

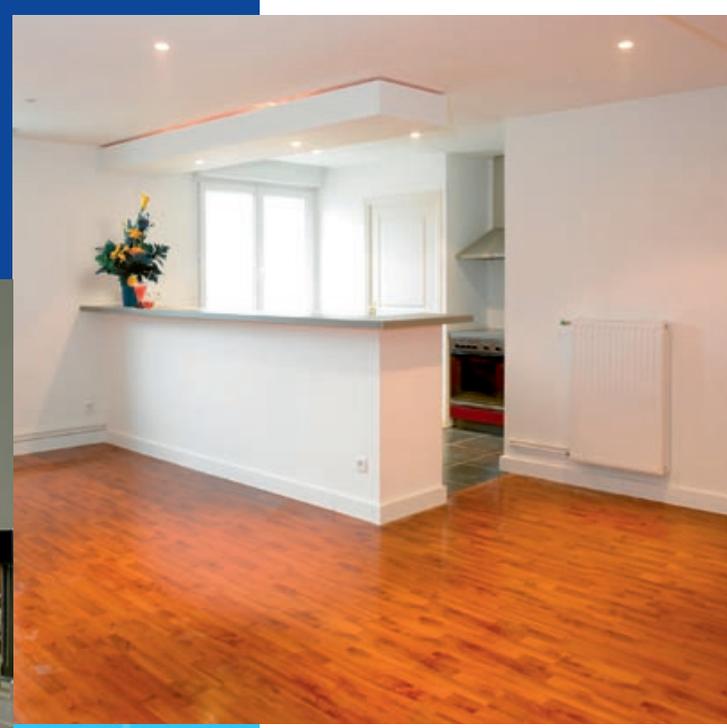
Cement Board

AQUAPANEL®



*Build on our strength*

# Floor Systems



# AQUAPANEL® Cement

## The first cement screed without water

AQUAPANEL® Cement Board technology has already revolutionised the design and construction of buildings throughout Europe. Now, the new generation of floor systems from Knauf USG Systems provides architects and construction professionals with a superior alternative to wet screeds which can be used for all kinds of floor constructions.

AQUAPANEL® Cement Board Floor has an innovative edge design with a slot on all four sides, making installation faster and easier. Simply apply the AQUAPANEL® Slot Adhesive (PU), insert the AQUAPANEL® Biscuit, and press the panels together. No screws are required. The system is self-levelling during installation so floor panels create a level surface.

It's easy to align the panels without the need to cut off any rebate edges. AQUAPANEL® Cement Board Floor's new edge design makes it extremely robust whilst no rebate edge means you get 9% more surface area per panel. You also benefit from an optimised and reduced cut-off, turning the last panels with the new edge design in any direction.

When used with AQUAPANEL® Levelling Fill, AQUAPANEL® Cement Board Floor provides the perfect floor structure. An AQUAPANEL® Cement Board Floor system is suitable for all kinds of floor constructions, particularly for refurbishment projects.

### Benefits of AQUAPANEL® Cement Board Floor System:

#### All the benefits of cement board

- All the benefits of wet cement screed without the hassles
- Best sound and thermal insulation
- Particularly suitable for tiles
- Recommended for all types of parquet
- Floor system with innovative slot edge – easy and fast installation
- When used with AQUAPANEL® Levelling Fill, provides the perfect floor structure
- Coverings can be placed 12 hours after laying
- Suitable for underfloor heating systems, up to 70°C
- 100% completely water-resistant
- 100% mould resistant
- High fire resistance class for fire protection
- Durable and stable with high load capacity

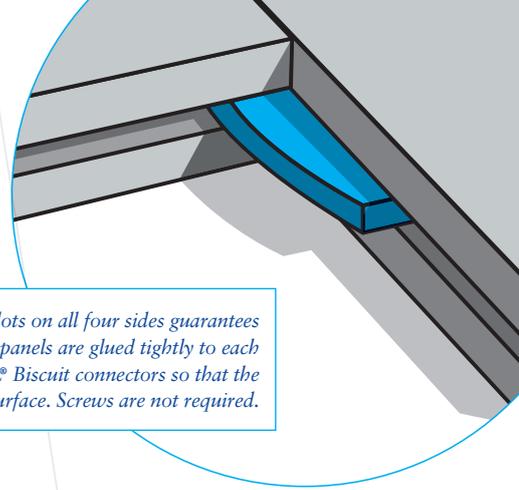
#### Peace of mind

- Proven system with panels and accessories designed and tested to work together for optimum result
- Comprehensive after-sales service and consultation
- Meets European industry norms



Certainty in

# Board Floor



*The innovative new edge design with precision slots on all four sides guarantees secure and level laying of the cementitious panels. The panels are glued tightly to each other and automatically levelled by the AQUAPANEL® Biscuit connectors so that the panels form a level surface. Screws are not required.*

## Knauf USG Systems - leading the way

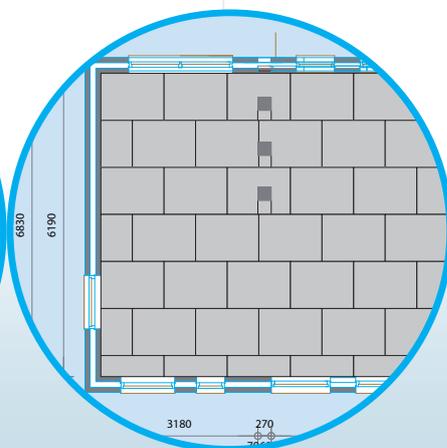
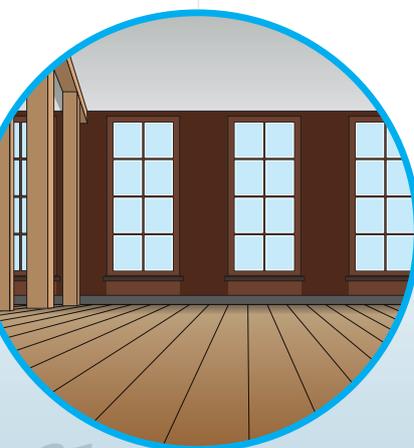
AQUAPANEL® Cement Board Floor is a proven system, manufactured by Knauf USG Systems, offering significant performance advantages in all types of buildings. Knauf USG Systems is a joint venture between Knauf and USG, two of the leading and well-established suppliers of systems and construction materials for interior and exterior use.

As the leading supplier of cement board systems in Europe, Knauf USG Systems is committed to developing innovative building materials. AQUAPANEL® Cement Board is used in interior, exterior and floor applications throughout Europe and is the cement board of choice for construction professionals. The new edge design for AQUAPANEL® Cement Board Floor and Floor MF is an example of this innovation.

This brochure explains AQUAPANEL® Cement Board Floor in more detail to ensure that a perfect end result can be achieved in your floor application, every time.

## Contents

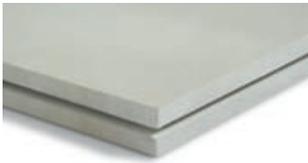
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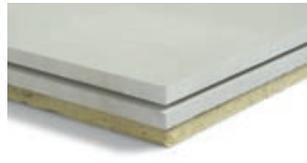
floor construction

# Product range

# Appro



**AQUAPANEL® Cement Board Floor**  
cementitious floor panel.



**AQUAPANEL® Cement Board Floor MF**  
cementitious floor panel laminated underneath with impact sound insulation board.

### AQUAPANEL® Cement Board Floor

Dry floor component made from Portland cement with aggregate. Rectangular edge with all-round milled slot allows end-to-end gluing together of panels.

**Thickness:**  
22mm AQUAPANEL® Cement Board Floor  
33mm AQUAPANEL® Cement Board Floor MF

**Length:** 900mm  
**Width:** 600mm  
Panel dimensions: 900 x 600mm  
**Weight:**  
ca. 37kg/m<sup>2</sup> AQUAPANEL® Cement Board Floor  
ca. 39kg/m<sup>2</sup> AQUAPANEL® Cement Board Floor MF  
**Packaging:** 50 pieces per pallet (27m<sup>2</sup>)



**AQUAPANEL® Slot Adhesive (PU)**  
AQUAPANEL® Slot Adhesive is used to firmly bond together the individual AQUAPANEL® Cement Board Floor or Floor MF panels.

**Coverage:** Approx. 60ml/m<sup>2</sup>  
**Packaging:** 310ml/cartridge  
600ml/tube



### AQUAPANEL® Biscuits

The AQUAPANEL® Biscuit has been specially developed for joining and levelling AQUAPANEL® Cement Board Floor and Floor MF panels.

The AQUAPANEL® Biscuit, when fitted into the slot of the floor panel, fixes the vertical position of panels relative to each other. Inserting the AQUAPANEL® Biscuit has a self-levelling effect so the floor panels create a level surface when laid. The AQUAPANEL® Biscuit is made of a special break-proof plastic material and has very high stability. Dimensions

of the biscuit are 60 x 23 x 4mm.

**Coverage:** approx. 7 per m<sup>2</sup>  
**Packaging:** AQUAPANEL® Biscuits 100/box  
AQUAPANEL® Biscuits 200/box

# ved accessories



**AQUAPANEL® Interior Primer**  
AQUAPANEL® Interior Primer is a ready-to-use plastic dispersion for priming the AQUAPANEL® Cement Board Floor guaranteeing maximum adhesion of floor coverings.

**Coverage:** approx. 50g/m<sup>2</sup> (concentrate)  
**Dilution:** 1 : 1 with water  
**Packaging:** 15l/bucket and 2.5l/bucket



**AQUAPANEL® Levelling Compound**  
AQUAPANEL® Levelling Compound is a frost-safe, powder-form floor plaster which, after mixing, is self-levelling thus ensuring an even plastered surface. It provides plane levelling of AQUAPANEL® Cement Board Floor dry underfloors under thin soft coverings and equalises unevenness in cement and poured screed, bare concrete floors, masonry and wooden floors of 2-15mm depth. It is particularly suitable for levelling areas subject to large temperature variations such as screeds with floor heating.

**Coverage:** around 1.5kg/m<sup>2</sup> per 1mm depth of layer  
**Packaging:** 25kg/bag



**AQUAPANEL® Levelling Fill**  
AQUAPANEL® Levelling Fill is ideal for height levelling, fire protection, heat insulation and impact sound resistance.

**Grain size:** d = 0 - 7mm  
**Bulk density:**  $\rho_s$  = ca. 140kg/m<sup>3</sup>  
**Fill quantity:** 100l/bag  
**Weight per unit area (built):** 1.54kg/m<sup>2</sup> per cm of depth  
**Thermal conductivity:**  $\lambda$  = 0.060 W/(m × K)

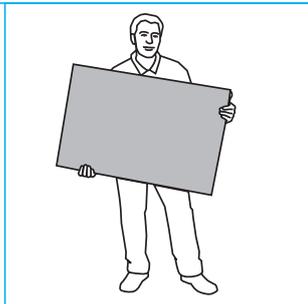
**Building materials class:** B2 in accordance with DIN 4102  
**Compressive strength (compressive strain at 10% compression):** 90kPa  
**Permit No.:** Z-23.11-1286

As a further accessory we recommend plasterboard in accordance with EN 520 or mineral wool insulation board in accordance with EN 13162 and/or soft fibreboard (WF) in accordance with EN 13171. All further information provided in the brochure is based on these boards.

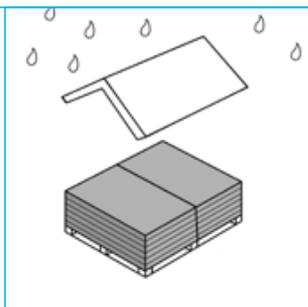
# Processing

## Transportation and storage

Always carry the AQUAPANEL® Cement Board Floor panels by the top edge, or transport them using a stacker truck or board truck. When unloading, take care not to damage the corners and edges. If AQUAPANEL® Cement Board Floor is not stored properly it may deform. This takes up valuable fitting time and can result in faults. Correct storage: fully-flat on an even base or on timber battens 25cm apart.



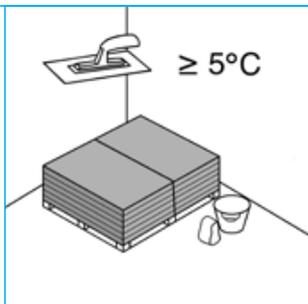
To avoid unwanted deformation, protect AQUAPANEL® Cement Board Floor from moisture and weathering right up until the time it is fitted. Where boards have become damp prior to fitting, they must - without exception - be dried on both sides while laid flat on an even surface.



Make sure you know the load-bearing capacity of the subsurface. A pallet of AQUAPANEL® Cement Board Floor loads the floor structure by around 1000kg.

Climatic conditions (state of air in the room) before, during and after laying AQUAPANEL® Cement Board Floor:

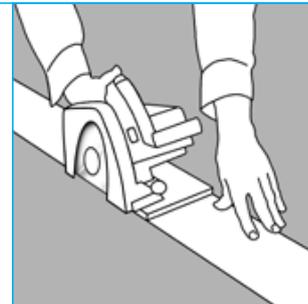
- relative humidity  $\leq 85\%$
- room and material temperature  $+ 5^{\circ}\text{C}$ .



AQUAPANEL® Cement Board Floor must be acclimatised to the conditions described above before laying. The moisture content must be at most 5.5 M-%.

## Formatting

To cut AQUAPANEL® Cement Board Floor and ensure smooth cut surfaces, use a handheld circular saw with a dust extractor, e.g. FESTO TS 55 Q plus FS, with diamond saw blade. If using a pendulum jigsaw, we recommend a carbide-tipped saw blade, e.g. Bosch T141 HM.



# Preparatory work

## Select fill

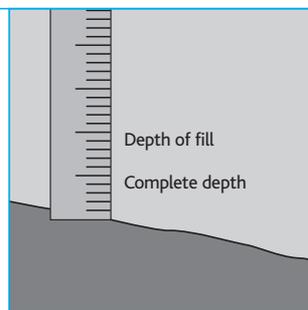
The universal AQUAPANEL® Levelling Fill is ideal for height levelling, fire protection, heat insulation and impact sound protection.

## Determine any height differences

Using a spirit level or a laser device, place the ruler as a point of reference. Then establish the highest point of the floor and determine the height difference in the room.

## Calculate depth of fill

Establish the desired finished height of the fill. At the highest point, the depth of the fill must be at least 1cm. There must also be a covering of 1cm over open pipework. Determine the depth of fill by considering compaction as follows: depth of AQUAPANEL® Levelling Fill = finished depth x 1.10. The templates are aligned to this depth later.



## Mark depth of fill

Now mark the depth of fill at a maximum distance of 2 metres on the wall.

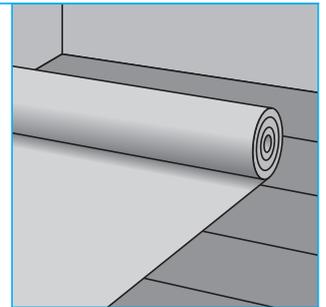
# Preparation of the subsurface

## Structural prerequisites

Knauf USG Systems floor constructions require a dry and load-bearing subsurface. Rising components, which will be plastered later, must be rendered before laying the insulation layer.

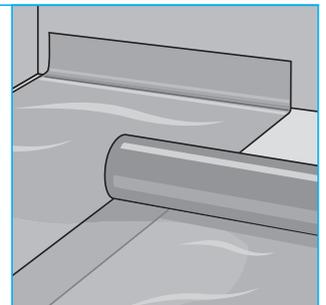
## Preparation of wood joist ceilings

Screw down loose or creaking boards and saw through locally squeaking tongue and groove joints. Larger openings must be closed, or covered in a sufficiently stable manner. A barrier is required to prevent the filler from flowing through holes, notches or joints in the space between the beams. If the physical conditions of the structure do not require a vapour control layer, a material (e.g. paper) open to diffusion can be used for the barrier.



## Preparation for solid ceilings

Solid ceilings contain moisture which must be prevented from rising into the floor structure. PE film is employed to do this in floor structures. The pieces of film should be laid flat and should overlap at least 20cm on joint locations. They must be drawn up over the rising components. Unless you know for sure that the floor structure contains no residual moisture, you must lay this film.



## Floorboards in contact with the ground

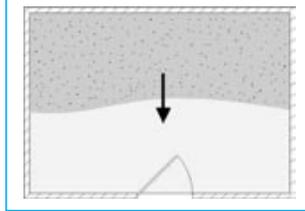
For floor boards in contact with the ground (cellar bases, buildings without cellars), sealing of building work is required to protect against the penetration of moisture, according to local building regulations.

# Laying diagram

## Specify direction of laying

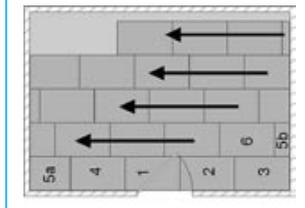
If wooden flooring is to be laid on the finished dry floor, the direction of laying must be established before laying the dry floor. Strip flooring is normally laid perpendicular to the dry floor, with parquet flooring in a fishbone pattern and mosaic parquet at an angle of 45 degrees.

## Apply fill from the window to the door

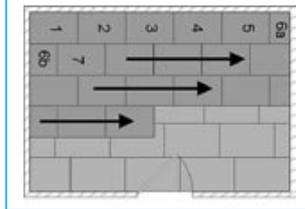


## Lay cover boards from the door to the window

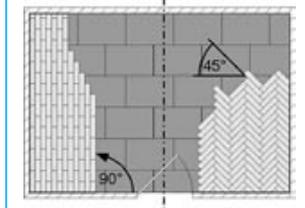
Use as cover boards either a gypsum plasterboard in accordance with DIN EN 520 or a mineral wool impact sound insulation board in accordance with DIN EN 13162, or a soft fibre board (WF) in accordance with EN 13171.



## Lay dry floor from the window to the door



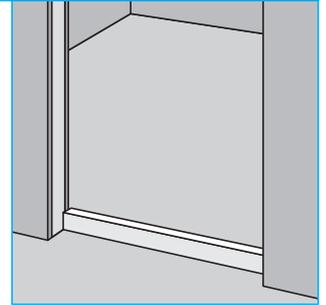
## Lay strip flooring at an angle of 90°, fishbone parquet at an angle of 45° to the dry floor.



# Lay loose fill

## Fit stop board

To ensure that the material cannot "run away", set a stop board in the door frame (80 - 100mm wide). It must be as high as the fill in its compacted condition.



## Align templates

Start at the wall furthest away from the door. Place a strip of fill about 25cm wide along the wall up to the marked depth of fill (top point). Put in a second auxiliary strip 2.5 metres away from the first strip.



## Laying the fill

Fill the area between both template layers with AQUAPANEL® Levelling Fill. But use no more than you'll be able to remove without treading on the fill.



## Removing the fill

Then remove the fill with the removal template. In doing so, always work from the side of the room farthest away from the door. Do not tread on the fill. For niches, wall protrusions and other edge areas, obtain the required marking height using a float or a short removal template. Only remove the fill. Do not compact the existing fill by tamping.



Please note:  
depth of fill 1cm

# Fill and cover boards

## Selection of cover boards

For planned fill depths of up to 60 mm, plasterboard according to DIN EN 520 or impact sound insulation board may be used as alternatives (see p. 14). For depths of fill over 60 mm, because of the mechanical compaction, a more robust plasterboard or fibreboard should always be used. Plasterboard, fibreboard and mineral wool insulation boards are also referred to as cover boards below.



## Cut cover boards

Cut cover boards to fit with a knife and lay on the fill. Use sections in lengths or widths of more than 20 cm. Lay cover boards from the door into the room. Lay each further board from above straight down onto the fill so that the surface remains plane and level. Lay the cover boards flush against the wall and butt the ends. Avoid crossovers and ensure joint staggering of 20 cm.

## Compacting with a hand rammer.

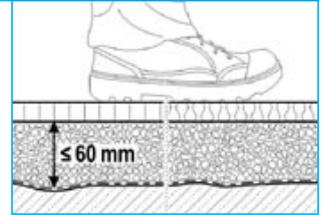


## Compacting with an electric floor compactor.



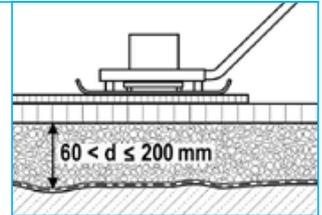
## Fill depth up to 60mm

Compact fill up to a depth of 60mm by walking on the entire surface of the cover board, including the wall and corner areas.



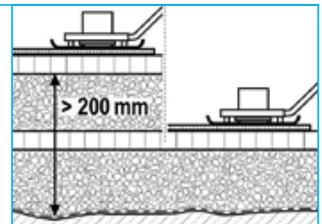
## Depth of over 60 and up to 200mm

Over a 60mm depth of fill, the fill must be mechanically compacted. To protect against damage, lay shuttering panels or strips of chipboard on the cover boards. Then mechanically compact the fill using a hand rammer or an electric floor compactor. Take account of compaction size.



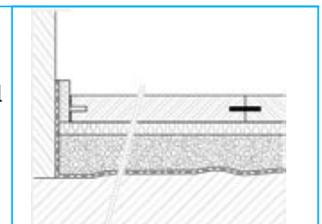
## Depth of fill over 200mm

Compact fills to a depth of greater than 200mm in several passes. Lay on shuttering panels for each layer. Then mechanically compact the fill using a hand rammer or an electric floor compactor. Repeat compaction as needed. Cover boards remain in the construction. Shuttering panels are removed.



## Edge insulation strips

To avoid sound bridges and stresses resulting from longitudinal thermal expansion, separate AQUAPANEL® Cement Board Floor from the wall parts above it using edge insulation strips. Trim any surplus after laying the floor covering.



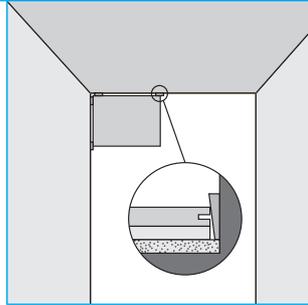
Expansion joints in the surface are necessary if the length along the side of the room exceeds 10m.

# Cementitious dry floor components

## Laying the first board

The first AQUAPANEL® Cement Board Floor panel is fitted in the corner of the room.

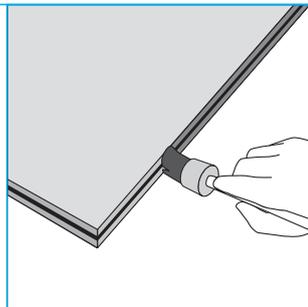
Insert wedges when doing this, to avoid the first boards becoming displaced by pushing in of subsequent components. When placing the wedges ensure that a 10 mm edge insulation strip can later be installed.



The finished components must be laid over almost the entire subsurface.

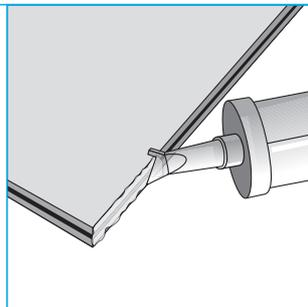
## Laying subsequent components

Before applying AQUAPANEL® Slot Adhesive (PU), clean the slot edge of the AQUAPANEL® Cement Board Floor panel with a damp brush to remove dust. Cleaning of the edges is a prerequisite for a tight-fitting joint and firm bonding of the components.



## Apply adhesive

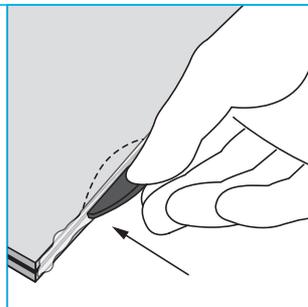
Apply AQUAPANEL® Slot Adhesive (PU) to the grooved edge of the panel using the special application nozzle. The adhesive will emerge as a wide, thin strip and cover the slot.



**Coverage:** 60ml/m<sup>2</sup>  
**Open time:** approx. 80 min.  
**Working temperature:** ≥ +5°C

## Insert biscuits

After applying the AQUAPANEL® Slot Adhesive (PU), push the AQUAPANEL® Biscuit into the slot through the "adhesive curtain". The adhesive, which also fixes the biscuit as it hardens, is pushed into the slot as a result of this process.



The position of the biscuit can be obtained from the layout diagram. (see page 11).

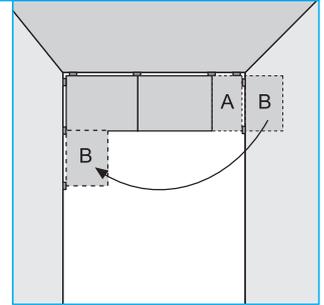
**Coverage:** approx. 7 per m<sup>2</sup>

## Lay according to diagram

The last AQUAPANEL® Cement Board Floor of each row should be cut to fit (A). Start a new row with the offcut (B). In this way you obtain the necessary joint staggering (min. 20cm).

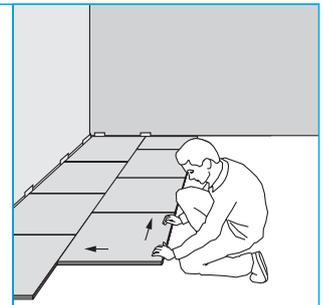
Installation is possible either from left to right or in the opposite direction.

Always work out from the room. Avoid cross joints.



## Laying and bonding

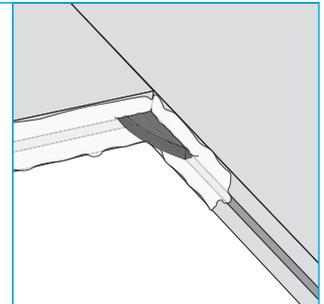
Push the longitudinal and wide sides of the AQUAPANEL® Cement Board Floor panels together, so the AQUAPANEL® Slot Adhesive (PU) emerges from the surface. In doing this, the AQUAPANEL® Biscuits are pushed into the slot in the board.



If the length along the side of the room exceeds 10m, expansion joints in the surface are necessary.

## Ensure offset

When laying panels, take care that no cross joints result. Butt joints must be offset by a minimum of 20cm and always fixed with an AQUAPANEL® Biscuit. If needed, use an additional biscuit.



## Finishing laying

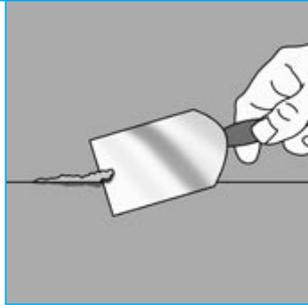
The last cut-to-size AQUAPANEL® Cement Board Floor panel is first tilted on one side, attached, and then "dropped". Then press the panel in both directions until adhesive emerges onto the surface.

The AQUAPANEL® Cement Board Floor panel can be pushed by hand, but tool assistance, e.g. a nail puller, may also be used.



### Scrape off the adhesive

After the adhesive has hardened (about 12 hours), scrape off any excess material.



### Priming

The entire, cleaned surface must be primed with AQUAPANEL® Interior Primer immediately after the adhesive has hardened, approx. 12 hours after laying.

**Coverage:** 50g/m<sup>2</sup>  
(Concentrate)

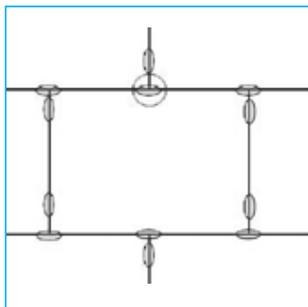
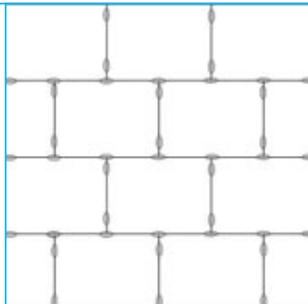
**Dilution:** 1:1 with water.



### Layout diagram for the biscuits

AQUAPANEL® Biscuits are installed in pairs on the short side of the finished floor panels and in threes along the long edge of the boards. The connectors are placed so that the neighbouring board at the end of a joint is fitted with a connector. The connector is installed perpendicularly to the joint of the already laid boards. (see diagram, connectors circled).

There must be no cross joints. Fitting of a biscuit into a cross joint is not permitted.



# Floor coverings

Because of its manufacturing accuracy and stability of form, AQUAPANEL® Cement Board Floor is particularly well suited for laying of tiles, boards and parquet flooring. Tile and parquet flooring can generally be laid directly. Refill joints if necessary. Take into account the drying time of the filling material.

## Moisture loading

For floor areas in domestic bathrooms, which receive light water spray only briefly and occasionally, only the edge joint needs to be sealed with sealing tape. Sealing of the entire surface is not required.

Sealing of the entire surface is not required in domestic bathrooms.

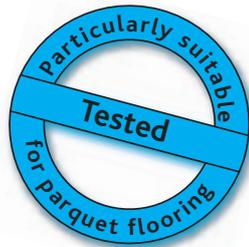
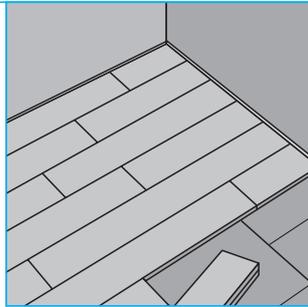
## Parquet flooring

The Institute of Flooring Engineering expressly recommends AQUAPANEL® Cement Board Floor for the laying of fully self-adhesive solid parquet.

AQUAPANEL® Cement Board Floor is suitable for use as a subsurface for virtually all types of parquet, from floating ready-made parquet over laminate, to fully self-adhesive solid parquet. If necessary refill joints. When selecting the parquet floor adhesive, all adhesives recommended by the parquet floor manufacturer are suitable, such as:

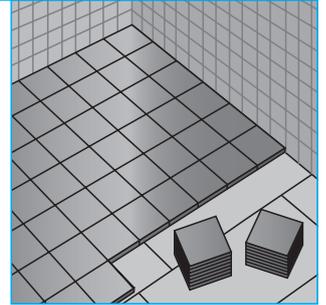
- Synthetic resin, dispersion wood floor adhesives
- Reaction resin wood floor adhesives
- Powder adhesives
- Polymer adhesives

The parquet flooring must be arranged perpendicular to the laying direction of the AQUAPANEL® Cement Board Floor. For laying parquet in a fishbone pattern, the angle between the laying directions is 45° (see p. 8). When laying parquet, refer to the local building regulations, as well as guidelines of the parquet flooring trade and the manufacturer's data.



## Tiles and natural stone

Ceramic coverings can generally be directly stuck on using a thin bed of cement. If necessary refill joints. The covering must be suitable for laying in a thin bed, and must be laid with "open joints". Flexible setting adhesives (plastic-coated cement powder adhesive) and jointing mortar are appropriate. The tile adhesive must meet C2 requirements (adhesion 1.0N/mm<sup>2</sup>) to DIN EN 12004 and S1 (bending displacement 2.5mm) to DIN EN 12002. Seal edge joints with elastic jointing material.



The maximum side length of ceramic coverings is 33 x 33cm. For larger formats, an isolation underlay mat must be used.

When laying ceramic coverings, please refer to manufacturer's data together with the further guidelines for tiling work. The local building regulations should be followed.

## Textile, PVC, linoleum

For coverings made of textiles, PVC and linoleum, apply AQUAPANEL® Levelling Compound over the entire surface before laying. To prevent the material from penetrating into the substrate, close gaps in the flooring surface beforehand with filler as appropriate. Only lay the floor covering after the screed is completely dry. By levelling, you prevent the joint areas of the components or other minor unevenness later appearing in the floor covering. Carpets should be fixed with double-sided adhesive tape or with a repositionable adhesive system applied over the entire surface. It is then possible to remove the covering later without leaving a residue.

When laying, follow the requirements local building, the further guidelines for tiling work and the manufacturer's specifications.

# Load-bearing capacity

## Load-bearing capacity of dry floor constructions

To determine the load bearing capacity, it is important to consider evenly-distributed loads and concentrated loads due to people, furniture, equipment, quantities of goods etc. Depending on the relevant loading, Knauf USG Systems Floor Systems have a good load-bearing performance – particularly for use in domestic and administrative buildings. Dry floor constructions are not suitable for driven loads.

## Guidelines for useful loads and areas of use

Use	Area load	Concentrated load
① Rooms and halls in residential buildings, hospital wards, hotel rooms including their kitchens and bathrooms.	2.0kN/m <sup>2</sup>	1.0kN
② Halls in office buildings, office areas, doctor's surgeries, station waiting rooms, recreation rooms including halls, salesroom areas up to 50m <sup>2</sup> , ground floor areas in residential, office and similar buildings	2.0kN/m <sup>2</sup>	2.0kN
③ Halls in hospitals, hotels, old people's homes, kitchens and treatment rooms including operating theatres without heavy equipment	3.0kN/m <sup>2</sup>	3.0kN
④ Areas with tables, e.g. schoolrooms, cafés, restaurants, dining halls, reading rooms, reception rooms.	3.0kN/m <sup>2</sup>	4.0kN
⑤ Areas with fixed seating, e.g. areas in churches, theatres or cinemas, conference halls, lecture theatres, meeting rooms, waiting rooms.	4.0kN/m <sup>2</sup>	4.0kN

### Point loads

The sum of point loads must not exceed the maximum permitted floor loading per square metre. For concentrated loads, additional consideration should be given to the formation of standing areas. We would be happy to advise you.

### Loads during the building period

Loads which exceed the permitted values should not be considered, even for a short time. Therefore, the construction progress should be planned so that the dry floor is not affected by other

works. If larger loads are required because of building activities, relevant protective measures should be taken. Our technical hotline would be pleased to answer any questions on bare floors and floor coverings.

# Load-bearing capacity

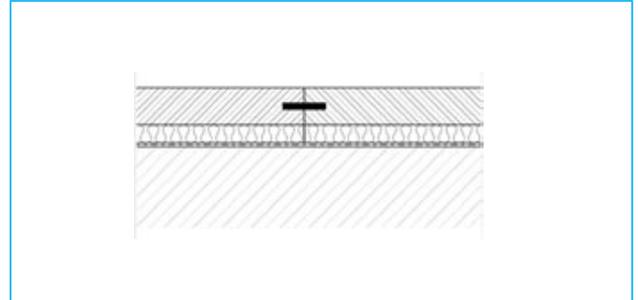
## Knauf USG Systems floor systems for various applications

① - ③ see table on page 13

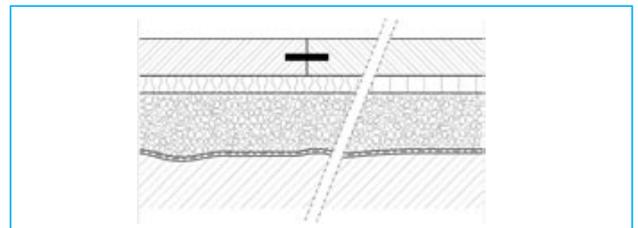
depth of layer

Assumption: stable, load-bearing bare floors with sufficient transverse distribution of load and low vibrations under dynamic loading.

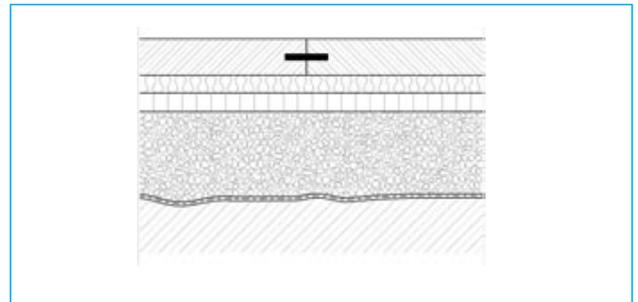
AQUAPANEL® Cement Board Floor MF	33mm
AQUAPANEL® Cement Board Floor Impact sound insulation board	22mm 12-1mm
AQUAPANEL® Cement Board Floor Fibreboard	22mm 8mm
AQUAPANEL® Cement Board Floor WF DEO 100 kPa	22mm ≤ 60mm
AQUAPANEL® Cement Board Floor EPS DEO 150 kPa	22mm ≤ 60mm



AQUAPANEL® Cement Board Floor Impact sound insulation board Fill	22mm 12-1mm ≤ 60mm
AQUAPANEL® Cement Board Floor Fibreboard Fill	22mm 8mm ≤ 200mm
AQUAPANEL® Cement Board Floor WF DEO 100 kPa Fibreboard Fill	22mm ≤ 60mm 8mm ≤ 100mm



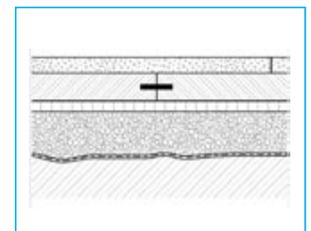
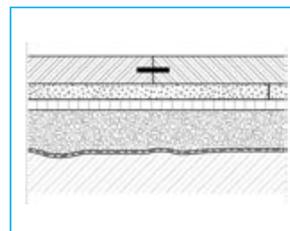
AQUAPANEL® Cement Board Floor EPS DEO 150 kPa Fibreboard Fill	22mm ≤ 60mm 8mm ≤ 100mm
AQUAPANEL® Cement Board Floor Impact sound insulation board Fibreboard Fill	22mm 12-1mm 8mm ≤ 100mm
AQUAPANEL® Cement Board Floor MF Fibreboard Fill	33mm 8mm ≤ 100mm



④ - ⑤ see table on page 13

depth of layer

AQUAPANEL® Cement Board Floor	22mm
AQUAPANEL® Cement Board Indoor Fibreboard Fill	12.5mm 8mm ≤ 60mm
AQUAPANEL® Cement Board Indoor AQUAPANEL® Cement Board Floor Fibreboard Fill	12.5mm 22mm 8mm ≤ 60mm



# Load-bearing capacity

## Fitting an additional load distribution layer

Useful loads ④ - ⑥ can be increased if the dry floor is provided with a further load distribution layer made of AQUAPANEL® Cement Board Indoor. This can be done above or below the AQUAPANEL® Cement Board Floor components.

### Assembly process

#### Version 1

- Lay AQUAPANEL® Cement Board Floor system in accordance with installation instructions.
- Wait for the adhesive to set.
- Remove dust, contamination and adhesive residues.
- Apply beads of AQUAPANEL® Slot Adhesive (PU) and AQUAPANEL® Joint Adhesive (PU) about 10cm apart on the AQUAPANEL® Cement Board Floor (Coverage 160ml/m<sup>2</sup>)
- Lay AQUAPANEL® Cement Board Indoor and screw down with AQUAPANEL® Maxi Screws (coverage 15/m<sup>2</sup>).

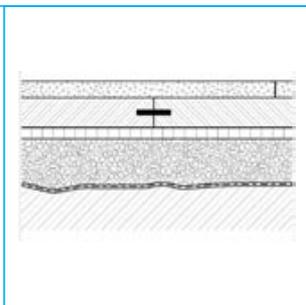
#### Version 2 (ideal for parquet flooring)

- Lay AQUAPANEL® Cement Board Indoor tightly butted, avoiding cross joints, and with joints staggered to the fibreboard.
- Remove dust and contamination
- Apply beads of AQUAPANEL® Slot Adhesive (PU) and AQUAPANEL® Joint Adhesive (PU) about 10cm apart on the AQUAPANEL® Cement Board Floor (Coverage 160ml/m<sup>2</sup>)
- Lay AQUAPANEL® Cement Board Floor at 90° angle to the direction of the AQUAPANEL® Cement Board Indoor in accordance with the installation instructions.



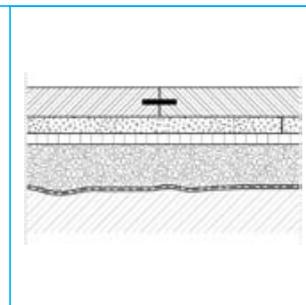
Apply AQUAPANEL® Slot Adhesive (PU) and AQUAPANEL® Joint Adhesive (PU) with gaps of 10cm.

#### Version 1



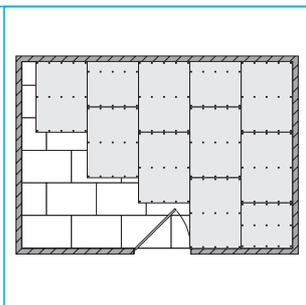
#### Version 2

AQUAPANEL® Cement Board Floor exhibits all the characteristics which make it suitable for laying floor coverings (e.g. parquet flooring, see p.12).



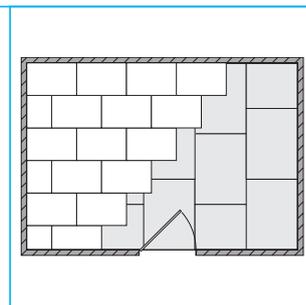
#### Laying diagram

Lay AQUAPANEL® Cement Board Indoor at 90° angle to AQUAPANEL® Cement Board Floor panels, without cross joints and joint covering.



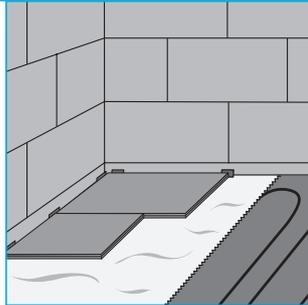
#### Laying diagram

Lay AQUAPANEL® Cement Board Floor rotated at 90° angle to AQUAPANEL® Cement Board Indoor panels, without cross joints and joint covering.



# Combination with floor heating

AQUAPANEL® Cement Board Floor is particularly well suited for combination with floor heating systems because of its mineral composition and thermal conductivity of 0.79W/(mK). As a cement board panel, AQUAPANEL® Cement Board Floor is resistant to a higher flow temperature of up to 70°C compared with gypsum-based dry floors. Any fire resistance classes of the floor are unaffected by installation of floor heating.



## Suitable systems

AQUAPANEL® Cement Board Floor is suitable for:

- electric heating systems, such as heating wires in the adhesive bed of the ceramic covering
- heating systems using water pipes. These consist of mould plates made of PS or PUR to take heating pipes close to the surface and a heat-conducting layer for surface transmission of the heat. The mould plates make it possible to lay a complete dry floor.

## Clear separation of work

With dry floors, unlike wet floors, there is a clear division between the work of the floor layer and the heating system contractor. This avoids inconsistencies in design and issues with warranties.

## Fire protection

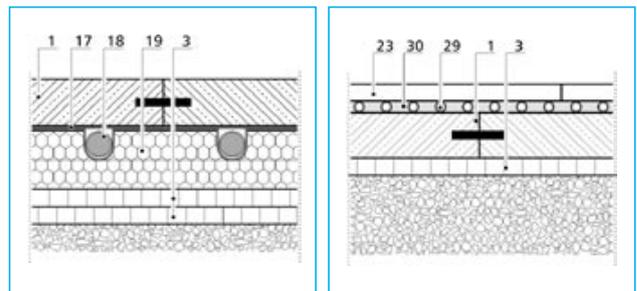
Floor heating systems of fire class E must be installed underneath AQUAPANEL® Cement Board Floor so as not to affect the fire resistance class.

## Thermal properties of AQUAPANEL® Cement Board Floor

Thermal conductivity 0.79W/(mK)  
All flow temperatures complying with the floor heating manufacturer's specifications are possible.

Reference heating is not required. However, to optimally acclimatise all building materials to the eventual usage temperature, the temperature of the floor heating should be gradually increased before applying the upper layer.

When using isolation systems and underlays beneath floor coverings, make sure you consider the effect on heat transfer through the floor structure.



## Key

- 1 AQUAPANEL® Cement Board Floor
- 3 Covering board
- 17 Heat-conducting layer or heat-conducting plate
- 18 Heating pipes
- 19 Mould plates made of PS or PUR

# Fire protection

By using AQUAPANEL® Cement Board Floor, floor structures can be manufactured that are proven to increase the fire resistance time of an existing bare floor. The precise classification is indicated for each floor construction.

For a fire load from above, constructions with AQUAPANEL® Cement Board Floor alone are sufficient for a fire resistance time of 30, 60 or 90 minutes, as proven by fire tests.

The following bare floors may be evaluated in fire protection technology together with AQUAPANEL® Cement Board Floor:

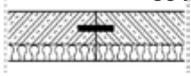
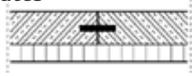
<p><b>Solid ceilings</b></p> 	<p><b>Wood joist ceilings</b></p> 	<p><b>Ceilings made of corrugated steel sheeting</b></p> 
<p><b>Upper covering from:</b>          16mm wood material boards  <math>\rho</math> 660kg/m<sup>3</sup> or          16mm plywood board,  <math>\rho</math> 520kg/m<sup>3</sup> or          21mm boards</p>		

## Fire protection with AQUAPANEL® Cement Board Floor

Each building material is given a building material class according to how it behaves during a fire. AQUAPANEL® Cement Board Floor is classified as "noncombustible", building material class A2 in accordance with DIN 4102. The fill is classified as "normally inflammable" building material class B2 in accordance with DIN 4102.

Produkt	Building material class in accordance with DIN 4102
AQUAPANEL®	
Cement Board Floor	A2
AQUAPANEL®	
Cement Board Floor MF	A2
AQUAPANEL®	
Levelling Fill	B2

## Fire protection classification of floor constructions alone, with fire loading from above

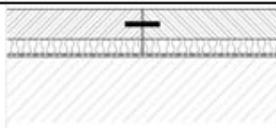
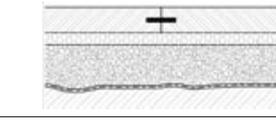
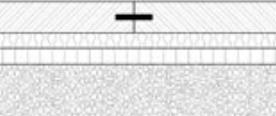
Fire resistance time	30 minutes		60 minutes		90 minutes	
						
<b>Structure</b>	AQUAPANEL® Cement Board Floor	AQUAPANEL® Cement Board Floor + impact sound insulation board*	AQUAPANEL® Cement Board Floor + Fibreboard	AQUAPANEL® Cement Board Floor + impact sound insulation board*	AQUAPANEL® Cement Board Floor + Fibreboard	AQUAPANEL® Cement Board Floor + Fibreboard
	–	or AQUAPANEL® Floor MF	–	or AQUAPANEL® Floor MF	–	–
<b>Fill</b>	–	–	–	AQUAPANEL® Levelling Fill	–	–
<b>Depth of Fill</b>	–	–	–	20 mm	–	–

\* Requirements in accordance with test certification P379/7978-MPA BS

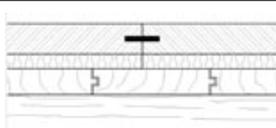
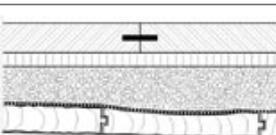
# Sound insulation

## Overview of structural acoustic tests (air and impact sound insulation) in accordance with EN ISO 140

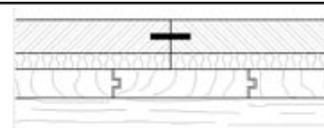
### AQUAPANEL® Cement Board Floor dry floor on solid ceiling

AQUAPANEL® Cement Board Floor MF	Evaluated sound insulation measurement $R_{w,R}$	58dB	
	Assessed standard impact noise level $L_{n,w,R}$	52dB	
	Impact sound improvement measurement $\Delta L_{w,R}$	21dB	
AQUAPANEL® Cement Board Floor Impact sound insulation board 30mm fill	Evaluated sound insulation measurement $R_{w,R}$	65dB	
	Assessed standard impact noise level $L_{n,w,R}$	44dB	
	Impact sound improvement measurement $\Delta L_{w,R}$	28dB	
AQUAPANEL® Cement Board Floor AQUAPANEL® Cement Board Indoor Fibreboard 30mm Fill	Evaluated sound insulation measurement $R_{w,R}$	61dB	
	Assessed standard impact noise level $L_{n,w,R}$	54dB	
	Impact sound improvement measurement $\Delta L_{w,R}$	17dB	

### AQUAPANEL® Cement Board Floor dry floor on wood Joist ceiling ①

AQUAPANEL® Cement Board Floor MF	Evaluated sound insulation measurement $R_{w,R}$	61dB	
	Assessed standard impact noise level $L_{n,w,R}$	51dB	
	Impact sound improvement measurement $\Delta L_{w,H}$	8dB	
AQUAPANEL® Cement Board Floor Fibreboard 30mm fill	Evaluated sound insulation measurement $R_{w,R}$	62dB	
	Assessed standard impact noise level $L_{n,w,R}$	45dB	
	Impact sound improvement measurement $\Delta L_{w,H}$	13dB	

### AQUAPANEL® Cement Board Floor dry floor on wood Joist ceiling ②



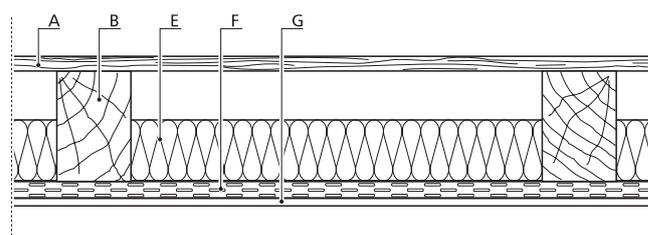
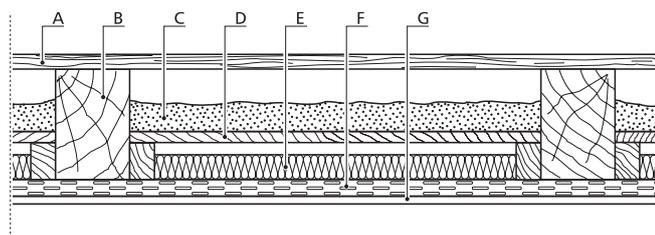
All tests were conducted on the test rig with suppressed flanking transmission at the engineering company for technical acoustics, ITA, in Wiesbaden, Germany.

The impact noise improvement measurement for wood joist ceilings has been determined in accordance with a calculation procedure introduced by Prof. Gösele relying on DIN 4109 Supplement 1. ("Procedure for Predetermining the Impact Sound Protection of Wood Joist Ceilings", Holz als Roh- und Werkstoff, Volume 37 (Germany, 1979, P. 213 to 220).

#### Key

- A Wood boards, d = 21mm
- B Wood joist 120/180mm, spacing 62.5cm
- C Sand filling, d = 50mm
- D Blind floor, chipboard, d = 19mm
- E Mineral fibre insulation boards, d = 40mm
- F Spring tracks, d = 27mm
- G Knauf gypsum plasterboards, d = 12.5mm

### Wood joist ceilings



①

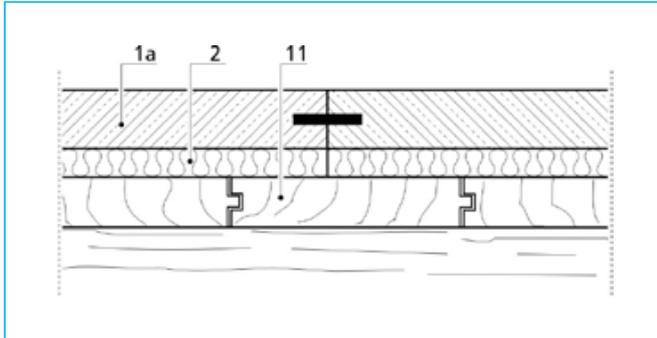
②

# Construction examples

## Ceiling constructions with AQUAPANEL® Cement Board Floor on wood

- Key**
- 1 a AQUAPANEL® Cement Board Floor
  - 1 b AQUAPANEL® Cement Board Floor MF
  - 2 Impact sound insulation board
  - 3 Fibreboard
  - 4 Fill
  - 6 Barrier
  - 11 Floors made of boards or chipboard

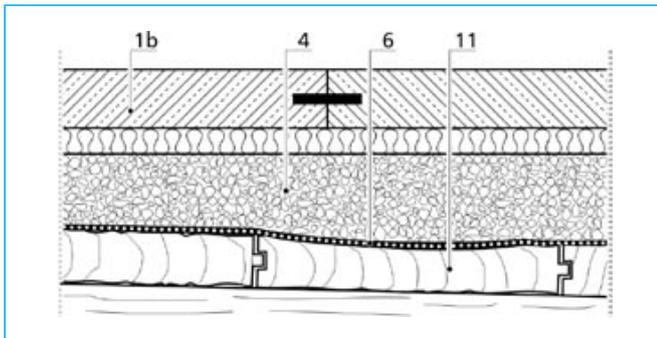
All the soundproofing values are comparative values determined with the floor constructions shown on page 18 and can be treated as an estimate of the values of comparable floors.



AQUAPANEL® Cement Board Floor MF

### AQUAPANEL® Cement Board Floor MF

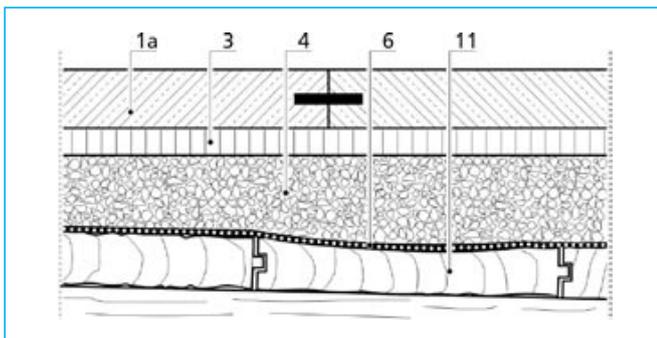
	$R_{w,R}$ dB	$L_{n,w,R}$ dB	$\Delta L_{w,H}$ dB	Fire resistance time
Typical "old" wood joist ceiling with load-bearing insert	61	51	8	60 min from above
"Exposed beam" ceiling	40	81	-	60 min from above



AQUAPANEL® Cement Board Floor with impact sound insulation board and fill

### AQUAPANEL® Cement Board Floor + impact sound insulation board + levelling fill

	$R_{w,R}$ dB	$L_{n,w,R}$ dB	$\Delta L_{w,H}$ dB	Fire resistance time	
Typical "old" wood joist ceiling with load-bearing insert	20-30mm fill	-	-	90 Min from above	
	30-60mm fill	62	45	13	90 Min from above
"Exposed beam" ceiling	20-60mm fill	-	-	90 Min from above	
	60mm fill	47	66	-	90 Min from above



AQUAPANEL® Cement Board Floor with fibreboard and fill

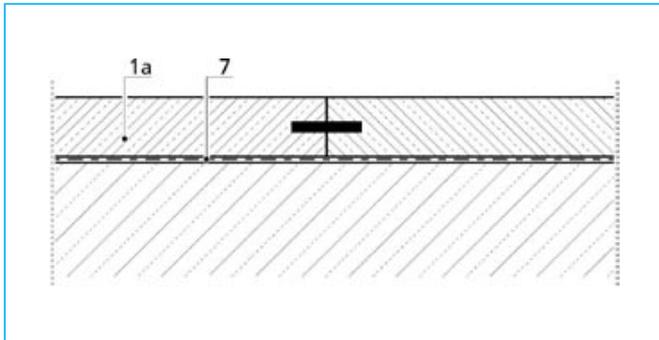
### AQUAPANEL® Cement Board Floor + fibre board + levelling fill

	$R_{w,R}$ dB	$L_{n,w,R}$ dB	$\Delta L_{w,H}$ dB	Fire resistance time
Typical "old" wood joist ceiling with load-bearing insert	20	-	-	90 min from above
	fill	-	-	-

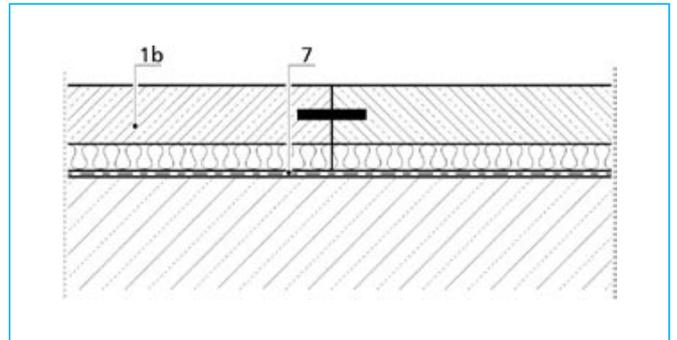
# Ceiling constructions with AQUAPANEL® Cement Board Floor/ Floor MF on solid ceilings

- Key**
- 1 a AQUAPANEL® Cement Board Floor
  - 1 b AQUAPANEL® Cement Board Floor MF
  - 2 Impact sound insulation board
  - 3 Fibreboard
  - 4 Fill
  - 7 Moisture barrier, if required

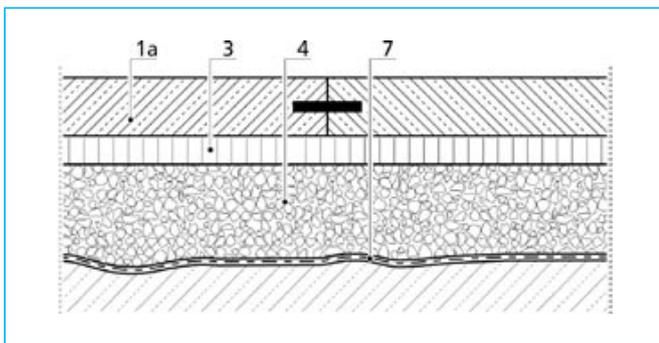
AQUAPANEL® Cement Board Floor / Floor MF				
	$R_{w,R}$	$L_{n,w,R}$	$\Delta L_{w,R}$	Fire resistance
	dB	dB	dB	time
AQUAPANEL® Cement Board Floor	-	-	-	30 Min from above
AQUAPANEL® Cement Board Floor MF	58	52	21	60 Min from above



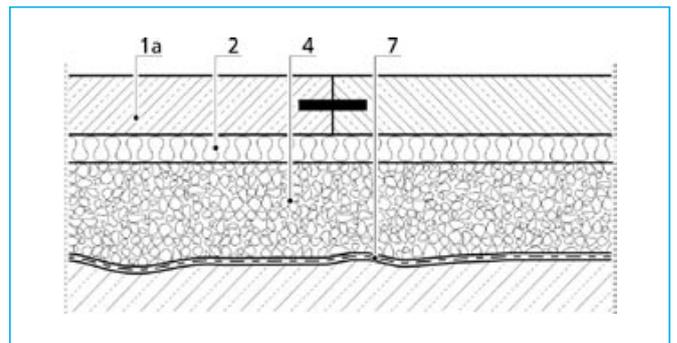
AQUAPANEL® Cement Board Floor on even solid floors with levelling fleece



AQUAPANEL® Cement Board Floor MF on even solid ceilings



AQUAPANEL® Cement Board Floor with cover boards and fill on even or uneven solid floors



AQUAPANEL® Cement Board Floor with cover boards and fill on even or uneven solid floors

AQUAPANEL® Cement Board + fibreboard + fill				
	$R_{w,R}$	$L_{n,w,R}$	$\Delta L_{w,R}$	Fire resistance
	dB	dB	dB	time
20 mm Fill	-	-	-	90 Min from above

AQUAPANEL® Cement Board + impact sound resistance board + fill				
	$R_{w,R}$	$L_{n,w,R}$	$\Delta L_{w,R}$	Fire resistance
	dB	dB	dB	time
20-30 mm Fill	-	-	-	90 Min from above
30-60 mm Fill	63	44	29	90 Min from above

## Special Instructions

### Instructions on Soundproofing:

- The impact sound reduction measure has been determined on the ceiling test rig with suppressed flanking transmission.

### Notes on Fire Protection:

- The fire resistance time is not changed by the installation of further layers of AQUAPANEL® Cement Board Floor, cover boards, fills or AQUAPANEL® Cement Board Indoor.
- Vapour control layers, sealing tracks or a seepage barrier layer between the bare ceiling and the rest of the floor structure do not affect the fire resistance time.

- Floor heating systems may be installed below the AQUAPANEL® Cement Board Floor.
- Installations can be laid immediately on top of the bare floor, so long as the minimum depth of fill over the installations does not fall below 10mm.
- The arrangement of floor coverings on the completed dry floor is permitted without any further considerations.

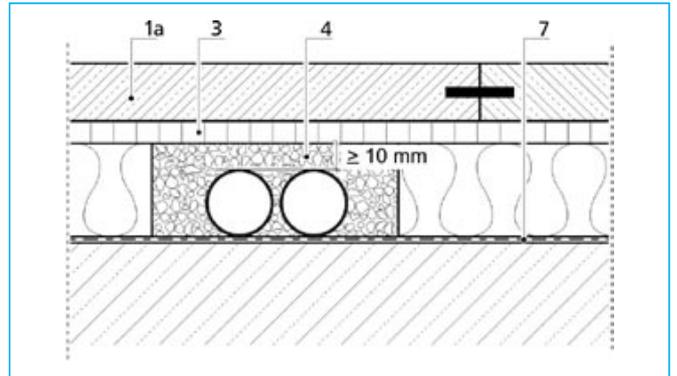
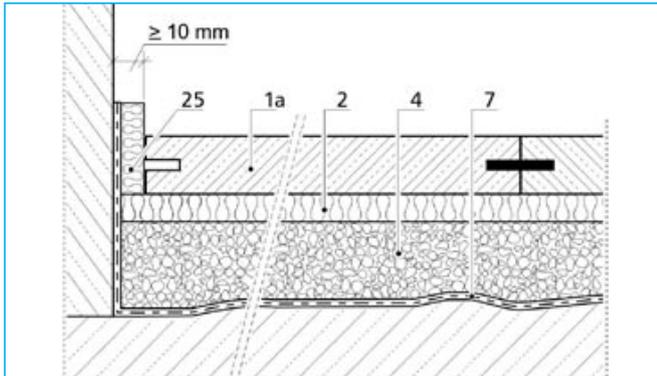
*Design details*

# General details

## The ideal construction for wood frame builds and prefabricated construction

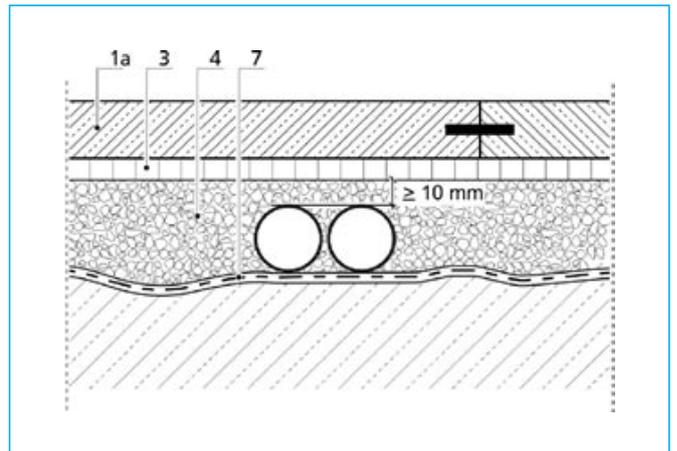
### Key

- 1 a AQUAPANEL® Cement Board Floor
- 1 b AQUAPANEL® Cement Board Floor MF
- 2 Impact sound insulation board
- 3 Fibreboard
- 4 Fill
- 7 Moisture barrier, if required
- 12 Nogging / wooden lath / underlay board > 19 mm
- 24 Special section
- 25 Edge insulation strips



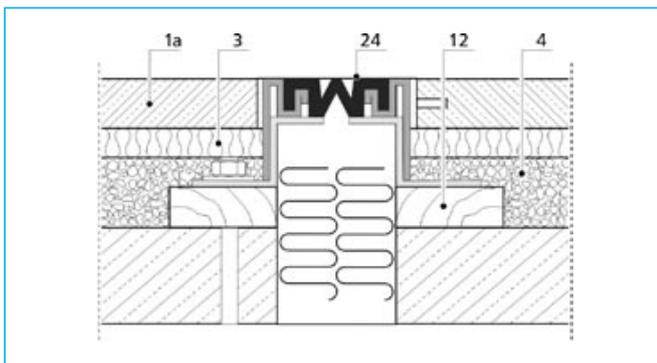
### Edge joints

Filler and cover boards can be taken up to the edge. An edge joint of at least 10mm must be maintained between the AQUAPANEL® Cement Board Floor and the adjoining wall. This avoids sound bridges and tensions if the material works due to temperature or moisture fluctuations. An edge insulation strip prevents the joint from filling with adhesive or filler compound from subsequent work. The edge insulation strip must be cut off flush with the upper edge only after laying the final floor covering which is to be walked on. The edge joint is later covered by the skirting board affixed to the wall.



### Pipes

Pipes and cables may be laid in dry fill. Additionally, they are fastened to the bare floor. Then the fill is made without any voids. The pipes and cables must be covered over by at least 10mm. Only pipe enclosures made from noncompressible material may be used.



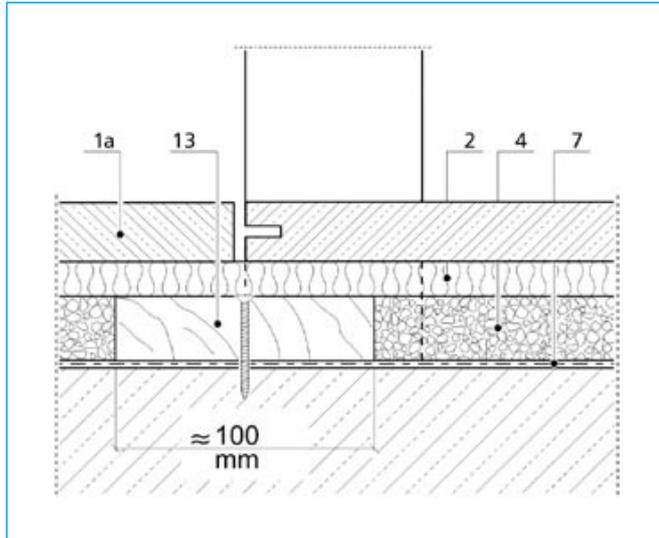
### Expansion joint

Construction joints are also self-evidently incorporated into the dry floor. As AQUAPANEL® Cement Board Floor only has low thermal and hygric extension coefficients, further joints are required only if the length of the side of the room exceeds 10m. The construction design of the joints should follow a suitable movement profile.

# Door sill area

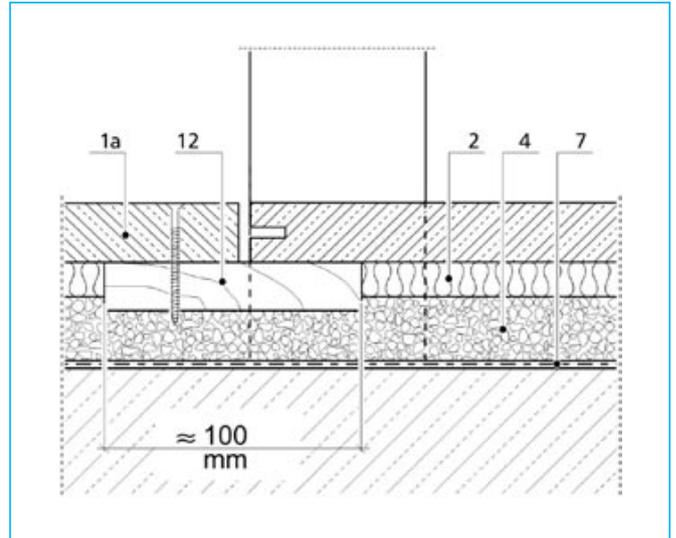
- Key**
- 1a AQUAPANEL® Cement Board Floor
  - 1b AQUAPANEL® Cement Board Floor MF
  - 2 Impact sound insulation board
  - 3 Fibreboard
  - 4 Fill
  - 7 Moisture barrier, if required
  - 12 Nogging / wooden lath / underlay board > 19 mm
  - 13 Stop board
  - 25 Edge insulation strips

The door sill area can be done in two ways:



### Door sill with stop board

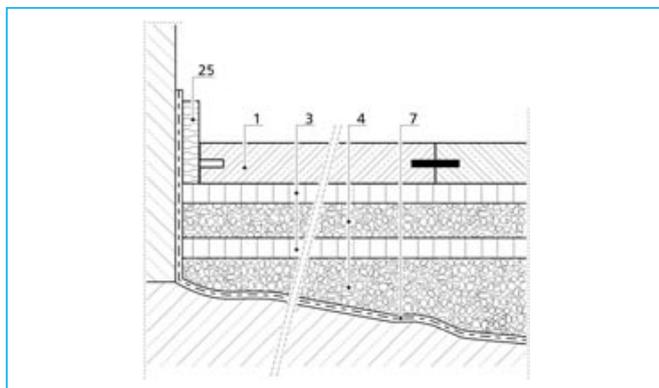
In the door sill area, you can work with a stop board that separates the various sections of work from each other and prevents the fill from flowing out. The wood must have a width of 80 to 100mm and be the same height as the finished compacted filling. The cover or impact sound insulation boards run over the wood. To prevent sound being transmitted through the AQUAPANEL® Cement Board Floor, this is butt jointed under the door leaf.



### Door sill with stop board

Alternatively, the fill in the door area can be done if the board butt end of the AQUAPANEL® Cement Board Floor is supported in the door area with a piece of wood at least 100mm wide.

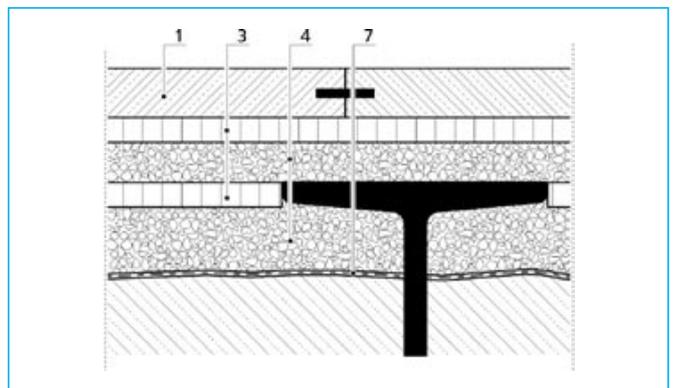
# Extreme gradient



### Extreme gradient

If the bare floor has a severe gradient, leave the compaction on the opposite side of the room a bit higher. The reason for this is the percentage compaction of the material in relation to the installed depth. We recommend the following procedure: make a rough equalisation only up to the upper edge of the steel girder underneath the planned installation depth. Level the remaining unevenness after compaction.

# Beamed ceiling



### AQUAPANEL® Cement Board Floor with cover boards and fill for refurbishing steel girder ceilings.

AQUAPANEL® Cement Board Floor can be used in the refurbishment of steel girder ceilings. In so doing, the minimum depth fill  $h = 10\text{mm}$  over the upper edge of the steel girder applies.

# Ideal for wood frame builds, prefabricated buildings and refurbishment

## Key

- 1 a AQUAPANEL® Cement Board Floor
- 1 b AQUAPANEL® Cement Board Floor MF
- 3 Fibreboard
- 4 Fill
- 6 Barrier
- 10 Load-bearing insert

## Module - Timber beam ceiling with AQUAPANEL® Cement Board Floor

Old timber beam ceilings can be refurbished with AQUAPANEL® Cement Board Floor as follows. Remove any floorboards, backing and false ceilings. Screw load-bearing battens onto the side of the present joists, fit in new false ceiling and provide with barrier as needed. Put fill between the joist and draw off. Lay fibreboard over this. Compact fill with the hand rammer over shuttering panels or chipboard panels laid on top. Apply a second layer of fill and lay a second layer of fibreboard on top. Compact fill over 60mm above the laid shuttering panels or chipboard panels. Lay AQUAPANEL® Cement Board Floor.

### Ceilings are loaded by dry floor as follows:

AQUAPANEL® Cement Board Floor	0.39 kN/m <sup>2</sup>
AQUAPANEL® Cement Board Floor MF	0.39 kN/m <sup>2</sup>
Fill (10cm compacted height)	
AQUAPANEL® Levelling Fill	0.015 kN/m <sup>2</sup>

### When determining the depth of fill, consider the compaction of the individual fill:

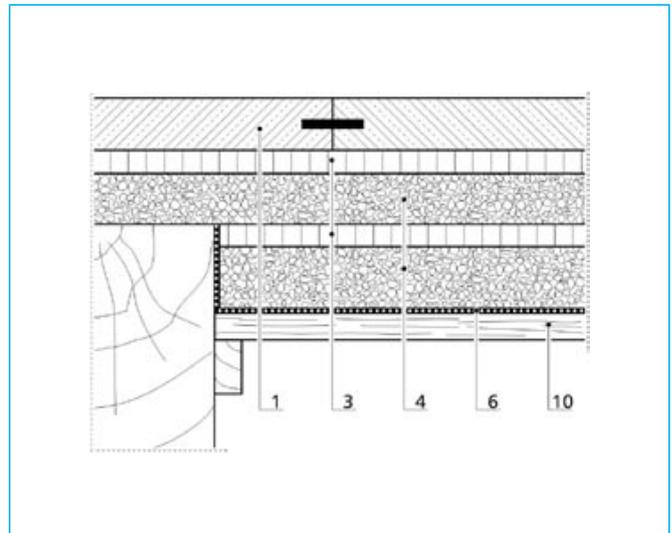
AQUAPANEL® Levelling Fill	10%
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## Special notes

- The impact sound reduction measure has been determined on the ceiling test rig with suppressed flanking transmission.

## Notes on fire protection:

- The fire resistance time is not changed by the installation of further layers made of AQUAPANEL® Cement Board Floor, cover board, fill or AQUAPANEL® Cement Board Indoor.
- The fitting of further layers must only be done after due consideration of the load-bearing capacity of the bare ceiling.
- Vapour control layers, sealing tracks or seepage barrier layers between the bare ceiling and the rest of the floor structure do not affect the fire resistance time.
- Floor heating systems may be installed underneath the AQUAPANEL® Cement Board Floor.
- Installations must be laid directly onto the bare floor, so long as the 10mm minimum depth of fill is maintained on this.
- Fitting floor coverings on the completed dry floor is permitted without any further considerations.
- An additional load distribution layer can be laid in accordance with the information on page 15.



# Details in wet rooms

## Key

- 22 Surface sealing
- 23 Ceramic covering
- 24 Special section
- 25 Edge insulation strips

### Details in damp rooms

Structural works subject to moisture, such as baths, showers and terraces, for example, must be protected against penetration of moisture. National standards must be observed accordingly.

### Moisture loading

For floor areas in domestic bathrooms which receive light water spray only briefly and occasionally, only an edge joint needs to be sealed with sealing tape. Depending on the moisture loading, suitable measures must be taken following national standards, codes of practice and recommendations.

### Area sealing

Floor areas in bathrooms that receive normal domestic usage with the planned or unplanned use of floor drains, and which receive moderate water spray briefly and occasionally, need to be sealed in accordance with the ZDB Code of Practice. Sealants made of the following materials are suitable for this purpose:

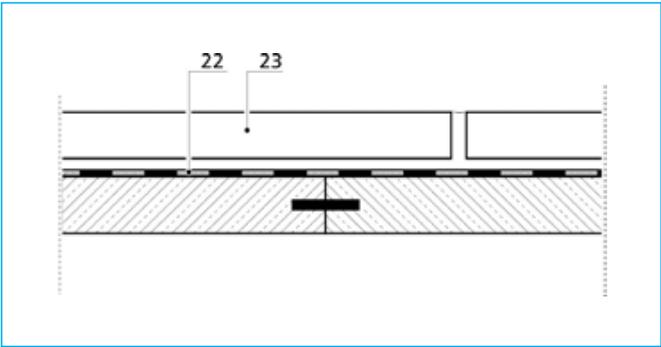
- Polymer dispersions
- Plastic-mortar combinations
- Reaction resins

The quantity of sealant to be applied and the number of layers is determined by the data provided by the manufacturer.

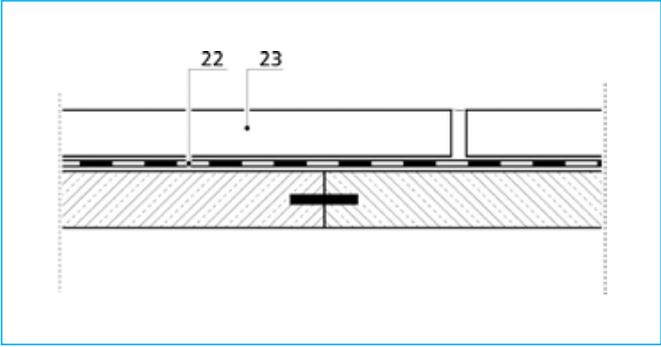
### Transition between floor coverings

The transition between tiles and other floor coverings must be flexible and must be secured against any entry of moisture. To do this, the dry screed is intersected down as far as the bare floor by a partition line with inlaid insulation strips. The transition between the floor coverings is done with a suitable profile.

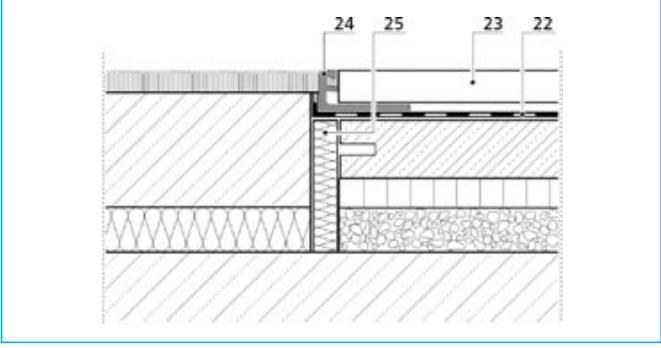
Sealing of the entire surface is not required in domestic bathrooms.



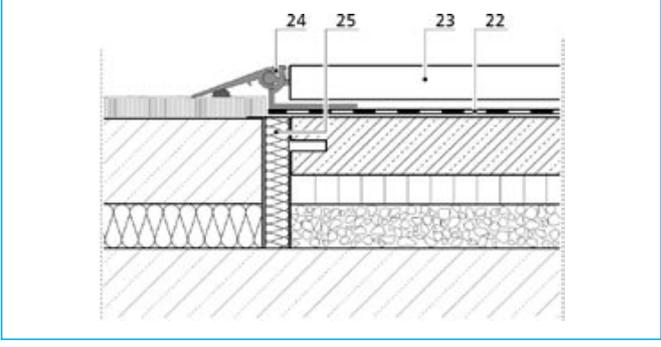
Area sealing



Sealing by sealing strips



Transition at the same height



Transition at a different height

**Key**

- 20 Elastic, fungicidal joint filler
- 22 Surface sealing
- 23 Ceramic covering
- 24 Special section
- 25 Edge insulation strips
- 26 Pipe enclosure
- 27 Pipe collar

**Edge joints**

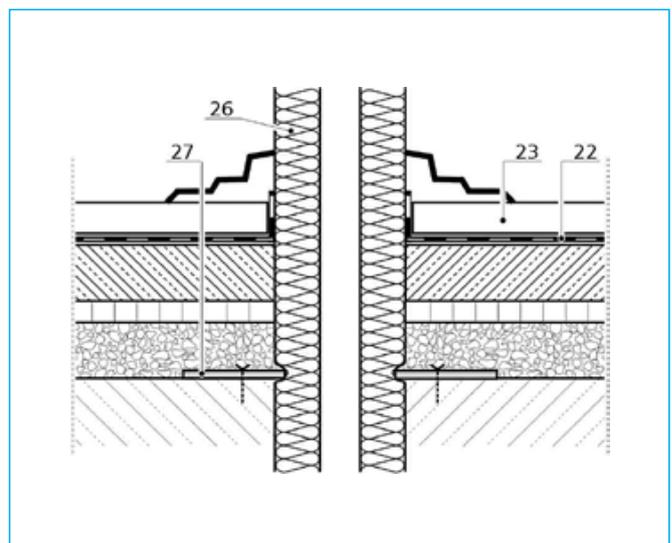
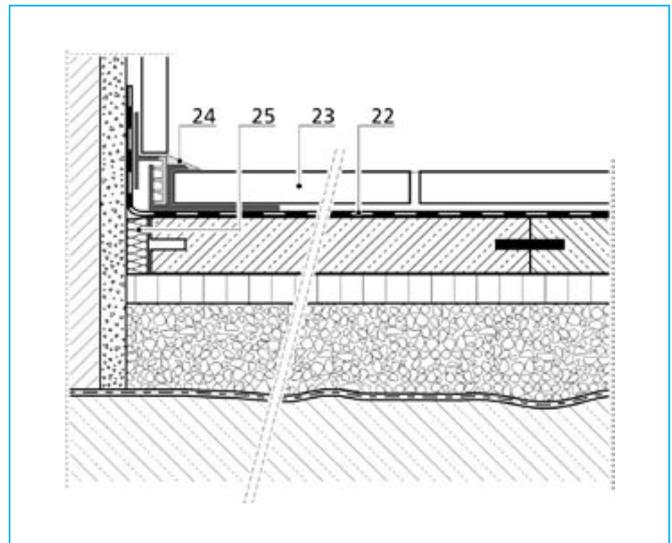
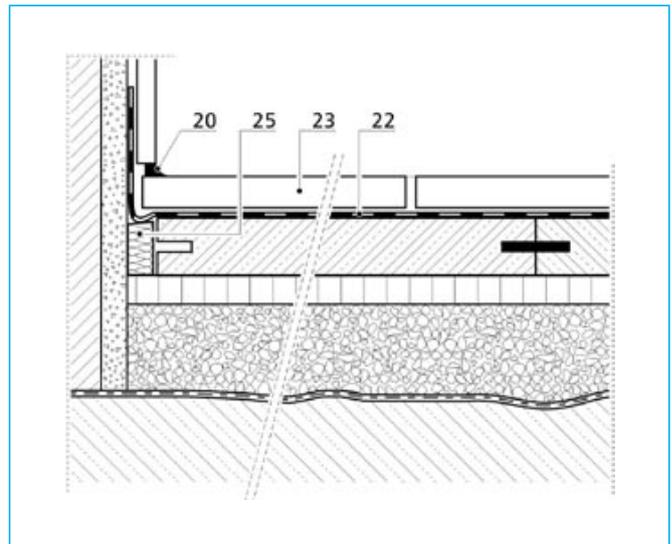
Filler and cover boards can be taken up to the edge. An edge joint of at least 10mm with inlaid edge insulation strips is required between AQUAPANEL® Cement Board Floor and the neighbouring wall. An additional sealing band inlay must be arranged in the corner area. It is laid in a loop to be able to accommodate any movement of the components.

For surface sealings with inlay, there is no need for the sealing strip inlay. In this case the fabric or film is carried in the form of a loop in the corner. The joint between wall and floor covering is closed with a permanently elastic, fungicidal joint filler or a suitable section.

**Pipe access**

Pipes are provided with a suitable, deformable enclosure.

For construction reasons, a pipe collar is fixed above the break-through into the bare ceiling. This pipe collar must be narrow enough to prevent fill material penetrating the opening.



# Technical data

## Physical properties

Product	AQUAPANEL® Cement Board Floor	AQUAPANEL® Cement Board Floor MF
Length (mm)	900	900
Width (mm)	600	600
Thickness (mm)	22	33
Weight per unit area (kg/m <sup>2</sup> )	approx. 37	approx. 39
Dry density (kg/m <sup>3</sup> )	approx. 1600	approx. 1600
Flexural strength (N/mm <sup>2</sup> )	3.0	3.0
Modulus of elasticity (N/mm <sup>2</sup> )	4000 - 7000	4000 - 7000
Water vapour permeability (DIN 4108)	70 / 150	70 / 150
Thermal conductivity $\lambda$ (W/mK)	0.79	0.79 (0.04)
Alkalinity (pH)	12	12
Building Material Class	A2	A2

## Material coverage

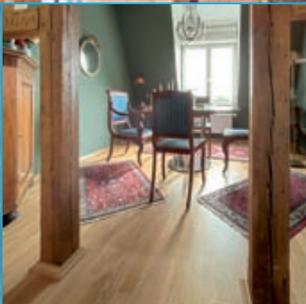
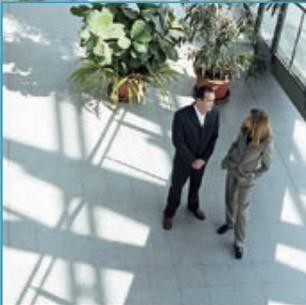
Material	Coverage/m <sup>2</sup>
AQUAPANEL® Slot Adhesive (PU)	60ml
AQUAPANEL® Biscuit	7 pieces
AQUAPANEL® Interior Primer	50g (concentrate); dilution 1:1 with water
AQUAPANEL® Levelling Compound	1.5kg/m <sup>2</sup> per layer at thickness of 1mm

### Fitting guideline values

Depth of fill	$\leq 60\text{mm}$		$> 60\text{mm}$	
	Floor plan and boundary conditions			
	simple	difficult	simple	difficult
• Fill plus cover board	3.5 –	7.0 min/m <sup>2</sup>	5.8 –	10.5 min/m <sup>2</sup>
• Fill, cover board plus AQUAPANEL® Cement Board Floor	11 –	18 min/m <sup>2</sup>	13 –	23 min/m <sup>2</sup>

Technical data

*Ideal for all kinds of*  
**FLOOR** *constructions*





IDEA | DESIGN | PLAN | REALISATION | COMPLETION

*AQUAPANEL® Cement Board  
is a technologically advanced  
building system. Because it's  
a system, it involves a clear  
step-by-step process from design  
idea to project completion.*

*AQUAPANEL® Cement Board  
Floor parts, accessories and  
services work in unison – you can  
be certain that your project will  
all come together as planned.*

**Knauf USG Systems GmbH & Co. KG**

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[www.aquapanel.com](http://www.aquapanel.com)

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