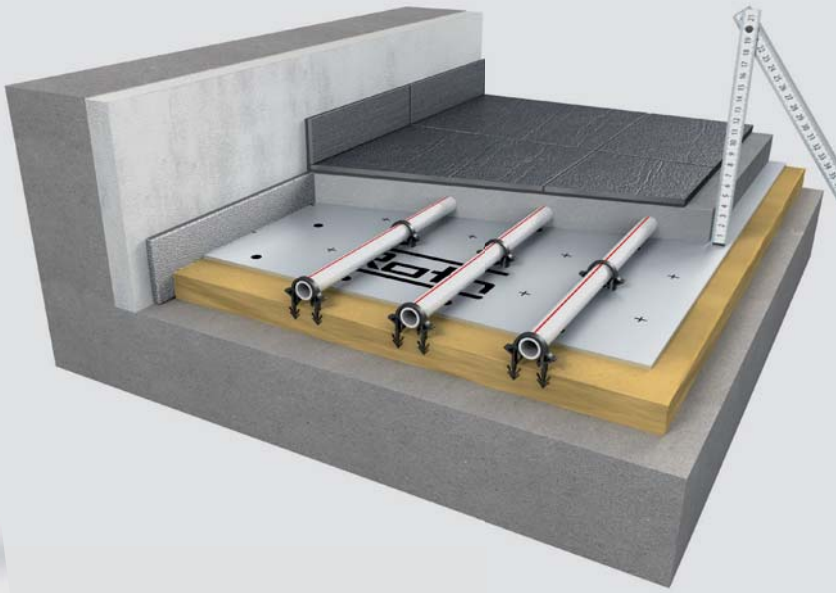
Energy Systems

Roth Flipfix Tacker System

Technical Information and Assembly Instructions



Living full of energy

Contents

System description

System description and system benefits

The Roth Flipfix Tacker System is suitable for use where insulation made of conventional EPS and PU materials and mineral insulation materials is installed on site.

The system is made up of the Roth Flipfix panel, Roth Original Tacker® E^X Clip and Roth System Pipes. The easy-to-install system is fitted using the tried-and-tested Roth Original Tacker® laying technique.

The two-millimetre-thick Roth Flipfix panel is available in prefabricated five-metre strips. It is folded down to a square metre in a practical zigzag pattern and requires less space and is easy to transport thanks to its compact dimensions.

The Flipfix panel is simply unfolded on the construction site.
The butt joints and the transitions to the edge insulating strip are connected using adhesive tape. This creates a closed insulation layer cover.
No other film to cover the insulation or to secure against floating is therefore required.
The elements can be cut using a commercially available cutter or scissors. Markings are printed in a five-centimetre grid to serve as a guide during installation.

The system is registered with DIN CERTCO under numbers 7F395-F and 7F400-F and is monitored.

DIN CERTCO
Gesellschaft für Konformitätsbewertung mbH

CERTIFICATE

Certificate holder	Roth Werke GmbH Am Seerain 35232 Dautphetal
Product	Water based surface embedded heating and cooling systems in floors, ceilings and walls
Type, Model	Flipfix Tacker-System 14
Testing basis	DIN EN 1264-2:2009-01 DIN EN 1264-4:2009-11 DIN EN 1264-5:2009-01 Certification scheme water based surface embedded heating and cooling systems (2009-11)
Mark of conformity	DIN Geprüft
Registration No.	7F395-F
Valid until	2018-03-31
Right of use	This certificate entitles the holder to use the mark of conformity shown above in conjunction with the specified registration number. See annex for further information.

DAkkS Deutsche Akkreditierungsstelle D-ZE-11125-01-00

2013-04-10
Dipl.-Ing P. Suxdorf
Managing Director

DIN CERTCO Gesellschaft für Konformitätsbewertung mbH · Alboinstraße 56 · D-12103 Berlin · www.dincertco.de

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Registration No.	7F400-F
Valid until	2018-03-31
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Possible applications

The Roth Flipfix system can be used in all building types envisaged in DIN EN 1264 – residential, office and commercial buildings, as well as other buildings used in the same way as residential buildings.

The 5 m² Flipfix panel allows the Roth Original Tacker® installation technique to be used on insulation layers already on site which are suitable for use beneath screeds.

System description

System components

The Flipfix panel serves as an insulation layer cover and prevents moisture penetration.
The impact sound insulation, compressibility and live load of the floor structure are not affected.

Flipfix panel

Roth uncoiler

Roth folding uncoiler

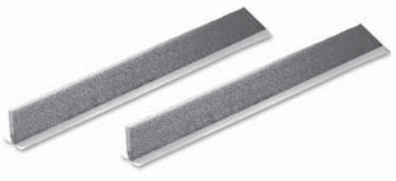
Roth Original Tacker® E^{X} Clip

Roth edge insulating strips 160 mm

Cement screed additive/
Cement screed additive plus

Roth antifreeze

Roth measuring point set



Roth expansion joint profile

System description

Roth pipe scissors

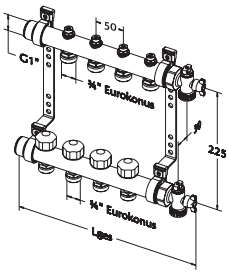
Roth calibration tool

Roth pipe cutter

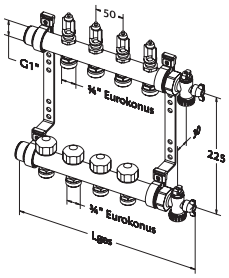
Roth knife

Roth Tacker 14

Roth Tacker 2.0



Roth universal manifold



Roth manifold with flow rate indicator, lockable

Technical data		
Manifold	**Total length in mm**	**Total width [mm]**
HC 2	245	75
HC 3	295	75
HC 4	345	75
HC 5	395	75
HC 6	445	75
HC 7	495	75
HC 8	545	75
HC 9	595	75
HC 10	645	75
HC 11	695	75
HC 12	745	75

Technical data		
Manifold	**Total length in mm**	**Total width [mm]**
HC 2	245	75
HC 3	295	75
HC 4	345	75
HC 5	395	75
HC 6	445	75
HC 7	495	75
HC 8	545	75
HC 9	595	75
HC 10	645	75
HC 11	695	75
HC 12	745	75

System description

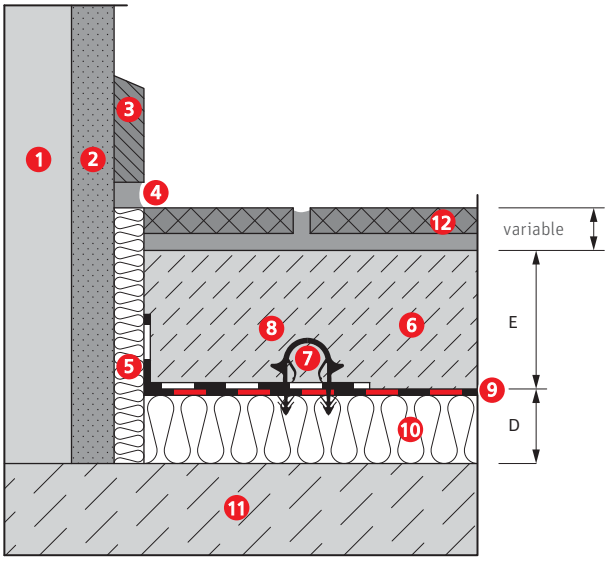
System Pipes DUOPEX S5®

System Pipes X-PERT S5®

System Pipes PERTEX® S5

Technical data			
Pipe dimension	Length delivered/ weight per PU	Length delivered/ weight per PU	Length delivered/ weight per PU
14	600 m/50 kg	240 m/21 kg 600 m/53 kg	–
16	–	200 m/21 kg 600 m/62 kg	–
17	200 m/22 kg 600 m/66 kg 3000 m/330 kg	200 m/22 kg 600 m/66 kg	200 m/23 kg 600 m/62 kg
Properties	very robust, very resilient	very flexible	flexible
Colour	light yellow pipe with red stripes	light yellow pipe with red stripes	white pipe
Pipe layers	5-layer pipe	5-layer pipe	5-layer pipe
Production process	S5 CoEx Technology	S5 CoEx Technology	S5 CoEx Technology
Thermal conductivity [W/mK]	0,35		
Linear elongation coefficient [1/K]	1,14 x 10^{-4}	1,95 x 10^{-4}	1,95 x 10^{-4}
Building material class	B2		
Min. bending radius	5 x da		
Pipe roughness [mm]	0,0003*		
Pipe dimension	Water capacity [l/m]		
11	–	–	–
14	0,079	0,079	–
16	–	0,11	–
17	0,13	0,13	0,13
Pipe markings	Length in metres, pipe designation, material, dimensions Manufacturer, pipe class Max. temperature (long term), oxygen tightness Any testing institute, date of manufacture Product number (manufacturer) Running metre details		
Max. temperature over long term [°C]	95	70	70
Max. temperature over short term [°C]	110	100	100
Max. pressure [bar]	6	6	6
Testing and certification basis	DIN 4726 DIN EN ISO 15875	DIN 4726 DIN EN ISO 22391	DIN 4726 DIN EN ISO 22391
Approval number	DIN CERTCO 3V203	DIN CERTCO 3V266	
Connection technology	Roth PPSU PressCheck® Roth MS PressCheck® Roth MS screw connector Roth Heating & Cooling (dim. 20 + 25 mm)	Roth PPSU PressCheck® Roth MS PressCheck® Roth MS screw connector Roth Heating & Cooling (dim. 20 mm)	Roth PPSU PressCheck® Roth MS PressCheck® Roth MS screw connector
Optimal installation temperature [°C]	>0	>0	>0
Permissible water additives	Roth antifreeze FKN 28		

Set-up and configuration



1. Wall
2. Plaster
3. Skirting board
4. Elastic grouting
5. Edge insulating strip
6. Screed in accordance with DIN 18560
7. Roth System Pipe Ø 14 - 17 mm
8. Roth Original Tacker E^X Clip
9. Roth Flipfix panel
10. On-site insulation
11. Load-bearing subsurface
12. Surface covering

	with screed depth E and 45 mm pipe coverage
Ø 14	65 mm
Ø 17	65 mm

When selecting insulation, the minimum requirements according to DIN EN 1264 must be considered.
Requirements resulting from EnEV are specified by the construction planner. The entire insulation structure is tailored to the building's specific requirements.

Possible insulation materials:
Soft insulation panels for thermal insulation with or without impact sound insulation which can be used beneath floating screeds:

- EPS DES
- EPS DEO
- Polyurethane (PUR)
- Mineral fibre insulation panels (e.g. Rockwool Floorrock SE)

The structure of the insulation must allow the Tacker clip to be anchored into it through the Flipfix panel with a normal amount of effort.

Solid wood fibre insulation panels are not suitable.

Performance data

DIN CERTCO registration numbers: 7F395-F and 7F400-F

Thermal output (q) = heating medium temperature ($\Delta\vartheta_H$) * increase in characteristic curve (K_H)

q: Thermal output of floor heating systems divided by effective surface
q_N: Specific standard thermal output of floor heating systems attained without floor covering
$\Delta\vartheta_H$: Logarithmic mean difference between heating medium temperature and inside temperature (temperature difference between heating medium and room)
$\Delta\vartheta_{H,N}$: Standard temperature difference between the heating medium and room for floor heating systems without floor covering
K_H: Increase in characteristic curve (equivalent thermal transmission coefficient)

Cooling output (q_C) = Cooling medium lower temperature ($\Delta\vartheta_C$) * increase in characteristic curve (K_C)

q_C: Cooling output of integrated cooling systems divided by effective surface
$q_{C,N}$: Specific standard cooling output of integrated cooling systems
$\Delta\vartheta_C$: Temperature difference between room and coolant for cooling systems
$\Delta\vartheta_{C,N}$: Standard temperature difference between room and coolant (set at 8 K)
K_C: Increase in characteristic curve (cooling)

Heating medium or coolant: Water

Test results Ø 14 mm

Heating characteristics for covering s_u = 45 mm — Characteristic curve $q_H = K_H \Delta\vartheta_H$

Pipe pitch T in mm	Specific standard thermal output $q_{H,N}$ in W/m²	Standard temperature difference $\Delta_{\vartheta H,N}$ in K	Increase in characteristic curve K_H in W/m²·K	Test report A No.	Test report A dated
100	97,7	15,4	6,344	13106003	08.03.2013
150	94,8	17,5	5,417	13106003	08.03.2013
200	90,9	19,4	4,686	13106003	08.03.2013
250	84,3	20,8	4,053	13106003	08.03.2013

Cooling characteristics for covering s_u = 45 mm — Characteristic curve $q_K = K_K \Delta\vartheta_K$

Pipe pitch T in mm	Specific standard cooling output $q_{K,N}$ in W/m²	Standard temperature difference $\Delta_{\vartheta H,N}$ in K	Increase in characteristic curve K_K in W/m²·K	Test report A No.	Test report A dated
100	35,4	8	4,423	13106003	08.03.2013
150	31,4	8	3,924	13106003	08.03.2013
200	27,9	8	3,491	13106003	08.03.2013
250	24,9	8	3,112	13106003	08.03.2013

Performance data

Test results Ø 17 mm

Heating characteristics for covering s_u = 45 mm Characteristic curve $q_H = K_H \Delta\vartheta_H$

Pipe pitch T in mm	Specific standard thermal output $q_{H,N}$ in W/m²	Standard temperature difference $\Delta_{\vartheta H,N}$ in K	Increase in characteristic curve K_H in W/m²·K	Test report A No.	Test report A dated
100	97,7	15,1	6,470	13106004	08.03.2013
150	94,6	16,9	5,598	13106004	08.03.2013
200	90,4	18,6	4,860	13106004	08.03.2013
250	83,7	19,9	4,206	13106004	08.03.2013
300	76,7	20,9	3,670	13106004	08.03.2013

Cooling characteristics for covering s_u = 45 mm Characteristic curve $q_K = K_K \Delta\vartheta_K$

Pipe pitch T in mm	Specific standard cooling output $q_{K,N}$ in W/m²	Standard temperature difference $\Delta_{\vartheta H,N}$ in K	Increase in characteristic curve K_K in W/m²·K	Test report A No.	Test report A dated
100	35,9	8	4,489	13106004	08.03.2013
150	32,1	8	4,016	13106004	08.03.2013
200	28,7	8	3,593	13106004	08.03.2013
250	25,7	8	3,212	13106004	08.03.2013

Heating medium upper temperature: $\Delta\vartheta_H = \dfrac{\vartheta_V - \vartheta_R}{\ln \dfrac{\vartheta_V - \vartheta_i}{\vartheta_R - \vartheta_i}}$ **or simplified:** $\Delta\vartheta_H = \dfrac{\vartheta_V + \vartheta_R}{2} - \vartheta_i$

Example: heating, 45 mm screed cover, system pipe: Ø 17

ϑ_V: Inlet temperature: = 40 °C (K)
ϑ_R: Return temperature: = 35 °C (K)
ϑ_i: Required room temperature: = 20 °C (K)
$\Delta_{\vartheta H}$: Calculated (from formula): = 17,4 K, simplified: 17,5 K
T: Installation spacing: 100 mm
K_H: Increase in characteristic curve from the table: 6,47 W/(m²K)
q = 17,4 K * 6,47 W/(m²K) = 113 W/m² (simplified: 113 W/m²)
Without floor covering $R_{\lambda B}$ = 0

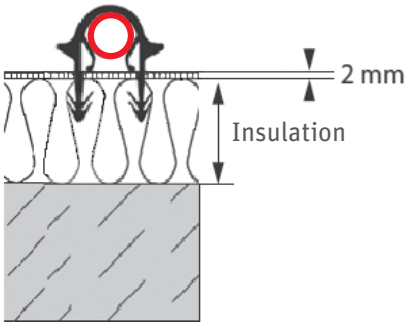
Installation requirements

Installation requirements

Before the heating engineer can start installing the Flipfix panels, the following requirements for the existing insulation must be met:

- The joint plan has been coordinated. Construction joints are taken into account in the insulation structure.
- The insulation layer is laid properly and meets 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.
- The edge insulating strip is attached to all rising components (walls, frames, supports and steps etc.).
- The PE film must be exposed so it can be laid on top of the Flipfix panel to serve as a seal against screed water.
- Particular care is required when using tile screeds. In this case, it must be ensured that the insulation layer cover and the edge connections are watertight.

Insulation panel thickness



Tacker clip	Minimum insulation panel thickness
Original Tacker E^Clip	20 mm
Original Tacker Clip 14	20 mm

Tools

We recommend using the following tools when installing the Roth Original Tacker® System:

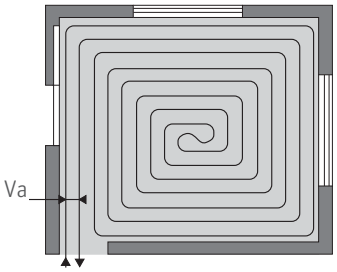
- Ruler or folding ruler
- Open-end spanner SW 30 mm for connecting Roth System Pipes to the Roth manifold • Open-end spanners SW 38 mm and 46 mm for assembling the Roth ball valve 1”
- Open-end spanners SW 27 mm and 30 mm for Roth brass fittings 14 mm, 16 mm, 17 mm or 20 mm
- Cutter or scissors
- Roth pipe uncoiler
- Calibration tool

Installation requirements

Installation information

When installing the Roth System Pipes, it must be ensured that the smallest bend radius of 5 x da (external diameter) of the system pipe is not exceeded.
The Roth System Pipes must not be installed on subsurfaces with sharp edges.
The system pipes should be secured with the PE protective pipe, e.g. when passing through wall and ceiling areas.

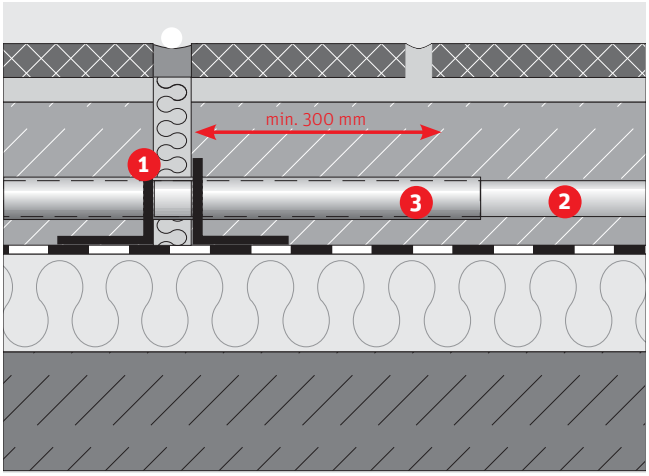
We recommend the spiral installation method.



Spiral
pipe layout
Va = installation spacing

When connecting the Roth System Pipes to the Roth heating circuit manifolds, bend degree supports are used to protect the pipes in the deflection area.
The heating circuits are installed in continuous loops.

Connections in the screed must be avoided.
However, if it becomes necessary to install a Roth brass fitting or Roth plastic fitting in the event of a repair, it must be ensured that these are fitted in an unbent pipe length. The fittings are protected against contact with the screed by measures taken on site (e.g. wrapping in film). The position of the fitting is measured and recorded in a diagram.
The heating circuits are designed so that no expansion joints are crossed. Connecting pipes which cross expansion joints must pass through a PE protective pipe.

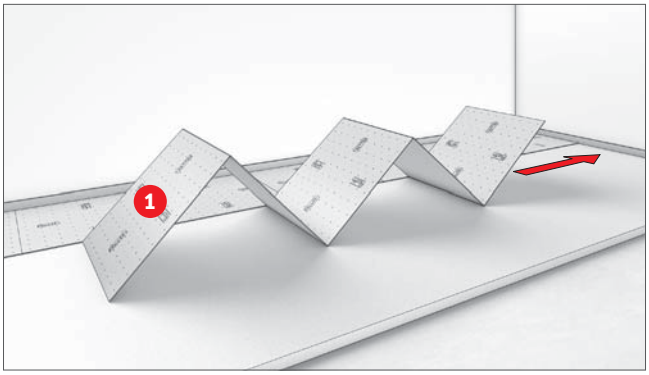


1. Roth expansion joint profile
2. Roth System Pipe
3. Roth PE protective pipe – at least 300 mm on both sides of the joint

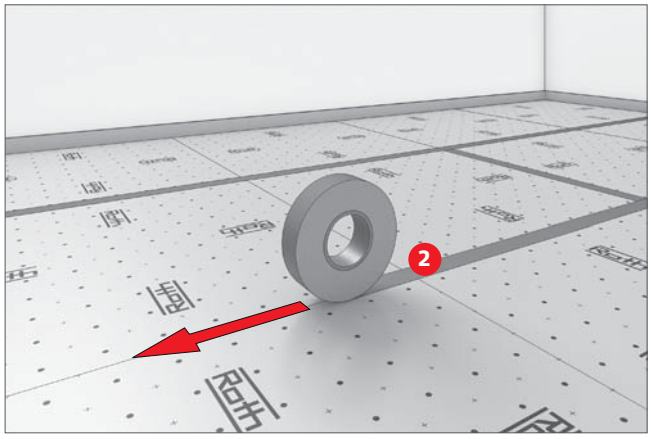
Expansion joints on top of construction joints must not be crossed by connecting pipes.
If this occurs, the heating circuits must be divided up as appropriate by installing additional manifolds.

Moisture measurement points are part of an underfloor heating system and must be provided by the heating engineer. Installation: At least 1 per accommodation unit and/or 3 per 200 m².

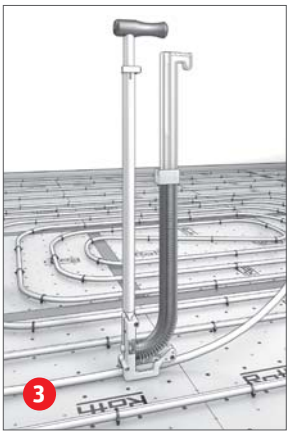
Assembly Instructions

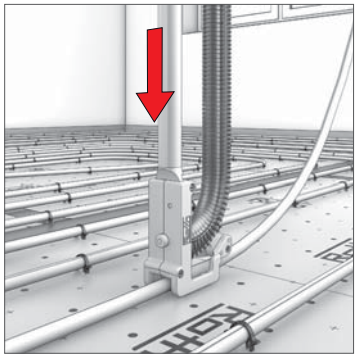


1. Install the Flipfix panel on the existing insulation.

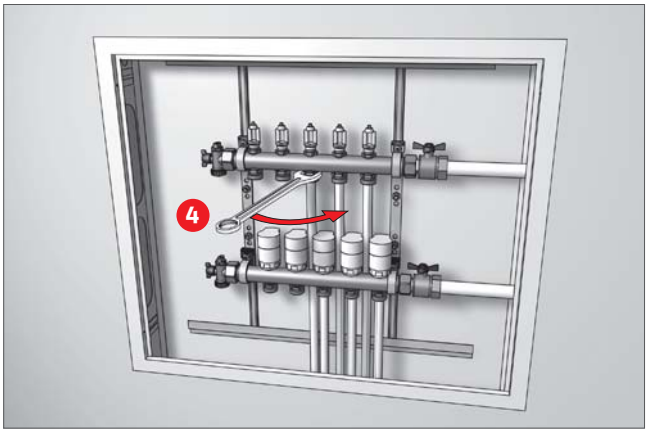


2. Then cover the edges with adhesive tape to create a closed surface.



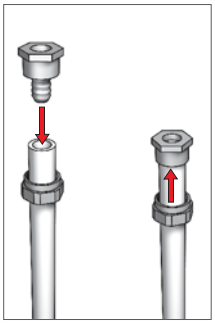


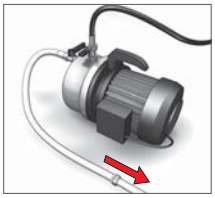
3. Lay the Roth System Pipes with the specified installation spacing.

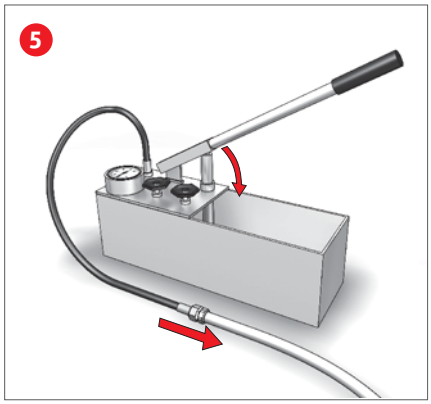


4. Connect the Roth System Pipes to the inlet and return of the Roth manifold.

Assembly Instructions

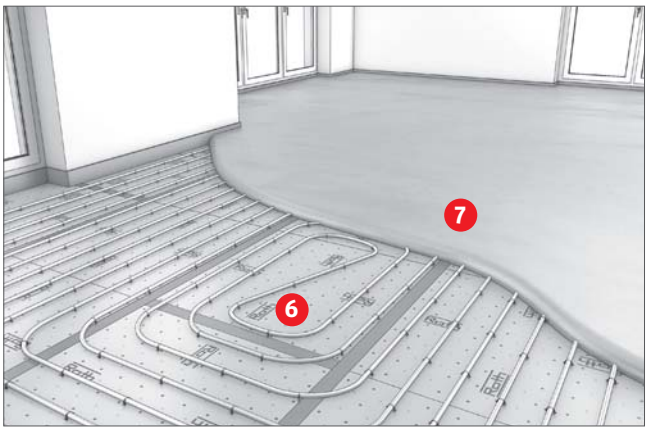






5. Perform the leak test for floor heating and cooling systems according to DIN 1264, Part 4.

   Procedure:
   The heating or cooling circuits of the Roth Flipfix system are checked for leaks by pressure testing. Tightness must be ensured immediately before and during installation of the load distribution layer.



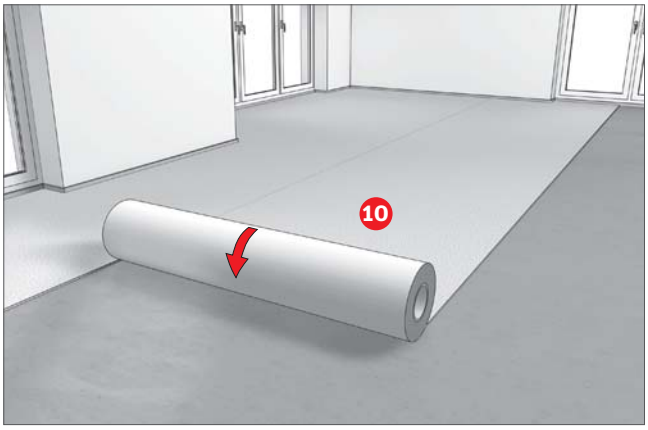
6. Provide measurement points.
   The points are arranged in the centre of the room; there must be no pipes installed at these points.

7. Apply screed.

Commissioning:

8. Functional heating according to heating protocol

9.If applicable, curing (in consultation with the floor layer)



10. Lay the surface covering.

Commissioning

Load distribution layers

Screed should only be laid at temperatures above +5 °C. The temperatures should be kept at the same level as much as possible for the entire curing time. The impact of draughts on the curing screed must be prevented. Anhydrite-bonded screeds can also be introduced as a load distribution layer of the Roth Flipfix system. The processing guidelines from the various suppliers must be noted in this case.

Functional heating

Heating: (see form in the heating protocol chapter)
The heating of the load distribution layer made of cement or anhydrite screed must be carried out according to DIN EN 1264 and recorded in writing. Depending on the floor covering selected, it may be necessary to heat the screed again in order to achieve the permitted screed residual moisture in readiness for covering.

Floor covering

Before starting to lay the floor covering, the screed is checked to determine whether it is ready to be covered. The floor layer can check the moisture content with a CM measurement at the specified points.

Maximum permitted screed moisture content in %, determined with the CM device				
Floor coverings		**Cement screed target**		**Calcium sulphate screed target**
1	elastic floor coverings, textile floor coverings	vapour-tight	1,8	0,3
		vapour-permeable	3,0	1,0
2	Parquet/cork	–	1,8	0,3
3	Laminate flooring			
4	Ceramic tiles or natural/ concrete stone	Thick bed	3,0	–
		Thin bed	2,0	0,3

(German Federal Association of Surface Heating and Surface Cooling (BVF) surface heating technical information service, interface coordination for heated floor constructions).

Control technology

In order to fulfil the requirements defined in EnEV for control technology for surface heating (single room controls and water precontrols), all control components and systems used for Roth floor heating and cooling systems can be used.

Leak test protocol

for performing a leak test on floor heating and cooling systems according to DIN EN 1264, Part 4

Building project: _____

Client: _____

Contractor: _____

The following Roth floor heating and cooling system has been installed as part of the above-mentioned building project:

System

- ☐ Roth Original Tacker®System
- ☐ Roth Knob System
- ☐ Roth ClimaComfort® Dry Construction System
- ☐ Roth Pipefix System
- ☐ Roth ClimaComfort® Panel System
- ☐ Roth ClimaComfort® Compact System
- ☐ Roth industrial floor heating/ non-residential property
- ☐ Roth sport and sprung floor heating
- ☐ Roth structural temperature control
- ☐ Roth outdoor panel heating
- ☐ Roth Flipfix Tacker System
- ☐ Roth Quick Energy Tacker System

Pipe type

- ☐ Roth DUOPEX S5®
  - ☐ ø 14
  - ☐ ø 17
  - ☐ ø 20
  - ☐ ø 25
  - ☐ ø 32
- ☐ Roth X-PERT S5®+
  - ☐ ø 14
  - ☐ ø 16
  - ☐ ø 17
  - ☐ ø 20
- ☐ Roth Alu-Laserflex
  - ☐ ø 14
  - ☐ ø 16
- ☐ Roth ClimaComfort® S5
  - ☐ ø 11
- ☐ Roth PERTEX® S5
  - ☐ ø 17

The leak test can be performed using water, compressed air or inert gas.
The heating circuits have been checked for leaks before fitting the load distribution layer.
All pipelines have been sealed with metal plugs, caps, etc. Any apparatus, pressure containers or fittings which are not suitable for the pressure test have been removed from the pipes.

Ambient temperature: _____ °C
Temperature of testing medium: _____ °C

Leak test protocol

Testing medium, compressed air or inert gas:

☐ Oil-free compressed air ☐ Nitrogen ☐ Carbon dioxide

☐ _____

☐ All pipe connections have been visually inspected to check they have been properly executed.

Test pressure: _____ **150 mbar**

Test period (up to pipework volume of 100 l) 120 min
For every additional 100 l _____ **+ 20 min**

The test period commences once temperatures have been calibrated and a steady state attained for plastic materials.

Pipework volume: _____ **l** **Test period:** _____ **min**

☐ **No drop in pressure has been detected during the test period.**
☐ **There is no evidence of leaks.**
☐ **The test criteria have been satisfied.**

Load testing at increased pressure

Test pressure ø ≤63 mm: _____ **bar (max. 3 bar)**
Test period: _____ **min (min. 10 min)**
For every additional 100 l _____ **+ 10 min**

The test period commences once temperatures have been calibrated and a steady state attained for plastic materials.

☐ **No drop in pressure has been detected during the test period.**
☐ **There is no evidence of leaks.**
☐ **The test criteria have been satisfied.**

Town/City: _____ Date: _____

Developer/Client Stamp/Signature	Construction Manager/Architect Stamp/Signature	Heating engineering company/Installer Stamp/Signature

Leak test protocol

Testing medium, water:

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

☐ The fill-up water has been adjusted and filtered according to VDI 2035-2. Heating circuits are fully vented.

☐ The temperature difference between the fill-up water and the environment does not exceed 10 °C.

Main test for smaller installations (e.g. on each floor) or preliminary test for large systems
Test period: 60 min

1. Permissible test pressure

P_{test} = 1.5 x $P_{operation}$ **P_{test} Test pressure applied: _____ bar**

2 x P_{test} in 30 min Test pressure generated twice within 30 min.
Time intervals between tests 10 min

2. Permissible pressure drop in 30 min

Max. 0,6 bar (0,1 bar/5 min)

P_{min} = P_{test} - 0,6 bar **P_{actual} ≥ P_{min} (after 30 min): _____ bar**

☐ **There is no evidence of leaks.**

☐ **The test criteria have been satisfied.**

Main test for large systems (if required)
Test period 120 min

Permissible pressure drop: max 0,2 bar

P_{min} = P_{test} - 0,2 bar **P_{actual} ≥ P_{min} (after 120 min): _____ bar**

☐ **There is no evidence of leaks.**

☐ **The test criteria have been satisfied.**

Suitable measures need to be taken if there is a risk of frost. These include using antifreeze and temperature equalisation of the building. When the system starts normal operation, any antifreeze can be drained and disposed of in accordance with national occupational health and safety requirements. The system then needs to be flushed through three times with clean water.

Town/City: _____ Date: _____

Developer/Client Stamp/Signature	Construction Manager/Architect Stamp/Signature	Heating engineering company/Installer Stamp/Signature

Heating protocol

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

Building project: _____

Client: _____

Construction stage: _____

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

- ø **Roth System Pipe PERTEX® S5** _____ mm
- ø **Roth System Pipe X-PERT S5®+** _____ mm
- ø **Roth System Pipe DUOPEX S5®** _____ mm
- ø **Roth System Pipe Alu-Laserflex** _____ mm
- ø **Roth System Pipe Alu-Laserplus** _____ mm

Screed thickness: _____ Type of screed: _____

Bonding agent: _____ Manufactured by: _____

Procedure:
Cement and anhydrite screeds must be heated before the floor coverings are laid. Work may not begin until at least 21 days after the screed work is finished with cement screeds or until at least 7 days after the screed work with anhydrite screeds depending on the manufacturer's instructions. The initial heat-up phase starts with an inlet 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 using screeds for which special procedures are specified by the manufacturer, these must be observed.

> Screed work completed on: _____

> Start of heating with constant 25 °C inlet temperature on: _____

>Start of heating with maximum design temperature (max. 60 °C permissible acc. to DIN 18560, Part 2) of: _____ °C
on: _____

> End of heating (7 days after start of heating at the earliest) on: _____

> Heating was interrupted (yes/no).
If so: from _____ to _____

> The heated flooring area was free/not free of building materials and other coverings.
The rooms were ventilated without draughts and the screed was protected from draughts and drying out too quickly after switching off the floor heating system (windows and external 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 to a temperature of _____ °C at the time.

Important information:
After carrying out the heating process as described, it has not yet been established whether the screed has reached the maximum permissible moisture content in readiness for covering (Table 1, DIN EN 1264, Part 2 contains guide values for readiness for covering). Before laying the floor covering, the floor layer must use a CM measuring device (procedure 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:

Developer/Client Stamp/Signature	Construction Manager/Architect Stamp/Signature	Heating engineering company/Installer Stamp/Signature

Standards and directives

The following laws, directives, guidelines and standards need to be taken into account when planning and creating a heating installation:

- German Energy Conservation Act (Energieeinsparungsgesetz – EnEG)
- German Energy Saving Directive (Energieeinsparverordnung – EnEV)
- German Heating Costs Directive (Heizkostenverordnung – HeizkostenV)
- The individual administrative instructions from the various German states regarding EnEG

Standards, guidelines and German Contract Procedures for Building Works (Verdingungsordnung für Bauleistungen – VOB)

- DIN 1168 Building plasters
- DIN 4108 Thermal insulation and energy saving in buildings
- DIN 4109 Sound insulation in buildings
- DIN 4701, Part 10 Energy efficiency assessment of heating, hot water and ventilation systems in buildings
- DIN 4726 Warm water surface heating systems and radiator connecting systems – Plastics piping systems and multilayer piping systems
- DIN 18195 Waterproofing of buildings
- DIN 18202 Tolerances in building construction – Structures
- DIN 18336 VOB, Part C: Waterproofing
- DIN 18340 VOB, Part C: Dry lining and partitioning work
- DIN 18350 VOB, Part C: Plastering and rendering
- DIN 18352 VOB, Part C: Wall and floor tiling
- DIN 18380 VOB, Part C: Installation of central heating systems and hot water supply systems
- DIN 18382 Electrical cable and wiring systems in buildings
- DIN 18560 Floor screeds in building construction
- DIN V 18599 Energy efficiency assessment of buildings – Calculation of the net, final and primary energy demand for heating, cooling, ventilation, domestic hot water and lighting
- DIN EN 1264 Water-based surface embedded heating and cooling systems
- DIN EN 1991-1-1 Actions on structures
- DIN EN 12831 Heating systems in buildings – Method for calculation of the design heat load
- DIN EN 13162 – DIN EN 13171 Factory-made thermal insulation products for buildings
- DIN EN 13501 Fire classification of construction products and building elements
- DIN EN 13813 Screed material and floor screeds – Screed materials – Properties and requirements
- DIN EN 13914 Design, preparation and application of external rendering and internal plastering
- VDI 2035 Part 2 Prevention of damage in water heating installations – Water-side corrosion

Guarantee

The guarantees and warranty conditions apply to the Roth Flipfix Tacker System in accordance with the warranty certificates enclosed with the products.

WARRANTY CERTIFICATE

Roth Floor Heating and Cooling Systems
Roth Pipe Installation Systems

1. Within 10 years of installation, but no longer than 10 1/2 years after delivery of the system components, we will provide free replacement products or repair and compensate for damage to the system components delivered by us at our discretion if the damage is 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 for a period of 12 months from installation in cases of material defects or manufacturing faults.
2. The requirements for this guarantee are:
   a. only system components belonging to the respective Roth floor heating and cooling system/pipe installation system are used and fitted,
   b. documented compliance with 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 floor heating and cooling system/Roth pipe installation system,
   d. that the installation company and the companies building and fitting out 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 fully completed warranty certificate to us,
   f. to immediately report damage and send the warranty certificate to us at the same time,
   g. to make the claim within the warranty period.

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

The above guarantee concerns:

Property _____

Client _____

Floor heating and cooling systems

☐ Roth Original Tacker® System
☐ Roth Flipfix Tacker System
☐ Roth Quick Energy Tacker System
☐ Roth Knob System
☐ Roth ClimaComfort® Dry Construction System
☐ Roth ClimaComfort® Panel System
☐ Roth ClimaComfort® Compact System
☐ Roth Pipefix System
☐ Roth industrial floor heating
☐ Roth sport and sprung floor heating
☐ Roth Isocore concrete core activation
☐ Roth outdoor panel heating

Pipe Installation Systems

☐ Roth radiator connecting system
☐ Roth drinking water system

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

Floor heating and cooling system: _____ m² installed area

Radiator connecting system: _____ Number of radiator connections

Drinking water system: _____ Number of point of use connections

Specialist heating company: _____

Installation/fit-out works:	Signature	Stamp	Installation date
	Signature	Stamp	Completion date
Commissioning:	Signature	Stamp	Completion date
	Signature	Stamp	Commissioning date

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Notes

Notes

Our strengths
Your benefits

Innovation

- Early identification of market requirements
- In-house materials research and development
- In-house engineering
- The company is certified according to DIN EN ISO 9001:2008

Service

- Extensive field network of qualified sales professionals
- Hotline and project planning service
- Factory training courses, planning and product seminars
- Fast availability of all Roth brand product ranges throughout Europe
- Comprehensive guarantee and extended liability agreements

Products

- Complete range of easy-to-install product systems
- Manufacturing expertise for the complete product range within the Roth Industries group of companies

Roth Energy and Sanitary Systems

Generation
- Solar systems
- Heat pump systems
- Solar heat pump systems

Storage
Storage systems for
- Domestic and heating water
- Combustibles and biofuels
- Rainwater and waste water

Application
- Floor heating and cooling systems
- Pipe installation systems
- Shower systems

Roth

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HAND® WERKER MARKE MEISTERKLASSE

TÜV SÜD ISO 9001

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