

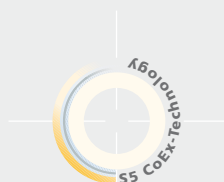
Radiant heating and cooling systems
System solutions for all areas of application



5 layers levels of safety



... living full of energy



made by Roth



Roth radiant heating and cooling systems

... innovation and performance for modern living spaces



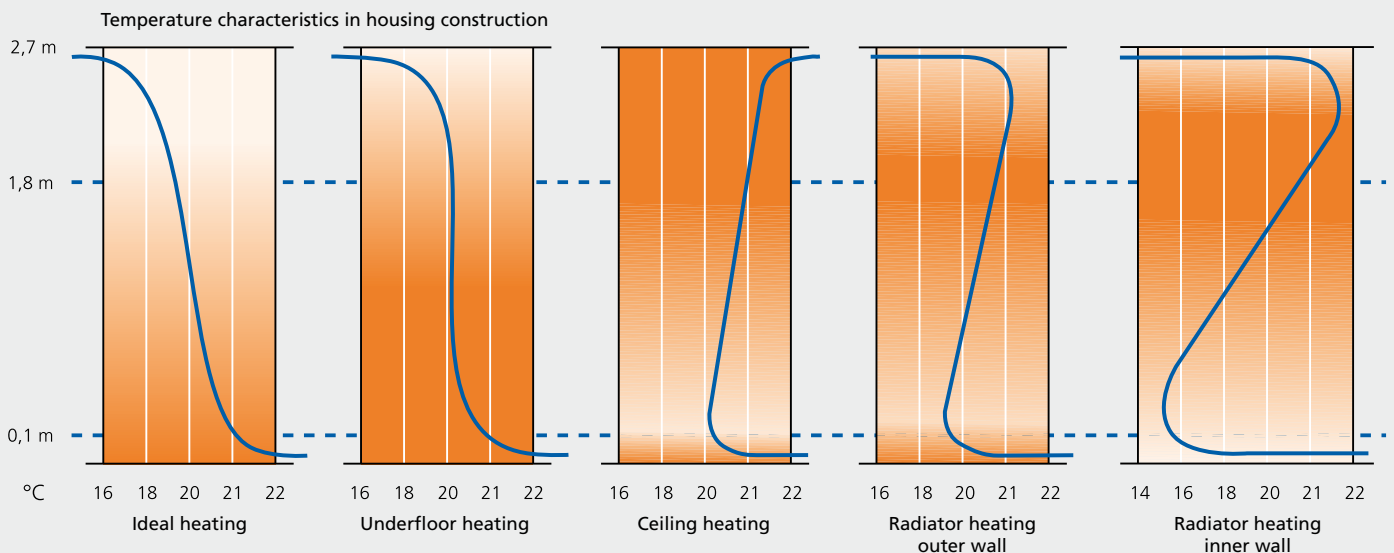
■ **The demand for high-quality living spaces in both existing and new buildings is increasing all the time, and with it the expectation of state-of-the-art temperature control.**

Whether it be for residential building, office and business construction, industrial and sports halls or open spaces – what was an exception to the rule yesterday has now become expected: usage-optimised heating and cooling systems that continually keep pace with individual requirements. It is therefore hardly surprising that the majority of planners and building owners looking for modern and advanced system solutions are now choosing radiant heating and cooling systems. The retrofitting of radiant 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 freedom of architectural design, the decisive criteria in the selection of a radiant heating and cooling system are energy savings, hygiene and environmental protection.

An optimal room temperature profile with precisely adjustable dosing makes the performance capability of Roth radiant heating and cooling systems readily perceptible – day in, day out. Equally, negative impacts on room temperature (such as those caused by swirling air, draughts or heat accumulation) are a thing of the past. As a matter of fact, their march of temperature characteristics corresponds almost precisely to ideal heating (see graph).

Experts know: the larger the heat-radiating surface, the more effective and economical the room heating will be. In comparison with conventional radiators, the ideal room temperature with a radiant heating system is 1 °C to 2 °C lower. The resulting energy savings of 6 to 12 % speak for themselves, as do the lower system and flow temperatures. These systems are also extremely well suited for use in conjunction with equipment that produces renewable energy, such as Roth solar panels. Additional plus points are also to be found from the point of view of hygiene: the dryness of the heat deprives bacteria and dust mites of the moisture they need for survival.



■ Guide to Roth radiant heating and cooling systems

Roth system name	Building types						Application areas			Mounting surfaces			Load-distribution/ covering layer		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
 Knob System	X	X	X	X			X	●		X			X		X
 ClimaComfort TBS	X	X			●		●	X	X	X			●	X	X
 Pipe Fixing System	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					
 Isocore®	●	X		X			X	●		X	X	X	X		

● : Building-specific

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Roth S5 CoEx Technology

... always playing it safe with 5 advantages

■ **All good things come in ... fives.
And piping, the arteries of a
perfectly planned and optimally
functioning radiant heating and
cooling system**

Profiting five times over from a professional system. The new Roth pipe philosophy makes this possible. The five-layer construction of Roth DUOPEX S5®, X-PERT S5®+ and ClimaCor® S5 system pipes equates to five real benefits for you and your company. All pipes are manufactured using our unique, tried-and-tested five-layer CoEx technology.



Advantage 1



Advantage 2

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

In order to meet the high requirements they must fulfil on site and during transport, Roth DUOPEX S5®, X-PERT S5®+ and ClimaCor® 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 radiant heating and cooling systems. With millions of systems proving their worth out in the field, Roth comes equipped with years of experience and thereby with the greatest amount of technological know-how. The Roth Original Tacker® System and the Roth Knob System fulfil the highest expectations in terms of quality and safety, in excess of technical standards.



made by Roth



Advantage 3



Advantage 4



Advantage 5

■ Service

- Comprehensive, qualified field service for fast on-site consultation concerning technical and commercial questions
- Planning service
- Training courses, planning and product seminars held on an ongoing basis
- 10-year spare parts provision and after-sales guarantee following termination of the product programme.
- Fast availability of all Roth brand product ranges throughout Europe



These services are further enhanced by our membership of the Handwerker Marke Craftsmen's Association.

■ Guarantee and warranty

Quality for the safety of our customers: we consider this as 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 of a termination of production. 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 radiant 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 radiant heating and cooling systems are concerned. They create a lasting sense of well-being by distributing energy in a way that is pleasant for their users and increase the value of the property in question too.



Roth DUOPEX S5[®], X-PERT S5[®]+, and ClimaCor[®] S5

... perfect for all requirements



■ **Roth DUOPEX S5[®], X-PERT S5[®]+
and ClimaCor[®] S5 system pipes –
just 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 – high quality for
every area of use**

You will always find the perfect solution to your building's specific requirements for a radiant 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 of the pipe layers to one another.

■ **5 layers – 5 levels of safety**

Roth system pipes offer maximum robustness thanks to their mechanical, thermal and chemical characteristics:

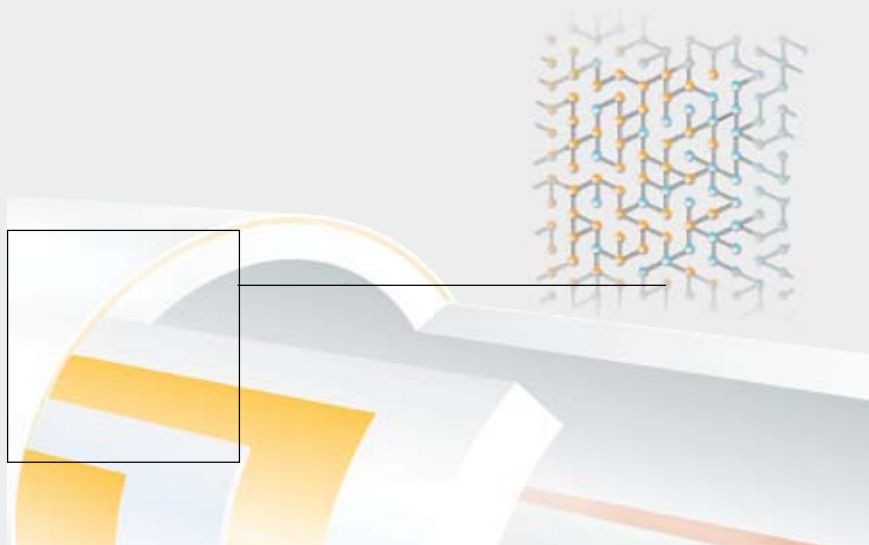
- Protection of the EVOH oxygen barrier against mechanical damage and the harmful effects of external factors such as heat and damp
- Highest level of resistance to deformation caused by concentrated mechanical loads
- The workings of the radiant heating and cooling system are optimally protected for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



- Polyethylene _____
- Polymer _____
- EVOH barrier layer _____
- Polymer _____
- Polyethylene _____

Roth DUOPEX S5® and X-PERT S5®+ system pipes

... a powerful team



All five layers of the Roth DUOPEX S5® system pipe are co-extruded and then subsequently cross-linked.

■ Roth DUOPEX S5® system pipe – the solution where only the very best will do

The 5-layer Roth DUOPEX S5® system pipe holds its own against really high levels of stress. This pipe meets the most stringent requirements, even those associated with concrete core activation and industrial construction. A continuous stress of 95 °C at an operating pressure of 6 bar and a short-term increase to 110 °C is no problem for the Roth DUOPEX S5® system pipe, which is interactively cross-linked throughout.

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

All five layers of the DUOPEX S5® system pipe are co-extruded and then subsequently cross-linked throughout by means of a patented production 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 and provides additional safety reserves.

■ Roth X-PERT S5®+ system pipe – the solution for challenging applications in the low-temperature range

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

The highly flexible 5-layer Roth X-PERT S5®+ system pipe, in combination with the new 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 a safety plus for a continuous thermal stress of 70 °C and a short-term thermal stress of 100 °C.

The X-PERT S5®+ system pipe is continuously pressure-resistant with multiple safety reserves up to 6 bar.

■ DUOPEX S5® and X-PERT S5®+ – even safer thanks to a strong surface

The surface layer means the Roth DUOPEX S5® and X-PERT S5®+ system pipes are now even stronger.

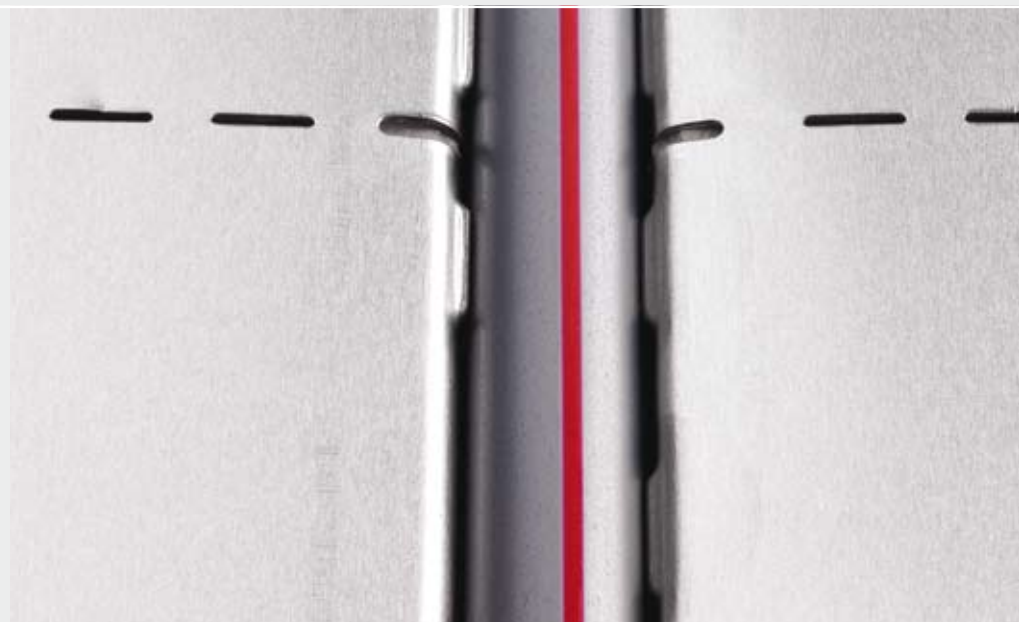
The yellow colour of these two system pipes indicates that they feature a robust surface. High resistance to wear and integrated UV stability provide additional protection, particularly for use in harsh site conditions.

■ 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.

Roth ClimaCor® S5 system pipe

... with an innovative aluminium blend layer



■ Roth ClimaCor® S5 system pipe for fast energy transfer within the Roth ClimaComfort® Panel System and the Roth ClimaComfort® Compact System

The ClimaCor® S5 system pipe is at the heart of the ClimaComfort Panel System and the ClimaComfort Compact System; it is used in new buildings and renovation projects. The pipe is available in two versions, with dimensions of 11 mm and 14 mm. In terms of quality, this pipe reaches the same high standard as the X-PERT S5®+ model. The red stripe indicates that the proven Roth S5 CoEx technology been used in this pipe, with the outer layer also being finished with an aluminium blend. The innovative aluminium blend layer ensures that the surface is particularly strong:

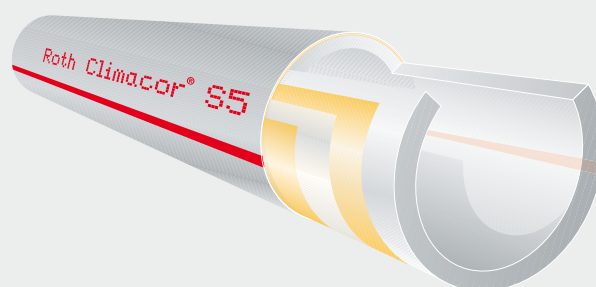
- High resistance to wear and UV protection in harsh site conditions
- Fast energy transfer within the system
- Ideal anti-friction properties for assembly and operation

This pipe is extremely flexible and therefore very easy to install, with optimum linear extension for applications where tolerance margins are tight.

The system pipe can be installed at a placement interval of 75 mm, 100 mm or 150 mm, depending on the dimensions in question. This enables excellent heating or cooling performance to be achieved.

■ The red stripe is an indicator of top quality

With its DUOPEX S5®, X-PERT S5®+ and ClimaCor® S5 five-layer system pipes, Roth is setting new standards in quality. They are the highest quality products available for their respective applications, with this quality being represented by a red stripe.



Roth Original Tacker® System

... proving its worth in millions of new buildings

■ Roth Original Tacker® System – for solutions that retain their value

A system solution whose components are designed to work together in perfect harmony provides 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 comprehensive 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 system steps to perfection

The high-quality ex-works prefabrication of all system components – pipe, composite panel and accessories – makes it possible: the complete Roth radiant heating and cooling system is laid in only three work steps using the patented Tacker technique. Of course, everything is in accordance with a precise computer calculation and taking into account all valid regulations.

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





A white, floor-standing cabinet or control unit with a control panel on the front. A white hard hat is resting on top of the cabinet.

A control panel mounted on the wall, featuring a horizontal manifold with several valves and pipes, likely for a heating system.

The floor is covered with a black mat with white dots and text, including "DIN 4102 - B2" and "32 32". The mat is covered with a network of yellow and black heating pipes, arranged in a complex, winding pattern.

Roth Original Tacker® System

... professional system solutions for top results



Roth coating plant

■ Roth radiant heating and cooling – comfort can be so simple

Fase of assembly with a high degree of flexibility, paired with operational and building site safety and superior efficiency, characterise Roth radiant heating and cooling systems – even with unusual floor plans.

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

The underfloor constructions of Roth radiant heating and cooling systems conform to DIN EN 1264 ("Water based floor heating"), 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.

■ System composite panel for radiant heating and cooling systems

Simple, fast, in compliance with standards: system composite panels made of polystyrene particle foam. An excellent choice for heat and sound insulation. They provide a self-enclosed space at the blink of an eye during the pipe laying stage. This makes it possible to have a 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, an imprinted grid makes it easier to put the system pipes exactly in place in accordance with precisely calculated laying distances.

■ A strong solution for high stresses

The Roth EPS 30 SE 26 mm system composite panel comes into play wherever traffic loads are high (in car showrooms, for example). This composite panel or panel combination can be utilised under an appropriately coordinated screed construction 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 needed depending on the thermal insulation requirements of the application in question.



Roth System Composite Panel

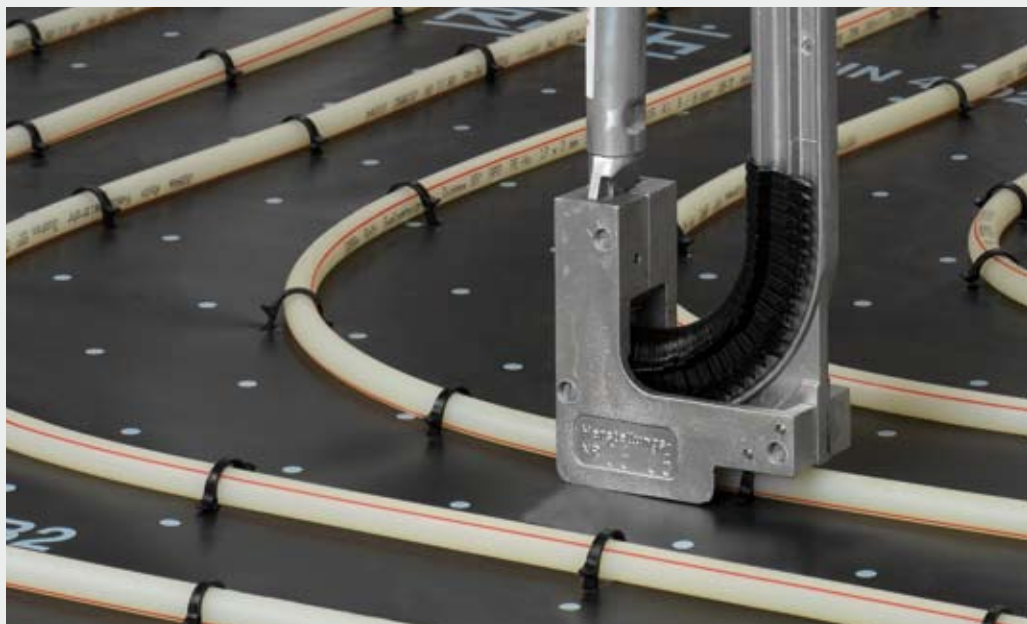


Roth composite roll



Roth Original Tacker® Clips

... with double hooks for outstanding retention force



- **Double hooks provide maximum protection against pipes being ripped out and outstanding retention force**

Roth is the inventor of both the Original Tacker® System and the unique Original Tacker® clips with double hooks, which are used to attach system pipes to composite panels. The double hooks combine maximum protection against pipes being ripped out with outstanding retention force. They also ensure that pipes are held in exactly the right place, with no chance of them moving out of position, even in harsh site conditions.

Roth Original Tacker® clips are made from a high-strength, extremely stable plastic so they can be pushed through the insulating film and into the composite panel easily and safely, enabling the system pipe to be fixed into position with no problems whatsoever.

- **30 clips per magazine for efficient working**

Roth Original Tacker® clips are available for Roth system pipes in sizes of 14, 16, 17 and 20 mm. The different sizes can be easily distinguished by the colours of the clips and the Tacker handle:

Clips for system pipes with a diameter of 14 mm are marked red, whilst those for 16 to 20 mm diameter pipes are black.

With 30 clips being grouped together to form a magazine, users benefit as they do not need to refill the Tacker over and over. Three strips, each containing 30 clips, can be inserted into the Tacker and that's all the effort required: as soon as the strip is removed, the clips are left loose in the magazine ready to use.

A weight ensures that, once a clip has been used, each subsequent clip slides into position easily.

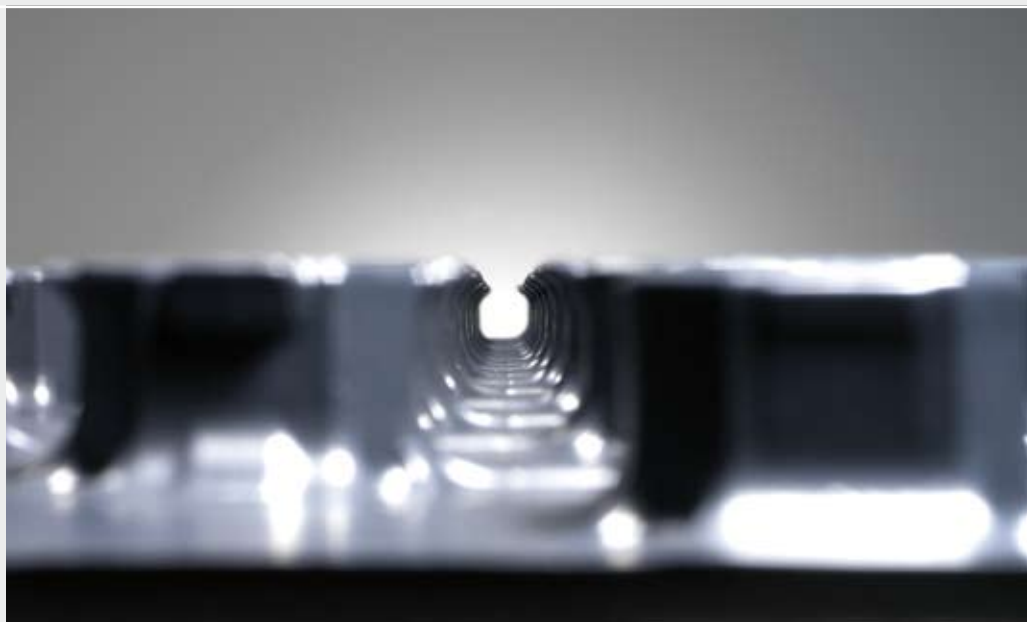
Roth Original Tackers® are height adjustable, so they can be used by any operator, be they short or tall.





Roth Knob System

... for fixing pipes securely in new buildings



■ An extremely flexible system

The new Roth Knob System is characterised by a high degree of flexibility and straightforward assembly. The undercut and ideal shape of the knobs enables 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, enabling you to create environmentally-friendly installations with very little waste. Filler knob panels are available too.

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

■ The advantages at a glance

- Suitable for all Roth system pipes with \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
- Knob grid of 50 mm: all placement intervals and shapes possible within the 50 mm grid
- Effective laying area/panel: 1,26 m²
- Assembled into a single unit ex-works
- Overlap on two sides so that elements can be interconnected
- Footfall noise is reduced
- 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 laying surface which is good to walk on
- The diagonal fixing method makes it easier to lay Roth system pipes in this way
- Films and support plates are manufactured without the use of CFCs

Roth Knob System

... flexible, problem-free, perfect



■ Roth knob panel 14 – 17 DEO 10

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 the placement of the Roth system heating pipes – even with low exterior temperatures.
- The Roth knobs interlock with one another respectively in double rows by means of two-sided foil protrusion. The best prerequisites for utilisation of flow screed.
- Without the use of additional tools, the Roth System heating pipe is pressed with the foot into the knob, where it audibly and securely engages.
- Suitable for all Roth system pipes of \varnothing 14 mm to \varnothing 17 mm
- The two-layer polystyrene construction ensures the knobs can be walked on, whilst also providing thermal insulation.
- The Roth manifold connection knob makes possible unproblematic adjustment of laying distances in the area of the manifold in accordance with distributor connections.

- The area of the door between two rooms is simply to be bridged with the Roth compensation knob in connection with the Roth compensation knob foil.
- The foil of the Roth edge insulation strip is to be pressed into the Roth knob with the Roth PE profile. An ideal solution, even with the utilisation of 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.

■ Thought through in detail

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



Roth radiant heating system,
Keramion Ceramic Museum,
Frechen, Germany



■ **Roth Knob System – innovative and high-quality**

The Roth system knob panel features a surface finished with steam pressure and is perfectly matched to the Roth DUOPEX S5® and X-PERT S5®+ system pipes; used together, they offer improved safety for modern low-temperature applications at a competitive price.

The innovative, high-quality Roth Knob System completes our range of products, complementing as it does our Roth Original Tacker® System.

■ **Simple assembly with the Roth system knob panel**

Excellent insulating properties and surfaces finished with steam pressure provide a high-quality basis for problem-free installation and long-term use. The Roth system knob panel ensures that pipes are easy to install and position. It is suitable for system pipes in dimensions of 14 mm and 17 mm.



Roth radiant heating system,
Niederösterreichisches Landesmuseum
(Museum of Lower Austria),
St. Pölten, Austria

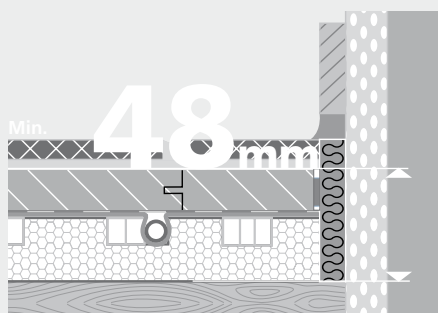
Roth ClimaComfort® TBS with Alu-Laserflex

... perfect for both new and existing buildings



■ A flexible system with a single insulation panel type

Whether it be for new construction or renovation plans: the Roth ClimaComfort® TBS will meet any and every requirement in a way you are sure to find really impressive. Only one single system panel type is required for laying the insulation. This ensures that installation is straightforward, secure and quick and allows for flexibility in the layout, even if the room in question poses difficult challenges.



Low installation height between 48 mm and 59 mm

The low installation height and the low mass per unit area mean that the Roth ClimaComfort® TBS is ideal for use in buildings undergoing renovation. The Roth ClimaComfort® TBS system panel is just 33 mm in height. This means that the entire installation height for the floor structure falls between 48 mm and 59 mm, depending on the load-distribution layer used. The installation on the wall, including dry-mounted boards, amounts to 46 mm. Together with the diffusion-proof and dimensionally stable Roth Alu-Laserflex 14 mm system pipe, you have a system whose component parts are perfectly harmonised.

■ So versatile – it's even the ideal solution for wall heating

The Roth ClimaComfort® TBS is suitable for a large number of applications. The Roth ClimaComfort® TBS system panels can be fastened directly to the wall for the installation of wall heating. After the Roth heat-conducting segments have been mounted, the Roth Alu-Laserflex system pipes are positioned in a meandering pattern rising up the wall. The dry construction elements are attached to this structure once the PE film has been applied.

More impressive features of the Roth ClimaComfort® TBS:

- Ideally suitable for both wet and dry construction.
- Thermal insulation in accordance with DIN EN 1264 for intermediate storey ceilings ($R_{\lambda,INS} = 0,75 \text{ m}^2 \text{ K/W}$)
- Pipes are easy to lay, allowing you to choose either a spiralling or a meandering layout.
- The hook groove on the ClimaComfort DCS system panel makes it easy to interconnect insulation panels.
- Heat-conducting segments are held securely on the ClimaComfort TBS system panel.
- Heat conducting segment with predetermined breaking point every 100 mm for the production of the desired length.
- Direction of placement either horizontal, vertical or semi-diagonal.

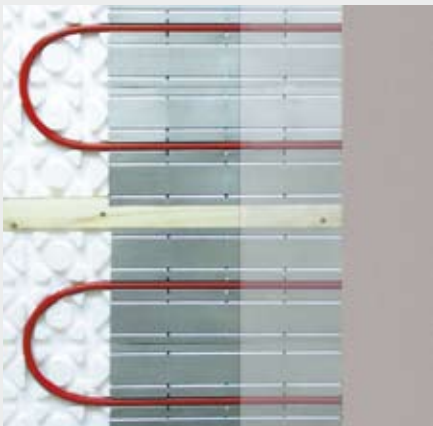


Roth Alu-Laserflex





Roth ClimaComfort® DCS, Frauenkirche, Dresden, Germany



Roth ClimaComfort® TBS wall heating

■ Easy to install

The heat-conducting segments prefabricated ex-works ensure simple adjustment of the required lengths by breaking them in two at the perforation. This has been machined in such a way that breaking off the heat-conducting segment will not lead to sharp edges, even when no tools are utilised. The system pipe can be securely embedded into the indentation provided for that purpose. The use of additional metal covering sheets is not necessary.

■ Roth ClimaComfort® TBS

This system, with its low installation height and low static dead weight, is suitable for radiant heating and cooling systems in both new and existing buildings. It can also be installed on any existing flat flooring or timber beam construction that has a sufficient load-bearing capacity.

The combination of high-quality system components, multifaceted application options and simple installation techniques is the key to your success. Roth ClimaComfort® TBS for modern heating applications.

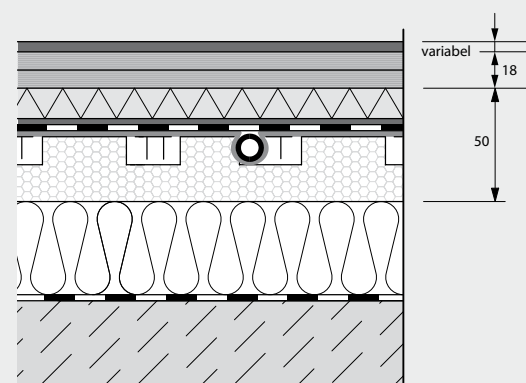
The system components are designed to work with one another optimally to ensure rapid and simple assembly. The knob design of the ClimaComfort TBS system panel makes it easy to attach the heat-conducting segments (which snap into place), even with vertical assembly, such as that required by Roth wall heating.

■ Roth ClimaComfort® TBS for sport flooring

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.

Left:
Roth ClimaComfort® TBS for sport floors,
Butzbach, Germany



Installation of Roth ClimaComfort® TBS for sport floors





Roth ClimaComfort® Panel System

... all-round comfort



■ Experience all-round comfort in existing and new buildings

The new Roth ClimaComfort® Panel System transforms floors, walls and ceilings into highly efficient, fast-response 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 is enabling people to experience that wonderful feeling of "all-round comfort".

■ Unrestricted installation of pipes and lining of surfaces – the perfect fit for every application

The ClimaComfort panel's design makes for optimum pipe installation. The ClimaCor® S5 system pipe is simply snapped on to floors, walls or ceilings. If the direction taken by the pipe has to change, 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 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.

Perforations on the ClimaComfort panel help the user to size the panel exactly for lining the room in question, even in the case of slanted room surfaces. 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.

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.

Roth has designed the system for use with the Roth ClimaCor® S5 pipe in dimensions of 14 mm and 16 mm.

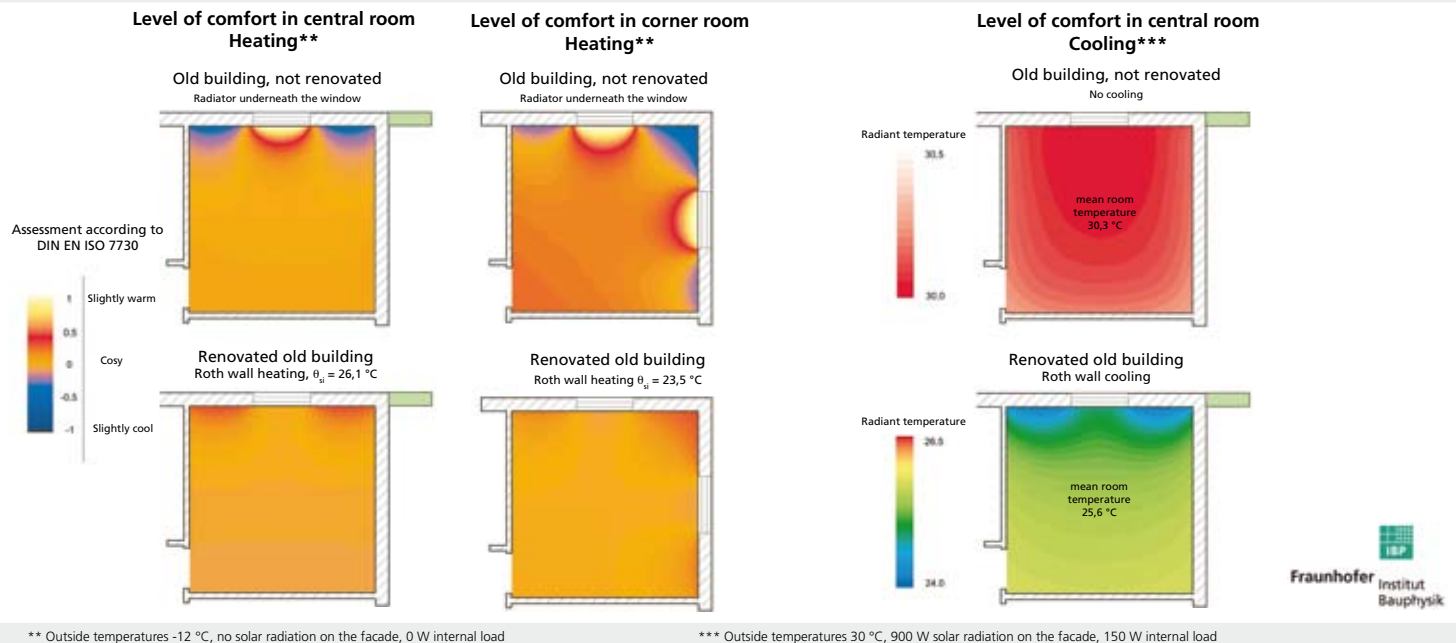
The ClimaComfort Panel System will increase the value of a property. It is a particularly interesting proposition as far as owner-occupied flats are concerned, because it enables a person living in a block of flats to independently design a customised system of heating and cooling for his or her personal space. The system will also improve a property's rental prospects (thanks to the associated energy performance certificate).

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



Roth ClimaComfort® Panel System

... the solution for external walls



■ **The Fraunhofer Institute agrees that the ClimaComfort Panel System keeps things nice and comfortable, particularly when external walls are lined**

If the external walls of a room are lined using the ClimaComfort Panel System, the outside temperature is "isolated" so that it no longer has any effect on the temperature inside the room. For timber-framed structures in particular, using standard additional insulation in line with EnEV can significantly reduce heating and cooling requirements.

The minimum requirements specified in the new EnEV 2009 must be met. According to this regulation, if modifications are made to existing buildings, the external wall must achieve a heat transfer coefficient of 0,24 W/m²K if insulation has been applied from outside, or 0,35 W/m²K if insulation has been applied from inside the room (interior insulation).

The positive effects of first lining external walls can be seen in the results of a "comfort study" carried out by the Fraunhofer Institute for Building Physics (IBP). The study was based on DIN EN ISO 7730. Another of its findings was that the temperature control skirting available in Roth's range of products eliminates the thermal bridges that can interfere with a room's temperature. 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**

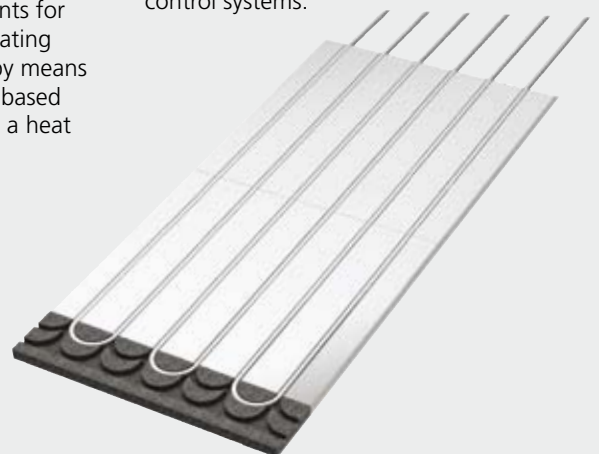
If a room's floor and walls do not cover the energy requirements in question, the ceiling can be brought into play. It makes good sense to line the ceiling, primarily if you are converting an attic. The use of the ClimaComfort Panel System on the ceiling is recommended for cooling purposes in particular.

■ **Unique performance profile: Comfort, energy efficiency, the ability to respond quickly**

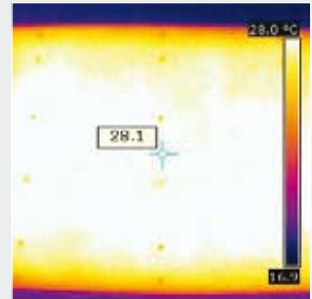
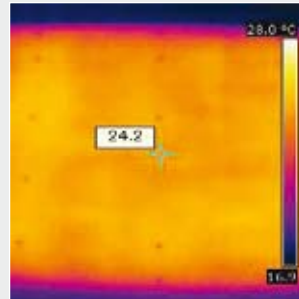
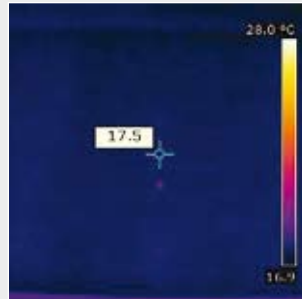
Whilst the EnEV stipulates that, for new buildings, it is sufficient to line only relatively small areas with the ClimaComfort Panel System, when it comes to existing buildings the question of how to plan which areas will need to be lined and the requirements such linings need to meet still remains. In response to this, the IBP has developed ways of calculating the thermal and humidity requirements for typical existing buildings. The heating requirements are then reduced by means of additional internal insulation, based on these calculations (relating to a heat transfer coefficient of 0,35).

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, reaching 60 % of its total output in just around 12 minutes. Furthermore, with a flow 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 plasterboards, which have a high capacity for thermal conductivity, the system can achieve levels of heating and cooling output that would have been simply unimaginable with the conventional linings used in radiant temperature control systems.



■ Extremely high thermal output across the entire surface, plus a really fast reaction time!

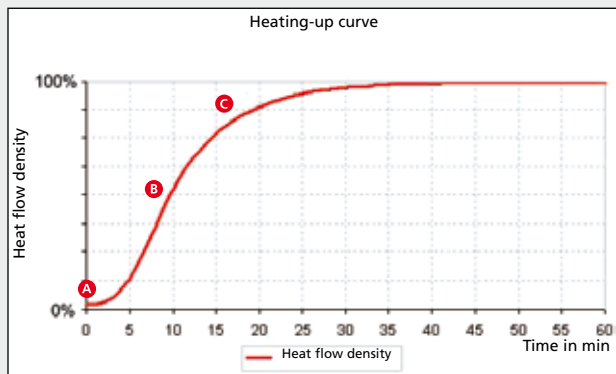


■ Process of heating up

A

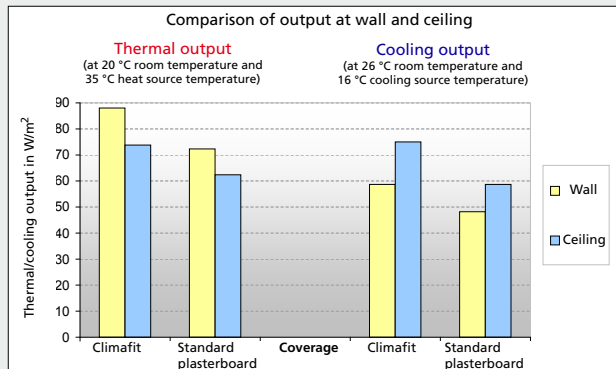
B

C

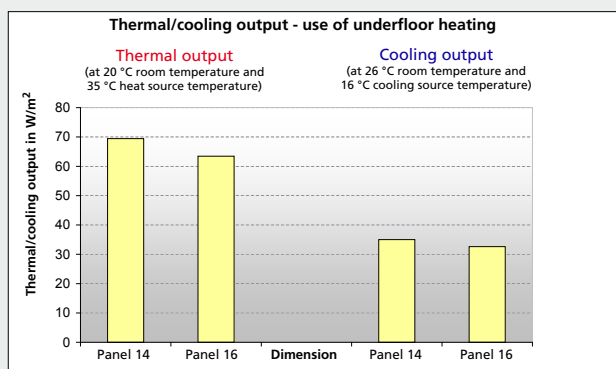


■ Together they are strong:
Roth ClimaComfort® Panel System
and Rigips Climafit dry construction panel for walls and ceilings

Optimum output values are achieved with Rigips 10 mm Climafit dry construction panels (see images on the left). The thermal images above show how the entire heating surface heats up really evenly, which is what enables the system to achieve its high thermal output.

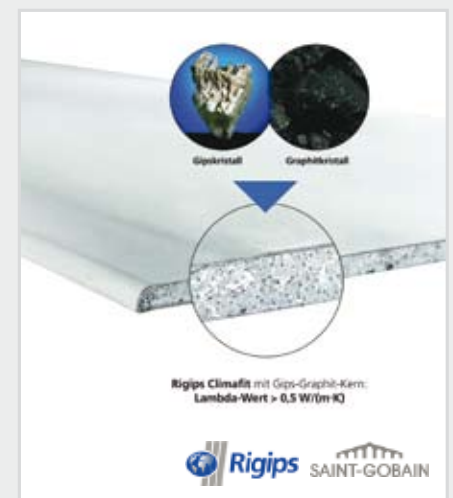


■ ClimaComfort Panel System 14



■ ClimaComfort Panel System 14 and 16

Load-distribution layer, dry screed element ($s_0=25\text{ mm}$ with $\lambda_0=0,28\text{ W/mK}$)



Roth ClimaComfort® Temperature Control Skirting...

ideal surface temperatures in every single spot



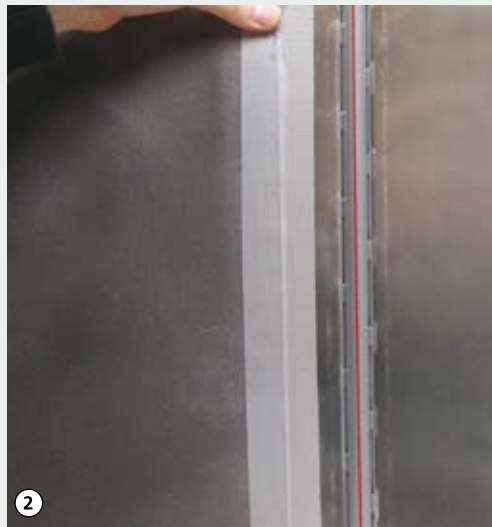
ClimaComfort high-performance temperature control skirting with heat-conducting film and flexible, high-performance insulation

■ Optimisation thanks to highly efficient ClimaComfort temperature control skirting

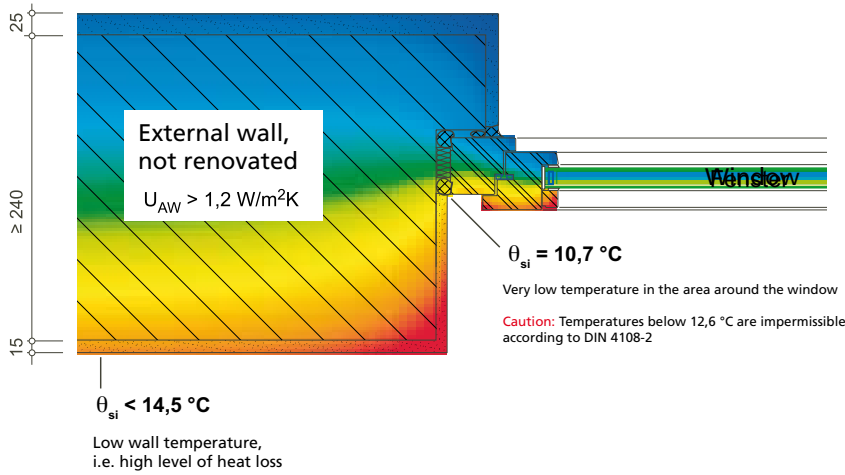
In old buildings, draughts can be felt and mould can form on external walls, on window reveals, in areas where ceilings meet walls and in corners where external walls meet internal ones. This is down to thermal bridges, which reduce the surface temperature of the wall in a localised area. With Roth's high-performance temperature control skirting, even these parts of a building can be made cosy and comfortable by increasing the surface temperature at such spots. The temperature control skirting consists of a high-performance heat-conducting composite film (with a thermal conductivity of around 300 W/mK) and a flexible, high-performance insulating layer (WLG 0,013) that is 5 mm thick.

Installation couldn't be easier

1. Connect to the ClimaCompact panel with a 30 mm overlap.
2. Secure with adhesive tape.
3. Wrap the temperature control skirting around the window reveal, then cover with a 9,5 mm thick dry construction panel or a Rigips Climafit 10 mm panel.



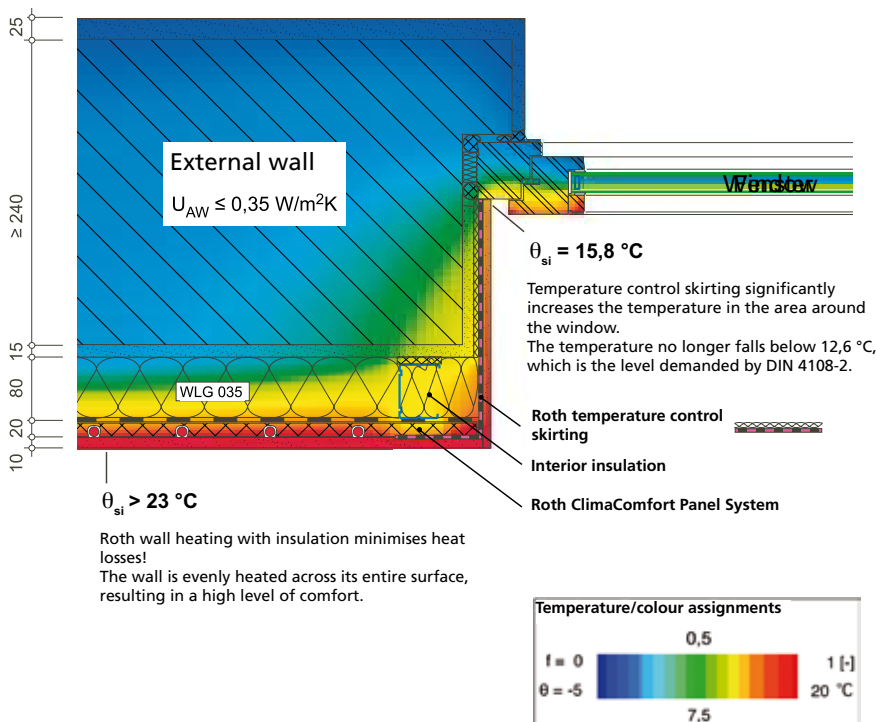
Initial situation: window reveal not renovated



■ IBP investigations confirm a considerable increase in wall temperatures

Window reveal with ClimaComfort Panel System and ClimaComfort temperature control skirting

The IBP has assessed typical window reveal conditions with Roth ClimaComfort® temperature control skirting, using a range of two-dimensional thermal bridges. When connected to the ClimaComfort panel, the surface temperature θ_{si} increases from 10,7 °C to 15,8 °C, significantly above the surface temperature of 12,6 °C required by DIN 4108-2.



Roth ClimaComfort® Panel System

... at a glance



■ Roth ClimaComfort® panel

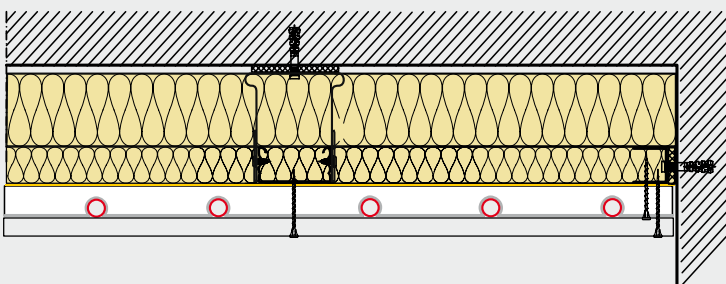
The ClimaComfort panel is the foundation for creating a room with a comfortable temperature. It has the following characteristics:

- EPS isolating layer (WLG 032) on the walls, ceiling and floor of the room
- Extremely efficient heat-conducting elements made of aluminium
- A "snap-in" mechanism for retaining the system pipe, so that pipe installation, particularly on walls and ceilings, is made much easier and pipes are held permanently in place
- EPP end piece for redirecting pipes
- Option of building-specific additional insulation

■ Roth ClimaComfort® Panel System at a glance

- Heating and cooling via floor, walls and ceiling for existing and new buildings, with just one type of panel
- ClimaCor® S5 system pipe with aluminium blend for fast energy transfer within the system
- "All-round comfort"
- Energy-efficient, environmentally-friendly and fast-response surface temperature control
- The level of comfort offered by the system when used in wall applications has been confirmed by Prof. Gerd Hauser of the Fraunhofer Institute for Building Physics. It's THE solution for external walls.
- When external wall surfaces are lined, the outside temperature is completely isolated from what is going on inside the building, thus lowering energy requirements
- Fast-response system with optimum temperature control via a heat-conducting plate
- Short assembly times thanks to dry construction method
- Low mass per unit area
- Assembly benefits: system pipes snap in easily and elements for redirecting pipes lock into system panels
- Unrestricted installation of pipes and lining of surfaces – the perfect fit for every application!
- Perforated heat-conducting plate helps the user size the panel exactly to meet requirements

Roth ClimaComfort® panel, wall installation







Roth ClimaComfort® Compact System

... rapid reaction when heating and cooling

■ Heating and cooling for renovation projects and new buildings

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 high system reaction speed resulting from it open up new perspectives for planning and installation. The building owner receives additional comfort.

With this additional innovation, and as the inventor of the Original Tacker® System, Roth offers solutions for all applications from a single source.

Basic building blocks of the Roth ClimaComfort® Compact System:

- Roth ClimaCor® S5 system pipe (material composition and processing method as for the tried-and-tested X-PERT S5®+ CoEx-technology),
- Roth ClimaComfort® Compact system panel (transparent, vacuum-formed synthetic panel).

The 14 mm high ClimaComfort Compact system panel is made of a partially crystalline material. The new material and the unique panel structure are responsible for the great stability and toughness that go hand-in-hand with its flexibility.

This ensures a high degree of resistance to crushing, even though it is easy to shape. 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 spiralling or meandering form in a 75 mm grid. Diagonal placement at intervals of 105 mm is possible.

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. 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 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.



Roth ClimaComfort® Compact System

... minimum installation height combined with maximum reaction speed



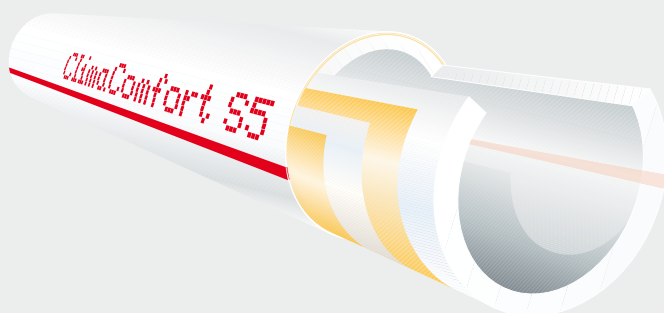
■ Roth ClimaComfort® Compact System at a glance

- Minimum installation height of just 17 mm
- Rapid reaction when heating and cooling
- ClimaCor® S5 11 mm system pipe in tried-and-tested X-PERT S5®+ quality
- ClimaComfort Compact system panel offers great stability 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
- Rapid, simple and universal assembly, even in unusually shaped rooms that present difficult challenges
- Compatible module in the Roth radiant heating and cooling systems product line

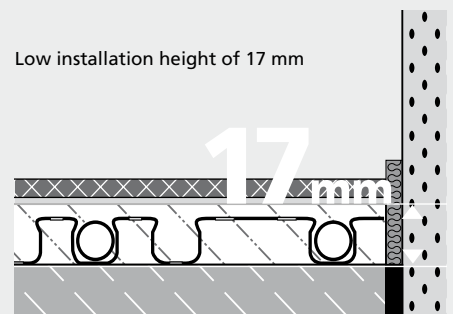
Roth ClimaComfort® Compact system panel



Roth ClimaCor® S5 system pipe



Low installation height of 17 mm





■ **Renovating bathrooms with the Roth ClimaComfort® Compact System**

Having a radiant 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.

With its extremely low installation height of just 17 mm, the Roth ClimaComfort® Compact System for heating and cooling is perfectly suited for use in bathroom renovation work. A specialist in radiant heating and cooling systems, Roth has developed this modernisation 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 potable and impotable water when carrying out bathroom renovation projects.

■ **Fraunhofer "Umsicht" Institute for Environmental, Safety and Energy Technology awards Roth ClimaComfort® Compact system panel with a prize**

The Fraunhofer "Umsicht" Institute of Oberhausen, Germany, awards Roth's ClimaComfort® Compact system panel with a 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 Pipe Fixing System

... a match for any challenge

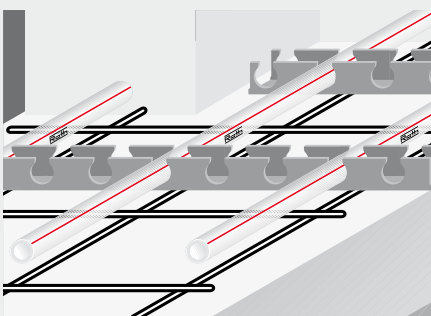


■ Roth Pipe Fixing System for individual applications

Demanding structural and static requirements, such as those associated with industrial and open spaces, as well as with sport and sprung floors, call for Roth radiant heating and cooling systems based on our Pipe Fixing System. This system is also ideally suited for flush-mounting wall heating units or installing them behind dry construction elements. Roth offers a specially designed Pipe Fixing System for sport and sprung floors. The support components used in this system have been developed by Roth and are made of a prefabricated plastic profile section with Roth pipe holders at appropriate intervals. Thanks to its flexibility, the Roth Pipe Fixing System makes installation easy, no matter what the building-specific conditions of the on-site floor or wall structures actually are.



Roth pipe fixing rail





Roth Pipe Holder Component System, Tropical Island, Krausnick-Groß Wasserburg, Germany

■ Roth industrial radiant heating – for a sense of well-being in the workplace

Industrial floor heating saves energy by means of low heating water flow temperatures. 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 spent time and which then drop towards the ceiling make for an optimal room temperature profile. Cycle heat and waste heat from production can easily be used to heat Roth industrial radiant heating units, which means that the investment pays for itself very quickly.



Roth underfloor heating, sports hall and fitness centre, Barbezieux, France

Roth underfloor and wall heating, Kunstmuseum Dieselkraftwerk, Cottbus, Germany

■ Roth sport and sprung floor heating

This involves a special development for sport and sprung floor areas. Thanks to its special design, the Roth Pipe Fixing System is optimised for integration into any floor structure. This system is modularly constructed and consists of only a few system components with a high degree of prefabrication. It is possible, without having to make allowances for the heating system, to select the correct flooring for every building, whether it be a gym, exercise room, multipurpose room, sports hall, etc.

■ Roth wall heating

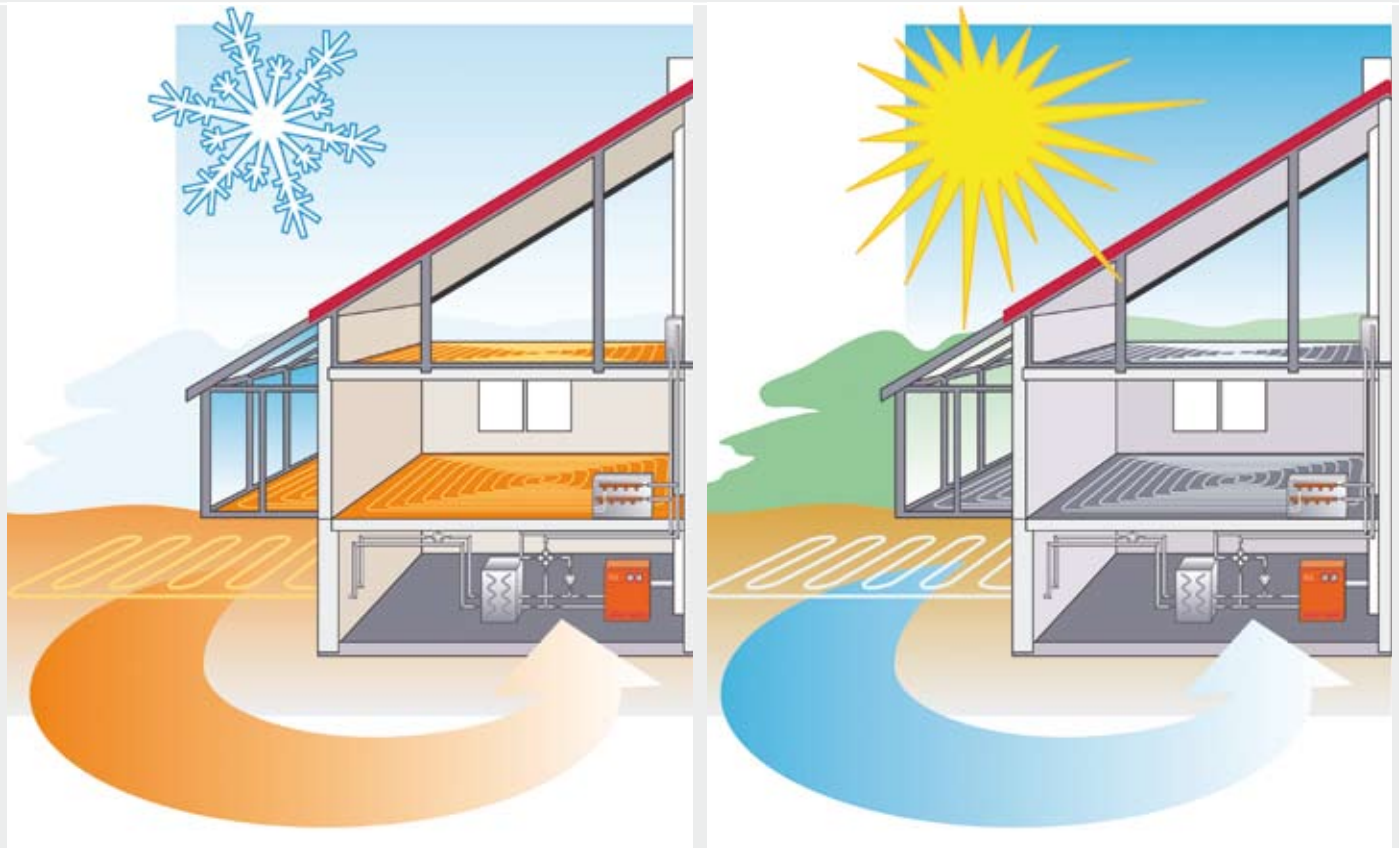
A Roth wall heating installation can be created based on the Roth Pipe Fixing System. The Roth pipe fixing rail is fastened to the wall with plugs and screws, in accordance with the individual on-site conditions. When interior insulation is used, this is fastened to the wall first and the Roth Pipe Fixing System is then mounted on top. The Roth 11 and 14 mm system pipes utilised here are positioned in a meandering pattern rising up the wall. Once the Roth wall heating unit has been installed, the plaster is applied directly on top. Another option is to cover the wall heating unit with dry construction elements.





Roth Heating and Cooling System

... a feeling of comfort the whole year round



■ The basic concept behind the system

When designing an energy system for technical building installations, the fundamental aim must be to ensure that a comfortable temperature can be achieved within the building's rooms. The heating and cooling system developed by Roth offers appropriate solutions for seasonal and user-specific requirements. During colder seasons, low-temperature radiant heating achieves room temperatures which are warm and comfortable, whilst the Roth system pipes integrated into the floor structure generate a pleasant cooling effect in the summertime.

■ Heating in winter

A pleasant, almost ideal room temperature profile for the user arises as the result of the large-surface, evenly-distributed dispersion of heat. With its system-dependent low heating water temperatures, this system is all but predestined for use in combinations with environmentally friendly and energy-saving heat generators, with low temperature and calorific value technology and with alternative energy sources.

■ Cooling in summer

Uniform room cooling without unpleasant draughts is achieved via radiant cooling by means of the Roth system pipes integrated into the floor structure. From the point of view of control engineering, the Roth heating and cooling system is designed in such a way that, when cooling, both drops in floor surface temperature to below 19 °C (deemed the critical level in terms of comfort, according to DIN 1946), and vertical temperature shifts between two relevant measuring points (0,1 to 1,1 m) of two degrees Kelvin can be sensibly avoided. A dew point monitoring is integrated in order to effectively prevent condensation caused by weather-related, elevated room humidity. Cooling water can be generated by means of system pipes placed in the ground, chiller units or surface water, etc.



Roth Isocore®

... a new kind of building temperature control



Roth Isocore®, Kleines Festspielhaus (Small Festival Hall) in Salzburg, Austria

■ Roth Isocore® – the storage power of concrete

The sensible utilisation of valuable resources continues to be one of the most important technological challenges of the 21st century. Roth Isocore® is the perfect response to these demands. Low system temperatures in cases of heating and relatively high system temperatures for those of cooling ensure economical energy usage. It is also possible to efficiently integrate existing environmentally-friendly sources of energy, such as solar or geothermal energy. A room preheating capability that is appropriate, comfortable and practically constant while at the same time also being independent of internal and external loads is assured.

These system advantages are achieved through the integration of the water bearing pipe system in solid concrete ceilings and wall modules, whereby their storage capacity is made exploitable for building preheating purposes. Roth Isocore® is ideally suited for use in the construction of new office and administrative buildings with a high thermal mass.

Special features of Roth Isocore®

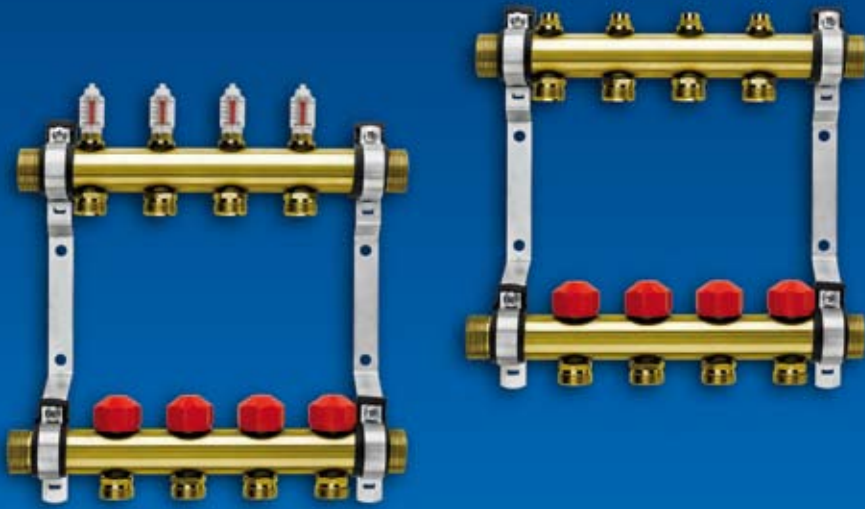
- Complete systems technology made up of system components specially designed to work with one another.
- Extensive service offerings
- Intensive support in the planning preparation stages
- Project planning of the installation, construction site guidance and object-specific acceptance of the system by Roth.
- High degree of variability in the assembly technique used
- Proven control concept tested in everyday use
- Tested performance data

Roth Isocore®, Büro Campus Deutz office buildings, Cologne, Germany



Roth Heating Circuit Manifold

... a well rounded unit



■ Roth heating circuit manifolds keep you cosy and comfortable

The heating circuit manifold distributes heat evenly and maintains room temperatures at a constant level, thus keeping the building's inhabitants cosy and comfortable.

Used in conjunction with the room thermostat, the manifold ensures that flow volumes can be precisely controlled.

The flow distributor and return flow collector, made from brass circular profiles, can be connected from the left or right via the 1" flat-sealing external thread. There is no misalignment at the ends of the pipes, so no compensating pieces are required and there are fewer seal contact areas.

The flow and return pipes are staggered, which makes assembly easier.

The heating circuits are connected via 3/4" Eurokonus fittings. The distributor is pre-assembled on a sound-insulated console.

The valve cores are suitable for Roth actuators, making the heating circuit manifold an integral part of the system solutions offered by Roth.

The heating circuit manifold is available with between 2 and 12 connections and with or without a flow volume indicator. It can be used for all Roth system pipes in sizes of 11 to 20 mm.



Roth Compact Control Station

... professional solutions for all applications



■ Tried-and-tested connections

The compact control station is used to connect radiant heating units to existing radiators.

Two underfloor heating circuits can be connected with the dual coupling. The room temperature is controlled via a Roth room thermostat and the integrated actuator.

■ Technical data

Maximum system temperatures:	
Radiator circuit	110 °C
Underfloor heating circuit	45 °C
Maximum differential pressure:	
Radiator circuit	1 bar (100 kPa)
Electrical connection	230 V/50 Hz
Power consumption:	
Circulating pump	25 W
Actuator	1,8 W
Maximum number of heating circuits	2
Flow setting range	10 to 45 °C
Maximum length of heating circuit Roth KlimaComfort S5 system pipe	60 m
Maximum system pressure	10 bar (1 MPa)
Weight	2.5 kg

Roth Control Engineering

... maximum comfort at minimum cost

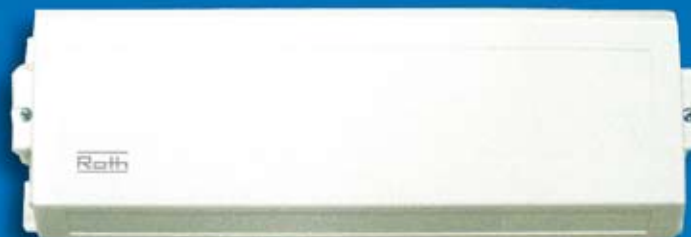
Wired controls for individual rooms, heating



Wired controls for individual rooms, heating/cooling



Wireless controls for individual rooms, heating/cooling



■ Control engineering

Radiant heating and cooling systems should guarantee an operational mode which is optimally suited to atmospheric conditions as well as to user requirements while at the same time offering the highest degree of economic efficiency and the best possible energy utilisation. The mandatory requirements contained in the EnEV include provisions for devices for controlling and regulating radiant heating and cooling systems in relation to such things as exterior temperature and time, in addition to temperature regulation in individual rooms. Roth control engineering components meet these requirements and are perfectly matched to the mode of operation employed by Roth radiant heating and cooling systems.

Roth controls for individual rooms are specially adapted to the needs of the application in question (heating/heating and cooling) and are characterised by their extremely straightforward method of operation. Due to the reduced amount of wiring work required, wireless control is suitable for new buildings and particularly for renovation projects.

Naturally, the Roth control engineering components are also covered in the same way as the other system components of the Roth radiant heating and cooling systems by the extensive guarantee service provisions listed in the Roth warranty certificate.



Expertise in Radiant Heating and Cooling Systems

... quality in every respect



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

Those who want to enjoy all the advantages of radiant 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.

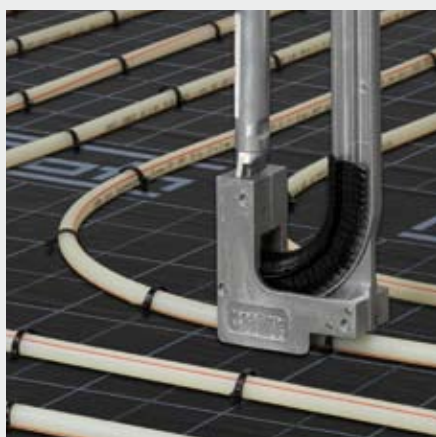
A high degree of prefabrication ex-works, universal utilisation possibilities, system components that are designed to work optimally with one another, long service life and stable value – these are the Roth System advantages. They bring together all of the advantages of radiant heating and cooling to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

■ **Roth radiant heating and cooling systems are always the perfect fit**

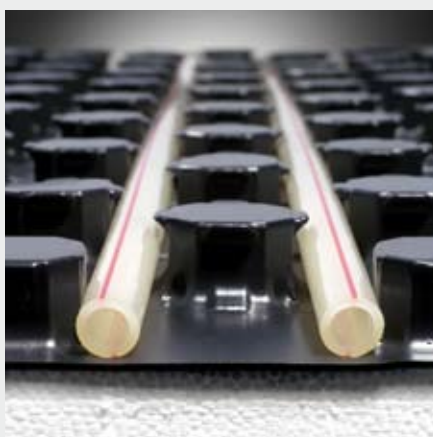
All Roth radiant heating and cooling systems are quite suitable for use in combination with one another.

Depending on living quality expectations, Roth offers individualised preheating capability by means of floors, walls and ceilings for new construction and modernisation.

Roth Original Tacker® System



Roth Knob System



Roth ClimaComfort® TBS



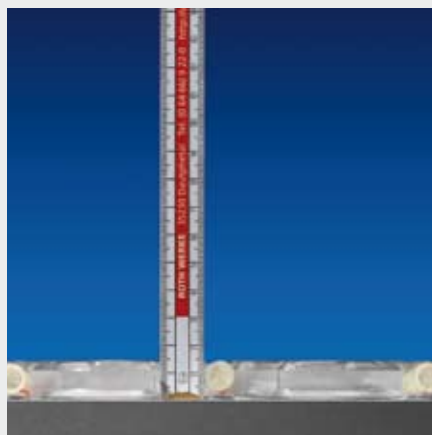


Roth underfloor heating (Roth Original Tacker® System with 17 mm X-PERT S5®+), Roth TerraCompact® 17 kW heat pump and Roth DUO impotable water storage tank 500, family home, Oer-Erkenschwick, Germany

Roth ClimaComfort® Panel System



Roth ClimaComfort® Compact System



Roth wall heating



References

... actual examples that speak for themselves



Roth underfloor heating,
Hotel Loisium, Langenlois, Austria

Roth underfloor heating,
Kulturkirche St. Jakobi, Stralsund, Germany

Roth Original Tacker® System,
Cineplex and arts centre, Marburg, Germany





Roth radiant heating system,
Frauenkirche, Dresden, Germany

Roth industrial radiant heating,
small commercial building, Kempten, Germany



Roth Original Tacker® System,
office facility and training centre,
Arnsdorf, Germany

References

... actual examples that speak for themselves



Roth Original Tacker® System,
Therme Linsberg spa, Linsberg, Austria



Roth underfloor heating,
Rosenberg Town Hall, Sulzbach-Rosenberg, Germany

Roth Isocore®,
Media Tower, Dusseldorf, Germany





Roth KlimaComfort® Compact System,
Luggesmühle housing area,
Bottrop, Germany



Roth Original Tacker® System,
exclusive apartments on Goethegasse,
Vienna, Austria



Roth Isocore®,
Rheinisches Landesmuseum (Rhineland Regional Museum),
Bonn, Germany



Roth Building and Plastics Technology

... international



Ideas and services with added value for the customer

Roth Werke, Dautphetal, Germany

Belgium, Bertem • China, Shanghai • Denmark, Frederikssund • Finland, Parainen • France, Lagny sur Marne • Greece, Athens • Great Britain, Taunton • Italy, Castelveverde
Canada, Beloeil, QC • Lettland, Riga • Netherlands, Delft • Norway, Baerum • Austria, Krems • Northern Ireland, Carrickmore • Poland, Zielona Góra • Rumania, Timisoara • Russia, Moscow
Sweden, Malmö • Swizerland, Kreuzlingen, Stansstad • Serbia, Beograd • Slowakia, Kosice • Spain, Tudela • Slovenia, Ljubljana • Czech Republic, Brno • Hungary, Budapest • Turkey, Istanbul
Ukraine, Kiev

■ Innovation:

- Early recognition of market requirements for the formulation of new product, system and service concepts
- In-house materials research and development with the goal of making high-quality, technically perfected products available on the market
- In-house engineering for the development of product and materials processing methods
- Systematic further development of existing product ranges in close cooperation with our customers

■ Products:

- Complete and easy-to-assemble product system offering
- Manufacturing competence for the complete product range within the corporate group of Roth Industries
- All products and product systems are manufactured and tested in accordance with DIN EN ISO 9001:2000 and comply with the relevant standards and approval tests

■ Services:

- Comprehensive, qualified field service for flexible, fast on-site consultation on technical and commercial matters
- Planning service
- Training courses, planning and product seminars held on an ongoing basis
- Fast availability of all Roth brand product ranges throughout Europe
- Comprehensive guarantees and liability agreements for all products and product systems

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