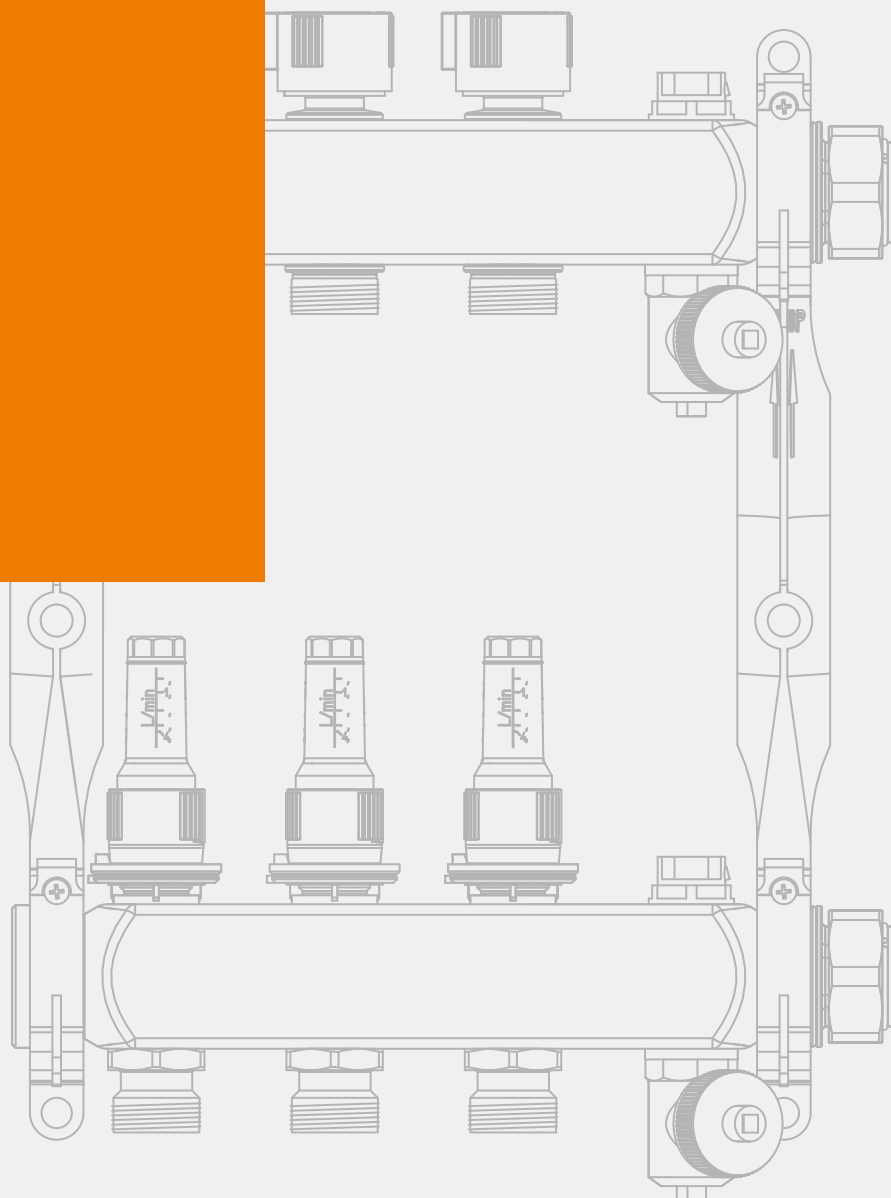




Pipe systems

TECEfloor

TECHNICAL GUIDELINES



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TECEfloor – System description

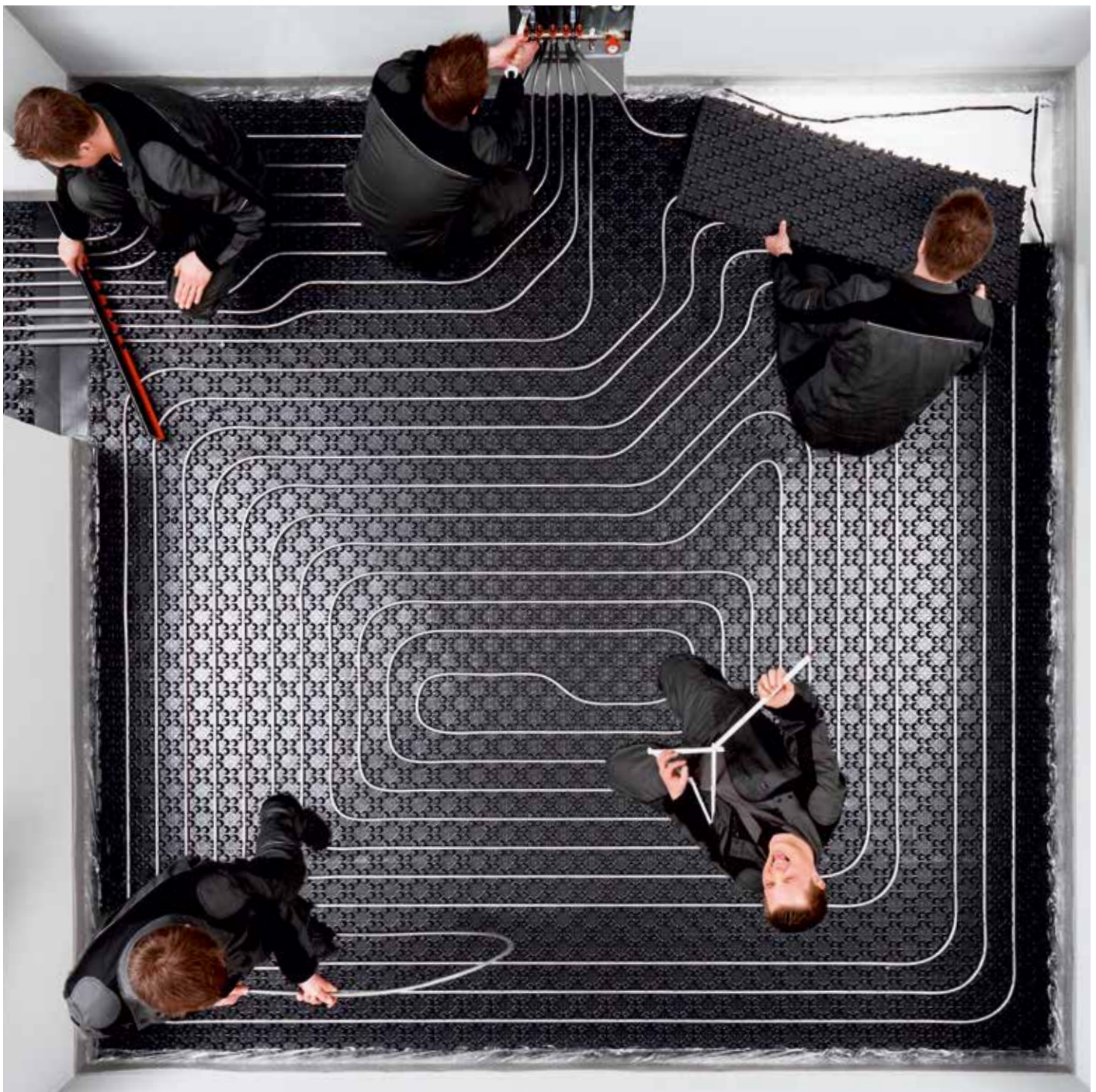
System description

The TECEfloor heating system is a low-temperature heat distribution system for heating living spaces in new builds and renovations. Heat is evenly distributed across the entire floor construction, creating an optimum indoor climate. Due to the high level of radiation compared to static heating systems, an optimum level of comfort is maintained even at significantly lower room temperatures. This enables energy savings of 6 to 12 %.

Considerable advantages

- low investment and operating costs
- high degree of comfort
- free scope for interior design
- Low-temperature system (more efficient use with renewable energies)

The TECE floor heating system ensures comfort, energy efficiency and economy, all at once. It is distinguished by high flexibility and straightforward assembly. The consistently high quality standards of the individual components and the entire system meet the respective standard requirements.



The complete TECEfloor system

TECEfloor, the new floor heating system from TECE

When it comes to floor heating, TECE has long been a specialist: in the 1980s, the company launched the first diffusion-tight composite aluminium pipes on the market. TECE is now back with the TECEfloor range for floor heating.

TECEfloor is a complete system

It comprises heating pipes, installation accessories, manifolds and controls.

TECEfloor emphasises quality

All components are carefully selected and have been tested for 100 % compatibility.

“Silver Line Quality” (SLQ)

The high quality standards are manifested by the “Silver Line Quality” (SLQ) label which stands for tested quality and guaranteed compatibility of all components.

SLQ standard – for water-bearing and functional parts

The strict production tolerances of the heating pipes in TECEfloor are perfectly tailored to the support and clamping ring of the clamped joint. The O-ring on the clamped joint provides accurately dimensioned sealing in the manifold's Eurocone. In the servomotor, not only the union nut but also the lifting and closing dimensions are adjusted to match the manifold's valve insert.



TECEfloor – Planning information

Planning information

Standards and guidelines

When planning and designing TECEfloor heating systems, local laws, standards and guidelines must be observed.

Constructional requirements

Before installing the TECEfloor heating system, the following constructional requirements must be met:

- the rooms must be roofed over, with windows and doors mounted
- interior plastering must have been completed
- an installation mark must be marked in all rooms
- electricity and water connections must be available
- the load-bearing subsurface must be sufficiently firm and dry
- flatness tolerances must be observed
- recesses must be available for heating circuit manifolds and heating pipes
- any necessary joint plans must be available

Note: For a clear distribution of roles and to avoid the overlapping of trades, the Federal Association of Surface Heating and Surface Cooling (BVF) has defined specifications which can be found in its technical information entitled “Interface coordination on heated flooring constructions”.

System pipes

The quality of area heating systems depends largely on the quality of the heating pipes used. They must be resistant to cracking caused by stress, provide an oxygen barrier and be free of corrosion.



Continuous quality control at TECE's renowned, in-house testing laboratory enables TECE to offer the highest level of reliability on all of its heating pipes, ensuring that the pipes continue to work flawlessly even after many years of operation.

Four types of heating pipes are available for use in area heating systems:

- crosslinked SLQ PE-Xc floor heating pipes
- non-crosslinked SLQ PE-RT type 2 floor heating pipes
- SLQ PE-RT/AL/PE composite metal pipes
- crosslinked PE-MDXc 5S floor heating pipes

These four types of pipe boast outstanding characteristics, such as a long service life, resistance to corrosion and scaling, the ability to withstand chemicals, and flexibility — in addition to being extremely easy to install.

The TECE material laboratory continuously monitors the quality of TECEfloor pipes and connectors. This is supplemented by semi-annual tests carried out by independent institutions. Pipes and connectors are tested in conformity with DIN standards.

| Certificate/type | Class (Cl.)/operating pressure |
|------------------|--------------------------------|
| 3V355 PE-Xc | Cl. 4/6 bar; Cl. 5/6 bar |
| 3V353 PE-RT | Cl. 4/6 bar; Cl. 5/6 bar |
| 3V373 MPX-5S | Cl. 4/4 bar; Cl. 5/4 bar |
| 3V377 AI-PE-RT | Cl. 4/6 bar |

SLQ PE-Xc floor heating pipe

SLQ PE-Xc floor heating pipes made from electron beam crosslinked, high-density polyethylene are manufactured in accordance with DIN 16892, and offer an oxygen barrier in accordance with DIN 4726. The special physical crosslinking between molecular chains provides high resistance to both temperature and pressure. The material reliably prevents cracks from forming at nicks and scratches.

The heating pipes are available in dimensions 14 x 2 mm, 16 x 2 mm, 17 x 2 mm and 20 x 2 mm. The minimum bending radius is 5 x d.

SLQ PE-RT type 2 floor heating pipe

SLQ PE-RT floor heating pipes made from non-crosslinked polyethylene are manufactured in accordance with DIN 16833 and offer an oxygen barrier in accordance with DIN 4726. For the PE-RT heating pipes, specially modified polyethylene is used which has a molecular structure and composition that provide excellent thermal stability and high mechanical strength.

The heating pipes are available in dimensions 14 x 2 mm, 16 x 2 mm, 17 x 2 mm and 20 x 2 mm. The minimum bending radius is 5 x d.

SLQ PE-RT/AL/PE composite metal pipes

The five-layer SLQ PE-RT/AL/PE composite metal pipes consist of a non-crosslinked PE-RT type 2 inner pipe, a bonding layer, a butt-welded aluminium core pipe, another bonding layer and a PE outer sheath. They are manufactured in accordance with DIN 16836 and have an oxygen barrier that eliminates all oxygen permeability. In real-life applications, the composite metal heating pipes retain their shape while still allowing flexible installation. In addition to these optimal pipe laying characteristics, they also offer extremely low coefficients of linear expansion. They are ideal for dry-wall construction, dimpled sheets and wall heating.

This heating pipe is available in size 16 x 2 mm. The minimum bending radius is 5 x d.

SLQ PE-MDXc 5S floor heating pipe

The PE-MDXc 5S floor heating pipe — in accordance with DIN 16894/95 — is the next development in PE-Xc pipes and has special characteristics for use in floor heating systems. Similarly to a PE-Xc pipe, this pipe is designed with electron beam crosslinking, but the use of MD-PE gives the pipe extraordinary flexibility.

PE-MDXc heating pipes are designed with five-layer technology. The oxygen barrier is located in the middle of the pipe sheath, providing effective protection from damage.

This heating pipe comes in size 16 x 2 mm. The minimum bending radius is 5 x d.

TECEfloor – System pipe

Application classes and classification of operating conditions in accordance with ISO 10508

| Application class | Calculation temperature T_D °C | Operating period ^b at T_D Years ^a | T_{max} °C | Operating period at T_{max} Years | T_{mal} °C | Operating period at T_{mal} Hours | Typical application area |
|-------------------|----------------------------------|---|--------------|-------------------------------------|--------------|-------------------------------------|---|
| 1 ^a | 60 | 49 | 80 | 1 | 95 | 100 | Hot water supply (60°C) |
| 2 ^a | 70 | 49 | 80 | 1 | 95 | 100 | Hot water supply (70°C) |
| 3 ^c | 20 | 0.5 | 50 | 4.5 | 65 | 100 | Low-temperature floor heating |
| | 30 | 20 | | | | | |
| | 40 | 25 | | | | | |
| 4 ^b | 20 | 2.5 | 70 | 2.5 | 100 | 100 | Floor heating and low-temperature radiator connection |
| | 40 | 20 | | | | | |
| | 60 | 25 | | | | | |
| 5 ^b | 20 | 14 | 90 | 1 | 100 | 100 | High-temperature radiator connection |
| | 60 | 25 | | | | | |
| | 80 | 10 | | | | | |

T_D = temperature, for which the pipe system has been designed.

T_{max} = maximum temperature which may occur for short periods only

T_{mal} = highest possible temperature which may occur in the event of a fault (maximum 100 hours in 50 years)

^a A country may choose class 1 or class 2 depending on its national regulations.

^b If more than one calculation temperature exists for an application class for the operating period and the related temperature, the corresponding times of the operating period must be added. "Plus cumulative" in the table implies a temperature group for the given temperature for an operating period (e.g. the temperature group for a period of 50 years for class 5 is made up as follows: 20 °C over 14 years, followed by 60 °C over 25 years, followed by 80 °C over 10 years, followed by 90 °C over 1 year, followed by 100 °C over 100 hours).

^c Only permitted if the temperature during a fault cannot exceed 65 °C.

Connection technology

All fittings and screw connections for connecting and fastening the SLQ floor heating pipes are carefully designed and adapted, and have been extensively tested according to all the applicable test requirements. Of course, pipe and connection technology is quality-monitored on a continual basis by external institutes. Long-term and dependable functionality is thus assured in the best possible way.

Connections in screed

When installing floor heating systems, the questions constantly arises as to whether connections are permissible in screed. Surprisingly, pipe connections under screed, e.g. on radiator connections or potable water installations are not questioned.

Detachable connections which are not permanently leak-proof, must remain accessible in accordance with DIN 18380:2010-04 (German Construction Contract Procedures [“VOB”], Part C, 3.2.7). Inversely, permanently leak-proof connections may be installed in the structure. This is common practice with radiator connections and potable water installations.

Whether or not a connection is permanently leak-proof is indicated by the test procedure of the respective pipe standard. For instance, for PE-Xc pipes, the DIN EN ISO 15875-5 “Plastic pipe systems for hot and cold water installation. Crosslinked polyethylene (PE-X). Fitness for purpose of the system” procedure applies. In this procedure, the test requirements for the pipe with connector are described in point 4. If these conditions are satisfied, the connection is considered to be leak-proof within the scope of this standard.

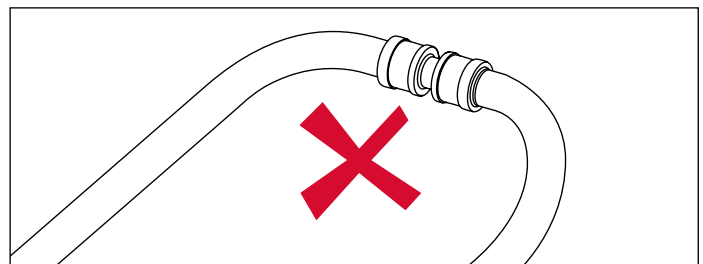
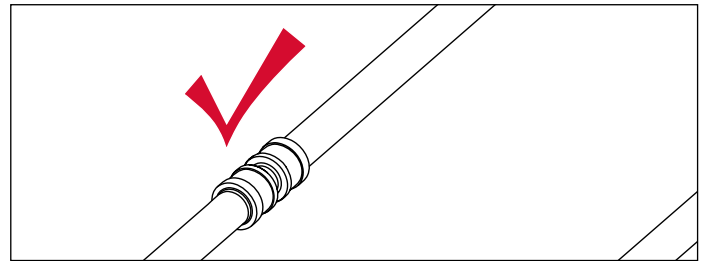
The results of an independent test can be confirmed within the framework of a certificate, e.g. “DIN CERTCO”. The system is then subject to regular monitoring by an independent institute.

Metal connections must be protected from substances which could damage them. In accordance with DIN 18380 (VOB, part C, 3.1.9), the use of these substances is not permitted, nevertheless it is highly recommended to preventively cover connections in screed with masking tape to protect them from coming into contact with any substances of a destructive nature, such as plaster or chloride-containing quick binders.

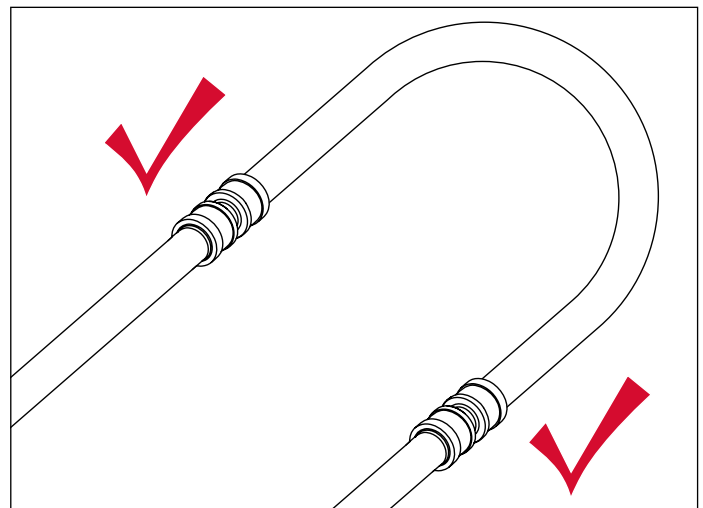
Finally, the position of all connections in the screed in accordance with DIN EN 1264-4 should be recorded in a revision drawing.

Assembly instructions

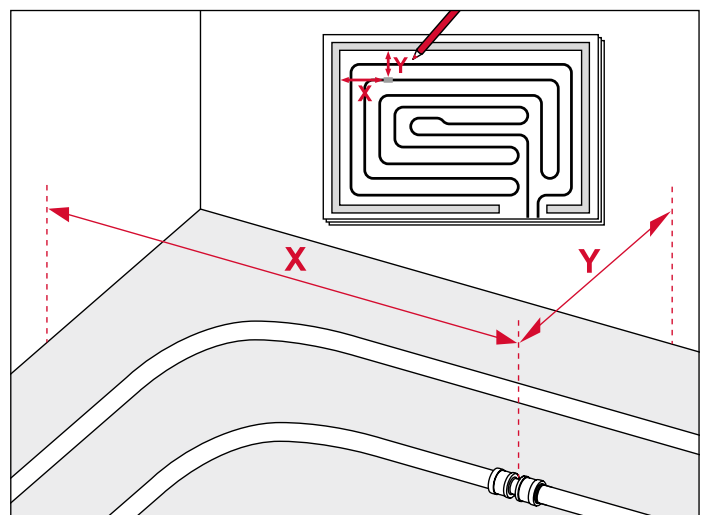
Couplings should not be installed in the elbows or bends:



if necessary, two couplings should be precisely installed along the reversal pipes:



As described above in the “Connections in screed” section, the position of the couplings should be recorded in the revision plan.



TECEfloor – Connection technology

The following table shows the correct connection technology for all available SLQ floor heating pipes:

| Connection technology | SLQ PE-RT type 2 floor heating pipe 7712 xx xx | SLQ PE-Xc floor heating pipe 7713 xx xx | SLQ MDXc 5S floor heating pipe 7714 xx xx | SLQ AI/PE-RT floor heating pipe 7715 xx xx |
|---|--|---|---|--|
| SLQ Eurocone clamping ring connection  | ✓ | ✓ | ✓ | ✓ |
| SLQ pressure sleeve coupling  | ✓ | ✓ | ✓ | ✗ |
| PPSU pressure sleeve coupling  | ✗ | ✗ | ✗ | ✓ |
| TECElogo coupling  | ✗ | ✗ | ✓ | ✓ |

SLQ Eurocone clamping ring connection



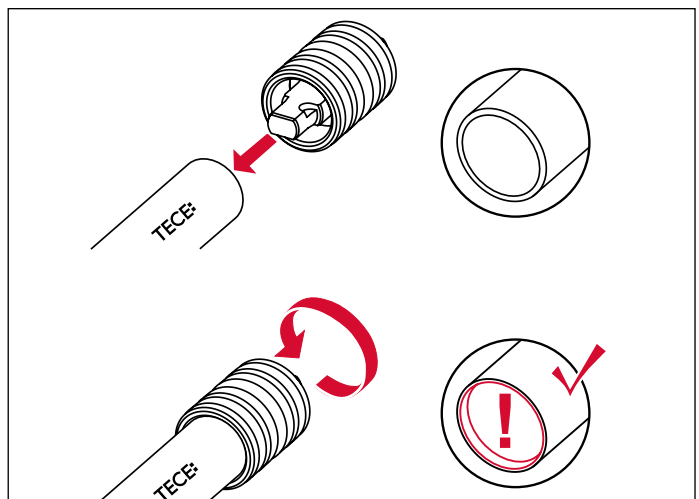
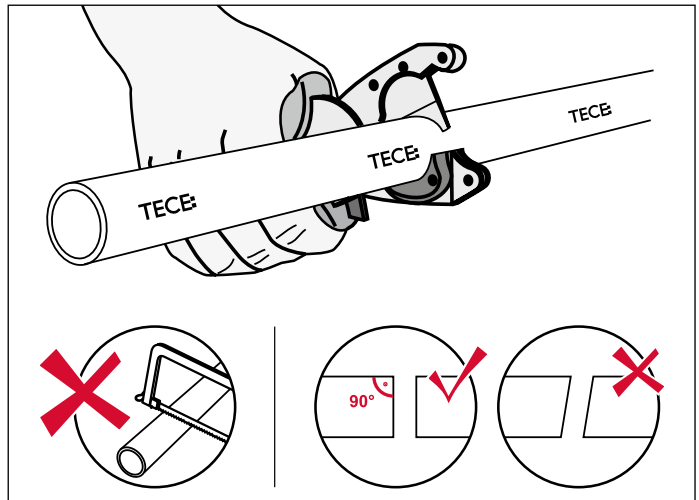
SLQ Eurocone clamping ring connections, which are quality-monitored and tested for compatibility, are equipped with a plastic clamping ring. This excludes the risk of damage to the end of the pipe caused by sharp edges and burrs. In

addition, the screw connection is designed with a “fixed” attachment point. This reliably prevents over-tightening and over-crimping. The nickel-plated union nuts of the SLQ Eurocone clamping ring connection are marked with a system ID and dimensions (e.g. SLQ 16). This prevents them from being used erroneously with other pipe systems or pipe dimensions.

The tested SLQ system also includes a calibrator, specially developed for the SLQ range, and optimally adapted to the pipe and clamped joint.

Assembly

- Use pipe scissors to separate the pipe at right angles.
- Deburr and calibrate the end of the pipe prior to assembly.
- Mount the union nut with the clamping ring.
- Carefully mount the nozzle onto the pipe by rotating it.
- Tighten the union nut up to the stop, SW 27.
- The connection pipes should be positioned vertically or horizontally to the screw connection.
- If necessary, align and attach the pipe.



SLQ pressure sleeve coupling for all-plastic pipes



The equally reliable and easily processed SLQ pressure sleeve coupling falls back upon TECEflex technology which has proven itself for many years. Therefore, the expanding tool and crimping pliers from the TECEflex range can be used.

Special expanding heads are available from the SLQ range for the 17 x 2.0 mm and 20 x 2.0 mm pipes.

For installation information, see the TECEflex chapter.

PPSU pressure sleeve coupling for SLQ composite pipes



The PPSU pressure sleeve coupling for Al/PE-RT under-floor heating pipes is based on tried and tested TECEflex technology, and should be installed using well-known TECEflex tools.

For installation information, see the TECEflex chapter.

TECEfloor push-fit coupling 16 x 16, TECElogo type for SLQ MDXc and composite pipes



For quick, easy and twist-free connection of TECEfloor system pipes: order no. 771416xx and 771516xx. Push fitting based on innovative TECElogo technology.

Twist-free and resistant to temperature changes.

Only use with the corresponding system pipes and system tool.

For installation information, see the TECElogo chapter.

Note:

Our technical information “TECEfloor Universal panel” is available for downloading as a separate PDF file.



TECEfloor – System panels

System panels

Dimpled panel system

The TECEfloor dimpled panel system comes in three different designs. The dimpled panel 30-2 with 30-mm-thick impact noise insulation on the underside, the dimpled panel 11 with 11-mm-thick thermal insulation on the underside, and the dimpled sheet without insulation on the underside. All three design types have a polystyrene multifunctional cover sheet on the top side, which has an extremely good pipe-holding capacity, provides an excellent base for walking on, and ensures a secure seal against liquid screed and moisture. The special dimpled contour allows installation spacings of 6 cm and multiples thereof, and can incorporate heating pipes with dimensions 14, 16 and 17 mm. Installation is carried out in the floor construction under the load distribution layer made of cement or calcium sulphate screed.



Dimpled panel 30-2

The dimpled panel 30-2 is a highly effective thermal and impact noise insulation system. It satisfies the minimum insulation requirements of DIN EN 1264-4 for ceilings above heated rooms, and achieves an impact sound improvement of 28 dB. Higher insulation requirements in accordance with EnEV or higher sound insulation requirements must be checked and provided at the installation site. The maximum permissible moving load of the dimpled panel 30-2 is 5 kN/m².

Dimpled panel 11

Dimpled panels 11 are used in areas with high moving loads of up to 30 kN/m². They have 11 mm-thick thermal insulation on the underside which has no impact sound properties. The thermal resistance of the panel is R = 0.31 m²K/W.

Dimpled sheet

The dimpled sheet has been designed for laying on top of the on-site insulation.

Technical data

| | Dimpled panel 30-2 | Dimpled panel 11 | Dimpled sheet |
|---|-------------------------|-------------------------|---------------|
| Insulation material | EPS 040 DES sg | EPS 035 DEO | - |
| Multi-functional sheet material | PS sheet | PS sheet | PS sheet |
| Installation dimension (length x width) | 1,440 x 840 | 1,440 x 840 | 1,440 x 840 |
| Insulation thickness under heating pipe | 30 mm | 11 mm | - |
| Installation spacings | 6 cm grid | 6 cm grid | 6 cm grid |
| Thermal resistance | 0.75 m ² K/W | 0.31 m ² K/W | - |
| Impact sound improvement** | 28 dB | - | - |
| Building material class according to DIN 4102 | B2 | B2 | B2 |
| Max. area load | 5 kN/m ² | 30 kN/m ² | * |

* depending on the insulation used

** on a solid ceiling and screed applied on top of the impact noise insulation with a mass of ≥ 70 kg/m²

Tacking sheet system

The TECEfloor tacking sheet system is available in two different designs: as roll insulation 30-2 and as roll insulation 30-3 with 30 mm-thick impact noise insulation. Both design types consist of a slotted insulation board on the underside and a laminated composite sheet on the top. The tacking sheet layer made of woven fabric forms the basis for quick, easy and secure laying of heating pipes. A line grid is printed on the top side of the sheet, allowing installation spacings of 5 cm and multiples thereof. Special tacking pins facilitate the installation of heating pipes with dimensions 14 x 2 mm, 16 x 2 mm and 17 x 2 mm. Installation is carried out in the floor construction under the load distribution layer made of cement or calcium sulphate screed.



Roll insulation 30-2

Roll insulation 30-2 is a highly effective thermal and impact noise insulation system. It satisfies the minimum insulation requirements of DIN EN 1264-4 for ceilings above heated rooms, and improves insulation against impact sound by 28 dB. Higher insulation requirements in accordance with EnEV or higher sound insulation requirements must be checked and provided at the installation site. The maximum permissible moving load of tacking sheet 30-2 is 5 kN/m².

Roll insulation 30-3

Roll insulation 30-3 is always used wherever additional thermal insulation is required. With a thermal resistance of 0.67 m²K/W, this roll insulation used on its own does not meet the minimum insulation requirements of DIN EN 1264. Roll insulation 30-3 improves insulation against impact sound by 29 dB. The maximum permissible moving load of tacking sheet 30-2 is 4 kN/m².

Technical data

| | Roll insulation 30-2 | Roll insulation 30-3 |
|---|-------------------------|-------------------------|
| Insulation material | EPS 040 DES sg | EPS 045 DES sm |
| Woven film material | PE | PE |
| Installation dimension (length x width) | 10 x 1 m | 10 x 1 m |
| Insulation thickness under heating pipe | 30 mm | 30 mm |
| Installation spacings | 5 cm grid | 5 cm grid |
| Thermal resistance | 0.75 m ² K/W | 0.67 m ² K/W |
| Impact sound improvement** | 28 dB | 29 dB |
| Building material class according to DIN 4102 | B2 | B2 |
| Max. area load | 5.0 kN/m ² | 4.0 kN/m ² |

* depending on the insulation used

** on a solid ceiling and screed applied on top of the impact noise insulation with a mass of ≥ 70 kg/m²

TECEfloor tacking sheet 10plus

10 mm-thick EPS folding tacking sheet for universal application on insulation at the installation site, such as suitable mineral wool, EPS and PUR insulation, or in renovations on existing screed.



- Made from expanding polystyrene EPS, nominal value of the thermal conductivity 0.034 W/mK (DIN EN 13163; DIN EN 126667), $R \lambda = 0.285 \text{ W}/(\text{m}^2\text{K})$
- Compression strength at 10% compression 150 kPa CS(10/Y) 150 (DIN EN 826; DIN EN 13163), EPS Euro-class E (DIN EN 13501-1)
- Coated with a highly tear-resistant, finely woven, fibre-reinforced multi-layer composite woven film made of polyethylene (DIN EN 1264-4), highly adhesive, for the extremely high holding forces of the TECEfloor 10plus tacking pins.
- One-sided, self-adhesive 30-mm-thick film overlap, grid markings 5 and 10 cm, EPS strength: 10 mm,
- Dimensions: 1.60 x 1.20 m (1.92 m²), delivered folded to 0.80 x 1.20 m, optional: underside with self-adhesive coating.

Advantages:

- Universally applicable on many types of insulation material
- Special solutions for renovations
- Easy to handle when cutting and installing
- Clear separation of installing and screed-laying trade
- Up to 200 m² on a Euro-pallet — facilitates transport and reduces storage space

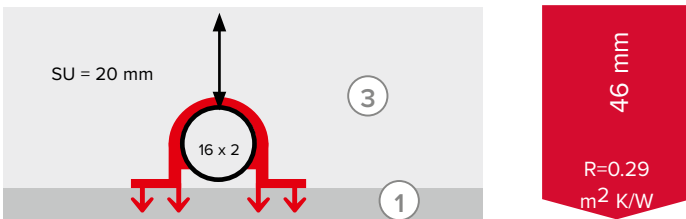
TECEfloor – System panels



One of the many laying options: TECEfloor 10 plus on mineral wool insulation improves impact sound insulation by more than 30 dB.

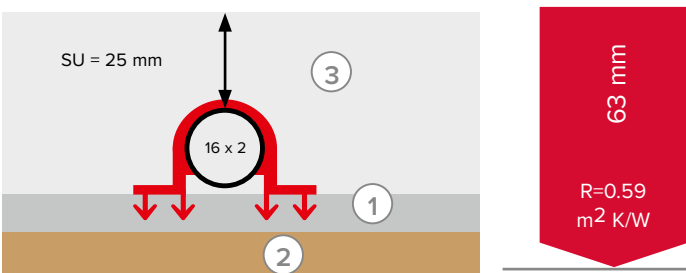


The 10plus tacking sheet is also optionally available with a self-adhesive back.



Individual load to **3 kN**, area load to **3 kN/m²**

In acc. with DIN 1991-1-1N/A, areas belonging to categories A2, A3, B1, B2 and D1.

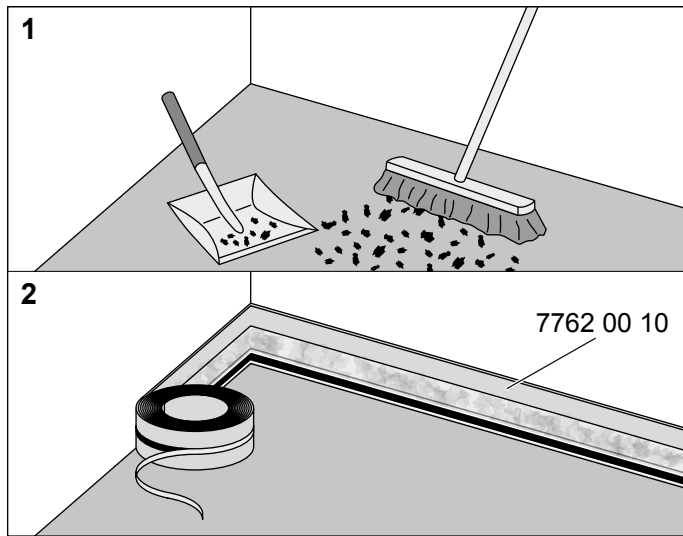


Individual load to **1 kN**, area load to **2 kN/m²**

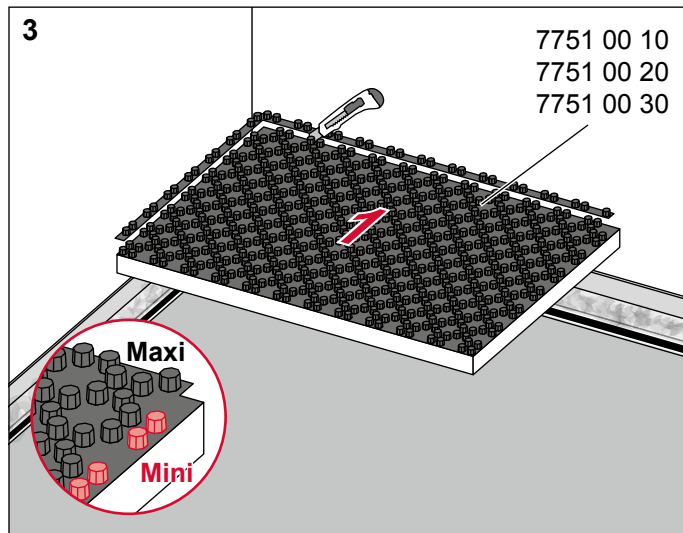
In acc. with DIN 1991-1-1N/A, areas belonging to categories A2, A3 (living rooms and areas).

- 1) TECEfloor tacking sheet 10plus
- 2) Knauf mineral wool TP-GP-12-1
- 3) Knauf 425 levelling screed

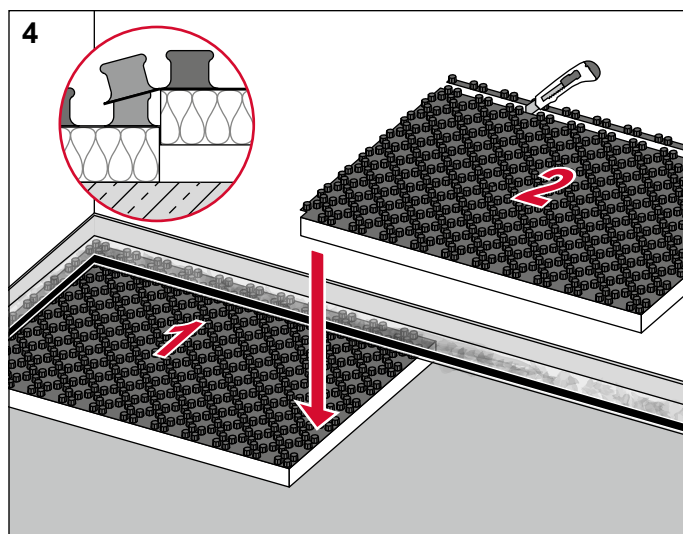
Dimpled panel system assembly instructions



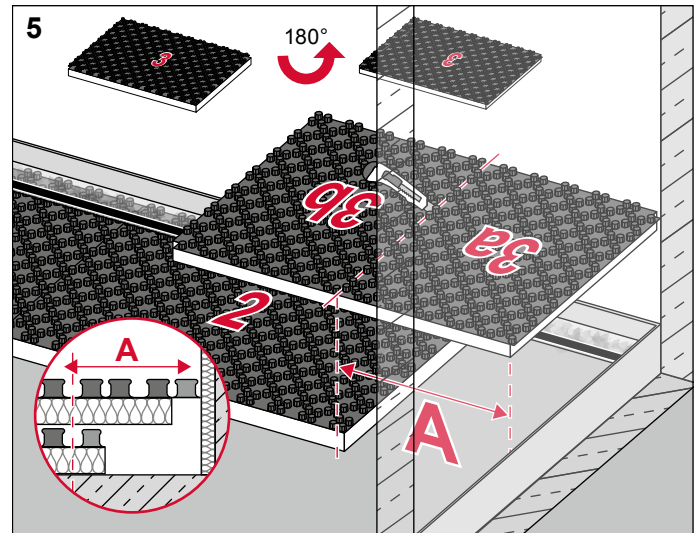
Clean the bare floors and attach the edge insulation strips.



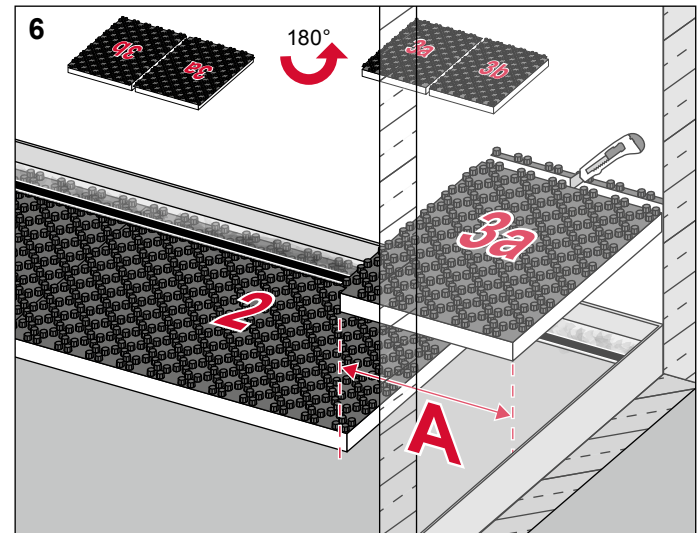
Separate overlap of 1st dimpled panel as illustrated.



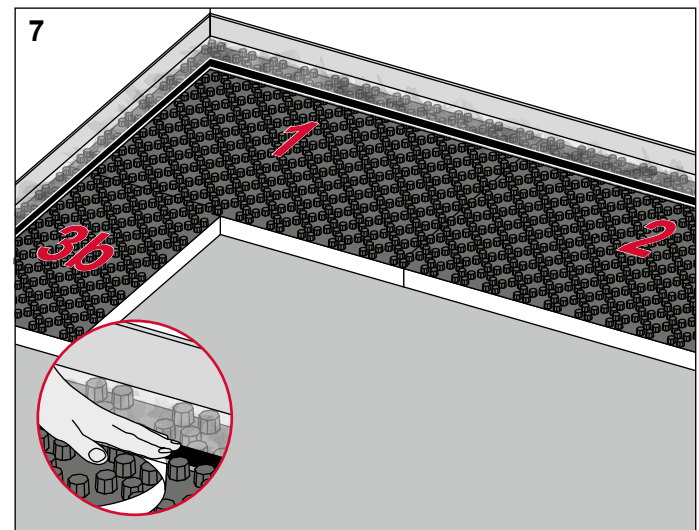
Separate the 2nd and additional dimpled panels along the first installed row on the long side, and combine by means of the snap fastener principle.



Turn the last panel by 180° to calculate dimension "A" (see details).

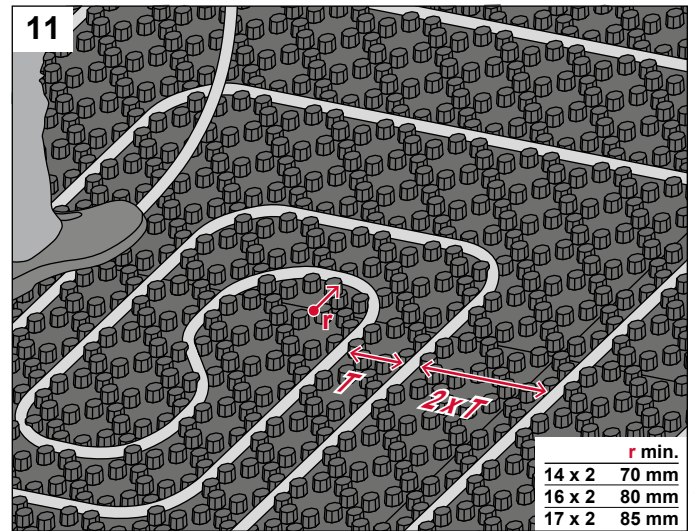
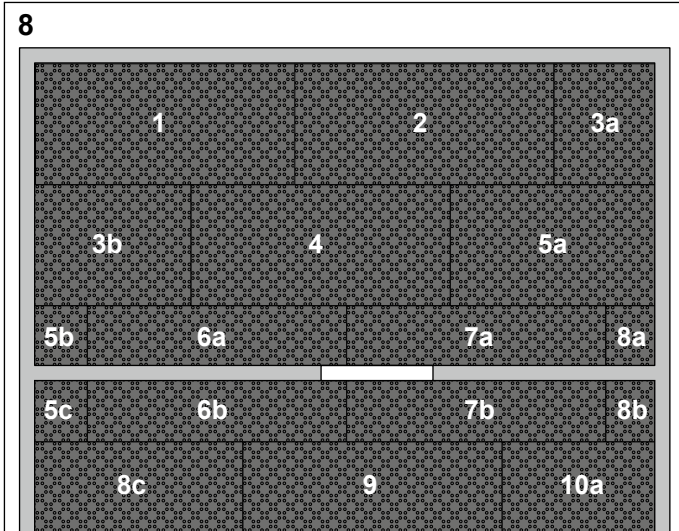


Turn the panel back again, separate the overlap and combine as above.



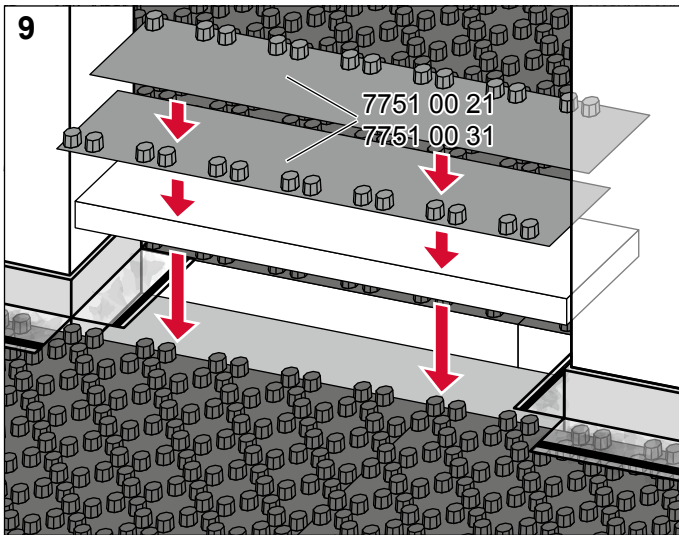
2. Start the next row using the cut-off piece.

TECEfloor – System panels

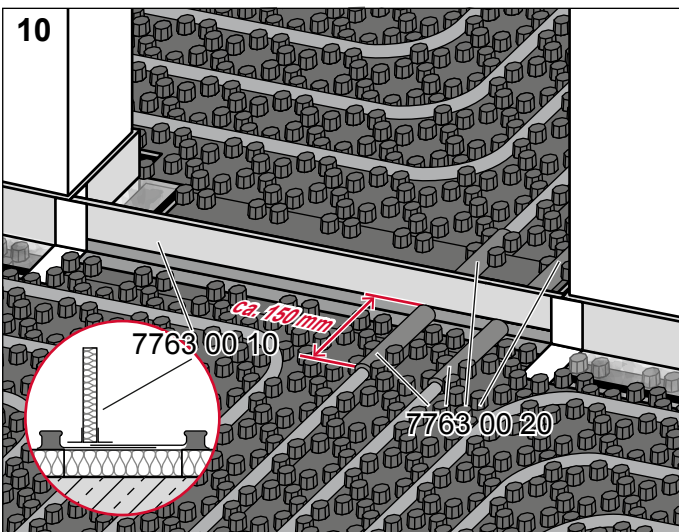


Lay the dimpled panels on the surface as shown. Use any cut-off pieces in other areas, where possible.

Lay pipes according to the plan, and observe bending radii!

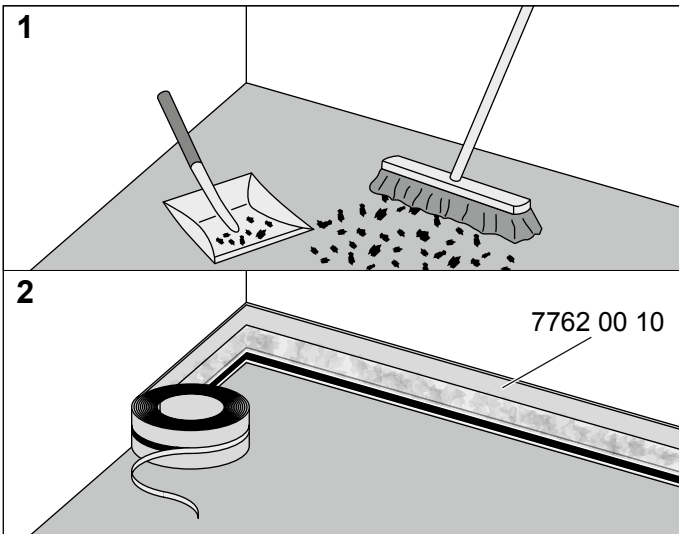


Overlap compensating elements over the customer's own insulation strips.

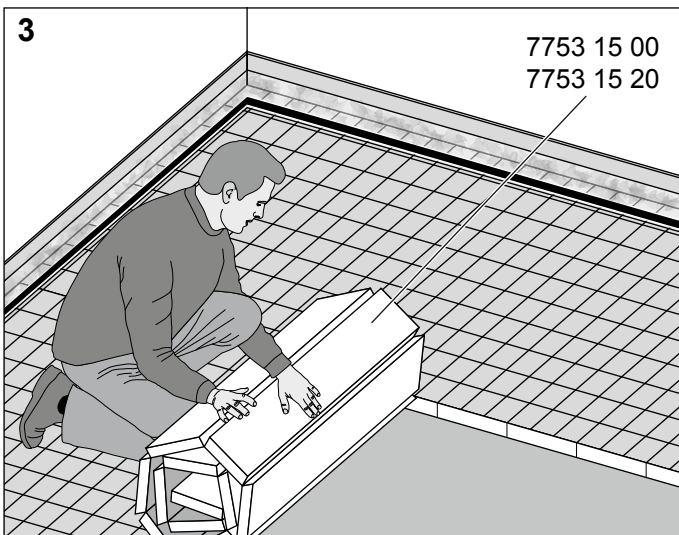


Position the joint pipe protection and expansion gap profile in the joints and between the screed areas.

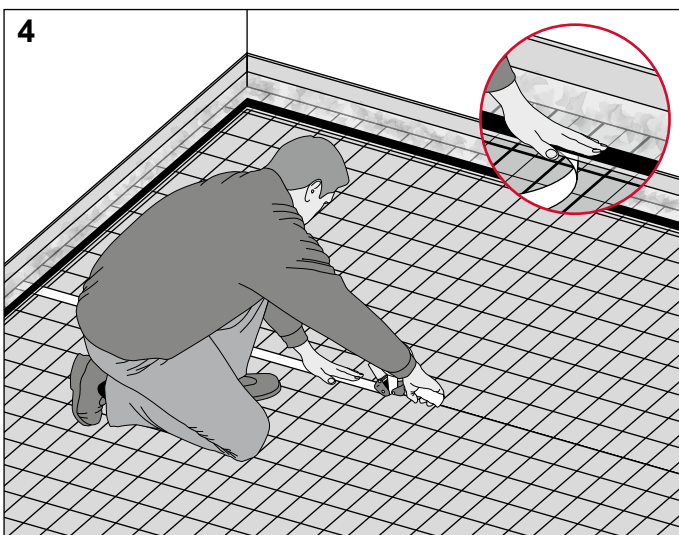
Tacking sheet system assembly instructions



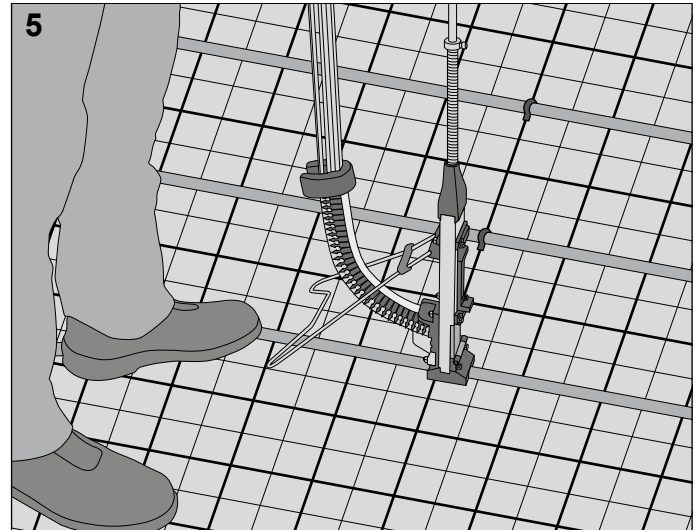
Clean the bare floors and attach the edge insulation strips.



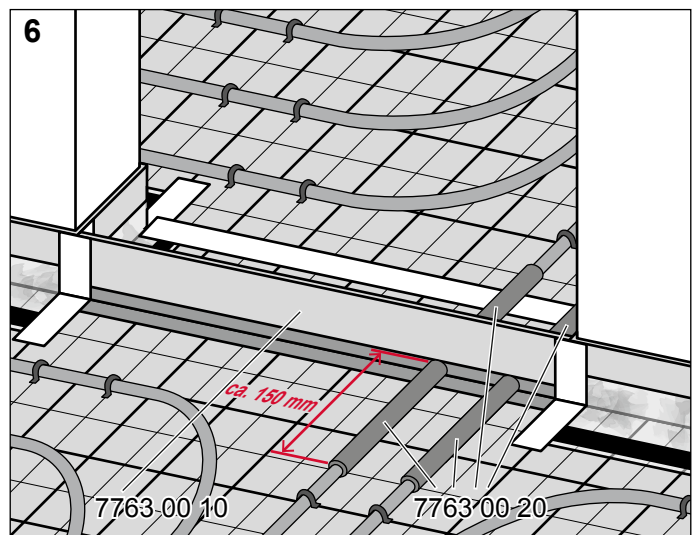
Unroll the roll insulation, applying additional insulation beforehand, if necessary.



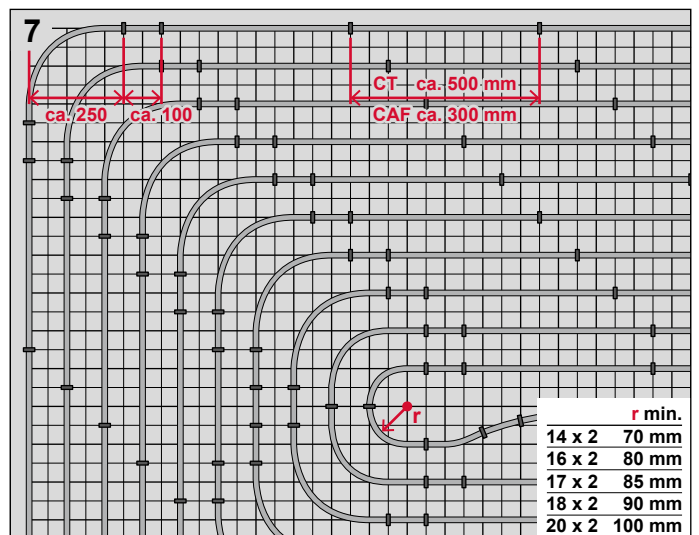
Cover any welts and joints to the edge insulation strips with adhesive tape.



Lay pipes according to the plan and attach to roll insulation using tacking pins (distance in cement screed max. 500 mm, in calcium sulphate screed max. 300 mm).

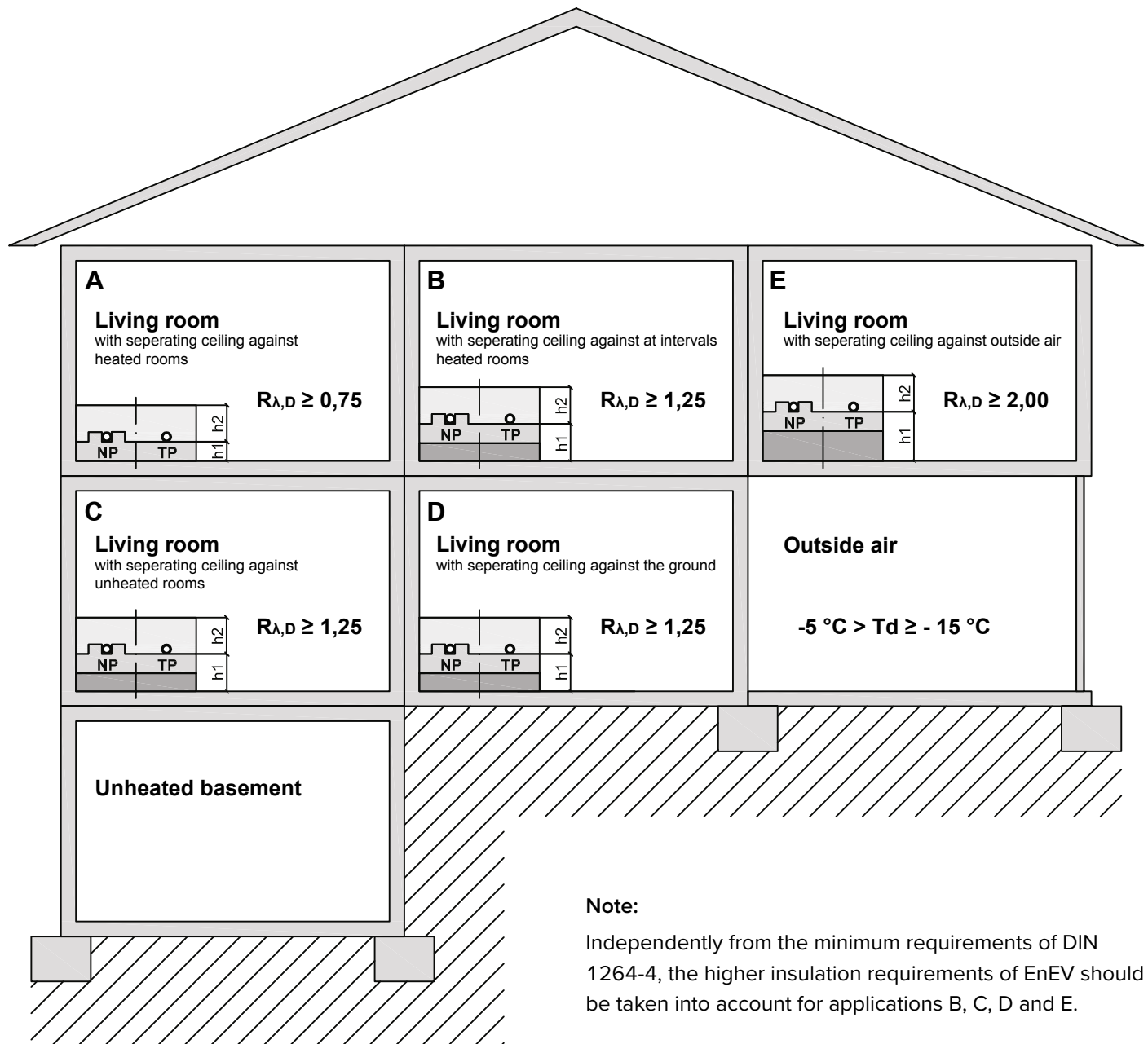


Position the joint pipe protection and expansion gap profile in the joints and between the screed areas.



For additional installation spacings, etc., see the assembly instructions.

Minimum insulation requirement in accordance with DIN EN 1264-4



Note:

Independently from the minimum requirements of DIN 1264-4, the higher insulation requirements of EnEV should be taken into account for applications B, C, D and E.

Minimum screed layer heights h_2 according to DIN 18560-2

| Area load | C | CT F4 | CT F5 | CAF F4 | CAF F5 |
|------------------------|--------------------|----------|----------|----------|----------|
| $\leq 2\text{ kN/m}^2$ | $\leq 5\text{ mm}$ | $45 + d$ | $40 + d$ | $40 + d$ | $35 + d$ |
| $\leq 3\text{ kN/m}^2$ | $\leq 5\text{ mm}$ | $65 + d$ | $55 + d$ | $50 + d$ | $45 + d$ |
| $\leq 4\text{ kN/m}^2$ | $\leq 3\text{ mm}$ | $70 + d$ | $60 + d$ | $60 + d$ | $50 + d$ |
| $\leq 5\text{ kN/m}^2$ | $\leq 3\text{ mm}$ | $75 + d$ | $65 + d$ | $65 + d$ | $55 + d$ |

C = max. permissible insulation compressibility of insulating layers
 CT F4/CT F5 = cement screed (CT) with flexural tensile strength F4/F5
 CAF F4/CAF F5 = calcium sulphate flow screed with flexural tensile strength F4/F5
 d = outer diameter of heating pipes or height of dimple

Minimum thickness h_1 (according to DIN 1264-4)

| System | Application | | |
|--|----------------------------|--|--|
| | A | B, C and D | E |
| TECEfloor dimpled panel 30-2 | 30 mm | 30 mm | 30 mm |
| Minimum additional insulation according to DIN EN 1264-2 (installation site) | - | e. g. 20 mm EPS WLG 040 | e. g. 50 mm EPS WLG 040 |
| Thermal resistance ($R_{\lambda,D}$) | 0.75 m ² K/W | 1.25 m ² K/W | 2.00 m ² K/W |
| Minimum thickness h_1 | 30 mm | 50 mm | 80 mm |
| TECEfloor dimpled panel 11* | 11 mm | 11 mm | 11 mm |
| Minimum additional insulation according to DIN EN 1264-2 (installation site) | e. g. 20 mm EPS WLG 040 | e. g. 40 mm EPS WLG 040 | e. g. 70 mm EPS WLG 040 |
| Thermal resistance ($R_{\lambda,D}$) | 0.81 m ² K/W | 1.31 m ² K/W | 2.06 m ² K/W |
| Minimum thickness h_1 | 31 mm | 51 mm | 81 mm |
| TECEfloor dimpled sheet* | - | - | - |
| Minimum additional insulation according to DIN EN 1264-2 (installation site) | e. g. 30 mm EPS WLG 040 | e. g. 50 mm EPS WLG 040 | e. g. 80 mm EPS WLG 040 |
| Thermal resistance ($R_{\lambda,D}$) | 0.75 m ² K/W | 1.25 m ² K/W | 2.00 m ² K/W |
| Minimum thickness h_1 | 30 mm | 50 mm | 80 mm |
| TECEfloor tacking sheet 30-2 | 30 mm | 30 mm | 30 mm |
| Minimum additional insulation according to DIN EN 1264-2 (installation site) | - | e. g. 20 mm EPS WLG 040 | e. g. 50 mm EPS WLG 040 |
| Thermal resistance ($R_{\lambda,D}$) | 0.75 m ² K/W | 1.25 m ² K/W | 2.00 m ² K/W |
| Minimum thickness h_1 | 30 mm | 50 mm | 80 mm |
| TECEfloor tacking sheet 30-3 | 30 mm | 30 mm | 30 mm |
| Minimum additional insulation according to DIN EN 1264-2 (installation site) | e. g. 5 mm EPS WLG 040 | e. g. 25 mm EPS WLG 040 | e. g. 55 mm EPS WLG 040 |
| Thermal resistance ($R_{\lambda,D}$) | 0.795 m ² K/W | 1.29 m ² K/W | 2.71 m ² K/W |
| Minimum thickness h_1 | 35 mm | 55 mm | 85 mm |
| TECEfloor tacking sheet 10plus | 10 mm | 10 mm | 10 mm |
| Minimum additional insulation according to DIN EN 1264-2 (installation site) | 20 mm EPS DES WLG 040 | 20 mm EPS DES WLG 040 + 20 mm EPS DEO WLG 040 | 20 mm EPS DES WLG 035 + 30 mm PUR WLG 025 |
| Thermal resistance | 0.789 m ² K/W | 1.286 m ² K/W | 2.057 m ² K/W |
| Minimum thickness h_1 | 30 mm | 50 mm | 60 mm |

* no impact noise (in the event of an impact noise requirement, provide additional insulation)

Thermal conductivity group: Insulating materials are classified into thermal conductivity groups according to the rated value of the thermal conductivity which simplifies calculation and use. The thermal conductivity group is derived directly from the rated value $\lambda(R)$: $\lambda(R)$ with 0.040 W/(m·K) = TCG 040.

Thermal resistance R_{λ} of TECEfloor system panels

| TECEfloor system panels | Thermal resistance R_{λ} |
|-------------------------|--|
| Dimpled panel 30-2 | $R_{\lambda,SP} = 0.75 \text{ W/m}^2\text{K}$ |
| Dimpled panel 11 | $R_{\lambda,SP} = 0.31 \text{ W/m}^2\text{K}$ |
| Dimpled sheet | $R_{\lambda,SP} = 0.00 \text{ W/m}^2\text{K}$ |
| Tacking sheet 30-2 | $R_{\lambda,SP} = 0.75 \text{ W/m}^2\text{K}$ |
| Tacking sheet 30-3 | $R_{\lambda,SP} = 0.67 \text{ W/m}^2\text{K}$ |
| Tacking sheet 10plus | $R_{\lambda,SP} = 0.286 \text{ W/m}^2\text{K}$ |

TECEfloor – System panels

Note:

When selecting additional insulation, in conjunction with the TECEfloor system panels, the minimum requirements according to EN 1264 must be taken into account. Requirements derived from considering the building in its entirety according to EnEV must be stipulated by the designer. The overall insulation structure for underfloor heating must be appropriately adapted to the building's specific requirements.

Example:

Detached house with TECEfloor heating system with dimple system 30-2, pipe dimension 14 x 2 mm
Architect's specifications:

- Separating ceiling on upper floor above heated ground floor:
no requirements according to EnEV
- Ground floor ground slab (against the ground):
U-value according to energy performance certificate:
0.28 W/m²K
⇒ $R_{\lambda,D} = 1/U = 1/0.28 \text{ W/m}^2\text{K} = 3.57 \text{ m}^2\text{K/W}$
- Ground slab installation height: 160 mm top edge of screed

Calculation of additional insulation required or thermal conductivity group:

1. Separating ceiling on upper floor above heated ground floor

$$\begin{aligned} R_{\lambda,D} \text{ total thermal insulation:} & \quad 0.75 \text{ m}^2\text{K/W} \\ & \text{(in accordance with DIN 1264-4)} \\ R_{\lambda,SP} \text{ TECEfloor dimpled panel 30-2:} & \quad - 0.75 \text{ m}^2\text{K/W} \\ R_{\lambda,ZD} \text{ additional insulation:} & \quad = 0 \text{ m}^2\text{K/W} \end{aligned}$$

⇒ no additional insulation required

2. Ground floor ground slab (against the ground)

Floor construction:

- 160 mm top edge of screed
- 60 mm heating screed
- 30 mm TECEfloor dimpled panel 30-2
- = 70 mm additional insulation

$$\begin{aligned} R_{\lambda,D} \text{ total thermal insulation:} & \quad 3.57 \text{ m}^2\text{K/W} \\ R_{\lambda,SP} \text{ TECEfloor dimpled panel 30-2:} & \quad - 0.75 \text{ m}^2\text{K/W} \\ R_{\lambda,ZD} \text{ additional insulation:} & \quad = 2.82 \text{ m}^2\text{K/W} \end{aligned}$$

$$\begin{aligned} R_{\lambda,ZD} &= d_{ZD} / \lambda_{ZD} \\ \Rightarrow \lambda_{ZD} &= d_{ZD} / R_{\lambda,ZD} = 0.07 / 2.82 = 0,0248 \text{ W/mK} \end{aligned}$$

⇒ Selected thermal insulation:
70 mm PUR, WLG 025

$R_{\lambda,D}$ required thermal resistance of overall insulation in m²K/W (according to DIN EN 1264-4 or EnEV energy performance certificate)
 $R_{\lambda,SP}$ thermal resistance of TECEfloor system panel in m²K/W
 $R_{\lambda,ZD}$ required thermal resistance of additional insulation in m²K/W
 d_{ZD} thickness of additional insulation in m
 λ_{ZD} thermal conductivity of additional insulation in W/mK

Heating circuit manifold and manifold housing

TECEfloor stainless steel heating circuit manifold with flow rate indicator

The TECEfloor heating circuit manifold has a large chamber volume, a polished surface, a sound-absorbent plastic holder with a quick assembly function and union nut 1" flat sealing.



It features integrated return valves with double O-ring sealing on the valve tappet, a valve disk with O-ring sealing for permanently reliable closing of the heating circuits, and a flow metre with shut-off, 0.5-4 litres with locking mechanism to DIN EN 1264-4.

The viewing glasses can be replaced under system pressure. The batch indication enables tracking and unique identification of the manifold even after many years of operation (supply of accessories and spare parts).

SLQ quality-monitored and tested for compatibility. Every manifold is 100% tested for tightness and function. Made in Germany

TECEfloor stainless steel heating circuit manifold type Logo with flow rate indicator



The TECEfloor heating circuit manifold type Logo has outlets with "Type Logo" pre-assembled push fittings for quick and twist-free connection of the TECEfloor heating pipe, dim. 16, types SLQ AI/PE-RT and SLQ MDXc 5S. Push fitting with Eurocone connection can be subsequently removed with ease using the system tool.

Only use in conjunction with the corresponding system tool. Specially for TECEfloor heating pipe, dim. 16, types SLQ AI/PE-RT and SLQ MDXc 5S.

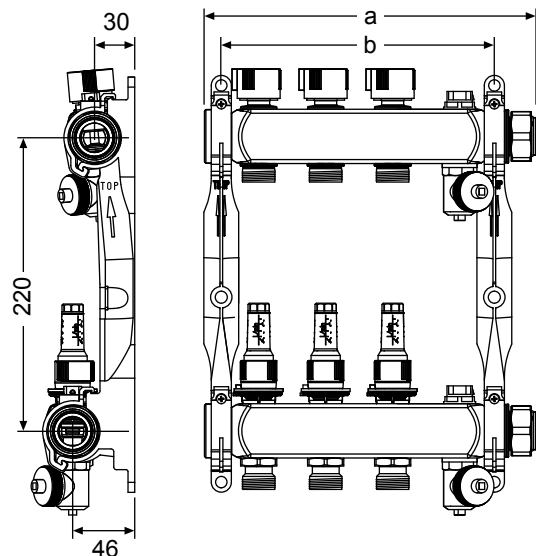
Kvs value flow and return valve: 1.2 m³/h
distance to heating circuit: 50 mm

Operating conditions:

90 °C/3 bar
80 °C/4 bar
70 °C/5 bar
60 °C/6 bar
max. test pressure: 10 bar (< 30 °C)

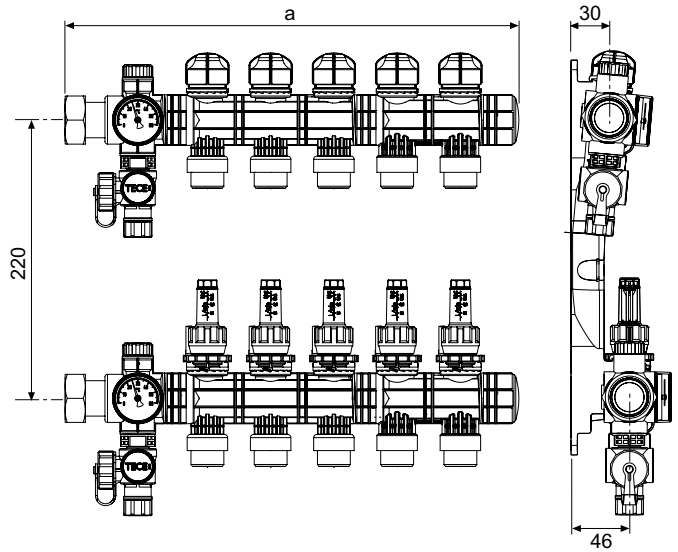
Dimensions of heating circuit manifold according to heating circuit:

| Heating circuits | a (in mm) | b (in mm) |
|------------------|-----------|-----------|
| 2 | 198 | 154 |
| 3 | 248 | 204 |
| 4 | 298 | 254 |
| 5 | 348 | 304 |
| 6 | 398 | 354 |
| 7 | 448 | 404 |
| 8 | 498 | 454 |
| 9 | 548 | 504 |
| 10 | 598 | 554 |
| 11 | 648 | 604 |
| 12 | 698 | 654 |



TECEfloor – Heating circuit manifold and manifold housing

SLQ plastic heating circuit manifold with flow rate indicator



As a modular manifold, the SLQ plastic heating circuit manifold consists of a base module and one or more 2-way or 3-way connection modules with integrated valve technology.

Base module, primary side flat sealing with union nut G1, flow and return thermometer, two rotatable filling and emptying units and two bleed valves for manual air release.

Includes manifold wall holder with sound insulation inserts in accordance with DIN 4109 and mounting set.

Connection modules with finely-regulating and flow meter (0–3.5 l/min) with shut-off in the flow part, and thermostat valves M 30 x 1.5 mm (supplied with protective cap), suitable for holding thermoelectric servomotors in the return part. Heating circuit outlets with 3/4" Eurocone connection.

Kvs value flow and return valve: 0.75 m³/h
 distance to heating circuit: 50 mm

Operating conditions:

max. operating pressure: 6 bar (3 bar)
 max. operating temperature: 60 °C (90 °C)
 min. operating temperature: 6 °C
 max. test pressure: 10 bar (< 30 °C)

Dimensions of heating circuit manifold according to heating circuit:

| Heating circuits | a (in mm) |
|------------------|-----------|
| 2 | 202 |
| 3 | 252 |
| 4 | 302 |
| 5 | 352 |
| 6 | 402 |
| 7 | 452 |
| 8 | 502 |
| 9 | 552 |
| 10 | 602 |
| 11 | 652 |
| 12 | 702 |

SLQ industrial plastic heating circuit manifold with flow rate indicator



The SLQ industrial plastic heating circuit manifold 1 1/2" has a modular design: With the base module, up to 20 flow and return modules can be combined into one manifold.

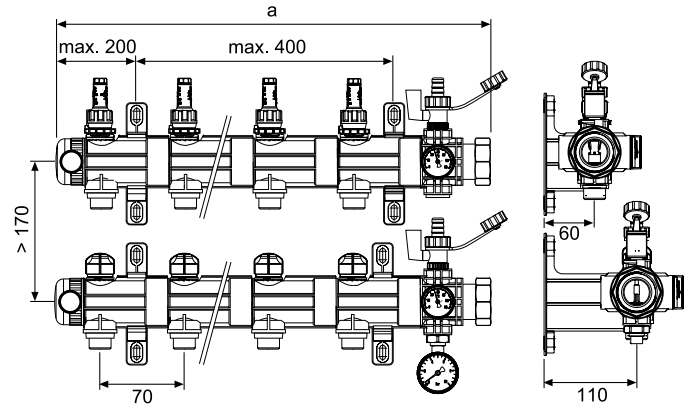
On the primary side, the industrial plastic heating circuit manifold can be connected via a flat sealing union nut connection 1 1/2". Corresponding ball valves 1 1/2" MT/1 1/2" FT are available for this. On the secondary side, the heating circuits are connected via a 3/4" Eurocone thread.

In the flow direction, the heating circuit modules are equipped with a flow meter (4–20 l/min) with shut-off, and in the return direction, with valve cores (M 30 x 1.5) with a shut-off valve.

Kv value of flow and return valves (together): 2.09 m³/h
distance to heating circuit: 70 mm

Operating conditions:

max. operating pressure: 6 bar (3 bar)
max. operating temperature: 60° C (90 °C)
max. test pressure (24 hours): 6 bar (< 30 °C)



Note: A wall mount set should be provided every 400 mm. This must be ordered separately, if required.

Dimensions of heating circuit manifold according to heating circuit:

| Heating circuits | a (in mm) |
|------------------|-----------|
| 2 | 250 |
| 3 | 320 |
| 4 | 390 |
| 5 | 460 |
| 6 | 530 |
| 7 | 600 |
| 8 | 670 |
| 9 | 740 |
| 10 | 810 |
| 11 | 880 |
| 12 | 950 |
| 13 | 1020 |
| 14 | 1090 |
| 15 | 1160 |
| 16 | 1230 |
| 17 | 1300 |
| 18 | 1370 |
| 19 | 1440 |
| 20 | 1510 |

TECEfloor – Heating circuit manifold and manifold housing

Fixed value control 20-55°C



As a manifold station, the TECE floor fixed value control regulates the temperature of the water in the secondary floor heating area via a thermostat head with a flow sensor. This remains below the water temperature on the primary side as long as this – generally weather-compensating water temperature – remains above the value set on the fixed value control. If the water temperature on the primary side drops due to the

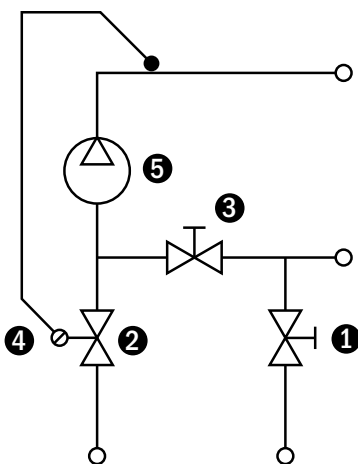
heating curve setting being below the set fixed value temperature, the flow temperature on the secondary side in the underfloor heating circuit will also drop. The station is designed according to pressure loss, flow rate and spread to provide an output of approx. 10 kW.

To hydraulically harmonise the connected underfloor heating with the rest of the heating installation, the TECEfloor fixed value control is equipped with a control valve (1) in the primary return, and a balance valve (3) in the underfloor heating circuit return.

The pre-mounted and electronically-controlled circulating pump ES 25-60 is fitted with a permanent magnet synchronous motor which can be set via a simple push button to the following operating modes:

- constant pressure 300 mbar
- constant pressure 400 mbar
- proportional pressure
- and continuous

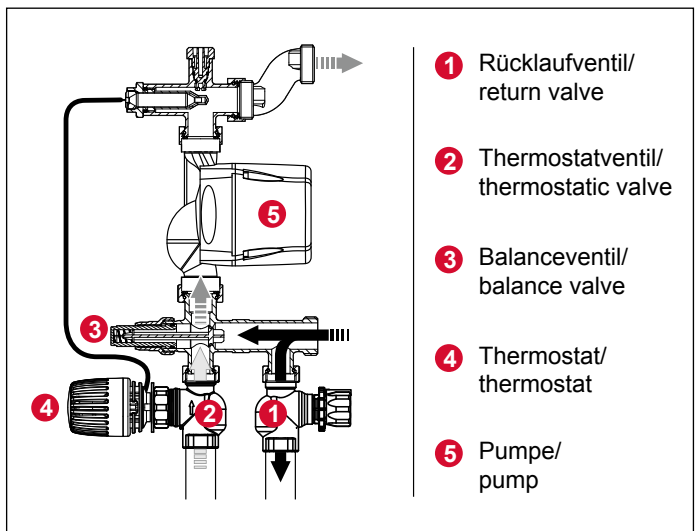
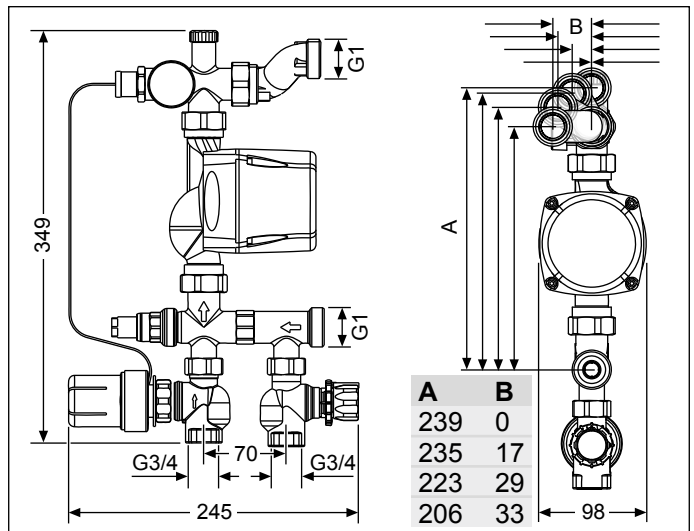
Secondary connection to manifold R 1", flat-sealing



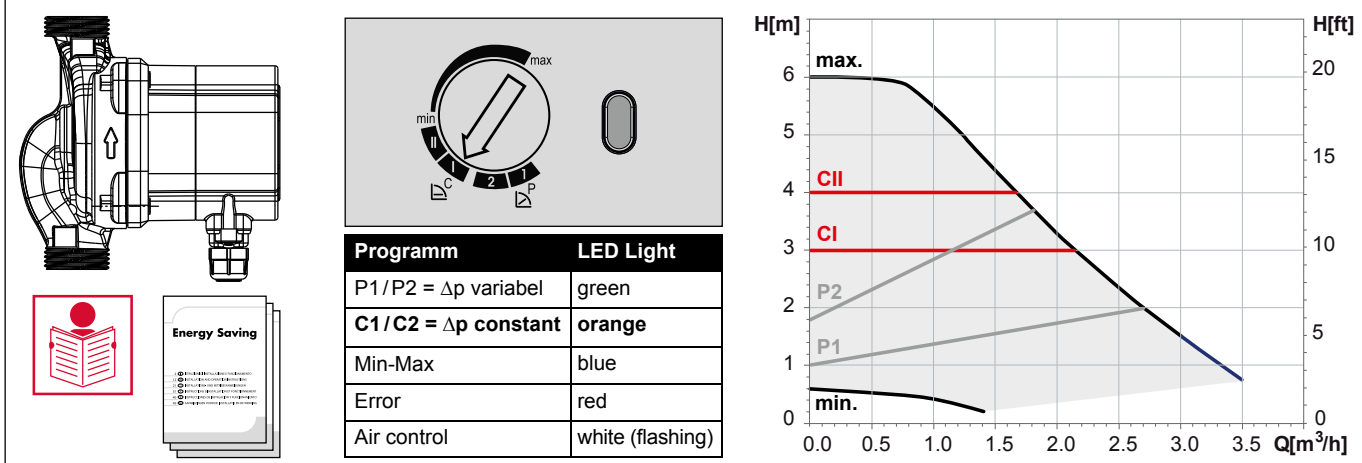
| Temperatur | Temperature | |
|------------|-------------|----------|
| Primär | Primary | 20-90° C |
| Sekundär | Secondary | 20-55° C |
| p max. | p max. | 6 bar |

| Pumpe | Pump | |
|--------|--------|-----------------------|
| U | U | 230 V, 50 Hz |
| Q | Q | 2,7 m ³ /h |
| H | H | 6 mWs |
| P | P | 8,4 ... 53 W |
| Glykol | Glycol | max. 40 vol% |

| Ventile | Valves | |
|------------------|------------------|---------------------------|
| Rücklaufventil | Return valve | kvs 2,7 m ³ /h |
| Thermostatventil | Thermostic valve | kvs 4,0 m ³ /h |



Pumpe / Pump / Bomba / Hacoc / Pompe / Pompa di circolazione / Pompa



Manifold housing UP 110 (flush-mounted)

Flush-mounted manifold housing made of galvanized sheet steel for accommodating the SLQ heating circuit manifold. With lateral, pre-punched holes for manifold main connection and removable screed baffle plate. Powder-coated door and frame similar to RAL 9010. Housing, height-adjustable from 705–775 mm, depth-adjustable from 110–150 mm. C-rail for mounting heating circuit manifold.

Manifold housing UP 80 (flush-mounted)

similarly to manifold housing UP 110, but depth-adjustable by 80–120 mm

| Housing type | UP 110 | UP 80 |
|-------------------------|------------|------------|
| Housing depth, interior | 110-150 mm | 80-120 mm |
| Installation height | 705-775 mm | 705-775 mm |
| Required niche depth | 115-155 mm | 80-125 mm |
| Required niche height | 710-780 mm | 710-780 mm |

Dimensions of manifold housing UP 80/UP 110

| Interior width | 400 | 540 | 690 | 840 | 990 | 1140 |
|---|-----|-----|-----|------|-------|------|
| required niche width | 445 | 585 | 735 | 885 | 1035 | 1185 |
| No. heating manifolds incl. ball valve* | 2 | 3–5 | 6–8 | 9–11 | 12 | – |
| No. heating manifolds incl. corner ball valve* | – | 2–4 | 5–7 | 8–10 | 11–12 | – |
| No. heating manifolds incl. corner calorimeter set* | – | 2–3 | 4–6 | 7–9 | 10–12 | – |
| No. heating manifolds incl. fixed value control* | – | 2 | 3–5 | 6–8 | 9–11 | 12 |

* Recommended housing width = fittings + mounting distance on both sides (2 x \geq approx. 50 mm)

Manifold housing AP 125 (wall-mounted)

Wall-mounted manifold housing made of galvanized sheet steel for accommodating the SLQ heating circuit manifold. Powder-coated, similar to RAL 9010. C-rail for mounting heating circuit manifold.

Housing height: 618 mm

Housing depth: 125 mm

Housing type UP 125

| Interior width | 500 | 730 | 880 | 1030 |
|---|-----|-----|-------|-------|
| No. heating manifolds incl. ball valve* | 2–4 | 5–9 | 10–11 | 12 |
| No. heating manifolds incl. corner ball valve* | 2–3 | 4–8 | 9–11 | 12 |
| No. heating manifolds incl. corner calorimeter set* | 2 | 3–7 | 8–10 | 11–12 |
| No. heating manifolds incl. fixed value control* | – | 2–6 | 7–9 | 10–12 |

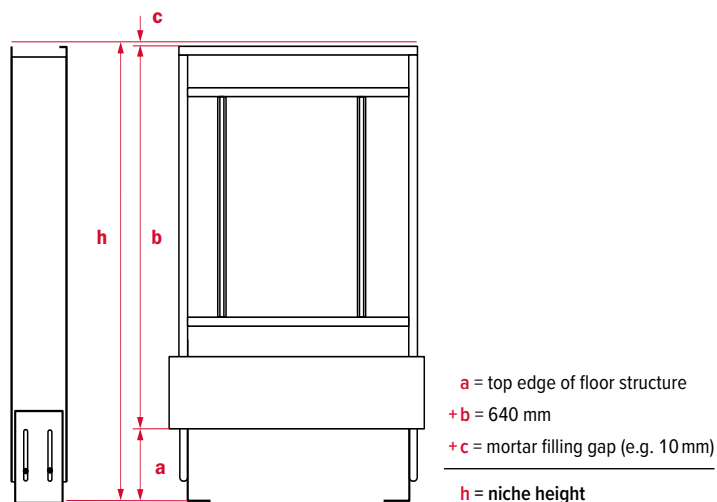
* Recommended housing width = fittings + mounting distance on both sides (2 x \geq approx. 50 mm)

Housing depth: 125 mm

Housing height: 618 mm

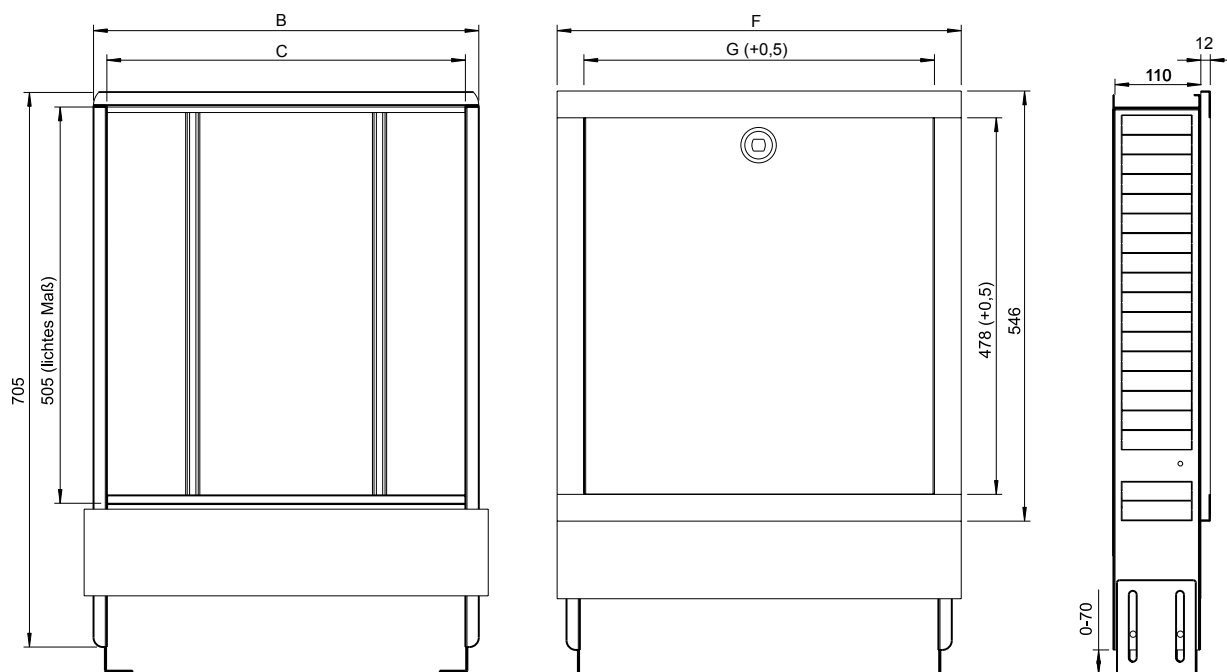
TECEfloor – Heating circuit manifold and manifold housing

TECEfloor



Dimension tables and drawings

| Type | 400 | 600 | 750 | 900 | 1050 | 1200 |
|----------|-----|-----|-----|-----|------|------|
| B | 435 | 574 | 724 | 874 | 1024 | 1174 |
| C | 401 | 540 | 690 | 840 | 990 | 1040 |
| F | 459 | 598 | 748 | 898 | 1048 | 1198 |
| G | 391 | 530 | 680 | 830 | 980 | 1130 |



Individual room controller



Note: Please observe the information in the assembly instructions attached. Disconnect the wiring from the mains prior to carrying out any work.

System components

- TECEfloor room thermostat, analogue (24 V or 230 V, heating or heating/cooling)



- TECEfloor room thermostat LC display (24 V or 230 V, Standard or Control)



- TECEfloor connection unit (24 V or 230 V, Standard or Standard Plus)



- TECEfloor servomotor (24 V or 230 V)



TECEfloor room thermostat

TECEfloor room thermostats are high quality room temperature controls for measuring and regulating the required room temperature to achieve maximum user comfort. The room thermostat is available for operating voltages 24 V and 230 V. Easy individual room control is possible with servomotors which can be directly connected. In conjunction with the TECEfloor connection unit, it is possible to create a perfectly harmonised overall system for regulating surface temperatures.

TECEfloor room thermostat, analogue

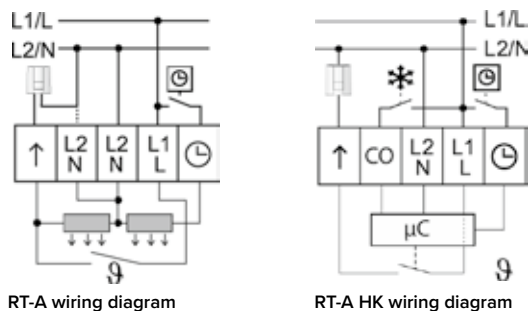
- Available in two versions: Heating (RT-A) and heating/cooling (RT-A HK)
- available in a choice of 24 V or 230 V
- flat design and small footprint (86 x 86 x 29 mm)
- stand alone controls or controls integrated into the system
- set-back input for reducing the room temperature
- target value calibration
- limitation of the target value setting range
- valve safeguard and frost protection function
- changeover input (only RT-A HK)
- high-quality, modern design
- high functional safety

Technical data

| | |
|--|--|
| Operating voltage: | 24 V ± 20 %, 50 Hz 230 V ± 10%, 50 Hz |
| Safety feature: | 24 V: T1A 230 V: T2AH |
| Switching element: | 24 V: Triac 230 V: relay |
| Switching capacity: | 24 V: 1 A ohmic load 230 V: 2 A ohmic load |
| Temperature setting range: | 10°C - 28 °C |
| target value calibration: | ±2 K |
| Set-back temperature: | 2 K |
| Temperature measurement: | 0 - 40 °C |
| Measurement accuracy: | ±0.5 K |
| Ambient temperature: | 0 - 50 °C |
| CE conformity in accordance with: | EN 60730 |
| Protection class: | 24 V: III 230 V: II |
| Degree of protection: | IP 20 |
| Weight: | 90 g |
| Dimensions (W x H x D): | 86 x 86 x 29 mm |
| Frost protection function: | From + 6 °C in heating mode, not active in cooling mode. |
| Controller with heating/cooling function only: | |
| Valve safeguard function: | Every two weeks for 6 minutes after the last actuation |

TECEfloor – Individual room control

Electrical connection



- Mains connection (power supply via TECEfloor connection unit or an external voltage source)
- Set-back input (receives an external set-back signal for time-controlled lowering of the room temperature of a TECEfloor room thermostat RT-D Control, or an external system clock)
- Changeover-input (switches between heating and cooling via an external potential-free contact)
- Connection for servomotor (integrated valve safeguard function)

Note: On the 24 V version, a 50 VA transformer is also required.

TECEfloor room thermostat, LC display

- available in two versions: RT-D Standard and RT-D Control
- available in a choice of 24 V or 230 V
- large, clearly arranged LC display (with background lighting, RT-D Control version only)
- flat design and small footprint (86 x 86 x 31 mm)
- stand alone controls or controls integrated into the system
- equipment for heating and cooling systems
- Smart Start/Smart Stop function
- configurable operating modes
- heating and cooling mode comfort program
- configurable set-back temperature
- correction of actual temperature measurement
- limitation of the target value setting range
- valve safeguard and frost protection function
- connection for an external temperature sensor
- Changeover input
- high-quality, modern design
- suitable for NC and NO operation
- high functional safety

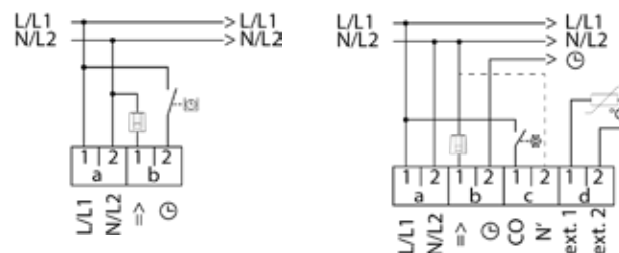
Technical data

| | |
|-----------------------------------|--|
| Operating voltage: | 24 V ± 20 %, 50 Hz 230 V ± 10 %, 50 Hz |
| Safety feature: | 24 V: T1A 230 V: T1AH |
| Switching element: | 24 V: Triac 230 V: relay |
| Switching capacity: | 1 A ohmic load |
| Temperature setting range: | 5 - 30 °C |
| Terminals: | 0.22 mm ² to 1.5 mm ² |
| Set-back difference: | RT-D Standard: 2 K RT-D Control: configurable |
| Temperature measurement: | 0 - 40°C |
| Ambient temperature: | 0 - 50 °C |
| CE conformity in accordance with: | EN 60730 |
| Protection class: | 24 V: III 230 V: II |
| Degree of protection: | IP 20 |
| Weight: | 105 g |
| Dimensions (W x H x D): | 86 x 86 x 31 mm |

Valve safeguard function: Every two weeks for 10 minutes after the last actuation.

Frost protection function: From +5°C in heating mode. Not active in cooling mode

Electrical connection



RT-D Standard wiring plan

RT-D Control wiring plan

- Mains connection (power supply via TECEfloor connection unit or an external voltage source)
- Set-back input (RT-D Standard version, receives external time signal for time-controlled lowering of the room temperature)
- Set-back output (RT-D Control version, transmits the internal time signal to other components of the TECEfloor room thermostat range)
- Changeover-input (RT-D Control design, switches between heating and cooling via an external signal (potential-free contact))
- Connection for servomotor (integrated valve safeguard function or integrated frost protection function)
- Connection of an external sensor (monitoring of room or floor temperature and minimum floor temperature regulation)

TECEfloor connection unit

The TECEfloor connection unit is the central base of the TECEfloor individual room controller for regulating surface temperatures of heating and cooling systems. The base can be wired to all system components such as the controller and servomotors with very little effort. The system components are supplied directly via the unit's power supply. All the controller's switching commands are transmitted directly to the connected components via the TECEfloor connection unit. This high quality connection unit is available with 6 or 10 zones in 24 V or 230 V. Two designs are available to satisfy all installation requirements. Standard version for heating mode with set-back channel, or enhanced Standard Plus version with comprehensive functions for energy-efficient heating/cooling mode which protects the system.

- Available in two versions: Standard or Standard Plus,
- Version with 6 or 10 zones
- available in a choice of 24 V or 230 V
- up to 18 servomotors can be connected
- equipment for heating and/or cooling systems
- easy, intuitive installation and operation
- tried and trusted cabling, and standard-compliant tension relief
- screwless terminal connection technology
- clearly arranged terminals
- set-back channel for time-controlled lowering of the room temperature
- pump or boiler controller
- fixed follow-up time for pump or boiler controller
- connection for a temperature limiter or dew point sensor
- control direction of servomotors to be connected: NC or NO (NC: without current / NO: with current)
- high functional safety
- maintenance-free

Technical data

| | |
|--------------------------|---|
| Operating voltage: | |
| - Standard: | 24 V ± 20 %, 50 Hz 230 V ± 10 %, 50 Hz |
| - Standard Plus: | 24 V ± 20 %, 50 Hz 230 V ± 10 %, 50 Hz |
| Power input: | 24 V: max. 30 VA 230 V: max. 50 VA |
| Safety feature: | 24 V: T2A 230 V: T4AH |
| Number of heating zones: | 6 or 10 |

Servomotors to be connected:

| | |
|-------------------------------|--|
| - Type | NC or NO |
| - 6 heating areas: | 24 V or 230 V max. 15 to 2 W (230 V) max. 12 to 2 W (24 V) |
| - 10 heating areas: | max. 18 to 2 W (230 V) max. 12 to 2 W (24 V) |
| - Nominal load of all motors: | max. 24 W (at 24 V) max. 36 W (at 230 V) |
| Control direction: | NC or NO (Standard) NC (Standard Plus) |

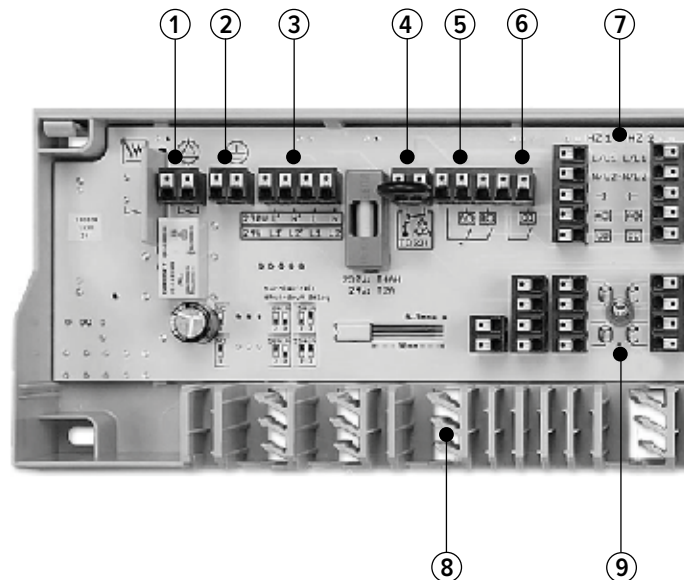
Ambient temperature: 0 to +50 °C

Protection class: 24 V: III

230 V: II

Protection class: IP 20

Electrical connection



TECEfloor connection unit (Standard Plus)

1. Pump controller* (pump control via a potential-free contact)
2. Protective conductor adapter plug* (adapter plug terminal for the protective conductor of an electrical consumer such as a boiler or pump (230 V version only))
3. Power supply/mains feed-through terminal (mains connection of TECEfloor connection unit, mains feed-through terminal for connecting an electrical consumer such as a pump or boiler (230 V version only), mains feed-through terminal for connecting a dew point sensor (24 V version only))
4. Temperature limiter/dew point sensor*
5. Set-back channel — connection for an external system clock (transmission of up to two timer signals for time-controlled lowering of the room temperature to a connected controller via a potential-free contact. Alternatively, up to two TECEfloor RT-D Control room thermostats (point 7) can be used as a timer.
6. Changeover heating/cooling* switching of entire individual room controller between heating and cooling, transmission of an external signal via a potential-free contact, transmission of change-over signal to a connected controller
7. Connection for controller (power supply for connected controller)
8. Cabling and tension relief (integrated cabling and tension relief in accordance with DIN EN 60730)
9. Connection for servodrives (power supply for connected servodrives)

*Standard Plus only

TECEfloor – Individual room control

TECEfloor radio-controlled unit for individual room control



Note: Please observe the information in the assembly instructions attached. Disconnect the wiring from the mains prior to carrying out any work.

System components

- TECEfloor radio-controlled room thermostat, analogue (RTF-A)



- TECEfloor radio-controlled room thermostat LC display (RTF-D)



- TECEfloor radio-controlled base unit including transformer, 24 V



- TECEfloor servomotor (24 V or 230 V)



TECEfloor radio-controlled room thermostats

TECEfloor radio-controlled room thermostats, analogue (RTF-A) with LC display (RTF-D) are high quality room temperature controls for measuring and regulating the required room temperature to achieve maximum user comfort.

On the RTF-A, the required room temperature in the allocated heating zone can be set easily by means of an easy-to-read dial with soft-lock. Sliders beneath the dial are used to limit the possible setting range and perform a target value comparison.

The RTF-D also guarantees the bidirectional exchange of data with the radio base station for calling up numerous status messages and displaying them on the large, clearly arranged display. The thermostat is operated by means of a dial with turn and press mechanism, soft-lock and the clearly arranged, language-neutral indicator on the high quality display.

TECEfloor radio-controlled room thermostat, analogue

- optimum value for money
- patented target value comparison
- setting range 10 to 28 °C
- reliable 868 MHz radio technology for optimum positioning without any cabling at all
- flat design and small footprint (86 mm x 86 mm x 26 mm)
- dial with ¼ degree soft-lock
- wall- and flush-mounted container (Germany and Switzerland)
- with limitation of the room temperature setting range to a maximum and/or minimum value

Technical data

| | |
|----------------------------|---------------------------------------|
| Power supply: | 2 x LR03/AAA (Micro) alkaline battery |
| Battery life: | > 2 years |
| Radio technology: | radio, 868 MHz, SRD band |
| Temperature setting range: | 10 °C - 28 °C |
| Temperature measurement: | 0 - 40 °C |
| Measurement accuracy: | ±0.3 K |
| Ambient temperature: | 0 - 50 °C |
| Ambient humidity: | 5 % to 80 % (non-condensing) |
| Protection class: | III |
| Degree of protection: | IP 20 |
| Weight: | 90 g |
| Dimensions (W x H x D): | 86 x 86 x 20 (26) mm |
| Colour: | RAL 9010 (pure white) |

TECEfloor radio-controlled room thermostat with LC display

- flat design and small footprint (86 mm x 86 mm x 26.5 mm)
- self-explanatory, language-neutral operation and user prompting
- large, clearly arranged LC display (60 mm x 40 mm)
- continuous display of room temperature, system time and operating status
- reliable 868 MHz radio technology for optimum positioning without any cabling at all
- 3 menu levels (Lifestyle functions, Settings and Service) for greater reliability
- limitation of the room temperature setting range
- convenient operation with dial (turn and press mechanism with dynamic soft-lock)
- wall- and flush-mounted container (Germany and Switzerland)
- setting range 5 to 30 °C
- optional remote sensor or integrated infra-red sensor for monitoring the floor temperature
- high-quality design version with real glass cover

Technical data

| | |
|----------------------------|---------------------------------------|
| Power supply: | 2 x LR03/AAA (Micro) alkaline battery |
| Battery life: | > 2 years |
| Radio technology: | radio, 868 MHz, SRD band |
| Temperature setting range: | 5 °C - 30 °C |
| Temperature measurement: | 0 - 40 °C |
| Measurement accuracy: | ±0.3 K |
| Ambient temperature: | 0 - 50 °C |
| Ambient humidity: | 5% to 80% (non-condensing) |
| Protection class: | III |
| Degree of protection: | IP 20 |
| Weight: | 115 g |
| Dimensions (W x H x D): | 86 x 86 x 21.5 (26.5) mm |
| Colour: | RAL 9010 (pure white) |

TECEfloor radio-controlled base unit

The TECEfloor system radio is the intelligent control for individual rooms of the future, for maximum comfort and energy efficiency when regulating surface temperatures.

The TECEfloor radio-controlled base units 24 V with 4 or 8 zones are the system's intelligent regulation and connection units for processing central information and communicating with all system components. They capture and utilise a large amount of measurement data for individual, energy-efficient temperature regulation in each room, achieving maximum user comfort. The 868 MHz radio

technology guarantees reliable, bidirectional communication between the assigned room controllers, base stations and connected drives with minimal radio load. Even in the standard version, the highly developed system software meets all the demands of current and future systems — adaptations and updates for a technologically-changing environment can be conveniently carried out via a MicroSD card slot.

The Ethernet version is not just easily integrated into the home network and conveniently controlled by PC and/or Smartphone or over the Internet. The XML interface also enables integration into higher-level building control and home automation systems.

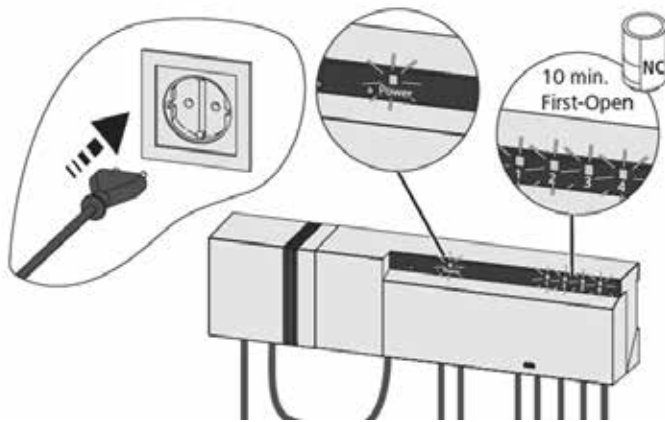
- high-quality, modern design
- versions with 4 and 8 zones
- All-in-one – fully equipped for heating and/or cooling systems even in the standard version
- Coupling of up to 7 base stations via radio and or syBUS
- automatic Plug&Play configuration even for future extensions to the system
- easy, intuitive installation, operation and maintenance
- connection for up to 12 x 2 W servo motors (1 to 2 per zone)
- initial state can be selected as NC or NO
- tried and trusted cabling and tension relief
- screwless plug/terminal connection technology
- MicroSD card slot for individual adjustments by means of MicroSD cards over an online service
- easy to operate, program and initialise
- perfect interaction of several base stations over Bus
- integrated system clock
- Ethernet version only: Smart Home ready, therefore easy to integrate via XML into higher-level home automation systems
- Ethernet version only: easy to integrate into the home network
- Ethernet version only: web-based application software for convenient control via PC, Smartphone or the Internet
- Smart Start function for even more energy-efficient operation

TECEfloor – Individual room control

Technical data

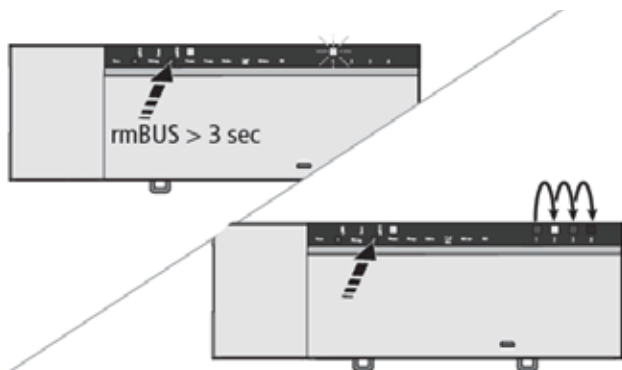
| | |
|-------------------------------------|---|
| Max. number of heating zones: | 4 to 8 |
| Operating voltage: | 24 V / ± 20 % / 50 Hz |
| Power input | 0.6 W or 1.4 W |
| Idle speed/with transformer: | limited |
| max. power input (without pump): | 50 W (limited by system transformer) |
| Safety feature: | 5 x 20 mm, T2A |
| Protection class: | II |
| Degree of protection: | IP20 |
| Radio technology: | radio, 868 MHz, SRD band |
| Max. number of heating zones: | 6 to 12 |
| max. nominal load of all drives: | 24 W (12 x 2 W) |
| Control mode: | PI/2-point adjustable |
| Control accuracy: | ±1 K |
| Control oscillation: | ±0.2 K |
| Perm. ambient temperature: | 0 to 60 °C |
| Perm. ambient humidity: | 5 to 80 % (non-condensing) |
| Mains connection version: | System transformer with Euro plug |

Start-up (pairing of components)

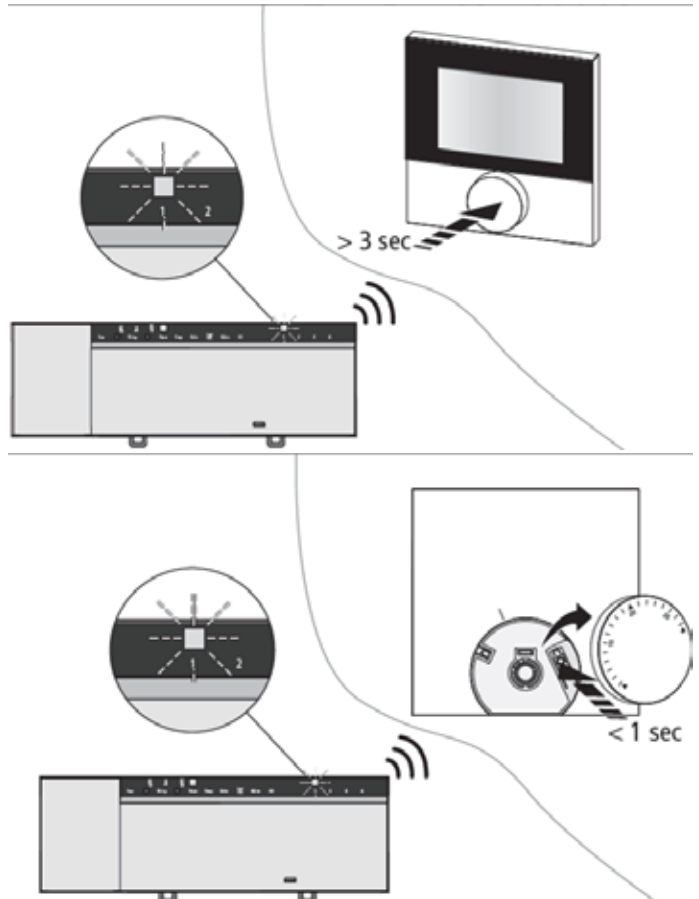


Switch on mains voltage (the base station initialises the installation mode for 30 minutes.)

If the base station is parameterised for NC drives, all heating zones are driven for 10 minutes, to unlock the First Open function of NC drives.



Activate the pairing function on the base station for the required heating zones.



Press the dial (RTF-D) or pairing button under the setpoint adjuster (RTF-A) on the radio-controlled room thermostat for a few seconds to activate the pairing function. The base unit and room controller are connected to each other.

One room controller can be assigned to several heating zones. It is not possible to assign several room controllers to one zone.

TECEfloor design RTL box

TECEfloor RTL box is a high-quality room temperature control with a real glass cover and an attractive aluminium thermostat head. It is ideal for performing decentralised individual room control of floor and wall heating systems in combination with radiator heating systems. The high radiator water temperatures can be limited (via an integrated return temperature limiter) to a suitable temperature level for the floor heating.

With its compact design, it is not only up to 60 % smaller than standard RTL boxes, but is also pleasing with its sophisticated depth adjustment which ensures that its appearance never changes. This makes it the first RTL box to offer the option of installation at standard switch height. Operation at floor level is a thing of the past.



TECEfloor design RTL box

- real glass cover in white or black
- anodised aluminium thermostat head
- flat design and small footprint (124 x 104 x 7 mm)
- individual room control without auxiliary energy
- integrated return temperature limiter
- integrated stop and control valve
- integrated air release
- 25 mm depth adjustment
- minimum installation depth of just 50 mm
- suitable for dry-wall and brick-wall installation

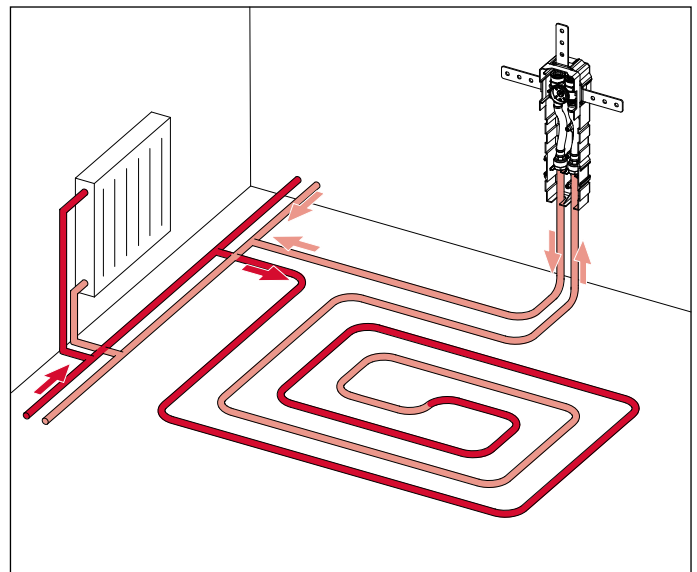
Function

From a control technology point of view, the integrated thermostat valve in the TECEfloor RTL box is a continuous proportional controller (P controller) which does not require auxiliary energy. It does not need any electrical connection or other outside source. The change in room air temperature (controlled variable) is proportional to the change in valve stroke (correcting variable). If the room air temperature increases, e.g. due to the sun's rays, the liquid in the temperature sensor expands, affecting the corrugated sheath pipe. Via the valve spindle, this restricts the

water supply in the underfloor heating circuit. If the room air temperature drops, the process is reversed. The TECEfloor RTL box is also equipped with a return temperature limiter (RTL), which prevents the set return temperature from being exceeded. The valve opens if the value falls below the set limiting value.

Instructions for use

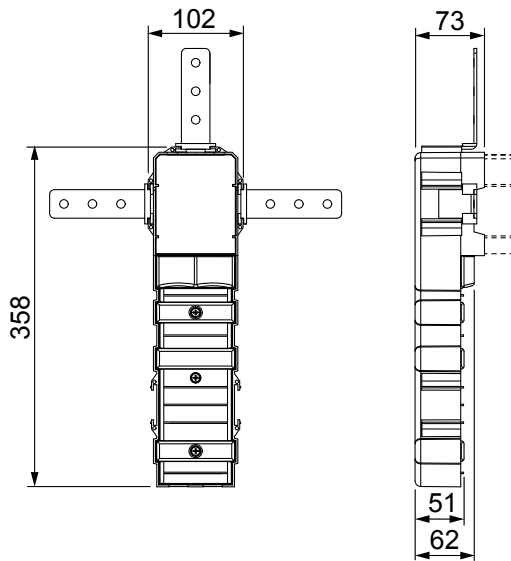
- The TECEfloor RTL box should always be installed behind the surface heating circuit, i.e. in the return direction. Observe the flow direction



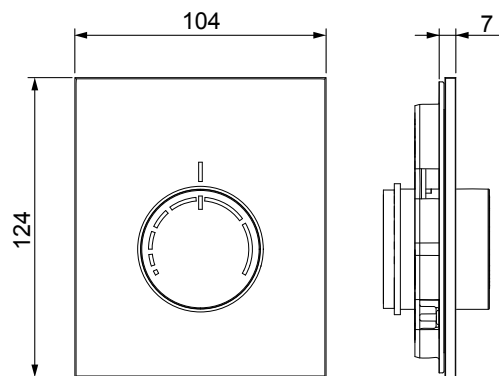
- The TECEfloor Design RTL box offers individual room control by means of an automatic thermostat and, at the same time, limits the temperature of the heating area by means of the return temperature limiter.
- Hydraulic compensation is performed at the preconfigurable valve insert. The TECEfloor Design RTL box can be operated without additional heaters if the thermal output of the radiant heating is sufficient.
- The TECEfloor Design RTL box is, depending on pipe loss, suitable for heating circuits of up to approx. 20 m² or approx. 120 m with an inner diameter of 12 mm.
- If used in combination with radiator heating, the flow temperature must not exceed 70 °C so that the max. screed temperature of 55 °C is not exceeded in the pipe area.
- The RTL box thermostat must be protected from heating by external sources. Do not install near other sources of heat, e.g. additional heaters. Protect from direct sunlight. Do not install in areas where there are draughts.
- The floor heating pipes are connected via suitable Euro-cone clamping ring connections.
- To ensure quiet operation of the system, the pressure difference over the valve must not exceed 0.2 bar.
- Cement and anhydrite screed must be heated in accordance with EN 1264-4.

TECEfloor – Design RTL box

Dimensions



Bare-wall set dimensions



Fine assembly set dimensions

Setting range

| | |
|---------------------------|---------------------|
| Return temperature limit: | 1 – 4 or 20 – 48 °C |
| (factory settings: | 2.5 = 40 °C) |
| Room temperature control: | 10 – 30 °C |
| Control valve: | 1 – 4 |
| (factory settings: | 4 = fully open) |

Accessories

Edge insulation strip

For sound insulation and to compensate for thermal expansion of the screed layer in accordance with DIN 18560. The edge insulation strips, made of closed cell polyethylene foam with adhesive tape and a special film apron, guarantee high adhesiveness and quick installation. Suitable for cement and flow screed.

Thickness: 10 mm
Height: 150 mm
Length: 40 m roll

Movement joint profile

To create permanently elastic screed joints and to limit screed areas. Suitable for cement and flow screed.

Thickness: 10 mm
Height: 100 mm

To protect the floor heating pipes, cut approx. 30 cm-long pipe sleeves made of pipe joint protection, and tape in the area of the movement joints above the connection lines.



TECEfloor screed accessories

Screed additive

Plasticizing additive especially for the production of cement and calcium sulphate-bonded heating screeds (not suitable for flow screeds). In addition to higher bending tension and compression strength, adding the screed additive to the mixing water significantly improves processing of the mortar and reduces the quantity of the mixing water while achieving the same mortar consistency. Requirement: 0.03 kg/m² per cm screed thickness.

Additional screed additives do not need to be added; observe the instructions for use.

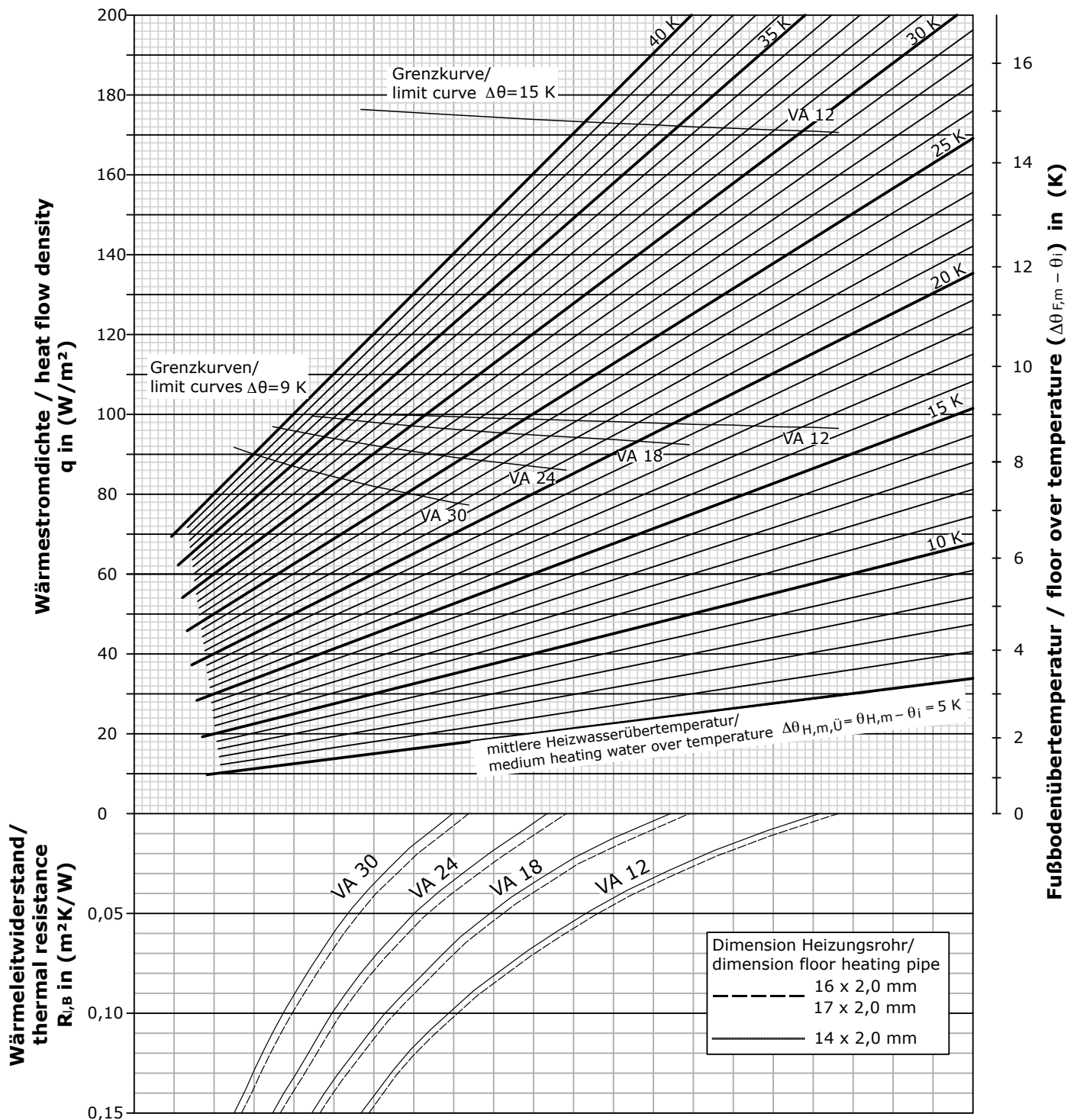
Special screed additive

Strengthening, modifying additive to produce thin-bed cement screeds.

Requirement: 0.25-0.30 kg/m² per cm screed thickness. Minimum pipe overlap 30 mm.

Heat output diagram for TECEfloor dimple system

(45 mm screed cover)



Limit curves $\Delta\theta = 9$ K applies to residence zones

- Indoor temperature $\theta_i = 20$ °C with max. surface temperature $\theta_{F,max} = 29$ °C
- Indoor temperature $\theta_i = 24$ °C with max. surface temperature $\theta_{F,max} = 33$ °C

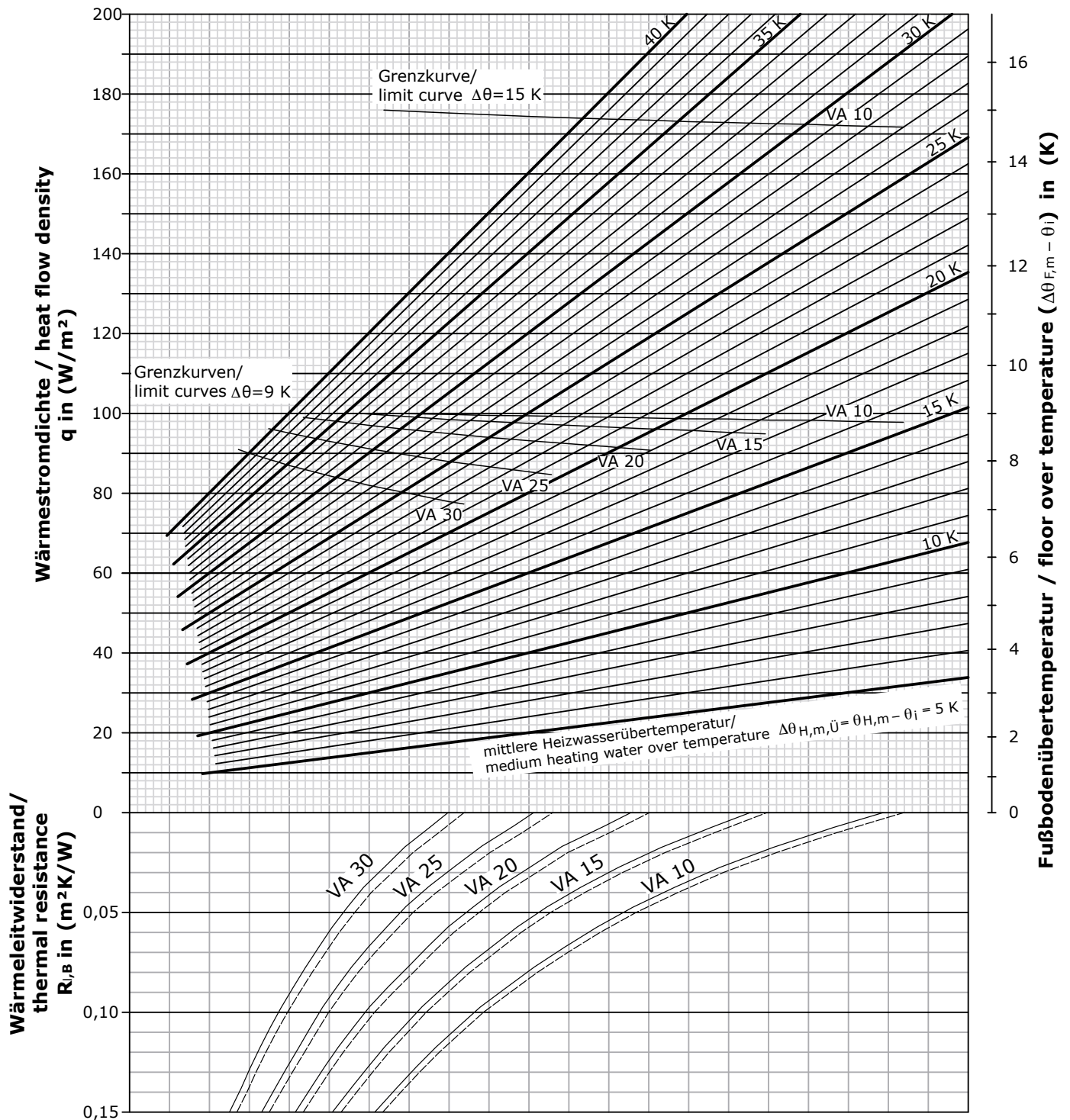
Limit curves $\Delta\theta = 15$ K applies to edge zones

- Indoor temperature $\theta_i = 20$ °C with max. surface temperature $\theta_{F,max} = 35$ °C

The limit curves must not be exceeded, i.e. the flow temperature of the design may be max. 2.5 K above the heating limit temperature.

Heat output diagram for TECEfloor tacking system

(45 mm screed cover)



Limit curves $\Delta\theta = 9$ K applies to living areas

- Indoor temperature $\theta_i = 20$ °C with max. surface temperature $\theta_{F,max} = 29$ °C
- Indoor temperature $\theta_i = 24$ °C with max. surface temperature $\theta_{F,max} = 33$ °C

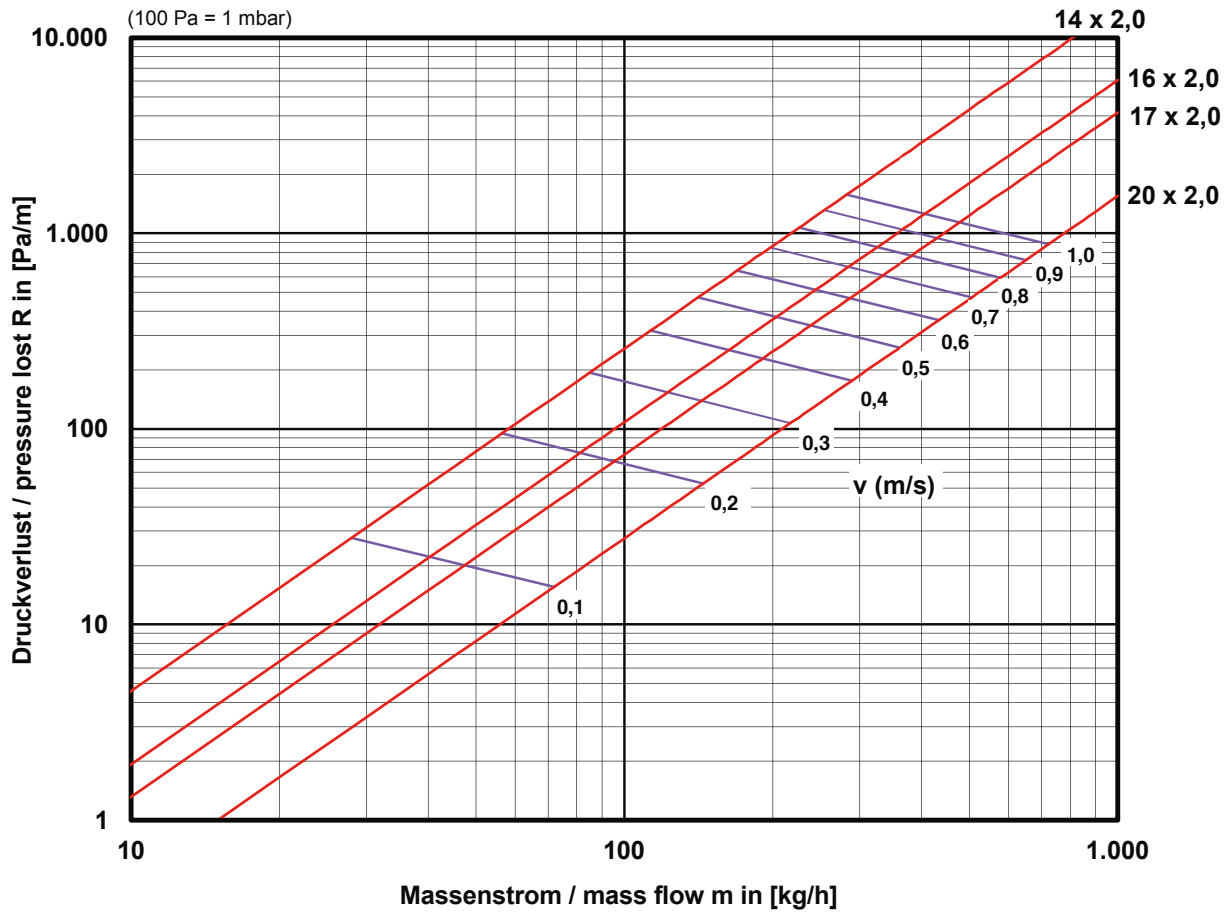
Limit curves $\Delta\theta = 15$ K applies to edge areas

- Indoor temperature $\theta_i = 20$ °C with max. surface temperature $\theta_{F,max} = 35$ °C

The limit curves must not be exceeded, i.e. the flow temperature of the design may be max. 2.5 K above the heating limit temperature.

TECEfloor – Planning and design

Pressure loss diagram for SLQ floor heating pipes



Quick design table for TECEfloor dimple system

(45 mm screed cover)

| Flow and return temperature | | | | 35/27°C | | | | 40/30°C | | | |
|-----------------------------|------------------|---------|--------------------------|------------------------|-----------------------------|---------------------------|---------------------------|------------------------|-----------------------------|---------------------------|---------------------------|
| Thermal resistance | Room temperature | Spacing | Heating pipe requirement | max. heat flux density | average surface temperature | max. heating circuit area | max. heating circuit area | max. heat flux density | average surface temperature | max. heating circuit area | max. heating circuit area |
| R _{t,B} | t _i | VA | L | q | t _o | Dim. 14 | Dim. 16 | q | t _o | Dim. 14 | Dim. 16 |
| m ² K/W | °C | (cm) | (m) | (W/m ²) | (°C) | (m ²) | (m ²) | (W/m ²) | (°C) | (m ²) | (m ²) |
| 0.01 | 20°C | 12 | 8.3 | 60 | 25.7 | 10.4 | 14.9 | 82 | 27.5 | 9.7 | 13.8 |
| | | 18 | 5.6 | 50 | 24.8 | 13.5 | 19.3 | 69 | 26.4 | 12.4 | 17.6 |
| | | 24 | 4.2 | 43 | 24.2 | 16.3 | 23.3 | 59 | 25.6 | 15.1 | 21.6 |
| | | 30 | 3.3 | 37 | 23.7 | 19.5 | 27.9 | 50 | 24.9 | 18.3 | 26.1 |
| | 24°C | 12 | 8.3 | 38 | 27.7 | 14.6 | 20.5 | 60 | 29.7 | 12.2 | 17.3 |
| | | 18 | 5.6 | 32 | 27.2 | 18.9 | 26.5 | 50 | 28.8 | 15.8 | 22.3 |
| | | 24 | 4.2 | 28 | 26.8 | 22.6 | 31.9 | 43 | 28.2 | 19.2 | 27.4 |
| | | 30 | 3.3 | 23 | 26.4 | 27.9 | 39.6 | 37 | 27.7 | 23.1 | 32.7 |
| 0.05 | 20°C | 12 | 8.3 | 48 | 24.7 | 12.4 | 17.4 | 65 | 26.1 | 11.5 | 16.3 |
| | | 18 | 5.6 | 41 | 24.0 | 15.7 | 22.1 | 56 | 25.3 | 14.6 | 20.7 |
| | | 24 | 4.2 | 36 | 23.6 | 18.7 | 26.6 | 49 | 24.7 | 17.5 | 24.7 |
| | | 30 | 3.3 | 31 | 23.1 | 22.2 | 31.8 | 43 | 24.2 | 20.4 | 29.1 |
| 0.10 | 20°C | 12 | 8.3 | 38 | 23.7 | 14.6 | 20.5 | 52 | 25.0 | 13.7 | 19.2 |
| | | 18 | 5.6 | 34 | 23.4 | 18.0 | 25.4 | 46 | 24.4 | 16.9 | 23.8 |
| | | 24 | 4.2 | 30 | 23.0 | 21.6 | 30.5 | 41 | 24.0 | 19.9 | 28.3 |
| | | 30 | 3.3 | 27 | 22.7 | 24.9 | 35.1 | 37 | 23.7 | 23.1 | 32.7 |
| 0.15 | 20°C | 12 | 8.3 | 32 | 23.2 | 16.6 | 23.3 | 44 | 24.2 | 15.4 | 21.6 |
| | | 18 | 5.6 | 29 | 22.9 | 20.2 | 28.4 | 40 | 23.9 | 18.7 | 26.3 |
| | | 24 | 4.2 | 26 | 22.6 | 24.0 | 33.6 | 36 | 23.6 | 22.1 | 31.0 |
| | | 30 | 3.3 | 23 | 22.4 | 27.9 | 39.6 | 32 | 23.2 | 25.5 | 36.3 |

| Flow and return temperature | | | | 45/35°C | | | | 50/40°C | | | |
|-----------------------------|------------------|---------|--------------------------|------------------------|-----------------------------|---------------------------|---------------------------|------------------------|-----------------------------|---------------------------|---------------------------|
| Thermal resistance | Room temperature | Spacing | Heating pipe requirement | max. heat flux density | average surface temperature | max. heating circuit area | max. heating circuit area | max. heat flux density | average surface temperature | max. heating circuit area | max. heating circuit area |
| R _{t,B} | t _i | VA | L | q | t _o | Dim. 14 | Dim. 16 | q | t _o | Dim. 14 | Dim. 16 |
| m ² K/W | °C | (cm) | (m) | (W/m ²) | (°C) | (m ²) | (m ²) | (W/m ²) | (°C) | (m ²) | (m ²) |
| 0.01 | 20°C | 12 | 8.3 | 109 | 29.7 | 7.8 | 11.2 | 136 | 31.9 | 6.6 | 9.5 |
| | | 18 | 5.6 | 92 | 28.3 | 9.9 | 14.2 | 115 | 30.2 | 8.3 | 12.1 |
| | | 24 | 4.2 | 78 | 27.1 | 12.0 | 17.5 | 98 | 28.9 | 10.1 | 14.6 |
| | | 30 | 3.3 | 67 | 26.2 | 14.4 | 21.0 | 84 | 27.7 | 12.0 | 17.4 |
| | 24°C | 12 | 8.3 | 87 | 31.9 | 9.4 | 13.2 | 114 | 34.1 | 7.6 | 10.8 |
| | | 18 | 5.6 | 73 | 30.8 | 11.9 | 16.9 | 96 | 32.7 | 9.5 | 13.9 |
| | | 24 | 4.2 | 63 | 29.9 | 14.4 | 20.6 | 83 | 31.5 | 11.5 | 16.8 |
| | | 30 | 3.3 | 54 | 29.2 | 17.4 | 24.9 | 70 | 30.5 | 13.8 | 20.1 |
| 0.05 | 20°C | 12 | 8.3 | 87 | 27.9 | 9.4 | 13.2 | 108 | 29.7 | 7.9 | 11.3 |
| | | 18 | 5.6 | 75 | 26.9 | 11.7 | 16.6 | 94 | 28.4 | 9.7 | 14.0 |
| | | 24 | 4.2 | 65 | 26.1 | 13.9 | 20.2 | 82 | 27.5 | 11.5 | 16.8 |
| | | 30 | 3.3 | 57 | 25.4 | 16.5 | 23.7 | 71 | 26.6 | 13.8 | 20.1 |
| 0.10 | 20°C | 12 | 8.3 | 70 | 26.6 | 10.9 | 15.5 | 87 | 27.9 | 9.4 | 13.2 |
| | | 18 | 5.6 | 62 | 25.8 | 13.5 | 19.1 | 77 | 27.0 | 11.3 | 16.4 |
| | | 24 | 4.2 | 55 | 25.2 | 15.8 | 22.8 | 68 | 26.3 | 13.4 | 19.4 |
| | | 30 | 3.3 | 49 | 24.7 | 18.6 | 26.4 | 61 | 25.8 | 15.6 | 22.5 |
| 0.15 | 20°C | 12 | 8.3 | 59 | 25.6 | 12.5 | 17.5 | 74 | 26.8 | 10.6 | 14.9 |
| | | 18 | 5.6 | 53 | 25.1 | 15.1 | 21.4 | 66 | 26.1 | 12.8 | 18.4 |
| | | 24 | 4.2 | 48 | 24.7 | 17.8 | 25.2 | 60 | 25.7 | 14.9 | 21.4 |
| | | 30 | 3.3 | 43 | 24.2 | 20.4 | 29.1 | 53 | 25.0 | 17.4 | 24.9 |

The TECEfloor performance table enables you to quickly calculate the required spacing and max. heating circuit size.

Procedure:

1. Determine the required flow and return temperature.
2. Determine the thermal resistance of the top floor covering and the indoor temperature
3. Compare the required heating output (e.g. from the heat load analysis) with the max. heat flux density.
4. Read off the required spacing VA and maximum heating circuit area (dim. 14 or dim. 16)

When creating the design, the max. surface temperatures must be taken into account:

Living zones: 29°C/edge zones (max. 1 m): 35°C/bathrooms: 33°C

The following data has been taken into account in the performance tables:

- screed cover over pipes: 45 mm
- underlying room heated in the same way (insulation: R = 0.75 m²K/W)
- max. heating circuit area at 200 mbar pressure loss (incl. 2 x 5 m connection line)

TECEfloor – Planning and design

Quick design table for TECEfloor tacking system

(45 mm screed cover)

| Flow and return temperature | | | | 35/27°C | | | | 40/30°C | | | |
|-----------------------------|------------------|---------|--------------------------|------------------------|-----------------------------|---------------------------|---------------------------|------------------------|-----------------------------|---------------------------|---------------------------|
| Thermal resistance | Room temperature | Spacing | Heating pipe requirement | max. heat flux density | average surface temperature | max. heating circuit area | max. heating circuit area | max. heat flux density | average surface temperature | max. heating circuit area | max. heating circuit area |
| R _{l,B} | t _i | VA | L | q | t _o | Dim. 14 | Dim. 16 | q | t _o | Dim. 14 | Dim. 16 |
| m ² K/W | °C | (cm) | (m) | (W/m ²) | (°C) | (m ²) | (m ²) | (W/m ²) | (°C) | (m ²) | (m ²) |
| 0.01 | 20°C | 10 | 10.0 | 64 | 26.0 | 9.5 | 13.4 | 87 | 27.9 | 8.8 | 12.5 |
| | | 15 | 6.6 | 56 | 25.4 | 11.7 | 16.7 | 76 | 27.0 | 11.0 | 15.6 |
| | | 20 | 5.0 | 48 | 24.7 | 14.4 | 20.4 | 66 | 26.2 | 13.2 | 18.8 |
| | | 25 | 4.0 | 42 | 24.2 | 16.8 | 24.0 | 58 | 25.5 | 15.5 | 22.3 |
| | 24°C | 10 | 10.0 | 41 | 28.0 | 13.1 | 18.4 | 64 | 30.0 | 11.1 | 15.5 |
| | | 15 | 6.6 | 35 | 27.5 | 16.7 | 23.4 | 56 | 29.3 | 13.8 | 19.5 |
| | | 20 | 5.0 | 31 | 27.1 | 19.8 | 28.0 | 48 | 28.7 | 16.8 | 23.8 |
| | | 25 | 4.0 | 27 | 26.7 | 23.5 | 33.3 | 42 | 28.1 | 19.8 | 28.0 |
| 0.05 | 20°C | 10 | 10.0 | 51 | 24.9 | 11.2 | 15.7 | 69 | 26.4 | 10.5 | 14.8 |
| | | 15 | 6.6 | 45 | 24.4 | 13.8 | 19.5 | 61 | 25.8 | 12.9 | 18.3 |
| | | 20 | 5.0 | 40 | 23.9 | 16.4 | 23.4 | 54 | 25.2 | 15.4 | 21.8 |
| | | 25 | 4.0 | 35 | 23.5 | 19.3 | 27.5 | 48 | 24.7 | 18.0 | 25.5 |
| | | 30 | 3.3 | 31 | 23.1 | 22.2 | 31.8 | 43 | 24.2 | 20.4 | 29.1 |
| 0.10 | 20°C | 10 | 10.0 | 40 | 23.9 | 13.4 | 18.7 | 55 | 25.3 | 12.4 | 17.4 |
| | | 15 | 6.6 | 36 | 23.6 | 16.4 | 23.0 | 50 | 24.8 | 15.0 | 21.2 |
| | | 20 | 5.0 | 33 | 23.3 | 19.0 | 26.8 | 45 | 24.3 | 17.6 | 25.0 |
| | | 25 | 4.0 | 30 | 23.0 | 21.8 | 30.8 | 41 | 23.9 | 20.3 | 28.8 |
| | | 30 | 3.3 | 27 | 22.7 | 24.9 | 35.1 | 37 | 23.7 | 23.1 | 32.7 |
| 0.15 | 20°C | 10 | 10.0 | 33 | 23.3 | 15.3 | 21.4 | 46 | 24.4 | 14.0 | 19.6 |
| | | 15 | 6.6 | 30 | 23.0 | 18.8 | 26.1 | 42 | 24.2 | 17.1 | 24.0 |
| | | 20 | 5.0 | 28 | 22.8 | 21.4 | 30.0 | 38 | 23.7 | 20.0 | 28.2 |
| | | 25 | 4.0 | 25 | 22.6 | 25.0 | 35.0 | 35 | 23.5 | 22.8 | 32.0 |
| | | 30 | 3.3 | 23 | 22.4 | 27.9 | 39.6 | 32 | 23.2 | 25.5 | 36.3 |

| Flow and return temperature | | | | 45/35°C | | | | 50/40°C | | | |
|-----------------------------|------------------|---------|--------------------------|------------------------|-----------------------------|---------------------------|---------------------------|------------------------|-----------------------------|---------------------------|---------------------------|
| Thermal resistance | Room temperature | Spacing | Heating pipe requirement | max. heat flux density | average surface temperature | max. heating circuit area | max. heating circuit area | max. heat flux density | average surface temperature | max. heating circuit area | max. heating circuit area |
| R _{l,B} | t _i | VA | L | q | t _o | Dim. 14 | Dim. 16 | q | t _o | Dim. 14 | Dim. 16 |
| m ² K/W | °C | (cm) | (m) | (W/m ²) | (°C) | (m ²) | (m ²) | (W/m ²) | (°C) | (m ²) | (m ²) |
| 0.01 | 20°C | 10 | 10.0 | 117 | 30.3 | 7.1 | 10.1 | 145 | 32.7 | 6.0 | 8.6 |
| | | 15 | 6.6 | 101 | 29.2 | 8.9 | 12.6 | 127 | 31.2 | 7.4 | 10.7 |
| | | 20 | 5.0 | 88 | 28.0 | 10.6 | 15.2 | 110 | 29.8 | 8.8 | 12.8 |
| | | 25 | 4.0 | 77 | 27.1 | 12.3 | 18.0 | 96 | 28.7 | 10.3 | 15.0 |
| | 24°C | 10 | 10.0 | 93 | 32.4 | 8.4 | 11.9 | 122 | 34.8 | 6.8 | 9.7 |
| | | 15 | 6.6 | 81 | 31.5 | 10.5 | 14.9 | 107 | 33.6 | 8.4 | 12.0 |
| | | 20 | 5.0 | 70 | 30.6 | 12.6 | 18.0 | 93 | 32.4 | 10.0 | 14.6 |
| | | 25 | 4.0 | 62 | 29.8 | 14.8 | 21.0 | 81 | 31.4 | 11.8 | 17.3 |
| 0.05 | 20°C | 10 | 10.0 | 92 | 28.3 | 8.5 | 12.0 | 115 | 30.2 | 7.2 | 10.2 |
| | | 15 | 6.6 | 81 | 27.5 | 10.5 | 14.9 | 102 | 29.1 | 8.7 | 12.6 |
| | | 20 | 5.0 | 72 | 26.7 | 12.4 | 17.6 | 90 | 28.1 | 10.4 | 15.0 |
| | | 25 | 4.0 | 64 | 26.0 | 14.3 | 20.5 | 80 | 27.3 | 12.0 | 17.3 |
| | | 30 | 3.3 | 57 | 25.4 | 16.5 | 23.7 | 71 | 26.6 | 13.8 | 20.1 |
| 0.10 | 20°C | 10 | 10.0 | 73 | 26.8 | 10.1 | 14.2 | 92 | 28.3 | 8.5 | 12.0 |
| | | 15 | 6.6 | 66 | 26.2 | 12.2 | 17.3 | 83 | 27.6 | 10.2 | 14.7 |
| | | 20 | 5.0 | 60 | 25.7 | 14.2 | 20.2 | 75 | 26.9 | 12.0 | 17.2 |
| | | 25 | 4.0 | 54 | 25.2 | 16.3 | 23.5 | 67 | 26.3 | 13.8 | 20.0 |
| | | 30 | 3.3 | 49 | 24.7 | 18.6 | 26.4 | 61 | 25.8 | 15.6 | 22.5 |
| 0.15 | 20°C | 10 | 10.0 | 61 | 25.8 | 11.5 | 16.1 | 76 | 27.0 | 9.8 | 13.7 |
| | | 15 | 6.6 | 56 | 25.3 | 13.8 | 19.5 | 69 | 26.5 | 11.9 | 16.8 |
| | | 20 | 5.0 | 51 | 24.9 | 16.0 | 22.8 | 63 | 26.0 | 13.6 | 19.6 |
| | | 25 | 4.0 | 47 | 24.5 | 18.3 | 26.0 | 58 | 25.5 | 15.5 | 22.3 |
| | | 30 | 3.3 | 43 | 24.2 | 20.4 | 29.1 | 53 | 25.1 | 17.4 | 24.9 |

Example: TECEfloor quick design

Construction project: Example house
 TECEfloor laying system: tacking sheet 30-2
 Flow and return temperature: 40/30 °C
 TECEfloor pipe: PE-Xc 14 x 2.0 mm

| 1 | Name of room | | Office | Bedroom | Kitchen | Living room | Bath-room | Toilet | Hall | Σ |
|----|---------------------------------------|--------------------|--------|---------|---------|-------------|-----------|--------|------|-------|
| 2 | Room number | | 1 | 3 | 4 | 5 | 6 | 7 | 8 | |
| 4 | Standard indoor temperature | °C | 20 | 20 | 20 | 20 | 24 | 20 | 20 | |
| 5 | Room area | m ² | 14.5 | 20.0 | 12.5 | 34.0 | 8.0 | 3.0 | 10.5 | 102.5 |
| 6 | Floor area to be heated | m ² | 14.5 | 20.0 | 12.5 | 34.0 | 6.2 | 3.0 | 10.5 | 100.7 |
| 7 | Heating load (according to DIN 12831) | W | 754 | 960 | 700 | 1496 | 608 | 195 | 546 | 5259 |
| 8 | Required heat flux density | W/m ² | 50.0 | 48.0 | 56.0 | 44.0 | 98.0 | 65.0 | 52.0 | |
| 9 | Flooring resistance | m ² K/W | 0.1 | 0.1 | 0.01 | 0.1 | 0.01 | 0.01 | 0.05 | |
| 10 | Spacing | cm | 15 | 15 | 20 | 20 | 10 | 20 | 20 | |
| 11 | Max. heat flux density | W/m ² | 50 | 50 | 66 | 45 | 64 | 66 | 54 | |
| 12 | Average surface temperature | °C | 24.8 | 24.8 | 26.2 | 24.3 | 30.0 | 26.2 | 25.2 | |
| 13 | Max. heating circuit area | m ² | 15.0 | 15.0 | 13.2 | 17.6 | 11.1 | 13.2 | 15.4 | |
| 14 | Number of floor heating circuits | m | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 9+1 |
| 15 | Length of pipe per heating circuit | m | 97 | 67 | 63 | 85 | 62 | 15 | 53 | 592 |
| 16 | Connection line per heating circuit | m | 10 | 16 | 6 | 12 | 12 | 8 | 2 | 94 |
| 17 | Heat flow per heating circuit (↑u.↓) | W | 880 | 655 | 844 | 939 | 521 | 329 | 623 | 6385 |
| 18 | Mass flow per heating circuit | l/min | 1.3 | 0.9 | 1.2 | 1.3 | 0.7 | 0.5 | 0.9 | 9.1 |

Note:

1. Areas underneath baths and shower trays are omitted.
2. In bathrooms, there is a residual heating load of approx. 211 W ($64 \text{ W/m}^2 \times 6.2 \text{ m}^2 = 397 \text{ W} - 608 \text{ W} = 211 \text{ W}$).
3. The residual heating load in the bathroom is covered by the additional bathroom radiator. Provide an additional manifold outlet.
4. Connection lines may need to be insulated to protect them from too high levels of heat dissipation.

List of materials:

| | Amount | | Order amount | | Delivery units | |
|---|--------|----------------|--------------|----------------|----------------|----------------|
| | | | | | | |
| TECEfloor tacking sheet 30-2 | 102.5 | m ² | 110 | m ² | 10 | m ² |
| TECEfloor tacking pins | 2058 | pc. | 2,200 | pc. | 200 | pc. |
| TECEfloor adhesive tape | 3 | pc. | 3 | pc. | 1 | pc. |
| TECEfloor pipe 14 x 2 | 686 | m | 900 | m | 300/600 | m |
| TECEfloor stainless steel manifold HCM 10 | 1 | pc. | 1 | pc. | 1 | pc. |
| TECEfloor manifold housing 110-5, flush-mounted | 1 | pc. | 1 | pc. | 1 | pc. |
| TECEfloor clamping ring connections 14 x 2 | 20 | pc. | 20 | pc. | 10 | pc. |
| TECEfloor corner ball valve 1" | 1 | Set | 1 | Set | 1 | Set |
| TECEfloor edge insulation strips | 120 | m | 200 | m | 100 | m |
| TECEfloor movement joint profile | 15 | m | 18 | m | 18 | m |
| TECEfloor pipe joint protection | 10 | m | 12 | m | 12 | m |
| TECEfloor pipe bend guides | 20 | pc. | 25 | pc. | 25 | pc. |
| TECEfloor terminal strip | 2 | pc. | 2 | pc. | 1 | pc. |
| TECEfloor servomotor | 9 | pc. | 9 | pc. | 1 | pc. |
| TECEfloor room thermostat | 7 | pc. | 7 | pc. | 1 | pc. |
| TECEfloor screed additive | 18.5 | kg | 20 | kg | 10 | kg |
| Additional notes | | | | | | |

Functional heating protocol for TECE floor heating

According to DIN EN 1264 part 4, anhydrite and cement screed should be heated before installing floor coverings. For cement screed, this should be done 21 days at the earliest, and for anhydrite screed, 7 days at the earliest (according to the manufacturer's instructions) after the screed work has been completed.

Note: Reductions to the above-mentioned drying times and/or any changes to the heating sequence described below (temperature, number and duration of heating steps) require written approval by the screed manufacturer and/or the screed layer before commencing the heating phase.

Construction project: _____

Heating installation company: _____

Screed laying company: _____

TECE laying system: _____

TECE pipe (type/nominal dimension/spacing): _____

Screed type: Cement screed _____ cm thick Anhydrite screed _____ cm thick

Date of screed application: _____

Outdoor temperature before start of functional heating: _____

Room temperature before start of functional heating: _____

1. Start flow temperature of 20–25 °C set and maintained constantly for 3 days:

Started on: _____ Ended on: _____

2. Max. available design temperature set and maintained for at least 4 days (not reduced at night time):

Started on: _____ Ended on: _____

Functional heating performed flawlessly: Yes No

Heating interrupted on: _____

Identified defects: _____

Place, date

Place, date

Client/representative
(Signature)

Contractor/Installer
(Stamp/signature)

Note: After completion of the functional heating process, it cannot be guaranteed that the screed has reached the degree of humidity required to create suitable conditions for laying the floor covering. Therefore, the suitability of the screed for laying the floor covering must be checked by the floor layer.

Pressure test protocol for TECE underfloor heating

Construction project: _____

Heating installation company: _____

1. System data

Heat source type and output: _____

Manufacturer: _____

Installation site: _____

max. operating pressure: _____

max. operating temperature: _____

2. Pressure test

- | | completed |
|--|--------------------------|
| a. Close ball valve on manifold | <input type="checkbox"/> |
| b. Fill and purge each heating circuit, one after the other | <input type="checkbox"/> |
| c. Bleed air from the system | <input type="checkbox"/> |
| d. Apply the test pressure: The test pressure must be twice as high as the operating pressure but at least 6 bar (according to DIN EN 1264 part 4) | <input type="checkbox"/> |
| e. Apply pressure again after 2 hours as a drop in pressure may occur due to pipe expansion | <input type="checkbox"/> |
| f. Test time: 12 hours | <input type="checkbox"/> |
| g. The pressure test is successful if no water leaks out anywhere from the pipe and the test pressure has not dropped by more than 0.1 bar per hour. | <input type="checkbox"/> |

Note: During laying of screed, the max. operating pressure must be maintained so that any leaks can be detected immediately.

3. Certification

The pressure test was performed correctly. No leaks were detected during the test, and none of the components permanently changed shape.

Place, date

Place, date

Client/representative
(Signature)

Contractor/Installer
(Stamp/signature)

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