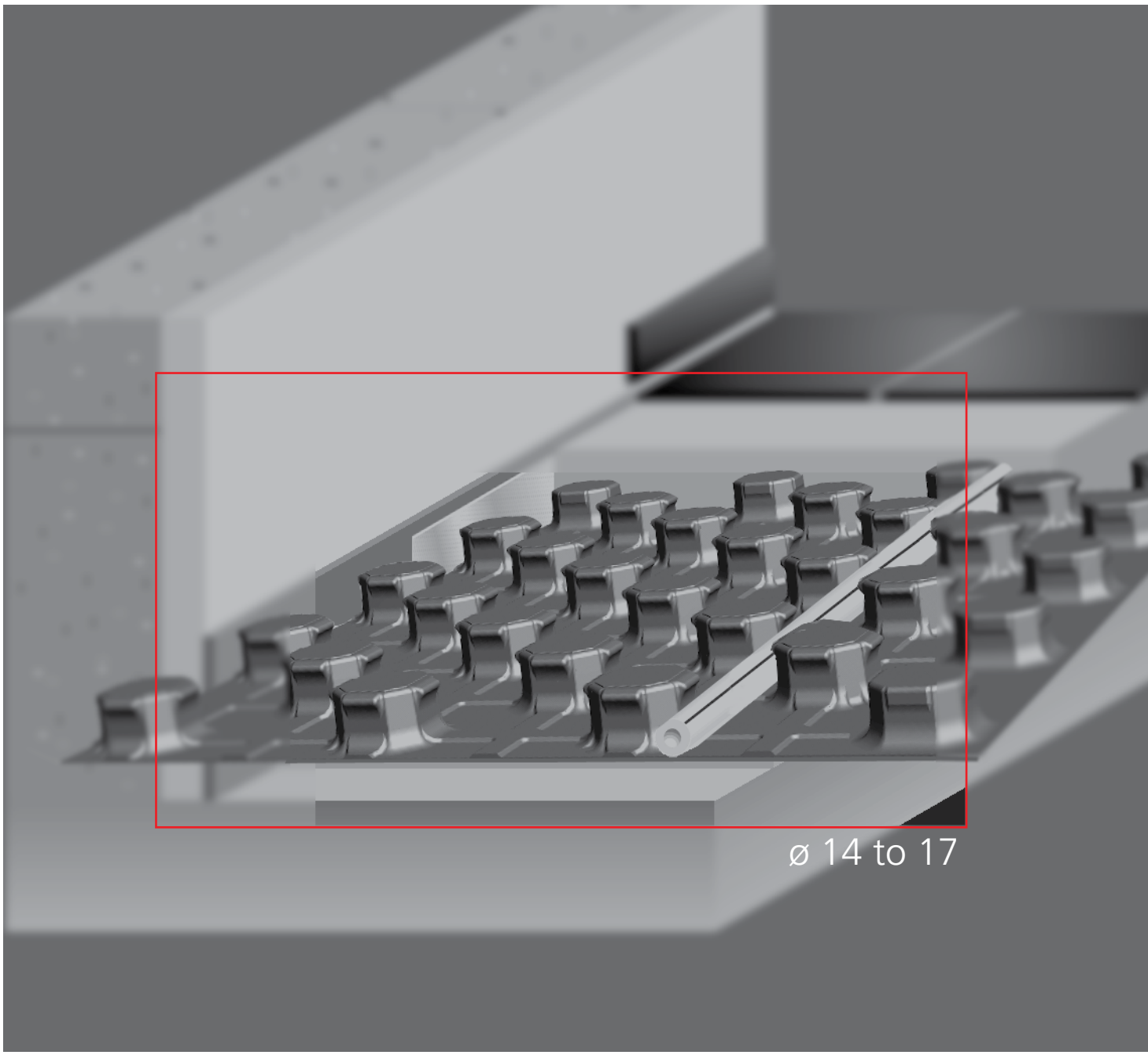
KNOB SYSTEM

TECHNICAL INFORMATION



ENERGY AND SANITARY SYSTEMS

System description

System description / System benefits

The Roth Knob System is distinguished by its high flexibility and easy assembly, combined with operating and construction site safety.
The heat is emitted evenly across the whole floor structure, thus creating an optimum room temperature.

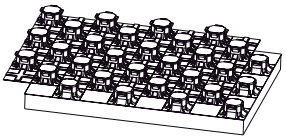
The flooring layout designs of the Roth Knob System are determined by the requirements of EnEV and DIN EN 1264 (surface embedded heating and cooling systems) taking into account DIN 18560 (screeds in the building industry) and DIN 4109 (sound insulation in building construction).

Applications

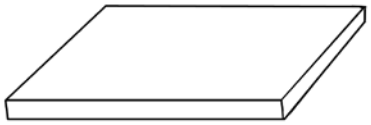
It is possible to use the Roth Knob System for all building types specified in DIN EN 1264, such as residential, office and commercial buildings, as well as other buildings with comparable use.

System components

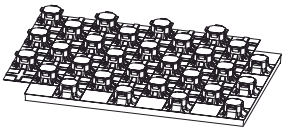
- Roth Knob Panel 14-17 mm EPS DES 30-2
  Dimensions: 1450 x 950 x 50 mm
  Improved impact sound insulation: $\Delta L_{W,R}(VM_R) = 28$ dB
  Thermal resistance: $R_{\lambda, INS} = 0{,}75$ m² K/W
  Maximum traffic load: 5 kN/m²
  Installation distances (mm): 50/100/150/200/250/300
  Effective installation area: 1,26 m²
  Building material class: B2
  Colour of cover film: black
  Packing unit: 8 panels



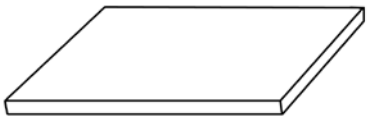
- Manifold connection panel EPS DES 30-2
  Dimensions: 1000 x 500 x 30 mm
  Improved impact sound insulation: $\Delta L_{W,R}(VM_R) = 28$ dB
  Thermal resistance: $R_{\lambda, INS} = 0{,}75$ m² K/W
  Maximum traffic load: 5 kN/m²
  Effective installation area: 0,5 m²
  Building material class: B2
  Packing unit: 10 panels



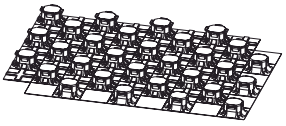
- Roth Knob Panel 14-17 mm EPS DEO 10 for low installation height and high loads
  Dimensions: 1450 x 950 x 30 mm
  Thermal resistance: $R_{\lambda, INS} = 0{,}35$ m² K/W
  Maximum traffic load: 75 kN/m²
  Installation distances (mm): 50/100/150/200/250/300
  Effective installation area: 1,26 m²
  Building material class: B2
  Colour of cover film: black
  Packing unit: 13 panels



- Manifold connection panel EPS DEO 10
  Dimensions: 1000 x 500 x 10 mm
  Thermal resistance: $R_{\lambda, INS} = 0{,}35$ m² K/W
  Maximum traffic load: 75 kN/m²
  Effective installation area: 0,5 m²
  Building material class: B2
  Packing unit: 10 panels



- Roth Knob Film 14-16 mm for laying on plastic insulation provided by the customer
  Dimensions: 1450 x 950 x 20 mm
  Installation distances (mm): 50/100/150/200/250/300
  Effective installation area: 1,26 m²
  Building material class: B2
  Colour of cover film: black
  Packing unit: 16 panels

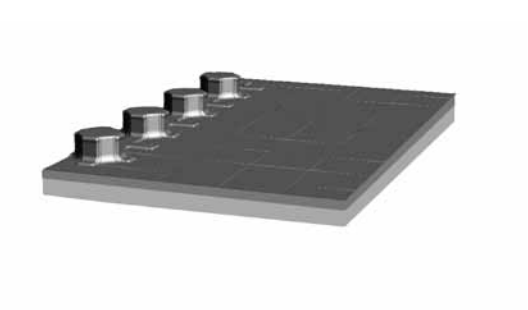


System description

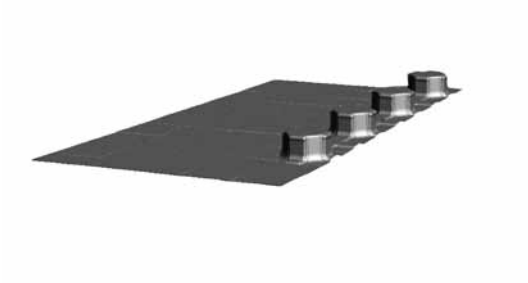
System components

- Roth Alignment Knob EPS DES 30-2
  Dimensions: 1150 x 250 x 50 mm
  Improved impact sound insulation: $\Delta L_{W,R}(VM_R) = 28$ dB
  Thermal resistance: $R_{\lambda, INS} = 0{,}75$ m² K/W
  Maximum traffic load: 5 kN/m²
  Building material class: B2
  Packing unit: 8 panels

  For making doorways together with the Roth alignment knob film



- Roth alignment knob film
  Dimensions: 1150 x 250 x 20 mm
  Building material class: B2
  Packing unit: 10 films



- Roth Alignment Knob EPS DEO 10
  Dimensions: 1150 x 250 x 30 mm
  Thermal resistance: $R_{\lambda, INS} = 0{,}35$ m² K/W
  Maximum traffic load: 75 kN/m²
  Building material class: B2
  Packing unit: 10 panels

  For making doorways together with the Roth alignment knob film

- Roth fixing strips
  Length: 1200 mm
  Width: 10 mm
  Packing unit: 10 films

  For connecting individual pipes

- Roth diagonal fixing
  Dimensions: 1150 x 250 x 20 mm
  Building material class: B2
  Packing unit: 10 films

Accessories

Other accessories from the Roth radiant heating and cooling range:

- Roth System Pipes X-PERT S5®+, DUOPEX® S5, ø 14 to 17 plus Alu-Laserflex ø 14 and 16
- Roth edge insulating strips 160 mm
- Roth expansion joint profile
- Roth manifold with flow rate indicator, lockable
- Roth universal manifold
- Roth manifold cabinets
- Roth connection technology
- Roth screed additive
- Roth measuring point set

The functionality and warranty claim are only guaranteed if the matching system components are used.

Installation requirements

Installation requirements

- The supporting subsurface must satisfy the static requirements for bearing the flooring construction and the intended traffic load.
- The height and evenness of the surface of the supporting subsurface as regards the limits and the evenness tolerances must correspond to the requirements in DIN 18202 "Tolerances in building construction" Table 3 Line 2.

Evenness tolerances					
Measuring points distance (m)	0,1	1,0	4,0	10,0	15,0
Evenness tolerances in (mm)	5	8	12	15	20

- Uneven areas or pipes installed on the unfinished covering are compensated by installing a levelling insulation, laying a levelling screed or a levelling compound in accordance with DIN 18560 in order to produce a horizontal and even surface to accommodate the system insulation.
- The rooms must be closed and the interior plasterwork finished.

Grainy, loose materials are not suitable.

- The supporting subsurface must be dry and clean-swept before installing the Roth Knob System.
- Construction joints from the supporting subsurface must be adopted in the flooring design.
- In the case of flooring areas touching the ground, or areas where rising damp is anticipated, seals against ground moisture and non-pressurised water in accordance with DIN 18195 are provided.
  The construction planner's specifications apply here. If seals made of PVC or bitumen are laid on the unfinished floor, these shall be covered with a PE film.
- Furthermore, the requirements of DIN EN 1264 for surface embedded heating and cooling systems, and the applicable directives of EnEV and the requirements of DIN 4109 on impact sound insulation must be observed.
- The optimum installation temperature for knob panels and pipes is > 10 °C.
- For improved installation, pipes and system panels should be stored in the rooms in order to prevent large temperature differences.

Assembly instructions

Insulation and knob panel

- The Roth edge insulation strip (160 mm) is attached all the way round to all rising components, walls, frames, supports and steps. In case of two-layer installation, the Roth edge insulation strip can only be attached after installing the bottom layer. Care must be taken here that the PE film attached to the edge insulation strip is placed over the knob panel in order to prevent water and screed from penetrating and the possible formation of sound bridges. The PE film is fixed in place in the knob area by the Roth System Pipes or the Roth PE round profile.

- When installing the Roth system knob panels, work is always started at the narrow side of the areas from right to left (Figure 1).

- The panels can be cut in a 5 cm grid.

- Particular care is required when using tile screeds: it must be ensured here that the insulating layer cover including the edge connections is watertight.

- When installing on an additional insulation layer, the top layer is installed with offset joints to the bottom layer.

- Moisture measurement points are part of an underfloor heating system and must be provided by the heating engineer.
  Fitting: at least 1 per accommodation unit and/ or 3 per 200 m^2.

Pipe installation

- The permitted, smallest bending radius of 5x outer diameter must be observed. The Roth System Pipes must not be installed on subsurfaces with sharp edges. The system pipes should therefore be secured with the PE sheath, e.g. when passing through wall and ceiling areas.

- Heating circuits should be made out of one pipe section. Connections in the screen must be categorically avoided. In case of repair, care should be taken that the brass coupling is only fitted in a straight section of pipe. The couplings are protected from direct contact with the screed by a PE film or similar measures. The position of the Roth brass fitting is measured and recorded in a diagram.

- The heating circuits are designed so that no expansion joints are crossed if possible. Connecting pipes that cross expansion joints are covered with a PE sheath in such a way that the Roth System Pipes are covered at least 30 cm on each side of the joint (Figure 3 and 4).

- Expansion joints on top of construction joints must not be crossed by connecting pipes.

- Starting with the connection of the heating circuit flow to the Roth heating circuit manifold, the Roth System Pipes are laid in the snail-shaped arrangement recommended by us (Figure 5).

- The calculated installation distance is then achieved by installing the heating circuit return.

- When connecting the Roth System Pipes to the Roth heating circuit manifold, pipe guide bends are used to protect the pipes in the deflection area.

Assembly instructions

Figure 1:
Installation diagram showing installation direction of system composite panels

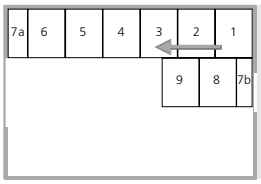


Figure 2:
1. Roth edge insulating strips with PE film
2. Roth PE profile
3. Roth System Pipe
4. Roth Knob Panel 14 or 17

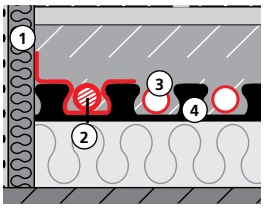


Figure 3:
1. Roth expansion joint profile
2. Roth System Pipe
3. Roth PE protective pipe at least 300 mm on both sides of the joint

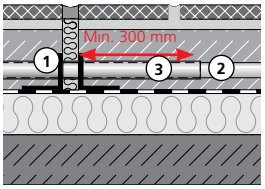


Figure 4:
It is best to plan the heating circuits so that the number of pipes passing through expansion joints is kept to a minimum.

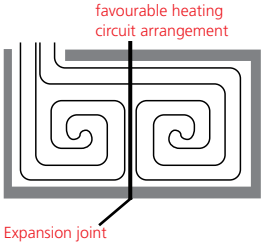
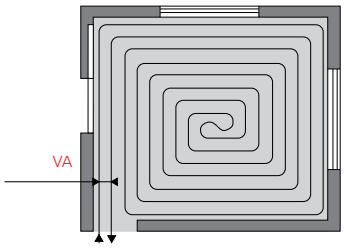
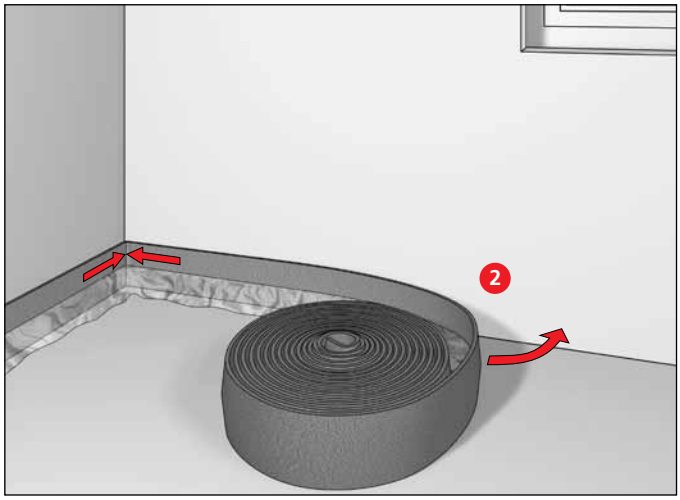


Figure 5:



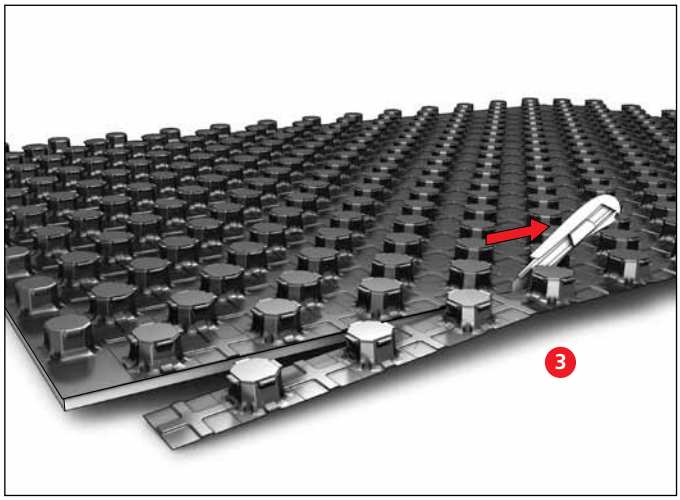
Assembly instructions

Assembly steps



1. Check the assembly requirements.

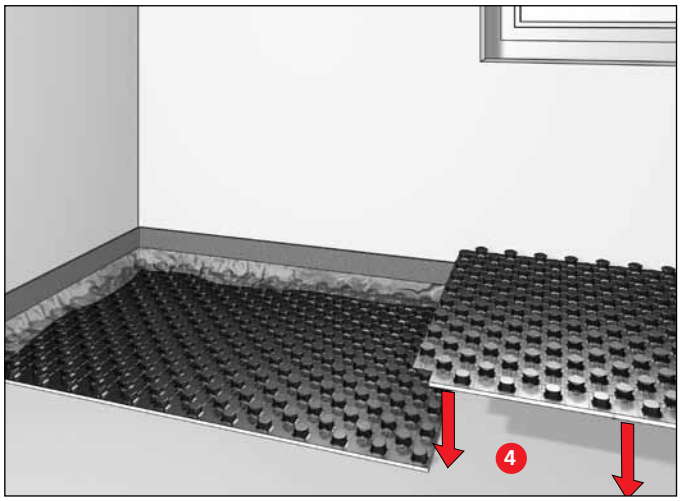
2. Apply the Roth edge insulating strips 160 mm.



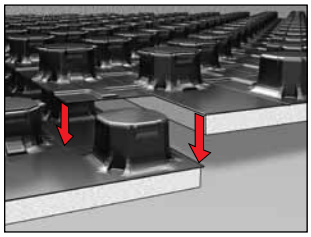
3. Starting from a corner of the room, the protruding edge knobs are cut off.

When using the **knob film without insulation**, it is possible to start without cutting the panels!

The knob panel is placed directly against the edge insulation strips. The film on the edge insulation strip lies above the knob panel.



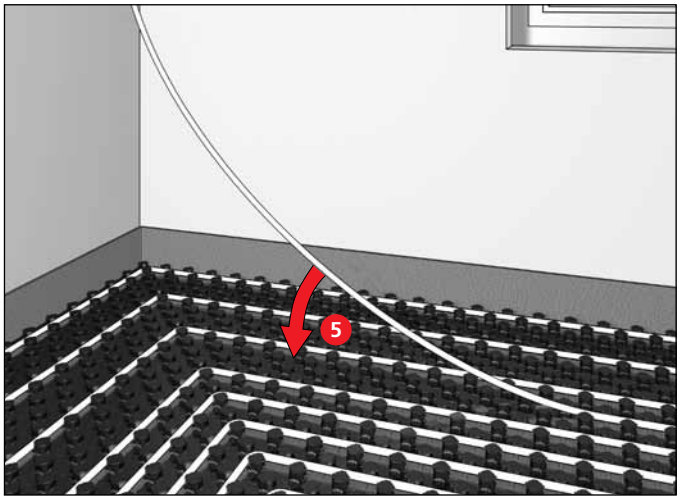
4. Lay the Roth system knob panel.
Due to the knobs protruding on 2 sides, a closed panel bond is made on the whole insulation level.



Assembly instructions

Assembly steps

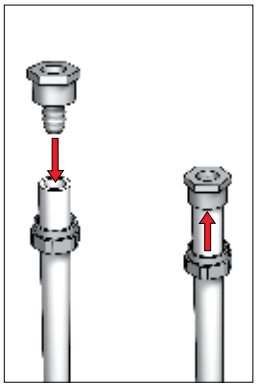
5. Install the Roth System Pipes DUOPEX S5®, X-PERT S5®+ 14 to 17 mm and Alu-Laserflex 14 and 16 mm.

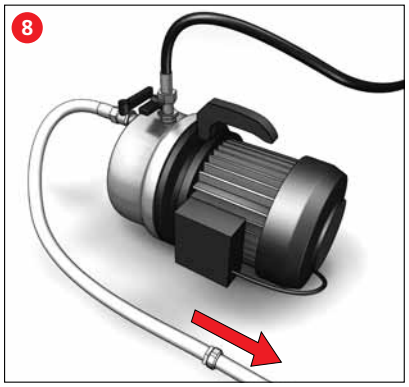


6. Connect the Roth System Pipes to the inlet and return on the Roth manifold.

7. The Roth expansion joint profiles are fitted at the places specified by the designer.

8. Before and whilst the screed is being laid, the Roth Knob Panel system is checked for leaks and recorded by a water or pressurised air test, see pressure test (Page 10).

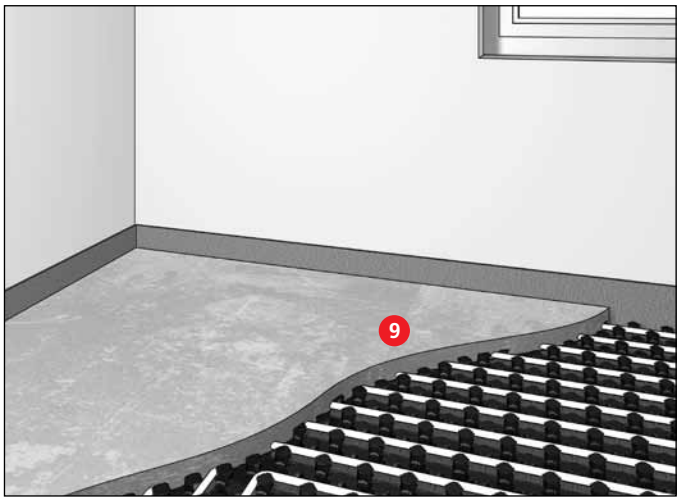


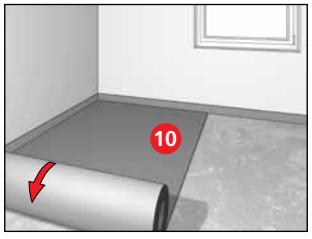


The test pressure must not be less than 4 bar and not more than 6 bar.

9. Lay the load-distribution layer.

10. Lay the floor covering, e.g. tiles, carpet, laminate, parquet etc.





Notes

Commissioning

- To measure the moisture content, according to DIN EN 1264, suitable places should be marked on the heating area. In this respect, at least 3 measuring points every 200 m² or at least 1 per apartment must be planned before making the screed. Over and above that, however, it makes sense to plan at least 1 measuring point per room. The points are arranged in the centre of the room; there must be no pipes installed at these points.

- Applying the load-distribution layer as a cement screed or calcium sulphate floating screed. Depending on the type of screed, the drying time takes up to 21 days (take note of manufacturer's instructions and additives).

- The first heating of the load-distribution layer made of cement or anhydrite screed is done according to DIN EN 1264 Part 4 and is documented in the heating protocol (page 9).

Load-distribution layers/live loads

Pressure test: (see form on page 10)

Before laying the screed, a water or pressurised air test shall be carried out according to DIN EN 1264 and recorded in writing.

Heating: (see form on page 11)

When heating the load-distribution layer made of cement or anhydrite screed, the process shall be carried out according to DIN EN 1264 and recorded in writing. The above-mentioned procedure is classed as a functional test. It may be necessary, depending on the floor covering selected, to heat the screed again in order to achieve the maximum permitted screed residual moisture in readiness for covering.

Commissioning

Before laying the floor covering, the screed's readiness for covering must be established. Depending on the residual moisture requirement, it may be necessary to further heat the screed in readiness for covering.

Floor covering

The screed's maximum permitted moisture content in %, determined with the CM device

Floor coverings			Nominal screed	Nominal calcium sulphate screed
1	elastic floor coverings textile floor coverings		1,8 1,8	0,3 0,3
		vapour-tight		
		vapour-permeable	3,0	1,0
2	Parquet/cork		1,8	0,3
3	Laminate flooring		1,8	0,3
4	Ceramic tiles or	Thick bed	3,0	-
	natural/concrete stone	Thin bed	2,0	0,3

Leak test protocol

for carrying out a leak test on radiant heating systems in accordance with DIN EN 1264 Part 4 (2009-11)

Building project: _____

Client: _____

Construction stage: _____

In the above-mentioned building project, a Roth radiant heating system of type: _____ construction type A according to DIN 18560 Part 2/DIN EN 1264 Part 4, was installed.

Ø Roth System Pipe X-PERT S5® _____ mm

Ø Roth System Pipe DUOPEX S5® _____ mm

Ø Roth System Pipe Alu-Laserflex® _____ mm

Method of procedure:

After finishing installation work on anhydrite and cement screeds, the heating circuits on the Roth radiant heating system must be tested for leaks using a water or compressed air test. Tightness against leaks must be ensured immediately before and whilst laying the screed. The test pressure must not be less than 4 bar and not more than 6 bar.

If there is a risk of freezing, in case of the water pressure test, suitable measures must be taken, e.g. using anti-freeze, carrying out the temperature equalisation of the building. If anti-freeze is used that is not designed for the intended use, then this should be removed by emptying and flushing the system with at least 3 changes of water.

- Completion of the Roth radiant heating system on: _____
- Start of the pressure test on: _____ with test pressure: _____ bar
  ☐ Water ☐ Pressurised air
- End of the pressure test on: _____ with test pressure: _____ bar
- Screed laid on: _____
- System pressure during application was _____ bar
- Anti-freeze was added to the system water and handled as described. (Yes/No)
- The system was tested for leaks on: _____ inspected and approved

Confirmation:

Builder/Client Stamp/Signature	Building manager/Architect Stamp/Signature	Heating engineering company/installation company Stamp/Signature

Material no. 1180000337 X710 B Subject to technical modifications.

Heating protocol

for cement and anhydrite screeds for radiant heating systems according to DIN EN 1264 Part 4

Building project: _____

Client: _____

Construction stage: _____

In the above-mentioned building project, a Roth radiant heating system of type: _____
construction type A according to DIN 18560 Part 2/DIN EN 1264 Part 4, was installed.

_____

Ø Roth System Pipe X-PERT S5® _____ mm

Ø Roth System Pipe DUOPEX S5® _____ mm

Ø Roth System Pipe Alu-Laserflex® _____ mm

Screed thickness: _____ Screed type: _____

Bonding agent: _____ Manufacturer: _____

Method of procedure:

Cement and anhydrite screeds must be heated up before the floor coverings are laid. With cement screeds, work may therefore begin at the earliest 21 days, and with anhydrite screens, depending on the manufacturer's instructions, at the earliest 7 days after finishing the screed work. The initial heat up phase starts with a run-in temperature of 25 °C, which should be maintained for 3 days. After that the maximum design temperature is set and maintained for another 4 days. If screeds are used, for which special methods of procedure are specified by the manufacturer, then these should be observed.

- Screed work completed — on: _____
- Start of heating with constant 25 °C inlet temperature — on: _____
- Start of heating with maximum design temperature (according to DIN 18560 Part 2 maximum 55 °C permitted in area of Roth System Pipes) — from: _____ °C; on: _____
- End of heating (at the earliest 7 days after start of heating) — on: _____
- Heating was interrupted. (Yes/No)
  If yes: from _____ to _____
- The heated flooring area was free/not free of building materials and other covers. The rooms were ventilated without draughts, the screed protected from draughts and from drying out too quickly after switching off the radiant heating system (windows and outer doors closed). (Yes/No)
- The installation was approved for further building work at an outside temperature of: _____ °C
  - ☐ The installation was not in use at the time.
  - ☐ The screed was heated at the time to a temperature of: _____ °C.

Important information:

After the heating process has been carried out as described, it has not yet been established that the screed has reached the maximum permitted moisture content in readiness for covering (Table 1, DIN EN 1264, Part 1 contains guide values for the readiness for covering). Before laying the floor covering, the floor installer must use a CM measuring device (the test with the CM device should be done in accordance with ZTV-SIB 90) to determine whether the screed is ready for covering. If further heating of the screed is necessary, this must be done by operating the heating system as intended.

Confirmation:

Builder/Client Stamp/Signature	Building manager/Architect Stamp/Signature	Heating engineering company Stamp/Signature

Material no. 1180000323 X710 B Subject to technical modifications.

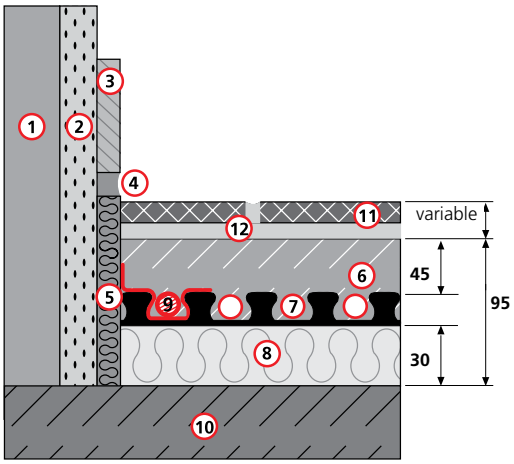
Compositions

Roth Knob System

Coverings in rooms with same utilisation

Tiling

Coverings in rooms with same utilisation as defined in DIN EN 1264
$R_{\lambda, INS}$ = 0,75 m² K/W



Roth Knob Panel 14 - 17
Tiling

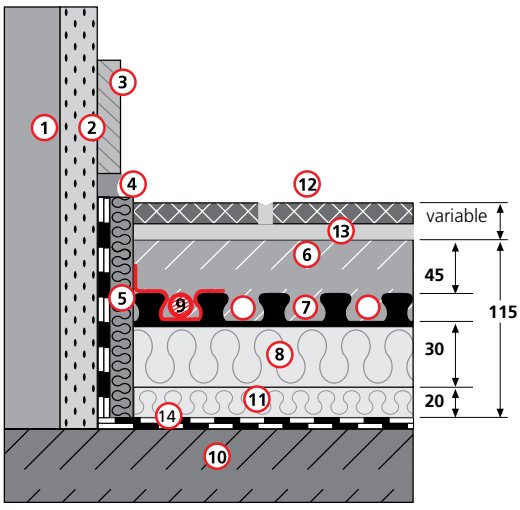
1 Wall
2 Plaster
3 Skirting board
4 Elastic grouting
5 Roth edge insulating strips 160 mm with PE film
6 Screed in accordance with DIN 18560
7 Roth System Pipe 14 to 17
8 Roth Knob Panel 14 to 17
9 Roth PE profile
10 Supporting subsurface
11 Tiles
12 Thin bed mortar / tile adhesive

Roth Knob System

Coverings adjoining unheated rooms or those heated at intervals

Tiling

Coverings on unheated rooms or those heated at intervals, adjoining ground as defined in DIN EN 1264
$R_{\lambda, INS}$ = 1,25 m² K/W



Roth Knob Panel 14 - 17
Tiling
If the water table < 5 m, the heat insulation should be increased

1 Wall
2 Plaster
3 Skirting board
4 Elastic grouting
5 Roth edge insulating strips 160 mm with PE film
6 Screed in accordance with DIN 18560
7 Roth System Pipe 14 to 17
8 Roth Knob Panel 14 to 17
9 Roth PE profile
10 Supporting subsurface
11 Roth additional insulation
12 Tiles
13 Thin bed mortar / tile adhesive
14 Sealing against ground moisture according to DIN 18195 and PE film 0,2 mm (not required if not adjoining ground)

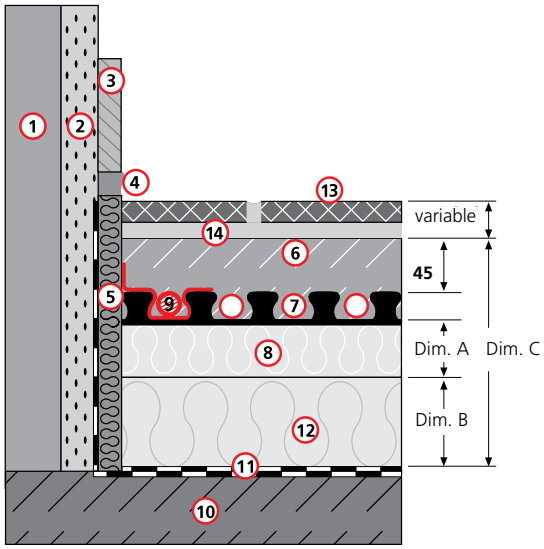
Compositions

Roth Knob System

Coverings adjoining outside air (-5 °C>T-15°C)

Tiling

Coverings adjoining outside air (-5 °C>T-15 °C)
as defined in DIN EN 1264
$R_{\lambda, INS}$ = 2,0 m² K/W



1 Wall
2 Plaster
3 Skirting board
4 Elastic grouting
5 Roth edge insulating strips 160 mm with PE film
6 Screed in accordance with DIN 18560
7 Roth System Pipe 14 to 17
8 Roth Knob Panel 14 to 17
9 Roth PE profile
10 Supporting subsurface
11 Sealing against ground moisture according to DIN 18195 and PE film 0,2 mm
12 Roth insulation panel (see table)
13 Tiles
14 Thin bed mortar / tile adhesive

Two-layer installation. Roth knob panel 14-17 with Roth additional insulation
Tiling

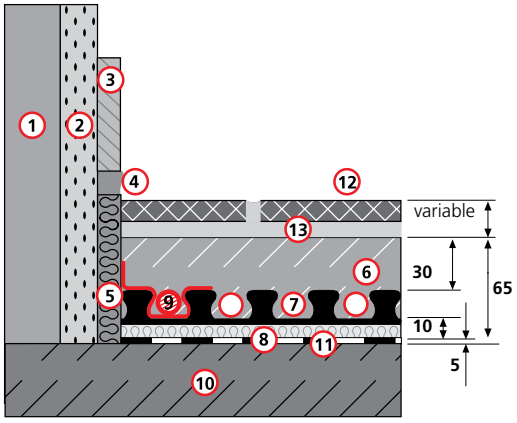
Table to illustrate the special application area, coverings next to outside air.
Requirement according to DIN EN 1264

Knob panel 30-2 PS-TK 5,0	Roth insulation panel	Dimension A	Dimension B	Dimension C
30-2 EPS DES	EPS DEO WLG 040	30 mm	50 mm	145 mm
30-2 EPS DES	EPS DEO WLG 035	30 mm	45 mm	140 mm
30-2 EPS DES	PU WLG 025	30 mm	32 mm	127 mm

Roth Knob System

Tiling

Roth industrial knob panel 14 - 17
on unfinished floor without insulation



1 Wall
2 Plaster
3 Skirting board
4 Elastic grouting
5 Roth edge insulating strips 160 mm with PE film
6 Thin-layered screed in accordance with DIN 18560
7 Roth System Pipe 14 to 17
8 Roth industrial knob panel 14 to 17
9 Roth PE profile
10 Supporting subsurface
11 Sealing against ground moisture according to DIN 18195 and PE film 0,2 mm (not required if not adjoining ground)
12 Tiles
13 Thin bed mortar

Roth industrial knob panel 14-17
Tiling in thin bed on thin-layered screed

Roth Knob System performance data ø 14 mm

Thermal resistance of the floor covering R_λ = 0,00 m² K/W (screed pipe covering with 30 mm)

Thermal resistance of the floor covering R_λ = 0,00 m² K/W Ceramic covering spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 14 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA	L	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR
	(cm)	(m/m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)
Inside temperature ϑi 15,00 °C	10	10,0	132	26,7	10,00	165	29,6	8,50	198	32,5	7,50	231	35,4	7,00	263	38,3	6,00
	15	6,7	113	25,0	12,50	141	27,4	11,00	169	29,9	10,00	197	32,4	9,00	225	34,9	8,00
	20	5,0	97	23,6	15,50	121	25,7	13,50	145	27,8	12,00	169	30,0	11,00	193	32,1	10,00
	25	4,0	83	22,4	18,50	104	24,2	16,00	125	26,0	14,50	146	27,9	13,00	166	29,7	12,00
	30	3,3	72	21,4	22,00	90	23,0	19,00	108	24,5	17,00	126	26,1	15,50	144	27,7	14,00
Inside temperature ϑi 18,00 °C	10	10,0	112	27,9	11,00	145	30,8	9,50	178	33,7	8,00	211	36,7	7,50	244	39,6	6,50
	15	6,7	96	26,5	14,00	124	29,0	12,00	152	31,4	10,50	180	33,9	9,50	208	36,4	8,50
	20	5,0	82	25,3	17,00	106	27,4	14,50	131	29,6	13,00	155	31,7	11,50	179	33,8	10,50
	25	4,0	71	24,3	20,50	92	26,1	17,50	112	27,9	15,50	133	29,8	13,50	154	31,6	12,50
	30	3,3	61	23,4	24,50	79	25,0	20,50	97	26,6	18,00	115	28,2	16,00	133	29,8	14,50
Inside temperature ϑi 20,00 °C	10	10,0	99	28,7	12,00	132	31,7	10,00	165	34,6	8,50	198	37,5	8,00	231	40,4	7,00
	15	6,7	84	27,5	15,50	113	30,0	12,50	141	32,4	11,00	169	34,9	10,00	197	37,4	9,00
	20	5,0	73	26,4	18,50	97	28,6	15,50	121	30,7	13,50	145	32,8	12,00	169	35,0	11,00
	25	4,0	62	25,5	22,50	83	27,4	18,50	104	29,2	16,00	125	31,0	14,50	146	32,9	13,00
	30	3,3	54	24,8	26,50	72	26,4	22,00	90	28,0	19,00	108	29,5	17,00	126	31,1	15,00
Inside temperature ϑi 22,00 °C	10	10,0	86	29,6	13,00	119	32,5	10,50	151	35,4	9,00	184	38,3	8,50	217	41,2	7,50
	15	6,7	73	28,5	16,50	101	31,0	13,50	129	33,5	11,50	158	35,9	10,50	186	38,4	9,50
	20	5,0	63	27,6	20,50	87	29,7	16,50	111	31,8	14,00	135	34,0	12,50	160	36,1	11,50
	25	4,0	54	26,8	24,50	75	28,6	20,00	96	30,5	17,00	116	32,3	15,00	137	34,2	13,50
	30	3,3	47	26,1	28,50	65	27,7	23,50	83	29,3	20,00	101	30,9	17,50	119	32,5	16,00
Inside temperature ϑi 24,00 °C	10	10,0	72	30,4	14,50	105	33,3	11,50	138	36,2	9,50	171	39,2	9,00	204	42,1	8,00
	15	6,7	62	29,5	18,50	90	32,0	14,50	118	34,5	12,50	146	36,9	11,00	174	39,4	10,00
	20	5,0	53	28,7	23,00	77	30,8	18,00	102	33,0	15,00	126	35,1	13,50	150	37,3	12,00
	25	4,0	46	28,1	27,00	67	29,9	21,50	87	31,7	18,00	108	33,6	16,00	129	35,4	14,00
	30	3,3	40	27,5	32,00	58	29,1	25,00	75	30,7	21,50	93	32,3	18,50	111	33,9	16,50

Thermal resistance of the floor covering R_λ = 0,05 m² K/W (screed pipe covering with 30 mm)

Thermal resistance of the floor covering R_λ = 0,05 m² K/W Plastic spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 14 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA	L	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR
	(cm)	(m/m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)
Inside temperature ϑi 15,00 °C	10	10,0	96	23,5	12,00	121	25,7	10,50	145	27,8	9,50	169	29,9	8,50	193	32,1	7,50
	15	6,7	85	22,5	15,50	106	24,4	13,50	127	26,2	12,00	148	28,1	10,50	169	30,0	9,50
	20	5,0	75	21,6	18,50	93	23,2	16,00	112	24,9	14,50	130	26,5	13,00	149	28,2	11,50
	25	4,0	66	20,8	22,00	82	22,2	19,00	98	23,7	17,00	115	25,1	15,00	131	26,6	14,00
	30	3,3	58	20,1	25,50	72	21,4	22,00	87	22,7	19,50	101	24,0	17,50	116	25,2	16,00
Inside temperature ϑi 18,00 °C	10	10,0	82	25,3	13,50	106	27,4	11,50	130	29,5	10,00	154	31,7	9,00	178	33,8	8,00
	15	6,7	72	24,4	17,00	93	26,2	14,50	114	28,1	12,50	135	30,0	11,00	157	31,9	10,00
	20	5,0	63	23,6	20,50	82	25,3	17,50	101	26,9	15,00	119	28,5	13,50	138	30,2	12,50
	25	4,0	56	22,9	24,00	72	24,4	20,50	88	25,8	18,00	105	27,3	16,00	121	28,7	14,50
	30	3,3	49	22,4	28,00	64	23,6	24,00	78	24,9	21,00	93	26,2	18,50	107	27,5	17,00
Inside temperature ϑi 20,00 °C	10	10,0	72	26,4	14,50	96	28,5	12,00	121	30,7	10,50	145	32,8	9,50	169	34,9	8,50
	15	6,7	64	25,6	18,50	85	27,5	15,50	106	29,4	13,00	127	31,2	11,50	148	33,1	10,50
	20	5,0	56	24,9	22,50	75	26,6	18,50	93	28,2	16,00	112	29,9	14,50	130	31,5	13,00
	25	4,0	49	24,3	26,50	66	25,8	22,00	82	27,2	19,00	98	28,7	16,50	115	30,1	15,00
	30	3,3	43	23,8	30,50	58	25,1	25,50	72	26,4	22,00	87	27,7	19,00	101	29,0	17,50
Inside temperature ϑi 22,00 °C	10	10,0	63	27,5	16,00	87	29,7	13,00	111	31,8	11,00	135	34,0	10,00	159	36,1	9,00
	15	6,7	55	26,9	20,50	76	28,7	16,50	97	30,6	14,00	119	32,5	12,00	140	34,4	11,00
	20	5,0	48	26,3	24,50	67	27,9	20,00	86	29,6	17,00	104	31,2	15,00	123	32,9	13,50
	25	4,0	43	25,8	29,00	59	27,2	23,50	75	28,7	20,00	92	30,1	17,00	108	31,6	15,50
	30	3,3	38	25,3	33,50	52	26,6	27,00	67	27,9	23,00	81	29,2	20,50	95	30,4	18,00
Inside temperature ϑi 24,00 °C	10	10,0	53	28,7	18,00	77	30,8	14,00	101	33,0	12,00	125	35,1	10,50	150	37,2	9,50
	15	6,7	47	28,1	22,50	68	30,0	17,50	89	31,9	15,00	110	33,7	13,00	131	35,6	11,50
	20	5,0	41	27,6	27,00	60	29,3	21,50	78	30,9	18,00	97	32,6	16,00	115	34,2	14,00
	25	4,0	36	27,2	32,00	52	28,6	25,00	69	30,1	21,00	85	31,5	18,50	102	33,0	16,50
	30	3,3	32	26,8	37,00	46	28,1	29,00	61	29,4	24,50	75	30,7	21,50	90	31,9	19,00

Roth Knob System performance data ø 14 mm

Thermal resistance of the floor covering R_λ = 0,10 m² K/W (screed pipe covering with 30 mm)

Thermal resistance of the floor covering R_λ = 0,10 m² K/W Parquet/carpet spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 14 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA (cm)	L (m/m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)
Inside temperature ϑ_i 15,00 °C	10	10,0	76	21,7	14,00	95	23,4	12,50	114	25,1	11,00	133	26,8	9,50	152	28,4	9,00
	15	6,7	68	21,0	17,50	85	22,5	15,50	102	24,0	13,50	119	25,5	12,00	136	27,0	11,00
	20	5,0	61	20,4	21,00	76	21,8	18,50	92	23,1	16,50	107	24,5	14,50	122	25,8	13,50
	25	4,0	54	19,8	24,50	68	21,0	21,50	82	22,2	19,00	95	23,4	17,00	109	24,6	15,50
	30	3,3	49	19,4	28,50	62	20,5	24,50	74	21,5	22,00	86	22,6	19,50	99	23,7	18,00
Inside temperature ϑ_i 18,00 °C	10	10,0	65	23,7	15,50	84	25,4	13,50	103	27,1	12,00	122	28,8	10,50	141	30,4	9,50
	15	6,7	58	23,1	19,50	75	24,6	16,50	92	26,1	14,50	109	27,6	13,00	126	29,1	12,00
	20	5,0	52	22,6	23,50	67	23,9	20,00	82	25,3	17,50	98	26,6	15,50	113	28,0	14,00
	25	4,0	46	22,1	27,50	60	23,3	23,00	73	24,5	20,50	87	25,7	18,00	101	26,9	16,50
	30	3,3	42	21,7	31,50	54	22,8	26,50	67	23,9	23,50	79	25,0	20,50	91	26,1	19,00
Inside temperature ϑ_i 20,00 °C	10	10,0	57	25,0	17,00	76	26,7	14,50	95	28,4	12,50	114	30,1	11,00	133	31,8	10,00
	15	6,7	51	24,5	21,50	68	26,0	18,00	85	27,5	15,50	102	29,0	13,50	119	30,5	12,50
	20	5,0	46	24,1	25,50	61	25,4	21,50	76	26,8	18,50	92	28,1	16,00	107	29,5	14,50
	25	4,0	41	23,6	29,50	54	24,8	25,00	68	26,0	21,50	82	27,2	19,00	95	28,4	17,00
	30	3,3	37	23,3	34,00	49	24,4	28,00	62	25,5	24,50	74	26,5	21,50	86	27,6	20,00
Inside temperature ϑ_i 22,00 °C	10	10,0	49	26,4	19,00	68	28,1	15,00	87	29,7	13,00	106	31,4	11,50	125	33,1	10,50
	15	6,7	44	25,9	23,00	61	27,4	19,00	78	28,9	16,50	95	30,4	14,00	112	31,9	13,00
	20	5,0	40	25,5	28,00	55	26,9	22,50	70	28,2	19,50	85	29,6	17,00	101	30,9	15,50
	25	4,0	35	25,1	32,50	49	26,3	26,50	63	27,5	22,50	76	28,7	19,50	90	29,9	18,00
	30	3,3	32	24,8	37,00	44	25,9	30,00	57	27,0	26,00	69	28,1	22,00	81	29,2	20,50
Inside temperature ϑ_i 24,00 °C	10	10,0	42	27,7	21,00	61	29,4	16,50	80	31,1	14,00	99	32,7	12,00	118	34,4	11,00
	15	6,7	37	27,3	26,00	54	28,8	20,50	71	30,3	17,00	88	31,8	15,00	105	33,3	13,50
	20	5,0	34	27,0	31,00	49	28,3	24,50	64	29,7	20,50	79	31,0	18,00	95	32,4	16,00
	25	4,0	30	26,6	36,00	44	27,9	28,50	57	29,1	24,00	71	30,3	21,00	84	31,5	19,00
	30	3,3	27	26,4	40,00	39	27,5	32,50	52	28,6	27,50	64	29,7	24,00	76	30,8	21,50

Thermal resistance of the floor covering R_λ = 0,15 m² K/W (screed pipe covering with 30 mm)

Thermal resistance of the floor covering R_λ = 0,15 m² K/W Carpet spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 14 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA (cm)	L (m/m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)
Inside temperature ϑ_i 15,00 °C	10	10,0	63	20,6	16,00	79	22,0	14,00	95	23,4	12,50	110	24,8	11,00	126	26,2	10,00
	15	6,7	57	20,1	20,00	72	21,3	17,00	86	22,6	15,50	100	23,9	13,50	115	25,1	12,50
	20	5,0	52	19,6	23,50	65	20,8	20,50	78	21,9	18,00	91	23,1	16,00	104	24,2	15,00
	25	4,0	47	19,2	27,00	59	20,2	23,50	71	21,3	21,00	83	22,3	18,50	95	23,4	17,00
	30	3,3	43	18,8	31,00	54	19,8	26,50	65	20,7	24,00	76	21,7	21,00	86	22,6	19,50
Inside temperature ϑ_i 18,00 °C	10	10,0	54	22,7	18,00	69	24,1	15,00	85	25,5	13,50	101	26,9	11,50	117	28,3	10,50
	15	6,7	49	22,3	22,00	63	23,6	18,50	77	24,8	16,50	92	26,1	14,50	106	27,4	13,00
	20	5,0	44	21,9	26,00	57	23,1	22,00	70	24,2	19,50	83	25,4	17,00	96	26,5	15,50
	25	4,0	40	21,6	30,00	52	22,6	25,50	64	23,7	22,00	76	24,7	20,00	88	25,8	18,00
	30	3,3	37	21,2	34,00	47	22,2	29,00	58	23,2	25,50	69	24,1	22,50	80	25,1	20,50
Inside temperature ϑ_i 20,00 °C	10	10,0	47	24,2	19,50	63	25,6	16,00	79	27,0	14,00	95	28,4	12,00	110	29,8	11,00
	15	6,7	43	23,8	24,00	57	25,1	20,00	72	26,3	17,00	86	27,6	15,00	100	28,9	13,50
	20	5,0	39	23,5	28,50	52	24,6	23,50	65	25,8	20,50	78	26,9	18,00	91	28,1	16,00
	25	4,0	36	23,1	32,50	47	24,2	27,00	59	25,2	23,50	71	26,3	21,00	83	27,3	18,50
	30	3,3	32	22,9	37,00	43	23,8	31,00	54	24,8	26,50	65	25,7	23,50	76	26,7	21,00
Inside temperature ϑ_i 22,00 °C	10	10,0	41	25,6	21,50	57	27,0	17,00	72	28,4	15,00	88	29,8	13,00	104	31,2	11,50
	15	6,7	37	25,3	26,00	52	26,6	21,50	66	27,8	18,00	80	29,1	16,00	95	30,4	14,00
	20	5,0	34	25,0	31,00	47	26,1	25,00	60	27,3	21,50	73	28,5	19,00	86	29,6	17,00
	25	4,0	31	24,7	35,50	43	25,8	29,00	54	26,8	25,00	66	27,9	22,00	78	28,9	19,50
	30	3,3	28	24,5	40,00	39	25,4	33,00	50	26,4	28,50	60	27,3	25,00	71	28,3	22,50
Inside temperature ϑ_i 24,00 °C	10	10,0	35	27,1	23,50	50	28,5	18,50	66	29,9	15,50	82	31,2	13,50	98	32,6	12,00
	15	6,7	32	26,8	29,00	46	28,1	23,00	60	29,3	19,00	74	30,6	17,00	89	31,9	15,00
	20	5,0	29	26,5	34,50	42	27,7	27,00	55	28,8	23,00	68	30,0	20,00	81	31,1	18,00
	25	4,0	26	26,3	40,00	38	27,4	31,50	50	28,4	26,00	62	29,4	23,00	73	30,5	20,50
	30	3,3	24	26,1	40,00	35	27,1	35,50	45	28,0	30,00	56	29,0	26,00	67	29,9	23,50

Roth Knob System performance data ø 14 mm

Thermal resistance of the floor covering R_λ = 0,00 m² K/W (screed pipe covering with 45 mm)

Thermal resistance of the floor covering R_λ = 0,00 m² K/W Ceramic covering spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 14 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA	L	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR
	(cm)	(m/m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)
Inside temperature ϑi 15,00 °C	10	10,0	120	25,6	10,50	149	28,2	9,00	179	30,9	8,00	209	33,5	7,50	239	36,2	6,50
	15	6,7	103	24,1	13,50	129	26,4	11,50	154	28,7	10,50	180	30,9	9,50	206	33,2	8,50
	20	5,0	89	22,9	16,50	111	24,9	14,00	134	26,8	12,50	156	28,8	11,50	178	30,8	10,50
	25	4,0	77	21,8	19,50	97	23,6	17,00	116	25,3	15,00	135	27,0	13,50	155	28,7	12,50
	30	3,3	67	21,0	22,50	84	22,4	19,50	101	23,9	17,50	118	25,4	16,00	135	26,9	14,50
Inside temperature ϑi 18,00 °C	10	10,0	102	27,0	11,50	131	29,6	10,00	161	32,3	8,50	191	34,9	7,50	221	37,6	7,00
	15	6,7	87	25,7	14,50	113	28,0	12,50	139	30,3	11,00	165	32,6	10,00	190	34,8	9,00
	20	5,0	76	24,7	18,00	98	26,7	15,50	120	28,7	13,50	143	30,6	12,00	165	32,6	11,00
	25	4,0	66	23,8	21,50	85	25,5	18,50	104	27,2	16,00	124	29,0	14,50	143	30,7	13,00
	30	3,3	57	23,1	25,50	74	24,6	21,50	91	26,0	18,50	108	27,5	17,00	125	29,0	15,00
Inside temperature ϑi 20,00 °C	10	10,0	90	27,9	12,50	120	30,6	10,50	149	33,2	9,00	179	35,9	8,00	209	38,5	7,50
	15	6,7	77	26,8	16,00	103	29,1	13,50	129	31,4	11,50	154	33,7	10,50	180	35,9	9,50
	20	5,0	67	25,9	19,50	89	27,9	16,50	111	29,9	14,00	134	31,8	12,50	156	33,8	11,50
	25	4,0	58	25,1	23,50	77	26,8	19,50	97	28,6	17,00	116	30,3	15,00	135	32,0	13,50
	30	3,3	51	24,5	27,50	67	26,0	23,00	84	27,4	20,00	101	28,9	17,50	118	30,4	16,00
Inside temperature ϑi 22,00 °C	10	10,0	78	28,9	13,50	108	31,5	11,00	137	34,2	9,50	167	36,8	8,50	197	39,4	7,50
	15	6,7	67	27,9	17,50	93	30,2	14,00	118	32,5	12,50	144	34,8	11,00	170	37,0	9,50
	20	5,0	58	27,1	21,50	80	29,1	17,50	103	31,1	15,00	125	33,0	13,00	147	35,0	12,00
	25	4,0	50	26,4	25,50	70	28,2	21,00	89	29,9	18,00	108	31,6	16,00	128	33,3	14,00
	30	3,3	44	25,9	30,00	61	27,4	24,50	77	28,9	21,00	94	30,3	18,50	111	31,8	16,50
Inside temperature ϑi 24,00 °C	10	10,0	66	29,8	15,00	96	32,5	12,00	125	35,1	10,00	155	37,7	9,00	185	40,4	8,00
	15	6,7	57	29,0	19,50	82	31,3	15,50	108	33,6	13,00	134	35,8	11,50	160	38,1	10,00
	20	5,0	49	28,3	24,00	71	30,3	19,00	94	32,3	16,00	116	34,3	14,00	138	36,2	12,50
	25	4,0	43	27,8	28,50	62	29,5	22,50	81	31,2	19,00	101	32,9	16,50	120	34,6	14,50
	30	3,3	37	27,3	33,00	54	28,8	26,50	71	30,3	22,00	88	31,7	19,00	104	33,2	17,00

Thermal resistance of the floor covering R_λ = 0,05 m² K/W (screed pipe covering with 45 mm)

Thermal resistance of the floor covering R_λ = 0,05 m² K/W Plastic spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 14 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA	L	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR
	(cm)	(m/m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)
Inside temperature ϑi 15,00 °C	10	10,0	89	22,9	12,50	111	24,9	11,00	134	26,8	10,00	156	28,8	9,00	178	30,8	30,8
	15	6,7	79	22,0	16,00	98	23,7	14,00	118	25,4	12,50	138	27,2	11,00	157	28,9	28,9
	20	5,0	70	21,2	19,00	87	22,7	16,50	104	24,2	15,00	122	25,8	13,50	139	27,3	27,3
	25	4,0	62	20,5	22,50	77	21,8	19,50	93	23,2	17,50	108	24,6	16,00	124	25,9	25,9
	30	3,3	55	19,9	26,00	69	21,1	22,50	82	22,3	20,00	96	23,5	18,50	110	24,7	24,7
Inside temperature ϑi 18,00 °C	10	10,0	76	24,7	14,00	98	26,7	12,00	120	28,6	10,50	143	30,6	9,50	165	32,6	32,6
	15	6,7	67	23,9	17,50	86	25,7	15,00	106	27,4	13,00	126	29,1	12,00	145	30,9	30,9
	20	5,0	59	23,2	21,50	77	24,8	18,00	94	26,3	16,00	111	27,9	14,00	129	29,4	29,4
	25	4,0	53	22,6	25,00	68	24,0	21,00	83	25,4	18,50	99	26,7	17,00	114	28,1	28,1
	30	3,3	47	22,1	29,00	60	23,3	24,50	74	24,6	21,50	88	25,8	19,50	101	27,0	27,0
Inside temperature ϑi 20,00 °C	10	10,0	67	25,9	15,50	89	27,9	12,50	111	29,9	11,00	134	31,8	10,00	156	33,8	33,8
	15	6,7	59	25,2	19,00	79	27,0	16,00	98	28,7	14,00	118	30,4	12,50	138	32,2	32,2
	20	5,0	52	24,6	23,00	70	26,2	19,50	87	27,7	16,50	104	29,2	15,00	122	30,8	30,8
	25	4,0	46	24,1	27,00	62	25,5	22,50	77	26,8	19,50	93	28,2	17,50	108	29,6	29,6
	30	3,3	41	23,6	31,50	55	24,9	26,00	69	26,1	22,50	82	27,3	20,00	96	28,5	28,5
Inside temperature ϑi 22,00 °C	10	10,0	58	27,1	16,50	80	29,1	13,50	102	31,1	11,50	125	33,0	10,50	147	35,0	35,0
	15	6,7	51	26,5	21,00	71	28,3	17,00	90	30,0	14,50	110	31,7	13,00	130	33,5	33,5
	20	5,0	45	26,0	25,00	63	27,5	20,50	80	29,1	17,50	97	30,6	15,50	115	32,2	32,2
	25	4,0	40	25,6	30,00	56	26,9	24,00	71	28,3	20,50	86	29,7	18,00	102	31,0	31,0
	30	3,3	36	25,2	34,50	49	26,4	28,00	63	27,6	24,00	77	28,8	21,00	91	30,0	30,0
Inside temperature ϑi 24,00 °C	10	10,0	49	28,3	18,50	71	30,3	14,50	94	32,3	12,50	116	34,2	11,00	138	36,2	36,2
	15	6,7	43	27,8	23,50	63	29,6	18,50	83	31,3	15,50	102	33,0	13,00	122	34,8	34,8
	20	5,0	38	27,4	28,00	56	28,9	22,00	73	30,5	18,50	91	32,0	16,50	108	33,6	33,6
	25	4,0	34	27,0	33,00	49	28,4	26,00	65	29,7	22,00	80	31,1	19,00	96	32,5	32,5
	30	3,3	30	26,7	38,00	44	27,9	30,00	58	29,1	25,50	71	30,3	22,00	85	31,5	31,5

Roth Knob System performance data ø 14 mm

Thermal resistance of the floor covering R_λ = 0,10 m² K/W (screed pipe covering with 45 mm)

Thermal resistance of the floor covering R_λ = 0,10 m² K/W Parquet/carpet spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 14 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA (cm)	L (m/m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)
Inside temperature ϑ_i 15,00 °C	10	10,0	71	21,3	14,50	89	22,9	13,00	107	24,5	11,50	125	26,0	10,50	142	27,6	9,50
	15	6,7	64	20,7	18,50	80	22,1	16,00	96	23,5	14,00	112	24,9	13,00	128	26,4	12,00
	20	5,0	58	20,1	21,50	72	21,4	19,00	87	22,7	17,00	101	24,0	15,50	116	25,2	14,00
	25	4,0	52	19,6	25,00	65	20,8	22,00	78	21,9	19,50	91	23,1	17,50	104	24,2	16,00
	30	3,3	47	19,2	29,00	59	20,2	25,00	71	21,3	22,50	83	22,3	20,00	94	23,4	18,50
Inside temperature ϑ_i 18,00 °C	10	10,0	61	23,4	16,50	78	24,9	14,00	96	26,5	12,50	114	28,1	11,00	132	29,7	10,00
	15	6,7	55	22,8	20,00	71	24,2	17,00	87	25,7	15,00	103	27,1	13,50	119	28,5	12,50
	20	5,0	49	22,4	24,00	64	23,6	20,50	78	24,9	18,00	93	26,2	16,00	107	27,5	14,50
	25	4,0	44	21,9	28,00	57	23,1	24,00	70	24,2	21,00	84	25,4	18,50	97	26,5	17,00
	30	3,3	40	21,6	32,00	52	22,6	27,00	64	23,6	24,00	76	24,7	21,50	87	25,7	19,50
Inside temperature ϑ_i 20,00 °C	10	10,0	53	24,7	18,00	71	26,3	14,50	89	27,9	13,00	107	29,5	11,50	125	31,0	10,50
	15	6,7	48	24,3	22,00	64	25,7	18,50	80	27,1	16,00	96	28,5	14,00	112	29,9	13,00
	20	5,0	43	23,8	26,00	58	25,1	22,00	72	26,4	19,00	87	27,7	16,50	101	29,0	15,00
	25	4,0	39	23,5	30,50	52	24,6	25,50	65	25,8	22,00	78	26,9	19,50	91	28,1	17,50
	30	3,3	35	23,1	34,50	47	24,2	28,50	59	25,2	25,00	71	26,3	22,50	83	27,3	20,50
Inside temperature ϑ_i 22,00 °C	10	10,0	46	26,1	19,50	64	27,7	15,50	82	29,2	13,50	100	30,8	12,00	118	32,4	10,50
	15	6,7	42	25,7	24,00	58	27,1	19,50	74	28,5	17,00	90	29,9	15,00	106	31,4	13,50
	20	5,0	38	25,3	28,50	52	26,6	23,50	67	27,9	20,00	81	29,2	17,50	95	30,4	16,00
	25	4,0	34	25,0	33,00	47	26,2	27,00	60	27,3	23,00	73	28,5	20,50	86	29,6	18,50
	30	3,3	31	24,7	37,50	42	25,8	31,00	54	26,8	26,50	66	27,8	23,50	78	28,9	21,00
Inside temperature ϑ_i 24,00 °C	10	10,0	39	27,5	21,50	57	29,0	17,00	75	30,6	14,50	93	32,2	12,50	110	33,8	11,00
	15	6,7	35	27,1	26,50	51	28,5	21,00	67	30,0	18,00	83	31,4	15,50	99	32,8	14,00
	20	5,0	32	26,8	32,00	46	28,1	25,00	61	29,4	21,00	75	30,7	18,50	90	31,9	16,50
	25	4,0	29	26,5	37,00	42	27,7	29,00	55	28,9	24,50	68	30,0	21,50	81	31,2	19,50
	30	3,3	26	26,3	40,00	38	27,3	33,50	50	28,4	28,00	61	29,4	24,50	73	30,5	22,00

Thermal resistance of the floor covering R_λ = 0,15 m² K/W (screed pipe covering with 45 mm)

Thermal resistance of the floor covering R_λ = 0,15 m² K/W Carpet spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 14 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA (cm)	L (m/m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)
Inside temperature ϑ_i 15,00 °C	10	10,0	60	20,3	16,50	74	21,6	14,50	89	22,9	13,00	104	24,2	11,50	119	25,5	10,50
	15	6,7	54	19,8	20,50	68	21,0	17,50	82	22,2	16,00	95	23,4	14,00	109	24,6	13,00
	20	5,0	50	19,4	24,00	62	20,5	21,00	74	21,6	18,50	87	22,7	17,00	99	23,8	15,50
	25	4,0	45	19,0	27,50	57	20,0	24,00	68	21,0	21,50	79	22,0	19,50	91	23,0	18,00
	30	3,3	42	18,7	31,50	52	19,6	27,50	62	20,5	24,50	73	21,4	22,00	83	22,3	20,00
Inside temperature ϑ_i 18,00 °C	10	10,0	51	22,5	18,50	65	23,8	15,50	80	25,1	14,00	95	26,4	12,50	110	27,7	11,00
	15	6,7	46	22,1	22,50	60	23,3	19,00	73	24,5	17,00	87	25,7	15,00	101	26,9	14,00
	20	5,0	42	21,7	26,50	55	22,8	22,50	67	23,9	20,00	79	25,0	18,00	92	26,1	16,00
	25	4,0	39	21,4	30,50	50	22,4	26,00	61	23,4	22,50	73	24,4	20,50	84	25,4	18,50
	30	3,3	35	21,1	35,00	46	22,0	29,50	56	23,0	26,00	66	23,9	23,50	77	24,8	21,00
Inside temperature ϑ_i 20,00 °C	10	10,0	45	24,0	20,00	60	25,3	16,50	74	26,6	14,50	89	27,9	13,00	104	29,2	11,50
	15	6,7	41	23,6	24,50	54	24,8	20,50	68	26,0	17,50	82	27,2	16,00	95	28,4	14,50
	20	5,0	37	23,3	29,00	50	24,4	24,00	62	25,5	21,00	74	26,6	18,50	87	27,7	17,00
	25	4,0	34	23,0	33,00	45	24,0	27,50	57	25,0	24,00	68	26,0	21,50	79	27,0	19,50
	30	3,3	31	22,8	38,00	42	23,7	31,50	52	24,6	27,00	62	25,5	24,50	73	26,4	22,00
Inside temperature ϑ_i 22,00 °C	10	10,0	39	25,4	22,00	54	26,7	17,50	68	28,1	15,50	83	29,4	13,50	98	30,7	12,00
	15	6,7	35	25,1	27,00	49	26,3	22,00	62	27,5	18,50	76	28,7	16,50	90	29,9	14,50
	20	5,0	32	24,9	32,00	45	26,0	26,00	57	27,0	22,00	69	28,1	19,50	82	29,2	17,50
	25	4,0	29	24,6	36,50	41	25,6	30,00	52	26,6	25,50	64	27,6	22,50	75	28,6	20,00
	30	3,3	27	24,4	40,00	37	25,3	34,00	48	26,2	29,00	58	27,1	25,50	69	28,1	23,00
Inside temperature ϑ_i 24,00 °C	10	10,0	33	26,9	24,50	48	28,2	19,00	63	29,5	16,00	77	30,8	14,00	92	32,2	12,50
	15	6,7	30	26,6	30,00	43	27,8	23,50	57	29,0	19,50	71	30,3	17,50	84	31,5	15,50
	20	5,0	27	26,4	35,00	40	27,5	27,50	52	28,6	23,50	65	29,7	20,50	77	30,8	18,50
	25	4,0	25	26,2	40,00	36	27,2	32,00	48	28,2	26,50	59	29,2	23,50	70	30,2	21,00
	30	3,3	23	26,0	40,00	33	26,9	36,00	44	27,9	30,50	54	28,8	26,50	64	29,7	24,00

Roth Knob System performance data ø 16 mm

Thermal resistance of the floor covering R_λ = 0,00 m² K/W (screed pipe covering with 30 mm)

Thermal resistance of the floor covering R_λ = 0,00 m² K/W Ceramic covering spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 16 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA	L	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR
	(cm)	(m/m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)
Inside temperature ϑi 15,00 °C	10	10,0	135	26,9	15,00	168	29,9	13,00	202	32,9	7,50	236	35,8	7,00	269	38,8	6,50
	15	6,7	115	25,2	19,50	144	27,7	17,00	173	30,3	9,50	202	32,8	8,50	230	35,4	8,00
	20	5,0	99	23,8	24,00	124	26,0	20,50	148	28,1	11,50	173	30,3	10,50	198	32,5	10,00
	25	4,0	85	22,5	28,50	106	24,4	24,50	128	26,3	14,00	149	28,2	12,50	170	30,1	11,50
	30	3,3	74	21,5	33,50	92	23,1	29,00	110	24,8	16,50	129	26,4	15,00	147	28,0	14,00
Inside temperature ϑi 18,00 °C	10	10,0	114	28,1	17,00	148	31,1	14,50	182	34,1	8,00	215	37,1	7,50	249	40,0	6,50
	15	6,7	98	26,7	21,50	127	29,2	18,50	155	31,8	10,00	184	34,3	9,00	213	36,9	8,50
	20	5,0	84	25,4	26,50	109	27,6	22,50	134	29,8	12,50	158	32,0	11,00	183	34,2	10,50
	25	4,0	72	24,4	31,50	94	26,3	26,50	115	28,2	15,00	136	30,1	13,50	158	31,9	12,50
	30	3,3	62	23,5	37,00	81	25,2	31,00	99	26,8	17,50	118	28,4	15,50	136	30,0	14,50
Inside temperature ϑi 20,00 °C	10	10,0	101	28,9	18,50	135	31,9	15,00	168	34,9	8,50	202	37,9	7,50	236	40,8	7,00
	15	6,7	86	27,6	23,50	115	30,2	19,50	144	32,7	11,00	173	35,3	9,50	202	37,8	9,00
	20	5,0	74	26,6	28,50	99	28,8	23,50	124	31,0	13,00	148	33,1	11,50	173	35,3	10,50
	25	4,0	64	25,7	34,00	85	27,5	28,00	106	29,4	15,50	128	31,3	14,00	149	33,2	12,50
	30	3,3	55	24,9	40,00	74	26,5	33,00	92	28,1	18,50	110	29,8	16,50	129	31,4	15,00
Inside temperature ϑi 22,00 °C	10	10,0	87	29,7	20,00	121	32,7	16,00	155	35,7	9,00	188	38,7	8,00	222	41,7	7,00
	15	6,7	75	28,6	25,50	104	31,2	21,00	132	33,7	11,50	161	36,3	10,00	190	38,8	9,00
	20	5,0	64	27,7	31,00	89	29,9	25,50	114	32,1	14,00	139	34,3	12,50	163	36,5	11,00
	25	4,0	55	26,9	37,00	77	28,8	30,00	98	30,7	16,50	119	32,6	14,50	141	34,4	13,00
	30	3,3	48	26,2	40,00	66	27,9	35,50	85	29,5	19,50	103	31,1	17,00	121	32,7	15,50
Inside temperature ϑi 24,00 °C	10	10,0	74	30,6	22,50	108	33,5	17,50	141	36,5	9,50	175	39,5	8,00	209	42,5	7,50
	15	6,7	63	29,6	28,50	92	32,2	22,20	121	34,7	12,00	150	37,2	10,50	179	39,8	9,50
	20	5,0	54	28,8	34,50	79	31,0	27,50	104	33,2	14,50	129	35,4	13,00	153	37,6	11,50
	25	4,0	47	28,1	40,00	68	30,0	32,50	89	31,9	17,50	111	33,8	15,50	132	35,7	13,50
	30	3,3	40	27,6	40,00	59	29,2	38,00	77	30,8	20,50	96	32,5	18,00	114	34,1	16,00

Thermal resistance of the floor covering R_λ = 0,05 m² K/W (screed pipe covering with 30 mm)

Thermal resistance of the floor covering R_λ = 0,05 m² K/W Plastic spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 16 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA	L	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR
	(cm)	(m/m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)
Inside temperature ϑi 15,00 °C	10	10,0	98	23,7	18,50	122	25,8	16,50	147	28,0	9,00	171	30,2	8,50	196	32,3	7,50
	15	6,7	86	22,6	23,50	108	24,5	20,00	129	26,4	11,50	151	28,3	10,50	172	30,2	9,50
	20	5,0	76	21,7	28,00	95	23,4	24,50	114	25,1	14,00	133	26,7	12,50	152	28,4	11,50
	25	4,0	67	20,9	33,00	83	22,4	28,50	100	23,9	16,00	117	25,3	15,00	133	26,8	13,50
	30	3,3	59	20,2	38,50	74	21,5	33,00	88	22,8	19,00	103	24,1	17,00	118	25,4	15,50
Inside temperature ϑi 18,00 °C	10	10,0	83	25,4	20,50	108	27,5	17,50	132	29,7	10,00	157	31,9	9,00	181	34,0	8,00
	15	6,7	73	24,5	26,00	95	26,4	22,00	116	28,3	12,50	138	30,2	11,00	159	32,1	10,00
	20	5,0	64	23,7	31,50	83	25,4	26,50	102	27,1	15,00	121	28,7	13,50	140	30,4	12,00
	25	4,0	57	23,0	36,50	73	24,5	31,00	90	26,0	17,50	107	27,5	15,50	123	28,9	14,50
	30	3,3	50	22,4	40,00	65	23,7	36,00	80	25,0	20,00	94	26,3	18,00	109	27,7	16,50
Inside temperature ϑi 20,00 °C	10	10,0	73	26,5	22,50	98	28,7	18,50	122	30,8	10,50	147	33,0	9,50	171	35,2	8,50
	15	6,7	65	25,7	28,00	86	27,6	23,50	108	29,5	13,00	129	31,4	11,50	151	33,3	10,50
	20	5,0	57	25,0	34,00	76	26,7	28,00	95	28,4	15,50	114	30,1	14,00	133	31,7	12,50
	25	4,0	50	24,4	40,00	67	25,9	33,00	83	27,4	18,00	100	28,9	16,00	117	30,3	15,00
	30	3,3	44	23,9	40,00	59	25,2	38,00	74	26,5	21,00	88	27,8	19,00	103	29,1	17,00
Inside temperature ϑi 22,00 °C	10	10,0	64	27,6	24,50	88	29,8	20,00	113	32,0	11,00	137	34,1	9,50	162	36,3	8,50
	15	6,7	56	27,0	31,00	78	28,9	25,00	99	30,8	13,50	121	32,7	12,00	142	34,6	11,00
	20	5,0	49	26,4	37,00	68	28,0	30,00	87	29,7	16,50	106	31,4	14,50	125	33,1	13,00
	25	4,0	43	25,8	40,00	60	27,3	35,50	77	28,8	19,00	93	30,3	17,00	110	31,7	15,50
	30	3,3	38	25,4	40,00	53	26,7	40,00	68	28,0	22,50	83	29,3	19,50	97	30,6	17,50
Inside temperature ϑi 24,00 °C	10	10,0	54	28,8	27,00	78	30,9	21,50	103	33,1	11,50	127	35,3	10,00	152	37,4	9,00
	15	6,7	47	28,2	34,00	69	30,1	27,00	90	32,0	14,50	112	33,9	12,50	133	35,8	11,00
	20	5,0	42	27,7	40,00	61	29,4	32,50	80	31,0	17,50	99	32,7	15,00	118	34,4	13,50
	25	4,0	37	27,2	40,00	53	28,7	38,00	70	30,2	20,50	87	31,7	18,00	103	33,2	16,00
	30	3,3	32	26,9	40,00	47	28,2	40,00	62	29,5	23,50	77	30,8	20,50	91	32,1	18,50

Roth Knob System performance data ø 16 mm

Thermal resistance of the floor covering R_λ = 0,10 m² K/W (screed pipe covering with 30 mm)

Thermal resistance of the floor covering R_λ = 0,10 m² K/W Parquet/carpet spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 16 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA (cm)	L (m/m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)
Inside temperature ϑ_i 15,00 °C	10	10,0	77	21,8	22,00	96	23,5	19,00	115	25,2	11,00	134	26,9	9,50	154	28,6	9,00
	15	6,7	69	21,1	27,00	86	22,6	23,50	103	24,1	13,00	121	25,7	12,00	138	27,2	11,00
	20	5,0	62	20,5	32,00	77	21,8	28,00	93	23,2	15,50	108	24,6	14,50	124	26,0	13,00
	25	4,0	55	19,9	37,00	69	21,1	32,50	83	22,3	18,50	97	23,6	17,00	110	24,8	15,50
	30	3,3	50	19,4	40,00	63	20,5	37,00	75	21,6	21,00	88	22,8	19,00	100	23,9	17,50
Inside temperature ϑ_i 18,00 °C	10	10,0	65	23,8	24,00	85	25,5	20,50	104	27,2	11,50	123	28,9	10,50	142	30,6	9,50
	15	6,7	59	23,2	30,00	76	24,7	25,00	93	26,2	14,00	110	27,8	13,00	127	29,3	12,00
	20	5,0	53	22,7	35,50	68	24,0	30,00	84	25,4	17,00	99	26,8	15,50	115	28,1	14,00
	25	4,0	47	22,2	40,00	61	23,4	35,00	75	24,6	19,50	88	25,8	18,00	102	27,0	16,00
	30	3,3	43	21,8	40,00	55	22,9	40,00	68	24,0	22,50	80	25,1	20,50	93	26,2	18,50
Inside temperature ϑ_i 20,00 °C	10	10,0	58	25,1	26,00	77	26,8	21,50	96	28,5	12,00	115	30,2	11,00	134	31,9	10,00
	15	6,7	52	24,6	32,50	69	26,1	27,00	86	27,6	15,00	103	29,1	13,50	121	30,7	12,00
	20	5,0	46	24,1	38,50	62	25,5	32,00	77	26,8	17,50	93	28,2	16,00	108	29,6	14,50
	25	4,0	41	23,7	40,00	55	24,9	37,00	69	26,1	20,50	83	27,3	18,50	97	28,6	17,00
	30	3,3	38	23,3	40,00	50	24,4	40,00	63	25,5	23,50	75	26,6	21,50	88	27,8	19,50
Inside temperature ϑ_i 22,00 °C	10	10,0	50	26,4	28,50	69	28,1	23,50	88	29,8	12,50	108	31,5	11,50	127	33,2	10,50
	15	6,7	45	26,0	35,50	62	27,5	28,50	79	29,0	15,50	96	30,5	14,00	114	32,1	12,50
	20	5,0	40	25,6	40,00	56	26,9	34,00	71	28,3	18,50	87	29,7	16,50	102	31,0	15,00
	25	4,0	36	25,2	40,00	50	26,4	39,50	64	27,6	21,50	77	28,8	19,50	91	30,1	17,50
	30	3,3	33	24,9	40,00	45	26,0	40,00	58	27,1	25,00	70	28,2	22,00	83	29,3	20,00
Inside temperature ϑ_i 24,00 °C	10	10,0	42	27,7	32,00	61	29,4	25,00	81	31,1	13,50	100	32,8	12,00	119	34,5	10,50
	15	6,7	38	27,4	39,00	55	28,9	31,00	72	30,4	16,50	90	31,9	14,50	107	33,5	13,00
	20	5,0	34	27,0	40,00	50	28,4	37,00	65	29,8	19,50	80	31,1	17,50	96	32,5	15,50
	25	4,0	30	26,7	40,00	44	27,9	40,00	58	29,1	23,00	72	30,4	20,50	86	31,6	18,50
	30	3,3	28	26,4	40,00	40	27,5	40,00	53	28,7	26,00	65	29,8	23,50	78	30,9	21,00

Thermal resistance of the floor covering R_λ = 0,15 m² K/W (screed pipe covering with 30 mm)

Thermal resistance of the floor covering R_λ = 0,15 m² K/W Carpet spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 16 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA (cm)	L (m/m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)
Inside temperature ϑ_i 15,00 °C	10	10,0	63	20,6	24,50	79	22,0	21,00	95	23,4	12,00	111	24,8	11,00	127	26,2	10,00
	15	6,7	58	20,1	30,00	72	21,4	26,00	87	22,7	15,00	101	24,0	13,50	116	25,2	12,50
	20	5,0	53	19,7	35,50	66	20,8	31,00	79	22,0	17,50	92	23,2	15,50	105	24,3	14,50
	25	4,0	48	19,2	40,00	60	20,3	35,50	72	21,4	20,00	84	22,4	18,00	96	23,5	16,50
	30	3,3	44	18,9	40,00	55	19,8	40,00	66	20,8	23,00	77	21,8	20,50	87	22,7	19,00
Inside temperature ϑ_i 18,00 °C	10	10,0	54	22,8	27,00	70	24,2	23,00	86	25,6	13,00	102	27,0	11,50	117	28,4	10,50
	15	6,7	49	22,3	33,50	64	23,6	28,50	78	24,9	16,00	93	26,2	14,50	107	27,5	13,00
	20	5,0	45	22,0	39,00	58	23,1	33,50	71	24,3	18,50	84	25,5	17,00	97	26,6	15,50
	25	4,0	41	21,6	40,00	53	22,7	38,00	65	23,7	21,50	77	24,8	19,00	89	25,8	17,50
	30	3,3	37	21,3	40,00	48	22,3	40,00	59	23,2	24,50	70	24,2	22,00	81	25,2	20,00
Inside temperature ϑ_i 20,00 °C	10	10,0	48	24,2	29,50	63	25,6	24,50	79	27,0	13,50	95	28,4	12,00	111	29,8	11,00
	15	6,7	43	23,8	35,50	58	25,1	30,00	72	26,4	16,50	87	27,7	15,00	101	29,0	13,50
	20	5,0	39	23,5	40,00	53	24,7	35,50	66	25,8	19,50	79	27,0	17,50	92	28,2	16,00
	25	4,0	36	23,2	40,00	48	24,2	40,00	60	25,3	22,50	72	26,4	20,00	84	27,4	18,00
	30	3,3	33	22,9	40,00	44	23,9	40,00	55	24,8	25,50	66	25,8	22,50	77	26,8	20,50
Inside temperature ϑ_i 22,00 °C	10	10,0	41	25,7	32,00	57	27,1	26,00	73	28,5	14,50	89	29,9	12,50	105	31,3	11,50
	15	6,7	38	25,3	39,00	52	26,6	32,00	66	27,9	17,50	81	29,2	15,50	95	30,4	14,00
	20	5,0	34	25,0	40,00	47	26,2	38,00	61	27,4	20,50	74	28,5	18,50	87	29,7	16,50
	25	4,0	31	24,8	40,00	43	25,8	40,00	55	26,9	24,00	67	27,9	21,00	79	29,0	19,00
	30	3,3	28	24,5	40,00	39	25,5	40,00	50	26,5	27,00	61	27,4	24,00	72	28,4	21,50
Inside temperature ϑ_i 24,00 °C	10	10,0	35	27,1	35,50	51	28,5	28,00	67	29,9	15,00	83	31,3	13,00	98	32,7	12,00
	15	6,7	32	26,8	39,00	46	28,1	34,50	61	29,4	18,50	75	30,7	16,50	90	31,9	14,50
	20	5,0	29	26,6	40,00	42	27,7	40,00	55	28,9	22,00	68	30,1	19,00	82	31,2	17,00
	25	4,0	26	26,3	40,00	38	27,4	40,00	50	28,5	25,00	62	29,5	22,00	74	30,6	19,50
	30	3,3	24	26,1	40,00	35	27,1	40,00	46	28,1	28,50	57	29,0	25,00	68	30,0	22,50

Roth Knob System performance data ø 16 mm

Thermal resistance of the floor covering R_λ = 0,00 m² K/W (screed pipe covering with 45 mm)

Thermal resistance of the floor covering R_λ = 0,00 m² K/W Ceramic covering spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 16 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA	L	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR
	(cm)	(m/m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)
Inside temperature ϑi 15,00 °C	10	10,0	123	25,9	10,50	154	28,6	9,00	184	31,3	8,00	215	34,0	7,50	246	36,8	6,50
	15	6,7	106	24,4	13,50	133	26,7	11,50	159	29,1	10,50	186	31,4	9,50	212	33,8	8,50
	20	5,0	92	23,1	16,50	115	25,2	14,00	138	27,2	12,50	161	29,2	11,50	184	31,3	10,50
	25	4,0	80	22,1	19,50	100	23,8	17,00	120	25,6	15,00	140	27,4	13,50	160	29,1	12,50
	30	3,3	69	21,1	22,50	87	22,7	19,50	104	24,2	17,50	121	25,7	16,00	139	27,3	14,50
Inside temperature ϑi 18,00 °C	10	10,0	104	27,2	11,50	135	30,0	26,00	166	32,7	8,50	197	35,4	7,50	227	38,1	7,00
	15	6,7	90	26,0	14,50	117	28,3	12,50	143	30,7	11,00	170	33,0	10,00	196	35,4	9,00
	20	5,0	78	24,9	18,00	101	26,9	15,50	124	29,0	13,50	147	31,0	12,00	170	33,0	11,00
	25	4,0	68	24,0	21,00	88	25,8	18,00	108	27,5	16,00	128	29,3	14,50	148	31,1	13,00
	30	3,3	59	23,2	25,00	76	24,8	21,00	94	26,3	18,50	111	27,8	17,00	128	29,4	15,00
Inside temperature ϑi 20,00 °C	10	10,0	92	28,2	12,50	123	30,9	10,50	154	33,6	9,00	184	36,3	8,00	215	39,0	7,50
	15	6,7	80	27,0	16,00	106	29,4	13,50	133	31,7	11,50	159	34,1	10,00	186	36,4	9,50
	20	5,0	69	26,1	19,50	92	28,1	16,50	115	30,2	14,00	138	32,2	12,50	161	34,2	11,50
	25	4,0	60	25,3	23,00	80	27,1	19,50	100	28,8	16,50	120	30,6	15,00	140	32,4	13,50
	30	3,3	52	24,6	27,00	69	26,1	22,50	87	27,7	19,50	104	29,2	17,50	121	30,7	16,00
Inside temperature ϑi 22,00 °C	10	10,0	80	29,1	13,50	111	31,8	11,00	141	34,5	9,50	172	37,2	8,50	203	39,9	7,50
	15	6,7	69	28,1	17,50	95	30,4	14,00	122	32,8	12,50	148	35,1	11,00	175	37,5	9,50
	20	5,0	60	27,3	21,50	83	29,3	17,50	106	31,4	15,00	129	33,4	13,00	152	35,4	12,00
	25	4,0	52	26,6	25,50	72	28,4	20,50	92	30,1	17,50	112	31,9	15,50	132	33,6	14,00
	30	3,3	45	26,0	30,00	62	27,5	24,00	80	29,1	20,50	97	30,6	18,50	114	32,1	16,50
Inside temperature ϑi 24,00 °C	10	10,0	68	30,0	15,00	98	32,7	12,00	129	35,4	10,00	160	38,1	9,00	190	40,9	8,00
	15	6,7	58	29,2	19,50	85	31,5	15,50	111	33,9	13,00	138	36,2	11,50	164	38,5	10,00
	20	5,0	51	28,5	24,00	74	30,5	18,50	97	32,5	15,50	119	34,6	14,00	142	36,6	12,50
	25	4,0	44	27,9	27,50	64	29,6	22,50	84	31,4	18,50	104	33,2	16,00	124	34,9	14,50
	30	3,3	38	27,4	33,00	56	28,9	26,00	73	30,4	22,00	90	32,0	19,00	108	33,5	17,00

Thermal resistance of the floor covering R_λ = 0,05 m² K/W (screed pipe covering with 45 mm)

Thermal resistance of the floor covering R_λ = 0,05 m² K/W Plastic spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 16 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA	L	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR
	(cm)	(m/m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)
Inside temperature ϑi 15,00 °C	10	10,0	91	23,1	12,50	114	25,1	11,00	137	27,1	10,00	159	29,1	9,00	182	31,1	8,00
	15	6,7	81	22,1	16,00	101	23,9	14,00	121	25,7	12,50	141	27,5	11,00	161	29,3	10,00
	20	5,0	71	21,3	19,00	89	22,9	16,50	107	24,5	15,00	125	26,1	13,50	143	27,6	12,50
	25	4,0	63	20,6	22,50	79	22,0	19,50	95	23,4	17,50	111	24,8	16,00	127	26,2	14,50
	30	3,3	56	20,0	26,00	70	21,2	22,50	85	22,5	20,00	99	23,7	18,50	113	25,0	16,50
Inside temperature ϑi 18,00 °C	10	10,0	77	24,9	14,00	100	26,9	12,00	123	28,9	10,50	146	30,9	9,50	168	32,9	8,50
	15	6,7	68	24,1	17,50	89	25,8	15,00	109	27,6	13,00	129	29,4	12,00	149	31,2	10,50
	20	5,0	61	23,4	21,50	79	25,0	18,00	96	26,5	16,00	114	28,1	14,00	132	29,7	13,00
	25	4,0	54	22,8	25,00	70	24,2	21,00	86	25,6	18,50	101	27,0	16,50	117	28,4	15,00
	30	3,3	48	22,2	29,00	62	23,5	24,50	76	24,7	21,50	90	26,0	19,50	104	27,2	17,50
Inside temperature ϑi 20,00 °C	10	10,0	68	26,0	15,50	91	28,1	12,50	114	30,1	11,00	137	32,1	10,00	159	34,1	9,00
	15	6,7	60	25,3	19,00	81	27,1	16,00	101	28,9	14,00	121	30,7	12,50	141	32,5	11,00
	20	5,0	54	24,7	23,00	71	26,3	19,50	89	27,9	16,50	107	29,5	15,00	125	31,1	13,50
	25	4,0	48	24,2	27,00	63	25,6	22,50	79	27,0	19,50	95	28,4	17,50	111	29,8	15,50
	30	3,3	42	23,7	31,50	56	25,0	26,00	70	26,2	22,50	85	27,5	20,00	99	28,7	18,00
Inside temperature ϑi 22,00 °C	10	10,0	59	27,2	16,50	82	29,3	13,50	105	31,3	11,50	127	33,3	10,50	150	35,3	9,00
	15	6,7	52	26,6	21,00	72	28,4	17,00	93	30,2	14,50	113	32,0	13,00	133	33,8	11,50
	20	5,0	46	26,1	25,00	64	27,7	20,50	82	29,3	17,50	100	30,8	15,50	118	32,4	14,00
	25	4,0	41	25,6	29,50	57	27,0	24,00	73	28,5	20,50	89	29,9	18,00	105	31,3	16,50
	30	3,3	37	25,2	34,50	51	26,5	27,50	65	27,7	24,00	79	29,0	21,00	93	30,2	19,00
Inside temperature ϑi 24,00 °C	10	10,0	50	28,4	18,50	73	30,4	14,50	96	32,5	12,50	118	34,5	11,00	141	36,5	9,50
	15	6,7	44	27,9	23,50	64	29,7	18,50	85	31,5	15,50	105	33,3	13,00	125	35,0	12,00
	20	5,0	39	27,5	28,00	57	29,1	22,00	75	30,6	18,50	93	32,2	16,50	111	33,8	14,50
	25	4,0	35	27,1	33,00	51	28,5	26,00	67	29,9	21,50	82	31,3	19,00	98	32,7	17,00
	30	3,3	31	26,7	38,00	45	28,0	30,00	59	29,2	25,00	73	30,5	22,00	87	31,7	19,50

Roth Knob System performance data ø 16 mm

Thermal resistance of the floor covering R_λ = 0,10 m² K/W (screed pipe covering with 45 mm)

Thermal resistance of the floor covering R_λ = 0,10 m² K/W Parquet/carpet spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 16 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA (cm)	L (m/m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)
Inside temperature ϑ_i 15,00 °C	10	10,0	73	21,4	14,50	91	23,0	13,00	109	24,6	11,50	127	26,2	10,50	145	27,8	9,50
	15	6,7	65	20,8	18,50	82	22,2	16,00	98	23,7	14,00	115	25,1	12,50	131	26,6	12,00
	20	5,0	59	20,2	21,50	74	21,5	19,00	89	22,8	17,00	103	24,2	15,00	118	25,5	14,00
	25	4,0	53	19,7	25,00	67	20,9	22,00	80	22,1	19,50	93	23,3	17,50	107	24,5	16,00
	30	3,3	48	19,3	28,50	60	20,3	25,00	72	21,4	22,50	85	22,5	20,00	97	23,6	18,50
Inside temperature ϑ_i 18,00 °C	10	10,0	62	23,5	16,50	80	25,1	14,00	98	26,7	12,50	116	28,3	11,00	134	29,9	10,00
	15	6,7	56	22,9	20,00	72	24,4	17,00	88	25,8	15,00	105	27,3	13,50	121	28,7	12,00
	20	5,0	50	22,4	24,00	65	23,8	20,00	80	25,1	18,00	95	26,4	16,00	109	27,7	14,50
	25	4,0	45	22,0	28,00	59	23,2	23,50	72	24,4	20,50	85	25,6	18,50	99	26,7	17,00
	30	3,3	41	21,6	32,00	53	22,7	27,00	65	23,8	23,50	77	24,8	21,50	89	25,9	19,50
Inside temperature ϑ_i 20,00 °C	10	10,0	54	24,8	18,00	73	26,4	14,50	91	28,0	13,00	109	29,6	11,50	127	31,2	10,50
	15	6,7	49	24,3	22,00	65	25,8	18,00	82	27,2	16,00	98	28,7	14,00	115	30,1	13,00
	20	5,0	44	23,9	26,00	59	25,2	21,55	74	26,5	19,00	89	27,8	16,50	103	29,2	15,00
	25	4,0	40	23,5	30,50	53	24,7	25,00	67	25,9	21,50	80	27,1	19,50	93	28,3	17,50
	30	3,3	36	23,2	34,50	48	24,3	28,50	60	25,3	25,00	72	26,4	22,00	85	27,5	20,50
Inside temperature ϑ_i 22,00 °C	10	10,0	47	26,2	19,50	65	27,8	15,50	83	29,4	13,50	102	31,0	12,00	120	32,6	10,50
	15	6,7	43	25,8	24,00	59	27,2	19,50	75	28,7	17,00	92	30,1	15,00	108	31,6	13,50
	20	5,0	38	25,4	28,50	53	26,7	23,00	68	28,0	20,00	83	29,3	17,50	98	30,6	16,00
	25	4,0	35	25,1	33,00	48	26,3	27,00	61	27,4	23,00	75	28,6	20,50	88	29,8	18,50
	30	3,3	31	24,8	37,50	43	25,8	30,50	56	26,9	26,00	68	28,0	23,00	80	29,1	21,00
Inside temperature ϑ_i 24,00 °C	10	10,0	40	27,5	21,50	58	29,1	17,00	76	30,7	14,50	94	32,3	12,50	112	34,0	11,00
	15	6,7	36	27,2	26,50	52	28,6	21,00	69	30,1	17,50	85	31,5	15,50	101	33,0	14,00
	20	5,0	33	26,9	32,00	47	28,2	25,00	62	29,5	21,00	77	30,8	18,50	92	32,1	16,00
	25	4,0	29	26,6	36,50	43	27,8	28,50	56	29,0	24,50	69	30,1	21,00	83	31,3	19,00
	30	3,3	27	26,4	40,00	39	27,4	33,00	51	28,5	28,00	63	29,6	24,00	75	30,6	21,50

Thermal resistance of the floor covering R_λ = 0,15 m² K/W (screed pipe covering with 45 mm)

Thermal resistance of the floor covering R_λ = 0,15 m² K/W Carpet spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 16 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA (cm)	L (m/m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)
Inside temperature ϑ_i 15,00 °C	10	10,0	60	20,3	16,50	76	21,7	14,50	91	23,0	13,00	106	24,4	11,50	121	25,7	10,50
	15	6,7	55	19,9	20,00	69	21,1	17,50	83	22,3	15,50	97	23,6	14,00	111	24,8	13,00
	20	5,0	51	19,5	24,00	63	20,6	20,50	76	21,7	18,50	88	22,8	17,00	101	23,9	15,50
	25	4,0	46	19,1	27,00	58	20,1	23,50	69	21,1	21,50	81	22,2	19,50	93	23,2	17,50
	30	3,3	42	18,8	31,00	53	19,7	26,50	64	20,6	24,00	74	21,6	22,00	85	22,5	20,00
Inside temperature ϑ_i 18,00 °C	10	10,0	51	22,5	18,50	66	23,9	15,50	82	25,2	14,00	97	26,6	12,50	112	27,9	11,00
	15	6,7	47	22,2	22,50	61	23,4	19,00	75	24,6	17,00	88	25,8	15,00	102	27,0	13,50
	20	5,0	43	21,8	26,50	56	22,9	22,50	68	24,0	20,00	81	25,2	18,00	94	26,3	16,00
	25	4,0	39	21,5	30,00	51	22,5	25,50	62	23,5	22,50	74	24,6	20,50	86	25,6	18,50
	30	3,3	36	21,2	34,00	47	22,1	29,00	57	23,1	26,00	68	24,0	23,50	78	24,9	21,00
Inside temperature ϑ_i 20,00 °C	10	10,0	45	24,0	19,50	60	25,3	16,50	76	26,7	14,50	91	28,0	13,00	106	29,4	11,50
	15	6,7	41	23,7	24,00	55	24,9	20,50	69	26,1	17,50	83	27,3	15,50	97	28,6	14,00
	20	5,0	38	23,4	28,50	51	24,5	24,00	63	25,6	21,00	76	26,7	18,50	88	27,8	17,00
	25	4,0	35	23,1	32,50	46	24,1	27,50	58	25,1	24,00	69	26,1	21,50	81	27,2	19,50
	30	3,3	32	22,8	37,00	42	23,8	31,00	53	24,7	27,00	64	25,6	24,50	74	26,6	22,00
Inside temperature ϑ_i 22,00 °C	10	10,0	39	25,5	21,50	54	26,8	17,50	70	28,2	15,50	85	29,5	13,50	100	30,8	12,00
	15	6,7	36	25,2	26,50	50	26,4	21,50	64	27,6	18,50	77	28,8	16,50	91	30,1	14,50
	20	5,0	33	24,9	31,00	45	26,0	25,50	58	27,1	22,00	71	28,3	19,00	83	29,4	17,50
	25	4,0	30	24,7	36,00	42	25,7	29,00	53	26,7	25,50	65	27,7	22,00	76	28,8	20,00
	30	3,3	28	24,4	40,00	38	25,4	33,00	49	26,3	28,50	59	27,3	25,50	70	28,2	23,00
Inside temperature ϑ_i 24,00 °C	10	10,0	33	26,9	24,50	48	28,3	19,00	63	29,6	16,00	79	31,0	14,00	94	32,3	12,50
	15	6,7	30	26,7	30,00	44	27,9	23,50	58	29,1	19,50	72	30,4	17,00	86	31,6	15,50
	20	5,0	28	26,5	35,00	40	27,6	27,50	53	28,7	23,50	66	29,8	20,00	78	30,9	18,00
	25	4,0	25	26,3	40,00	37	27,3	31,00	49	28,3	26,50	60	29,3	23,00	72	30,3	21,00
	30	3,3	23	26,1	40,00	34	27,0	35,50	45	27,9	30,50	55	28,9	26,50	66	29,8	23,50

Roth Knob System performance data ø 17 mm

Thermal resistance of the floor covering R_λ = 0,00 m² K/W (screed pipe covering with 30 mm)

Thermal resistance of the floor covering R_λ = 0,00 m² K/W Ceramic covering spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 17 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA	L	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR
	(cm)	(m/m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)
Inside temperature ϑi 15,00 °C	10	10,0	134	26,9	15,00	168	29,9	13,00	201	32,8	7,50	235	35,8	7,00	269	38,8	6,50
	15	6,7	116	25,2	19,50	144	27,8	17,00	173	30,3	9,50	202	32,9	8,50	231	35,4	8,00
	20	5,0	100	23,8	24,00	125	26,0	20,50	149	28,2	11,50	174	30,4	10,50	199	32,6	10,00
	25	4,0	86	22,6	28,50	107	24,5	24,50	129	26,4	14,00	150	28,3	12,50	172	30,2	11,50
	30	3,3	74	21,6	33,50	93	23,2	29,00	112	24,9	16,50	130	26,5	15,00	149	28,2	14,00
Inside temperature ϑi 18,00 °C	10	10,0	114	28,1	17,00	148	31,1	14,50	181	34,0	8,00	215	37,0	7,50	248	40,0	6,50
	15	6,7	98	26,7	21,50	127	29,2	18,50	156	31,8	10,00	185	34,4	9,00	214	36,9	8,50
	20	5,0	85	25,5	26,50	110	27,7	22,50	135	29,9	12,50	159	32,1	11,00	184	34,3	10,50
	25	4,0	73	24,5	31,50	95	26,4	26,50	116	28,3	15,00	138	30,2	13,50	159	32,1	12,50
	30	3,3	63	23,6	37,00	82	25,2	31,00	100	26,9	17,50	119	28,5	15,50	138	30,2	14,50
Inside temperature ϑi 20,00 °C	10	10,0	101	28,9	18,50	134	31,9	15,00	168	34,9	8,50	201	37,8	7,50	235	40,8	7,00
	15	6,7	87	27,7	23,50	116	30,2	19,50	144	32,8	11,00	173	35,3	9,50	202	37,9	9,00
	20	5,0	75	26,6	28,50	100	28,8	23,50	125	31,0	13,00	149	33,2	11,50	174	35,4	10,50
	25	4,0	64	25,7	34,00	86	27,6	28,00	107	29,5	15,50	129	31,4	14,00	150	33,3	12,50
	30	3,3	56	24,9	40,00	74	26,6	33,00	93	28,2	18,50	112	29,9	16,50	130	31,5	15,00
Inside temperature ϑi 22,00 °C	10	10,0	87	29,7	20,00	121	32,7	16,00	154	35,7	9,00	188	38,6	8,00	222	41,6	7,00
	15	6,7	75	28,6	25,50	104	31,2	21,00	133	33,8	11,50	162	36,3	10,00	191	38,9	9,00
	20	5,0	65	27,7	31,00	90	29,9	25,50	115	32,1	14,00	139	34,3	12,50	164	36,5	11,00
	25	4,0	56	26,9	37,00	77	28,8	30,00	99	30,7	16,50	120	32,7	14,50	142	34,6	13,00
	30	3,3	48	26,3	40,00	67	27,9	35,50	85	29,6	19,50	104	31,2	17,00	123	32,9	15,50
Inside temperature ϑi 24,00 °C	10	10,0	74	30,5	22,50	107	33,5	17,50	141	36,5	9,50	175	39,4	8,00	208	42,4	7,50
	15	6,7	64	29,6	28,50	92	32,2	22,20	121	34,7	12,00	150	37,3	10,50	179	39,8	9,50
	20	5,0	55	28,8	34,50	80	31,1	27,50	105	33,3	14,50	130	35,5	13,00	154	37,7	11,50
	25	4,0	47	28,2	40,00	69	30,1	32,50	90	32,0	17,50	112	33,9	15,50	133	35,8	13,50
	30	3,3	41	27,6	40,00	59	29,3	38,00	78	30,9	20,50	97	32,6	18,00	115	34,2	16,00

Thermal resistance of the floor covering R_λ = 0,05 m² K/W (screed pipe covering with 30 mm)

Thermal resistance of the floor covering R_λ = 0,05 m² K/W Plastic spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 17 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA	L	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR
	(cm)	(m/m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)
Inside temperature ϑi 15,00 °C	10	10,0	98	23,7	18,50	122	25,8	16,50	147	28,0	9,00	171	30,2	8,50	196	32,3	7,50
	15	6,7	86	22,6	23,50	108	24,6	20,00	130	26,5	11,50	151	28,4	10,50	173	30,3	9,50
	20	5,0	76	21,8	28,00	95	23,4	24,50	115	25,1	14,00	134	26,8	12,50	153	28,5	11,50
	25	4,0	67	21,0	33,00	84	22,5	28,50	101	23,9	16,00	118	25,4	15,00	135	26,9	13,50
	30	3,3	60	20,3	38,50	75	21,6	33,00	89	22,9	19,00	104	24,2	17,00	119	25,6	15,50
Inside temperature ϑi 18,00 °C	10	10,0	83	25,4	20,50	108	27,5	17,50	132	29,7	10,00	157	31,9	9,00	181	34,0	8,00
	15	6,7	73	24,5	26,00	95	26,4	22,00	117	28,3	12,50	138	30,2	11,00	160	32,2	10,00
	20	5,0	65	23,7	31,50	84	25,4	26,50	103	27,1	15,00	122	28,8	13,50	141	30,5	12,00
	25	4,0	57	23,1	36,50	74	24,6	31,00	91	26,0	17,50	108	27,5	15,50	125	29,0	14,50
	30	3,3	51	22,5	40,00	66	23,8	36,00	80	25,1	20,00	95	26,4	18,00	110	27,8	16,50
Inside temperature ϑi 20,00 °C	10	10,0	73	26,5	22,50	98	28,7	18,50	122	30,8	10,50	147	33,0	9,50	171	35,2	8,50
	15	6,7	65	25,7	28,00	86	27,6	23,50	108	29,6	13,00	130	31,5	11,50	151	33,4	10,50
	20	5,0	57	25,1	34,00	76	26,8	28,00	95	28,4	15,50	115	30,1	14,00	134	31,8	12,50
	25	4,0	51	24,5	40,00	67	26,0	33,00	84	27,5	18,00	101	28,9	16,00	118	30,4	15,00
	30	3,3	45	24,0	40,00	60	25,3	38,00	75	26,6	21,00	89	27,9	19,00	104	29,2	17,00
Inside temperature ϑi 22,00 °C	10	10,0	64	27,6	24,50	88	29,8	20,00	113	32,0	11,00	137	34,1	9,50	162	36,3	8,50
	15	6,7	56	27,0	31,00	78	28,9	25,00	99	30,8	13,50	121	32,7	12,00	143	34,6	11,00
	20	5,0	50	26,4	37,00	69	28,1	30,00	88	29,8	16,50	107	31,5	14,50	126	33,1	13,00
	25	4,0	44	25,9	40,00	61	27,4	35,50	77	28,9	19,00	94	30,3	17,00	111	31,8	15,50
	30	3,3	39	25,4	40,00	54	26,7	40,00	69	28,1	22,50	83	29,4	19,50	98	30,7	17,50
Inside temperature ϑi 24,00 °C	10	10,0	54	28,8	27,00	78	30,9	21,50	103	33,1	11,50	127	35,3	10,00	152	37,4	9,00
	15	6,7	48	28,2	34,00	69	30,1	27,00	91	32,0	14,50	112	33,9	12,50	134	35,9	11,00
	20	5,0	42	27,7	40,00	61	29,4	32,50	80	31,1	17,50	99	32,8	15,00	118	34,5	13,50
	25	4,0	37	27,3	40,00	54	28,8	38,00	71	30,3	20,50	88	31,7	18,00	104	33,2	16,00
	30	3,3	33	26,9	40,00	48	28,2	40,00	63	29,5	23,50	78	30,9	20,50	92	32,2	18,50

Roth Knob System performance data ø 17 mm

Thermal resistance of the floor covering R_λ = 0,10 m² K/W (screed pipe covering with 30 mm)

Thermal resistance of the floor covering R_λ = 0,10 m² K/W Parquet/carpet spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 17 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA (cm)	L (m/m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)
Inside temperature ϑ_i 15,00 °C	10	10,0	77	21,8	22,00	96	23,5	19,00	115	25,2	11,00	135	26,9	9,50	154	28,6	9,00
	15	6,7	69	21,1	27,00	86	22,6	23,50	104	24,2	13,00	121	25,7	12,00	138	27,2	11,00
	20	5,0	62	20,5	32,00	78	21,9	28,00	93	23,3	15,50	109	24,6	14,50	125	26,0	13,00
	25	4,0	56	19,9	37,00	70	21,2	32,50	84	22,4	18,50	98	23,6	17,00	111	24,9	15,50
	30	3,3	51	19,5	40,00	63	20,6	37,00	76	21,7	21,00	89	22,8	19,00	101	24,0	17,50
Inside temperature ϑ_i 18,00 °C	10	10,0	65	23,8	24,00	85	25,5	20,50	104	27,2	11,50	123	28,9	10,50	142	30,6	9,50
	15	6,7	59	23,2	30,00	76	24,7	25,00	93	26,3	14,00	111	27,8	13,00	128	29,3	12,00
	20	5,0	53	22,7	35,50	69	24,1	30,00	84	25,4	17,00	100	26,8	15,50	115	28,2	14,00
	25	4,0	47	22,2	40,00	61	23,4	35,00	75	24,7	19,50	89	25,9	18,00	103	27,1	16,00
	30	3,3	43	21,8	40,00	56	22,9	40,00	68	24,0	22,50	81	25,2	20,50	94	26,3	18,50
Inside temperature ϑ_i 20,00 °C	10	10,0	58	25,1	26,00	77	26,8	21,50	96	28,5	12,00	115	30,2	11,00	135	31,9	10,00
	15	6,7	52	24,6	32,50	69	26,1	27,00	86	27,6	15,00	104	29,2	13,50	121	30,7	12,00
	20	5,0	47	24,1	38,50	62	25,5	32,00	78	26,9	17,50	93	28,3	16,00	109	29,6	14,50
	25	4,0	42	23,7	40,00	56	24,9	37,00	70	26,2	20,50	84	27,4	18,50	98	28,6	17,00
	30	3,3	38	23,4	40,00	51	24,5	40,00	63	25,6	23,50	76	26,7	21,50	89	27,8	19,50
Inside temperature ϑ_i 22,00 °C	10	10,0	50	26,4	28,50	69	28,1	23,50	88	29,8	12,50	108	31,5	11,50	127	33,2	10,50
	15	6,7	45	26,0	35,50	62	27,5	28,50	80	29,0	15,50	97	30,6	14,00	114	32,1	12,50
	20	5,0	40	25,6	40,00	56	27,0	34,00	72	28,3	18,50	87	29,7	16,50	103	31,1	15,00
	25	4,0	36	25,2	40,00	50	26,4	39,50	64	27,7	21,50	78	28,9	19,50	92	30,1	17,50
	30	3,3	33	24,9	40,00	46	26,0	40,00	58	27,1	25,00	71	28,3	22,00	83	29,4	20,00
Inside temperature ϑ_i 24,00 °C	10	10,0	42	27,7	32,00	61	29,4	25,00	81	31,1	13,50	100	32,8	12,00	119	34,5	10,50
	15	6,7	38	27,4	39,00	55	28,9	30,50	73	30,4	16,50	90	32,0	14,50	107	33,5	13,00
	20	5,0	34	27,0	40,00	50	28,4	36,50	65	29,8	19,50	81	31,2	17,50	97	32,5	15,50
	25	4,0	31	26,7	40,00	45	27,9	40,00	59	29,2	23,00	72	30,4	20,50	86	31,6	18,50
	30	3,3	28	26,5	40,00	40	27,6	40,00	53	28,7	26,00	66	29,8	23,50	78	30,9	21,00

Thermal resistance of the floor covering R_λ = 0,15 m² K/W (screed pipe covering with 30 mm)

Thermal resistance of the floor covering R_λ = 0,15 m² K/W Carpet spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 17 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA (cm)	L (m/m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)
Inside temperature ϑ_i 15,00 °C	10	10,0	64	20,6	24,50	79	22,0	21,00	95	23,4	12,00	111	24,8	11,00	127	26,2	10,00
	15	6,7	58	20,1	30,00	72	21,4	26,00	87	22,7	15,00	101	24,0	13,50	116	25,3	12,50
	20	5,0	53	19,7	35,50	66	20,9	31,00	79	22,0	17,50	93	23,2	15,50	106	24,4	14,50
	25	4,0	48	19,3	40,00	60	20,3	35,50	72	21,4	20,00	85	22,5	18,00	97	23,6	16,50
	30	3,3	44	18,9	40,00	55	19,9	40,00	66	20,9	23,00	77	21,8	20,50	88	22,8	19,00
Inside temperature ϑ_i 18,00 °C	10	10,0	54	22,8	27,00	70	24,2	23,00	86	25,6	13,00	102	27,0	11,50	118	28,4	10,50
	15	6,7	49	22,4	33,50	64	23,6	28,50	78	24,9	16,00	93	26,2	14,50	107	27,5	13,00
	20	5,0	45	22,0	39,00	58	23,2	33,50	71	24,3	18,50	85	25,5	17,00	98	26,7	15,50
	25	4,0	41	21,6	40,00	53	22,7	38,00	65	23,8	21,50	77	24,8	19,00	89	25,9	17,50
	30	3,3	38	21,3	40,00	49	22,3	40,00	60	23,3	24,50	71	24,3	22,00	82	25,2	20,00
Inside temperature ϑ_i 20,00 °C	10	10,0	48	24,2	29,50	64	25,6	24,50	79	27,0	13,50	95	28,4	12,00	111	29,8	11,00
	15	6,7	43	23,8	35,50	58	25,1	30,00	72	26,4	16,50	87	27,7	15,00	101	29,0	13,50
	20	5,0	40	23,5	40,00	53	24,7	35,50	66	25,9	19,50	79	27,0	17,50	93	28,2	16,00
	25	4,0	36	23,2	40,00	48	24,3	40,00	60	25,3	22,50	72	26,4	20,00	85	27,5	18,00
	30	3,3	33	22,9	40,00	44	23,9	40,00	55	24,9	25,50	66	25,9	22,50	77	26,8	20,50
Inside temperature ϑ_i 22,00 °C	10	10,0	41	25,7	32,00	57	27,1	26,00	73	28,5	14,50	89	29,9	12,50	105	31,3	11,50
	15	6,7	38	25,3	39,00	52	26,6	32,00	67	27,9	17,50	81	29,2	15,50	96	30,5	14,00
	20	5,0	34	25,0	40,00	48	26,2	38,00	61	27,4	20,50	74	28,6	18,50	87	29,7	16,50
	25	4,0	31	24,8	40,00	43	25,8	40,00	56	26,9	24,00	68	28,0	21,00	80	29,1	19,00
	30	3,3	29	24,5	40,00	40	25,5	40,00	51	26,5	27,00	62	27,5	24,00	73	28,4	21,50
Inside temperature ϑ_i 24,00 °C	10	10,0	35	27,1	35,50	51	28,5	28,00	67	29,9	15,00	83	31,3	13,00	98	32,7	12,00
	15	6,7	32	26,8	39,00	46	28,1	34,50	61	29,4	18,50	75	30,7	16,50	90	32,0	14,50
	20	5,0	29	26,6	40,00	42	27,7	40,00	56	28,9	22,00	69	30,1	19,00	82	31,3	17,00
	25	4,0	27	26,4	40,00	39	27,4	40,00	51	28,5	25,00	63	29,6	22,00	75	30,6	19,50
	30	3,3	24	26,1	40,00	35	27,1	40,00	46	28,1	28,50	57	29,1	25,00	68	30,1	22,50

Roth Knob System performance data ø 17 mm

Thermal resistance of the floor covering R_λ = 0,00 m² K/W (screed pipe covering with 45 mm)

Thermal resistance of the floor covering R_λ = 0,00 m² K/W Ceramic covering spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 17 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA	L	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR
	(cm)	(m/m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)
Inside temperature ϑi 15,00 °C	10	10,0	123	25,9	10,50	153	28,6	9,00	9,00	15,8	8,00	215	34,0	7,50	245	36,7	6,50
	15	6,7	106	24,4	13,50	133	26,8	11,50	11,50	16,0	10,50	186	31,5	9,50	213	33,8	8,50
	20	5,0	93	23,2	16,50	116	25,2	14,00	14,00	16,2	12,50	162	29,3	11,50	185	31,4	10,50
	25	4,0	81	22,1	19,50	101	23,9	17,00	17,00	16,5	15,00	141	27,5	13,50	161	29,3	12,50
	30	3,3	70	21,2	22,50	88	22,8	19,50	19,50	16,7	17,50	123	25,9	16,00	140	27,4	14,50
Inside temperature ϑi 18,00 °C	10	10,0	104	27,2	11,50	135	29,9	10,00	10,00	18,9	8,50	196	35,4	7,50	227	38,1	7,00
	15	6,7	90	26,0	14,50	117	28,4	12,50	12,50	19,1	11,00	170	33,1	10,00	197	35,4	9,00
	20	5,0	79	25,0	18,00	102	27,0	15,50	15,50	19,4	13,50	148	31,1	12,00	171	33,2	11,00
	25	4,0	68	24,1	21,50	89	25,8	18,50	18,50	19,6	16,00	129	29,4	14,50	149	31,2	13,00
	30	3,3	60	23,3	25,50	77	24,8	21,50	21,50	19,9	18,50	112	27,9	17,00	130	29,5	15,00
Inside temperature ϑi 20,00 °C	10	10,0	92	28,1	12,50	123	30,9	10,50	10,50	20,9	9,00	184	36,3	8,00	215	39,0	7,50
	15	6,7	80	27,1	16,00	106	29,4	13,50	13,50	21,2	11,50	160	34,1	10,50	186	36,5	9,50
	20	5,0	69	26,1	19,50	93	28,2	16,50	16,50	21,5	14,00	139	32,3	12,50	162	34,3	11,50
	25	4,0	60	25,3	23,50	81	27,1	19,50	19,50	21,7	17,00	121	30,7	15,00	141	32,5	13,50
	30	3,3	53	24,7	27,50	70	26,2	23,00	23,00	22,0	20,00	105	29,3	17,50	123	30,9	16,00
Inside temperature ϑi 22,00 °C	10	10,0	80	29,1	13,50	110	31,8	11,00	11,00	23,0	9,50	172	37,2	8,50	203	39,9	7,50
	15	6,7	69	28,1	17,50	96	30,5	14,00	14,00	23,2	12,50	149	35,2	11,00	176	37,5	9,50
	20	5,0	60	27,3	21,50	83	29,4	17,50	17,50	23,5	15,00	130	33,5	13,00	153	35,5	12,00
	25	4,0	52	26,6	25,50	72	28,4	21,00	21,00	23,9	18,00	113	32,0	16,00	133	33,8	14,00
	30	3,3	46	26,0	30,00	63	27,6	24,50	24,50	24,2	21,00	98	30,7	18,50	116	32,2	16,50
Inside temperature ϑi 24,00 °C	10	10,0	68	30,0	15,00	98	32,7	12,00	12,00	25,1	10,00	160	38,1	9,00	190	40,8	8,00
	15	6,7	59	29,2	19,50	85	31,5	15,50	15,50	25,4	13,00	138	36,2	11,50	165	38,6	10,00
	20	5,0	51	28,5	24,00	74	30,6	19,00	19,00	25,7	16,00	120	34,7	14,00	143	36,7	12,50
	25	4,0	44	27,9	28,50	64	29,7	22,50	22,50	26,0	19,00	105	33,3	16,50	125	35,0	14,50
	30	3,3	39	27,4	33,00	56	29,0	26,50	26,50	26,3	22,00	91	32,1	19,00	109	33,6	17,00

Thermal resistance of the floor covering R_λ = 0,05 m² K/W (screed pipe covering with 45 mm)

Thermal resistance of the floor covering R_λ = 0,05 m² K/W Plastic spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 17 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA	L	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR	$\dot{q}$		AHKR
	(cm)	(m/m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)	(W/m²)	(°C)	(m²)
Inside temperature ϑi 15,00 °C	10	10,0	91	23,1	12,50	114	25,1	11,00	137	27,1	10,00	159	29,1	9,00	182	31,1	8,00
	15	6,7	81	22,2	16,00	101	23,9	14,00	121	25,7	12,50	142	27,5	11,00	162	29,3	10,50
	20	5,0	72	21,4	19,00	90	23,0	16,50	108	24,5	15,00	126	26,1	13,50	144	27,7	12,50
	25	4,0	64	20,7	22,50	80	22,1	19,50	96	23,5	17,50	112	24,9	16,00	128	26,3	14,50
	30	3,3	57	20,0	26,00	71	21,3	22,50	85	22,6	20,00	100	23,8	18,50	114	25,1	16,50
Inside temperature ϑi 18,00 °C	10	10,0	77	24,9	14,00	100	26,9	12,00	123	28,9	10,50	146	30,9	9,50	169	32,9	8,50
	15	6,7	69	24,1	17,50	89	25,9	15,00	109	27,7	13,00	129	29,5	12,00	150	31,2	11,00
	20	5,0	61	23,4	21,50	79	25,0	18,00	97	26,6	16,00	115	28,2	14,00	133	29,8	13,00
	25	4,0	54	22,8	25,00	70	24,2	21,00	86	25,6	18,50	102	27,1	17,00	118	28,5	15,00
	30	3,3	48	22,3	29,00	63	23,5	24,50	77	24,8	21,50	91	26,1	19,50	105	27,3	18,00
Inside temperature ϑi 20,00 °C	10	10,0	68	26,0	15,50	91	28,1	12,50	114	30,1	11,00	137	32,1	10,00	159	34,1	9,00
	15	6,7	61	25,4	19,00	81	27,2	16,00	101	28,9	14,00	121	30,7	12,50	142	32,5	11,00
	20	5,0	54	24,8	23,00	72	26,4	19,50	90	28,0	16,50	108	29,5	15,00	126	31,1	13,50
	25	4,0	48	24,2	27,00	64	25,7	22,50	80	27,1	19,50	96	28,5	17,50	112	29,9	15,50
	30	3,3	43	23,8	31,50	57	25,0	26,00	71	26,3	22,50	85	27,6	20,00	100	28,8	18,00
Inside temperature ϑi 22,00 °C	10	10,0	59	27,2	16,50	82	29,3	13,50	105	31,3	11,50	128	33,3	10,50	150	35,3	9,00
	15	6,7	53	26,7	21,00	73	28,4	17,00	93	30,2	14,50	113	32,0	13,00	133	33,8	11,50
	20	5,0	47	26,1	25,00	65	27,7	20,50	83	29,3	17,50	101	30,9	15,50	119	32,5	14,00
	25	4,0	42	25,7	30,00	58	27,1	24,00	74	28,5	20,50	90	29,9	18,00	106	31,3	16,50
	30	3,3	37	25,3	34,50	51	26,5	28,00	66	27,8	24,00	80	29,1	21,00	94	30,3	19,00
Inside temperature ϑi 24,00 °C	10	10,0	50	28,4	18,50	73	30,4	14,50	96	32,5	12,50	118	34,5	11,00	141	36,5	9,50
	15	6,7	44	27,9	23,50	65	29,7	18,50	85	31,5	15,50	105	33,3	13,00	125	35,1	12,00
	20	5,0	40	27,5	28,00	58	29,1	22,00	76	30,7	18,50	94	32,3	16,50	111	33,9	14,50
	25	4,0	35	27,1	33,00	51	28,5	26,00	67	29,9	22,00	83	31,4	19,00	99	32,8	17,00
	30	3,3	31	26,8	38,00	46	28,0	30,00	60	29,3	25,50	74	30,6	22,00	88	31,8	20,00

Roth Knob System performance data ø 17 mm

Thermal resistance of the floor covering R_λ = 0,10 m² K/W (screed pipe covering with 45 mm)

Thermal resistance of the floor covering R_λ = 0,10 m² K/W Parquet/carpet spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 17 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA (cm)	L (m/m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)
Inside temperature ϑ_i 15,00 °C	10	10,0	73	21,4	14,50	91	23,0	13,00	109	24,6	11,50	127	26,2	10,50	145	27,9	9,50
	15	6,7	66	20,8	18,50	82	22,3	16,00	99	23,7	14,00	115	25,2	13,00	131	26,6	12,00
	20	5,0	59	20,3	21,50	74	21,6	19,00	89	22,9	17,00	104	24,2	15,50	119	25,5	14,00
	25	4,0	54	19,8	25,00	67	21,0	22,00	81	22,2	19,50	94	23,3	17,50	108	24,5	16,00
	30	3,3	49	19,3	29,00	61	20,4	25,00	73	21,5	22,50	85	22,6	20,00	98	23,6	18,50
Inside temperature ϑ_i 18,00 °C	10	10,0	62	23,5	16,50	80	25,1	14,00	98	26,7	12,50	116	28,3	11,00	134	29,9	10,00
	15	6,7	56	22,9	20,00	72	24,4	17,00	89	25,9	15,00	105	27,3	13,50	122	28,8	12,50
	20	5,0	51	22,5	24,00	65	23,8	20,50	80	25,1	18,00	95	26,4	16,00	110	27,7	14,50
	25	4,0	46	22,1	28,00	59	23,2	24,00	73	24,4	21,00	86	25,6	18,50	100	26,8	17,00
	30	3,3	42	21,7	32,00	54	22,8	27,00	66	23,8	24,00	78	24,9	21,50	90	26,0	19,50
Inside temperature ϑ_i 20,00 °C	10	10,0	54	24,8	18,00	73	26,4	14,50	91	28,0	13,00	109	29,6	11,50	127	31,2	10,50
	15	6,7	49	24,4	22,00	66	25,8	18,50	82	27,3	16,00	99	28,7	14,00	115	30,2	13,00
	20	5,0	45	23,9	26,00	59	25,3	22,00	74	26,6	19,00	89	27,9	16,50	104	29,2	15,00
	25	4,0	40	23,6	30,50	54	24,8	25,50	67	26,0	22,00	81	27,2	19,50	94	28,3	17,50
	30	3,3	37	23,2	34,50	49	24,3	28,50	61	25,4	25,00	73	26,5	22,50	85	27,6	20,50
Inside temperature ϑ_i 22,00 °C	10	10,0	47	26,2	19,50	65	27,8	15,50	84	29,4	13,50	102	31,0	12,00	120	32,6	10,50
	15	6,7	43	25,8	24,00	59	27,2	19,50	76	28,7	17,00	92	30,1	15,00	108	31,6	13,50
	20	5,0	39	25,4	28,50	54	26,7	23,50	68	28,1	20,00	83	29,4	17,50	98	30,7	16,00
	25	4,0	35	25,1	33,00	49	26,3	27,00	62	27,5	23,00	75	28,7	20,50	89	29,9	18,50
	30	3,3	32	24,8	37,50	44	25,9	31,00	56	27,0	26,50	68	28,1	23,50	81	29,1	21,00
Inside temperature ϑ_i 24,00 °C	10	10,0	40	27,5	21,50	58	29,1	17,00	76	30,7	14,50	94	32,4	12,50	113	34,0	11,00
	15	6,7	36	27,2	26,50	53	28,7	21,00	69	30,1	18,00	85	31,6	15,50	102	33,0	14,00
	20	5,0	33	26,9	32,00	48	28,2	25,00	62	29,5	21,00	77	30,8	18,50	92	32,2	16,50
	25	4,0	30	26,6	37,00	43	27,8	29,00	57	29,0	24,50	70	30,2	21,50	84	31,4	19,50
	30	3,3	27	26,4	40,00	39	27,5	33,50	51	28,5	28,00	63	29,6	24,50	76	30,7	22,00

Thermal resistance of the floor covering R_λ = 0,15 m² K/W (screed pipe covering with 45 mm)

Thermal resistance of the floor covering R_λ = 0,15 m² K/W Carpet spread 12,5 K			Heating medium temperature 35,00 °C			Heating medium temperature 40,00 °C			Heating medium temperature 45,00 °C			Heating medium temperature 50,00 °C			Heating medium temperature 55,00 °C		
	Installation spacing	Heating pipe requirement Ø 17 mm	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area	maximum heat flux density	average surface temperature	maximum heating circuit area
	VA (cm)	L (m/m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)	$\dot{q}$ (W/m²)	(°C)	AHKR (m²)
Inside temperature ϑ_i 15,00 °C	10	10,0	60	20,4	16,50	76	21,7	14,50	91	23,0	13,00	106	24,4	11,50	121	25,7	10,50
	15	6,7	55	19,9	20,50	69	21,1	17,50	83	22,4	16,00	97	23,6	14,00	111	24,8	13,00
	20	5,0	51	19,5	24,00	64	20,6	21,00	76	21,7	18,50	89	22,9	17,00	102	24,0	15,50
	25	4,0	47	19,1	27,50	58	20,2	24,00	70	21,2	21,50	82	22,2	19,50	93	23,3	18,00
	30	3,3	43	18,8	31,50	54	19,7	27,50	64	20,7	24,50	75	21,6	22,00	86	22,6	20,00
Inside temperature ϑ_i 18,00 °C	10	10,0	51	22,5	18,50	67	23,9	15,50	82	25,2	14,00	97	26,6	12,50	112	27,9	11,00
	15	6,7	47	22,2	22,50	61	23,4	19,00	75	24,6	17,00	89	25,9	15,00	103	27,1	14,00
	20	5,0	43	21,8	26,50	56	22,9	22,50	69	24,1	20,00	81	25,2	18,00	94	26,3	16,00
	25	4,0	40	21,5	30,50	51	22,5	26,00	63	23,6	22,50	75	24,6	20,50	86	25,6	18,50
	30	3,3	36	21,2	35,00	47	22,2	29,50	58	23,1	26,00	68	24,1	23,50	79	25,0	21,00
Inside temperature ϑ_i 20,00 °C	10	10,0	45	24,0	20,00	60	25,4	16,50	76	26,7	14,50	91	28,0	13,00	106	29,4	11,50
	15	6,7	42	23,7	24,50	55	24,9	20,50	69	26,1	17,50	83	27,4	16,00	97	28,6	14,50
	20	5,0	38	23,4	29,00	51	24,5	24,00	64	25,6	21,00	76	26,7	18,50	89	27,9	17,00
	25	4,0	35	23,1	33,00	47	24,1	27,50	58	25,2	24,00	70	26,2	21,50	82	27,2	19,50
	30	3,3	32	22,8	38,00	43	23,8	31,50	54	24,7	27,00	64	25,7	24,50	75	26,6	22,00
Inside temperature ϑ_i 22,00 °C	10	10,0	39	25,5	22,00	54	26,8	17,50	70	28,2	15,50	85	29,5	13,50	100	30,8	12,00
	15	6,7	36	25,2	27,00	50	26,4	22,00	64	27,6	18,50	78	28,9	16,50	92	30,1	14,50
	20	5,0	33	24,9	32,00	46	26,0	26,00	58	27,2	22,00	71	28,3	19,50	84	29,4	17,50
	25	4,0	30	24,7	36,50	42	25,7	30,00	54	26,7	25,50	65	27,8	22,50	77	28,8	20,00
	30	3,3	28	24,5	40,00	39	25,4	34,00	49	26,4	29,00	60	27,3	25,50	71	28,2	23,00
Inside temperature ϑ_i 24,00 °C	10	10,0	33	26,9	24,50	48	28,3	19,00	64	29,6	16,00	79	31,0	14,00	94	32,3	12,50
	15	6,7	31	26,7	30,00	44	27,9	23,50	58	29,2	19,50	72	30,4	17,50	86	31,6	15,50
	20	5,0	28	26,5	35,00	41	27,6	27,50	53	28,7	23,50	66	29,8	20,50	79	31,0	18,50
	25	4,0	26	26,3	40,00	37	27,3	32,00	49	28,3	26,50	61	29,4	23,50	72	30,4	21,00
	30	3,3	24	26,1	40,00	34	27,0	36,00	45	28,0	30,50	56	28,9	26,50	66	29,9	24,00

Guarantee

Guarantees

The guarantees and warranty conditions apply to the Roth Knob System according to the warranty certificates enclosed with the products.

GUARANTEE DOCUMENT

Roth Floor Heating and Cooling Systems
Roth Pipe Installation Systems

1. Within 10 years from installation, yet no longer than 10 1/2 years after delivery of the system components, we will provide free product replacement of our choice, or repair and compensate for damage to the system components delivered by us if they are attributable to material defects or manufacturing faults.
Excluded from this are mechanical moving parts and products as well as electrical and electrically driven parts and products for which we provide the above-mentioned warranty within a period of 12 months from installation in cases of material defects or manufacturing faults.

2. Requirements for this guarantee are:

a. only system components belonging to the respective Roth radiant heating and cooling system/pipe installation system are used and fitted,
b. documented compliance of the planning, installation and operating instructions valid at the time of installation,
c. compliance with the standards and directives valid for these works and the applicable adjoining works in connection with the respective Roth radiant heating and cooling system/Roth pipe installation system,
d. that the installation company and the companies building and expanding the works are all recognised and approved specialist companies and these companies have provided confirmation on this certificate with their name and signature,
e. the immediate return of a copy of the completely filled out warranty certificate to us,
f. to immediately report damage and at the same time send the warranty certificate to us,
g. to raise the claim within the warranty period.

We are insured against claims from this promise by an extended public and product liability insurance policy with a sum insured of **Euro 5.000.000** for personal injury and material damage for each insured event.
The statutory consumer protection regulations remain unaffected by this warranty.

The above guarantee concerns:

Building _____

Builder _____

RADIANT HEATING AND COOLING SYSTEMS

- ☐ Roth Original Tacker® system
- ☐ Roth Knob System
- ☐ Roth ClimaComfort® TBS
- ☐ Roth ClimaComfort® Panel system
- ☐ Roth ClimaComfort® Compact system
- ☐ Roth pipefix system
- ☐ Roth industrial radiant heating
- ☐ Roth sport and sprung floor heating
- ☐ Roth outdoor panel heating

PIPE INSTALLATION SYSTEMS

- ☐ Roth radiator connecting system
- ☐ Roth drinking water system

The system components belonging to the respective Roth radiant heating and cooling system or to the respective Roth pipe installation system were fully supplied and fitted on the day of installation.

Radiant heating and cooling system:	m^2 installed area
Radiator connecting system:	number of radiator connections
Drinking water system:	number of point of use connections

Specialist heating company: _____
Signature | Stamp | Installation date

Installed/extended works: _____
Signature | Stamp | Completion date

_____
Signature | Stamp | Completion date

Commissioning: _____
Signature | Stamp | Commissioning date

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Notes

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Material No.: 1180002662 10710 B Subject to technical modifications.