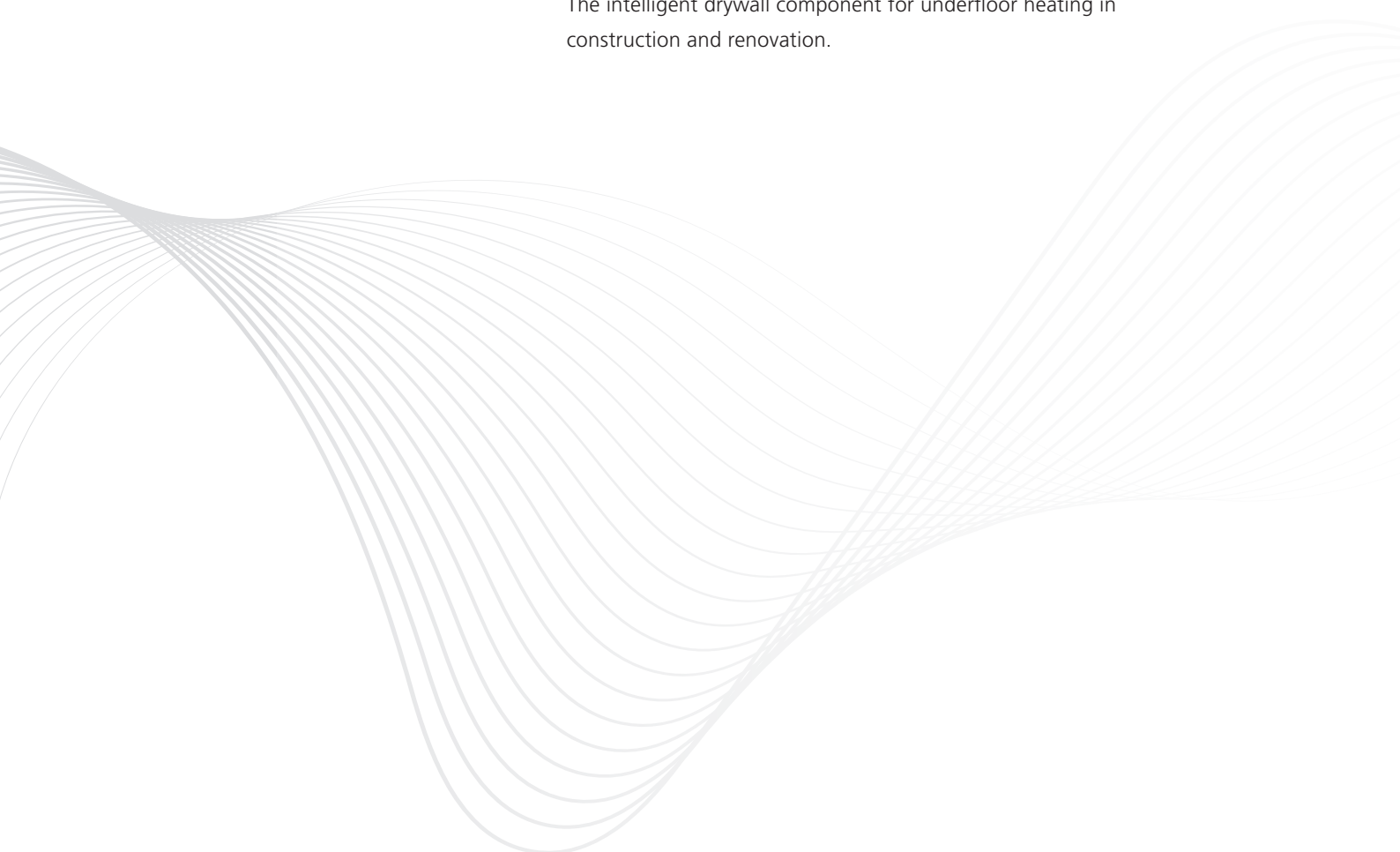


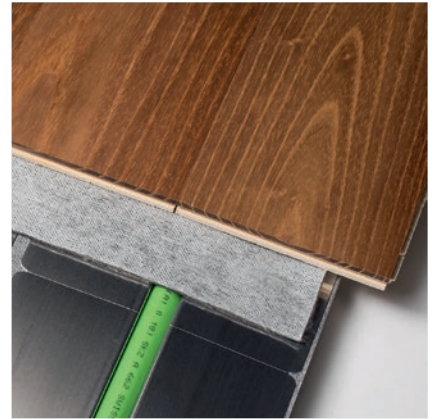
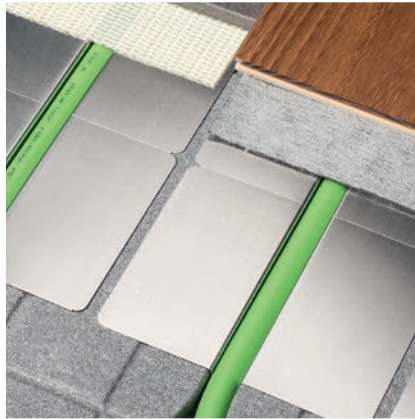
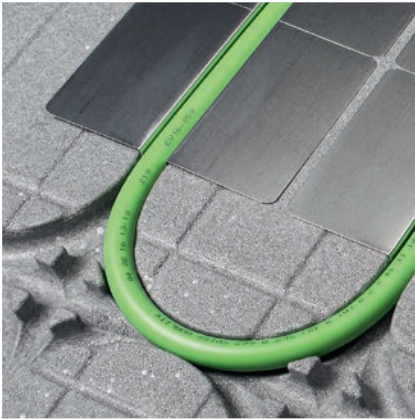
HAKAfloor

Technical manual

The intelligent drywall component for underfloor heating in construction and renovation.



| | | |
|---------------------------|--|---|
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Introduction

- 1.1 Application areas
- 1.2 Structure
- 1.3 Performance data
- 1.4 Performance test
- 1.5 Breaking load test

1.1 Application area

HAKAfloor components were specially developed for our customers and can be assembled in various modular configurations as an underfloor heating drywall system.

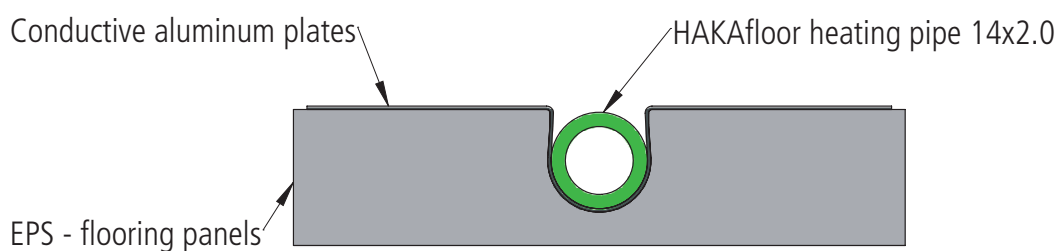
The components meet the requirements of a very low floor construction height thanks to the flat design of only 20 mm. HAKAfloor is ideal for all residential renovations involving an energy-efficient, low-temperature surface heating system. New buildings can naturally also benefit from such excellent properties.

The elements impress with their simple, quick assembly and comparatively fast reaction times, as screed compound does not require heating. The dry construction method makes it ideal for renovating old buildings due to its low net weight. The EPS panels nevertheless offer excellent stability, which lends the prefabricated floor a "stable property without a floating feeling". The installation panels can be installed on all solid and level floor coverings.

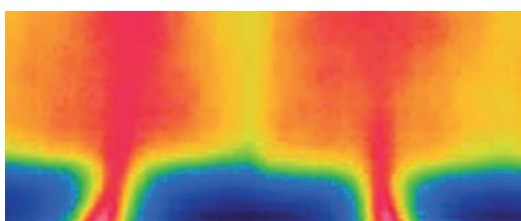
The modular design and a specific system structure leave nothing to be desired. All desired floor coverings can be installed. The aluminium slats quickly and uniformly distribute and release the heat in the room. This prevents the room from overheating and allows you to save energy without sacrificing comfort.

1.2 The structure

The dry solution with the following main components from HakaGerodur AG:



1.3 Performance data

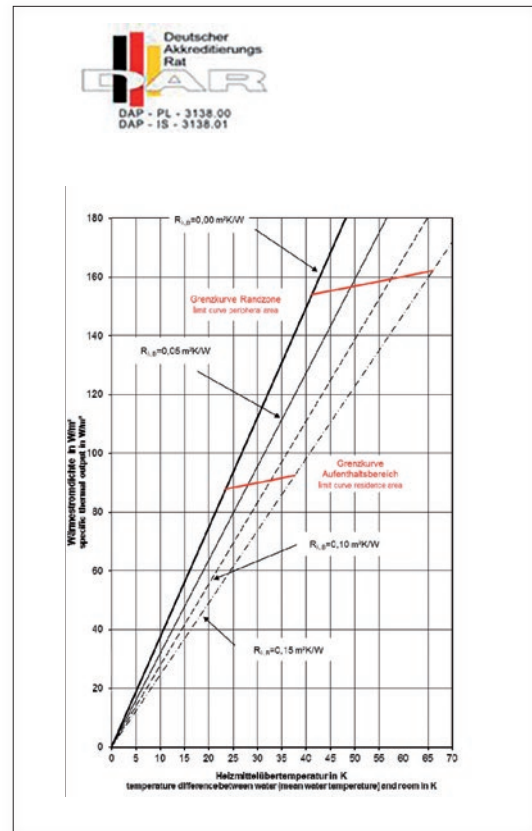
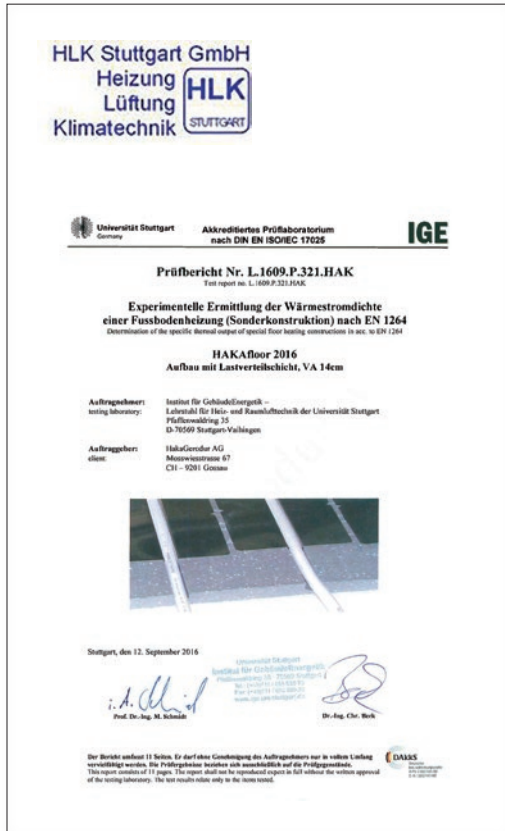


Heat output with the three main components 14 mm pipe, aluminium slats and EPS installation panel:

- Heat flow density according to DIN EN 1264
- Standard heat flow density at 23.5°C
- $q_N = 87.8 \text{ W/m}^2$
- With a maximum ripple of 2 K

1.4 Performance testing

Performance data testing was checked in the laboratory and confirmed by:



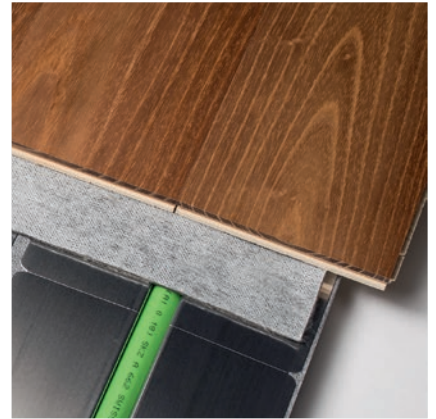
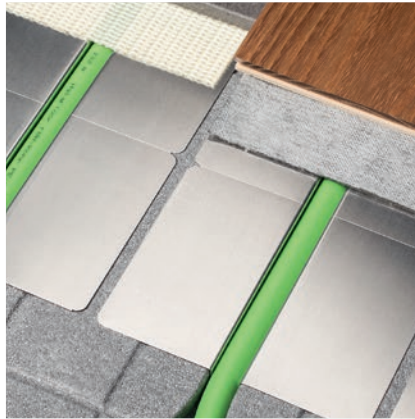
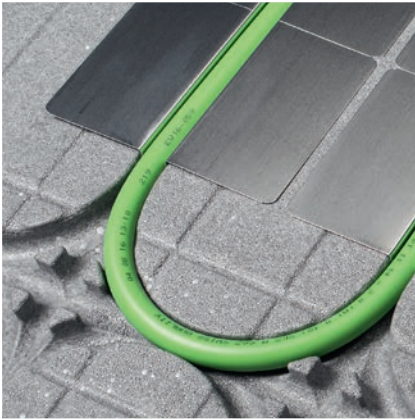
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1.5 Breaking load testing

Breaking load testing was checked and confirmed at the Karlsruhe Materials Testing and Research Institute (MPA Karlsruhe):



The recommended floor structures fulfil categories A1-3 and B1-2 according to DIN EN 1991-1-1/NA.



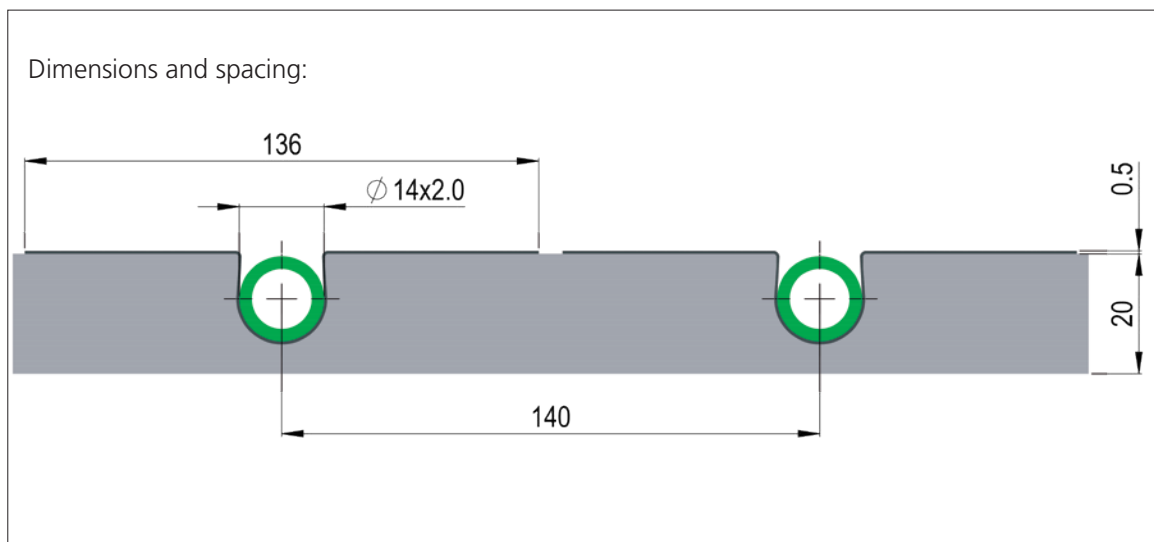
Components

- 2.1 Technical information
- 2.2. Main components
- 2.3 Additional components
- 2.4 Connection technology – fittings
- 2.5 Control unit
- 2.6 Tools

2.1 Technical information

Quantity required and weight for a complete installation covering per square metre with an installation spacing of 14 cm with no underlays or overlays:

| Component | Requirement per m ² | Weight per m ² |
|---------------------------|--------------------------------|---------------------------|
| Metal composite pipe 14x2 | 7.0 m | 620 g |
| EPS installation panel | 1.6 pieces | 1090 g |
| Heat conducting slats | 6.0 pieces | 990 g |
| Total | | 2700 g |



System design

The "Win_HT" industry software can be used for the technical data, calculations and system design.



on the "Win_HT" industry software

2.2 Main components

Metal composite pipe



The well-known flexible and inherently stable plastic-metal composite pipe Hakathen and its prized advantages form an essential part of the solution. Its optimised dimensions of 14 x 2.0 mm reduce the installation height. The inner pipe design allows for low pressure loss while maximising heat dissipation and can be installed with a one-person crew.

| | |
|------------------------|--------------------------------|
| Pipe structure | PE-RT/AL/PE-RT |
| Pipe dimensions | Outer 14.0 mm Inner 10.0 mm |
| Pipe length | 200 m rings |
| Pipe weight | 88 g/m |
| Water quantity | 0.079 litres/m |

Installation panel

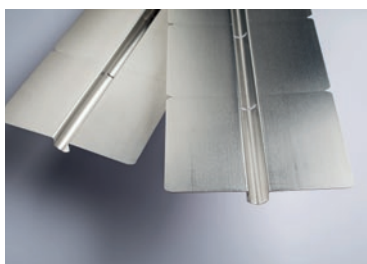


The high-strength EPS installation panel PS60 ensures quick, convenient installation on the construction site and can be installed on all existing and flat floors.

The special grid on the bottom side makes it easy to cut the panels to size with the EPS cutter or simply using a standard cutter.

| | |
|------------------------------|------------------|
| Panel dimensions | 112x56x2 cm |
| Panel dimensions | 680 g |
| Installation distance | 14 cm bzw. 28 cm |

Heat conducting slats

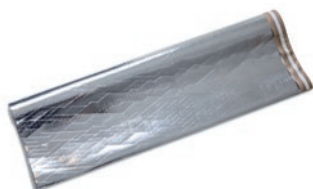


The integrated aluminium heat-conducting slats ensure optimum heat transfer. Predetermined breaking points save time when cutting the slats to length. The omega-shaped groove ensures that the pipe and slats are securely fixed in the EPS installation panel.

| | |
|--------------------------------------|-------------------|
| Panel dimensions | 100x 13.6x 1.6 cm |
| Panel thickness | 0.45 mm |
| Predetermined breaking points | Every 10 cm |
| Panel weight | 165 g |

2.3 Additional components

Acoustic underlay



Sound-absorbing acoustic underlay made of natural rubber for the floating installation of laminate and wooden floors with an aluminium vapour barrier.

| | |
|--------------------------------|----------------------|
| Dimensions | 10 x 1 m/height 2 mm |
| Impact sound insulation | 18 dB |
| Walking sound reduction | > 39% |

Acrylic adhesive tape



Acrylic adhesive tape for bonding acoustic underlay joints.

| | |
|-------------------|--------------|
| Dimensions | 40 m x 60 mm |
|-------------------|--------------|

Decoupling mat



Multifunctional self-adhesive decoupling mat for tile and natural stone coverings as well as parquet and carpet coverings with additionally enhanced room and impact sound values.

| | |
|-------------------|-------------------------|
| Dimensions | 20 x 1 m/height 1.2 mm |
| | 7.5 x 1 m/height 1.2 mm |
| Weight | 850 g/m ² |

The decoupling mat must be bonded with an overlap and installed as tightly as possible.

EPS adhesive



Powerprimer is a solvent-free primer with an adhesive and fixing effect for all mineral substrates. It is suitable for bonding the EPS installation panel to smooth surfaces such as tiles. The Powerprimer is not suitable for use on rough, porous surfaces.

| | |
|-----------------------|---------------------------------------|
| Consumption | Approximately 30-100 g/m ² |
| Flash-off time | Approximately 15 minutes |

Floor levelling compound



Extremely low-stress, fibre-reinforced, silicate-based floor levelling compound for levelling uneven surfaces and different floor structures:

Highly flowable and rapid-hardening.

| | |
|----------------------------|--|
| Consumption | Approximately 1.6 kg/m ² pro mm thickness |
| Coating thicknesses | 1 – 32 mm |
| Processing time | Approximately 45 minutes |
| Walkability | Approximately 3 hours depending on temperature. |

2

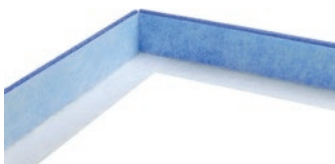
Ultralite S2 Quick lightweight adhesive mortar



The lightweight adhesive mortar is easy to process, rapid-setting and highly deformable, and is suitable for installing the EPS installation panel on rough, even, standard building substrates or tiles and porcelain stoneware. Primer may be necessary depending on the substrate.

| | |
|------------------------------|-------------------------|
| Layer thickness up to | 10 mm |
| Walkability | Approximately 2-3 hours |

Edge insulation strip



Self-adhesive edge insulation strip, in particular for renovation work and when using floor levelling compound and thin-bed adhesive.

Roll of 20 metres, 50 mm high

2.4 Connection technology – fittings

Fittings



All the required connectors and fittings are available from one single source, whether as a connection to the distributor or as a repair kit.

| | |
|-----------------------|---------------------------------------|
| Compression fitting | Dim. 14 mm x 3/4" Eurocone connection |
| Press fitting | Dim. 14 mm x 3/4" Eurocone connection |
| Repair press coupling | Dim. 14 mm – 14 mm |
| Press coupling | Dim. 16 mm – 14 mm |
| Press transition | Dim. 14 mm x 1/2" external thread |
| Press transition | Dim. 14 mm x 1/2" external thread |
| Press jaw | Dim. 14 mm |
| Calibration tool | Dim. 14 mm |

2.5 Control units

IC Box



The IC Box is a regulation unit for individual underfloor heating circuits that can be connected directly to the existing return installation and does not require an additional heating pump or mixing valve. It also features a thermostatic head for direct mounting or with remote sensor, including an integrated manual vent valve and installation housing for flush mounting.

| | |
|--------------------|---|
| Control box | with and without remote sensor Cover, white RAL 9010 |
|--------------------|---|

2.6 Tools

EPS Schneider

EPS cutter:



The EPS cutter is a professional hot cutting device for cutting insulation and insulating panels made of EPS. The temperature can be adjusted. The tool can be fixed in two positions.

Blades

– Omega groove cutter for dim. 14 mm pipe

Technical data: EPS cutter

| | |
|---------------------|--------------------|
| Ready to cut | Approx. 10 seconds |
| Voltage | 230 V-50Hz |
| Cutting temperature | max. 500° C |
| Weight | 610 g |

Cordless EPS cutter:

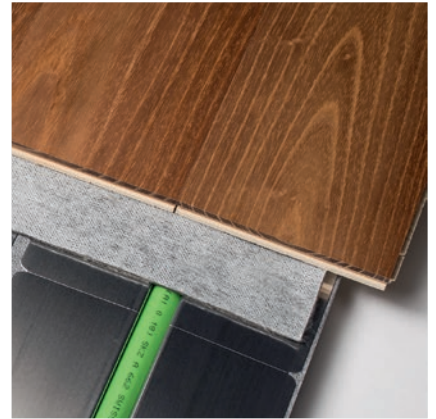
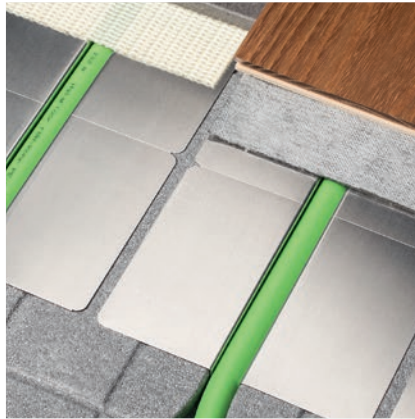
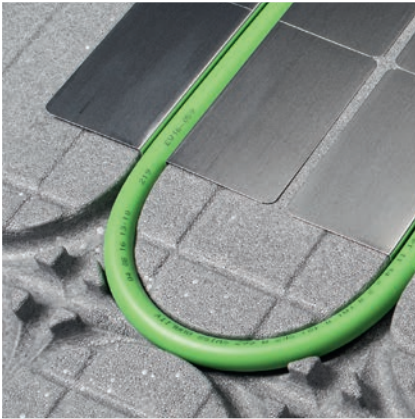


Technical data: Cordless EPS cutter

| | |
|---------------------|--------------------|
| Ready to cut | Approx. 10 seconds |
| Voltage | 36 V-1.5 AH |
| Cutting temperature | Max. 500° C |
| Weight | 1260 g |

Application and area of use is specified in the technical data sheets.

Please note that all details of the additional components are only options, and we recommend that you refer to the corresponding manufacturer's specifications. We do not assume any liability for completeness.



Possible floor structures

3.1 Parquet, laminate: floating

3.2 Multilayer parquet, laminate: bonded

3.3 Tiles, stone floor

3.4 Fitted carpet

3.1 Solution for parquet, laminate: floating

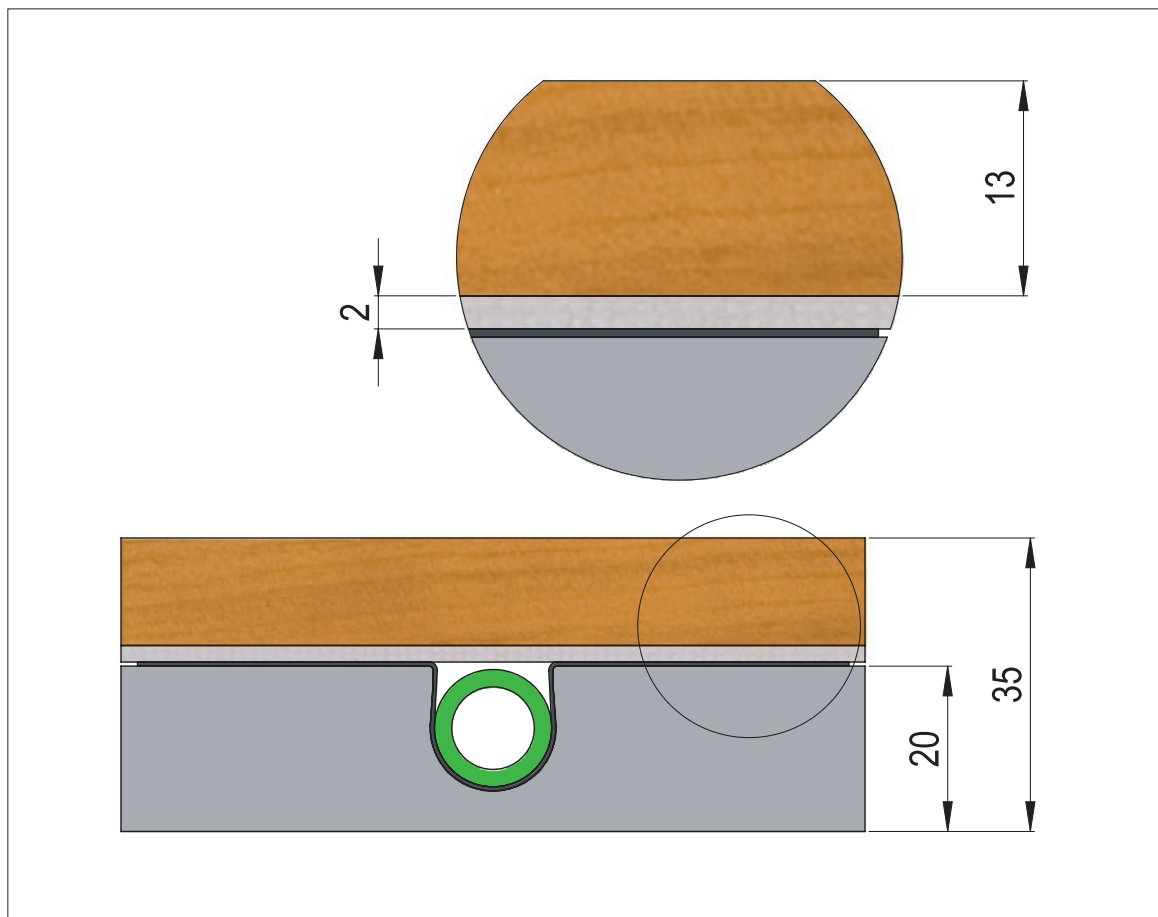
Floor structure

Parquet, laminate: floating*
Acoustic underlay
Heat conducting slats
EPS installation panel
Powerprimer / Flexkleber flexible adhesive
Existing floor covering, level and load-bearing

* The floating floor coverings used must have the necessary load-bearing capacity and load distribution must be ensured.

Additional information

- Fixing the EPS panel to the substrate is necessary depending on the conditions. We generally recommend it.
- We recommend Powerprimer or Flexkleber flexible adhesive for fixing, depending on the substrate.
- If the existing substrate is not level, we recommend using the floor levelling compound to level it out.
- There is generally no need for an edge insulation strip.



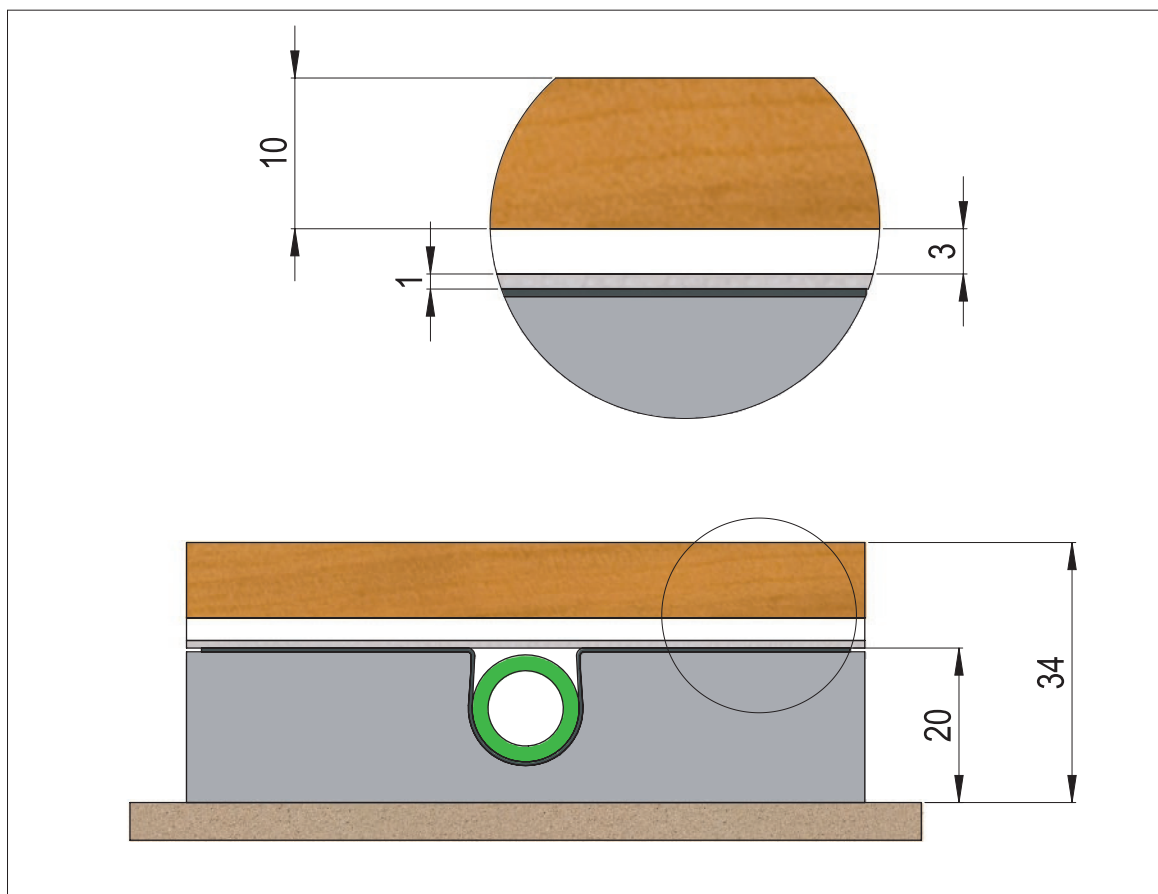
3.2 Solution for multilayer parquet, laminate: bonded

Floor structure

Parquet / laminate bonded
Parquet glue according to HAKAfloor data sheets
Floor levelling compound
Decoupling mat
Heat conducting slats
EPS installation panel
Powerprimer / Flexkleber flexible adhesive
Existing floor covering, level and load-bearing

Additional information

- The EPS panel must be fixed to the substrate.
- We recommend Powerprimer or Flexkleber flexible adhesive for fixing, depending on the substrate.
- If the existing substrate is not level, we recommend using the floor levelling compound to level it out.
- An edge insulation strip is required.
- Parquet glue according to separate matrix / data sheets
- The thickness of the floor levelling compound above the decoupling mat must be at least 3 mm.
- The system structure is not suitable for solid parquet.



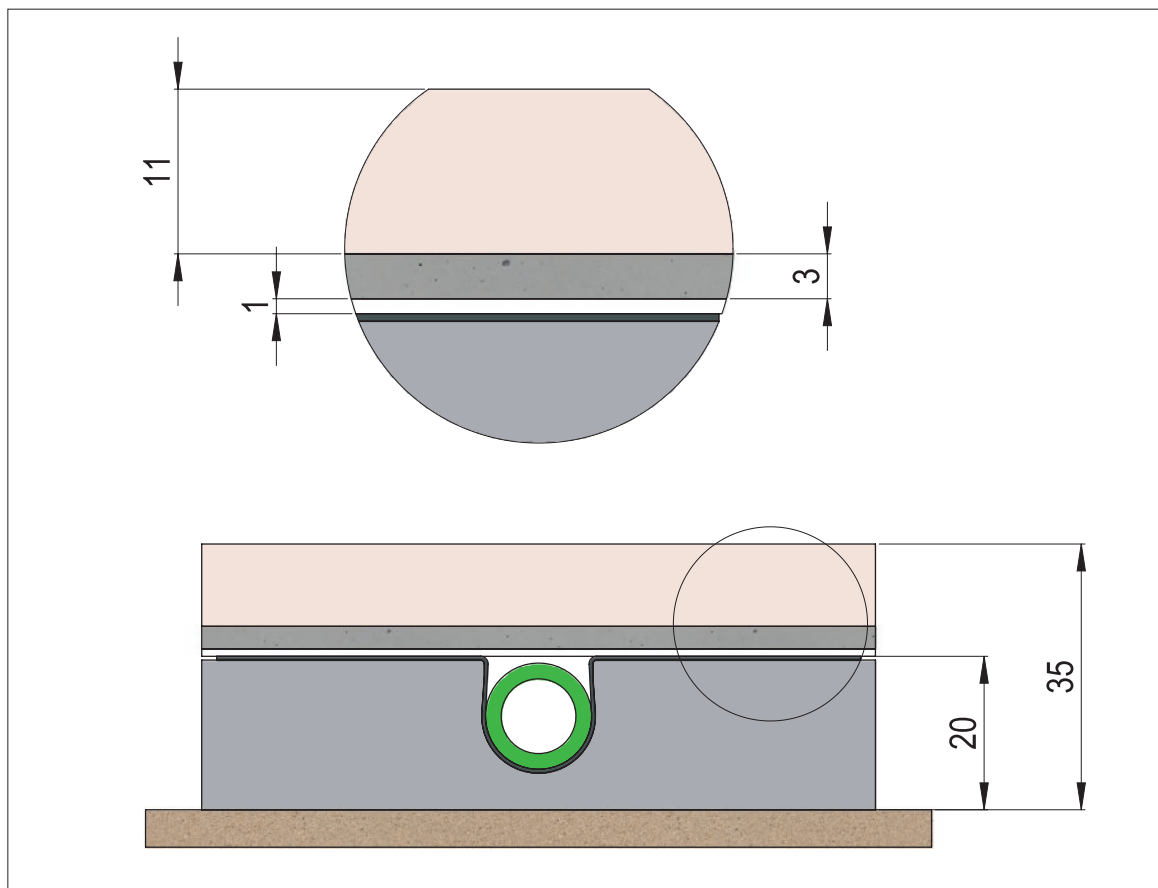
3.3 Solution for tiles, stone floors

Floor structure

Tiles/stone floors
Glue according to HAKAfloor data sheets
Floor levelling compound
Decoupling mat
Heat conducting slats
EPS installation panel
Powerprimer / Flexkleber flexible adhesive
Existing floor covering, level and load-bearing

Additional information

- The EPS panel must be fixed to the substrate.
- We recommend Powerprimer or Flexkleber flexible adhesive for fixing, depending on the substrate.
- If the existing substrate is not level, we recommend using the floor levelling compound to level it out.
- An edge insulation strip is required.
- Adhesive for tiles / stone floors according to separate matrix / data sheets.
- Adhesive for tiles / stone floors according to separate matrix / data sheets.
- In bathroom areas, separate waterproofing under the tiles is required according to local laws.



3.4 Solution for fitted carpet

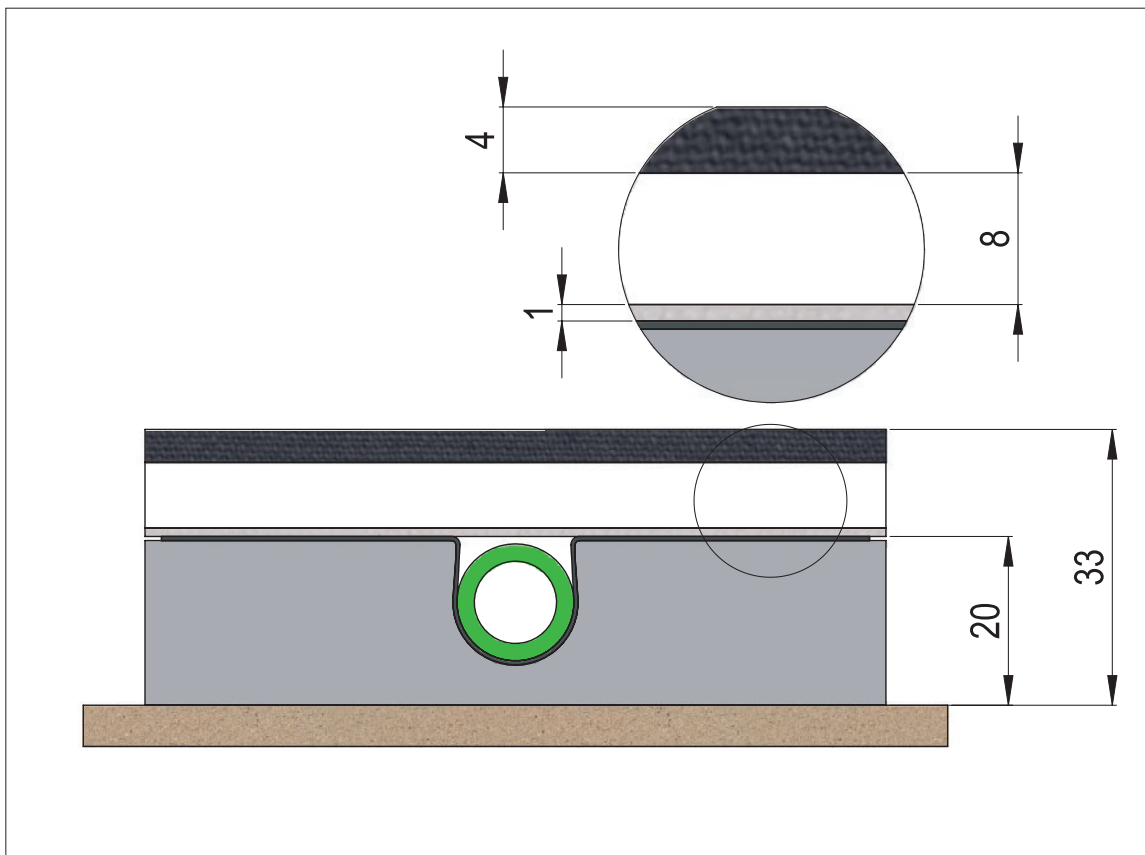
Floor structure

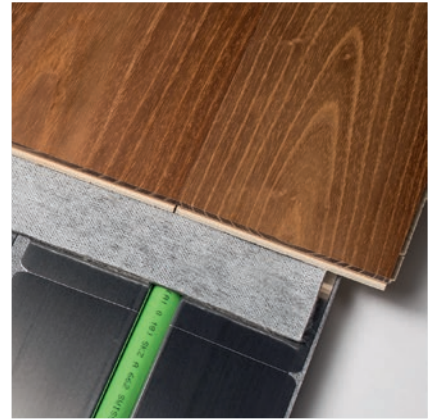
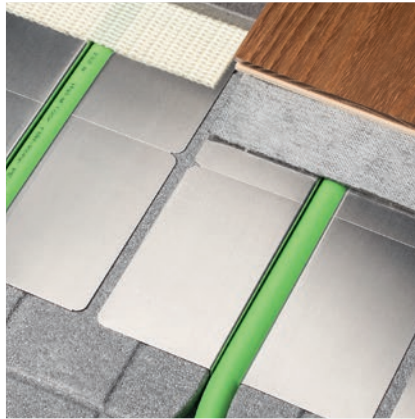
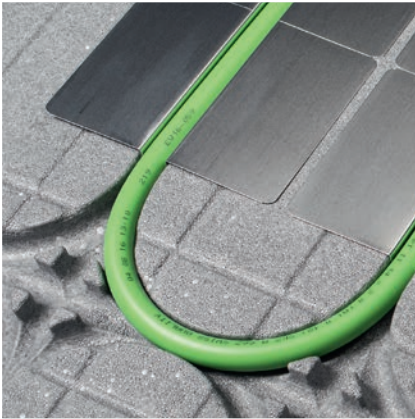
Fitted carpet
Glue according to HAKAfloor data sheets
Floor levelling compound
Decoupling mat
Heat conducting slats
EPS installation panel
Powerprimer / Flexkleber flexible adhesive
Existing floor covering, level and load-bearing

Additional information

- The EPS panel must be fixed to the substrate.
- We recommend Powerprimer or Flexkleber flexible adhesive for fixing, depending on the substrate.
- If the existing substrate is not level, we recommend using the floor levelling compound to level it out.
- An edge insulation strip is required.
- The thickness of the floor levelling compound above the decoupling mat must be at least 8 mm.

Install the components on level and load-bearing surfaces that are as dust-free as possible.





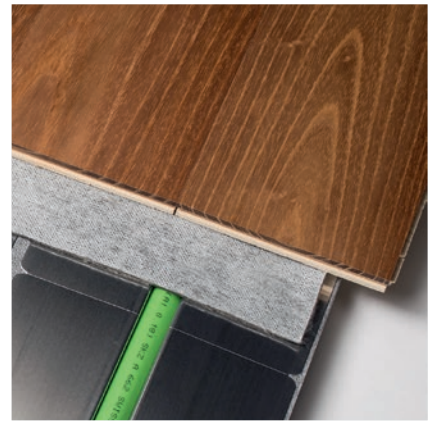
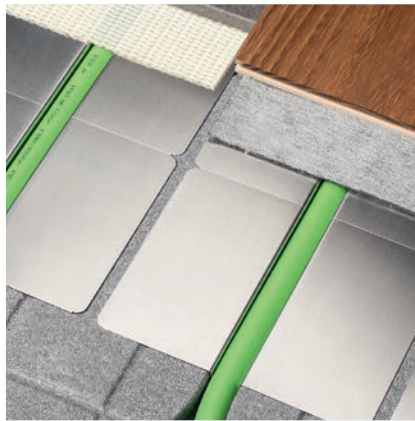
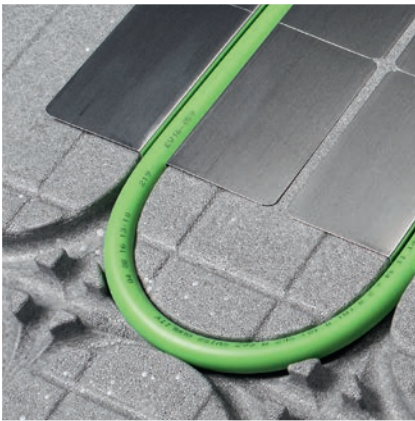
Reasons for HAKAfloor

4.1 Customer benefits

4.1. Customer benefits

HAKAfloor, the underfloor heating drywall system for your renovations.

- ✓ Minimum loss of room height due to 20 mm structure height plus floor build-up
- ✓ No need to break out the existing screed and floor slabs
- ✓ Modular construction system ensures cost-efficiency
- ✓ Low total weight ensures efficient and fast assembly
- ✓ Fast reaction time, as there is no need to heat up the screed
- ✓ Comfortable room climate with optimum heat distribution due to the aluminium slats
- ✓ No floating feeling due to the high-strength EPS installation panel
- ✓ Energy-efficient low-temperature surface heating
- ✓ Flexibility through free selection of floor quality for direct installation
- ✓ Planning security through tested power output
- ✓ Optionally also suitable for cooling
- ✓ Reduced construction time, since there is no need for the screed to dry out
- ✓ Empty pipes can be integrated on the unfinished floor



Data sheets

- 5.1 Installation panel
- 5.2 Acoustic underlay
- 5.3 Decoupling mat
- 5.4 Floor levelling compound
- 5.5 EPS adhesive / Powerprimer
- 5.6 Lightweight adhesive mortar
- 5.7 Edge insulation strip
- 5.8 IC BOX control units

5.1 Installation panel

The high-strength EPS installation panel EPS 60 ensures quick, convenient installation on the construction site.



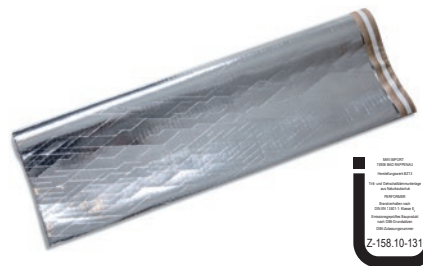
| Technical data | |
|--|--|
| Panel format (length x width) | 1120 x 560 mm |
| Usable panel dimension (length x width) | 1120 x 560 mm |
| Usable panel area | 0,62 m ² |
| Installation grid (pipe spacing) | 140 mm |
| Nominal insulation thickness | 4 mm |
| Total thickness with pipe support | 20 mm |
| Pipe diameter | 14 mm |
| Designation according to EN 13163 | EPS-EN 13163 - T(1) - L(2) - W(2) - S(2) - P(5) - DS(N)5 - DLT(3)5 - BS750 - CS(10)500 |
| Application type according to DIN 4108-10 | DEOs |
| Compressive strength at 10% compression | 500 kPa |
| Compressive stress at 2% compression | 150 kPa |
| Building material class according to EN 13501 1 | E |
| Thermal conductivity rating | 0,034 W/mK |
| Thermal resistance RD | 0,55 m ² K/W |
| Heat deflection temperature | 80 °C |
| Packing unit per box | 12 Stück |
| Installation area per cardboard box | 7,5 m ² |
| Cardboard box dimensions (length x width x height) | 1125 x 255 x 565 mm |

The EPS panels must be fixed to the substrate. Depending on the type and condition of the substrate, we recommend using Powerprimer or lightweight adhesive mortar.

5.2 Acoustic underlay

Sound-absorbing acoustic underlay with vapour barrier and self-adhesive overlap system for the toughest demands

For floating installation of laminate and wood flooring, ideally suited for private and commercial residential buildings



| | |
|-------------------|-----------------------|
| Dimensions | 10 m x 1 m x 2 mm |
| Roll | 10 m ² |
| Weight | 2.0 kg/m ² |

Properties:

– **18 dB Impact sound insulation**

reduces the impact sound to the room below (DIN EN ISO 140-8)

– **>39% walking sound reduction**

or reduction of the loudness (Sone) of the emitted walking sound compared to a 3 mm PE foam underlay (Institut für Holztechnologie Dresden IHD works standard 431, DIN 45631)

– **>181 [kPa] pressure stability**

corresponds to a very high compressive strength and is ideally suited for all laminate and wood floors with click systems (CEN/TS 16354)

– **Integrated vapour barrier**

fulfils the requirements for protection against increasing residual building moisture levels, which are mandatory according to German Construction Contract Procedures (DIN EN ISO 12572)

– **Fire behaviour tested**

It meets the building material class Efl (DIN EN 13501-01) as required by a number of building regulations

– **0.015 [m² · K/W] thermal resistance**







excellent in combination with underfloor heating (DIN EN ISO 12667)

– **Bulk density 1000 kg/m³**

protects the click connection system, structural stability and the surface covering of your floor

– **High-quality natural rubber**

Renewable, environmentally friendly raw material

| | | |
|---|----------------------------------|----------------------|
|  | Impact sound insulation | 18 dB |
|  | Walking sound reduction | >39 % |
|  | Pressure stability | >181 [kPa] |
|  | Integrated vapour barrier | ✓ |
|  | Fire behaviour tested | ✓ |
|  | Underfloor heating | ✓ |

Acoustic underlay – installation manual

1. The substrate must be level, smooth, clean, dry, resistant to bending tension and compression according to DIN 18365. The substrate to be covered must not contain any substances such as softeners, solvents or other diffusing substances. In case of unevenness and unsealed surfaces (e.g. cracks), these must be prepared in advance in a professional manner, e.g. by filling or levelling, so that they are even and ready for covering.
2. Make sure that the surface is free of dust and loose parts.
3. Install one sheet of acoustic underlay parallel to the wall with the aluminium side facing down. Make sure that the overlap is complete and smoothly folded out, and that the opposite long side is pulled approximately 5 cm up the wall. The overlap faces the direction of installation. Install the flooring according to the manufacturer's specifications, making sure that the overlap of the acoustic underlay remains visible and folded out.
4. Place the next sheet of acoustic underlay so that it is flush with the sheet already laid on the extended overlap. Lift the last installed sheet and peel off the protective film of the adhesive strip. Place the lifted sheet back on the unfolded overlap and press it down. The sheet joints must be laid so that they are completely flush with each other.
5. Continue installing the floor covering and acoustic underlay as described in step 4. Cover transverse joints with acrylic or aluminium tape. Let the last sheet of acoustic underlay overlap by approximately 5 cm. It will be covered by a skirting board.

5.3 Decoupling mat

Multifunctional, self-adhesive decoupling mat for tile and natural stone coverings, bonded parquet and levelling layers



The decoupling mat is a multifunctional, self-adhesive with the latest bi-compound technology. The lowest installation height and the highest decoupling performance make it suitable for the highest load areas. The special adhesive coating on the bottom of the decoupling also improves room and impact sound values. Thanks to the self-adhesive base, the installation speed is several times faster than with traditional decoupling mats, which are bonded with tile adhesive.

Features

- Lowest installation height – only 1.2 mm
- Low adhesive mortar consumption
- Best decoupling properties
- Fastest possible installation – since it is self-adhesive and can be walked on and loaded right after installation
- No hollow sounds
- Expansion joints can be bridged
- Integrated vapour barrier, fulfils the requirements for protection against increasing residual building moisture levels, which are mandatory according to German Construction Contract Procedures [Vergabe- und Vertragsordnung für Bauleistungen VOB] (DIN EN ISO 12572)
- With patent-pending "bi-compound technology"
- Including test certificate
- With 3 cm overlap on one side
- The covering can be installed immediately afterwards; no drying times
- Crack bridging of up to 8 mm (without tearing off the substrate)
- Very good adhesive tensile values of the tiles to the decoupling mat Application area

Application area

Can be applied to almost all substrates, with pretreatment as necessary (priming/surfacing, etc.)

- Perfect for large-format coverings, also with underfloor heating systems
- Ideal for renovation work where height is critical: there is no build-up and no need to increase the thickness of the structure with adhesive
- Also suitable for 20 x 20 mm mosaic tiles
- Suitable for high pressure loads, such as industrial areas and car dealerships, etc.
- For decoupling the covering on wooden substrates as well as magnesia, mastic asphalt and anhydrite screeds

Technical notes and data

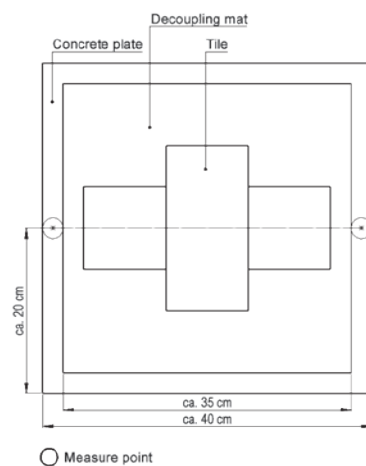
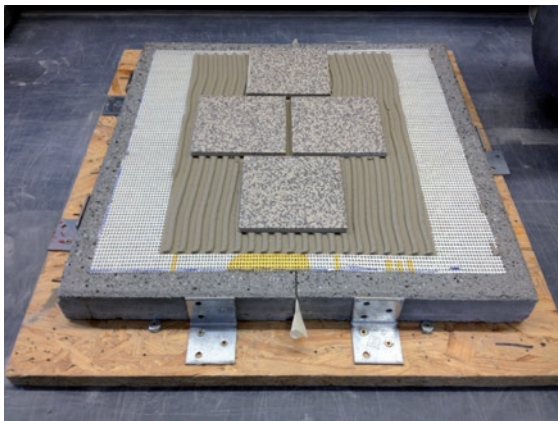
Adhesive strength/tensile strength of the adhesive matrix to the substrate

- In accordance with AFERA 5001
- Contact time: 1 hour
- Min. 30 N/25 mm

Layer separation is carried out underneath the adhesive matrix during the tensile adhesion test.

Decoupling effect

It was tested according to the specifications of the FDF leaflet "Testing the crack bridging of decoupling systems":



The test result revealed a decoupling mat of up to 8 mm, without tearing the mat from the substrate or otherwise damaging the joint or tile.

Viscoelasticity

The grid structure of the decoupling mat in the adhesive matrix ensures that the adhesive layer returns to its original shape and layer thickness after it has been deformed. This enhances the viscoelastic property of the adhesive layer.

Surface weight

Approximately 850 g/m²

Substrate specifications and processing instructions

- The substrate must be dry, even, load-bearing, clean and free of dust.
- Slopes and larger / higher levelling work must be carried out in the layers below the decoupling mat.
- The surface temperature as well as the material temperature should be between +10°C to +25°C during installation.
- In case of high foot traffic (e.g. in commercial areas), the tiles must have the sufficient tile thickness and pressure stability for the respective application area. To achieve a suitable covering, the instructions and tile thicknesses according to the valid ZDB bulletin "Ceramic floor coverings with high mechanical load-bearing capacity" must be observed.

- The decoupling mat can also be processed on the wall. It may be necessary to use anchoring dowels to reinforce the fastening.

Decoupling mat – installation instructions

1. In order to carry out installation in a corner or on a wall, the silicone foil is removed to approx. 20 cm. The decoupling mat is then attached directly into the corner with the self-adhesive side, so that it can be unrolled parallel to the wall.
2. Once fixed to the substrate, unroll approximately 1 m from the roll, depending on the area, fix this with your foot or knee and peel off the silicone sheet from under the mat on the fixed section.
3. Keep doing this until the entire width of the room is covered, taking the edge insulation strip into consideration. Cut off the mat at this point and overlap the next panel by approximately 3 cm. We recommend pressing the mat with a rubbing board. It is then finally fixed at the latest when the tile covering or top layer / adhesive layer is applied. Connection joints between the mats are made with an overlap of 3 cm. The decoupling mat can be walked on and loaded immediately after installation, even on transport routes. You can also start with the rest of the installation immediately after installation. No drying time is necessary.

5.4 Floor levelling compound

Extremely low-stress, silicate-based floor levelling compound, including fibre reinforcement for levelling uneven areas in the substrate and embedding thin-layer heating systems from 1 to 32 mm



Features

- Highly flowable
- Rapid setting
- Self-levelling
- Layer thicknesses from 1 to 32 mm
- Quickly set for foot traffic and ready for application
- Long processing time
- Can also be processed using machines
- Very low emission EC 1 + R
- Extremely low stress – around zero

Application areas

- As a substrate for all subsequent surface coverings, such as tiles, natural stone, PVC, parquet and carpet, etc.
- Due to the high material safety and low stress, it is also ideal for levelling old, load-bearing substrates in renovation and refurbishment work with tight deadlines.
- For embedding water-carrying thin-film heating systems
- For levelling cementitious and calcium sulphate screeds, concrete substrates, old ceramic coverings, dry, magnesia and poured asphalt screeds.
- It may only be used to a limited extent in permanent wet areas or with additional sealing.

| Technical data | |
|--|--|
| Grain size | 0 – 1 mm |
| Strength class | CT-C25-F5 according to EN 13813/DIN18560 |
| Bending tensile strength | Approximately 5 N/mm ² |
| Processing temperature | +5°C to +35°C (air, material and substrate temperature) |
| Abrasion resistance according to BCA | AR 0,5 |
| Processing time | Approximately 45 minutes |
| Mixing time | Approximately 1 minute |
| Water requirement | Approximately 5.5 l per 25 kg |
| Curing time | Approximately 2 minutes |
| Layer thicknesses | 1 to 32 mm |
| Walkability | After approximately 3 hours (depending on temperature and site conditions) |
| Ready for tiling | After approximately 4 hours (or when walkable) |
| Ready for covering for vapour-tight coverings | See the next page |
| Yield | Approximately 15.5 l per 25 kg |
| Consumption | Approximately 1.6 kg / m ² / mm layer thickness |
| Storage | Dry and correct |
| Delivery form | 25 kg bag |

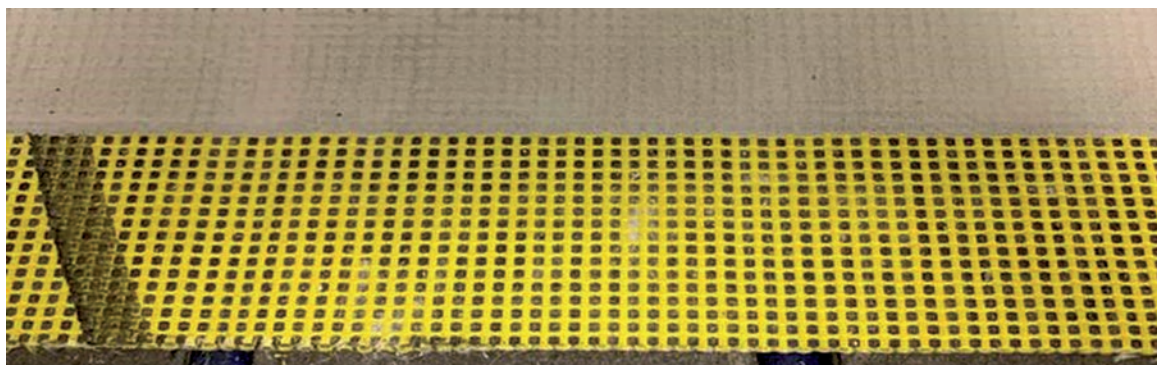
Preparing the substrate

The substrate must be load-bearing, ready for application, dry, free of vibrations and cracks, clean and free of impurities and separating layers of any kind (e.g. paint coats and oils, etc.). Depending on the substrate, it may be necessary to apply a primer – please consult HakaGerodur Anwendungstechnik.

Floor levelling compound installation instructions

1. Mix the contents of the bag (25 kg) with approximately 5.5 litres of clean water without any lumps until it reaches a flowable consistency. Add $\frac{3}{4}$ of the water quantity and mix for approximately 30 seconds using a suitable whisk. Then add the remaining water and mix again for approximately 30 seconds. After a curing time of approximately 2 minutes, briefly stir the mortar again.
2. Only mix as much material as can be applied consistently within the processing time. Make sure that the material is trowelled and distributed thoroughly "into the floor" with the trowel or rubber scraper. Then use a suitable squeegee, hard broom, spiked roller or similar to ensure that the material is optimally levelled and de-aerated.

3. The freshly created surfaces must be protected against drying out too quickly (draughts, high temperatures and direct sunlight, etc.).
4. Immediately clean tools with water after use.
5. We recommend pre-filling with a layer thickness of 1 to 2 mm to seal the pores in layers of 8 mm and more. After a curing time of approximately 30 to 45 minutes, apply the remaining layer thickness.



Ready for covering

The time required to achieve readiness for covering depends on the building site situation, layer thickness and ambient temperatures. High temperatures accelerate and low temperatures slow down the process. The indicated times refer to 21°C/relative humidity of 55%.

| Subsequent coating | Ready for covering |
|--|--|
| Ceramic coverings | After approximately 4 hours in the compound |
| Vapour-proof and moisture-sensitive coverings, e.g. PVC, parquet | If necessary, take a CM measurement. Vapour-tight coverings can be installed at a measured residual moisture of between 2.5–3.0 CM-%. Please note the following information. |

The residual moisture range indicated in the table above is the determining factor. The times listed below were determined under laboratory conditions and should only be regarded as a guide.

With thin-layer levelling coats up to 3 mm, the compound is ready for covering tiles after approximately 4 hours, vapour-proof coverings (e.g. carpet or PVC flooring) after 24 hours and parquet and laminate flooring after 48 hours.

Notes

The technical data refers to 21°C/relative humidity of 55%. Optimum flow properties are achieved in the temperature range >10°C. The flow behaviour is reduced at lower temperatures. In this case, do not add any more mixing water.

5.5 EPS adhesive / Powerprimer

Powerprimer for all absorbent and non-absorbent substrates



At a glance

The solvent-free, acrylate-copolymer-based Powerprimer provides an adhesive and fixing effect for all mineral substrates, such as concrete, masonry, plaster, wood-based materials, polystyrene, gypsum plasterboard and Fermacell, etc.

Depending on the self-adhesive effect and the desired adhesive strength/fixing power, the Powerprimer may be used undiluted (pure) or mixed in a ratio of up to 1:3 with water. We generally recommend using the primer undiluted for connections/constructions in the wall area.

Features

- Fast drying even at low temperatures
- Extremely self-adhesive
- Solvent-free
- Can be processed even after several hours after flash-off
- Also suitable for polysterolse

Processing instructions

The surfaces to be bonded must be load-bearing, damp at most, free of grease, oil and dust and free of loose components. Uneven substrates must be preplastered.

Apply Powerprimer uniformly and undiluted with a brush or even better, with a paint roller and allow it to flash off. The flash-off time can significantly increase with non-absorbent substrates and high humidity.

Tip – use a little power primer, spread evenly – less is more here.

Technical notes and data

| | |
|------------------------|--|
| Basis | Acrylic copolymer dispersion |
| Density | Approximately 1.3 g / cm ³ |
| Solid material | Approximately 62% |
| pH value | Approximately 7 |
| Viscosity | Pasty |
| Colour | White |
| Consumption | Approximately 30–100 g/m ² (depending on the substrate) |
| Processing temperature | 0° to +35°C |
| Flash-off time | 15 minutes (at 20°C, 50% relative humidity) |

Solvents and cleaning agents

Water

Storage

In dry, well-ventilated rooms 12 months after production in the original container not under 10°C.

Protect from frost.

Please note that the indicated values have been determined in the laboratory. You have to carry out your own tests to check the values for your individual production under practical conditions. No liability can be assumed based on this information. We can only guarantee the consistently high quality of our products.

5.6 Ultralite S2 Quick lightweight adhesive mortar

One-component, high-quality, highly deformable, rapid-setting, stable, cementitious lightweight, adhesive mortar with an extended open time and excellent wetting ability as well as very high yield, easy to process, for ceramic tiles, natural stone and thin porcelain stoneware tiles



Application area

Ultralite S2 Quick is used for installing:

- HAKAfloor EPS installation panels on uneven substrates
- ceramic tiles and panels of all types and formats (stoneware, earthenware, porcelain stoneware, clinker and cotto, etc.) for interior and exterior applications
- a large number of natural stones for interior and exterior applications
- thin, large-format porcelain stoneware tiles on walls and floors as well as on the façade, taking into consideration national standards and regulations.
- up to a layer thickness of 10 mm

Ultralite S2 Quick has been specifically developed for installing large-format tiles. Due to its high wetting capacity of the tile backing, Ultralite S2 Quick is particularly suitable for installing thin porcelain stoneware tiles using the buttering-floating method on thermal insulation composite systems.

Technical features

Ultralite S2 Quick is a grey or white ready-mixed dry mortar made of high-quality cement, selected sands, increased synthetic resin content and microspheres made from recycled silicates, which was developed in the MAPEI research laboratories. Using microspheres reduces the weight and consequently improves the sustainability of the construction.

The special manufacturing process, which reduces the density of the product, offers two key advantages:

- Reduced weight (15 kg) of Ultralite S2 Quick with the equivalent volume compared to conventional cementitious mortars (25 kg). This streamlines processing and minimises transport costs
- A high yield: the yield is approx. 80% higher compared to conventional classification S2 cementitious MAPEI adhesive mortars.

Thanks to its low viscosity, Ultralite S2 Quick can be applied more easily and quickly. The good wetting of the tile backing makes it possible to install large-format tiles indoors when using the floating method and is also especially suitable for installing thin porcelain stoneware tiles.

Applying Ultralite S2 Quick using the buttering-floating method on level substrates ensures that the tiles are installed with practically no cavities. This reduces the risk of damage to the surface covering resulting from use. When mixed with water, Ultralite S2 Quick provides a mortar with the following properties:

- Very good stress-relieving properties
- Excellent wettability of the panel backing
- Optimum adhesion to a wide range of substrates used in the construction industry
- Ultralite S2 Quick develops a high early strength after only 2 to 3 hours at +23°C (8 hours at +10°C). This allows the areas to be used again very quickly
- The longer processing time compared to other fast-setting products makes it easier to apply at higher summer temperatures
- Ultralite S2 Quick complies with the S2 classification according to EN 12004. There is no need to add liquid plastic unlike other installation mortars of this classification.

Important notes

Do not use Ultralite S2 Quick:

- on coverings made of metal, rubber, PVC or linoleum
- for natural stone coverings that are highly sensitive to discolouration and staining
- for natural stone coverings and agglomerate slabs that are very sensitive to deformation, such as some serpentinites, sandstones or slates (in this case, use Keralastic).

Do not add water to the installation mortar when the setting process has already started.

Application guidelines

The substrate must comply with the recognised engineering rules. It must be sufficiently dry, load-bearing, solid and free of cracks as well as clean and free of loose components that impair adhesion (e.g. grease, oil, dust, paints and waxes, etc.). After covering with ceramic tiles and panels, cementitious substrates must no longer be subject to any significant shrinkage stresses. Plaster must be dry (drying time is approximately 1 cm per week).

Cement-based screeds are ready for installation once the residual moisture content has been reached in accordance with the applicable national standards and regulations.

The waiting time until the screed is ready for installation may be considerably reduced by using special MAPEI rapid screed binders or dry mortars, such as Mapecem or Topcem or Mapecem Pronto, Mapecem Pronto SL or Topcem Pronto.en.

Sunlit surfaces must be adequately pre-wetted.

Gypsum-bonded substrates and calcium sulphate screeds must be dry, solid and dust-free when the surface covering is installed. Calcium sulphate screeds must generally be sanded clean and vacuumed. The surfaces must be primed before installation with Primer G or Eco Prim T, in areas exposed to high humidity with Primer S. National standards and regulations must be observed.

The evenness of the contact and installation surfaces must meet the requirements of DIN 18202. Suitable MAPEI system levelling compounds can be used to even out unevenness in the floor area.

Mixing

Pour the mixing water (5.1 to 5.7 litres) into a clean mixing container and then add Ultralite S2 Quick (15 kg) and mix with a slow-running mixer (max. 400 rpm) and suitable agitator to form a homogeneous, smooth mortar without any lumps. Allow the mixed mortar to set for approx. 5 minutes and then stir well again. The mortar mixed this way can be processed for approx. 50 minutes (at +23°C and 50% relative humidity).

Applying and installing

To achieve optimum adhesion, Ultralite S2 Quick should be applied thinly as a contact layer before "fresh in fresh" application of the adhesive bed using a notched trowel with suitable serration. The notching is selected taking into consideration the covering to be installed, the expected load and the position of the component - inside or outside.

Dimensional tolerances in the installation substrate and profiling on the reverse side may require deeper comb depths and result in increased material consumption. When installing tiles and panels on wall and floor surfaces outdoors, for tiles with sizes over 900 cm² and in case of high mechanical loads, the installation must be carried out with virtually no gaps in order to avoid damage.

In particular, when installing thin porcelain stoneware tiles, we recommend that the installation mortar is also applied to the tile backing using a suitable notch in order to avoid possible imperfections and the associated risk of cracks and flaking.

The covering to be installed should be free of dust. It is not necessary to wet the tile backing. The panels are inserted by slightly pushing and pressing them into place. The open time is approximately 30 minutes in a standard climate (+23°C and 50% relative humidity). Extreme influences, such as strong sunlight, dry wind, high temperatures and strong absorbency of the substrate may reduce this time to just a few minutes. In order to ensure sufficient adhesion, the adhesive bed must be continuously checked whether any skin has formed. If this has already been carried out, the adhesive bed must be thoroughly combed again before inserting the tile. Do not wet the adhesive bed after any skin has formed, since this process strongly compromises the adhesion bond. Any necessary corrections can be carried out within 15 minutes. The freshly installed covering must be protected from moisture for at least 3 to 4 hours and against frost and intense sunlight for at least 24 hours.

Grouting

Wall and floor joints may be grouted after 2 to 3 hours using the appropriate coloured cementitious or epoxy grouts. Movement and connection joints must be sealed using a suitable MAPEI sealant depending on the expected movement or dimensioning.

Walkability

Floor surfaces can be walked on after approximately 2 to 3 hours.

Final hardness

Covering surfaces can be loaded after approximately 24 hours.

Cleaning

Hands and tools can be easily cleaned with sufficient water when the material is fresh. Remove any residues on the coating using a damp cloth or sponge. Once residues harden, they can only be removed mechanically.

Consumption

0.8 kg/m² per mm layer thickness, this corresponds to 1.5 to 2.5 kg/m².

Storage

Can be stored for 12 months in the unopened original container in a cool and dry place.

Ultralite S2 Quick has a low chromate content according to Regulation (EC) 1907/2006, Annex XVII (REACH).

Precautionary and safety instructions

Ultralite S2 Quick is an irritant and contains cement. Cement has alkaline reactions with moisture (sweat) or mixing water. Skin irritation and burns of the mucous membranes are therefore possible. Avoid eye and prolonged skin contact by wearing suitable protective clothing, such as gloves and goggles. In case of contact with eyes or skin, immediately rinse thoroughly with water.

Please refer to the latest version of the safety data sheet for more information on how to use our products safely.

Disposal

Empty the container free of any free-flowing material. Containers and product residues must be disposed of according to local regulations.

N.B.

The above information is for general guidance only. The working conditions, which are outside of our control and the variety of different materials rule out any claims based on this information. In case of doubt, we recommend conducting sufficient tests on your own. We can only guarantee the consistent quality of our products.

Technical data (approximate values)

| Product characteristics | |
|---|--|
| Consistency: | Powder |
| Colour: | Grey or white |
| Bulk density: | 900 kg/m ³ |
| Dry solids content: | 100% |
| Labelling according to – GISCODE: | ZP1 – Please refer to the safety data sheet for more information |
| Fresh mortar properties (at +23°C and 50% relative humidity) | |
| Mixing ratio: | 34 to 38 parts water to 100 parts Ultralite S2 Quick |
| Consistency of mix: | Soft plastic |
| Mixture density: | 1.100 kg/m ³ |
| pH value of the mixture: | > 12 |
| Processing time: | Approximately 50 minutes |
| Processing temperature: | From +5°C to +40°C |
| Adhesive open time (according to EN 1346): | ≥ 30 minutes |
| Adjustment time: | Approximately 15 minutes |
| Available after: | |
| – Wall: | 2 bis 3 hours |
| – Floor: | 2 bis 3 hours |
| Can be walked on after: | 2 bis 3 hours |
| Fully loadable after: | 24 hours |
| Fixed mortar properties | |
| Adhesive tensile strength according to EN 1348 (N/ mm ²): | |
| – After 28 days: | 2,5 |
| – After heat is applied: | 2,0 |
| – After immersion in water: | 1,2 |
| – After freeze-thaw cycles: | 1,3 |
| – Early strength after 6 hours: | 0,8 |
| Resistant to: | |
| – Lyes: | Highly |
| – Oil: | Highly (except for vegetable oils) |
| – Solvents: | Highly |
| Application temperature range: | -30°C to +90°C |
| Deformation according to EN 12004: | S2 – highly deformable (> 5 mm) |

5.7 Edge insulation strip

Self-adhesive, fleece-laminated polyethylene foam edge insulation strip



Application area

Edge insulation strips to prevent mortar bridges when applying tile adhesives and/or self-levelling floor levelling compounds.

Application examples

- On concrete floors, floating screeds, screeds on separating layers, wooden floorboards and floors made of chipboard as well as old stone and ceramic coverings
- Particularly for renovation work and when using thin-bed mortars
- Ensuring the impact sound-absorbing edge setting of slab coverings

Technical features

- Fleece-laminated, self-adhesive edge insulation strip on one side
- Tight installation on the wall without any bonding on the wall side
- Elastic
- Non-rotting
- Moisture-resistant
- Water-vapour permeable
- High level of adhesion on clean and dust-free substrates
- Prevents sound bridges and forced stresses
- Safe and easy corner formation

Processing

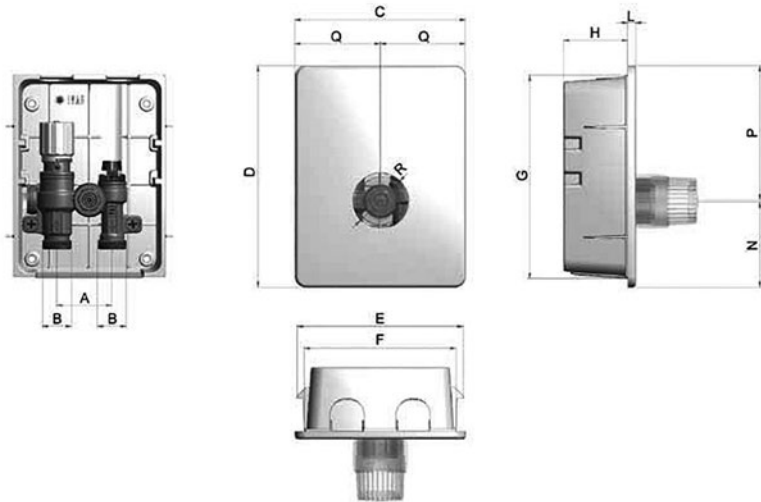
- The substrate must be clean, dry and free of dust.
- Remove the protective film.
- Press the self-adhesive strip firmly onto the substrate without prestressing.
- To form the corner, cut the polyethylene foam strip and cut through the fleece.
- Roll of 20 m (50 mm high).

5.8 IC BOX control units

For a constant return temperature without an additional mixing and pump unit

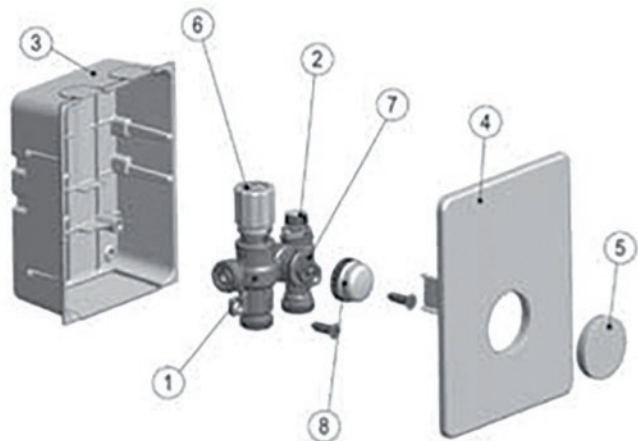


| | |
|---|---------|
| A | 50 mm |
| B | ¾" EK |
| C | 155 mm |
| D | 202 mm |
| E | 151 mm |
| F | 138 mm |
| G | 185 mm |
| H | 58.5 mm |
| L | 7 mm |
| N | 79 mm |
| P | 123 mm |
| Q | 77.5 mm |
| R | 50.5 mm |



Components

1. Brass body
2. Manual vent valve
3. Flush-mounted box
4. Cover
5. Insert
6. Limiting rotary knob for return flow temperature (RTL)
7. Thermostat connection screw
8. Protective cap



Operating conditions

- Maximum static operating pressure: 10 bar
- Fluid in contact: water/water-glycol mixtures
- Maximum temperature of the heating water (design limit): 90°C
- See sections "System features and types" and "Setting the return temperature" for more details on the maximum inlet operating temperatures.

IC Box features and types

- Hold the return temperature of the fluid constant
- Allow you to limit the average temperature of the heating water
- Are suitable for high temperature systems*
- Must be installed in the return of the floor heating circuit

* to the extent that they comply with the requirements of standard EN 1264 (see section "Setting the return temperature")

Installation instructions

Preparing the system

The connections of the IC-BOX are $\frac{3}{4}$ " Eurocone connections with a centre distance of 50 mm.m.

Make sure that the pipes leading to the installation box match these specifications. If necessary, also install the necessary channels in the wall for installing capillaries or electrical cables.

The IC BOX must be installed in the return of the underfloor heating circuit. Check that the direction of flow coincides with the arrow printed on the brass body.

Wall assembly

Make a niche in the wall with a depth of ≥ 59 mm and a height suitable for accommodating the flush-mounted box (≥ 186 mm) and connecting the pipes. The niche width must be 152 mm. Insert the flush-mounted box without the cover and install it in the wall. Four holes must be drilled in the back of the box for fastening it with screws, if necessary.

Connecting to the HAKAfloor metal composite pipes

Cut the pipes to the correct length. Cut the pipe neatly and perpendicular to the axis. Take care not to cause the pipe to become oval and leave any burrs or irregularities.

The IC-BOX is connected to the return pipe of the floor heating system with a $\frac{3}{4}$ " Eurocone screw connection. Only use specific connections for the type of pipe installed. Assemble the connection parts in the correct order. Apply the specified tightening torque. Please note that rubber parts must not be lubricated with mineral-based oil or grease. Water (is preferred) or silicone-based lubricants may be used. At this stage, the brass body of the IC-BOX may be unscrewed from the box using the two cross-head screws, if necessary. It must be replaced after the pipes have been connected:

This step should only be performed if it is urgent and carefully to avoid damaging the plastic nuts.

Assembling the thermostatic head with the built-in sensor

Remove the cover lock to create space for the thermostatic head. The circular opening has a diameter of 50 mm. Make sure that the diameter of the thermostatic head selected is not larger than this value.

The IC BOX is fitted with a thermostat connection screw with an M30 x 1.5 thread, which is suitable for mounting a control unit with a built-in sensor. Similar to ordinary thermostatic head installations, do not perform installations where the head is located behind curtains, under a window sill or in general, in a position that does not reflect the room temperature. To install the thermostatic head, remove the protective cap and open the head completely. To make it easier to screw the threaded ring, assemble the head on the connecting screw and tighten the threaded ring by hand until it stops.

Ventilation

The IC BOX is identified with a manual vent valve. The venting must be carried out with circulating water: This is why it must be checked that no existing control devices (return temperature controller, thermostatic head, electrothermal control or volume limiting valve) or other devices upstream or downstream of the IC-BOX limit the flow. To perform the venting procedure, unscrew the rotary wheel, which is made of white synthetic resin, until no air comes out of the venting opening, but only a steady stream of water. Close the rotary wheel clockwise again.

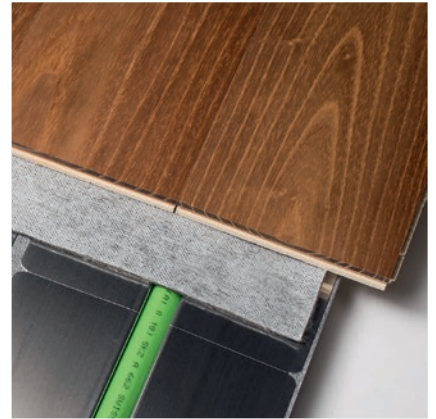
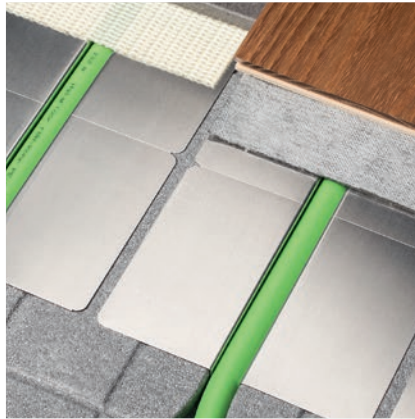
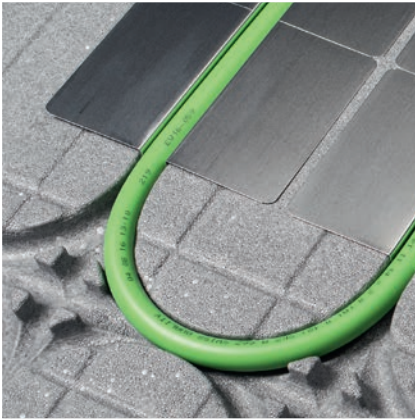
Setting the return temperature

The underfloor heating circuit and the corresponding settings must be implemented in accordance with standard EN 1364. Please note that, according to part 4, the temperature of the cement screed around the heating pipes must not exceed 55°C. In addition, according to parts 2 and 3, the temperature of the floor surface must not exceed 29°C in the areas that can be walked on and 35°C in the edge areas. In addition, the restrictions listed by the manufacturers regarding the materials must be observed.

To set the return temperature, use the corresponding rotary knob according to the following table:

| 0 | 1 | 2 | 3 | 4 |
|-----|-----|-----|-----|-----|
| 15° | 25° | 31° | 39° | 45° |

The return temperature is selected depending on the supply temperature: We generally recommend that average temperatures do not exceed 35-38°C. Example: for a flow temperature of 50°C, we recommend a return temperature of 25°C. The setting at 15°C is intended to circulate a reduced water flow to prevent the pipes from freezing.



Installation matrix

6.1 Mapei

6.2 PCI

6.3 ARDEX

6.1 Adhesive recommendation with Mapei products



| | Natural stone | Porcelain stoneware | Parquet | Linoleum | Carpet |
|--|--|---|--------------------------|--|-----------|
| Substrate – Silicate-based floor levelling compound (at least 3 mm) | | | | | |
| Primer | Primer G | Primer G | | Prime the substrate using Eco Prim T Plus and smooth it with e.g. Fiberplan | |
| Adhesive | Elastorapid Keraquick Plus S1 | Ultralite S2 Ultralite S2 Quick Elastorapid | Ultrabond Eco S958 1K | Ultrabond Eco 530 | Aquacol T |
| Joint | Ultracolor Plus | Ultracolor Plus | | | |
| Silicone | Mapesil LM | Mapesil AC | | | |
| Other/ notes | The absorbable breaking force of the covering material must be greater than the applied point load from use. | | Multilayer parquet only | In order to minimise the impression behaviour of resilient floor coverings under point load, the layer thickness should be sufficient. | |

6.2 Adhesive recommendation with PCI products



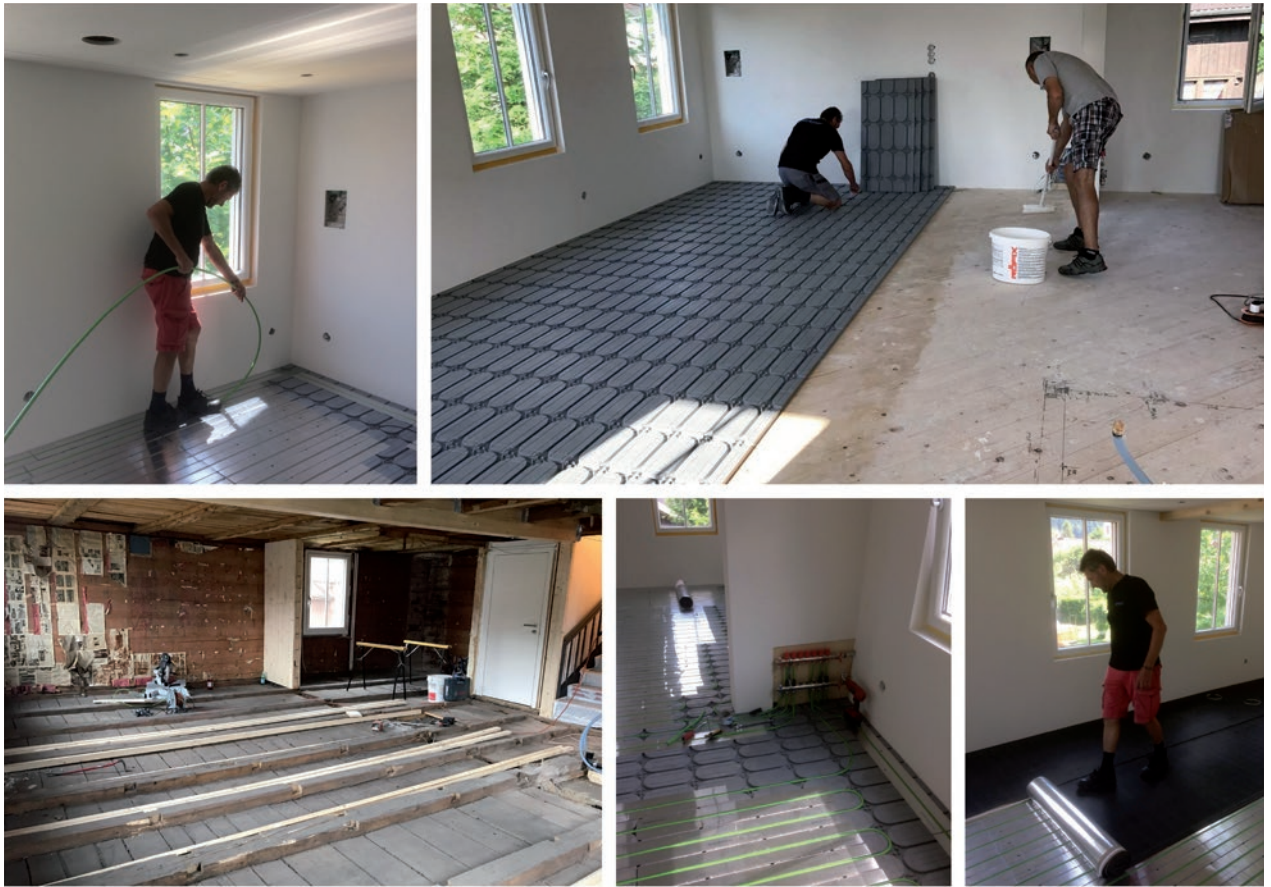
| | Natural stone | Porcelain stoneware | Parquet | Linoleum | Carpet |
|--|--------------------------------|--|------------------------------|---|---------------|
| Substrate – Silicate-based floor levelling compound (at least 3 mm) | | | | Before installation, prime the substrate with Thomsit R 766 and level with Thomsit FA 97 | |
| Adhesive | PCI Carraflex PCI Carrament | PCI Flexmörtel Premium PCI Flexmörtel S1 Flott PCI Flexmörtel S2 | Thomsit P 695 | Thomsit L240 D | Thomsit T 440 |
| Joint | PCI Nanofug Premium | PCI Nanofug Premium | | | |
| Silicone | PCI Carraferm. | PCI Silcoferm S PCI Silcofug E | | | |
| Other/ notes | | | Only 2 or 3-layer parquet | To avoid punctures / dents in the linoleum, make sure that the layer thickness of the filler is sufficient. | |

6.3 Adhesive recommendation with ARDEX products



| | Natural stone | Porcelain stoneware | Parquet | Linoleum | Carpet |
|---|---|---|---------------------------|-------------|-------------|
| Substrate – Silicate-based floor levelling compound (at least 3 mm) | PRIMING THE SUBSTRATE USING ARDEX P51 MV 1:3 | PRIMING THE SUBSTRATE USING ARDEX P51 MV 1:3 | | | |
| Adhesive | ARDEX N23* | ARDEX X78* | ARDEX AF460* | ARDEX AF270 | ARDEX AF270 |
| Joint | ARDEX MG | ARDEX G85 | | | |
| Silicone | ARDEX ST | ARDEX SE | | | |
| Other/ notes | * Format bis 30x30 cm | * Format bis 30x30 cm | * Mehrschichtpar- kett | | |

* For larger tile formats up to 60 x cm, ARDEX X78 must be mixed with ARDEX E90. The substrate must be durable, solid, load-bearing and torsion-resistant. Sufficient movement joints must be implemented in the construction according to the applicable technical guidelines and standards.



Practical images





Disclaimer

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