The results are classed as S1 or S2 in accordance with EN 12002.

To meet the requirements for class S1, the sample must reach a transverse deformation of at least 2.5 mm and less than 5 mm. Class S2 includes severely deformable flexible adhesives with a transverse deformation of at least 5 mm – a figure that is twice as high as the requirement of the German guidelines for flexible tile adhesives.



### Dispersion adhesives

Dispersion adhesives are classed as D1 or D2 depending on their shear strength (EN 12004). For inclusion in class D1, dispersion adhesives must reach a shear strength of at least 1 N/mm² after curing and tempering. For class D2, the adhesive must reach a shear strength of at least 0.5 N/mm² after storage under water and at least 1 N/mm² after storage at high temperatures.

### Reaction resin adhesives

Classes R1 and R2 are based on the shear strength of the adhesive, as in the case of dispersion adhesives (EN 12004). The minimum requirement for class R1 is a shear strength of at least 2 N/mm² after curing and tempering. For class R2, the adhesive must also reach a shear strength of at least 2 N/mm² after a temperature cycle.

### Processing properties

Other letters such as T, E and F in the designation indicate optional processing properties.

**T** = thixotropic:  
indicates reduced sagging

**E** = extended open time:  
(only for cementitious mortars and class D2 dispersion adhesives)








**F** = fast setting:  
(only for cementitious mortars)

## Classification of tile adhesives

Class C1 in accordance with EN 12004		
Mandatory characteristics	C1	Adhesive tensile strength in each of required tensile tests: $\geq 0.5 \text{ N/mm}^2$ plus open time: adhesive tensile strength after at least 20 minutes of exposure: $\geq 0.5 \text{ N/mm}^2$
Optional characteristics	C1 T	• Plus reduced sag of max. 0.5 mm
	C1 F	• Plus early adhesive tensile strength after dry storage and after max. 24 h $\geq 0.5 \text{ N/mm}^2$ • Plus shorter open time (adhesive tensile strength $\geq 0.5 \text{ N/mm}^2$ after min. 10 minutes of exposure)
	C1 FT	• Plus early adhesive tensile strength after dry storage and after max. 24 h $\geq 0.5 \text{ N/mm}^2$ • Plus shorter open time (adhesive tensile strength $\geq 0.5 \text{ N/mm}^2$ after at least 10 minutes of exposure) • Plus reduced sag of max. 0.5 mm
Class C2 in accordance with EN 12004		
Mandatory characteristics	C2	Adhesive tensile strength in each of required tensile tests: $\geq 1 \text{ N/mm}^2$ plus open time: adhesive tensile strength after at least 20 minutes of exposure: $\geq 0.5 \text{ N/mm}^2$
Optional characteristics	C2 T	• Plus reduced sag of max. 0.5 mm
	C2 E	• Plus longer open time: adhesive tensile strength after at least 30 minutes of exposure: $\geq 0.5 \text{ N/mm}^2$
	C2 TE	• Plus reduced sag of max. 0.5 mm • Plus longer open time: adhesive tensile strength after at least 30 minutes of exposure: $\geq 0.5 \text{ N/mm}^2$
	C2 F	• Plus early adhesive tensile strength after dry storage and after max. 24 h $\geq 0.5 \text{ N/mm}^2$ • Plus shorter open time (adhesive tensile strength $\geq 0.5 \text{ N/mm}^2$ after at least 10 minutes of exposure)
	C2 FT	• Plus early adhesive tensile strength after dry storage and after max. 24 h $\geq 0.5 \text{ N/mm}^2$ • Plus shorter open time (adhesive tensile strength $\geq 0.5 \text{ N/mm}^2$ after at least 10 minutes of exposure) • Plus reduced sag of max. 0.5 mm
	C2 EF	• Plus longer open time: adhesive tensile strength after at least 30 minutes of exposure: $\geq 0.5 \text{ N/mm}^2$ • Plus early adhesive tensile strength after dry storage and after max. 24 h $\geq 0.5 \text{ N/mm}^2$
	C2 FTE	• Plus early adhesive tensile strength after dry storage and after max. 24 h $\geq 0.5 \text{ N/mm}^2$ • Plus reduced sag of max. 0.5 mm • Plus longer open time: adhesive tensile strength after at least 30 minutes of exposure: $\geq 0.5 \text{ N/mm}^2$
Class S in accordance with EN 12002		
Designation	S1	Transverse deformation at least 2.5 mm
Designation	S2	• Transverse deformation at least 5 mm
Class D in accordance with EN 12004		
Mandatory characteristics	D1	Shear strength in each of required shear tests: $\geq 0.5 \text{ N/mm}^2$ plus open time: adhesive tensile strength after at least 20 minutes of exposure: $\geq 0.5 \text{ N/mm}^2$
Optional characteristics	D1 T	• Plus reduced sag of max. 0.5 mm
Mandatory characteristics	D2	Shear strength in each of required shear tests: $\geq 1 \text{ N/mm}^2$ plus open time: adhesive tensile strength after at least 20 minutes of exposure: $\geq 0.5 \text{ N/mm}^2$
Optional characteristics	D2 T	• Plus reduced sag of max. 0.5 mm
	D2 E	• Plus longer open time: adhesive tensile strength after at least 30 minutes of exposure: $\geq 0.5 \text{ N/mm}^2$
	D2 TE	• Plus reduced sag of max. 0.5 mm • Plus longer open time: adhesive tensile strength after at least 30 minutes of exposure: $\geq 0.5 \text{ N/mm}^2$
Class R in accordance with EN 12004		
Mandatory characteristics	R1	Shear strength in each of required shear tests: $\geq 2 \text{ N/mm}^2$ plus open time: adhesive tensile strength after at least 20 minutes of exposure: $\geq 0.5 \text{ N/mm}^2$
Optional characteristics	R1 T	• Plus reduced sag of max. 0.5 mm
Mandatory characteristics	R2	Shear strength in each of required shear tests: $\geq 2 \text{ N/mm}^2$ plus shear strength following temperature change: $\geq 2 \text{ N/mm}^2$ plus open time: adhesive tensile strength after at least 20 minutes of exposure: $\geq 0.5 \text{ N/mm}^2$
Optional characteristics	R2 T	• Plus reduced sag of max. 0.5 mm



Joint grouts

Application/type of tiles	PCI Nanofug® Premium	PCI Nanofug®	PCI Flexfug®	PCI FT® Fugengrau PCI FT® Fugenweiß	PCI Rapidfug®	PCI FT® Fugenbreit	PCI Carrafug®
Products							
Type of tiles							
Fully vitrified tiles	■	■	■		■		
Non-vitrified tiles	■	■	■	■	■		
Vitrified tiles	■	■	■	■	■	■	
Glass and porcelain mosaics	■	■		■			
Clinker, cotto, brick tiles, concrete stones		■				■	
Natural stones such as marble, granite, porphyry and quartzite					* ■		■
Applications							
In bathrooms and outdoors on balconies and terraces	■	■	■		■		
Especially for cotto and concrete stones						■	
Joint width	1 – 10 mm	1 – 10 mm	3 – 15 mm or 2 – 10 mm	2 – 8 mm	1 – 10 mm	5 – 20 mm	1 – 8 mm
Colours	23 colours	17 colours	3 colours	4 colours	11 colours	4 colours	5 colours

\* With low-absorbency natural stone/hard stone

■ product suitable



# The basics of joint grouts



## The right choice

As a design element, the joint puts the final touch to any covering of tiles or slabs. It is important to select the right joint grout because the material has a crucial impact on the appearance and durability of the tiling. The best product to use depends on the type of tile, the joint width, the application and service conditions.

### Fully vitrified tiles

Fully vitrified tiles have a number of advantages such as very hard surfaces, high bending strengths and low water absorption. However, these characteristics can create problems with joints. Because of the extremely low water absorption of the tiles, it may be difficult to create adhesion between the joint grout and the tile. Deformable flexible joint grouts such as PCI Nanofug® Premium or PCI Flexfug® feature outstanding side adhesion and water-repellent properties. They ensure the reliable grouting of fully vitrified tiles in indoor and outdoor applications. Where time is of the essence, the fast-setting flexible joint grout PCI Rapidfug® can be used.

Because of their extremely hard surfaces, fully vitrified tiles are also suitable for areas subject to high mechanical loads.

In addition, their low water absorption means that they are well-suited for areas exposed to frost. The cementitious joint grout PCI Durafug® NT was especially developed for applications of this type. Where tiled surfaces may be exposed to chemical attack, epoxy resin-based joint grouts such as PCI Durapox® NT must be used.

### Non-vitrified and vitrified tiles

Because of their low mechanical strength, non-vitrified tiles are only used on walls. They are normally laid with joint widths from 2 mm to a maximum of 8 mm. PCI FT® Fugenweiß and PCI FT® Fugengrau are suitable for such applications. Narrower joints (minimum 1 mm) may be grouted using the multi-use flexible joint grouts PCI Nanofug® or PCI Nanofug® Premium, which are available in a variety of different colours.

Vitrified tiles feature low water absorption and high strength and may be used on walls and floors indoors and outdoors. In order to allow better accommodation of dimension tolerances, vitrified tiles are laid with joint widths from 5 to 20 mm. The joints may be grouted with PCI FT® Fugenbreit.

### Natural stones

Precisely because of their “natural” appearance, natural stones such as granite, marble or Solnhofen slabs are popular in indoor and outdoor applications. Especially in the case of sedimentary stone, alkaline water from the joint grout may result in efflorescence on the surface of the stone. This can be prevented by using the fast-setting joint grout PCI Carrafug®. In the case of paving made from natural stone and extremely wide joints of the types found when irregular stones are used, joints may be grouted with PCI Pavifix® 1K Extra grout if the substructure allows drainage and the cementitious joint grout PCI Pavifix® CEM if the substructure is water-impermeable.

### Glass tiles

Because of the special effects which can be obtained, glass tiles and glass mosaics on walls are extremely popular with architects. In contrast to ceramic products and natural stones, glass is non-porous and therefore resists adhesion. The multi-use flexible joint grout PCI Nanofug® Premium has extremely good side adhesion and is therefore the product of choice for these applications. In addition, the wide range of colours available and the functional surfaces of the grout harmonize perfectly with the qualities of glass tiles.

## Joint colours

Colours	Products	transparent	01 brilliant white	02 bahama beige	03 caramel	05 mid-brown	11 jasin	12 anemone	16 silver grey	18 manhattan	19 basalt	20 white	21 grey	22 sand grey	23 light grey	25 carrara white	26 pearl grey	27 jura beige	30 aged white	31 cement grey	40 black	41 dark brown	43 pergamon	44 topas	47 anthracite	49 light brown	50 red-brown	51 intensive brown	52 beige brown	53 ochre	
PCI Carrafug®														•		•	•	•							•						
PCI Durafug® NT								•				•		•						•											
PCI Durapox® NT								•						•					•	•											
PCI Durapox® NT plus				•				•						•					•	•					•						
PCI Flexfug®										•	•			•																	
PCI FT® Fugenbreit											•		•							•				•							
PCI FT® Fugengrau								•					•		•						•										
PCI FT® Fugenweiß												•																			
PCI FT® Megafug											•									•											
PCI Nanofug®				•	•	•	•	•	•	•	•	•	•		•					•	•	•	•	•	•						
PCI Nanofug Premium®				•	•	•	•	•	•	•	•	•	•	•	•					•	•	•	•	•	•	•	•	•	•	•	
PCI Rapidfug®									•	•			•	•						•					•						
Silicone																															
PCI Carraferm®			•								•			•		•	•	•		•					•						
PCI Silcoferm® S			•		•	•	•	•	•	•	•	•	•	•	•					•	•	•	•	•	•						
PCI Silcofug® E			•	•	•	•	•	•	•	•	•		•	•	•					•	•	•	•	•	•	•	•	•	•	•	

## Cementitious/epoxy resin joint grouts


Tile material				
	Non-vitrified	Vitrified	Fully vitrified	Glass tiles/ mosaic
Joint width				
PCI Nanofug® from 1 mm				
PCI Nanofug® Premium 1 – 10 mm				
PCI Rapidfug® 1 – 10 mm				
PCI Flexfug® 2 – 10 mm				
PCI Durafug® NT 1 – 20 mm				
PCI Durapox® NT/NT plus 1 – 20 mm				

• recommended • suitable • suitable with restrictions



# Silicone sealants

Application examples	PCI Adaptol®	PCI Silcoferm® S	PCI Silcofug® E	PCI Carraferm®
Products				
For indoor and outdoor use				
For the elastic sealing of cracks in plaster and connecting joints				
For the elastic sealing of connecting, corner and expansion joints in the sanitary and living areas				
For connecting and expansion joints with natural stones and marble coverings in sanitary and living areas				
Colours	2 colours	19 colours	25 colours	7 colours

 product suitable



## The basics of silicone joints



### Durably elastic

Not every joint can be filled using a rigid material. Expansion, perimeter and connecting joints are intended to compensate for movement between two different materials or to accommodate the expansion or shrinkage of a material. Because of its durably elastic properties, silicone is a suitable sealant for joints of this type. As with joint grouts, the appropriate sealant must be selected on the basis of the materials concerned and service conditions.

#### Tiles, glass

PCI Silcofug® E is used for sealing expansion joints in tiling and corner and connecting joints in wet areas. This product is also the solution of choice for tiling on balconies and terraces. PCI Silcofug® E is available in a wide range of different colours – in line with the colour range of PCI joint grouts.

#### Natural stone

Like joint grouts, silicone sealants must be selected to prevent efflorescence and discolouration. PCI Carraferm® was developed for elastic joints in and around natural stone coverings and provides a reliable seal for joints of this type in indoor and outdoor applications.

#### Glass, wood, metals, plastics

The material properties of PCI Silcoferm® S make it suitable for almost any indoor or outdoor application – for example between tiles and components in sanitary facilities, kitchens, and between tiles and doors, windows and fitted components in living areas.

#### Special requirements for processing

DIN-Polyband should be inserted into deep joints before the silicone sealant is applied. The diameter of the string should be about 5 mm larger than the width of the joint. If one or more of the materials around the joint is critical or resists adhesion, various primers from the PCI Elastoprimer range may be used.







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