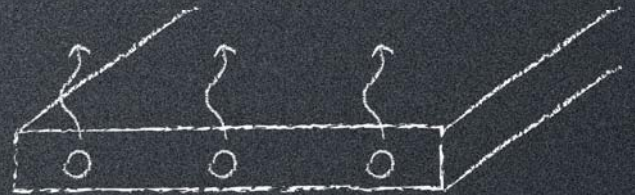


Energy Systems

Floor heating and cooling systems

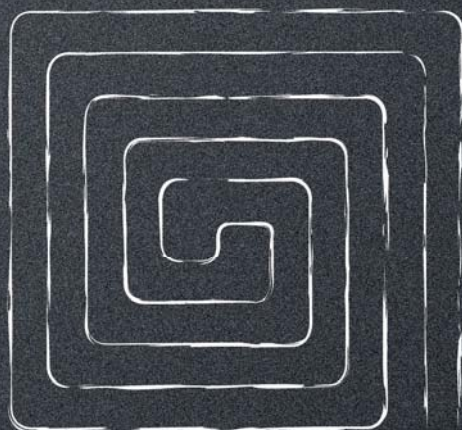


System solutions for everything you need in heating



Living full of energy

The larger the area that radiates heat the more effective and economical its heating effect will be. The ideal room temperature using a floor heating system is 1 °C to 2 °C lower than for systems using conventional radiators.





Heating and cooling systems for convenient all-round comfort

■ **The demand for high-quality living spaces in both existing and new buildings is increasing all the time, and this in turn creates an expectation of state-of-the-art temperature control**

Whether it is for residential buildings, offices and commercial premises, industrial facilities, sports halls or open spaces – what used to be exceptional is now the norm: heating and cooling systems optimised to individual needs and cleverly designed to keep up with changing demands. It is therefore hardly surprising that the majority of planners and building owners looking for modern and advanced system solutions are now choosing floor heating and cooling systems. The retrofitting of floor heating and cooling systems is also gaining in popularity.

The many innovations introduced by Roth over the years have made a significant contribution to this development. In addition to user comfort and greater freedom in architectural design, the decisive criteria in the selection of a floor heating and cooling system are the energy savings, hygiene and environmental protection it facilitates.

■ **Floor heating for a better quality of life**

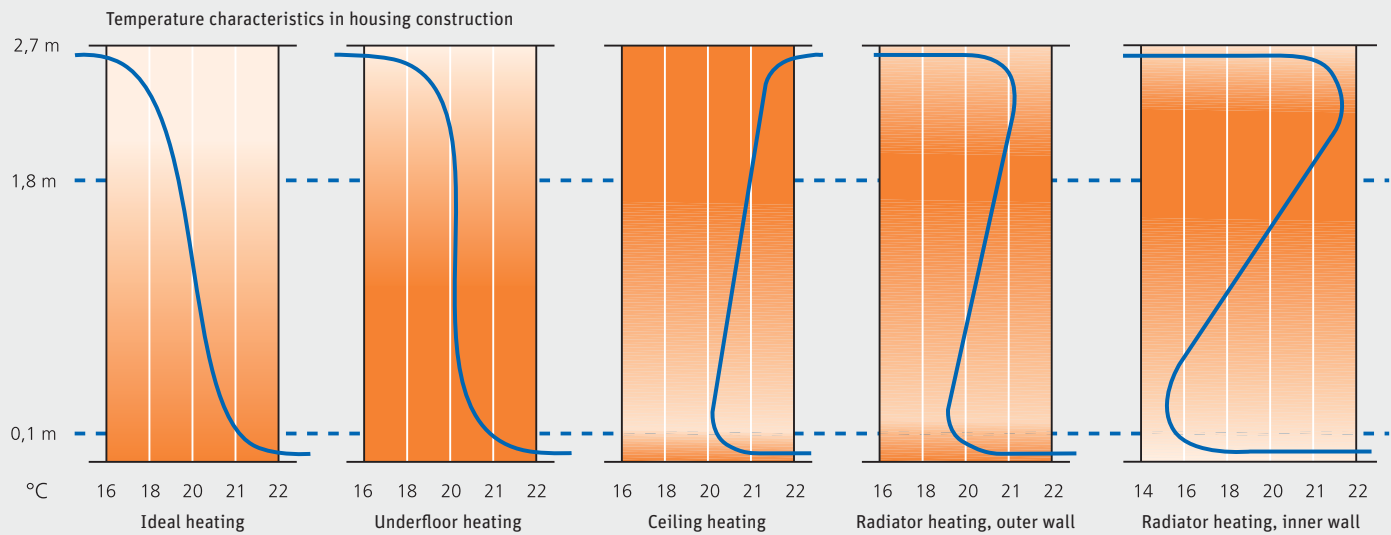
When choosing a suitable floor heating and cooling system for modernisation or new construction projects, the ultimate aim is to create a comfortable home environment. In addition, it will need to make optimal use of the available energy to ensure that the systems operate efficiently.

The level of thermal comfort experienced by every individual will depend on both objective and subjective parameters. Measurable values include such factors as air temperature, speed of air movement, air exchange rate and air humidity. A high level of thermal comfort is produced by heating spaces evenly. In this process, it is important that the heat given off the human body is emitted as uniformly as possible in all directions. Radiated heat and surface temperatures can be set proactively if one selects the right surface heating or cooling system.

We find it uncomfortable if too much heat is being abstracted away (leaving surfaces cold), even if the temperature of the space is within the optimal range. The lower the temperature on a space's boundary surfaces (walls, floors and ceilings) the higher the temperature the air must be to make the space comfortable, and vice versa. One can compensate for this effect by carefully controlling the temperature of ceilings and walls.

Roth floor heating and cooling systems

Innovation and high performance for modern living spaces



■ The ideal room temperature profile

You will feel the optimal, finely tunable room temperature profile that the Roth floor heating and cooling systems can provide as a real contribution to your everyday comfort. Negative factors in a room's climate (such as turbulence, drafts or heat congestion) are also a thing of the past. In reality, the system's temperature characteristics correspond almost exactly to the ideal heating system (see graphic). Experts tell us that the larger the area that radiates heat the more effective and economical its heating effect will be. The ideal room temperature needed will be between 1° and 2° C cooler than with conventional radiators. The resulting energy saving of 6 to 12 % that the system achieves speaks volumes for it, as do its lower system and input temperatures. It also provides the best conditions for combining renewable energy sources, including such systems as Roth heat pumps and solar collectors, for example. It wins further points in relation to the hygienic features of the system. The dryness of the heat produced deprives bacteria and dust mites of the moisture they need for survival.

■ Feel-good temperatures

Experience suggests that comfortable temperatures for heated rooms in winter will tend to be around the following values:

- > Living spaces: 20 - 22 °C
- > Bedrooms: 16 - 18 °C
- > Bathrooms: 24 - 26 °C

A room is considered comfortable when there is a difference of less than 4 °C between the surface temperatures and the temperature of the air of the room. If there is a difference of less than 5 °C between the temperatures of the various surfaces of the room, e.g. between an internal wall and an external wall, the room will generally also be experienced as very comfortable by the user.

Technical standards stipulate the following maximum permitted surface temperatures for floors:

- > in residential or office areas where people meet and spend time: 29 °C
- > in bathrooms: 33 °C
- > in peripheral zones: 35 °C

For reasons of comfort, it is important that walls and ceilings do not exceed a maximum surface temperature of 40 °C.

■ A guide to Roth floor heating and cooling systems

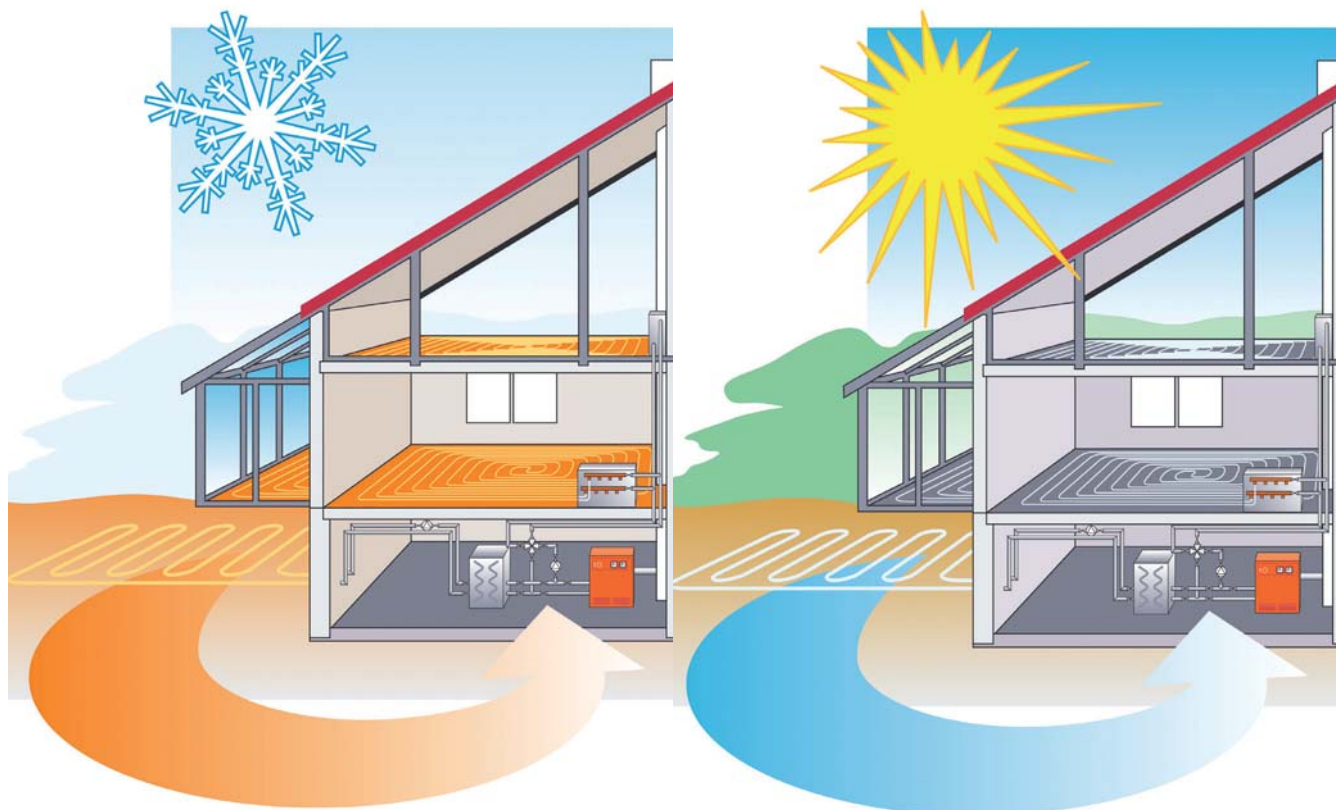
	Building types						Areas of application			Installation surfaces			Load distribution / Surface coating		Insulation integrated in the system
	Residential and commercial buildings	Administrative buildings	Car dealerships/showrooms	Industrial/factory halls	Sports halls	Outdoor areas	New buildings	Existing buildings/renovation projects	Minimum installation height, minimum mass per unit area	Floor	Wall	Ceiling	Wet construction (screed/plaster)	Dry construction	
 Original Tacker System	X	X	X	●			X	●		X			X		X
Quick-Energy® Tacker system	X	●					X	X	X	X			X		X
Flipfix® Tacker system	X	X	X	●			X	X	X	X			X		
 Knob System	X	X	X	X			X	●	X	X			X		X
 ClimaComfort TBS	X	X			X		●	X	X	X			●	X	X
 Pipefix System	X	X	X	X	X	X	X	●		X	X	X	X		
 ClimaComfort Panel System	X	X	●		●		X	X	X	X	X	X		X	X
 ClimaComfort Compact System	X	X	●				●	X	X	X					
 Large-scale application	●	X	X	X	X	X	X	●		X	X	X	X		
 Isocore® concrete core temperature control	●	X	●	X			X	●		X	X	X	X		

● : Building-specific



Roth heating and cooling system

a feeling of comfort the whole year round



■ The thinking behind the system

When designing an energy system for building services devices, the need to guarantee a comfortable living climate is a fundamental consideration. The heating and cooling systems developed by Roth offer solutions tailored to seasonal needs and individual requirements. During the cold seasons, low-temperature floor heating achieves warm and comfortable room temperatures. And in the summertime, Roth System Pipes integrated into the floor structure generate a pleasant cooling effect.

■ Heating in Winter

The evenly-distributed dispersion of heat over a wide surface area provides the user with a pleasant – practically ideal – room temperature profile. With the low temperature of the heating water it uses, the system is positively predestined for use in combination with environmentally friendly and energy-saving heat sources, with low-temperature and condensing technology and with alternative energy sources.

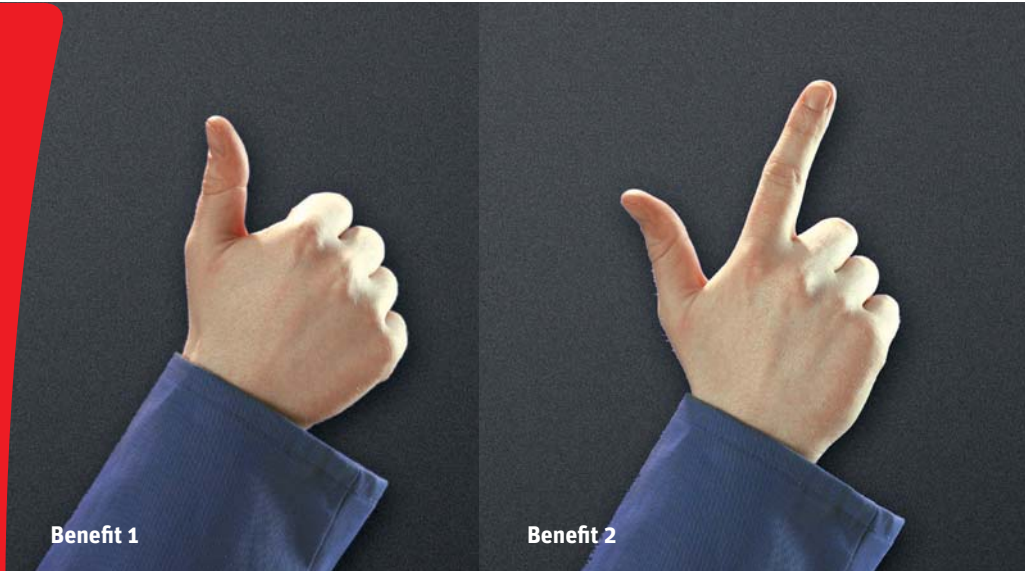
■ Cooling in summer

Uniform room cooling with no unpleasant draughts is achieved through the radiant cooling effect of the Roth System Pipes integrated into the floor structure. In terms of control engineering, the Roth heating and cooling system is designed to be able to effectively avoid both drops in floor surface temperature to below 19 °C (deemed by DIN 1946 to be the critical level for human comfort), and temperature shifts between two relevant measuring points (at a height of between 0,1 and 1,1 m) of two Kelvin. Dew point monitoring is integrated into the system in order to effectively prevent condensation caused by elevated room humidity due to the weather. The water for refrigeration can be produced via system piping laid in the ground, by heat pumps, by a cooling unit or using surface water.

Roth System Pipes

always on the safe side with S5 CoEx Technology

- > quality through five layers ("S5")
- > system expertise
- > service
- > guarantee and warranty
- > customer satisfaction



■ **All good things come in.... 5.
And pipes are the arteries of an
efficiently laid out and perfectly
functioning floor heating and cooling
system**

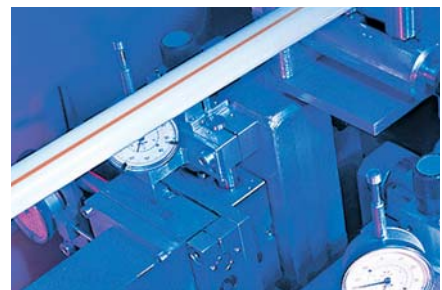
You can benefit five times over from a professional system. The new Roth pipe philosophy makes this possible. The five-layer construction of the Roth DUOPEX S5®, X-PERT S5®+ and ClimaComfort® S5 System Pipes equates to five real benefits for you. All pipes are manufactured using our unique, tried-and-tested five-layer CoEx Technology.

■ **Quality through five layers ("S5")**

In order to meet the demanding requirements they have to fulfil on site and during transport, the Roth DUOPEX S5®, X-PERT S5®+ and ClimaComfort S5 System Pipes are constructed in five layers. These are inseparably bound together by means of the S5 CoEx Technology to create a sandwich material with a high level of robustness and a long service life.

■ **System expertise – Roth system
solutions for demanding applications**

As the inventor of the Tacker system, Roth is among the leading suppliers of floor heating and cooling systems. With millions of systems proving their worth out in the field, Roth comes equipped with years of experience and thus with the greatest amount of technological know-how. The Roth Original Tacker® system and the Roth Knob system and all Roth's other heating and cooling systems fulfil the highest expectations in terms of quality and safety, well beyond minimum technical standards.





Benefit 3



Benefit 4



Benefit 5

■ **Service**

- > extensive field network of qualified sales professionals
- > Hotline and project planning service
- > Factory training courses, planning and product seminars
- > 10-year spare parts provision and after-sales guarantee following discontinuation of the product range
- > fast availability of all Roth brand product ranges throughout Europe

■ **Guarantee and warranty**

Quality for the safety of our customers: we consider this to be an obligation – from the creation of the product through manufacturing and storage, all the way to delivery. High quality products and services form the basis for world-wide insurance protection, which also covers long-term damage in the event of possible defects. A continued liability agreement guarantees insurance protection even in the event that production is discontinued. Relevant details are defined in a certificate of warranty. This confirms the existence of insurance coverage with a face value of up to 5 million euros for injury to persons and property damage for each individual incident; this cover applies to every Roth floor heating and cooling system for a period of up to ten years after start-up.

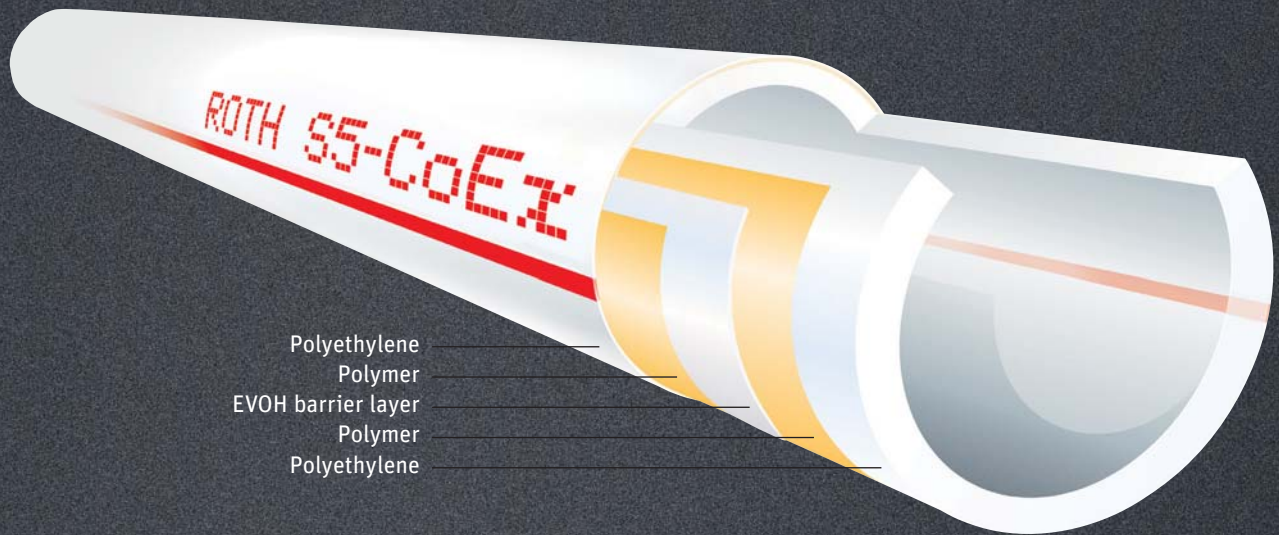
■ **Customer satisfaction**

Building owners expect reliability and preservation of value from their property. Roth Systems offer the customer the assurance of always having chosen the "best in class" as far as floor heating and cooling systems are concerned. They create a lasting sense of well-being by distributing energy in a way that is pleasant for the building users and increase the value of the property in question too.



These services are further enhanced by our membership of the "Handwerkermarke" Craftsmen's Association.

Roth DUOPEX S5[®], X-PERT S5[®]+ and ClimaComfort S5 perfect for all requirements



■ Roth DUOPEX S5[®], X-PERT S5[®]+ and ClimaComfort S5 System Pipes – the right solution for every application

What constitutes the "right" pipe system will depend on the building in question and the needs of its owner. Roth offers system pipes that meet the most stringent of quality standards.

■ S5 CoEx Technology – highest possible quality no matter what the application

You will always find the perfect solution to your building's specific requirements for a floor heating and cooling system, with pipes featuring the proven and unique S5 CoEx technology.

Thanks to quintuple co-extrusion in a single production process, the sandwich material of the Roth System Pipes guarantees optimal adhesion between the pipe layers.

5 layers – 5 levels of safety

Roth System Pipes offer maximum robustness thanks to their mechanical, thermal and chemical characteristics:

- > protection of the EVOH oxygen barrier against mechanical damage and the harmful effects of external factors such as heat and damp
- > highest level of resistance to deformation caused by concentrated mechanical loads
- > the workings of the floor heating and cooling systems are optimally protected for subsequent craftsmen in accordance with the Verdingungsordnung für Bauleistungen (Contract Procedures for Building Works [VOB])
- > long service life through the avoidance of oxygen exchange
- > The five layers provide optimised linear extension within a narrow tolerance

Roth DUOPEX S5® and X-PERT S5®+ System Pipes

an excellent team



All five layers of the Roth DUOPEX S5® System Pipe are co-extruded and then cross-linked.

■ Roth DUOPEX S5® System Pipe – the solution when only the very best will do

The 5-layer Roth DUOPEX S5® System Pipe holds its own against extremely high levels of stress. This pipe meets the most stringent requirements, even those associated with concrete core temperature control and industrial construction. A continuous stress of 90 °C at an operating pressure of 6 bar and a short-term temperature increase to 110 °C pose no problem for the Roth DUOPEX S5® System Pipe, which is interactively cross-linked all along its length.

■ Interactive cross-linking using an innovative and patented manufacturing process

All five layers of the DUOPEX S5® System Pipe are co-extruded and then cross-linked along their entire length using a patented manufacturing process. This ensures connections at the molecular level, not only within the individual layers but also between them. As a result, the five-layered pipe is absolutely stable. Interactive cross-linking improves the mechanical, thermal and chemical characteristics of the DUOPEX S5® System Pipe, thus providing additional safety.

■ Roth X-PERT S5®+ System Pipe – the solution for challenging applications at low temperatures

The average thermal stress during heating is falling, as a result of the Energiesparverordnung (Energy Savings Regulation [EnEV]).

The highly flexible five-layer Roth X-PERT S5®+ System Pipe, in combination with the Roth System Panels, is a system which has been optimised to meet the specific requirements of applications in the low-temperature range.

The "X" in X-PERT S5®+ represents the excellent finish of the material. It is designed with extra safety in mind, to withstand a continuous thermal stress of 70 °C and short periods of thermal stress at 100 °C.

The X-PERT S5®+ System Pipe has long-lasting pressure-resistance up to 6 bar with a generous safety reserve factor.

■ DUOPEX S5® and X-PERT S5®+ – with that extra level of safety thanks to its high-performance surface layer

The surface layer means that the Roth DUOPEX S5® and X-PERT S5®+ System Pipes are now even stronger.

The yellow colour of these two system pipes indicates that they feature a robust surface. High resistance to wear and integrated UV stability provide additional protection, particularly for use in harsh site conditions.

■ System compatibility

Roth DUOPEX S5® and X-PERT S5®+ System Pipes can all be used with the Roth Original Tacker® System, the Roth Knob System and the Roth Pipe Fixing System for heating and cooling purposes.



Approval no. 3V203 PE-Xc
Approval no. 3V266 PE-RT
Approval no. 3V331 PE-RT

Roth Original Tacker® System

proven reliability time and again in new buildings

- > perfectly coordinated system solution
- > tried and tested time and again
- > patented laying technique
- > easy to install
- > pipes positioned to the centimetre
- > optimal heat distribution and cooling



Roth floor heating and cooling system, Marburg central railway station, Germany

■ Roth, the Tacker experts

This system solution features components designed to work together in perfect harmony, providing the basis for mastering sophisticated heating construction tasks. The Roth Original Tacker® System (which has proven its worth a million times over) used in conjunction with Roth DUOPEX S5® and X-PERT S5®+ System Pipes provides the ideal foundation for creating a heating supply system that will retain its value in the long term. The friction-free interlocking connection of pipe and patented pipe laying technique is therefore always the first choice for the entire array of sophisticated applications. Perfection in the result, whether it is for residential, office or industrial construction projects.

■ Three steps to perfection

The high-quality ex-works prefabrication of all system components – pipe, composite panel and accessories – makes it possible: the complete Roth floor heating and cooling system is laid in only three work steps using the patented Tacker technique. Naturally, every step in the production process is carried out precisely according to correct computed values and conforming to all relevant regulations.

■ Roth floor heating and cooling – comfort can be so easy

Roth floor heating and cooling systems are easy to assemble, giving you a great degree of flexibility, combining operating and construction site safety standards with superior effectiveness – even on difficult sites.

The Roth Original Tacker® System makes assembly really simple and enables pipes to be positioned to the centimetre, with a view to achieving optimal heat distribution and cooling, even in the most difficult installation situations.

The underfloor constructions of Roth floor heating and cooling systems conform to DIN EN 1264 ("Water based surface embedded heating and cooling systems"), taking into account DIN 18560 ("Floor screeds in building construction"), DIN 4109 ("Sound insulation in buildings") and the Energieeinsparverordnung (Energy Savings Regulation [EnEV]).

The consistently high quality standards of the individual components and of the overall system are documented by a large number of marks of testing, monitoring and quality.



Unique, two-sided, self-adhesive overlap

Roth System composite panel



Roth Composite Roll



■ **System composite panels for floor heating and cooling systems**

Easy, fast, conforming to relevant standards: System composite panels in polystyrene particulate foam. An excellent choice for heat and sound insulation.

You can use them to enclose surfaces quickly and efficiently during pipe laying. This makes it possible to produce a unique, two-sided, self-adhesive overlap that is 30 mm wide. A secure closure against damp and screed (in accordance with DIN 18560) prevents sound and thermal bridges from forming. In addition, a pre-printed reference grid makes it easier to place the system pipes precisely according to the measurements calculated for them.

■ **A sturdy solution for high stresses**

The Roth EPS DEO WLG 035 26 mm system composite panel comes into its own wherever the floor needs to withstand heavy traffic loads (in car showrooms, for example). This composite panel can be used under a suitable screed covering layer with maximum traffic loads of up to 35 kN/m². The Roth range of products also includes additional insulation panels made of EPS or PU, which may be required where thermal insulation requirements are particularly high and traffic loads are especially heavy.

Roth floor heating and cooling system, Auto Velte KG car dealership, Biedenkopf, Germany

■ **Roth system composite panel – highly effective insulation where a flat structure is needed**

The new EPS DES 25-2 WLG 032 E^x system composite panel has the "X" factor when it comes to energy efficiency, allowing you to reduce the structural height of your floor by up to 10 mm compared to standard insulation panels with footfall sound insulation. The Neopor insulating material (thermal conductivity category WLG 032) makes it possible to reduce the insulation thickness while still absorbing impact sound. Consequently, panel heights of just 25 mm are sufficient to insulate ceilings between living quarters in accordance with the regulations.

■ **Made in Germany**

We develop and manufacture all Roth Original Tacker® System components in Germany. Roth's range of floor heating and cooling systems makes it the German market leader worldwide.

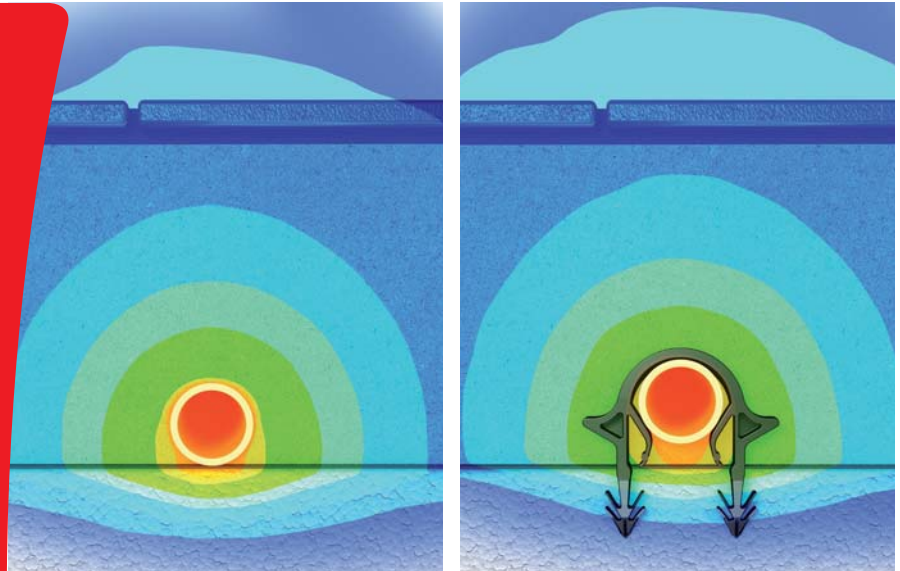


Approval no. 7F083
Approval no. 7F087
Approval no. 7F461

Roth Original Tacker® E^x clips

for that added extra in efficiency, comfort and safety

- > pipe raising function
 - pipes fully embedded in screed
 - optimal heat transfer and distribution for heating and cooling
- > double anchor barb
 - maximum protection against tear-out
 - exceptional holding power



Its pipe raising function allows the screed to flow underneath the piping so that it surrounds each pipe entirely. This ensures optimum transfer and distribution of heat and cooling, thus providing extra efficiency and comfort.

■ Roth Original Tacker® E^x clips for all round heat transfer

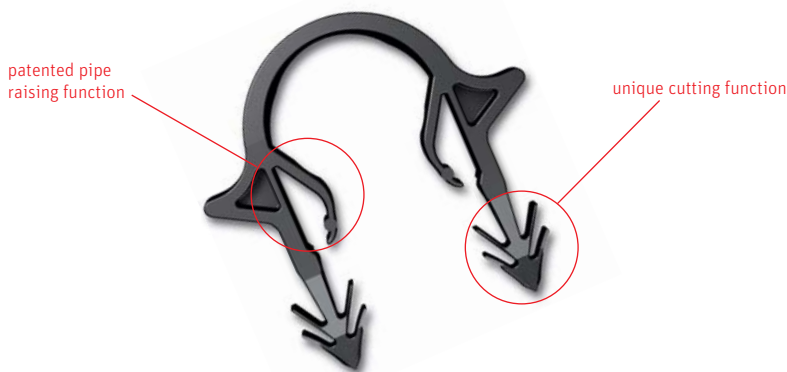
The original inventor of the Tacker system, Roth has since made further improvements to their Roth Original Tacker® clips. Roth Original Tacker® E^x clips are fitted with a pipe up-lift function, which ensures that they are installed at a predefined installation depth independently of the dimensions of the pipe. This ensures improved heat transfer and distribution during heating and cooling as the piping is always completely surrounded by screed even if it was unusually viscous when poured. Together with our new double anchor barb fitting, this feature adds the X factor in **added energy quality** in terms of **efficiency, comfort and safety**.

■ Double anchor barb with new design for improved ease of installation, maximum resistance to tear-out and extraordinary holding power



The lower anchor barb in a Roth Original Tacker® E^x Clip is highly stable and equipped with a sharp cutting edge, while the anchor barb on top of this is exceptionally flexible. This special technology makes it safe and easy to permeate the insulating film in the insulation, thus facilitating and speeding up the installation process. The stability of the lower anchor barb provides the perfect support for the upper anchor barb.

The double anchor barb offers optimum protection against pipes being ripped out and maximum holding power, as well as ensuring that pipes are positioned securely and precisely in the Roth System composite panels and rolls, even in harsh site conditions.



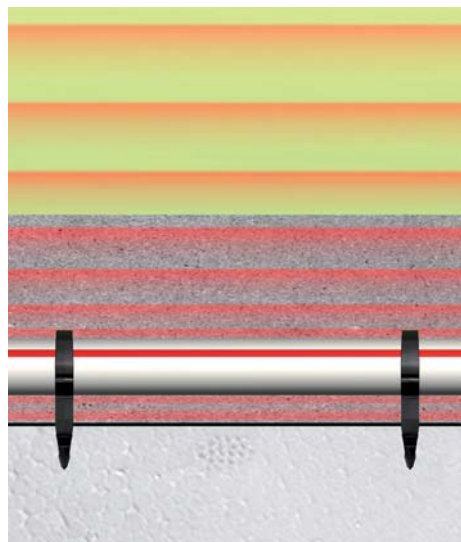


■ **Scientifically proven**

Scientific research and trials have proven the energy efficiency of the Roth Original Tacker® E^x clips system and the benefits of its pipe up-lift function. Independent studies by well-known German testing body, the Institut für methodische Analysen, confirm the practical benefits of Roth Original Tacker® E^x clips and their conformity with industrial standards. Compared with the state-of-the-art technology used in comparable pipe clamps, E^x clips provide physical, structural and energy-related benefits throughout any underfloor heating system.

■ **Ideal thermodynamic properties**

Roth Original Tacker® E^x clips provide significant improvements in thermodynamics compared to pipes simply laid over insulation. The way that E^x clips lift up the piping gives underfloor heating faster response times and improves control when the user changes the target temperature. Test measurements show that the floor material **warms up up to 15 percent faster*** when the pipe up-lift function is used. This means that the use of E^x clips can reduce the flow temperature needed to provide identical energy output in the underfloor heating system, thus reducing energy costs.



Roth Original Tacker® E^x clips

all-round heat transfer



■ Roth Original Tacker® system – by professionals for practical use!

When the Roth Original Tacker® system is used correctly, the insulation cover will be sufficiently impervious to the liquid screed – thus retaining the footfall sound insulation properties of the insulation layer entirely intact. The insulation covering of floor structures using the Roth Original Tacker® System conforms to the requirements of the DIN 18560 standard.

■ Improved structural properties of the screed

As well as providing the best possible heat distribution, the pipe raising function also has the effect of improving the structural stability of the screed component of the floor, meaning that it can stand up to higher loads, with less deformation at the same screed thickness.

■ 40 clips per magazine for maximum efficiency at work

Roth Original Tacker® E^x clips can be used with Roth System Pipes in sizes of 14, 16, 17 and 20 mm. With 40 clips grouped together to form a magazine, users benefit as they do not need to refill the Tacker over and over. Two strips, each containing 40 clips, can be loaded into the Tacker and inserted without any added effort.

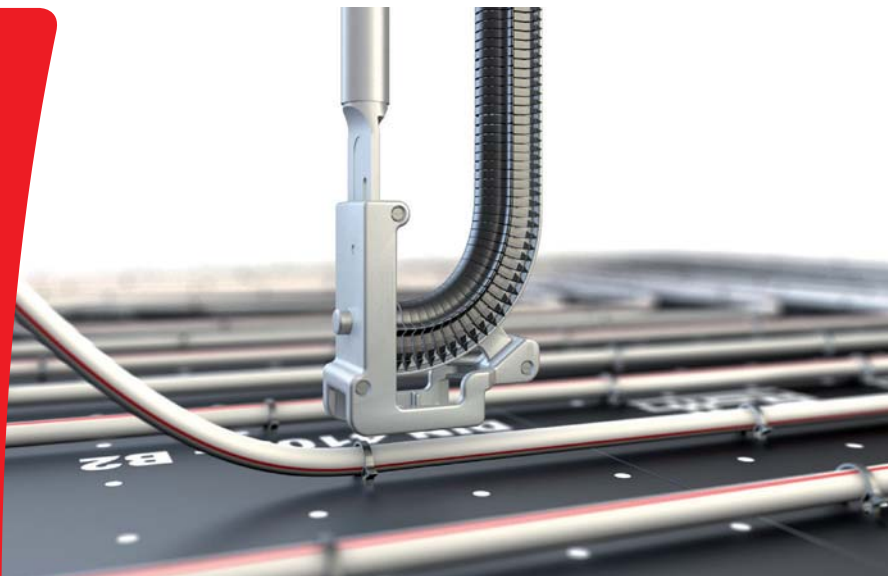


Approval no. 7F083
Approval no. 7F087

Roth Original Tacker® 2.0

tried and tested time and again

- > lighter
- > easier to handle
- > more ergonomically shaped
- > improved guidance of the E^x clips
- > increased clip capacity
- > height-adjustable
- > now with a stowing position for the Tacker weight



■ Roth Original-Tacker® 2.0 newly redesigned

Roth has developed its Tacker – it’s now lighter and easier to handle. With the new Roth Original Tacker® 2.0 system, installing the innovative Tacker system is now even easier. It is suitable for the installation of Roth System Pipes using Roth Original Tacker® E^x clips on insulation underlay when building underfloor heating and cooling systems.

■ Roth Original-Tacker® – now even lighter

Aside from its new modern look, the Tacker now weighs only two kilograms. It features a slimline housing and has an increased capacity of 135 pipe brackets (Roth Original Tacker® E^x clips). This significantly reduces the number of times the magazine has to be reloaded during pipe installation. In addition, a stowing position has been

developed on the magazine for the Tacker weight. This allows the clip magazine to be loaded from above without having to remove the weight.

It also prevents your weight from getting lost during use or storage. The Roth Original Tacker® 2.0 is suitable for Roth Original Tacker® 16 to 20-millimetre E^x clips. The Roth Original Tacker® is height adjustable and can be adjusted for any operator, be they short or tall.

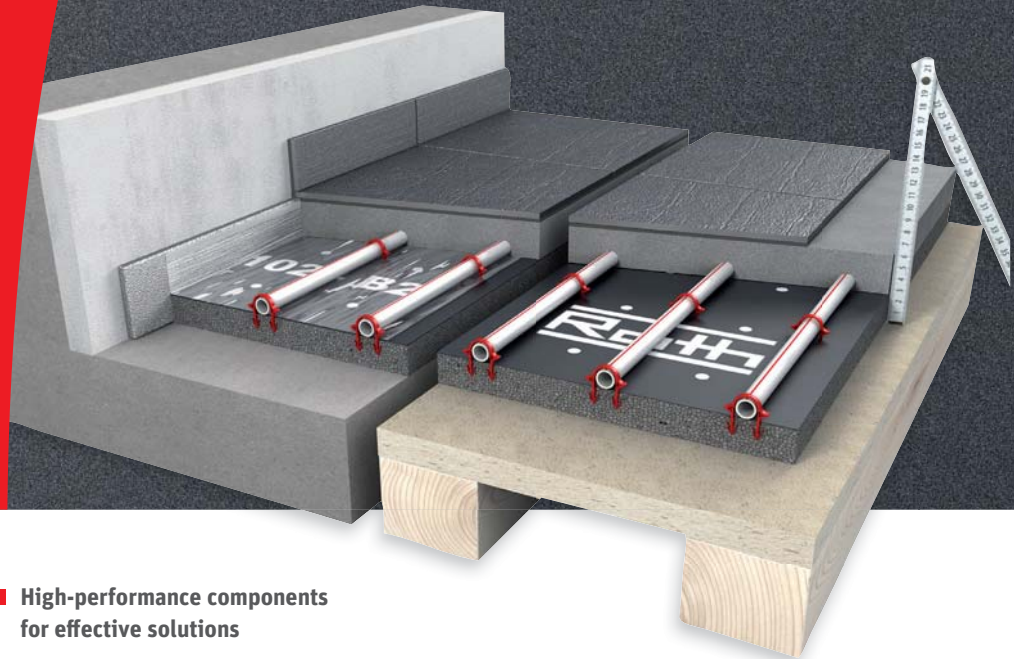
- 1 ergonomic, easy-grip handle
- 2 weight for pushing clips into position cannot be lost (thanks to stowing position on magazine)
- 3 quick and easy to fill, improved sliding properties
- 4 increased magazine capacity
- 5 shorter distance for the E^x clip to travel



Roth Quick-Energy Tacker system with QE high-efficiency screed

fast reaction with minimum installation thickness

- > convenient fast reaction system
- > minimum installation height, fastest heat delivery
- > minimised surface weight
- > improved impact sound insulation
- > QE high-efficiency screed
- > for new construction and renovation
- > for residential and commercial property solutions
- > fully certified system



■ Convenient fast reaction system with minimal installation thickness

The Roth Quick-Energy® Tacker system for floor heating and cooling is ideally suited for residential construction and commercial property solutions in both renovation and new-build projects.

It combines the quickest energy supply with the greatest convenience with regard to comfort and impact sound insulation. The slimline floor heating and cooling system with QE high-efficiency screed uses the wet construction method and requires pipe coverage of just two centimetres. Thanks to its minimal installation height, rapid response is guaranteed.

The Roth Quick-Energy® Tacker system is the cutting-edge addition to the highly successful Roth Original Tacker® system.

■ High-performance components for effective solutions

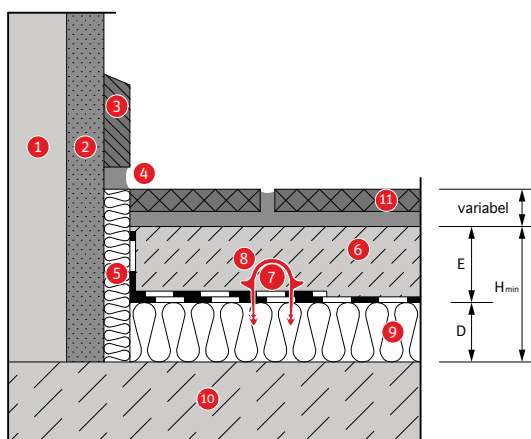
Optimal combination of Roth product components to achieve a high-performance system solution. The innovative Roth EPS DES 25-2 system composite panel, the Roth X-PERT S5® 14-millimetre or DUOPEX S5® 14-millimetre System Pipe, the Roth 14-millimetre Tacker clips and the new QE high efficiency screed together produce a surface heating and cooling system with an installation thickness of only 60 millimetres.

It can be used as a superstructure on concrete ceilings and other ceiling structures. The base must be load bearing and level. The system also improves sound insulation. The fully tested system installation is approved for transport loads of up to two kilonewtons per square metre.

■ Excellent insulation properties providing maximum improvement in footfall sound insulation with minimum installation thickness

The Roth EPS DES 25-2 system composite panel, which provides a combination of heat and sound insulation, reduces the installation height on the floor by up to ten millimetres compared to standard panels with impact sound insulation. The special insulating material (thermal conductivity category O32) makes it possible to reduce the insulation thickness while still absorbing the sound of impact. Consequently, panel heights of just 25 mm are sufficient to insulate ceilings between living quarters to conform with regulations.

Thanks to its unique combination of technical properties, the Quick-Energy® Tacker system offers a wide variety of applications for both new builds and renovation.



- 1 Wall
- 2 Plaster
- 3 Skirting board
- 4 elastic grouting
- 5 Roth edge insulating strip
- 6 QE high-efficiency screed
- 7 Roth System Pipe \varnothing 14
- 8 Roth Tacker Clip 14 mm
- 9 Roth EPS DES 25-2 system composite panel
- 10 load-bearing subsurface
- 11 Surface covering

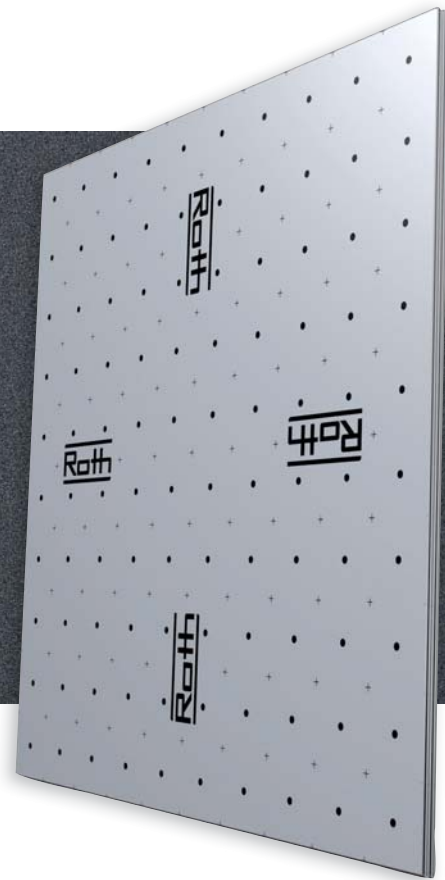
Roth Quick-Energy® Tacker system with QE high-efficiency screed

$R_{i,s}$ ($m^2 K/W$)	D Roth system composite panel or roll (mm)	E Height (mm) QE high-efficiency screed	H_{min} (mm) with 20 mm coverage over piping
0,78	25-2 EPS DES WLG 032	35	60

Roth Flipfix® Tacker system

on the insulation, get set, go!

- > for use with already existing insulation
- > proven Roth Original Tacker® installation technique
- > adjustable installation configurations and distances
- > only one system component
- > waste-free laying
- > no specialised tools required
- > compact dimensions for storage and transport



■ For new applications – just unfold and you are done

Roth provides the Flipfix® Tacker system for use as a supplement to existing insulation in floor heating and cooling systems. It is suitable for use where insulation made of conventional EPS and PU materials, as well as mineral insulation materials, is installed on site.

The comprehensive system solution for floor heating and cooling is the new Roth Flipfix panel, Roth Original Tacker® E^x clips combined with Roth System Pipes. The easy-to-install system is fitted using the tried-and-tested Roth Original Tacker® laying technique.

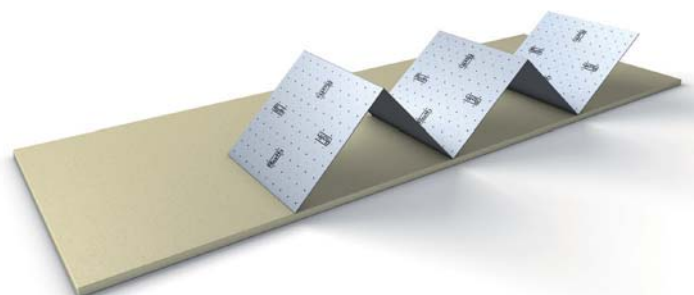
The inventor of the Roth Original Tacker® system, which has proven its worth a million times over, has expanded its range to include another innovative Tacker solution: the Roth Flipfix® Tacker system.

■ Installation made easy – by Roth

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 zig-zag pattern, giving compact packaging unit dimensions that are advantageous for transport and storage. Flipfix panels are simply unfolded on-site and quickly laid without producing any waste. The zig-zag fold also ensures that the individual plates can be effectively aligned in relation to one another.

The butt joints are connected using adhesive tape – this quickly produces a closed insulating layer. The elements can be cut using a commercially available cutter or scissors. Markings are provided in a five- and ten-centimetre grid for variable installation.

A separate film layer to serve as a cover for the insulation layer is unnecessary, as is protection against floating.



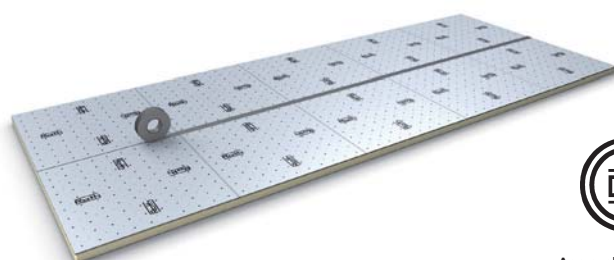
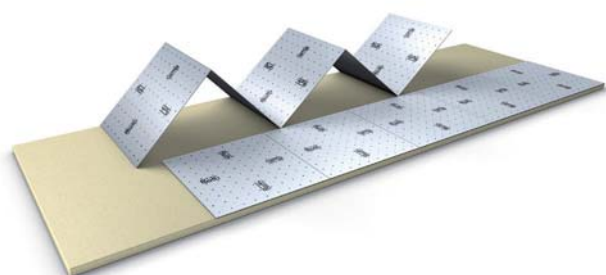


■ Roth Flipfix® panel in detail

- > 2 mm hollow-chamber component made of polypropylene
- > Building material class B2 (normal flammability)
- > 5 x 1 m (5 m²)
- > Folds apart at 1-m intervals (using concertina folding)
- > Colour: grey, with printed elements in black
- > Installation grid 5 x 5 cm

At a glance

- > for existing insulation made of EPS or PU materials or mineral wool
- > easy to assemble, time-saving and simple to install thanks to prefabricated 5 m² components with a concertina principle
- > aligning the panels in relation to one another is made easy by the concertina fold
- > joining seams with adhesive tape is easy and only needs to be done longitudinally
- > no film layer required to cover insulation layer
- > no precautions against “floating” needed
- > Roth E⁺ clips with pre-defined penetration depth and optimal energy efficiency



Approval no. 7F395-F
Approval no. 7F400-F



Roth Knob System

flexible, problem-free, perfect



The Roth floor heating and cooling system at the Keramion ceramic museum, Frechen, Germany

■ An extremely flexible system

The Roth Knob System is characterised by a high degree of flexibility and straightforward assembly. The undercut and ideal shape of the knobs enable Roth DUOPEX S5® and X-PERT S5®+ System Pipes in sizes of 14 to 17 mm to be attached to Roth Knob panels (which also come in sizes of 14 to 17 mm).

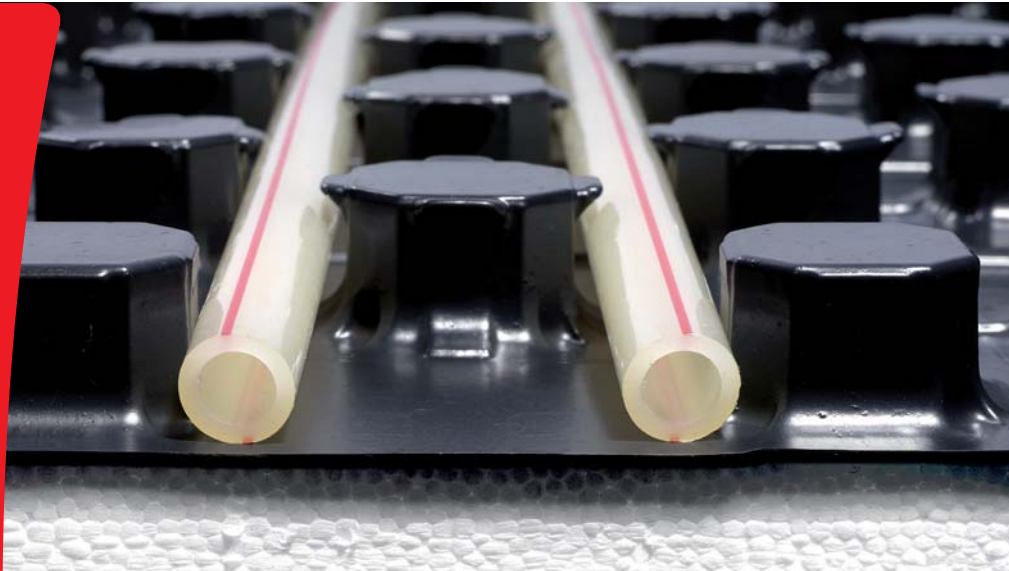
The pipes can be laid either orthogonally or – with the aid of an additional film – diagonally. Fixing strips mean that leftover pieces can easily be reused, which means that environmentally friendly installations with very little waste can be created. Filler knob panels are available too.

The Roth Knob System is suitable for laying in residential, office and commercial buildings.

Roth Knob System

assembly-friendly installation

- > flexible
- > easy to install
- > optimal knob shape
- > can be used for perpendicular and diagonal laying
- > environmentally friendly installation with very little waste



■ Roth knob panels and accessories

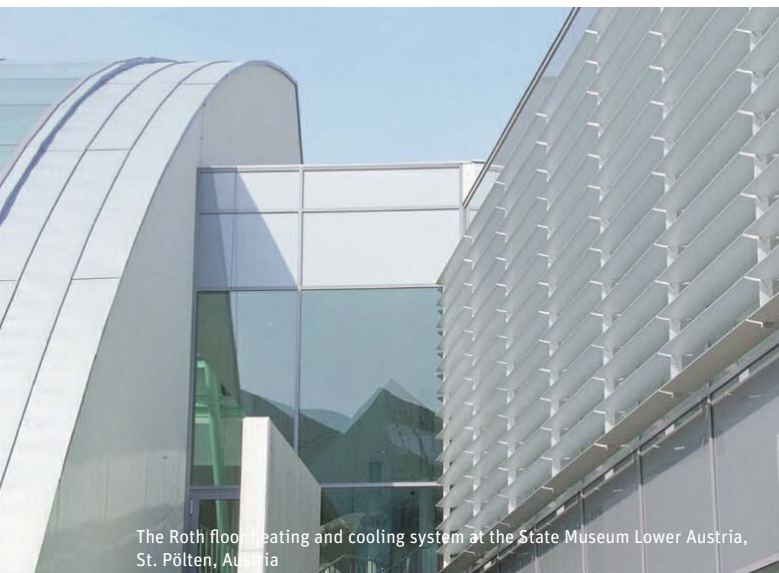
Roth offers a knob panel with high load-bearing capacity and low installation height for use in buildings with increased stress requirements:

- > The special geometry of the knob and its alignment on the entire Roth Knob Panel offers the perfect base for laying the Roth System Pipes – even with low outside temperatures.
- > The Roth knobs interlock with one another in double rows by means of a two-sided film protrusion. The best conditions for using flow screed.
- > Without the use of additional tools, the Roth System Pipe is pressed with the foot into the knobs, where it engages audibly and securely.

- > Suitable for all Roth System Pipes of \varnothing 14 mm to \varnothing 17 mm.
- > The two-layer polystyrene construction ensures the knobs and heat insulation can be walked on without damage.
- > The door area between two rooms can simply be bridged with the Roth alignment knob in connection with the Roth alignment knob film.
- > The film of the Roth edge insulating strip is pressed into the Roth knob with the Roth PE profile. An ideal solution, even when using flow screed.
- > When every millimetre of installation height counts: the Roth Knob Panel 14 – 17 DEO 10 can even be used when renovating residential buildings.

■ Well thought out to the last detail

Since Roth System Pipes can be laid diagonally, even unusual floor plans do not pose a problem.



The Roth floor heating and cooling system at the State Museum Lower Austria, St. Pölten, Austria

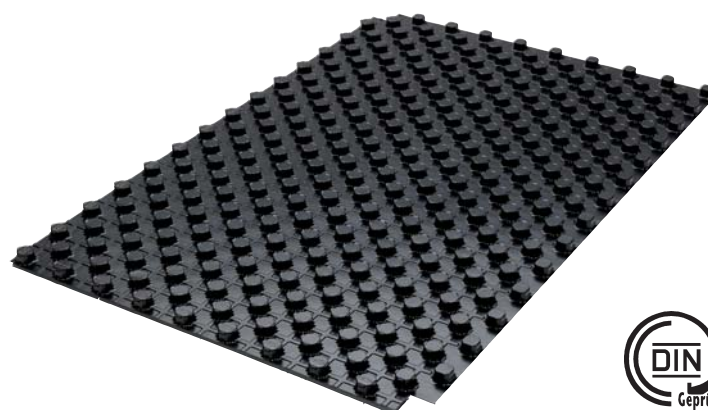


■ **Roth Knob Film 14-16 mm – a top-quality innovative product**

The Roth Knob Film 14-16 mm is suitable for laying on insulation on site. This is ideal in renovation projects, for example, where insulation is already in place and there is only a low installation height available. The highly effective Roth Knob Film is designed to meet demanding load requirements: for use in industrial floor heating applications, for example.

At a glance

- > suitable for all Roth System Pipes of \varnothing 14 mm to \varnothing 17 mm
- > available in two EPS qualities: EPS DES 30-2 (1450 x 950 x 50 mm) and EPS DEO 10 (1450 x 950 x 30 mm)
- > Support plate and cover film made of polystyrene, building material class B2
- > 50-mm knob grid: all installation distances and shapes are possible within the 50 mm grid
- > effective installation area/panel: 1.26 m²
- > assembled into a single unit ex-works
- > double-sided overlap to tie components into one another
- > improved impact sound insulation
- > the 4 mm undercut and the geometry of the individual knobs make it easy to install and secure pipes in place
- > the foam on the back of each individual knob creates an extremely stable installation area which is good to walk on
- > the diagonal fixing method makes it easier to lay Roth System Pipes in this way



Roth knob film 14-16 mm (without insulation), for laying on top of structural insulation

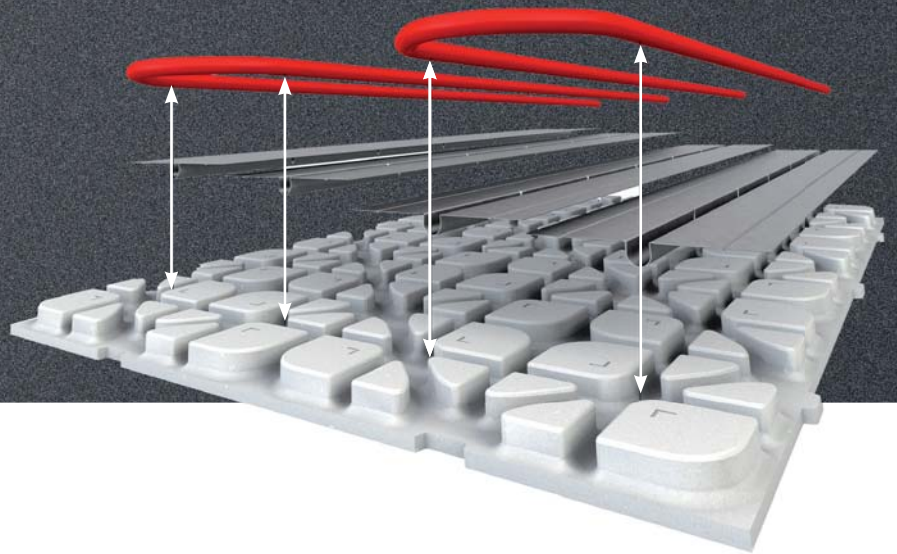


Approval no. 7F396-F
Approval no. 7F399-F

Roth ClimaComfort® dry construction system

low installation height and flexible installation

- > ideal for modernisation projects
- > easy, flexible installation
- > lightweight layer
- > heat conducting lamellas made of high-performance aluminium
- > flexible pipe laying
- > flexible laying direction



■ Universal components for flexible solutions

As a leading manufacturer of floor heating and cooling systems, Roth has developed a new dry construction system that is ideally suited to the types of installation required in renovation work. The Roth ClimaComfort® dry construction system features a minimum installation height of just 43 millimetres including covering (the load distribution layer). The structure of the insulation panel permits flexibility in the choice of direction of installation – it can even be laid diagonally.

■ Only one type of system panel for all applications

For easy installation, only one type of system panel is used. This ensures that installation is straightforward, secure and quick and allows for flexibility in its application. The Roth ClimaComfort® dry construction system panels can be combined in all orientations along its 30 cm grid and can be cut to size to fit the geometry of the room. Thanks to a special groove/notch system, precise positioning and alignment of the system panels is guaranteed. This prevents the panels from slipping on the subsurface.

The panel structure permits the heat-conducting lamellas to be affixed simply and securely in various directions. This allows Roth 14 and 16-millimetre Alu-Laserflex system piping to be laid horizontally, vertically or diagonally. This makes the system particularly suitable for renovation projects and permits a wide range of architectural design freedom, even if the room in question poses difficulties.



■ **Heat conducting plates in high-performance aluminium for optimal heating performance**

To improve heat output, the leading manufacturer of floor heating and cooling systems has developed heat-conducting plates made from high-performance aluminium. The material guarantees good heat transfer. The heat-conducting lamellas have predetermined breaking points so that they can be separated into the desired lengths. The smallest possible installation distance for Roth Alu-Laserflex system piping is 15 centimetres.

■ **The Roth Alu-Laserflex System Pipe – sturdy and diffusion resistant**

The five-layer Roth Alu-Laserflex System Pipe is precisely matched to the complete system and is flexible to install with minimal waste. It can be bent with the bending spring and remains dimensionally stable after being bent within its bending radius and during operation. The integrated aluminium layer serves as an oxygen barrier. The Alu-Laserflex System Pipe is pressure- and temperature-resistant with minimum linear expansion and therefore reduces impact sound. The DIN CERTCO approval and regular monitoring of the manufacturing process as well as the properties of the pipe guarantee quality and safety for installers and users.

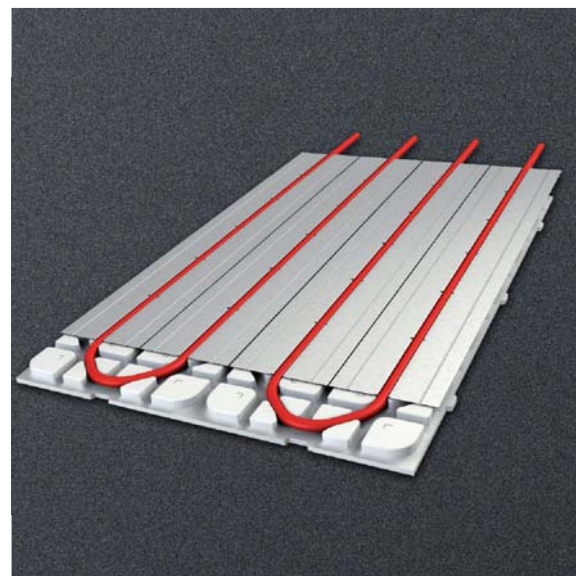


Roth Alu-Laserflex pipes \varnothing 14 and 16 mm



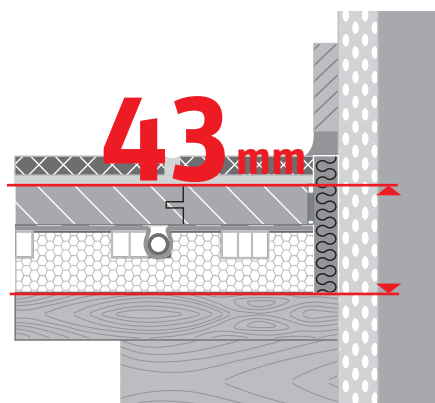
Approval no. 7F402-F





■ **Their lightweight design and low installation height – the decisive combination**

The Roth ClimaComfort® dry construction system, with its low installation height and lightweight design, is suitable for numerous applications in renovation and new-build projects. It can be installed on existing flat flooring that has a sufficient load-bearing capacity or on a timber beam construction. The perfectly matched components guarantee an ideal complete system from Roth.



At a glance

- > the Roth ClimaComfort® dry construction system panel, with a height of 25 mm, is ideal for modernisation projects
- > simple, time-saving and flexible installation
- > lightweight layer
- > heat conducting lamellas made of high-performance aluminium for optimal heating performance
- > panels joined together by tongue-and-groove system
- > secure hold of heat conducting lamellas on ClimaComfort dry construction system panels
- > heat conducting lamellas with predetermined breaking points so that they can be separated into the desired lengths
- > simple and flexible pipe installation with an installation spacing of 15 cm
- > horizontal, vertical or diagonal placement
- > suitable for dry and wet construction
- > decades of manufacturing expertise

Roth ClimaComfort® panel system

all-round comfort guaranteed

- > highly efficient EPS heat insulation
- > highly efficient heat-conducting elements
- > locking mechanism to hold pipes in place
- > EPP end piece for redirecting pipes
- > optional additional insulation



■ No restrictions on pipe laying and surface covering – the perfect fit every time

The ClimaComfort panel's design makes for optimum pipe installation. The X-PERT S5®+ System Pipe is simply snapped on to floors, walls or ceilings. To change the direction of the pipe, Roth offers an end piece that is inserted into the system panel. This makes wall and ceiling installations much easier to manage, since the components are retained in the correct positions.

The ClimaComfort panel consists of an EPS support plate, which is permanently bonded to an aluminium heat-conducting plate. The panel ensures that heating or cooling energy is transferred evenly and quickly.

The dry construction method keeps assembly times short (no drying phases) and the perfectly coordinated system components ensure that the ClimaComfort Panel System responds extremely quickly.

The ClimaComfort panel is suitable for laying floor surfaces according to individual room layouts, even on slopes.

The panel dimensions correspond to the dry construction standard size (625 x 1200 mm); the panels can be cut to meet the requirements of any room, irrespective of its size. The system meets the structural requirements associated with renovation projects in existing buildings and can be retrofitted as part of ad hoc minor refurbishment work.

■ “Room-by-room renovation”

The ClimaComfort panels can be easily mounted on conventional timber-framed structures for installations in walls or on ceilings. On external walls, the structure can then be easily back-filled with suitable insulating material. Unlike external insulation, this renovation method enables the process to be performed gradually, room by room.

Roth has designed the system for use with the Roth X-PERT S5®+ pipe with a diameter of 14 mm.

Roth also offers the ClimaComfort panel system in a 16-mm version for floor installation, together with the Roth Alu-Laserflex System Pipe.

■ Roth ClimaComfort® panel system – for direct flooring installation

Floor installations involving the Roth ClimaComfort® Panel System can be covered directly with tiles or parquet flooring using innovative adhesives. The subsurface must be clean, even and capable of bearing loads.

Parquet flooring can also be applied directly on to the Roth ClimaComfort® Panel System. Wooden floors must be approved for use with underfloor heating by the manufacturer.



■ **Experience all-round comfort in existing and new buildings**

The Roth ClimaComfort® Panel System transforms floors, walls and ceilings into highly efficient and responsive surfaces that distribute energy in order to heat and cool rooms. Roth has developed one type of panel that can be used for all applications. Storage and installation require minimum effort and offer maximum convenience.

Unlike conventional wall-mounted radiators, the Roth ClimaComfort® Panel System provides an even amount of radiant heat from all sides, resulting in a pleasant room temperature with no circulation of air. Practically the entire surface area of a room's walls, floor and ceilings can be used for heating/cooling purposes. For example, in winter a room can be heated via the floor and/or walls, whilst in summer it can be cooled via the ceiling and/or walls. The ClimaComfort Panel System can be retrofitted as part of minor refurbishment work and, at long last, it is enabling people to experience that wonderful feeling of "all-round comfort".

■ **Economical use of energy and the perfect partner for Roth heat pumps**

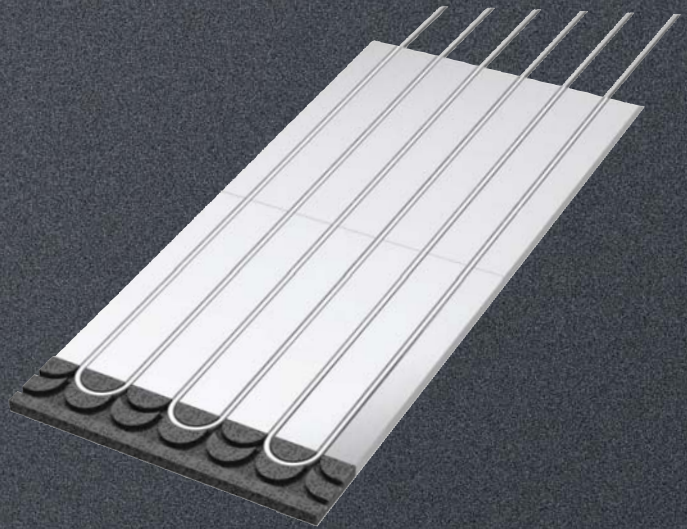
The system's special energy-saving mode of operation when heating up to an inlet temperature of 35 °C has been optimised for use in conjunction with the Roth heat pump, a producer of renewable energy. The materials and the process and product technology chosen for the system enable energy requirements (for heating and cooling) to be reduced dramatically, thus facilitating the integration of regenerative heaters (even in existing buildings). Combined with intelligent control technologies, this creates enormous potential for saving energy. Roth's heat pumps complete a range of products which represent a uniform energy concept specifically designed for renovation projects and new buildings. The system offers huge advantages from both an ecological and an economical point of view.



Approval no. 7F309-F/D/W

Roth ClimaComfort® panel system

the perfect solution for external walls



■ The Fraunhofer Institute has confirmed the room comfort features of the ClimaComfort panel system, especially when the panels are installed on outside walls

The positive effects of lining external walls to begin with can be seen in the results of a "comfort study" carried out by the Fraunhofer Institute for Building Physics (IBP). The study is based on DIN EN ISO 7730. It also reveals that the temperature control skirting eliminates the thermal bridges that can interfere with heating performance. If heating or cooling requirements are particularly high, the internal walls can be lined too.

■ The ceiling as a surface for distributing energy, especially for cooling purposes

If a room's floor and walls do not cover the energy requirements in question, the ceiling can be brought into play. It makes good sense to line the ceiling, especially if you are converting an attic. The use of the ClimaComfort panel system on the ceiling is particularly recommended for cooling purposes.

■ Optimisation thanks to the highly efficient ClimaComfort heat conduction skirting

In old buildings, people can feel draughts and mould can form on external walls, on window reveals, in areas where ceilings meet walls and in corners where external walls meet internal ones. This is down to thermal bridges, which reduce the surface temperature of the wall in a localised area. With Roth's high-performance temperature control skirting, even these parts of a building can be made cosy and comfortable by increasing the surface temperature. The heat conduction skirting consists of a high-performance heat-conducting composite film (with a thermal conductivity of around 350 W/mK) and a 5-mm flexible, high-performance insulating layer (WLG 013).



ClimaComfort high-performance temperature control skirting with heat-conducting film and flexible, high-performance insulation

At a glance

- > one panel type for heating and cooling via floors, walls and ceilings in old and new buildings
- > energy-efficient, environmentally friendly and highly responsive surface temperature control
- > in wall applications, the system offers proven comfort verified by the Fraunhofer Institute for Building Physics
- > reduced energy consumption
- > optimal temperature equalisation
- > fast installation
- > low mass per unit area
- > system pipes easily lock into place
- > unrestricted pipe installation and surface lining



■ **Unique performance profile:
Comfort, energy efficiency, fast
response times**

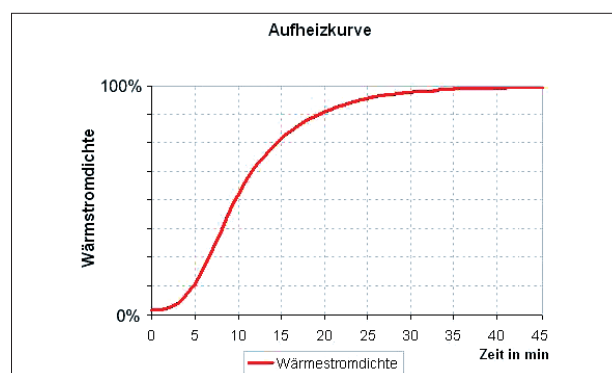
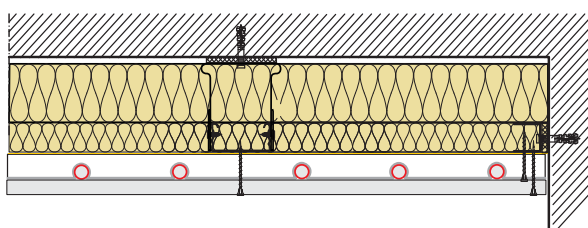
The ClimaComfort panel and its high-performance temperature control skirting prevent the walls, ceiling and floor of a room cooling down from inside. So, by observing the IBP guidelines and making careful plans, even old buildings can have cosy living spaces. This way of lining external walls is particularly well suited to buildings with listed facades.

Thermal measurements taken in accordance with EN 1264 make the capability of the system quite clear. Its most impressive feature is its fast reaction time.

Furthermore, with an inlet temperature of 35 °C, the system can achieve a thermal output at the wall of up to 88 W/m². When used in conjunction with Rigips Climafit plasterboard, which offers a high thermal conductivity, the system can achieve heating and cooling outputs that would have been simply unimaginable with the conventional linings used in surface-embedded temperature control systems.



Installing Roth ClimaComfort® panels on walls



Approval no. 7F309-F/D/W

Roth ClimaComfort® Compact System

Renovation made easy

- > minimum installation height
- > quick reaction
- > high stability
- > flexibility
- > safety monitoring for backfilling
- > installation on existing screeds
- > quick, easy and universal assembly

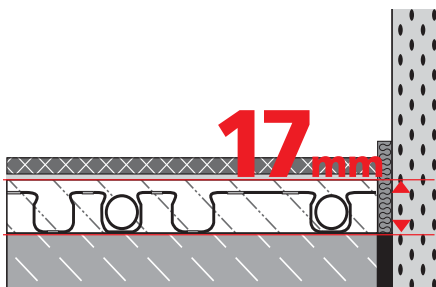


■ Heating and cooling for renovation projects and new builds

The Roth ClimaComfort® Compact System is a heating and cooling system which is particularly well suited to renovation projects. The extremely low, flat installation set-up and the resulting high system reaction speed open up new opportunities for planning and installation. This makes things easier and more convenient for the building contractor.

The 14-mm ClimaComfort Compact system panel is made of a partially crystalline material. The material and the unique panel structure are responsible for the great stability and toughness combined with

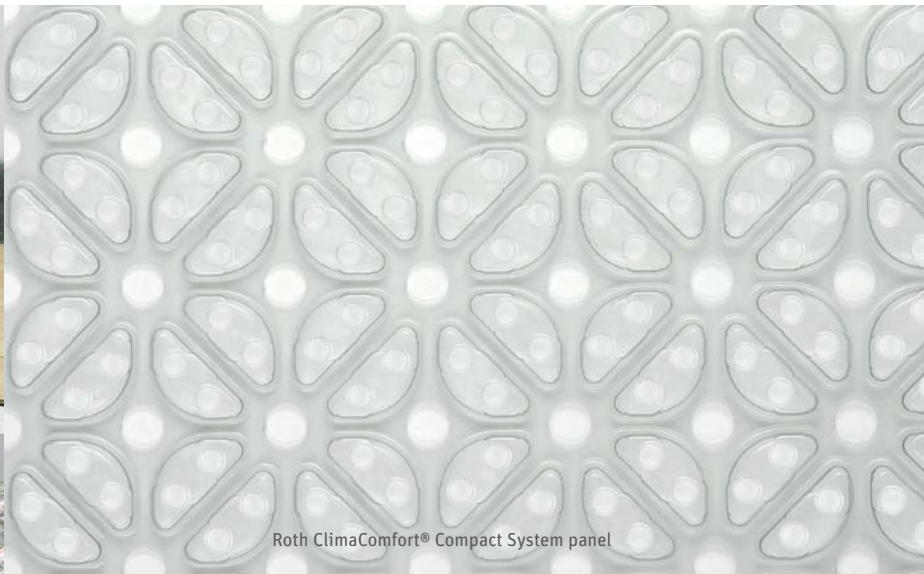
flexibility. This ensures a high degree of resistance to impact, even though it is easy to install. The system panel can be cut to fit easily and precisely, without cracks forming. The self-adhesive system panel is mounted on the existing subsurface. The special panel structure with undercutting makes reliable installation of the system pipe possible in a spiralling or meandering form in a 75 mm grid. Diagonal placement at intervals of 105 mm is possible.



Low installation height 17 mm

Basic building blocks in the Roth ClimaComfort® Compact System

- > Roth ClimaComfort® S5 System Pipe (material composition and processing method are the same as for the tried-and-tested X-PERT S5®+ CoEx Technology)
- > Roth ClimaComfort® Compact system panel (transparent, vacuum-formed plastic panel)



Roth Climacomfort® Compact System panel



Awarded
"Plastic recycling product of the year"

For installation on the floor, the installation set-up made of system panels and system pipe is filled with a quick-setting filling and potting compound with high performance capacity. It is easy to introduce this completely through the filling and ventilation openings. The system panel, system pipe and subsurface together make up a solid, load-bearing composite. The transparency of the system panel means that you can check that the compound has been filled to the maximum level. This is a decisive factor in ensuring the safety of the entire floor structure. The installation height of the Climacomfort Compact System amounts to only 17 mm.

■ **Fraunhofer UMSICHT Institute for Environmental, Safety and Energy Technology honours the Roth Climacomfort® Compact system panel**

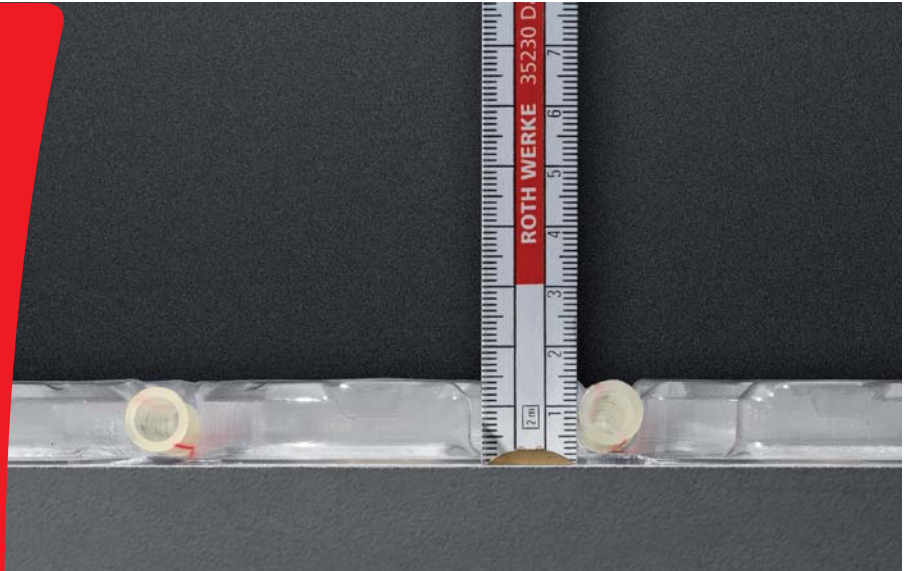
The Fraunhofer UMSICHT Institute of Oberhausen, Germany, has awarded Roth's Climacomfort® Compact system panel the prize for innovative environmental protection in the field of plastics processing. The panel is made of 100% recycled PET. The plastic is primarily obtained from transparent drinks bottles.



Roth Climacomfort® S5 System Pipe

Roth ClimaComfort® Compact System

the optimal choice for bathroom renovation



■ Minimum installation height, maximum comfort

Having a floor heating and cooling system for your own four walls is no longer a privilege which can only be enjoyed by those who are building their own homes from scratch.

Homeowners often want to retrofit underfloor heating into their houses or flats when renovating existing rooms such as bathrooms, where people will sometimes walk around barefoot. Depending on the location and conditions of the room in question, this can be achieved using the Roth ClimaComfort® Compact System, without the need to create a step up into the bathroom to accommodate a raised floor. The system is retrofitted without having to prise up the floor (a time-intensive procedure that generates a lot of dirt).

When renovating a bathroom by integrating the ClimaComfort Compact System into an existing heating system with radiators, you can make use of the heat in the return pipes; this is an environmentally friendly method of heating, as the energy is used twice.

The Roth ClimaComfort® Compact System for heating and cooling's extremely low installation height of 17 millimetres makes it ideal for bathroom renovation jobs. As a specialist in floor heating and cooling systems, Roth has developed this renovation solution for installation on existing screeds.

A one-stop supplier of energy and sanitary systems for modern building technology, Roth also offers high-quality genuine glass showers and pipe installation systems for connecting up drinking and domestic water when carrying out bathroom renovation projects.



At a glance

- > minimum installation height of just 17 mm
- > rapid reaction when heating and cooling (ideal when used in conjunction with Roth heat pumps)
- > ClimaComfort S5 11 mm System Pipe in tried-and-tested X-PERT S5⁺ quality
- > ClimaComfort Compact system panel offers excellent toughness combined with flexibility for easy handling
- > safety monitoring for backfilling by means of transparency of the system panel
- > installation on existing screeds (ideal for renovating kitchens and bathrooms, for example)
- > low heating water temperatures lead to energy savings
- > quick, simple and universal assembly, even in unusually shaped rooms that present difficulties
- > compatible module in the Roth floor heating and cooling systems product line



Roth large-scale applications

flexible, resilient and efficient

- > flexible pipe laying
- > high-performance floor structure
- > its low input temperatures saves energy
- > optimal room temperature profile



■ Roth large-scale applications—high-performance systems for heating and cooling

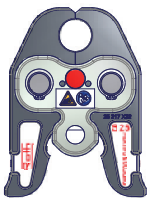
Roth offers special large-scale solutions for surface temperature control in buildings with exceptional load or structural requirements. This is where Roth Pipe Fixing Systems come into play, for example, in industrial premises and open spaces. In addition to the Pipe Fixing System, the Roth ClimaComfort® Dry Construction System is also available for sport floors. To make use of the storage capacity of solid concrete ceilings and wall modules, Roth offers the Isocore® concrete core temperature control system.

■ The Roth Pipefix system – ready for any challenge

Demanding structural and static requirements, such as those associated with industrial and open spaces, as well as with sport floors, call for Roth floor heating and cooling systems based on our Pipe Fixing System. When laying pipes with dimensions of 20 to 25 mm, the system also offers flexibility in terms of installation arrangements and distances.

In addition, it is ideally suited to heating and cooling via walls and ceilings. Thanks to its flexibility, it makes installation easy in any floor, wall or ceiling constructions adapted to meet individual building requirements on site.

The Roth Pipefix System can be used wherever there are any building-specific requirements with regard to installing pipes for floor heating and cooling systems. Aside from housing construction, the system can also be applied to industrial premises, commercial and office spaces, exhibition rooms, museums, universities, schools, church, sports and multifunctional halls, open spaces and undersoil sports field heating, and stadium construction.



Roth press jaws, "S25 Heating & Cooling"



Roth 25 x 20 x 25 mm T-piece, "Heating & Cooling"



Roth 1 1/2" Industrial Manifolds



Industrial premises, Bawinkel, Germany



Roth industrial floor heating, SMA Solar Technology, Niestetal, Germany

■ **Roth industrial floor heating – can withstand even the most demanding structural requirements**

For high load requirements in large halls where, for example, heavy machinery, forklift trucks or lorries are used, aircraft are stored or high-bay warehouses and logistics centres are run, high-performance floor structures are essential. Roth industrial floor heating also saves energy thanks to the low inlet temperatures of the heating water, while low transmission and ventilation heat losses have a favourable effect in the upper ceiling area. Pleasant temperatures in those parts of a room where people spend time then drop towards the ceiling to make for an optimal room temperature profile. Cycle heat and waste heat from production can easily be used to heat Roth industrial floor heating units, thus minimising operating costs and enabling investment costs to be paid off quickly. Roth industrial floor heating can be integrated into all static ceiling and floor constructions and is suited for all types

of concrete used for these applications (reinforced concrete, steel fibre concrete, rolled concrete). In accordance with the building's specific requirements, the pipes for the heating and cooling system are integrated into the concrete construction and connected hydraulically to the energy source.

■ **Roth outdoor heating**

Roth outdoor area heating is designed to keep car parks, access ramps, car wash facilities or open spaces in pedestrian zones clear of snow and ice. It offers installation options which can be varied to suit the specific construction requirements of each building, such as system solutions based on the Roth Pipe Fixing System and high-performance solutions for high structural and static requirements.



Harley Davidson office and sales building, West Michigan, USA

Roth sport floors

for all types of use

- > flexible for special project-specific structural requirements
- > optimal comfort
- > ideal surface temperatures
- > pipe fixing support elements for sprung floors
- > Roth ClimaComfort® TBS solution for sport floors
- > quick implementation
- > easy to install and maintain
- > highly durable Roth System Pipes
- > energy-efficient system solution



■ Roth sport floor heating – for all sorts of sport floors

Roth offers a specially developed Pipe Fixing System solution for flexible-surface sprung floors. The support elements for incorporating and securely fixing the system pipes at the measured installation distances consist of a prefabricated plastic profile with integrated pipe holders. Using coordinated fixing brackets, the support elements in the Roth Pipe Fixing System can be optimally integrated into any sprung floor construction, no matter what type of insulation layer is used. Direct installation on top of the insulation layer or the existing substructure is also possible. This system is modularly constructed and consists of only a few system components with a high degree of prefabrication. It can also be combined with the various sprung floor constructions supplied by the different sports floor manufacturers.

Architects, planners and structural engineers will have all the flexibility they need to transform all kinds of usage possibilities into reality.



Pipe fixing element and retaining bracket for fixing and guiding pipes between the sprung floor supports

The heating circuit for the Roth ClimaComfort® TBS floor heating system in the Hinterlandhalle in Dautphetal is connected using a Tichelmann distribution network



Roth underfloor heating, multi-purpose hall, Dautphetal, Germany

■ **Roth ClimaComfort® TBS for sports flooring**

In addition to traditional sprung floor heating systems, Roth also provides system solutions for surface temperature control in all other sport floor constructions. Flexible-surface sport floors with an elastic layer (sandwich construction) are produced using the Roth ClimaComfort® Dry Construction System TBS or the Roth ClimaComfort® Panel System.

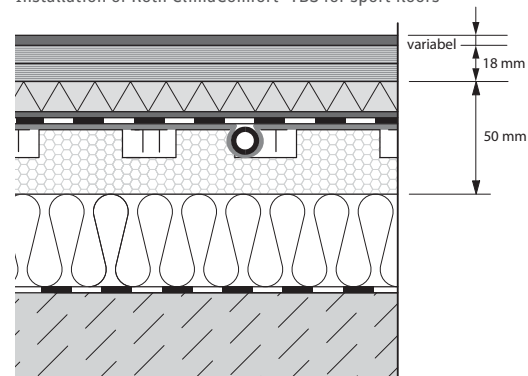
The Roth Dry Construction System for underfloor heating using hot water is the perfect match for flexible-surface sport floors conforming to DIN 18032.

We recommend that the entire Roth Dry Construction System is covered with a zinc-plated covering sheet. The flexible-surface layer made of polyurethane composite foam is then arranged on top of this sheet.

The sport and multi-purpose linoleum coating is applied on site to a layer made of plywood panels.

Even mixed elastic sport floors of construction Type A and B as set out in DIN V 18032-2 can be built in line with regulations and norms using the various Roth system solutions for floor heating and cooling systems.

Installation of Roth ClimaComfort® TBS for sport floors



Approval no. 7F416-F
Approval no. 7F414-F

Roth Isocore® concrete core temperature control

forward-looking system technology

Roth concrete core temperature control in the Skygarden, Munich:
- 16 500 m² active surface area with Roth Isocore®
- 116 500 m DUOPEX S5® 20-mm system piping

- > individual advice
- > building-specific system solutions
- > variable installation techniques
- > comprehensive service



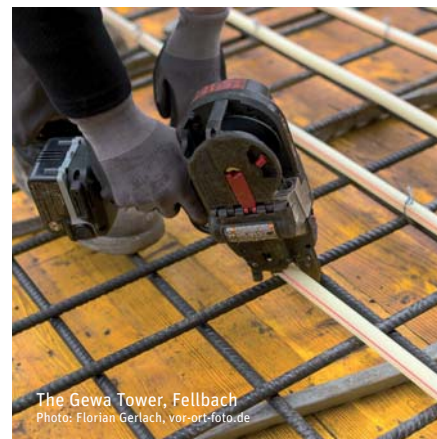
■ Exploiting the heat storage potential of concrete with Roth concrete core temperature control

Roth Isocore® concrete core temperature control enables a building's own temperature to be used when temperatures rise or drop by integrating a system of water pipes into solid concrete ceilings and walls, taking advantage of their capacity to store energy. Roth Isocore concrete core temperature control is ideally suited for use in the construction of new office and administrative buildings with high concrete core heat storage potential.

Thanks to low system temperatures when heating is required and the relatively high system temperatures when cooling is what is needed, Roth Isocore® can be used in combination with renewable energy sources, such as solar and heat pump systems to excellent effect. The Roth Isocore® is an energy-efficient, environmentally friendly and future-ready system designed for all-year-round building temperature control that keeps environmental factors at the centre of its focus.



Roth concrete core temperature control in the Gewa Tower
- 5 300 m² of active surface using Roth Isocore®
- 45 000 m of DUOPEX S5® 20-mm system piping





Central bus station, Munich, Germany
 Photo: HOCHTIEF Projektentwicklung GmbH

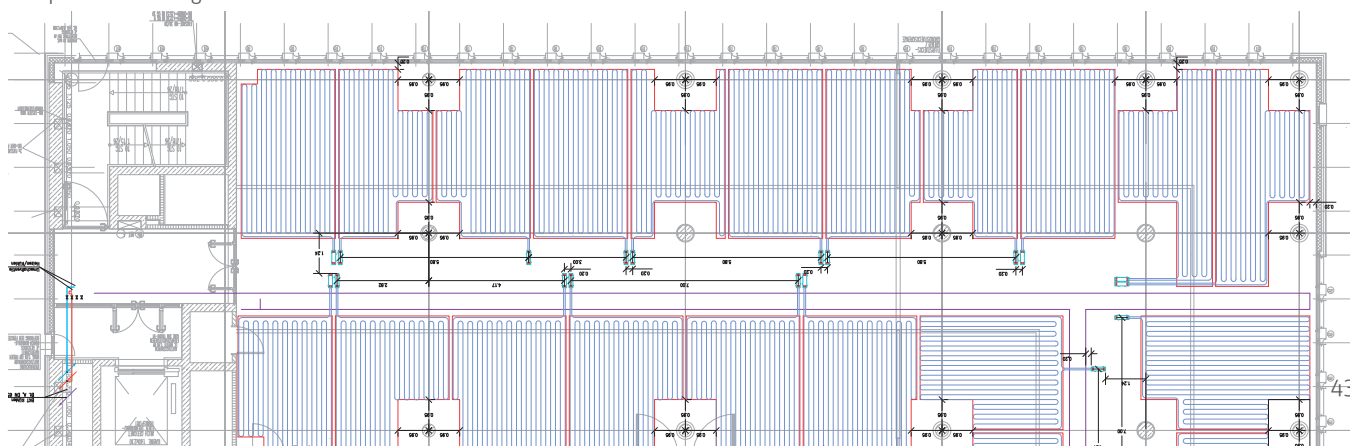
Roth concrete core temperature control in Munich central bus station
 - 7 000 m² of active surface using Roth Isocore®
 - 47 000 m of DUOPEX S5® 20-mm system piping

At a glance

- > made-to-measure system solutions adapted to on-site structural specifications for solid ceilings and walls
- > system components that work in harmony with one another
- > installation techniques can be varied to suit the specific requirements of each building
- > variable strategies for integrating the hydraulics into a building's overall building services system
- > validated system performance data that conforms to all relevant standards
- > comprehensive Roth planning and advice service
- > construction site guidance and building-specific system acceptance
- > support provided by specialists with many years of experience in project implementation

■ Service and planning

Roth provides you with support during the planning process and offers a comprehensive range of services





Roth Control Technology

for comfort and convenience



EnergyLogic Touchline wireless control system, heating/cooling



EnergyLogic Basicline wired controls for individual rooms, heating



EnergyLogic Basicline wired controls for individual rooms, heating/cooling

■ Temperature regulation technology

Floor heating and cooling systems should guarantee an operating mode ideally suited to weather conditions and user requirements, while at the same time offering the most efficient possible running and energy consumption. The mandatory requirements contained in the EnEV (German regulations on energy efficiency) include provisions for devices for controlling and regulating floor heating and cooling

systems governed by such factors as outside temperature and time of day, as well as temperature regulation for individual rooms. Roth building services technology components conform to these requirements and are perfectly matched to the way that Roth floor heating and cooling systems work.

Roth controls for individual rooms are specially adapted to the needs of the application (whether it be heating or

heating and cooling, at 230 V or 24 V) and are extremely easy to use. Due to the very small amount of wiring work it requires, wireless control, while it is also excellent for new builds, is particularly suitable for renovation projects.

Like the other system components of the Roth floor heating and cooling systems, Roth control technology components are also covered by the extensive guarantee services listed on the Roth warranty certificate.

Roth EnergyLogic Touchline

maximum comfort at minimum cost

- > very user-friendly
- > efficient and saves energy
- > optimal comfort
- > modern and always up to date
- > compact, slimline shape
- > timeless, stylish design
- > easy readability



■ Roth EnergyLogic Touchline – the state-of-the-art wireless control system for optimal living comfort

The Roth EnergyLogic Touchline wireless control system enables you to monitor precisely the temperature in every room to determine heating requirements. This data is collected and continuously analysed by the control distributor to ensure that the associated heating circuit or actuators are controlled precisely as required. That means that each room is supplied with the right amount of energy at the right time,

preventing any overheating and allowing the temperature to be controlled quickly and precisely. This can save you up to 20 percent of your heating costs.

The Roth EnergyLogic Touchline controls heating and cooling conveniently and efficiently. Its LAN connection and other communication interfaces make it possible to add system enhancements and integrate additional heat sources fast.

■ The future starts now

The Touchline in-room control unit forms part of a greater overall system. All Touchline in-room control units have a high-gloss surface with an easily readable display, along with five sensor buttons. The innovative sensor buttons are highly responsive, will not get dirty or wear out. An integrated SD memory card with boot loader software makes upgrading the system easy without having to replace the control unit.



19,5 mm



The most slimline control unit of its type



The Touchline connection module with 4, 8 or 12 channels provides the link for a perfect, accurate exchange of information between the Touchline room control units and the actuators.



■ **More than just an in-room thermostat**

With every Touchline in-room wireless control unit you can set the room temperature you want directly – but that’s not all it can do. The unit also provides additional information on and access to all system parameters whenever you need it.

Our Touchline wireless control units form part of our Touchline wireless control system. The current room temperature is constantly displayed on the large display panel. The temperature can be adjusted easily and directly at any time using the two sensor buttons at the top of the device. The units also provide additional information on battery status, connection quality and operating mode.

You can use the menu button to select from various operating modes (heating, reduced power, timer programs, etc.). An efficiency display supplies information on current energy consumption.

Every in-room control unit has two menu levels.

Timer programs, battery saving modes are among the menu items available on the user menu. The system also has a password-protected service menu, which allows the installer to read and adjust system parameters. A simple menu structure and convenient default factory settings help the installer to get the system up and running in no time at all.

The bi-directional radio connection (running on 868 MHz) between the in-room control unit and the connection module provides highly reliable transmission. As every in-room control unit is capable of both sending and receiving signals, the user is supplied with all information and feedback he or she needs from the connection module, making the system much easier to install, set up and operate. The power-optimised signal strength adjustment has the added benefit of extending battery life.

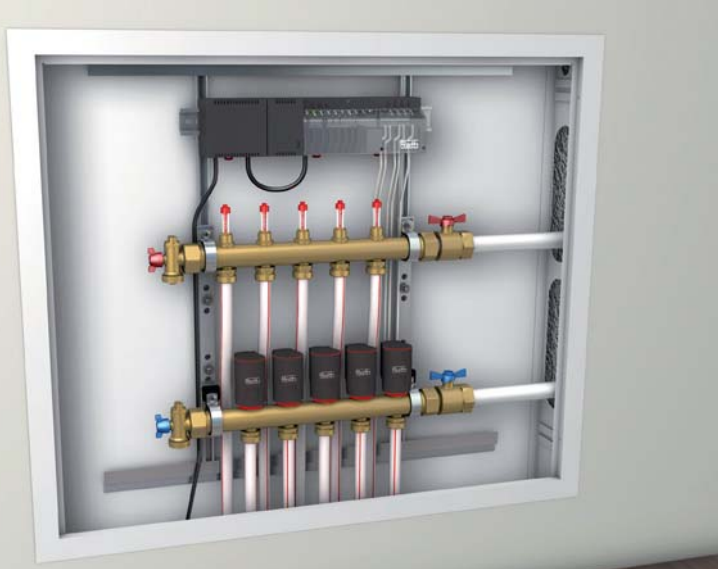
Energy savings: The energy consumption of

each in-room control unit, including the 230 V model, is less than 0.2 Watts.

Consequently, five in-room control units in an average-sized apartment will consume less than 1 Watt in total.

Roth EnergyLogic Touchline

modern functionality



The Roth heating circuit manifold with Touchline connection module distributes heat evenly and maintains room temperatures at a constant level



Infrared measurement of the surface temperature establishes the optimum temperature to keep feet comfortable

■ Roth EnergyLogic Touchline – convenient, efficient heating and cooling

> Energy savings

An extremely precise and intelligent control system, saving up to 20% in heating costs

> Smartphone operation

Easy operation of regulation functions using Touchline+ App available for Android and Apple iOS

> Comfort and convenience

Simple set-up and operation (easy to use, easy to control)

> Up-to-date

Always up to the current state-of-the-art thanks to its update function via integrated SD card

> Effectiveness

Latest-generation control system with optimal use of energy and hydraulics – for perfect comfort at home

> Optik Plus

Modern, timeless design with innovative sensor button, winner of the Plus X award

> Cutting-edge comfort

Additional infrared surface temperature measurements of the underfloor heating help to generate a comfortable, well-balanced room temperature, as well as protecting floor surfaces from any overheating.

> More than just an in-room thermostat

Each Touchline in-room control unit does more than just control the room temperature: it also provides full access to all the functions and settings for the entire system

> Operational safety and environmental benefits

The room control device with an optional 230 V power connection guarantees a constant power supply – with no need for batteries

■ An award-winning product

The Roth Touchline in-room control unit has won the Plus X Award in recognition of its excellent design, user-friendly operation and range of functions. The jury for the Plus X Award also awarded the Touchline the distinction of the “Best product of the year” accolade.

The accolade is the world's biggest innovation prize for high-quality technology, sport and lifestyle products.



Roth Touchline+ App

full temperature control via your smartphone



■ Thanks to the Touchline+ app, you can operate your Roth EnergyLogic Touchline wireless control system via Wi-Fi either from home or via the Roth portal server over the Internet when you are out and about. Simply connect the Touchline connection module to your existing home network using RJ45. You will need to have a Wi-Fi router when setting up for the first time.

The Touchline+ app is available for Android smartphones and tablets as well as for Apple iPhone and iPad systems.

Once you have installed the app, you can view the individual room temperatures and then check and modify target temperature values. You can change the function mode (daytime, reduced, frost protection operation) of each individual in-room wireless control unit – you can even change the function mode for the entire system at the touch of a button.

To make it even easier to use, you can give names to the each individual in-room wireless control unit in the app under “Settings”.



The Touchline+ App – available for Android and iOS (iPhone and iPad)



Manual and documents

At a glance

- > easy operation, whether you're at home or out and about
- > read out room temperatures
- > adjust target temperature values
- > select the function mode of in-room wireless control units individually (daytime, reduced power, frost protection operation)
- > change the function mode of the entire system at the touch of a button
- > choose names for each in-room wireless control unit

Roth EnergyLogic Basicline

compact, flat design

- > high-gloss surface finish with flush-mounted control knob
- > LED operation or status display glows gently through the device enclosure
- > slimline design, – just 16 mm thick



Room thermostats
Basicline H, H/C and H/E



Room thermostat
Basicline H.A

■ Effective control, stylish design

Designed for room-by-room control of floor heating and cooling systems, the EnergyLogic Basicline wired room thermostats are a new addition to Roth's product range. With their innovative, modern styling they have been modelled on the EnergyLogic Touchline in-room radio control units. This means that all Roth components in this product family have a consistent look.

■ Stylish details in the contemporary home

The flat, smooth design of the high-end plastic enclosure will not date and is also easy to clean. Whether in heating or cooling mode, the LED display glows gently through the high-gloss, pure white (RAL 9016) enclosure and the colour provides an attractive highlight in the home. Operation is simple thanks to the flush-mounted control knob on the enclosure.



16 mm



extremely slimline design!

■ Basicline thermostats for individual room control

The Basicline series includes five types of thermostat, each with its own range of features and functions:

The **Basicline H** in-room thermostat for temperature regulation of floor heating systems, the **Basicline H/E** with two additional connection terminals for an external temperature sensor and the **Basicline H.A.**, which is equipped with an analogue temperature scale. For heating and cooling operation, Roth can offer the **Basicline H/C 230 V** and **H/C 24 V**, while for public buildings the **Basicline H, i** with concealed internal temperature settings would be a good choice. Depending on the mode selected, the LED display of the room thermostats lights up red when heating and blue with the Basicline H/C when cooling. In addition, the digital **Basicline T** clock thermostat with a built-in weekly timer is also available.

The clock thermostat allows the required temperature profile to be precisely adjusted throughout the day to match the habits of the building's occupants. This guarantees the greatest possible comfort with maximum energy savings.

Depending on the model, high-quality clamp-type or plug-in terminals are used for electrical connection of the room thermostats.

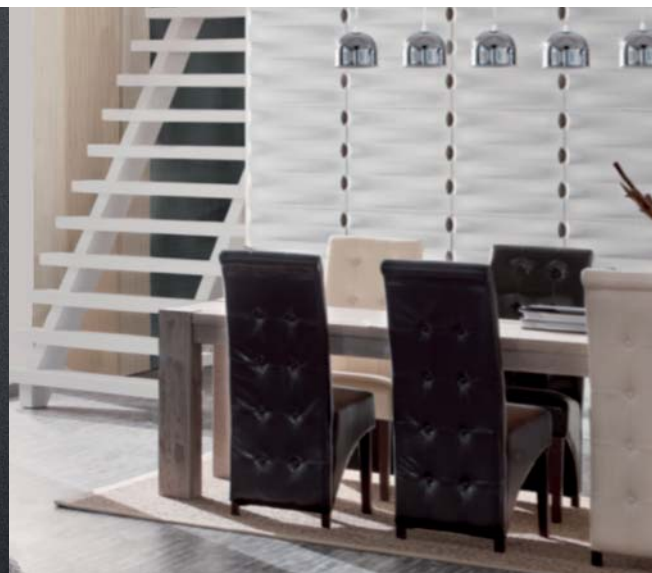
■ Basicline H room thermostat

The cable connected Basicline H electronic room thermostat is used for the standard function "H" (heating). It offers the following benefits:

- > extremely simple to use
- > built-in red LED display
- > reduced input for energy savings
- > completely silent
- > easy to connect using high-quality plug-in terminals



The Basicline connection module is designed to provide a fast, easy to understand and secure connection between the in-room thermostats and the system actuators



Room thermostat
Basicline H, i
The “Public
Authority” Model

Clock thermostat
Basicline T

■ **The Basicline H/E in-room thermostat**

The Basicline H/E in-room thermostat is similar to the Basicline H. It has two extra connection terminals, which are reserved for an external temperature sensor. It is available in both a 24 V and a 230 V model.

■ **The Basicline H.A in-room thermostat**

The Basicline H.A in-room thermostat is similar to the Basicline H. Its analogue temperature scale, which shows no digits or Celsius details, makes it particularly easy and intuitive to use. It is available in a 230-V variant.

■ **Basicline H, i room thermostat**

The Basicline H, i in-room thermostat differs from the Basicline H in that it has a concealed internal temperature setting. It is particularly suitable for use in public buildings. It is available in both a 24 V and a 230 V model.

■ **Basicline T clock thermostat**

Roth’s newly developed electronic, digital Basicline T in-room thermostat for heating modes comes with a built-in weekly timer, a large illuminated two-line display and five modern sensor buttons. It is suitable

for pilot control together with all 230 V Basicline in-room thermostats. Together with the optional temperature sensor, it can be used to monitor and regulate the floor surface temperature.

A large selection of operating modes gives you many options to choose from: automatic, comfort, reduced power and frost-protection temperature, as well as a party and holiday function.

- > large, modern display
- > wear-resistant sensor buttons
- > high-quality, extremely flat enclosure
- > easy-to-clean surface finish throughout
- > individually programmable temperature profile for each room
- > reduced output
- > Tamper-proof control buttons for use in public buildings
- > optimal energy savings

■ **Basicline H/C 230 V room thermostat**

The Basicline H/C 230 V in-room thermostat is suitable for controlling the temperature in both heating and cooling mode. The switch between heating and cooling mode is fully automatic for all Basicline H/C thermostats thanks to a centrally emitted switching signal, e.g. from a heat pump. Operation is therefore extremely simple and convenient for the user.

The thermostat can also be connected to the Roth floor and wall temperature sensor (optional).

The LED display is illuminated in either red or blue, so the user can see the current operating mode on each individual in-room thermostat.

- > simple to use
- > built-in red/blue LED display
- > reduced input for energy savings
- > completely silent
- > optional mode to disable cooling

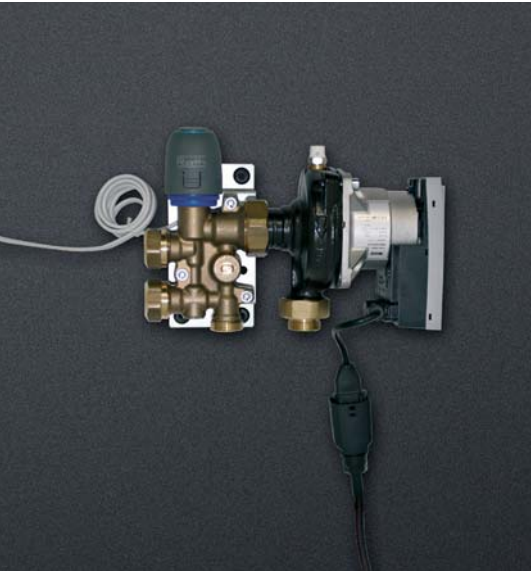
■ **Basicline H/C 24 V room thermostat**

The Basicline H/C 24 V in-room thermostat is similar to the Roth Basicline H/C 230 V in-room thermostat, but it also comes with a connection for the Roth RFTP1 dew point sensor. This sensor detects values which are below the dew point and temporarily switches off the cooling operation. The thermostat flashes blue when the values detected are below the dew point.

The area of application for the 24 V model ranges from floor heating/cooling to ceiling heating/cooling, with temperature and dew point monitoring on a room-by-room basis.

Roth control stations

quick and simple set-up



■ Roth small-area control station – the tried-and-tested connection

The small-area control station is used for connecting floor heating systems to existing radiator heating systems.

Two underfloor heating circuits can be connected with the device's dual coupling. The room temperature is controlled via a Roth room thermostat and the integrated actuator (providing fixed-value temperature control).



■ Roth HE fixed-value control set horizontal

A compact control station for constant input temperature control in floor heating systems with side connection to heat source with a thermal output of up to 14 KW. The control set is designed for use in manifold cabinets and requires an installation depth of at least 150 mm.

The product includes a control set with a high-efficiency pump, a thermostat head, a capillary tube temperature sensor and a safety temperature limiter.



■ Roth fixed-value control set with high-efficiency pump

A compact control station for constant input temperature control in floor heating systems (fixed-value temperature control) with a thermal output of up to 14 KW.

The control set is designed for use in manifold cabinets and is installed directly on the heating circuit manifold. The product includes a state-of-the-art high-efficiency pump, as well as additional ball valves and a thermometer.

The benefits of Roth control stations

- > Roth's control stations are categorised in energy efficiency class A and comply with the 2013 and 2015 ErP Directives
- > suitable for renovations and new buildings
- > quick and simple commissioning
- > easy to operate
- > ideal for renovations and retrofitting





■ **Roth weather regulated control station with high-efficiency pump**

A compact weather regulated control station for floor heating and cooling systems (weather-regulated temperature control) with a thermal output of 14 KW. The control station is fitted ex-works with a CC-HC climate controller and outside temperature sensor.

It is designed to be integrated into the manifold cabinet and connected directly to the heating circuit manifold.

■ **The Roth RKR 3 H/K control station**

A control station that includes an integrated CC-HC climate controller for central, weather-regulated input temperature control (weather-regulated temperature control) for floor heating and optional floor cooling. The compact, preassembled unit is completely enclosed in an EPP casing with fully insulated hydraulics conforming to EnEV regulations. The Roth RKR 3 H/K control station is designed with an enhanced thermal output of up to 18 KW for detached or semi-detached homes.

■ **The Roth CC-HC climate controller**

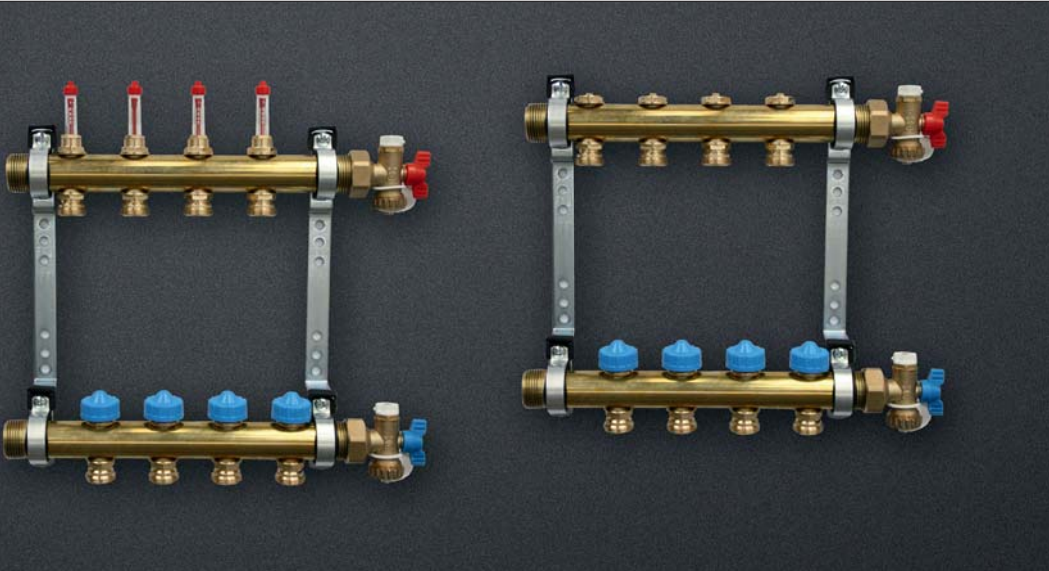
The CC-HC climate controller is a modern, fully electronic control device. It forms part of Roth's weather regulated control stations and the RKR 3 H/K control station. The climate controller is easy to operate, with two configurable heating programs and ten separate weekly programs. It features a large display that constantly shows the input temperature and outside temperature, as well as the status of the mixer and circulation pump, and the current operating mode. It also gives you the option of activating additional components such as

heat sources or switching valves.

Technical data on Roth control stations					
Type	Small-area control station	Fixed-value control set HE horizontal	Fixed-value control set with high-efficiency pump	Control station Weather regulated control station with high-efficiency pump	Control station RKR 3 H/K
Functional principle	Fixed-value temperature control			Weather-driven temperature control	
Mixing valve	2-way injection valve	3-way mixing valve			3-way mixer
Controller	Actuator and thermostatic valve	Thermostatic head with temperature sensor in inlet		Electronic controller with inlet, return and outside temperature sensors	
Setting range	10 - 45 °C	20 - 50 °C		10 - 45 °C (individually adjustable)	
Area of application	Underfloor heating e.g. in renovation projects	Floor heating systems in flats /floors of a building, installation in manifold cabinet with a minimum depth of 150 mm	Floor heating systems in flats/floors, For installation in manifold cabinet		As a central control station
Energy efficiency class	Energy efficiency class A, compliant with the ERP Directive for 2013 and 2015				
Thermometer	-	-	1 unit		2 units
Ball valves	-	-	2 units (inlet and return)		
Thermal output	max. 2 KW	max. 14 KW (take planning parameters into account)			max. 18 KW
other	Unit supplied ready for connection, completely preassembled and wired				
Dimensions [mm] L x H x D	215 x 175 x 97	240 x 380 x 140	276 x 360 x 110	256 x 360 x 110	300 x 370 x 240

Roth heating circuit manifold

a well rounded unit



Roth floor heating and cooling system, Marburg central railway station, Germany

■ **Roth heating circuit manifolds keep you cosy and comfortable**

The heating circuit manifold ensures that each individual heating circuit is hydraulically balanced and maintains room temperatures at a constant level, thus keeping the building's residents cosy and comfortable.

Through the system's ability to regulate temperatures in each room individually, it allows users to set in-room temperatures according to their needs.

The flow distributor and return flow collector, made from circular brass shaped strips, can be connected from the left or right via the 1" flat-sealing external thread. There is no misalignment at joints between pipes, and thus no compensation pieces are needed, which means fewer joint seal points.

The flow and return pipes are staggered, making them easier to assemble. The heating circuits are connected using a 3/4" Euro cone. The manifold is pre-mounted on sound-insulated consoles.

The valve cores are carefully chosen to be well suited to Roth actuators. This makes the heating circuit manifold an integral part of the system solutions offered by Roth. It is available with between 2 and 12 connections and with or without flow volume indicator. The heating circuit manifold can be used for all Roth System Pipes in sizes from 11 to 20 mm.



Roth actuator now uses just 1 Watt of electricity

- > compact and high-quality
- > simple plug-in installation
- > completely watertight (IP54)



Expertise in floor heating and cooling systems

Quality in every respect

- > comprehensive Roth system range
- > high degree of prefabrication ex-works
- > universal utilisation possibilities



■ From manufacture through project planning, all the way on to assembly – and, naturally, beyond!

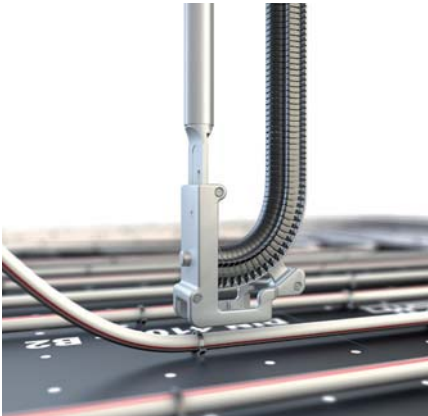
Those who want to enjoy all the advantages of floor heating and cooling know they can put their trust in the comprehensive Roth system range, since Roth not only offers the perfect solution for any requirement, but also promises customers a high standard of quality and service on which they can rely.

A high degree of prefabrication ex-works, universal utilisation possibilities, system components that are designed to work optimally with one another, long service life and stable value – these are the Roth System advantages. They bring together all of the advantages of floor heating and cooling to their fullest extent. Why be satisfied with less?

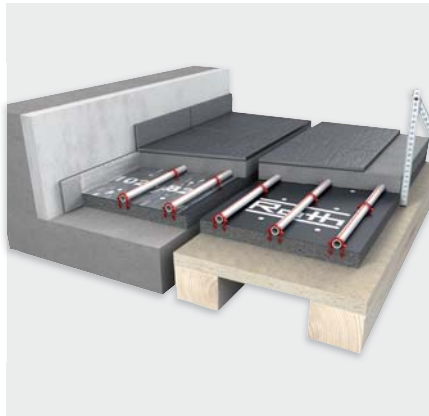
■ Roth floor heating and cooling systems always fit together perfectly

All Roth floor heating and cooling systems are quite suitable for use in combination with one another.

Depending on requirements for quality of living, Roth offers individualised temperature equalisation via floors, walls and ceilings for new buildings and renovations.



Roth Original Tacker® System



Roth Quick-Energy® Tacker System



Roth Flipfix® Tacker System



Roth Knob System



Roth ClimaComfort® Dry Construction System



Roth ClimaComfort® Panel System



Roth ClimaComfort® Compact System



Roth industrial floor heating



Roth sport floor heating



Roth Isocore®



Roth wall heating



Roth outdoor panel heating

References

actual examples that speak for themselves



- 1 **Roth underfloor heating**
Hotel Loisium, Langenlois, Austria
- 2 **The Roth Pipefix system**
St. Jakobi "Kulturkirche" cultural centre,
Stralsund, Germany
- 3 **Roth Original Tacker® system**
Cineplex and arts centre, Marburg, Germany

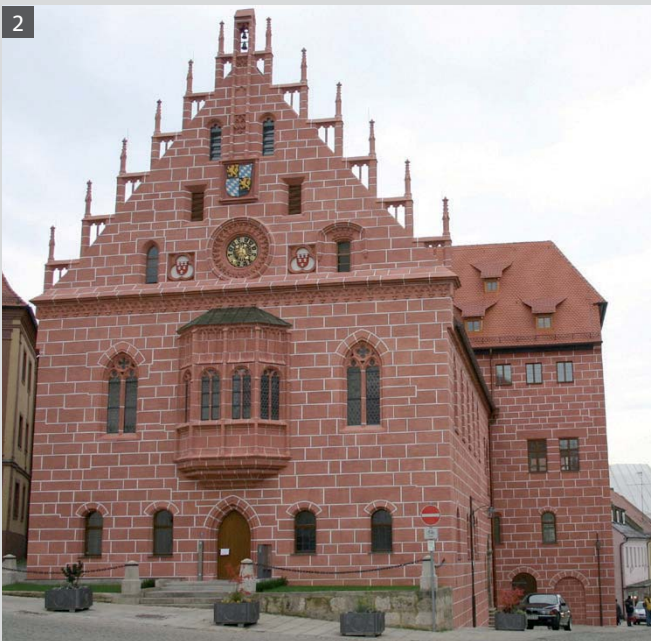




- 4 **Roth ClimaComfort® TBS**
Frauenkirche church, Dresden, Germany
- 5 **Roth industrial floor heating**
Kleiner commercial premises, Kempten, Germany
- 6 **Roth Original Tacker® system and
Roth AuraCompact® 12 kW E heat pump**
Office facility and training centre,
Arnsdorf, Germany

References

actual examples that speak for themselves



- 1 **Roth Original Tacker® system**
Spa at Linsberg, Austria
- 2 **Roth underfloor heating**
Town hall, Sulzbach-Rosenberg, Germany
- 3 **Roth Isocore®**
Media Tower, Düsseldorf, Germany



- 4 **Roth KlimaComfort® Compact System**
Residential complex at Luggesmühle, Bottrop, Germany
- 5 **Roth Original Tacker® system**
Exclusive apartments on Goethegasse, Vienna, Austria
- 6 **Roth Isocore®**
Rheinisches Landesmuseum (Rhineland Regional Museum) Bonn, Germany

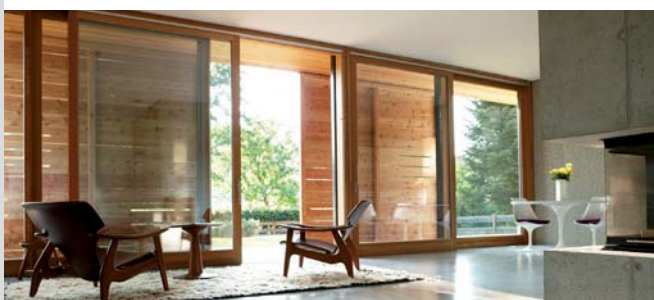


References

actual examples that speak for themselves



- 1 **Roth underfloor heating**
Marburg main railway station
- 2 **Roth ClimaComfort® Panel System**
Roth Original Tacker® system
The “Rauchkuchlhaus” overlooking the Schliersee
- 3 **Roth Quick-Energy® Tacker System**
Roth Original Tacker® system
A residential house in Dautphetal



Our strengths

Your benefits

Innovation

- > Early identification of market requirements
- > In-house materials research and development
- > In-house engineering
- > The company is certified in accordance with DIN EN ISO 9001

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 warranty 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





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 WERKE GMBH

Am Seerain 2
 35232 Dautphetal
 Germany
 Phone: +49(0)6466/922-0
 Fax: +49(0)6466/922-100
 Technical Support: +49(0)6466/922-266
 Email: service@roth-werke.de
www.roth-werke.de

