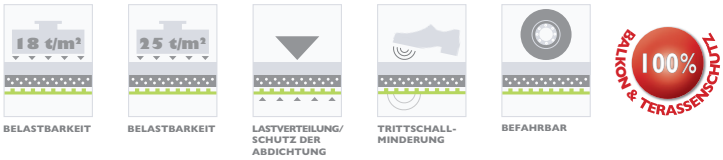
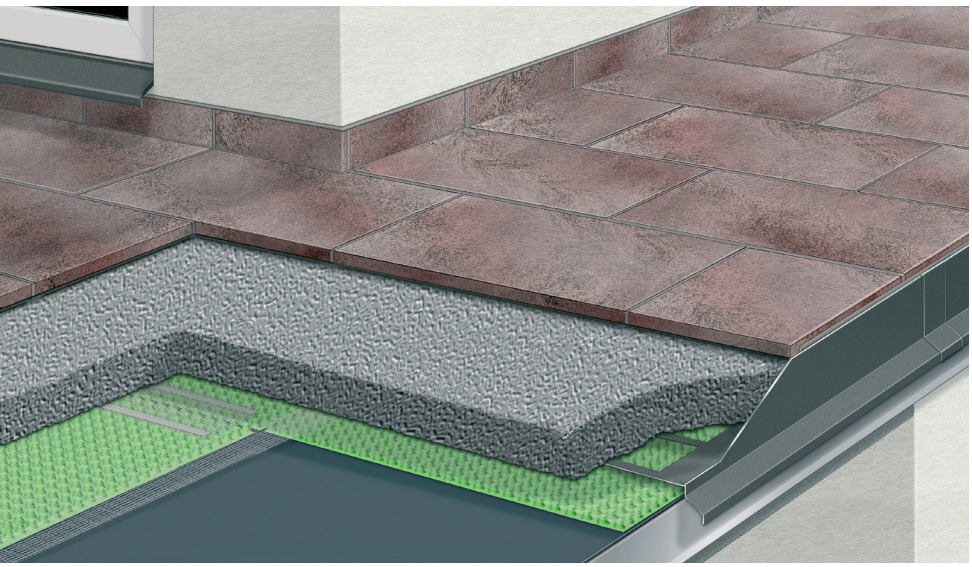
PROLINE

# PROCODRAIN GK

**Drainage mat for tile and paving slab surfaces on coarse grain mortar and coarse grain screed suitable for drainage.**



## Fields of application:

PROCODRAIN E is a stilted drainage mat for effective drainage from ceramic tiles and slabs made from natural or artificial stone as well as ceramic tiles and paving on mortar suitable for drainage in outside areas.
Areas of application are balconies, patios, flat roofs, pathways, garage driveways, courtyards or viewing terraces.

Through the use of PROCODRAIN GK, the structure of the covering is stilted to work against the capillary effect and a second drainage level is formed beneath the covering. The requisite fast, horizontal deflection of vertically ingressed water or water that has made its way to the sealed level through grids takes place here.

Slabs made from natural and artificial stone as well as ceramic tiles and paving can also have a larger format. They are bonded using the buttering method to hardened load distribution plates made from coarse grain mortar or tapped directly into the fresh coarse grain mortar with a suitable bonding course.
Two stud heights are available depending on the evenness of the surface and the expected water quantity.

- For secure drainage from balcony and patio surfaces made from natural or artificial stone or ceramic tiles via mortar layers suitable for drainage.
- To create a second drainage level under the floor covering that can be walked on.
- Also suitable for garage driveways and courtyards that are driven on by passenger vehicles.
- As requisite drainage on ungrouted surfaces.
- For necessary drainage on floor surfaces with additional façade grids or line drainage.
- For easy and secure application on surfaces exposed to the weather.

## Product advantages:

PROCODRAIN GK ensures fast drainage of rain water and melted ice/snow on floor structures laid on coarse grain mortar/screed on a second drainage level. Within this level, the water is channelled down the slope to the floor structure without contact. The floor structure is stilted upwards above the collected water. In this way, the capillary effect of the coarse grain mortar is also suppressed at the same time.
Thanks to the rapid deflection of water, the floor material also dries faster. The service life and appearance of the material benefits from this.

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Coarse grain mortar – advantages and disadvantages:
Coarse grain mortar/coarse grain screed is generally well suited as a load distribution plate for outdoor flooring with low build-up of tension and shrinkage through hydration. Even larger slab formats can be laid on top.

Ingressed water is deflected downwards in a vertical direction exceptionally well. Horizontally at the sealing level, however, it is slow and arduous.
Water that is left to stand for a long period leads to severe damage to the coarse grain mortar or screed over time as a result of chemical degradation (build up of calcium hydroxide and $CO_2$ layers that block water).
Despite being very porous, coarse grain mortar still has a capillary effect and transports standing moisture to the back of the covering material, which can lead to stains and changes in the finish.

The solution:
Targeted channelling of water through PROCODRAIN GK drainage mat. The layout of the studs on PROCODRAIN GK enables unhindered longitudinal and lateral drainage. It is not necessary to adhere to a laying direction or pattern.
The sturdy textile lattice deflects water exceptionally well and quickly, prevents the build-up of water-blocking layers and supports the floor structure above.
The sturdy stud membrane lies over the whole surface and protects the seals beneath and their separating layers from the strain of static and moving loads. At the same time, the drainage level and the layers built up above have a decoupling effect and thereby absorb the noise from footsteps.

With sufficiently bend-resistant and pressure-resistant load distribution plates, PROCODRAIN GK is also capable of taking the load of slow (walking pace) passenger vehicles up to 3.50 t total weight.

- Stilting, capillary inhibiting, very high drainage performance
- Fast deflection of water through unhindered longitudinal and lateral drainage
- Better drying of floor surfaces, high resistance to pressure and takes driving loads
- Improved aesthetics, function and service life of coverings
- Protects floor structures with coarse grain mortar effectively against damaging seepage and collected water
- Protective effect on seals – equates to DIN 18195

## Delivery form:

Strips rolled up and packed in a box, approx. 110 x 40 x 40 cm

| | | | |
|---|---|---|---|
| PROCODRAIN GK 8 mm | | | Art.no.: 93320 |
| 12.50 m/box | 12 boxes/pallet | 150.00 m²/pallet | |
| PROCODRAIN GK 20 mm | | | Art.no.: 93321 |
| 6.15 m/box | 12 boxes/pallet | 72.00 m²/pallet | |
| PROBAND L – butt-joining tape | | | Art. no.: 93723 |
| 25.00 m/box | | | |

## Storage and transportation:

The rolls should be stored and transported in a closed box, in a cool and dry place with protection against sunlight and contamination. Storage and transportation over longer distances should be in an upright position. The storage period under these conditions is two years.

## Disposal:

Offcuts and leftovers can be disposed of through the normal waste system or recycled as plastic at recycling centres.

Proline supports the German Grüner Punkt (green dot) recycling system.
Product packaging can be disposed of in the appropriate manner.

## Instructions on hazardous goods and substances:

No special measures required.

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# PROCODRAIN GK

## Specifications:

| PROCODRAIN GK | | |
|---|---|---|
| | 8 mm high<br>Art.no.: 93320 | 20 mm high<br>Art.no.: 93321 |
| Material | HDPE stud membrane with textile lattice laminated | |
| Colour - Membrane | green | |
| Textile lattice | Glass lattice MW 1.5x1.5 mm with alkaliresistant finish | |
| Width - Membrane | approx. 100 cm | approx. 97.5 cm |
| Width - Textile lattice | approx. 110 cm | approx. 110 cm |
| Textile lattice protrusion one-side lengthways | approx. 10 cm | approx. 12.5 cm |
| Weight: | approx. 0.6 kg/m$^2$ | approx. 1.1 kg/m$^2$ |
| Water deflecting capacity (as per DIN EN ISO 12958:1999) | approx. 4.6 ltr/m x s | approx. 12 ltr/m x s |
| Free drainage space | approx. 5.5 ltr/m$^2$ | approx. 12 ltr/m$^2$ |
| Rigidity at 10% compression up to | 250 KPa | 180 KPa |
| Temperature resistance | 30°C to +80°C | |
| Chemical resistance | Resistant to acids usually found in the earth and inorganic acids. | |
| Biological properties | Resistant to bacteria and fungus, does not decompose and unaffected by root growth. | |
| Physiological properties | Does not pose a risk to drinking water | |

| PROBAND L | |
|---|---|
| | Art.no.: 93723<br>Self-adhesive butt-joining tape for PROCODRAIN GK |
| Material | Glass mesh fabric |
| Type | Glass lattice MW 1.5x1.5 mm with alkaliresistant finish |
| Bonding | Self-adhesive strip in centre |
| | Width approx. 30 mm |
| Tape width | approx. 15 cm |

| PROCODRAIN E SV | |
|---|---|
| | Art.no.: 93328<br>Self-adhesive butt-joining tape for PROCODRAIN E |
| Material | Polyester material |
| Type | Grammage approx. 80-110 gr/m2 |
| Bonding | To double adhesive strips attached on both longitudinal sides |
| Fleece protrusion | approx. 10 mm on longitudinal sides |
| Tape width: | approx. 15 cm |
| Weight: | approx. 27 gr/m |

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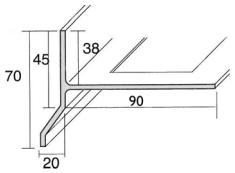
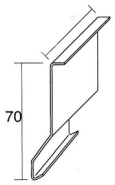
## Supplementary products:

### PROCOFORM balcony edge profile WSE

Edge finish profile at open end of balconies and terraces with lower attachments. The profile is installed above the drainage strips.
OK covering must always lie higher than OK profile.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Material | Aluminium, powder coated/untreated | | | | | | |
| Types | | Profile | | External corner | | Connector | |
| Colours | | Art.no. |  | Art.no. |  | Art.no. |  |
| | Light beige (RAL 1019) | 70417 | | 73517 | | 79417 | |
| | Light grey (RAL 7035) | 70440 | | 73540 | | 79440 | |
| | Autumn (RAL 8003) | 70427 | | 73527 | | 79427 | |
| | White aluminium (RAL 9006) | 70418 | | 73518 | | 79418 | |
| | Plain aluminium | 70400 | | 73500 | | 79400 | |
| Height | 70 mm | | | | | | |
| Length of profile | 3.00 m | | | | | | |

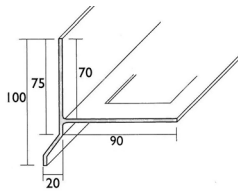
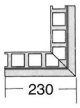
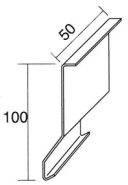






### PROCOFORM balcony edge profile K

Edge finish profile at open end of balconies and terraces with higher attachments. The profile is installed above the drainage strips.
OK covering must always lie higher than OK profile.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Material | Aluminium, powder coated/untreated | | | | | | |
| Types | | Profile | | External corner | | Connector | |
| Colours | | Art.no. |  | Art.no. |  | Art.no. |  |
| | Light grey (RAL 7035) | 72403 | | 73403 | | 79640 | |
| | Autumn (RAL 8003) | 72405 | | 73405 | | 79627 | |
| | White aluminium (RAL 9006) | 72406 | | 73406 | | 79618 | |
| | Plain aluminium | 72401 | | 73401 | | 79600 | |
| Height | 100 mm | | | | | | |
| Length of profile | 3.00 m | | | | | | |







### PROSTRIP S edge insulating strip

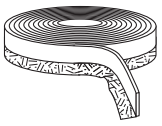
Fleece backed, fall-through safe PE edge insulating strip for lower installation heights with self-adhesive foot and clinging technique.
Can be affixed securely to the drainage mat along rising installations, such as walls, doors, railing posts, etc.

| Height | Thickness | Length | Art.no. |
|---|---|---|---|
| 50 mm | 8 mm | 25 m | 93520 |

### PROSTRIP L edge insulating strip

Fleece backed, fall-through safe PE edge insulating strip for higher installation heights with self-adhesive foot and clinging technique.
Can be affixed securely to the drainage mat along rising installations, such as walls, doors, railing posts, etc.

| Height | Thickness | Length | Art.no. |
|---|---|---|---|
| 100 mm | 8 mm | 25 m | 93521 |



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## Preparing the substrate:

The substrates for the drainage strips generally consist of:
- Sealing strips and their recommended separating layers in accordance with DIN 18195 T5
- Fluid, strip or slab shaped joint seals
- Reaction resin seals or coatings
- Concrete surfaces, also without seals if necessary

The substances that come into direct contact with the drainage must not have any solvents or other substances that could damage the HDPE stud membrane.

Height differences in the substrate or seal (e.g. caused by overlaps) must not exceed 4 mm in the case of 8 mm drainage mats and 14 mm in the case of 20 mm high mats. Greater height differences should always be levelled out by suitable means to
- avoid puddles in the substrate.
  Puddles impair the drainage performance and, in the event of frost, can cause barrages.
- enable laying of the drainage mat evenly and over the entire surface. Uneven substrates impair the durability of the structure.

The surfaces to be laid must have a slope of between 1% and 3%. Larger slopes should be avoided.

The structures beneath the drainage mats must be suitably secure to take the intended loads and must not give under pressure or resonate.
This applies to insulating materials under the seal in particular. Ideally, XPS insulating material, PU insulating material or foam glass insulating material should be used that can withstand compressive stress in excess of 300 KPa at 10% compression. If point loads are expected, suitable insulating materials and sealing strips should be used for this purpose.

## Preparatory measures:

Simply unroll PROCODRAIN GK and lay over the surface. Use a sturdy craft knife or carpet scissors to cut to size. The strips must be adapted free of constraint forces to adjacent components with connection joints of at least 10 mm. The studs and textile lattice must always face upwards. The membrane strips are butted up tightly against each other and held down until laying with stones or sand bags.

The lateral overlaps of the textile lattice always lie completely on the laminate of the neighbouring strip. The overlaps up to the upper edge of the surface run next to rising components and along the edge strip or are cut off at this height at a later stage.

At joints, connections and along rising components at which no overlapping zones are present, the PROBAND L butt-joining tape is bonded down in such a way that gaps or clefts in the strips, or at the end of rising components, are completely covered with lasting effect.

> *At regular intervals, ensure that the supporting textile lattice is not perforated on the surface and that all connections and butted joints with overlaps and butt-joining tape are sealed so that no coarse grain mortar or particles of dirt can make their way into the drainage space under the textile lattice.*

On the laid surface, boards or formwork boards should be secured for work access or transport paths.
The laid strips that have been secured with butt-joining tape should then be covered at once with the floor covering. At low outside temperatures, the unrolled and weighed down strips can remain in position uncovered (even over a few days) so that they can acclimatise.

At the end of rising components, PROSTRIP S (50 mm) or PROSTRIP L (100 mm) is bonded with the self-adhesive bottom part to the textile lattice of the drainage mat.
If edge strips are bonded to the seal or separating layer before the drainage mat is laid, the gap between the drainage mat and edge strip is covered using PROBAND L butt-joining tape.

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## Laying coverings:

Coarse grain mortar or screed
is made with stone whose grading fraction does not include stones under 2 mm. It could comprise a mixture of stone from moraine gravel or river sand and also fragmented material. The grading fraction could be 2-5 to 2-8 mm.

The mortar may be of the type that is mixed on site, factory-dried mortar or delivered in a cement mixer from a concrete factory. The aggregate should not contain any elements that could lead to corrosion and staining (e.g. pyrite, biotite glimmer).

The binding agents used may consist of different types of cement or reaction resin.
The cement-based binding agents should form as little calcium hydroxide as possible during hydration (e.g. Portland puzzolan cement, 2 or 3 substance systems). The water-cement factor should generally be lower (compared with normal screed mortar).

> *Ensure at regular intervals that the binding agent is mixed in such a way and used in a sufficient quantity that it sticks to the aggregate and does not flow through the textile lattice into the drainage space.*

The minimum thickness of screed or mortar layers is determined according to the mechanical load that the covering is expected to be exposed to and the resistance to bending and compression achieved with the mortar mixtures. Specifications (BIN 1.4 DNV) dictate a minimum thickness of 60 mm.
If loads are higher, the layer thicknesses must be higher. The type of aggregate, the type and quantity of binding agent, the W/Z factor and density of the mortar determine the technical properties of the coarse grain screed.

The coarse grain screed must be sufficiently resistant to bending and compression, particularly with surfaces that are driven on. The floor structure must not sag or give under pressure when loads are moved over it.
A static calculation (assumption of swimming screed floor without ballast index) of the necessary thickness layer is recommended.
If provision is made for core rods, they must be resistant to corrosion (e.g. made from stainless steel).

Coarse grain mortar can be laid as a screed slab that is covered with tiles or paving only after it has hardened. It is likewise possible to tap in tiles or paving slabs 'fresh in fresh' via load distributing formwork boards. Boards with different thicknesses can also be tapped in 'fresh in fresh' in prelaid coarse grain mortar layers.

The tiles or paving slabs to be laid
are placed on suitable thin-bed or medium-bed mortar (in accordance with DIN EN 12004, at least C2) or suitable contact layers (combed or spread). The quality of the mortar or contact layers in question must be adapted to the top layer.
The joint space is to be kept free of mortar as it would have a negative effect on the drainage capability of the structure. The mortar or contact layers must have a suitable thickness when applied so that the upper coarse grain mortar zone is well coated. To do this, 10 mm square teeth or medium-bed teeth are suitable.

The tiles or slabs used must be suitable for outside areas and have a good track record with regard to this. Natural stone should not have a tendency to sag as a result of one-sided water absorption and must be sufficiently thick. Ceramic tiles should have a thickness of at least 8 mm. Natural stone should have a thickness of at least 20 mm.

Due to the lower stress experienced with coarse grain screed, tiles and slabs in large format can also be laid. The larger the format, the thicker it should be – depending on the type of material. The suitable size for the covering areas can be calculated using the table in the appendix.

Coverings that are grouted using rigid or solid joint filling compound should not exceed the 60 x 40 cm format. With large formats, the joints can be left open or sealed with elastic and smoothed filling compounds (e.g. silicone). If joints are left open there is a risk of them gradually filling tightly from airborne seeds, dust, dirt, grass, leaves and other deposits.

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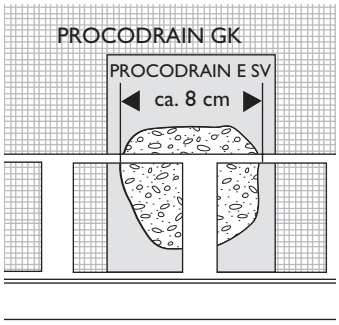
Expansion joints

of a sufficient size and quantity should be formed along rising components and also as boundary joints above the drainage mat up to the upper edge of the covering. The individual areas should exhibit a tendency towards square surfaces. The length of the area should not be greater than twice the width of the area. As an orientation aid, the following table can be used:

| Points<br>Parameter | **5** Points | **4** Points | **3** Points | **2** Points | **1** Point |
|---|---|---|---|---|---|
| chosen surface colour | white - light grey | grey - light beige | beige - red | brown - blue | dark brown |
| Covering direction/ solar irradiation | little / covered | little / northwest | moderat / northeast | strong / southwest | high / exposed |
| Tilesize | 11,5 x 24 cm | 24 x 24 cm | 30 x 30 cm | 35 x 35 cm | 40 x 40 cm |
| Joint pattern | cross joint clearance > 5 mm | cross joint clearance > 2 mm | diagonal laying | half tile laying | unite laying |
| **Points:** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**Total:** _____ **: 4** (Parameter) **=** _____ largest field length in this area (meters)

*(Calculation table in appendix)*

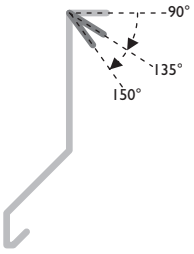



Align the profile to the desired direction and height. Bond lengths of PROCODRAIN E SV strips cut to approx. 12 cm on the textile lattice of the drainage mat at the points for later mortar attachment of the profile strips. Apply a quick hardening flexible mortar suitable for outside areas (at least C2F S1) approx. every 50 cm in lump form under the profile strip and over the PROCODRAIN E SV and fix the profile in it once it has been aligned. If necessary, use plastic shims or tile strips to support the height. The lumps should have a diameter of approx. 8 cm and enclose the T in the profile strip. The mortar escaping upwards should be scraped off with deep channels so that the following coarse grain mortar can take a hold in them.

## Finishing open surface ends with PROCOFORM balcony and terrace profiles:

Cut the PROCOFORM profile to the respective length and lay on the drainage mat.
Where PROCOFORM external corners join or between two bar sections, allow a space of approx. 5 mm and cover from the outside with a PROCOFORM connector.

To do this, fit a connector and bend the upper horizontal panel section over the upper edge of the profile by approx. 135° - 150°. The gap on the inside should be covered with a section of PROSTRIP S or PROSTRIP L of approx. 5 cm over the entire inner height of the profile.

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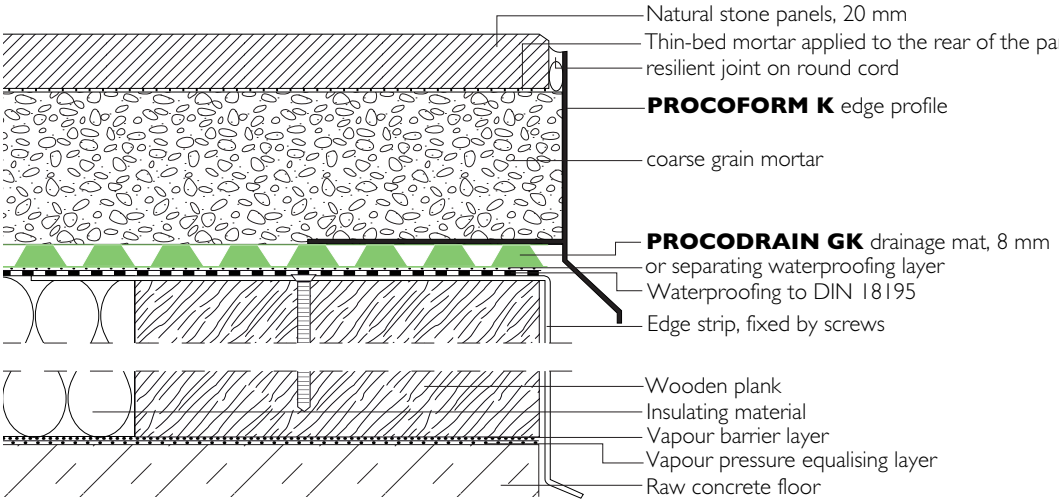
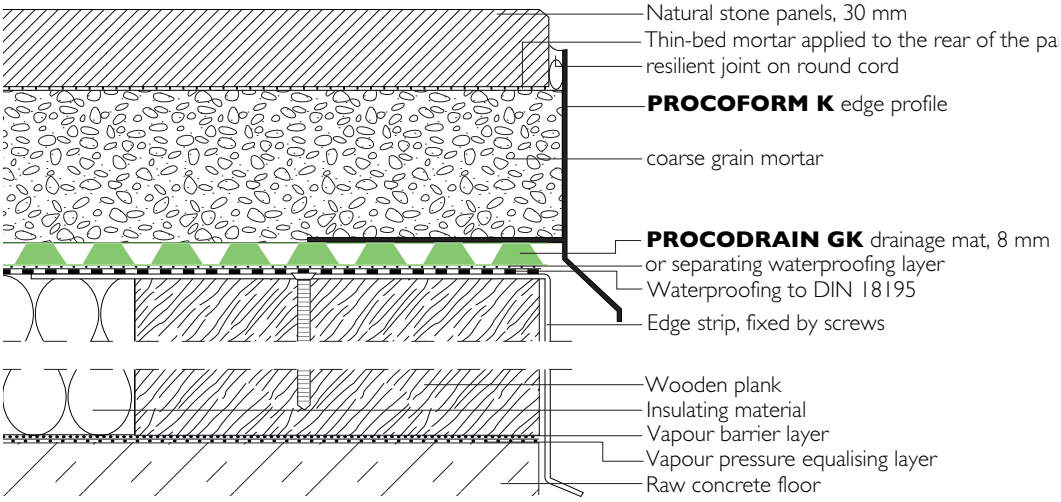
The following graphics give an indication of use:

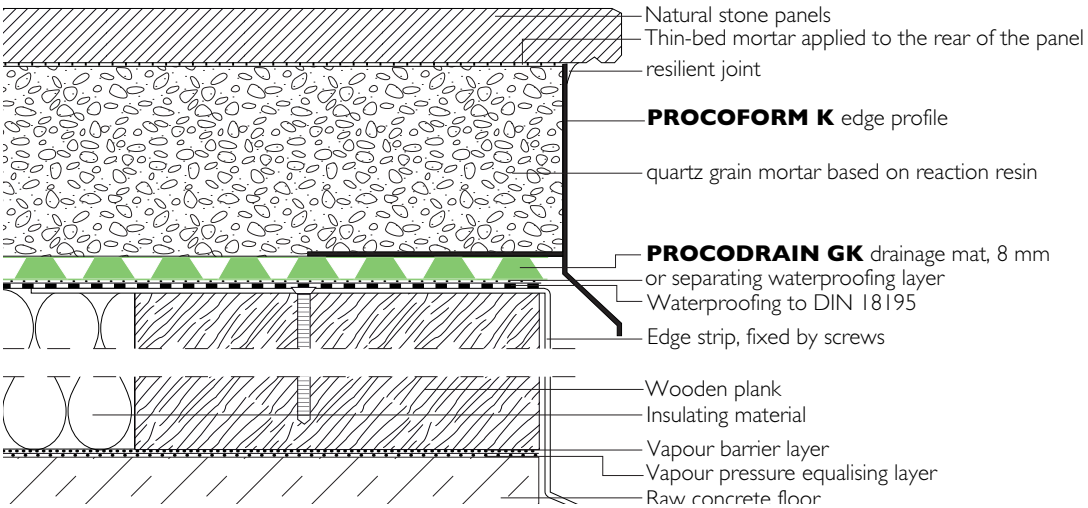
**1. PROCOFORM K EDGE PROFILE**
with approx. 20 mm thick natural stone slabs




**2. PROCOFORM K EDGE PROFILE**
for approx. 30 mm thick natural stone slabs




**3. PROCOFORM K EDGE PROFILE**
for projecting natural stone edge slabs

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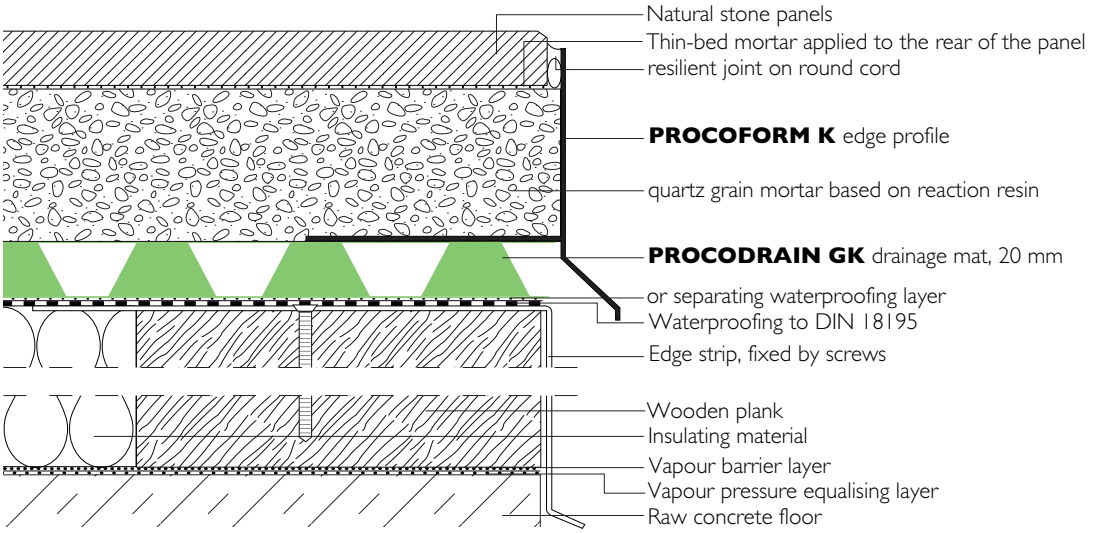
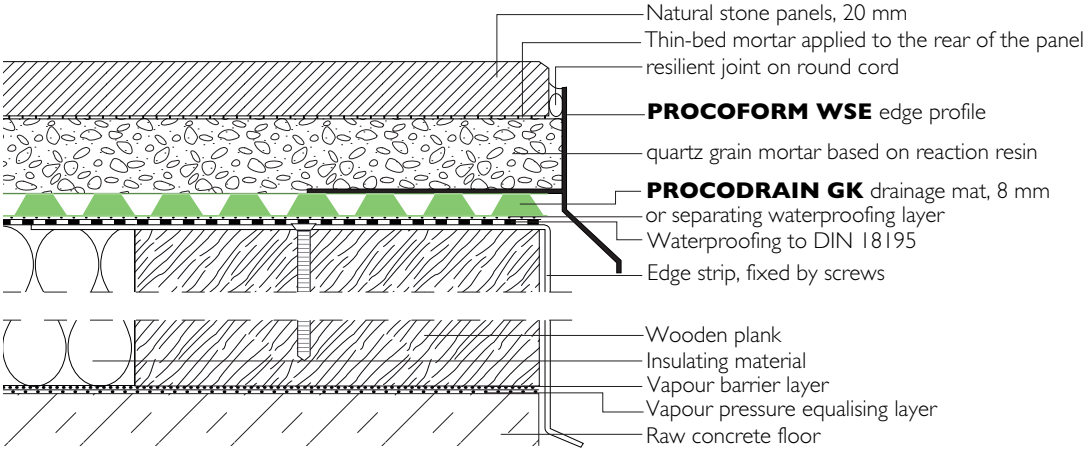
**4. PROCOFORM K EDGE PROFILE**
for 20 mm high PROCODRAIN GK mat




**5. PROCOFORM WSE EDGE PROFILE**
for covering on reaction resin bonded quartz grain mixture

In general, ensure that the upper edge of the profile is always lower than the upper edge of the floor covering.




## Connection to drainage troughs and grids for façade or surface drainage:

Drainage lines or drainage points installed for façade drainage or for further surface drainage are positioned directly on the sealing level via requisite protective layers where necessary and are aligned in height and direction.

The drainage mats are cut up to the frame of the grids. PROSTRIP S or PROSTRIP L edge strips are bonded to the drainage mat along the frame.

To prevent ballast from falling down under the grid, suitable gravel stops are fitted to the edge strips at an angle and weighed down with coarse grain mortar.

The joint between the frame and slab is filled with elastic filler (natural stone silicone or similar), thereby fixing the frame or grids. The frame or grids must be sturdy enough and stand on their own securely.

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**Important information:**

- Depending on outside temperatures, it may be necessary to unroll the strips, weigh them down and allow them to acclimatise for up to a day so that they lie flat and even on the substrate.
- From adjacent ground, no substances or water should be allowed to make their way into the drainage space from the outside. If necessary, suitable protective measures (e.g. drainage pits filled with coarse stones and seepage pipes) can be implemented in front of the patio or terrace. Water should be allowed to escape from surfaces laid with drainage mats by way of suitably deep, adjacent and water deflecting ground.
- Observe the details from the manufacturer of the covering and also the manufacturer of the construction chemical products and other products that are used.

**Standards and regulations:**

*It is recommended to refer to and comply with the following standards and regulations:*

- *DIN 18195 'Building seals'*
- *Rules and standards of the German roofing trade 'Trade regulations for roofs with seals'*
- *ZDB bulletin 'Outdoor flooring'*
- *DIN 18560 'Screeds in building construction'*
- *DIN EN 13813 'Screed mortar – properties and requirements'*
- *DIN EN 13318 'Screed mortar and screed flooring – terminology'*
- *DIN 18024 'Barrier-free constructions'*
- *DIN 18025 'Barrier-free flats'*
- *DIN 1986-100 'Water drainage systems for buildings and plots of land'*
- *Technical information concerning ashlar 1.4 'Outside flooring' from German Natural Stone Association*
- *Technical information concerning ashlar 1.3 'Solid steps and step covering outside' from German Natural Stone Association*
- *DIN EN 12004 'Mortar and adhesive for tiles and paving'*
- *DIN EN 12002 'Mortar and adhesive for … / Determining the shape'*



EDITION_2016_11_AH_LS

**Aid: Table for calculating maximum area length**

| Points<br>Parameter | **5** Points | **4** Points | **3** Points | **2** Points | **1** Point |
|---|---|---|---|---|---|
| chosen surface colour | white - light grey | grey - light beige | beige - red | brown - blue | dark brown |
| Covering direction/ solar irradiation | little / covered | little / northwest | moderat / northeast | strong / southwest | high / exposed |
| Tilesize | 11,5 x 24 cm | 24 x 24 cm | 30 x 30 cm | 35 x 35 cm | 40 x 40 cm |
| Joint pattern | cross joint clearance > 5 mm | cross joint clearance > 2 mm | diagonal laying | half tile laying | unite laying |
| **Points:** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**Total:** _____ **: 4** (Parameter) **=** _____ largest field length in this area (meters)