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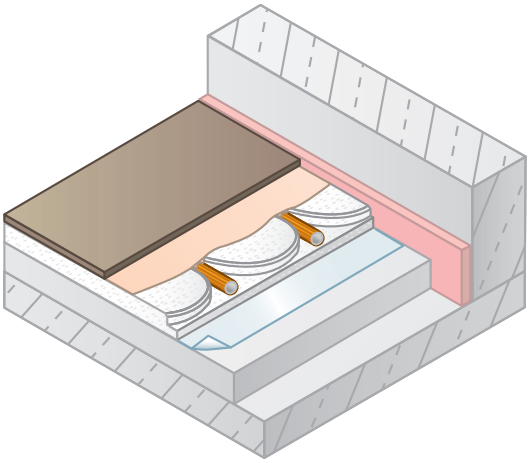
DRYWALL FLOOR HEATING

VarioComp.

Installation

VARIOTHERM

HEATING. COOLING. COMFORT.



Installation instructions

e80915

1. Safety information

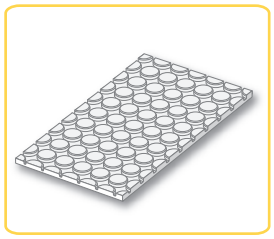
1.1 Provisions

- These installation instructions are intended for authorised specialist personnel
- Observe locally applicable provisions and standards for electrical installations, heating installations, floor covering work and dry floor construction.

1.2 Guarantee conditions

If the heating system is installed or commissioned incorrectly, all claims on the basis of the manufacturer's warranty and guarantee become void. Our respective applicable installation instructions are an integral part of our guarantee!

1.3 Compact panel



Compact panel,
1000 x 600 mm

The Compact panel is a milled 18 mm FERMACELL gypsum fibre panel and is delivered on pallets. When storing the Compact panel pallets, observe the load-bearing capacity of the place where they are being stored.
A single panel weighs 10.8 kg (50 pcs. / pallet)
The Compact panels should always be stored flat on an even surface. They should be protected from moisture, particularly rain. Panels that have become damp for a short time should only be used after they have completely dried out.
Always store the Compact panels with the naps facing upwards.

How to lift, carry and lay single Compact panels correctly:

Important: Carry single panels alone, as they may otherwise break in the middle.

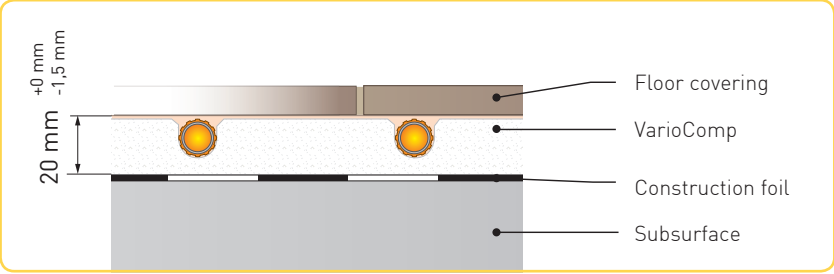
Lifting, carrying and laying down several panels:

If 5 or more panels are being transported at once, this must be done by two people.
First lower the Compact panels onto one edge and then lower them completely. Vertical storage leads to deformation of the panels and damage to the edges. It is possible to transport the panels horizontally inside the building with a lift truck or other panel transportation vehicle.

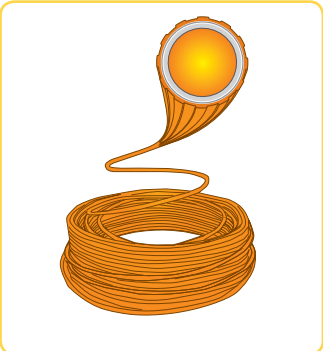
1.4 Compact filling compound T7 storage

Compact filling compound is supplied on pallets in sacks weiching 25 kg. Ensure dry storage in shrink wrap until processing. Maximum storage time is 12 months.

1.5 Tolerances



1.6 VarioProFile pipe 11.6x1.5 Laser



The VarioProFile pipe is a 5-layer metal composite pipe (100% oxygen tight).
Delivery scope: in 100, 300 and 500 m rolls (packed in cardboard).
In order to prevent the VarioProFile pipe from being damaged by drilling or chiselling during the construction phase, high-visibility warning signs should be placed at appropriate locations (see also page 6).
The VarioProFile pipe is only weather-resistant to a limited extent, to be shielded from direct sunlight and should not be stored outdoors. Normal intermediate storage on the construction site for a few days is permissible. Damage must be avoided during storage, transport, unloading, unwinding and laying. This type of damage has a detrimental effect on the creep behaviour. The packaging should be opened by hand and not with sharp utensils. Coils which have been opened can be bound together again with adhesive tape.

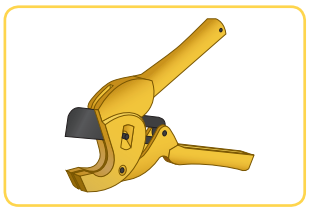
1.7 Coordination of floor construction

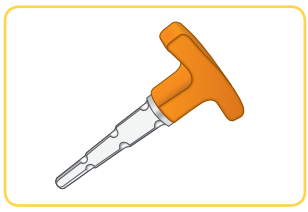
The following items must be coordinated between the architect, construction manager, installation technician and floor layer:

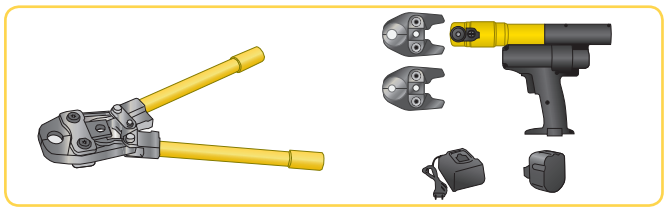
- Horizontal level line
- Floor structure with:
  - Strength appropriate to the level of use
  - Necessary vapour retarders/barriers
  - Necessary thermal insulation/impact sound insulation
- Expansion joints
- Compact filling compound to be applied by installer, floor layer or construction manager
- Floor covering, with heat sensors if necessary

1.8 Tools

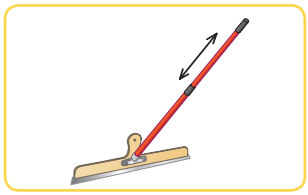
Available in the Variotherm range:


Pipe cutting pliers


Calibration and chamfering tool

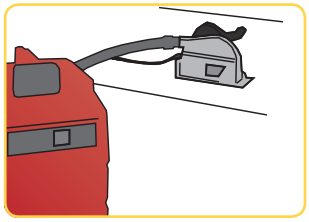

EcoPress or AkkuPress Mini pressing tool, incl. press-fitting jaws

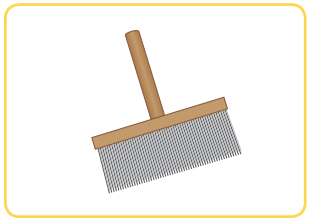
30 L bucket

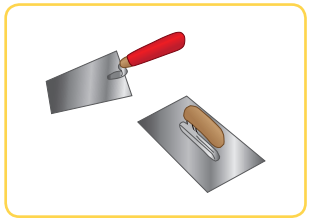

Scraper

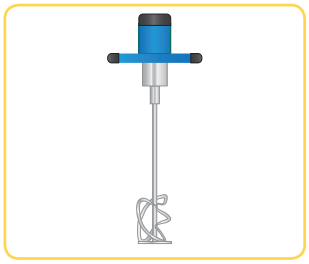
Other recommended tools (to be provided by customer):

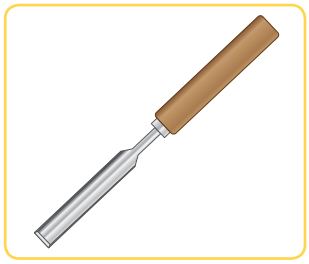

Vacuum cleaner


Circular saw with vacuum attachment or jig saw


Brush or paintbrush for cleaning


Trowel & plastering knife for cleaning


Agitator


Woodworking chisel

2. Properties of the subsurface

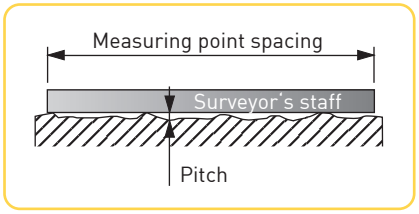
The Compact panel is purely a pipe bracket and thermal conduction element. The necessary static support, heat and impact sound insulation and protection against moisture diffusion must already be provided by the construction underneath the Compact panel. The rooms must be cleared out, clean, grease-free, dust-free and dry. Residual plaster and mortar must be removed. All professional installers carrying out subsequent work must be informed of the floor heating installation in order to avoid damage. You can hang an information sign at an appropriate place in the construction site – available from www.variotherm.at (Service/Info centre).

2.1 Dryness of the subsurface

The subsurface must be dry, dust-free and grease-free. The residual moisture may not exceed 1.0% CM.

2.2 Evenness of the subsurface

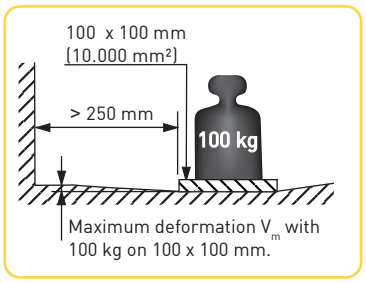
The required evenness is as follows (ÖNORM DIN 18202):



Measuring point spacing	0.1 m	1 m	4 m	10 m
Pitch max.	1 mm	3 mm	9 mm	12 mm

2.3 Load-bearing capacity of the subsurface

The load-bearing capacity specified in the table below must be provided.
If there are several concentrated loads, these must be at least 500 mm apart.
Caution! The sum of the concentrated loads must not exceed the maximum permissible floor load capacity. Particularly heavy objects (pianos, aquariums, bathtubs) must be given special consideration!

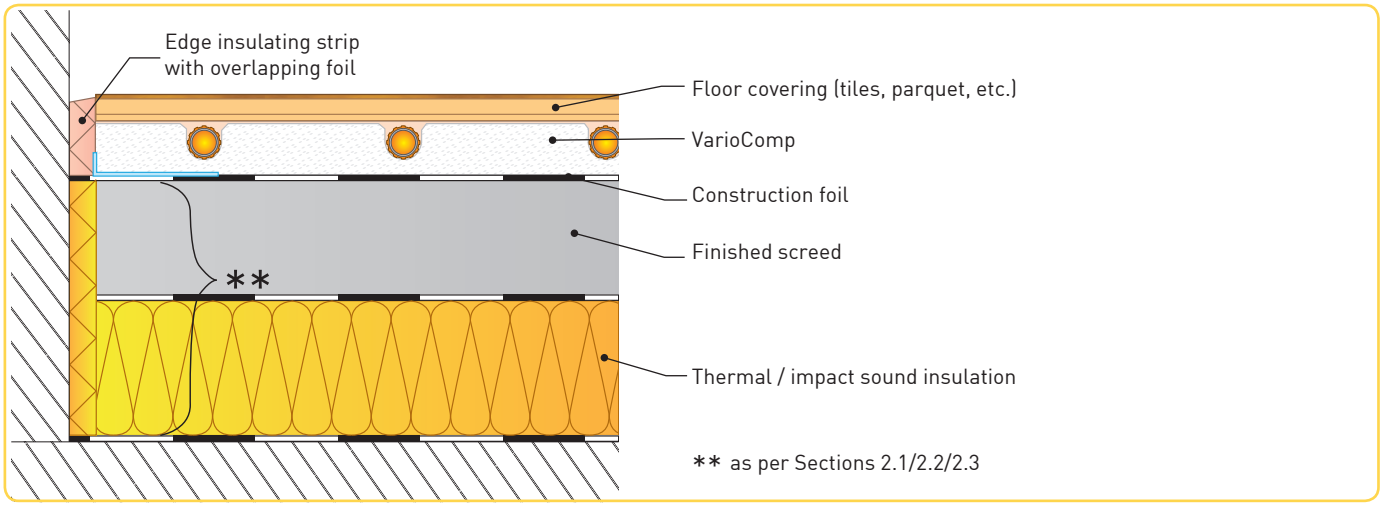


Room usage examples in accordance with ÖNORM EN 1991-1-1	Max. concentrated load Q_k [kN]	Max. service load q_k [kN/m²]	Max. deformation V_m [mm] (with 100 kg on 100 x 100 mm)
Category A1: Floors of rooms in residential buildings and houses, wards and hospital rooms (without heavy diagnostic instruments), rooms in hotels and lodgings, kitchens, toilets and rooms with residential-type use in existing buildings **Category B1:** Office floors in existing buildings	2.0	2.0	1.5
Category B2: Office floors in office buildings **Category C1:** Floors in rooms with tables etc., e.g. classrooms in schools, cafés, restaurants, food halls, reading rooms, reception rooms, wards and hospital rooms (with heavy diagnostic instruments)	3.0	3.0	1.0
Category C2: Floors in rooms with fixed seating, e.g. in churches, theatres, cinemas, conference rooms, lecture halls, meeting halls, waiting rooms, train station waiting rooms	4.0	4.0	(Floor structure on request)

2.4 Examples of floor structures

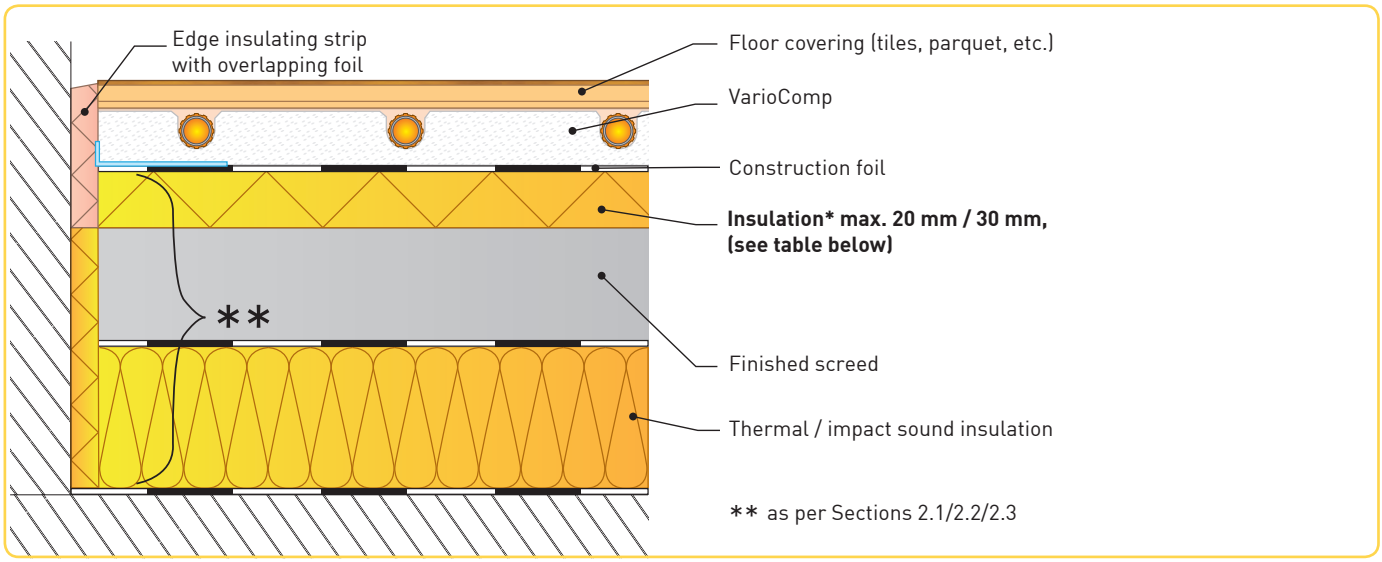
Compact floor heating on an existing subsurface

Room usage A2/A3 + B1/B2 + C2



Compact floor heating directly on thermal insulation / impact sound insulation

Room usage A2/A3 (+ B1/B2)



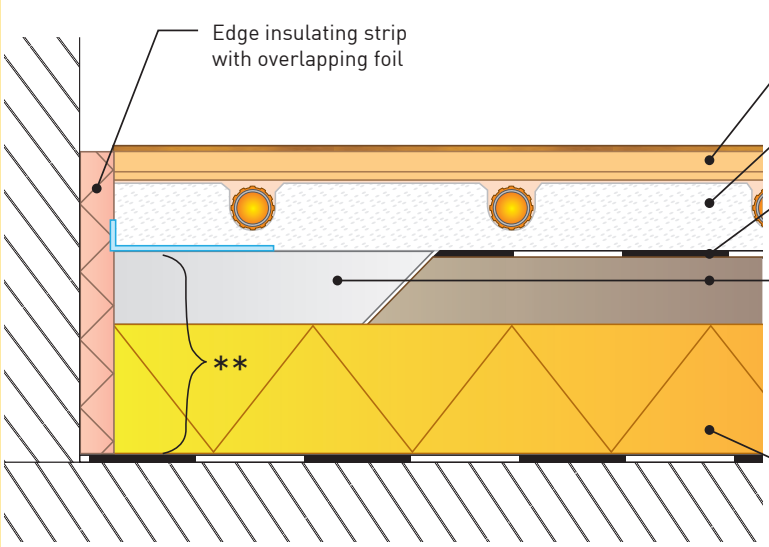
*Panels with **insulation max. 20 mm, compression strength 200 kPa (20 t/m²)** at 10 % compression **(Room usage A1/B1)**	*Panels with **insulation max. 30 mm, compression strength 300 kPa (30 t/m²)** at 10 % compression **(Room usage A1/B1 + B2/C1)**
Insulation panels and base panels	
Styrodur 2800C, Austrotherm Universalplatte, Austrotherm Uniplatte, DOW Floormate 200-A, DOW Styrofoam LB-A/LBH-X/RTM-NC-X, Jackon Jackodur CFR 300, Unifloor Jumpax CP/Heat-Pak, Variotherm XPS panel 10-200	Styrodur 3035CS, Austrotherm XPS Top 30, Foamglas T4+, DOW Floormate 500-A, DOW Styrofoam LB-A/LBH-X/RTM-NC-X, Kingspan Styrozone H 350 R, Jackon Jackodur CFR 300, Unifloor Jumpax CP/Heat-Pak
XPS panels with plastered weave on both sides	
Wedi Bauplatte, Jackon Jackoboard, PCI (BASF) Pecidur	PCI (BASF) Pecidur, Jackon Jackoboard, Wedi Bauplatte
Wood fibreboard	
Steico Universal, Steico Underfloor, Pavatex Isolair L22, Gutex Multiplex-top	-
Impact-sound insulation panel	
Ceresit/Cimsec CL58 Mutiverlegeplatte, Murexin Unitop, Ardex DS 40, PCI (BASF) Polysilent, Unifloor Heat-Foil/Redupax/Redupax+	Ceresit/Cimsec CL58 Multiverlegeplatte, PCI (BASF) Polysilent, Unifloor Redupax+

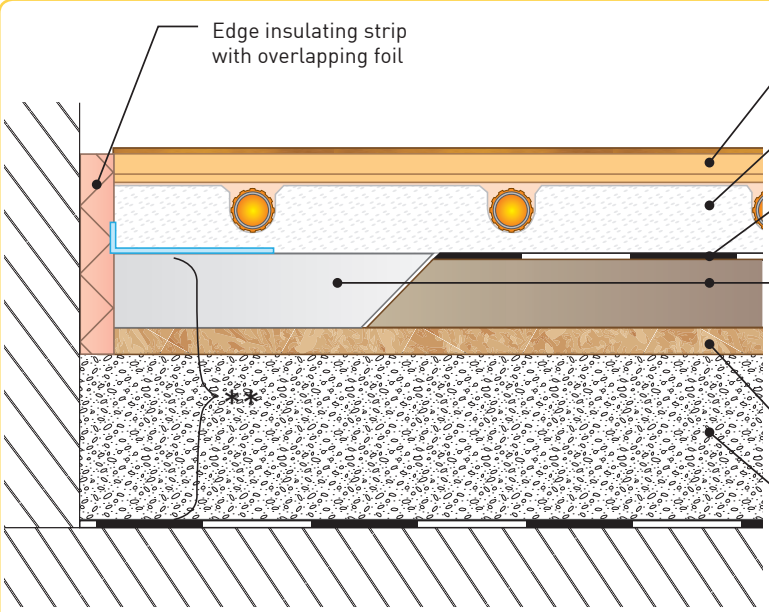
Compact floor heating on a load distribution layer

Room usage A2/A3 + B1/B2

A load distribution layer is required for:

- thermal insulation and impact sound insulation with a thickness > 30 mm or compression strength < 200 kPa (20 t/m²) at 10 % compression
- Substructures with a maximum deformation exceeding V_m (caution with wooden tram ceilings and infill)

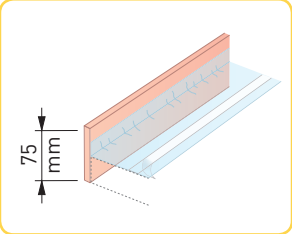




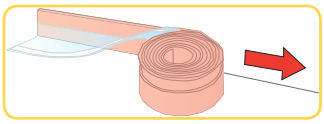
Structure with loose Europerl® fill

3. Installation

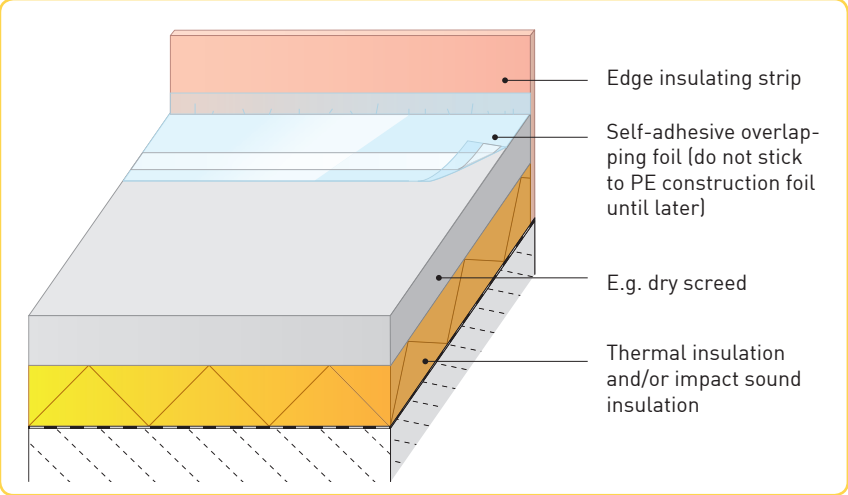
3.1 Edge insulating strip



Edge insulation strips are to be applied along the exterior walls, and also around columns, steps, door frames, pillars, shafts etc. before the Compact floor heating is laid. Edge insulation strips made of thin profiled ribbed board are unsuitable. As per ÖNORM EN 1264-4, the edge insulation strip must allow movement of at least 5 mm.



The edge insulation strip should reach from the load-bearing subsurface (or the lower edge of the top insulation) to the upper edge of the covering. If this is not possible due to the construction, the edge insulation strip must at least reach from the lower edge of the Compact panel to the upper edge of the covering.

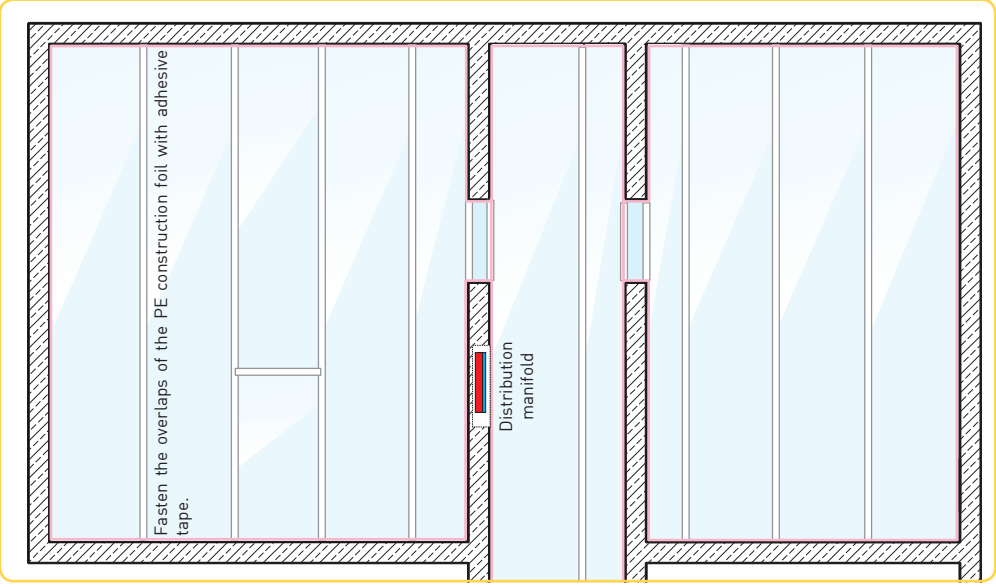


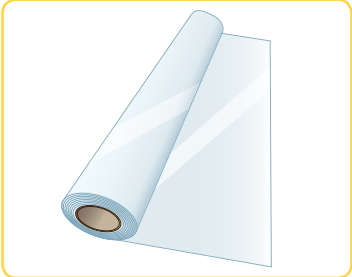
The foil of the edge insulation strip is stuck to the construction foil using the adhesive strip.

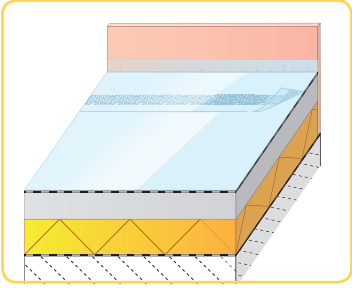
After the upper covering has been completed, the protruding remainder of the edge insulation strip is removed (by folding down).

3.2 PE construction foil

The construction foil is laid under the entire surface under the Compact panel with an overlap of 30 mm and fastened with adhesive tape. In the edge areas, the construction foil is stuck to the overlapping foil of the edge insulating strip (self-adhesive strip).



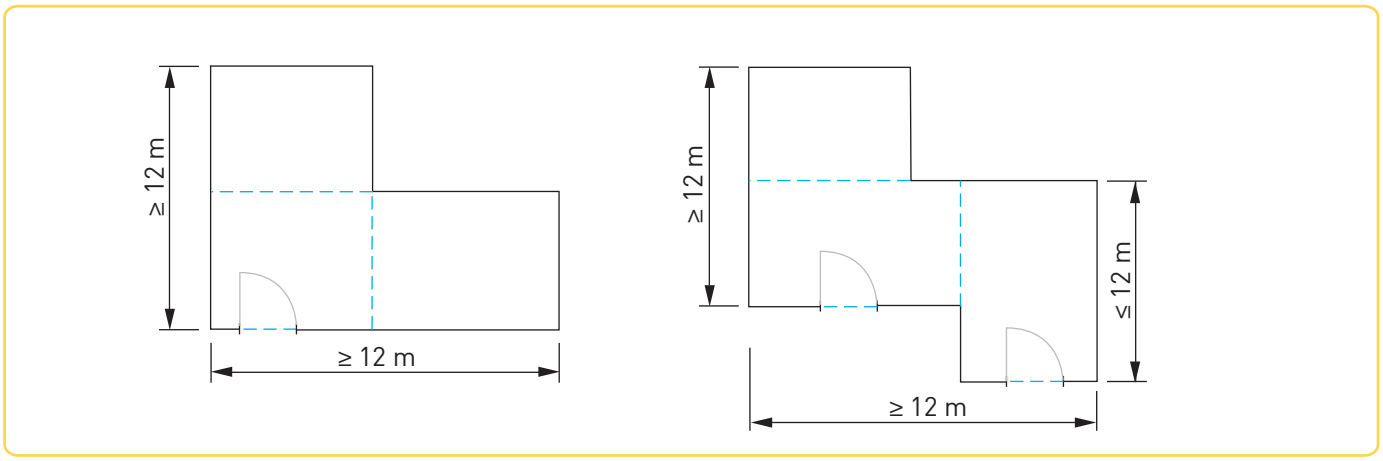




Example for laying the construction foil

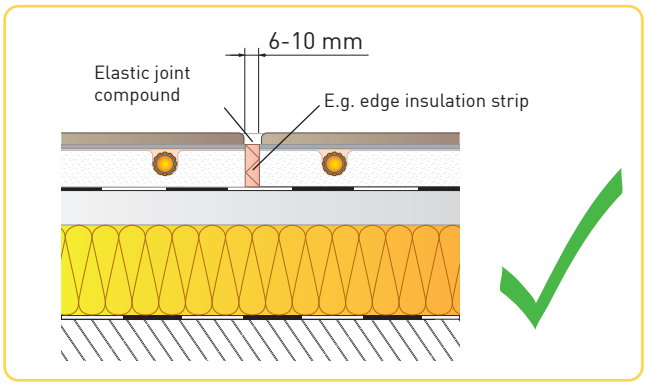
3.3 Movement joints

Movement joints (e.g. with edge insulation strips) are attached to provide tension-free accommodation of length alterations. These are to be defined by the architect or planner.

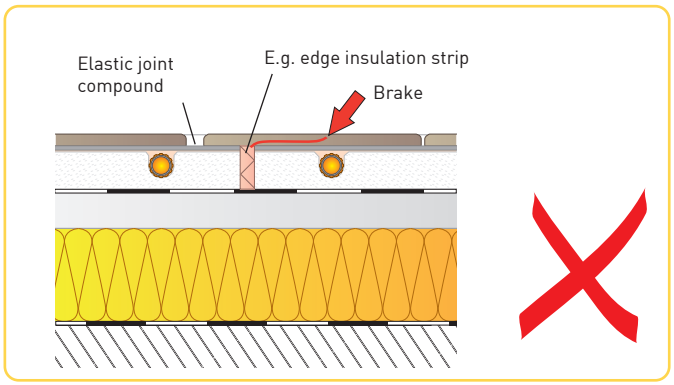


- Max. section size 80 m², max. edge length 12 m
- Keep the number of pipe feed-throughs through the movement joints as small as possible

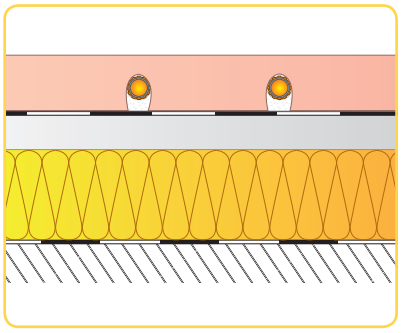
The movement joints are particularly significant in the case of ceramic coverings. It is crucial that the movement joints run congruently in all layers (compact floor heating and floor covering).



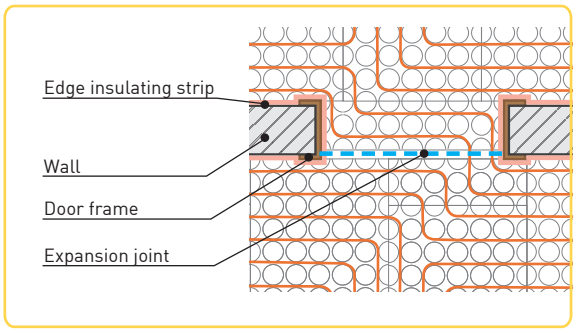
Correct movement joint



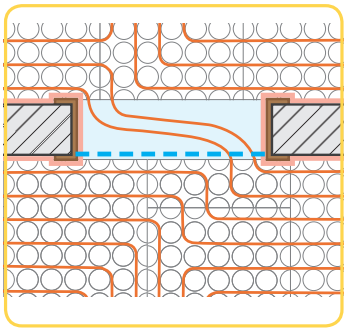
Incorrect movement joint



Pipe feed-through through the movement joint
(no sleeve tube required)

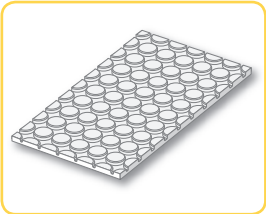


In the vicinity of the door, the expansion joint is fed through under the door leaf.
Variant 1: Door area fitted with Compact panel

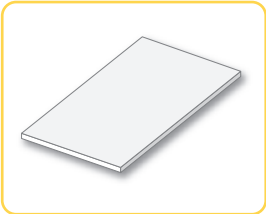


Variant 2: Later, only use Compact filling compound to fill in the door area.

3.4 Compact panels



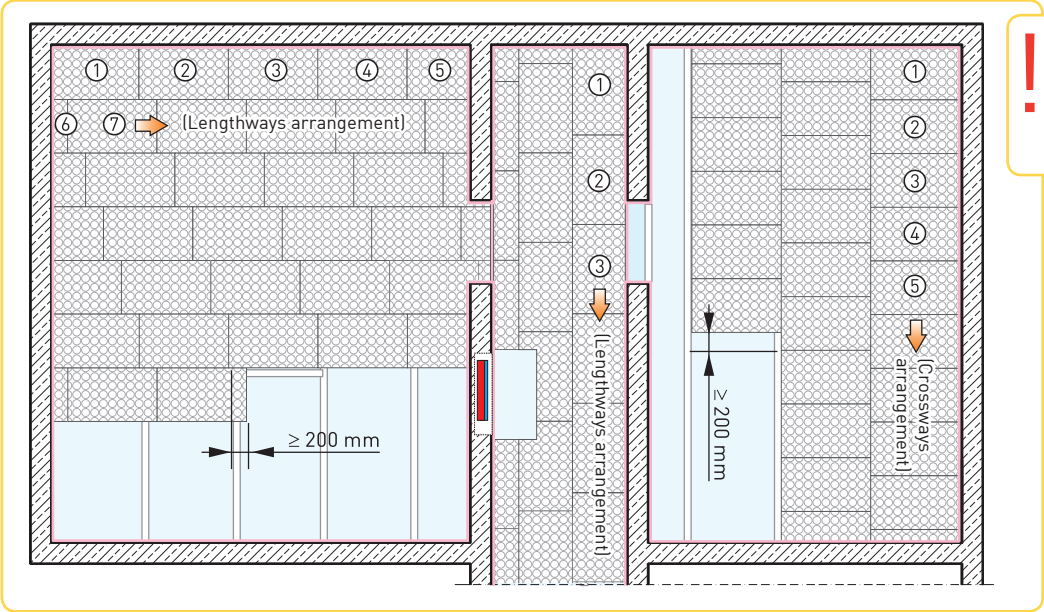
Compact panel, 1000 x 600 mm



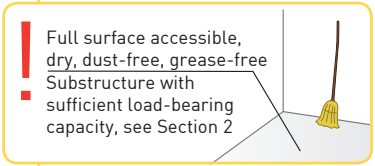
Blank panel, 1000 x 600 mm and 2000 x 600 mm

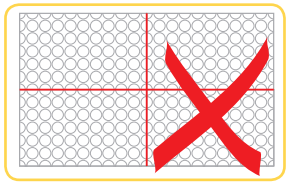
The mean daily relative humidity must not exceed φ = 70 % when laying the Compact panels. The floor must be clean, grease-free, dust-free and dry.
Blank panels instead of the compact panels are used for unheated areas, e.g. under kitchen units etc.

The Compact panels are arranged lengthways or crossways, edge to edge, offset by 200 mm.

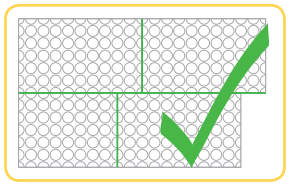


Possible laying patterns of the Compact panels



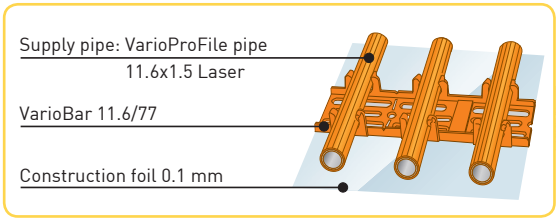


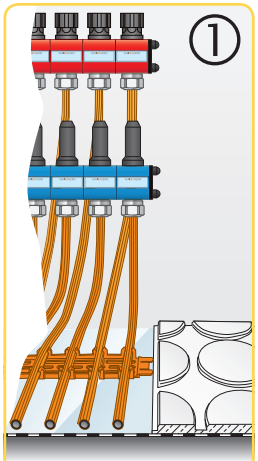
Avoid cross joints!

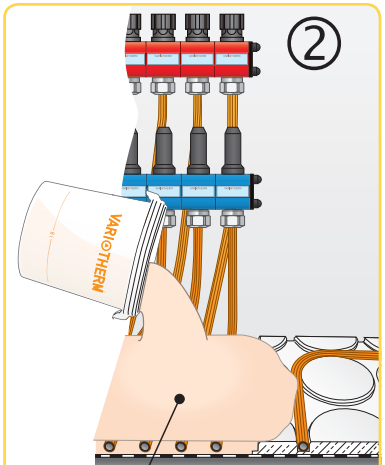


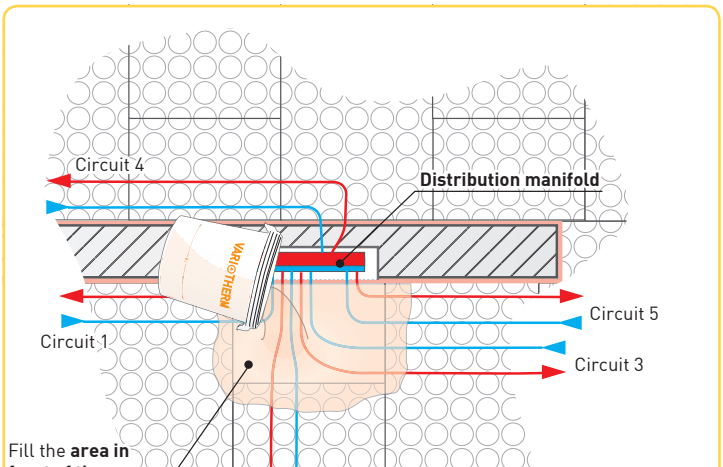
≥ 200 mm overlap

The area in front of the distribution manifold is left free because of the supply pipes (pipes are close together). The VarioBar 11.6/77 can be attached to fix the supply pipes in place. After the pipes have been laid, the supply pipe area is completely filled up with filling compound (see chapter 3.7).

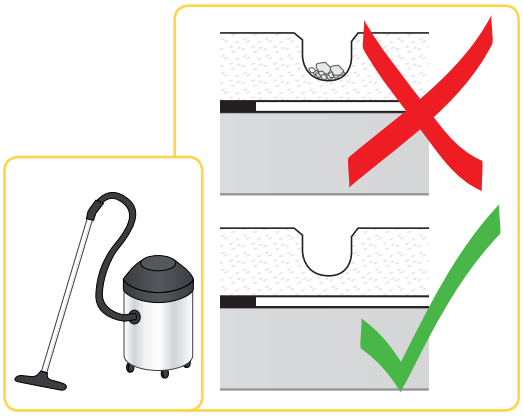








3.5 VarioProFile pipe 11.6x1.5 Laser

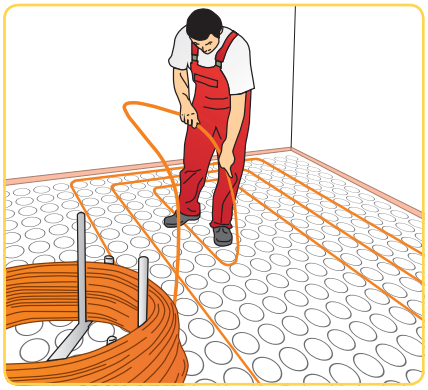


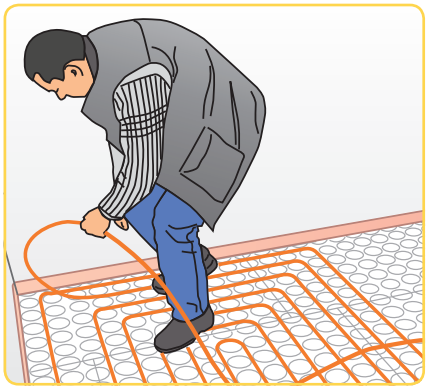
Grooves must be clean

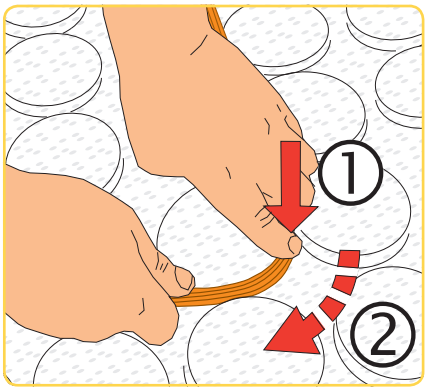
IMPORTANT:
Maximum pipe length per heating circuit including supply pipes: 80 m (pay attention to the pump design).
Pipe length requirements at 100 mm spacing: 10 m/m². As a guide, there are markings on the Variomodular pipe after each metre.

Laying the VarioProFile pipe 11.6x1.5 Laser:
The VarioProFile pipe 11.6x1.5 Laser is routed with no twisting from the heating distribution manifold to the respective room.
Be sure to also account for the pipe lengths from the floor to the heating distribution manifold connection point. The VarioProFile pipe is placed between the naps of the Compact panels at a spacing of 100 mm or 200 mm. 200 mm spacing is not suitable for living rooms or barefoot areas.

Caution! Do not make any folds in the pipe! Manual bending without warming is possible with room temperatures above +5 °C. At lower temperatures, the VarioProFile pipe is to be pre-warmed.



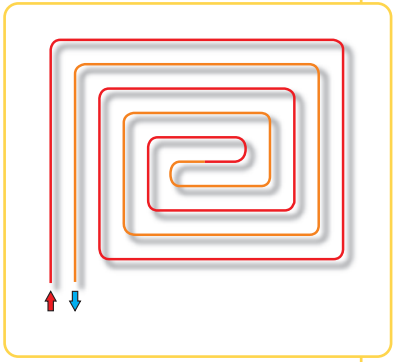




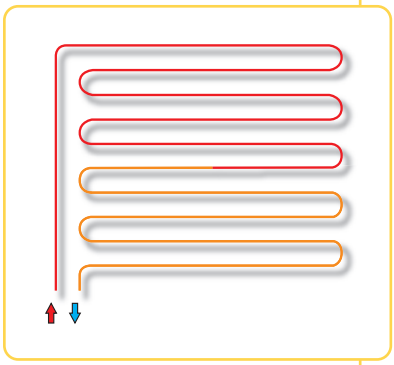
You can easily lay the Variomodular pipe while walking: Press between the naps with a flat shoe sole.

Manually insert multiple bends one after another.

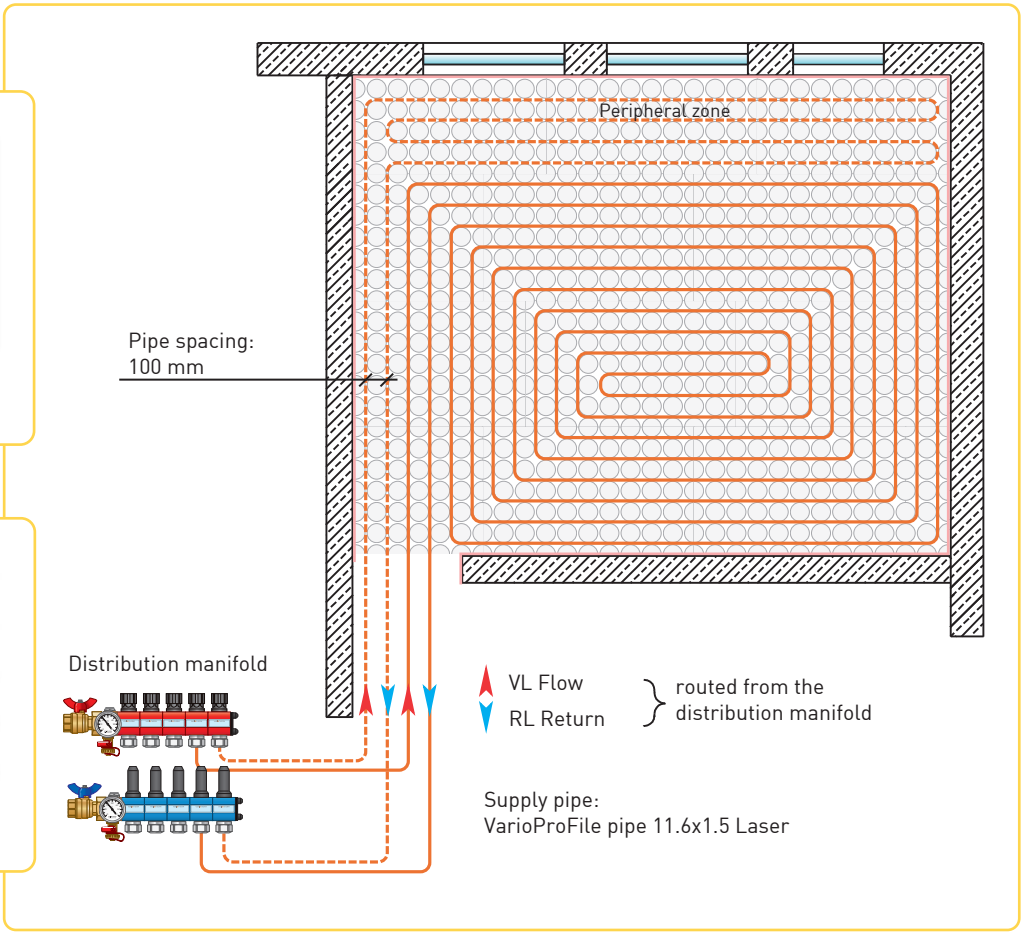
After the heating circuit is completed, the VarioProFile pipe is returned to the heating distribution manifold, cut off at the appropriate place and calibrated.



Bifilar system



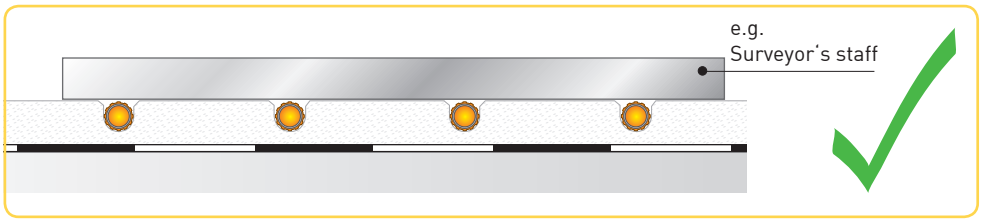
Meander system



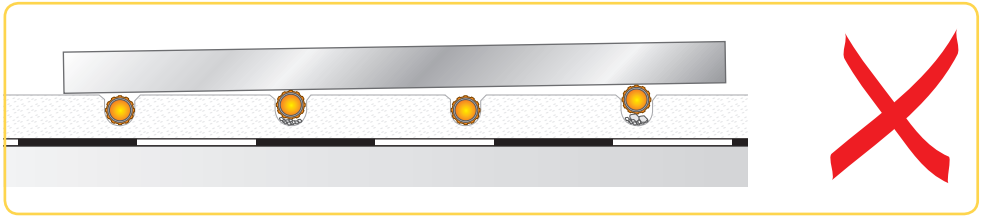
Example layout

Bifilar system: Even distribution of surface temperature because the flow is positioned next to the return.

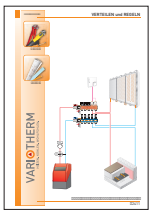
Meander system: Less even distribution of surface temperature for small and ancillary rooms and peripheral zones.



Correct: All Variomodular pipes lie at the Compact panel level.



Wrong: The Variomodular pipes protrude out of the Compact panel level.



„DISTRIBUTION and CONTROL"

Details regarding the system and heating circuit pipes and the room temperature control are provided in the „DISTRIBUTION and CONTROL" planning and installation manual.

3.6 Connecting the Variotherm pipes (press-connection)

For processing residual pipes or repairing the pipes a lasting and permanently attach among the VarioProFile pipes are possible with press-fit couplings.

Note:

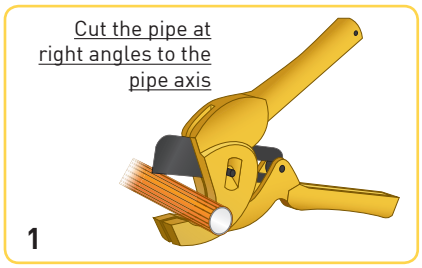
A lasting, tight connection is only guaranteed if original Variotherm system components are used:

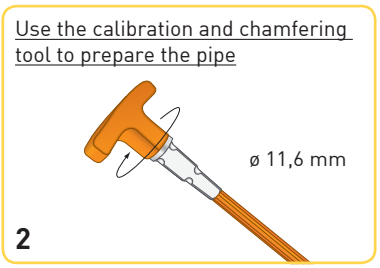
- VarioProFile pipe 11.6x1.5 Laser
- Variotherm calibration and chamfering tool
- Variotherm Press-fit couplings + associated Variotherm pressing tool

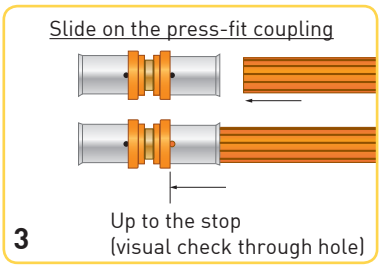
Maintenance

The press-fitting jaws and pressing tool must be checked at least once a year for correct operation by REMS or an authorised REMS customer service workshop.

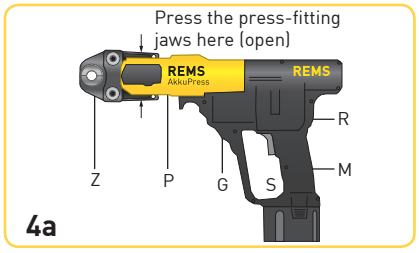
Preparation

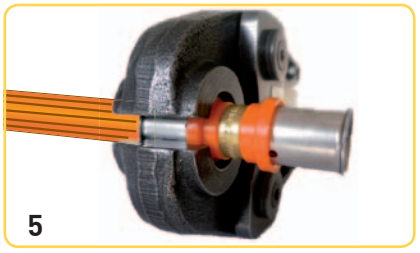


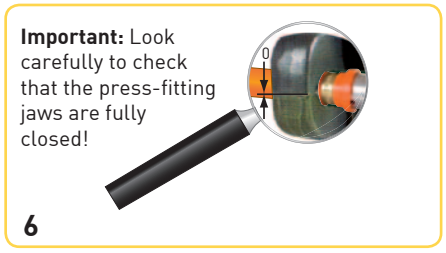




Pressing procedure for AkkuPress **4a**

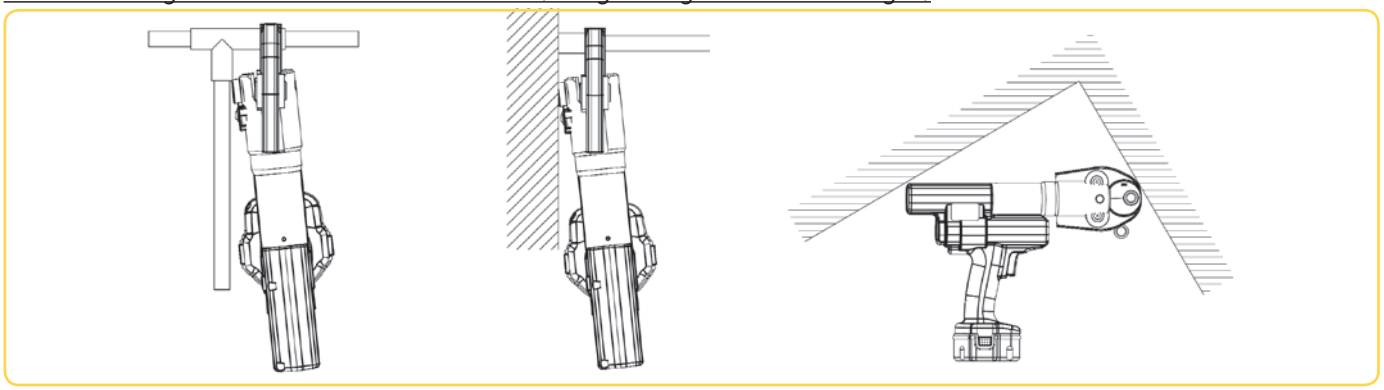




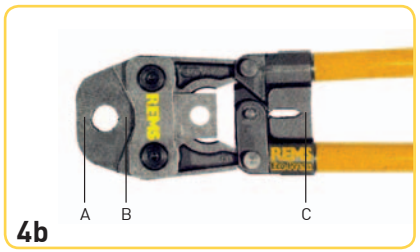


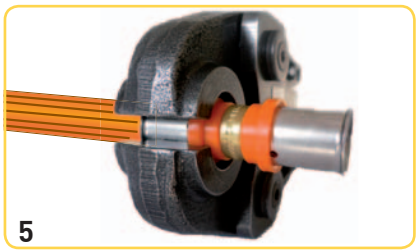
- Press the press-fitting jaws (Z) together by hand (press-fitting jaws open), far enough so that the press-fitting jaws can be slid over the press-fit coupling **(5)**. Position the pressing tool with press-fitting jaws on the press-fit coupling at right angles to the pipe axis.
- Release the press-fitting jaws so that they close around the press-fit coupling **(5)**.
- Hold the pressing tool at the housing grip (G) and at the motor grip (M). When using a REMS AkkuPress, hold the switch (S) pressed until the press-fitting jaws are fully closed. This is made apparent by an audible click **(6)**.
- Press the reset lever (R) until the pressing rollers (P) have retracted completely. Press the press-fitting jaws (Z) together by hand so that the jaws can be removed from the press-fit coupling (see also the REMS AkkuPress operating manual).

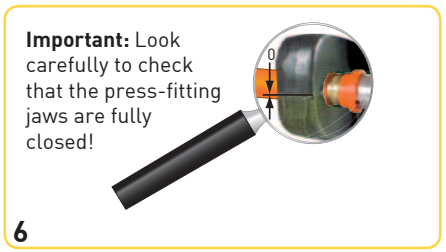
The following situations must be avoided (danger of gearbox breakage!)



Pressing procedure for Eco-Press **4b**

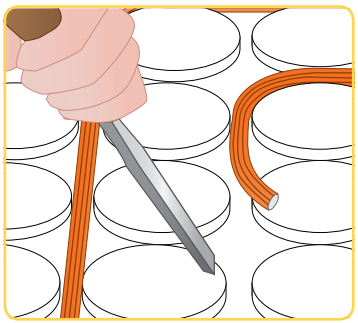


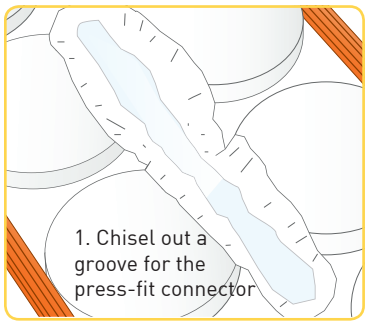


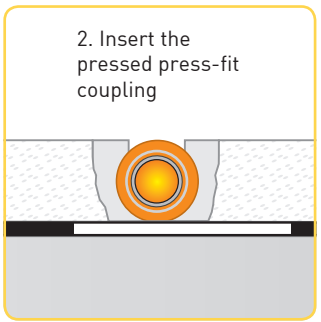


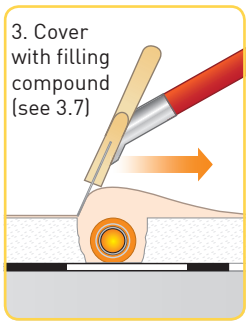
- The pressing tool's lever length can be adjusted to suit the pressing force and the available space on site. Use provided pipe arms with sleeve sockets for extension. Always screw pipe arms tight before use (danger of accidents!). Secure the selected press-fitting jaws with plug-in bolts.
- Pull the pipe arms far enough apart (press-fitting jaws open) so that the press-fitting jaws can be slid over the press-fit coupling **(5)**. Be sure to keep the press-fitting jaws at right angles to the pipe axis when sliding it onto the press-fit coupling.
- Push pipe arms together until they reach the stop position (C) (they make a click sound when they reach the stop). Only once the press-fitting jaws are fully closed at (A) and at (B) is a correct press connection realised. → Visual check **(6)**.
- Re-open the pipe arms so that the jaws can be removed from the press-fit coupling (see also the REMS Eco-Press operating manual).

If there are any press-fit connectors, chisel out the Compact panel accordingly using a wood chisel. The press-fit connector must lie flush at the level of the Compact panel



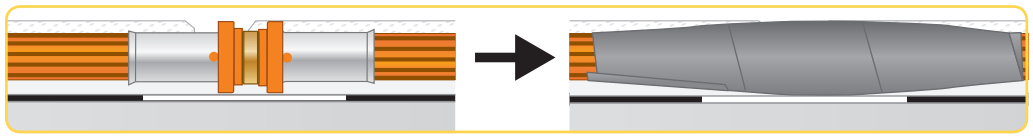






Corrosion protection measures

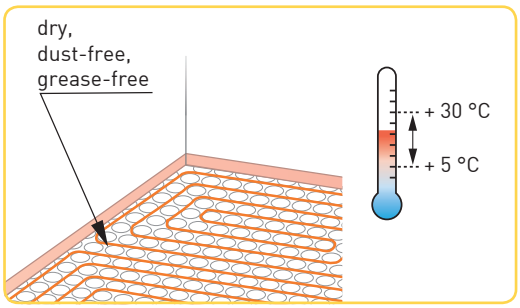
According to ÖN H5155, the joints should be protected after the pressure test (e.g. using cold shrink tape or corrosion protection tape).

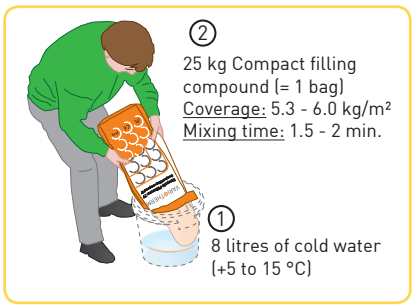


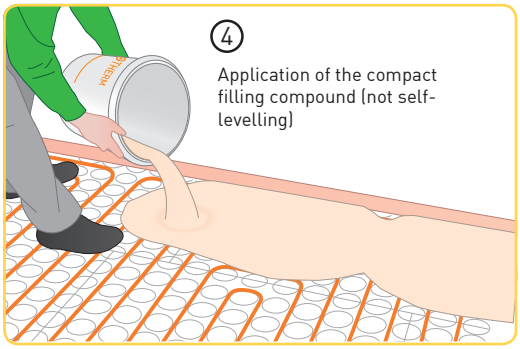
3.7 Compact filling compound T7

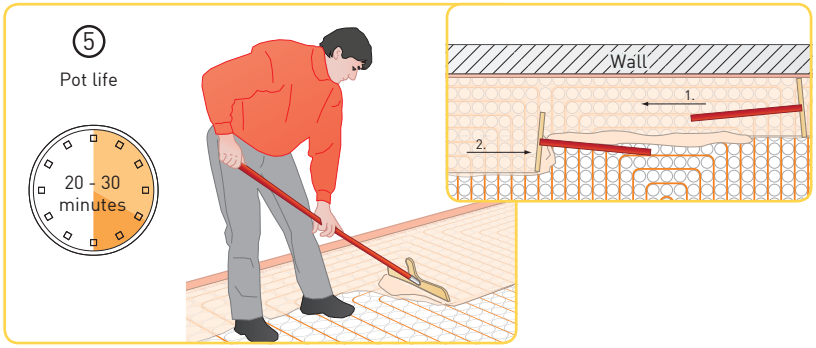
Before adding the filling compound, a pressure test should be carried out for all the relevant heating circuits. Use the protocol on page 22 (Section 5) for this. We recommend keeping the VarioProFile pipes under water pressure when adding the filling compound. The working temperature must be at least +5 °C.

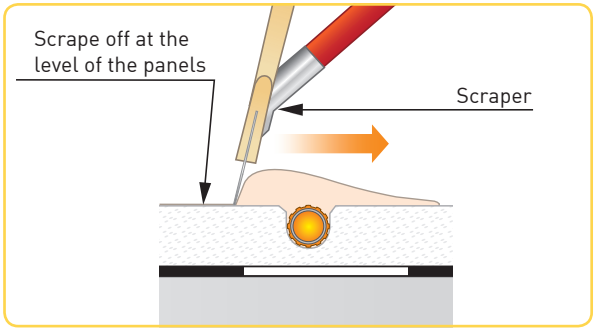
Manual application of the Compact filling compound (best with two people):

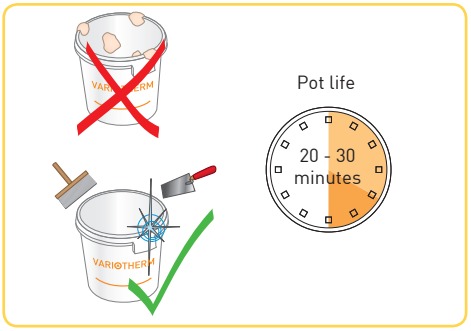








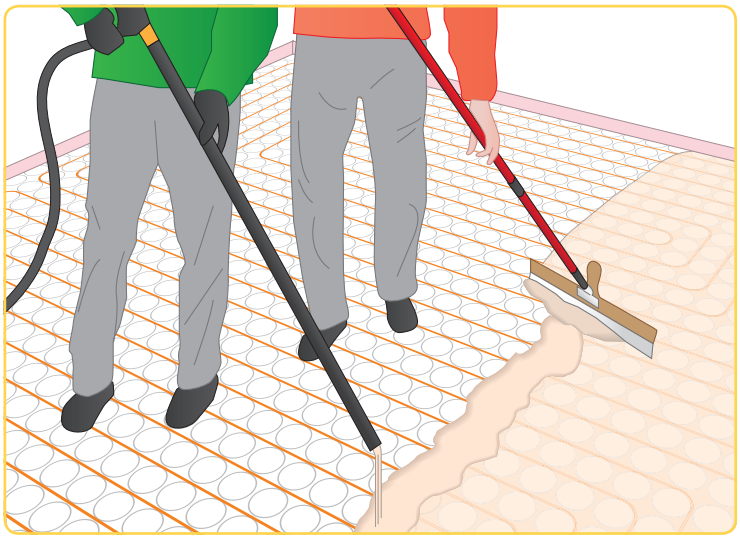




In order to prevent shortening of the pot life, empty the bucket completely after every mixing process with a trowel and clean it with a paint brush.

Note: The soffit of the VarioProFile pipe is flush with the level of the panel surface and can be visible at several points!

Mechanical application of the Compact filling compound:

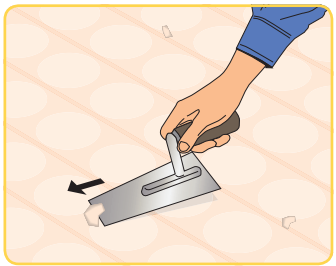


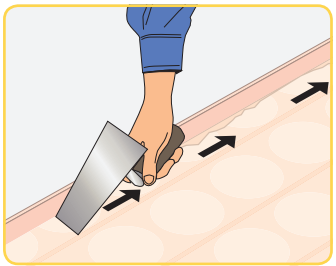
Applying the Compact filling compound with a mixing pump

Mixing pump, e.g. PFT G4

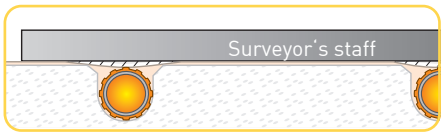
The Compact filling compound T7 can also be applied with a mixing pump (e.g. PFT G4, stator/rotor D6-3 PIN Twister with an agitator). The water quantity required is approx. 380 l/h.

Checking the applied Compact filling compound:





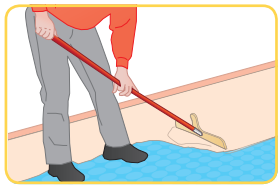
Remove excess filling compound with a trowel or plastering knife as soon as the surface is safe to walk on.



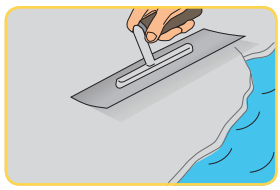
Special case: If the standard tolerances are too large for the design of the floor covering (see chapter 4), the depressions can be compensated:

Within 3 hours (at 20 °C) after applying the Compact filling compound, a 2nd layer of Compact filling compound is poured. 25 kg of Compact filling compound is stirred with 10 l of water, yielding a coverage of approx. 0.5 kg/m².

After 3 hours (at 20 °C) after applying the Compact filling compound, the surface of the Compact floor heating system must be primed before applying the 2nd layer of Compact filling compound (see chapter 4.3 for product examples) 25 kg of Compact filling compound is stirred with 10 l of water, yielding a coverage of approx. 0.5 kg/m².

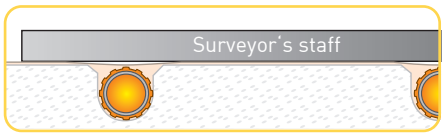


Compensation filling for levelling beyond the depressions is performed using a calcium sulphate-based floor-levelling compound as described in chapter 4.3.



4. Floor covering

The floor covering used must be suitable for floor heating systems (observe the manufacturer's instructions). The surface of the VarioComp complies with ÖNORM DIN 18202 (Table 3, Row 3), limits for evenness deviations.



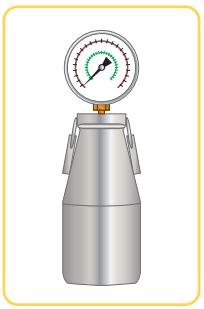
Measuring point spacing	0.1 m
Pitch max.	2 mm

Caution! The floor covering should be laid as quickly as possible to avoid any soiling of the surfaces or damage to the pipes.

Before laying the floor covering, the Compact floor heating must be dried as per the following table:

Floor covering (observe the manufacturer's instructions!)	**Drying time without baking out** at t_i = 20 °C		**Drying time with baking out*** at t_f = 40 °C, t_i = 20 °C	
	Time	CM value	Time	CM value
Stone and ceramic coverings (thin-bed)	6 days	1.3 %	24 h	1.3 %
Wood covering, parquet	8 days	0.3 %	36 h	0.3 %

*At 20 °C, you must wait at least 2 hours after finishing applying the filling compound before beginning the baking out process.



CM moisture meter

Use of primer and sealing systems:

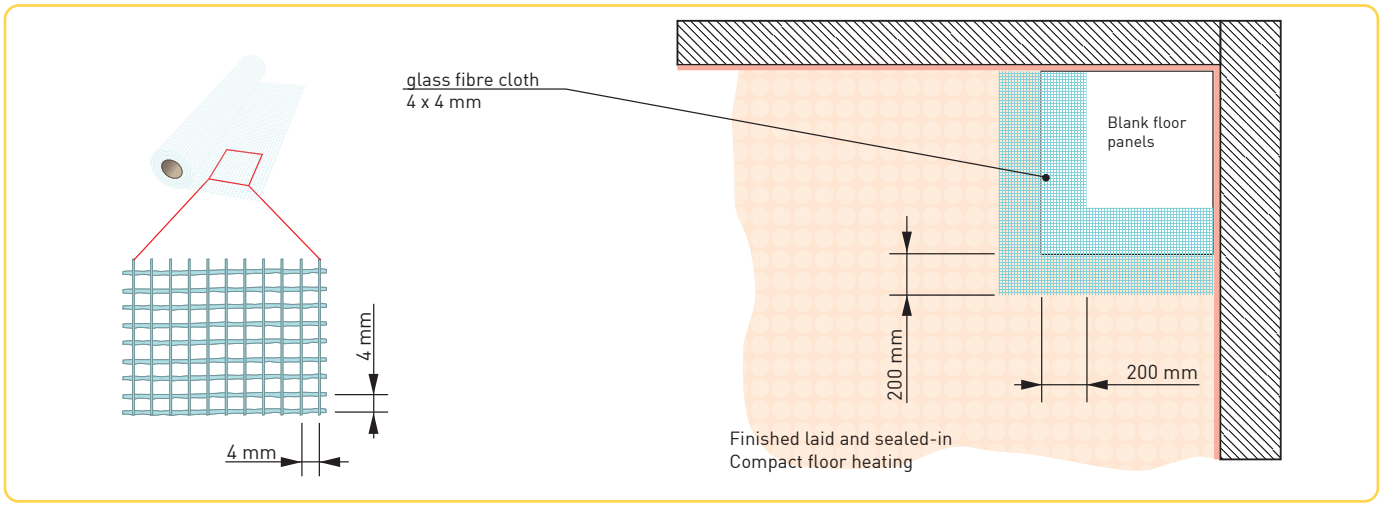
Operational demands group		**Which room?**	**Adhesive mortar with tile coverings**	**Sealing system**	**Primer**
ÖN B 3407	**ZDB composite waterproofing (Germany)**				
W1	-	Residential sector: living rooms, corridors, toilets, offices and the like	Calcium sulfate flexible adhesive mortar	Not required	Not required
			Cement flexible adhesive mortar	Not required	Required
W2	-	Residential sector: kitchen and rooms with similar usage Commercial sector: toilet systems	Only cement flexible adhesive mortar	Recommended	In addition to the sealing system, when recommended by the manufacturer
W3	A0	Wall and floor surfaces without drainage (e.g. bathroom with shower tub), toilet systems without floor drainage, porch	Only cement flexible adhesive mortar	Required	In addition to the sealing system, when recommended by the manufacturer
W4 – W6	B0, A, B, C	Wall and floor surfaces with drainage (e.g. shower with flush drain at the same level as the floor), shower systems, industrial kitchen, balconies, terraces,...	No Compact floor heating possible		

Product examples for primer or sealing system:

Manufacturer / Brand	**Primer**	**Sealing system**
Ardex	Ardex P51	Ardex 8 + 9
Murexin	Tiefengrund LF1	Duschdicht / Flüssigfolie 1KS
Cimsec	Gipsgrundierung	Dichtflex DU15
PCI (BASF)	Gisogrund	Lastogum
Schönox	Schönox KH	Schönox HA oder 1K-DS
Mapei	Primer G	Mapegum WPS
Weber	weber.prim 801	weber.tec 822
Ceresit	Lösungsmittelfreier Tiefengrund	Ceresit Dusch- & Badabdichtung
Sopro	GD 749	Flächendicht flexibel FDF 525/527

*For more details, see the Sopro installation recommendations (available on request).

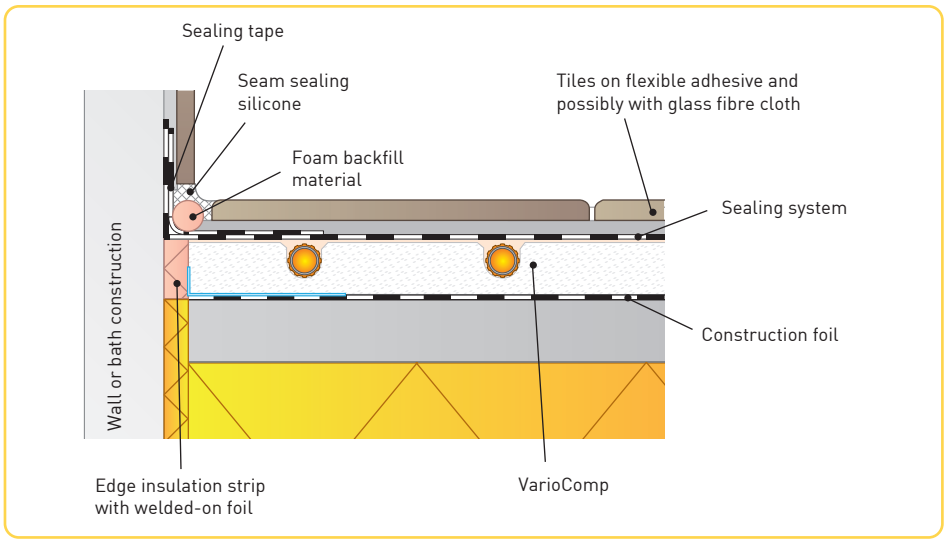
Borders between Compact panels and blank panels (at bonding of floor coverings):
Cover the borders using glass fibre cloth (4 x 4 mm) at an overlap of 200 mm (e.g. bond using tile adhesive).



4.1 Stone and ceramic coverings

See also the appropriate standards for laying tiles, panels and mosaics.
Points to be observed:

- The surface must be dust-free.
- Sealing systems must be used on surfaces subject to the effects of moisture (see page 18).
  The wall boundaries must be sealed using appropriate sealing tape.



Example:
Tiled floor covering subject to the effects of moisture (W2/W3)

- A flexible adhesive is used to bond the tiles. A primer must be applied if required by the adhesive manufacturer. This is particularly the case for flexible cement adhesives.
- Flexible grouting mortar must be used for grouting.
- After laying the tiles, boundaries with the walls are additionally sealed with silicone.

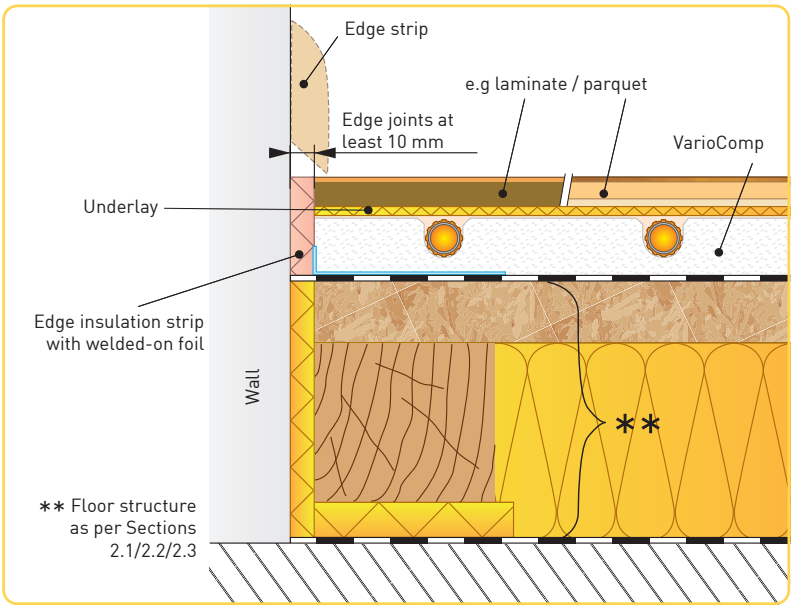
For critical floor structures, we recommend integrating a 4 x 4 mm fibre glass cloth into the flexible adhesive.

4.2 Wood covering, parquet and laminate

Lay only floor coverings that are approved by the manufacturer for use with floor heating systems. We recommend a covering with a maximum thermal resistance of 0.15 m²K/W.

Floating application:

The laminate/parquet covering is laid floating on an underlay suitable for floor heating (max. 2 mm). The edge seam to adjacent components should be at least 10 mm.

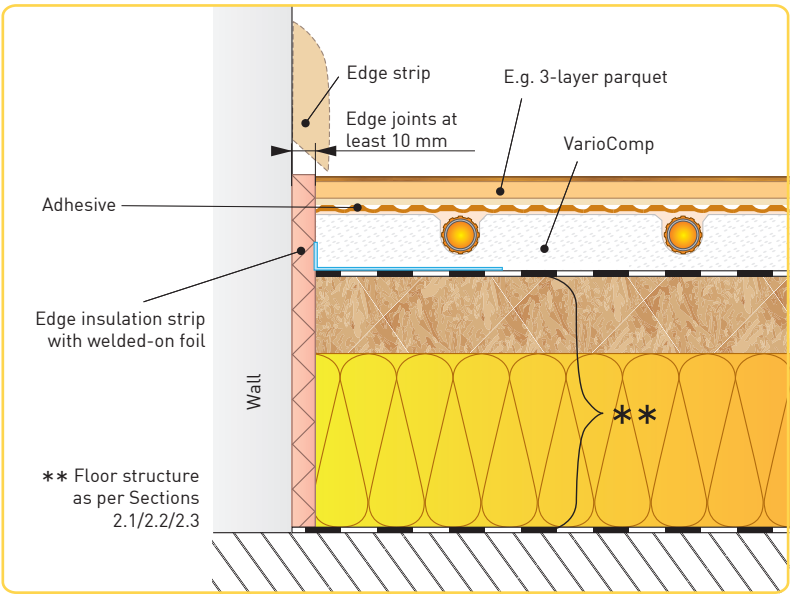


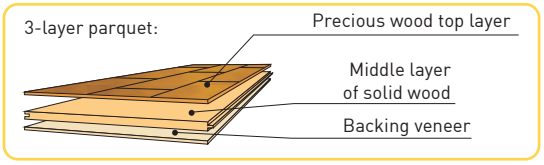
Adhesive parquet:

Parquet can be glued onto the Compact floor heating under the following conditions:

- 2 or 3 layer parquet suitable for floor heating, without gluing the tongue and grooves.
- Maximum flow temperature 40 °C (Maximum temperature limiter required!)
- Gluing without primer using e.g.:
  - Mapei Ultrabond P990 1K / Eco P991 1K
  - Thomsit P695
  - Ardex Premium AF2420
  - Weitzer Parkett Profi-SMP Adhesive No.400-EC1

  or equivalent adhesive (primer as per manufacturer's specifications).
- The parquet is glued either directly to the VarioComp system, or with decoupling fleece (observe the manufacturer's specifications!).



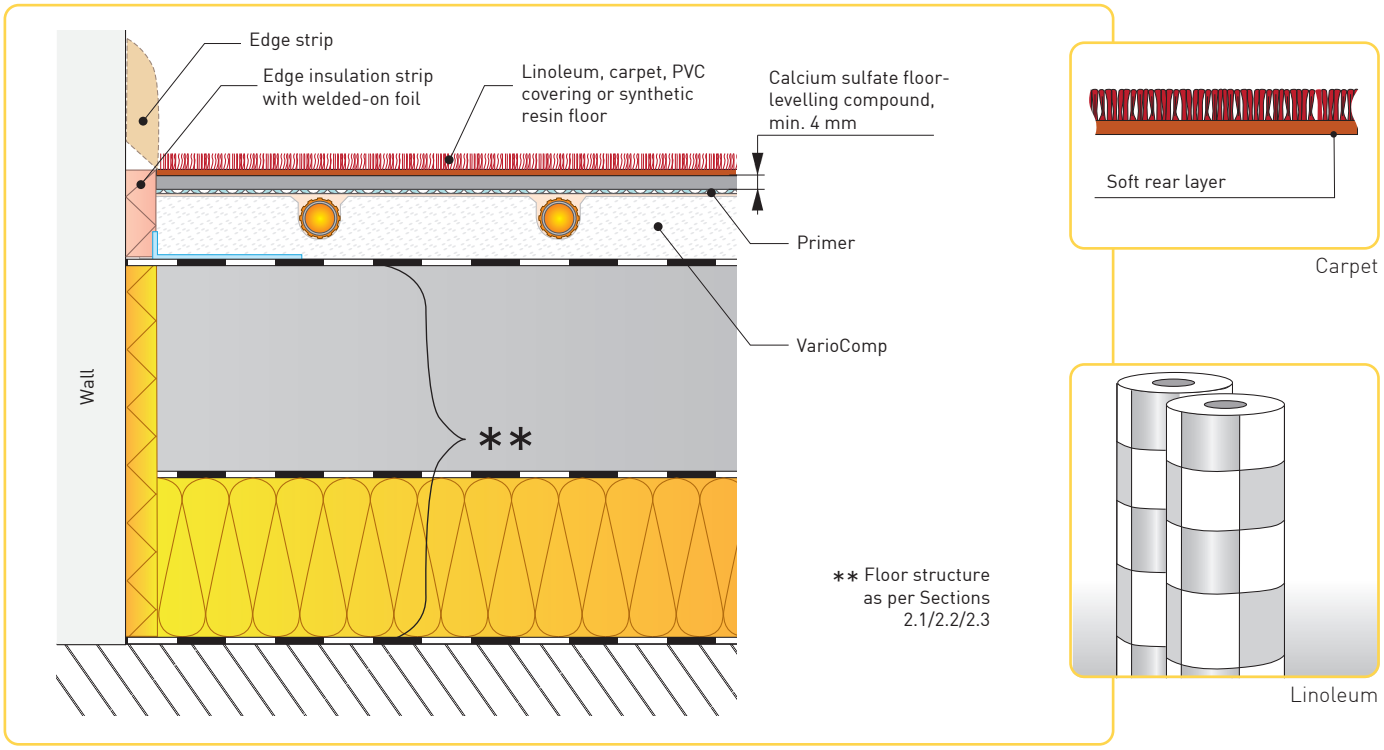


It is <u>not necessary</u> and prohibited to abrade the surface of the finished VarioComp!

4.3 Linoleum, carpet, PVC floor covering and synthetic resin floors

For soft floor coverings and synthetic resin floors, a calcium sulphate-based floor-levelling compound at least 4 mm thick is laid over the completed VarioComp.

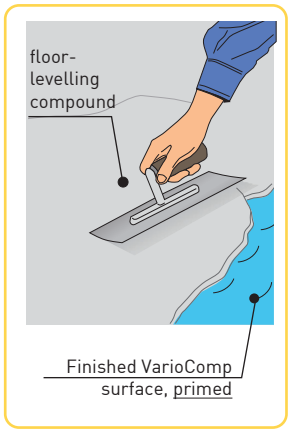
Caution: Only use synthetic resin floors with low thickening tension (polyurethane-based)!



Please observe the relevant manufacturer's instructions for the required primer or sealant of the VarioComp surface and of the planned floor-levelling compound. Work cannot be started earlier than 48 hours after applying the Compact filling compound.

Product examples for primer and calcium sulphate-based floor-levelling compound:

Manufacturer / Brand	Primer	Calcium sulfate floor-levelling compound
Mapei	Primer G	Planitex D10
Schönox	Schönox VD, PG	Schönox AP
Maxit	maxit floor 4716	maxit floor 4095
Fermacell	Tiefengrund	Boden-Nivelliermasse
Thomsit	R766, R777	AS1, AS2
Stauf	IBOLA D54	IBOLA GS
Murexin	D7	CA 40
Baumit	Grund	Nivello Quattro
Smet	Universal Floor Primer	SHG Casufloor FS
Ardex	Ardex P51	Ardex K22



5. Leak-tightness test & commissioning

Construction project: _____

Contractor / Occupant: _____

Client: _____

Heating installation technician: _____

Architect: _____

Other: _____

Leak-tightness test

The Variotherm Compact floor heating system circuits are to be tested for leak-tightness using a water pressure test after they have been laid. The test pressure should be min. 4 bar and max 6 bar. If there is a risk of freezing, appropriate measures should be taken, e.g. use of antifreeze and controlling the building's temperature.

- Installation completion of the Compact panels including connections and piping on: _____
- Beginning of pressure test on: _____ with test pressure ____ bar
- End of pressure test on: _____ with test pressure ____ bar
- Compact filling compound added Begun on: _____ Completed on: _____
- The system water was prepared (e.g. to ÖNORM H5195-1, VDI 2035) ☐ Yes ☐ No
- Antifreeze was added to the system water ☐ Yes ☐ No
- The Compact floor heating has been baked out as described in Section 4 with t_f/t_r = ___ /___ °C:
  ☐ No Yes: ☐ 24 h ☐ 36 h ☐ ____ h
- Floor covering: ☐ Tiles ☐ Parquet ☐ Carpet, linoleum ☐ Other _____
- Completing the laying work on: _____
- Baking out begin (max. flow temperature of the Compact floor heating t_f = 50 °C) on: _____

Approval:

_____	_____	_____
Contractor/Occupant/Client	Construction management/Architect	Heating installation technician

Commissioning

Please note that the flow temperature (heating water) of the Compact floor heating may not exceed t_f = 50 °C. The main stop valves at the distributor station, and the heating circuit shut-offs are to be opened. The entire system is to be deaerated thoroughly. The circulation pump may be switched on after deaeration. After commissioning, the Variotherm Compact floor heating system can be considered maintenance-free. (Subject to technical modifications without notice.)

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