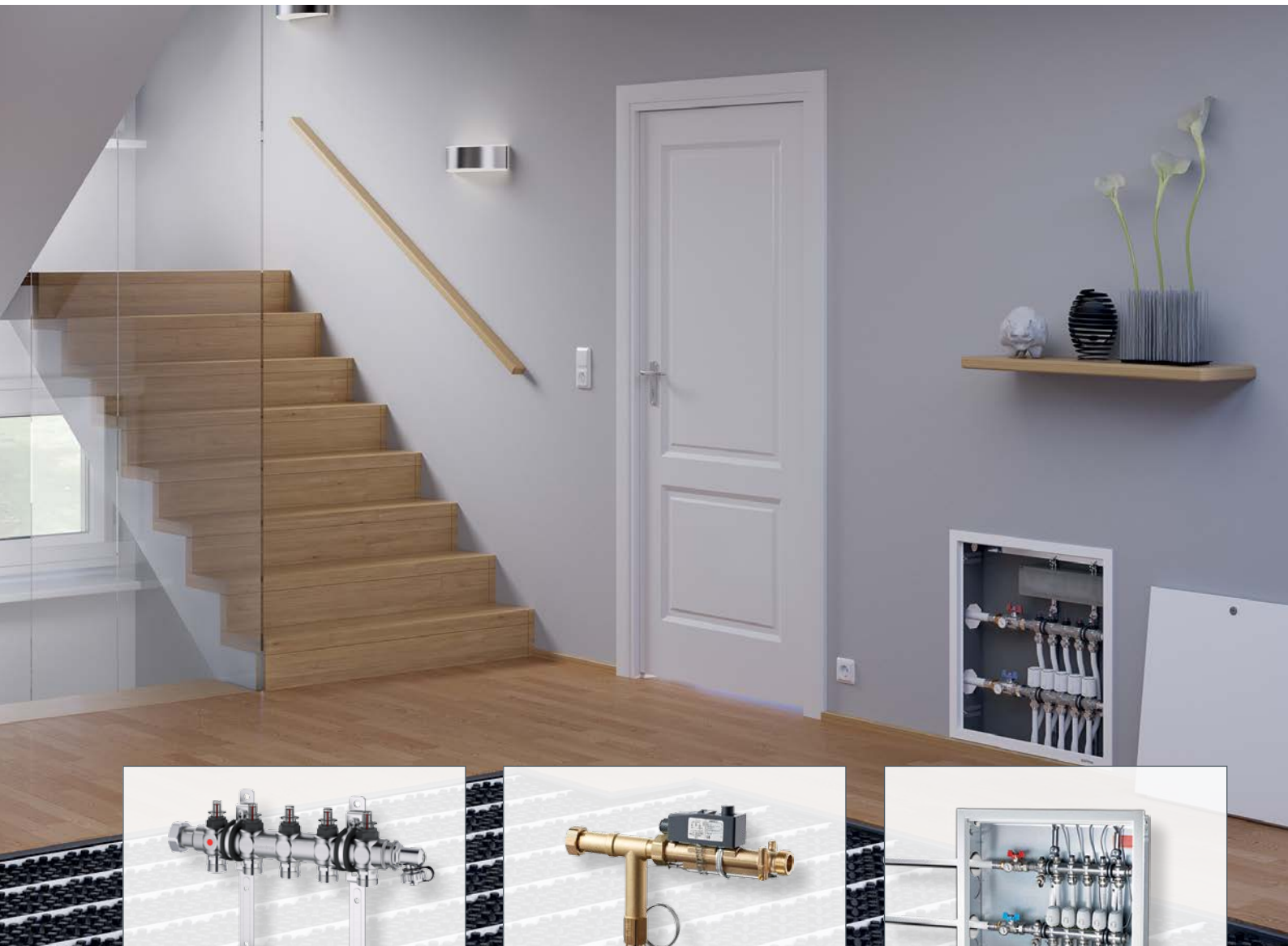
oventrop

Room climate

“Cofloor” Surface heating and cooling systems
Systems with distributor/collector



Content

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Surface heating and cooling: comfortable and economical

The times when energy was wasted carelessly are over. Nowadays the maxim is “Save energy”. Not only because of the continuously rising cost for oil and gas, but also to avoid environmental pollution. This is why the surface heating and to an increasing extent the surface cooling are becoming more and more important when choosing the heating/cooling system for new buildings as well as for renovation projects. Comfort temperatures cannot only be achieved economically during heating periods but also during periods of alternate heating and cooling. Energy savings result from the fact that the heat in a surface heating system spreads evenly and that the flow temperature of the heating and cooling water does not differ that much from the room temperature (during heating periods approx. 35°C instead of 70°C and during cooling periods not below 16°C).

Another advantage which, when combined with a modern heating and cooling generator, e.g. a low temperature or gross calorific boiler, heat pumps or cooled water from a well, reflects in the energy consumption. A further energy saving is made as temperatures can be reduced from the normal 22°C to 20°C without compromising the “comfort” feeling.

Moreover, surface heating stirs up less dust than radiator systems and dry floors prevent the build-up of germs, mites and fungus which can cause allergies.

Surface heating and cooling system “Cofloor”: practical and functional

With the surface heating/cooling system “Cofloor”, Oventrop offers the specialist trade not only products of first class quality but also all components required for the economical installation of various laying systems.

This includes base mats, a tacker system (base mat rolls and folded boards), a clamping rail system, a dry-build system, edge isolating strips, stainless steel distributors/collectors, components for regulation and hydronic balancing, cabinets, pipes etc., all complying with standards, coordinated and in accordance with the latest technical developments.

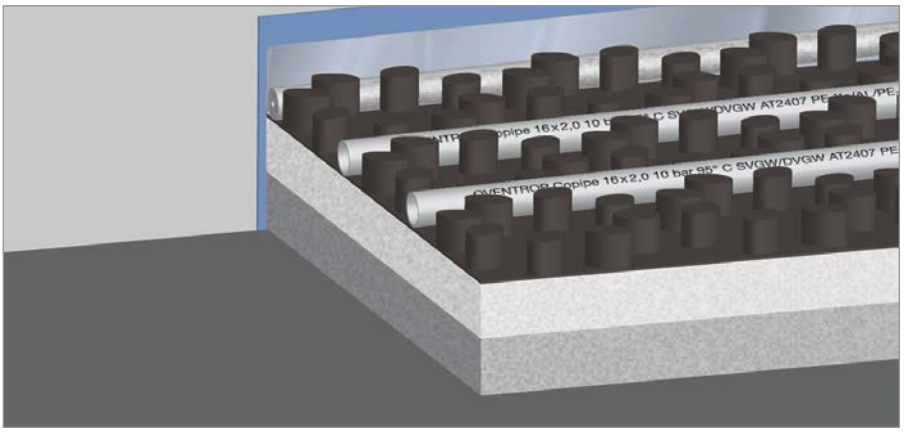
Regarding the pipes, the user may chose the PE-Xc pipe “Copex”, the composition pipe “Copipe HSC” or the PE-RT pipe “Copert”. All pipes can be laid fast and easily by only one person.

The composition pipe “Copipe” is also suitable for supply pipes and for the connection to heating or cooling generators and distributors/collectors.

As is generally known, a surface heating system only works perfectly if hydronic balancing of the mass flow in the supply pipes and heating circuits was carried out correctly.

A main factor for a trouble-free operation of surface heating and cooling systems is to ensure that the central flow temperature control in front of the distributor/collector and also the automatic individual room temperature control of each circuit at the distributor/collector is functioning correctly. This can only be achieved through hydronic balancing, i.e. the distribution of mass flow according to the heat demand of the whole system.

Oventrop offers a wide-ranging complete programme of valves and controls, suitable for any surface heating system.



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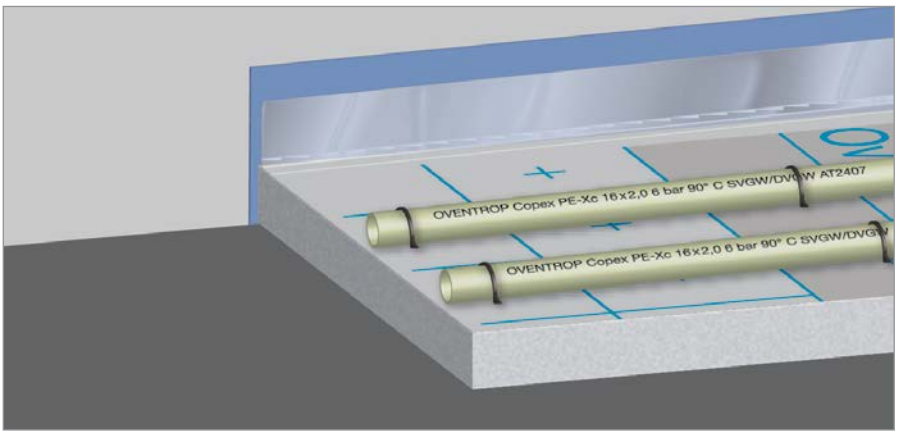

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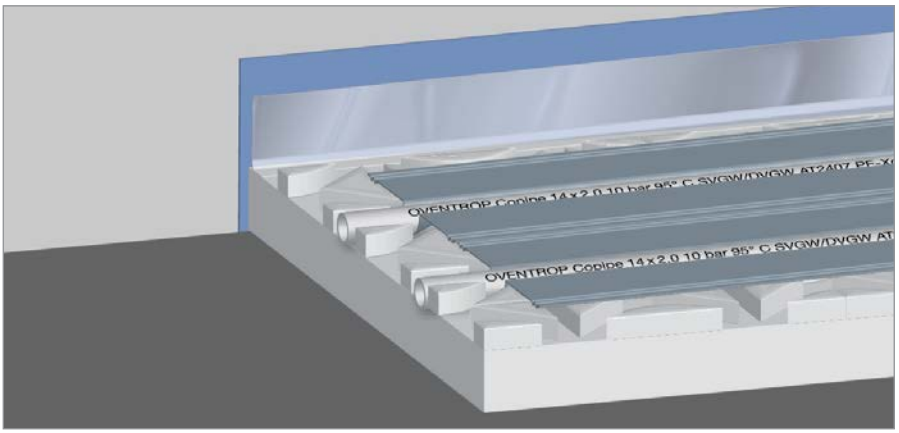

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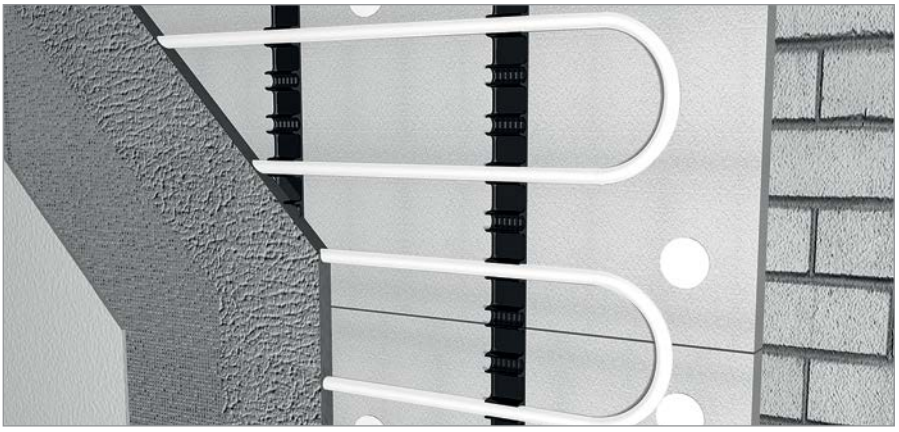

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1 Base mat system NP

For laying (45° diagonal laying without auxiliary material) of 14, 16 or 17 mm Oventrop PE-Xc plastic pipes “Copex”, PE-RT plastic pipes “Copert” or composition pipes “Copipe HSC”.
Size: 1.44 x 0.84 m = 1.2 m^2
Types:

– Thickness 30-2 mm, with thermal and sound insulation made of expanded polystyrene, thermal conductivity group 040, covered with polystyrene foil, building material class B 2 according to DIN 4102
– Thickness 11 mm with thermal insulation made of expanded polystyrene, thermal conductivity group 035, covered with polystyrene foil, building material class B 2 according to DIN 4102
– without thermal and sound insulation, made of moulded polystyrene foil.

2 Tacker system

Base mat roll or folded board made of expanded polystyrene according to DIN EN 13163, thermal conductivity group 045 or 040 for 30-2 mm, building material class B 2 according to DIN 4102, with laminated tissue foil, with imprinted laying screen (screen distance 5 cm), foil overlap on the edge, with adhesive strip on the opposite.

Fixing of the Oventrop PE-Xc plastic pipes “Copex”, PE-RT plastic pipes “Copert” or composition pipes “Copipe HSC” with plastic tacker hooks and tacker machine. Easily laid and trimmed even in areas with difficult access.

3 Dry- build system

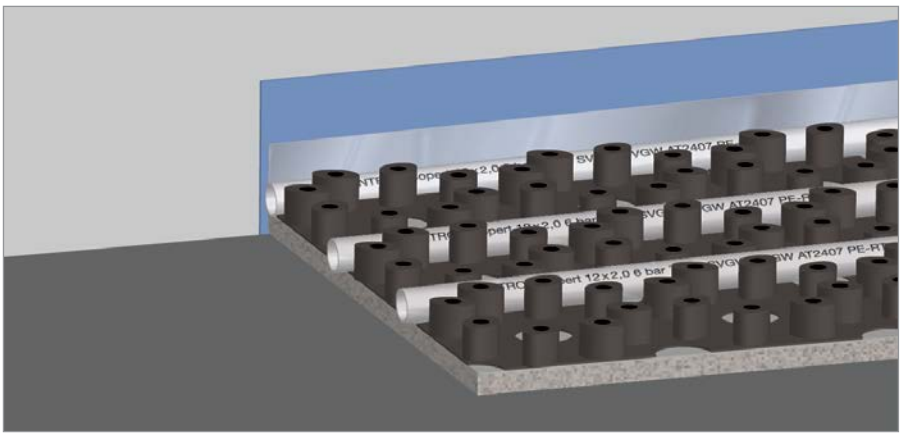
Dry-build element 1000 x 500 x 25 mm made of expanded polystyrene according to DIN EN 13163, thermal conductivity group 035, building material class B 1 according to DIN 4102.
For the simple laying of surface heating systems on solid or timber beam floors as a dry-build system (reduced overall thickness, for instance renovation of existing buildings) or with heating screed according to DIN 18560 on a membrane made of polystyrene.
The heat/cooling conducting strips allow for an either spiral or serpentine patterned laying of the composition pipe “Copipe HSC” 14 x 2 mm (Oventrop recommends the use of “Copipe” pipes because of their minimal thermal expansion). The Oventrop dry-build system is also suitable for a wall heating or cooling installation.

4 Clamping rail system

Self-adhesive clamping rails made of polypropylene, clamping distance 5 cm, length 1 m, for fixing 14 or 16 mm pipes onto the insulation (base mats or folded boards).

Advantage: Laminated tissue foil will not be damaged by the clamping rail.

The clamping rails are also suitable for the construction of a wall heating or cooling installation together with the Oventrop composition pipe “Copipe HSC” laid in a serpentine pattern.



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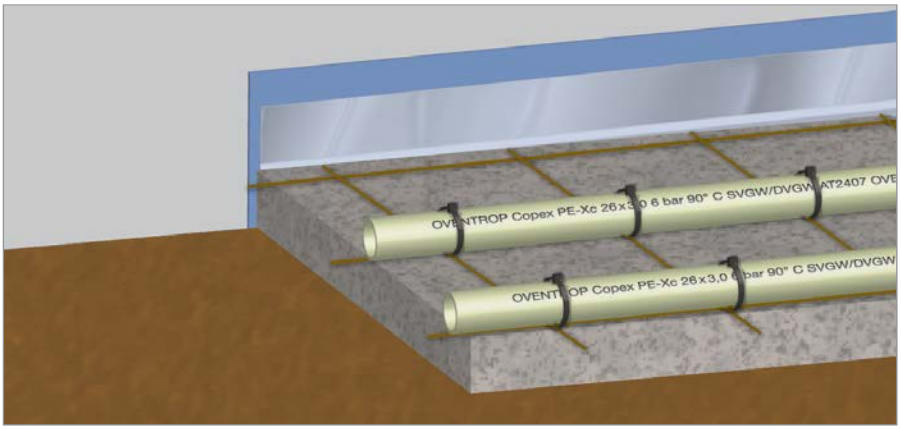

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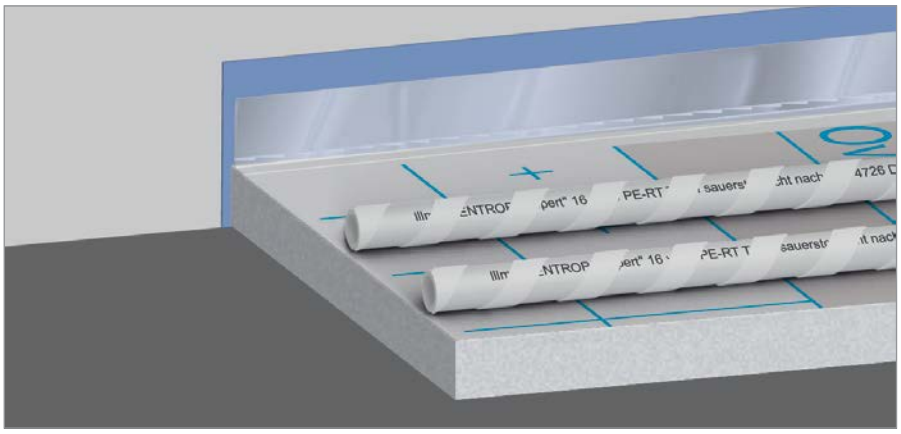

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1 Base mat system NP-R
For laying (45° diagonal laying without auxiliary material) of 12 mm Oventrop PE-RT plastic pipes “Copert”.
Size: 1.00 x 1.00 m = 1.00 m²
Without thermal insulation, made of moulded polystyrene foil, with adhesive layer on the reverse.
The perforations of the base mats allow for a simple allocation and a safe bonding of the levelling compound on the existing ground.

Tested minimum construction heights:
- Knauf N 430 min.17 mm
- PCI periplan extra min. 18 mm
- Weber-Maxit weber.floor min. 18 mm
- Knauf N 440 min. 21 mm
- Mapai Novoplan-Maxi min. 18 mm
- Sopro liquid filler FS 15 plus (FS 15 550) min. 17 mm

2 Industrial system
Components:
- PE-Xc plastic pipes “Copex” (20 x 2 mm and 26 x 3 mm)
- Distributor/collector (of modular construction for a maximum of 20 heating circuits) and accessories
- Compression fittings (20 x 2 mm and 26 x 3 mm)

For laying of industrial and commercial surface heating systems, for instance on reinforcing steel mesh.

3 Hook and loop system

For fixing 16 x 2 mm pipes with hook and loop fixing.
Base mat roll with laminated velours foil with hook and loop fixing.
With imprinted laying screen (screen distance 5 cm), with foil overlap on one side and adhesive strip on the opposite.

Size: 10.0 x 1.0 m = 10.0 m²
With thermal and sound insulation, made of expanded polystyrene according to DIN EN 13163, building material class B2 according to DIN 4102.

Suitable for concrete and liquid screed complying with standards.

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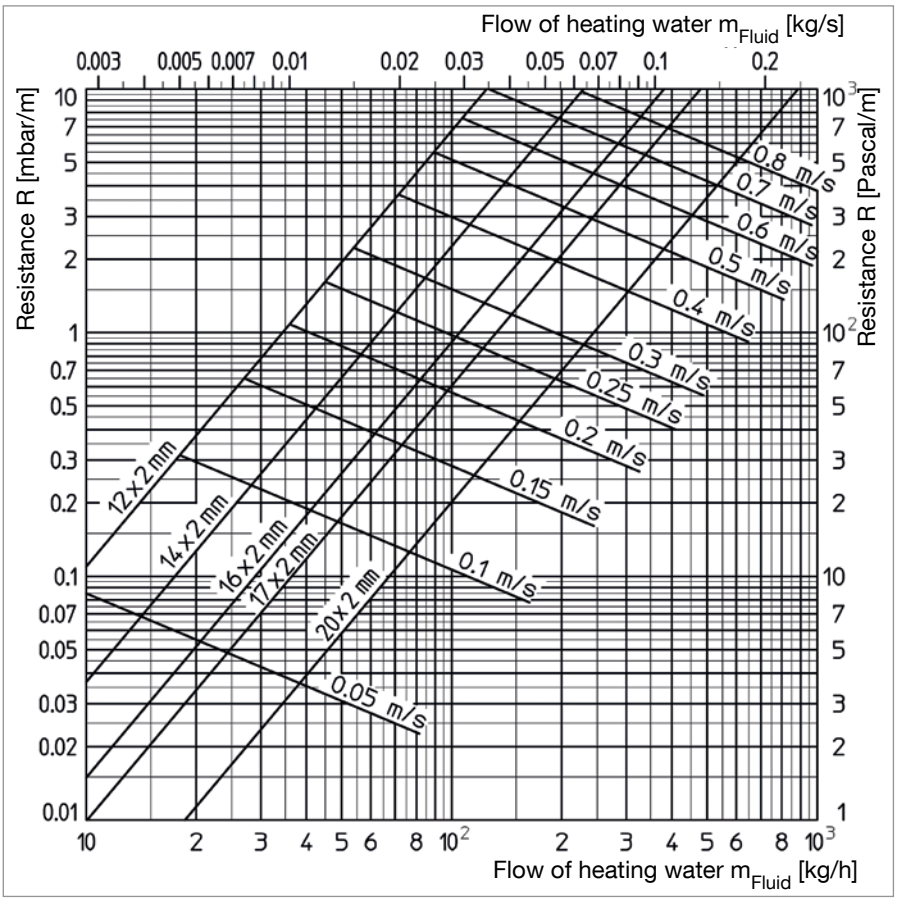

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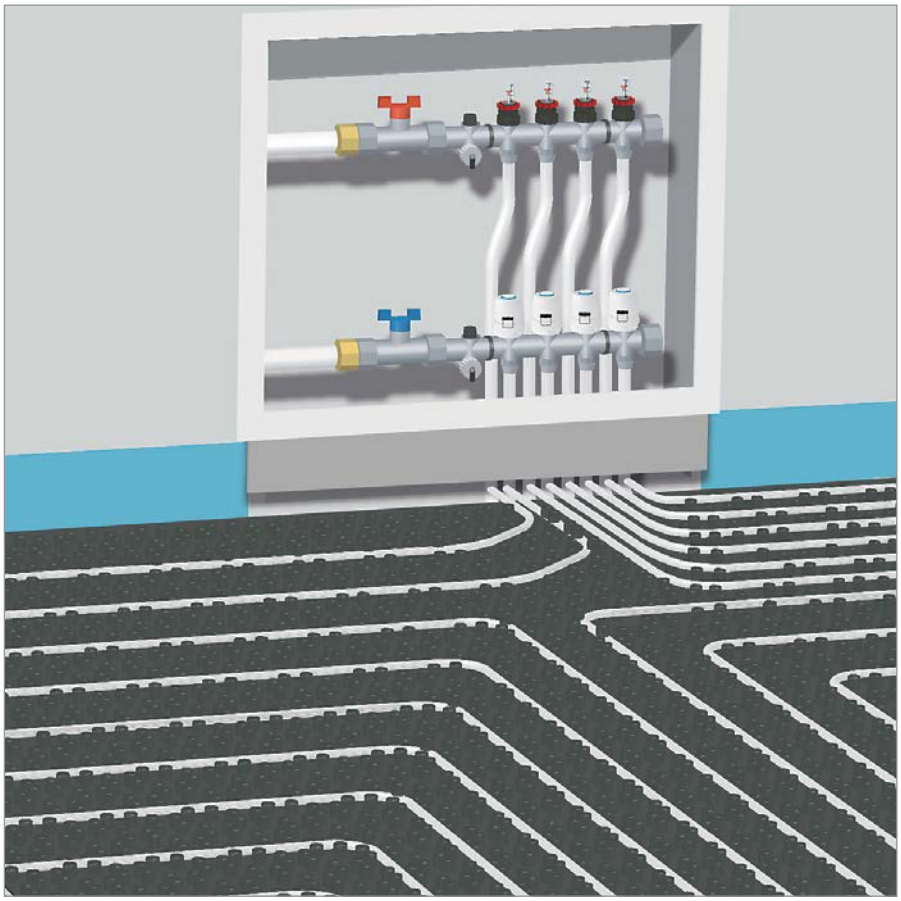
1 PE-RT/AL/PE-RT composition pipe “Copipe HSC”
Dimensions: 14 x 2.0 mm, 16 x 2.0 mm
17 x 2.0 mm, 20 x 2.5 mm
Max. pressure and temperature:
6 bar at 90 °C; 10 bar at 70 °C

2 PE-Xc plastic pipe “Copex” made of polyethylene (PE-Xc), with oxygen barrier
Dimensions: 14 x 2.0 mm, 16 x 2.0 mm,
17 x 2.0 mm, 20 x 2.0 mm,
26 x 3.0 mm
Max pressure and temperature:
6 bar at 90 °C; 10 bar at 60 °C
(8 bar at 70 °C for 20 x 2.0 mm)

3 PE-RT plastic pipe “Copert“ made of cross-linked polyethylene (PE-RT), with oxygen barrier
Dimensions: 14 x 2.0 mm, 16 x 2.0 mm,
17 x 2.0 mm, 20 x 2.0 mm,
Max. pressure and temperature:
6 bar at 70 °C

4 Pressure loss chart for PE-Xc plastic pipes “Copex”, PE-RT plastic pipes “Copert” and composition pipes “Copipe HSC” sized
12 x 2 mm, 16 x 2 mm,
17 x 2 mm, 20 x 2 mm.
With flow velocity indication of the heating water.



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1 The Oventrop base mat system "Cofloor" with its coordinated components allows for a fast laying by only one person.

The Oventrop base mats NP-30 and NP-11 feature a thermal insulation (NP-30 with thermal and sound insulation) made of expanded polystyrene, thermal conductivity group 040 (NP-30) or 035 (NP-11), covered with polystyrene foil, building material class B 2 according to DIN 4102. The base mats are laid directly onto the raw concrete flooring or, if required, onto the additional insulation.

The special grid pattern (6 cm between the nodules) allows for a simple laying of PE-Xc plastic pipes "Copex", PE-RT plastic pipes "Copert" and composition pipes "Copipe HSC" sized 14, 16 and 17 mm.
The handy base mats have practically no wastage. They can be laid economically and easily in any room whether it is small with many angles or with a large surface area.

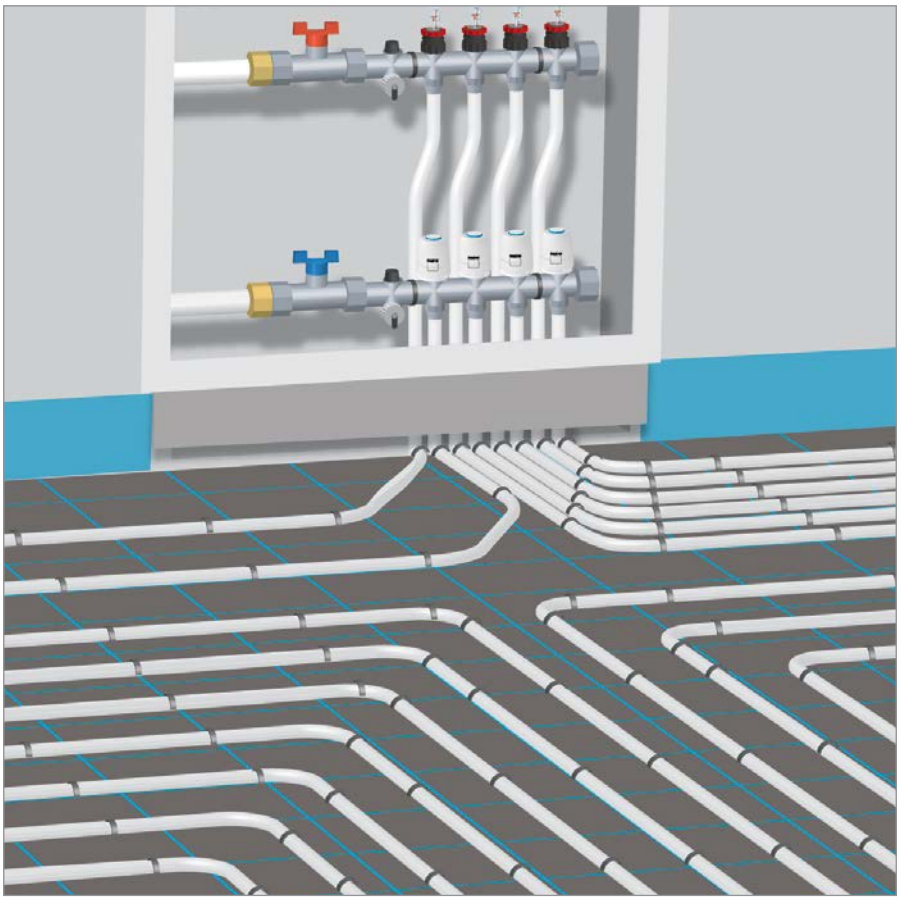
Laying of base mats in larger rooms starts in a corner opposite the entrance door. The outer rows of the base mats are connected like a press button closure. At the end of the room, the base mats can be cut to size as required. Any off cuts can be used in the same order.

By using the polyethylene foil of the edge insulating strip and the overlap of the base mat, the floor surface is completely covered and ready for concrete or liquid screed to be laid. Therefore a sound bridge to the raw concrete flooring is avoided.

Oventrop offers four different base mats:
- NP-30 with thermal and sound insulation made of expanded polystyrene
- NP-11 with thermal insulation made of expanded polystyrene
- NP without thermal and sound insulation made of moulded polystyrene foil
- NP-R without thermal insulation made of moulded polystyrene foil with adhesive layer on reverse

2 The nodules of the polystyrene foil (NP-30 and NP 11) are filled with expanded polystyrene foam. This increases the firmness of the nodules for the pipe fixing and secures the heating and cooling pipes firmly.

Sound improvement of the base mat NP-30: 28 dB



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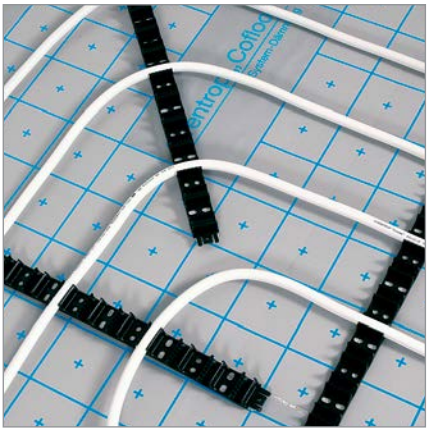

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Sound improvement of base mat roll:

Thickness	Sound improvement	Item no.
35-3 mm	29 dB	1402500
30-3 mm	29 dB	1402505
25-2 mm	28 dB	1402510
30-2 mm	28 dB	1402507
20-2 mm	26 dB	1402515
20-2 mm	28 dB	1402520

1 The economical Oventrop tacker and clamping rail systems "Cofloor" consist of a base mat roll 10 x 2 m or a folded board 2 x 1 m for use with concrete or anhydrite liquid screed. The base mat roll and folded board are made of expanded polystyrene and are laminated with a tissue foil with an imprinted laying screen (screen distance 5 cm).

One longitudinal edge of the base mat roll/ folded board has a foil overlap and the opposite edge is equipped with an adhesive tape preventing the penetration of humidity into the underlying insulation when applying concrete or anhydrite liquid screed.

The base mat roll and folded board are classed in the thermal conductivity group 045 (040 for 30-2 mm) and the building material class B 2 according to DIN 4102 with a maximum load of 4 kN/ m^2 (5 kN/m^2 for 30-2 mm).

The PE-Xc plastic pipes "Copex", PE-RT plastic pipes "Copert" and composition pipes "Copipe HSC" sized 14, 16 and 17 mm are fixed onto the base mat roll or folded board with tacker hooks or self-adhesive clamping rails made of polypropylene.

The base mat rolls or folded boards are laid directly onto the raw concrete flooring or, if required, onto the additional insulation.

The Oventrop base mat rolls or folded boards are laid in the same manner as the base mats, starting in a corner of the room opposite the entrance door. Off cuts can be used in the same order which leaves minimum wastage.

The "Cofloor" base mat rolls and folded boards with pipe fixing by use of tacker hooks or clamping rails allow for an economical, quick and simple laying of all components.

The imprinted laying screen makes it easy to lay the pipe in either a spiral or serpentine pattern.

The tissue foil ensures a secure fixing of the tacker hooks and/or the clean fitting of the self-adhesive clamping rails.

2,3 The 5 cm laying screen imprinted on the foil of the Oventrop base mat rolls and folded boards allows for a clean laying of the PE-Xc plastic pipes "Copex", PE-RT plastic pipes "Copert" and composition pipes "Copipe HSC" sized 14, 16 and 17 mm. The clear lines of the laying screen makes it very easy to tack the pipes in a straight line with the handy Oventrop tacker machine.

4 Self-adhesive clamping rails made of polypropylene, clamping distance 5 cm for PE-Xc plastic pipes "Copex", PE-RT plastic pipes "Copert" and composition pipes "Copipe HSC" sized 14 or 16 mm. Rail with a length of 1 m for fixing the pipes onto the insulation.

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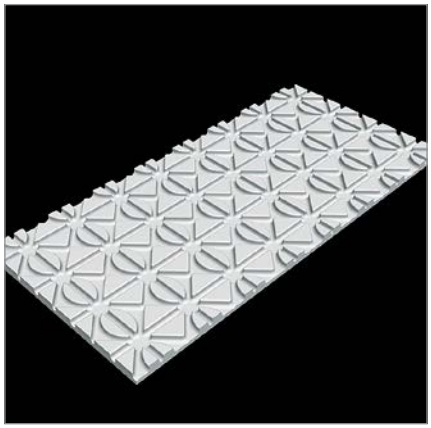

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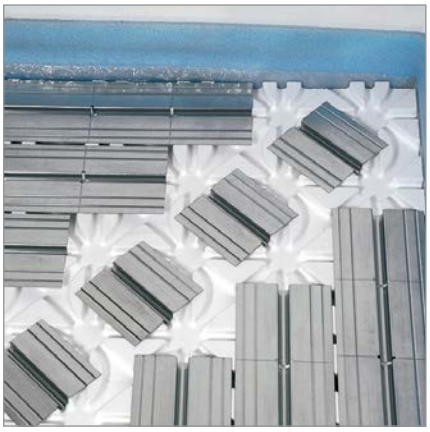

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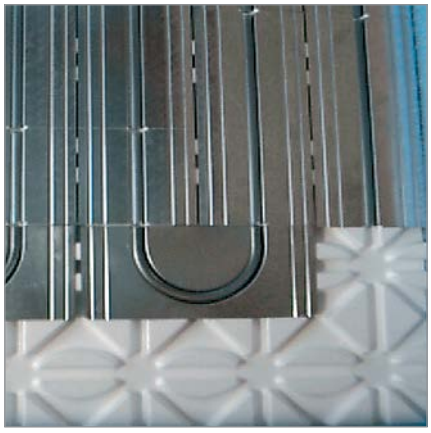

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1 Apart from the base mat, tacker and clamping rail system where wet screed is used, Oventrop offers the "dry-build" system. The components of the dry-build system are suitable for the renovation of old buildings as well as for new buildings.
The Oventrop "Cofloor" dry build surface heating/cooling system can be combined with standard screed flooring elements (such as Fermacell boards) but also with standard concrete or liquid screed.
The "Cofloor" dry-build board consists of expanded polystyrene foam with a thickness of 25 mm. It serves as thermal insulation and at the same time as carrier for the individual dry-build heat/cooling conducting strips and elbows. The specific order of the grooves of the basic elements allows for the Oventrop composition pipes "Copipe HSC" sized 14 x 2 mm to be laid in either a spiral or serpentine pattern.
Other laying pattern are also possible.
Oventrop recommends using the composition pipe "Copipe HSC" as it has a lower expansion coefficient than the PE-Xc and PE-RT plastic pipes. This way, a quiet operation within the strips and elbows is guaranteed.
The heat/cooling conducting strips with a thickness of 0.4 mm and the heat/cooling conducting elbows with a thickness of 0.5 mm are made of galvanised sheet steel and allow for an optimum heat/cooling transport into the screed flooring elements or the concrete or liquid screed. The practical pre-punched break points of the heat/cooling conducting strips with a length of 998 mm allow for an optimum laying of the pipes in any room.

Advantages

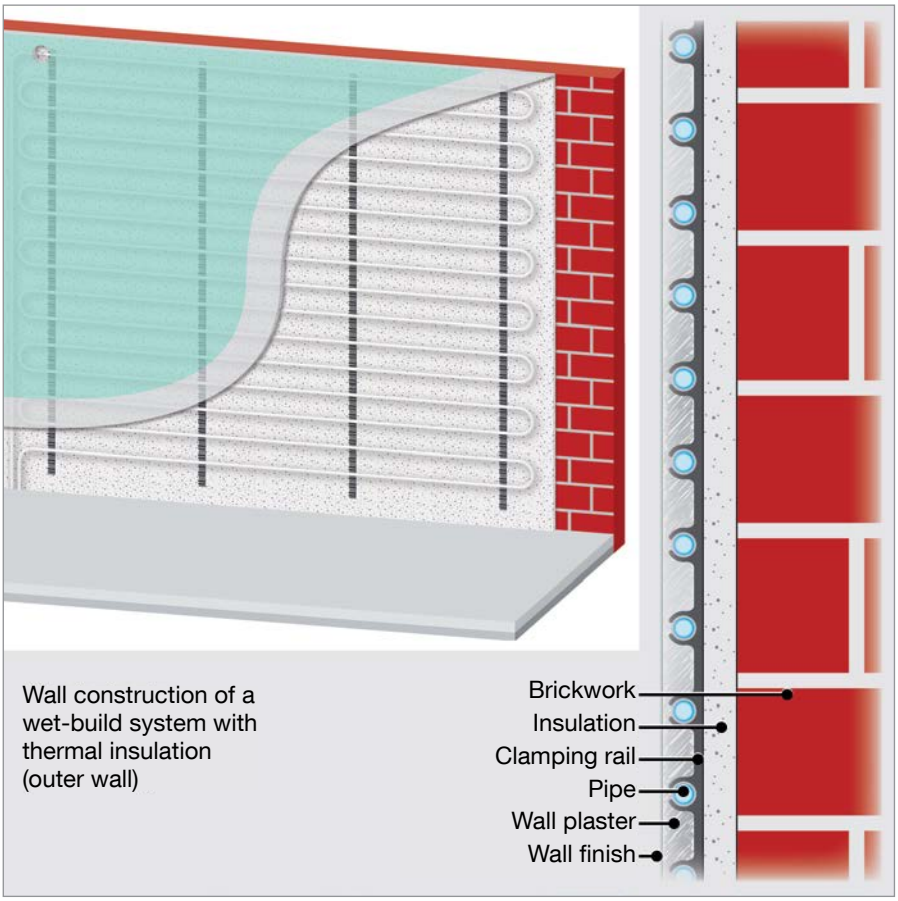
- Installation of the Oventrop dry-build system "Cofloor" is without wastage and can be carried out by only one person
- Reduced overall height compared to wet screed systems
- Optimum heat/cooling output via the strip and elbows made of galvanised sheet steel
- No delay in the building progress when screed flooring elements are installed
- No warm up period is to be observed when using screed flooring elements
- The floor can be walked on immediately after installation

When laying the pipes in a serpentine pattern, the Oventrop dry-build system "Cofloor" can also be used for wall heating/cooling.

2 Dry-build element made of expanded polystyrene (1000 x 500 x 25 mm) with grooved pattern for fully fitting any room.

3 Heat/cooling conducting strips installed as 90° elbow for spiral patterned laying.

4 Installed heat/cooling conducting elbow where the pipe loops in a serpentine patterned layout.



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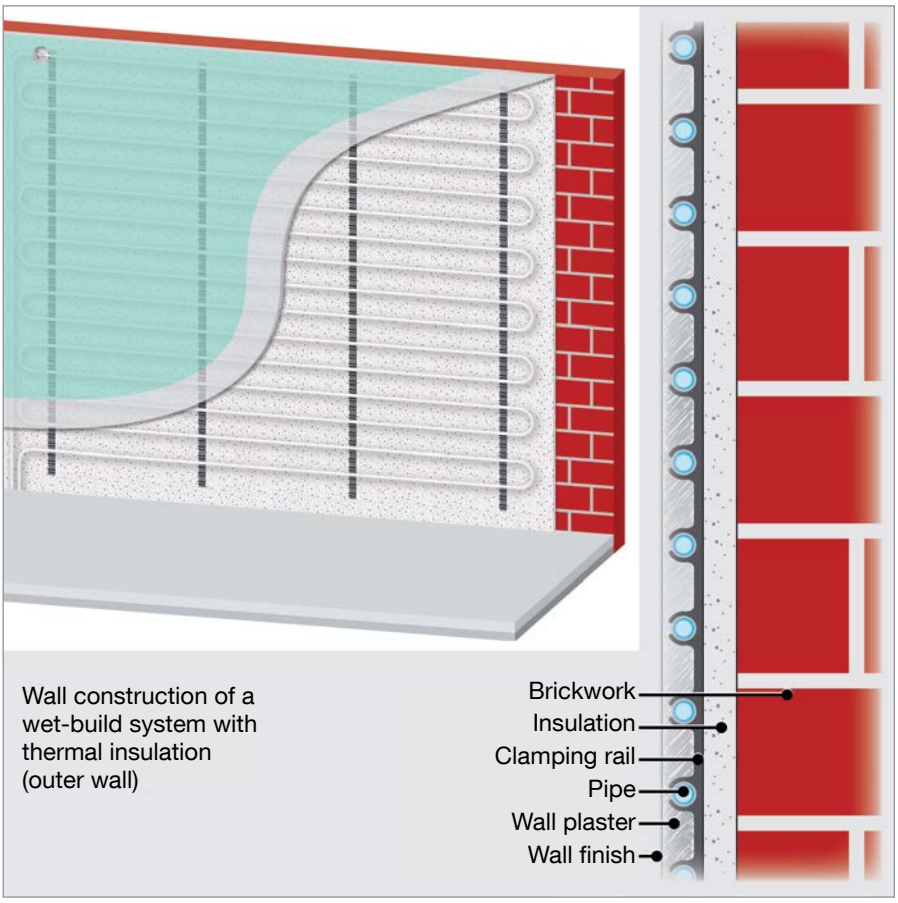

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The large wall surfaces of a room are ideal for the installation of a heating or cooling system with composition pipes (for instance "Copipe HSC").

Wall heating or cooling systems are low temperature systems. The temperature of the heating medium or coolant is only slightly above or below the room temperature. Most of the energy is radiated and comfort is increased. With the Oventrop wet-build wall heating or cooling system, the pipes are fixed under plaster.

With a wet-build system, the pipes are fixed directly onto the wall or, if necessary, onto an additional insulation layer, using self-adhesive, extendable polypropylene clamping rails and suitable wall fixings. The construction is covered with suitable wall plaster and then with the chosen wall finish, such as wall paper, structural plaster, paint, tiles etc.

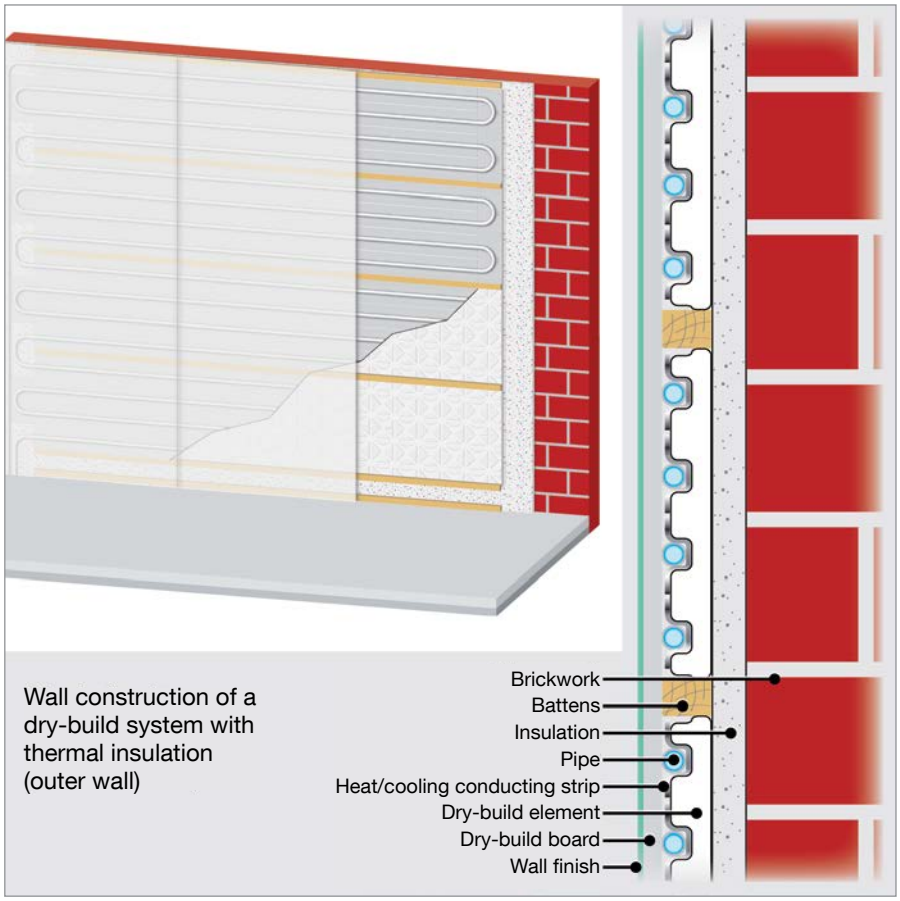
A plaster reinforcement may be necessary depending on the plastering system used. It has to be carried out in accordance with the manufacturer's instructions. Plaster reinforcements are textile inserts made of plastic or mineral fibres improving the tensile strength of the plaster and preventing cracks.

Contrary to floor surfaces, wall surfaces do not represent a direct contact surface, so that the temperature can be slightly higher during heating periods. For reasons of comfort it is, however, recommended not to exceed an average surface temperature of 40 °C during heating periods. The maximum temperature load bearing capacity of the wall finish may reduce this limit. The maximum permissible flow temperature contained within the instructions of the plaster manufacturer must be observed.

As with an underfloor heating, an incremental heating test has to be carried out for wall heating and cooling systems (in case of heating). This will confirm that it functions correctly but is not intended to dry the wall construction. Procedure and documentation must be carried out in accordance with the instructions of the plaster manufacturer.

1 Wall surface with thermal insulation

2 Wall surface without thermal insulation



Wall construction of a dry-build system with thermal insulation (outer wall)

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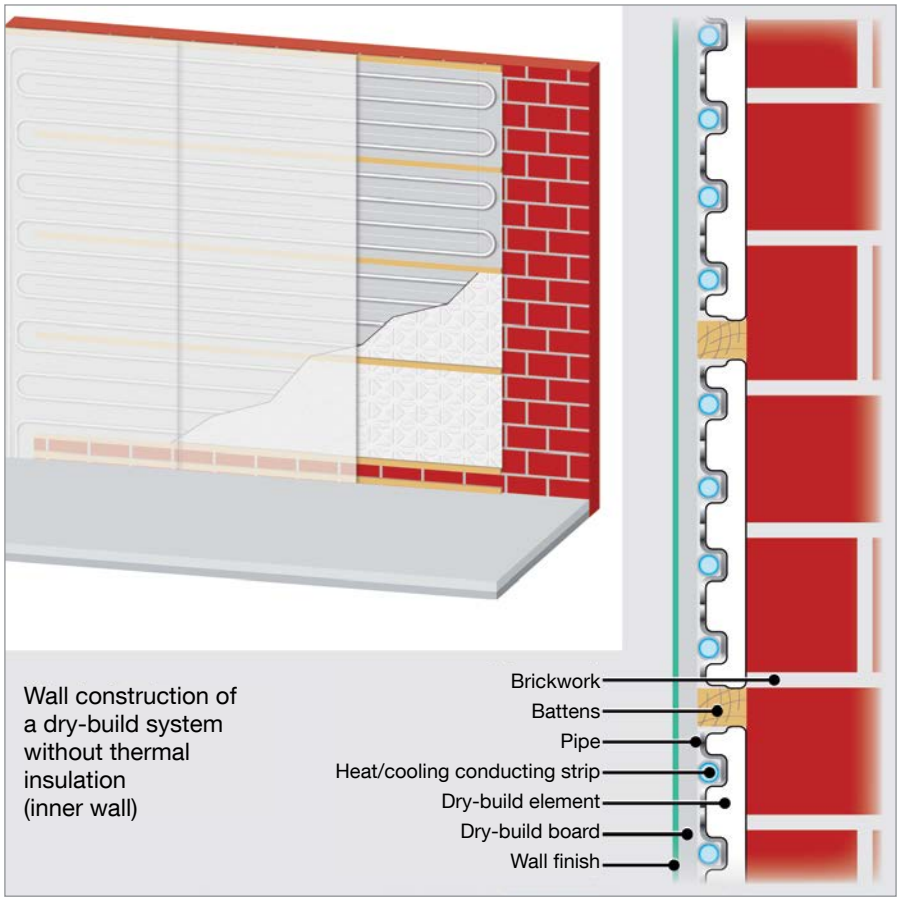

Wall construction of a dry-build system without thermal insulation (inner wall)

2

The large wall surfaces of a room are ideal for the installation of a heating or cooling system with composition pipes (for instance "Copipe HSC").

Wall heating or cooling systems are low temperature systems. The temperature of the heating medium or coolant is only slightly above or below the room temperature. Most of the energy is radiated and comfort is increased.

With the Oventrop "Cofloor" dry build wall heating and cooling system, the pipes with the heat/cooling conducting strips and elbows are integrated into the thermal insulation. Due to the large-surface covering of the dry-build elements, the heat/cooling conducting strips allow for a transmission of the heat into the room via the wall finish.
The dry-build elements serve as insulation and carrier for the heat/cooling conducting strips and elbows. The pre-punched break points of the strips allow for an optimum covering of the wall surfaces.

Provided that no additional insulation is required, the dry-build elements are fixed directly onto the wall between wood battens for plaster work. If an additional insulation layer is required, it has to be fixed firmly onto the bare wall.

The wall is normally covered with dry-build boards with a thickness of 12.5 mm which are fixed onto the battens. The dry-build boards are covered with the required wall finish (wall paper, structural plaster, paint, tiles, etc.). The dry-build wall heating/ cooling system reduces the time of construction.

Due to the dry-build construction, no humidity penetrates the wall.

Contrary to floor surfaces, wall surfaces do not represent a direct contact surface, so that the temperature can be slightly higher during heating periods. For reasons of comfort it is, however, recommended not to exceed an average surface temperature of 40 °C during heating periods. The maximum temperature load bearing capacity of the wall finish may reduce this limit. The maximum permissible flow temperature contained within the instructions of the plaster manufacturer must be observed.

As with an underfloor heating, an incremental heating test has to be carried out for wall heating and cooling systems (in case of heating). This will confirm that it functions correctly but is not intended to dry the wall construction. Procedure and documentation must be carried out in accordance with the instructions of the manufacturer of the dry-build boards.

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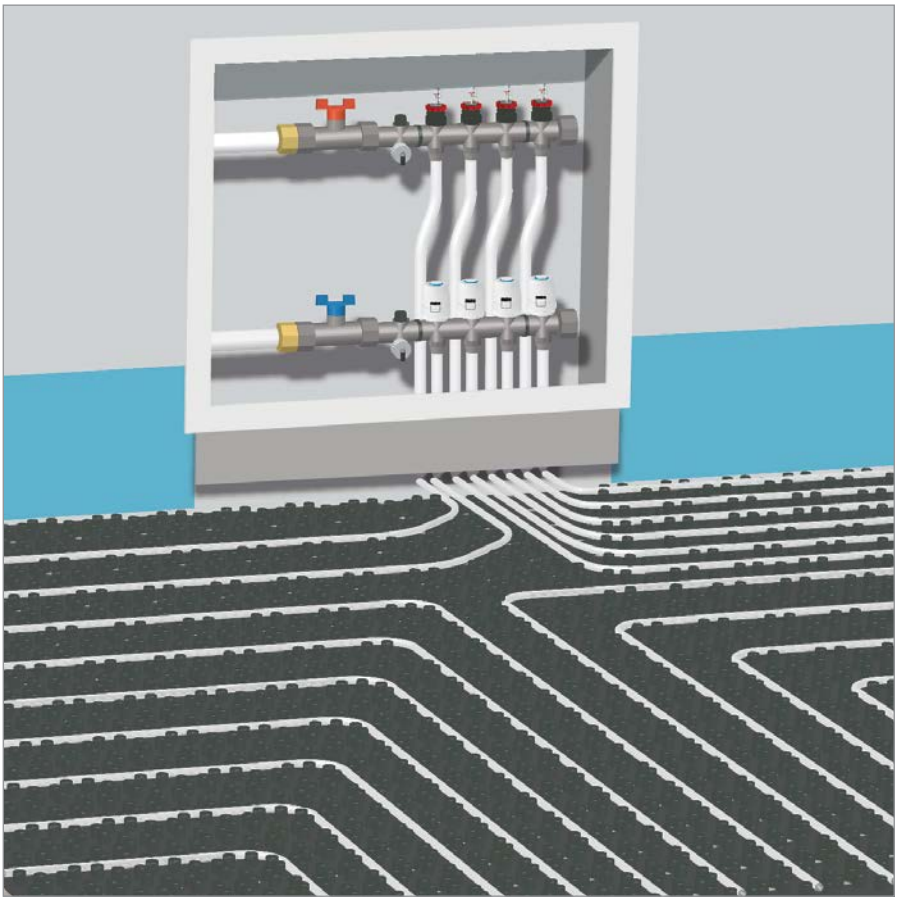
2 Wall surface without thermal insulation



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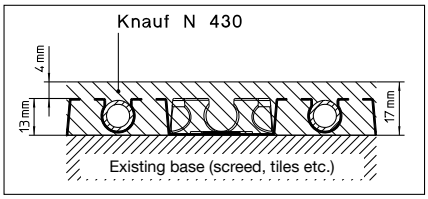

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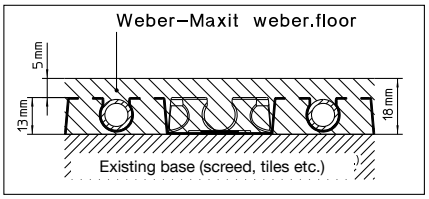

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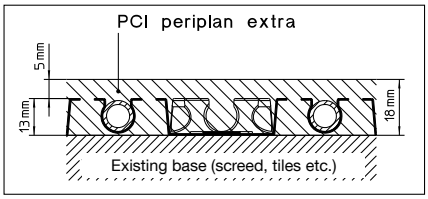

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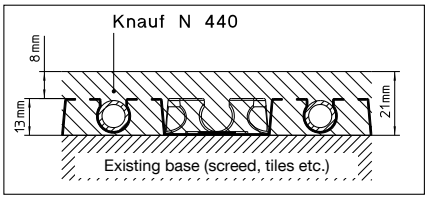

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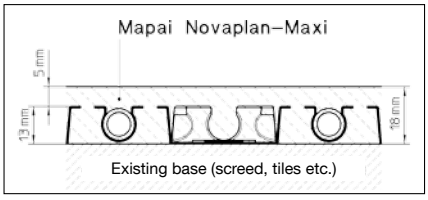

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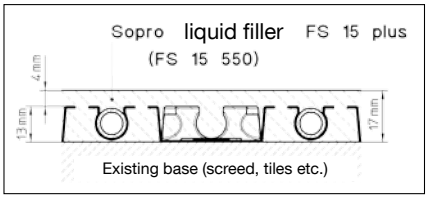

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The "Cofloor" base mat system NP-R is a water base surface heating/cooling system which is used in conjunction with thin layered screed. It can be used for new buildings and renovation projects.

Together with the corresponding levelling compound, the system is laid directly onto the existing flooring or the bare floor as compound construction.

Levelling compounds are offered by several manufacturers and can be used for the Oventrop base mat system NP-R according to the manufacturer's specifications.

System components:

- Base mat NP-R
- Edge insulating strip
- PE-RT plastic pipe "Copert" 12 x 2 mm
- Compression fittings "Ofix K" G ¾ collar nut x 12 x 2 mm

1 Base mat NP-R with PE-RT pipe "Copert" and liquid screed

2 Knauf N 430
Minimum cover: 4 mm
Overall height: 17 mm

3 PCI periplan extra
Minimum cover: 5 mm
Overall height: 18 mm

4 Weber-Maxit weber.floor
Minimum cover: 5 mm
Overall height: 18 mm

5 Knauf N 440
Minimum cover: 8 mm
Overall height: 21 mm

6 Mapei Novoplan-Maxi
Minimum cover: 5 mm
Overall height: 18 mm

7 Sopro liquid filler FS 15 plus (FS 15 550)
Minimum cover: 8 mm
Overall height: 21 mm

Note:

- The manufacturer's specifications of the levelling compound/screed must be observed.
- The overall height is related to a compound construction on the existing floor or the bare floor.
- In systems with additional insulation layers, the specifications of the manufacturer of the levelling compound/screed must be strictly observed (for instance regarding an increase of the minimum covering).
- The overall height does not include the top floor covering.

8 Base mat NP-R with PE-RT "Copert" pipe and liquid screed

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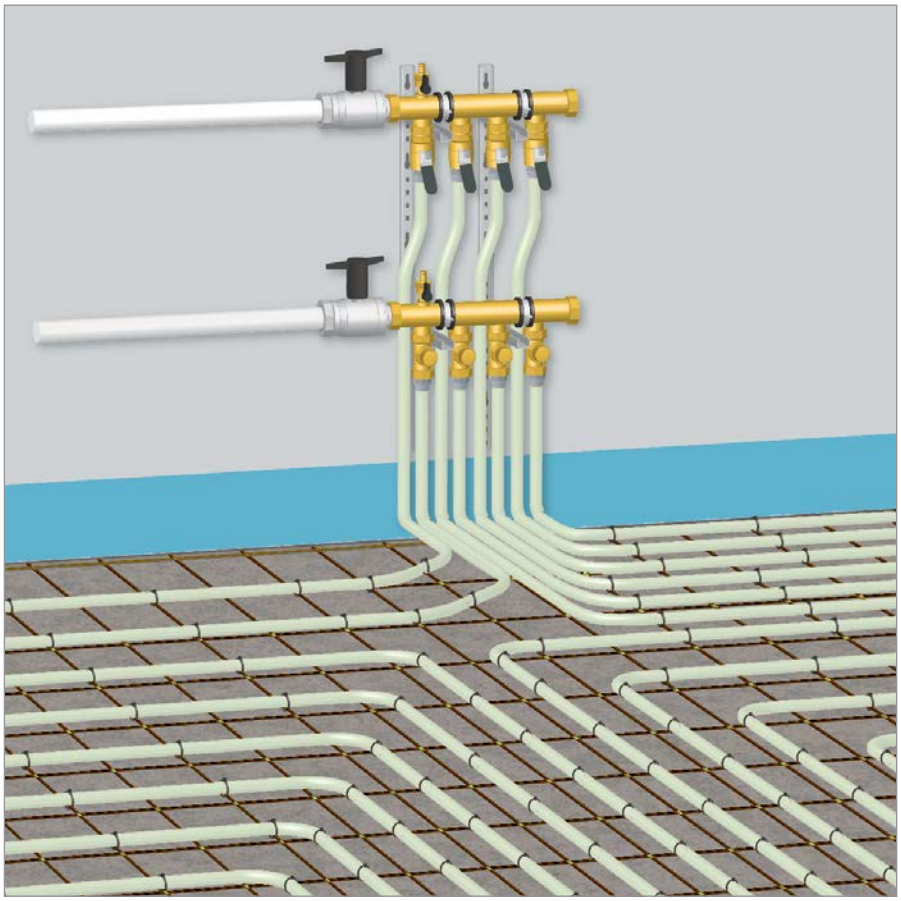


1

1 Surface heating and cooling systems for commercial and industrial buildings are becoming more and more important.

The advantages of surface heating and cooling systems can also be used for industrial buildings.

Oventrop offers high quality system components for a professional installation of the "Cofloor" system industry.

2 System components:

1 Brass distributor/collector "Multidis SFI", extension to a maximum of 20 heating circuits

2 Cap
for closing the ends of the flow distributor/return collector

3 Console
for fixing the brass distributor/collector "Multidis SFI"

4 Ball valve "Optiflex"
for filling and venting

5 "Optibal" Ball valve
for the isolation of the flow distributor and return collector

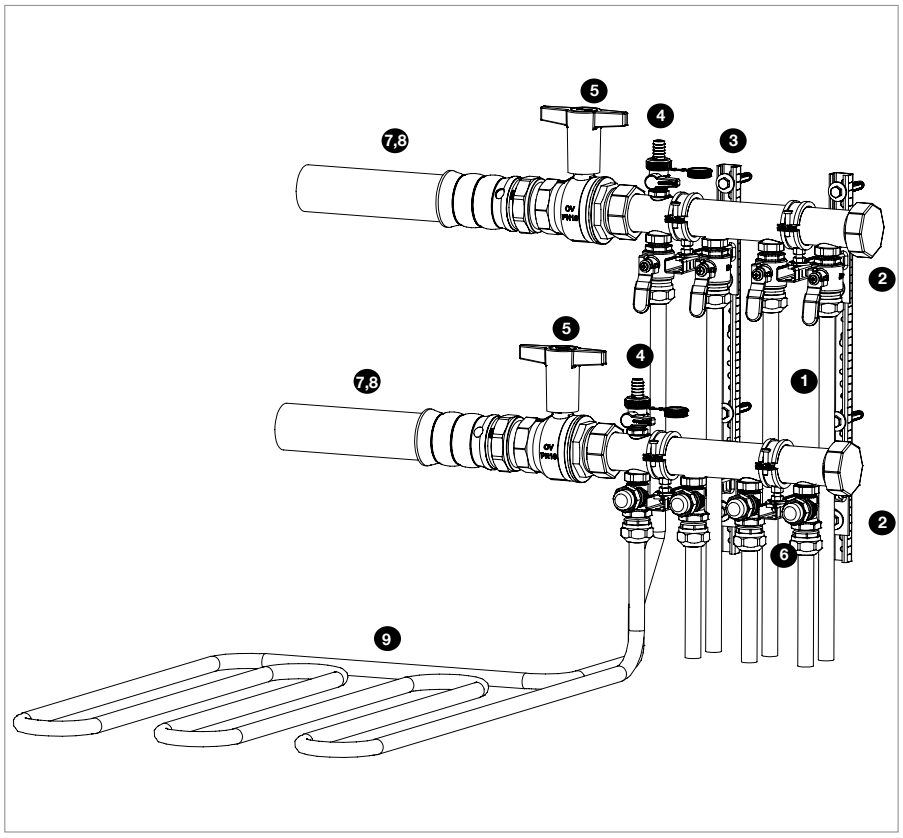
6 Compression fittings "Cofit S"
20 x 2 mm x G 1 collar nut
26 x 3 mm x G 1 collar nut
for the connection of the PE-Xc plastic pipes "Copex" to the distributor/ collector

7,8 Composition pipe "Copipe HSC" and press fittings "Cofit P" for a safe and quick connection of the distributor/ collector on the riser side

9 PE-Xc plastic pipe "Copex"
Diffusion tight pipe for the professional installation of the "Cofloor" system industry

3 Industrial hall

4 Distributor/collector "Multidis SFI"



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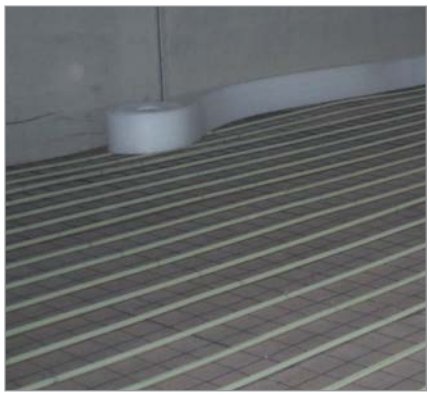

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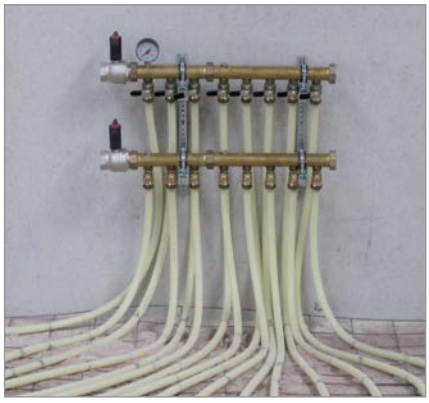

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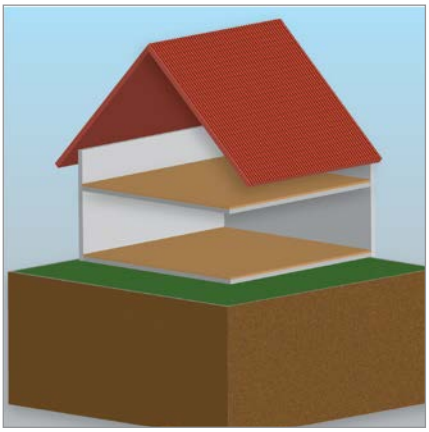

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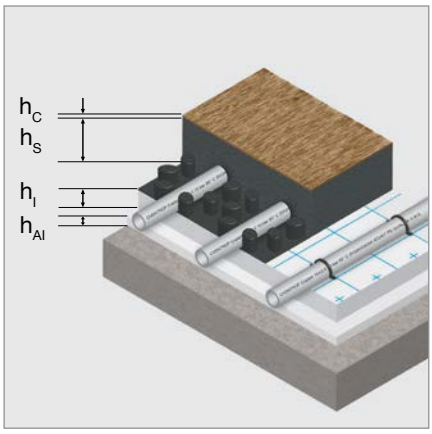

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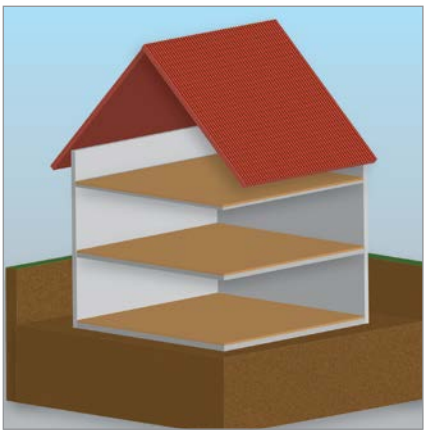

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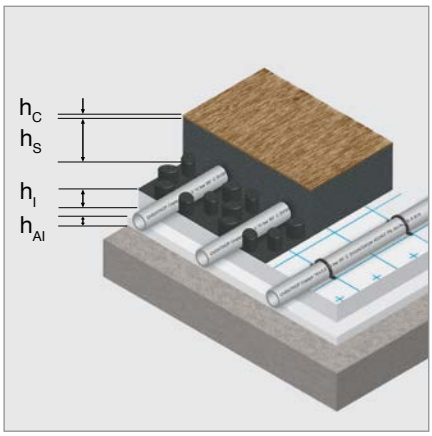

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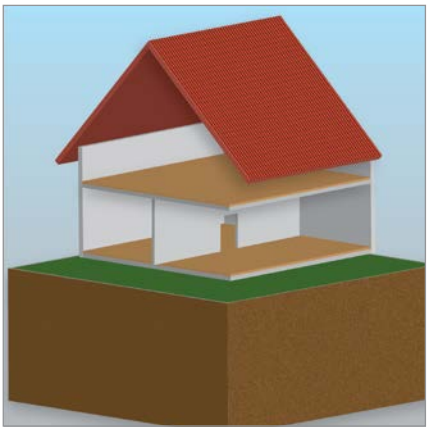

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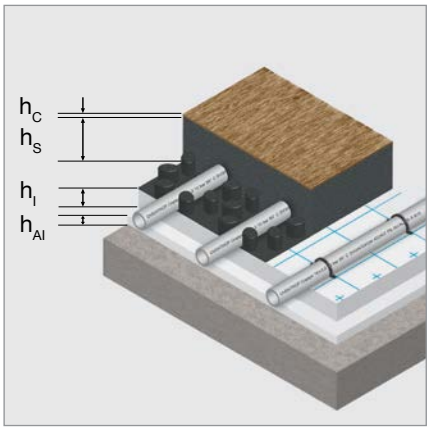

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The DIN EN 1264-4 standard and the German Energy Saving Directive (EnEV) describe the minimum requirements regarding the thermal insulation of surface heating systems. Higher demands can be defined by the specifying engineer.

The following standard constructions of the surface heating system “Cofloor” with the base mat NP-30 or the base mat roll/folded board with thermal and sound insulation as pipe backing.

Effective thickness of insulation layer:
30 mm (both systems)

Thermal conductivity group:
040 base mat NP-30
045 base mat roll/folded board

Sound improvement:
28 dB base mat NP-30
29 dB base mat roll/folded board

Overall height:
54 mm base mat NP-30
35 mm base mat roll/folded board

Elasticity under :
2 mm base mat NP-30
3 mm base mat roll/folded board

Max. load:
5 kN/m² base mat NP-30
4 kN/m² base mat roll/folded board

Screed volume for both systems with a pipe covering of:
45 mm (approx. 65 mm screed): approx. 60 l/m²
30 mm (approx. 50 mm screed): approx. 45 l/m²

1, 2 Surface heating above a heated room
Insulation layer according to DIN EN 1264- 4 with base mat, base mat roll or folded board: 30 mm
Thermal resistivity: R ≥ 0.75 (m² K)/W

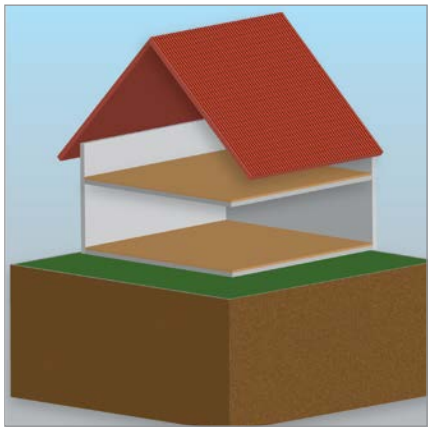
3, 4 Surface heating above unheated rooms, rooms heated at irregular intervals or on flooring in direct contact with the ground
Insulation layer according to DIN EN 1264- 4 with base mat, base mat roll or folded board: 30 mm
and expanded polystyrene, thermal conductivity group 040: 20 mm
Thermal resistivity: R ≥ 1.25 (m² K)/W

5, 6 Surface heating of a flooring with outside air from below
Insulation layer according to DIN EN 1264- 4 with base mat, base mat roll or folded board: 35 mm
and expanded polystyrene, thermal conductivity group 040: 50 mm
Thermal resistivity: R ≥ 2.0 (m² K/)W

Sealing of buildings according to DIN 18195 below the insulation layer: approx. 2 mm

Example of a floor construction according to points 3, 4 (valid for both systems):

h_C = Floor covering e.g.	10 mm
h_S = Screed, e.g.	+ 65 mm
h_I = Insulation layer	+ 35 mm
h_{AI} = Additional insulation	+ 20 mm
Overall height, e.g.	130 mm



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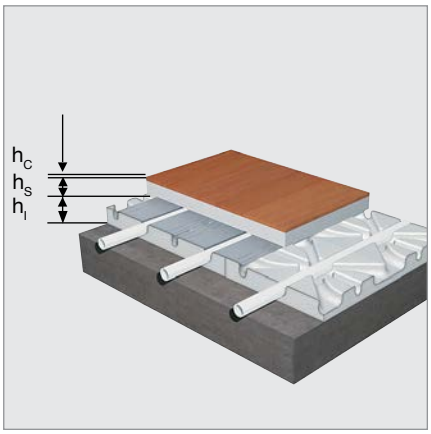

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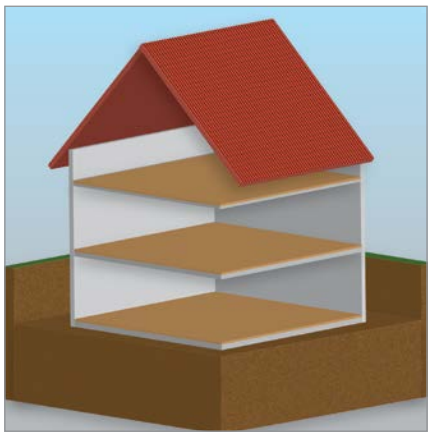

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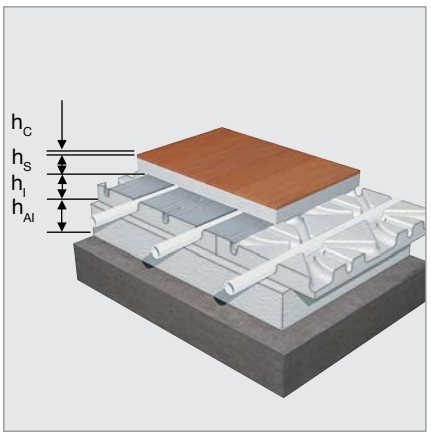

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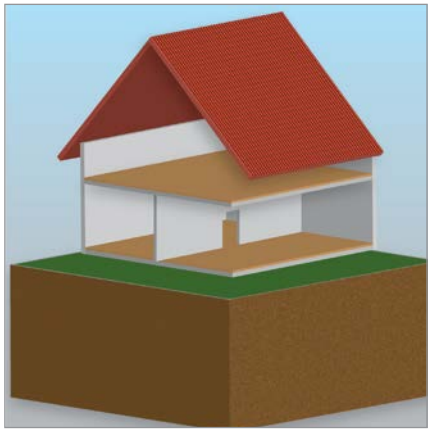

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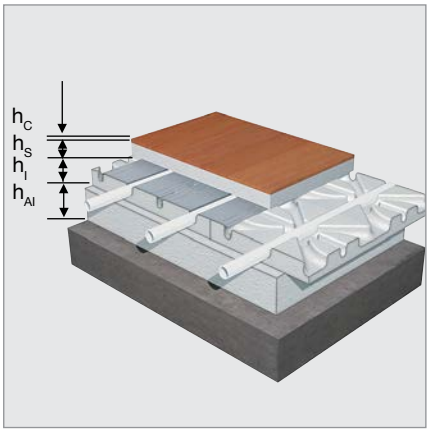

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Using the dry-build system with thermal insulation as pipe backing, the following standard constructions of the “Cofloor” surface heating are derived from the DIN EN 1264-4 and the German Energy Saving Directive (EnEV).

Thickness of dry-build element:	25.0 mm
Effective thickness of insulation layer:	17.5 mm
Thermal conductivity group:	035
Max. load (dry-build element):	60 kN/m²
Construction height of screed flooring board:	25.0 mm

1, 2 Surface heating above a heated room

Insulation layer according to DIN EN 1264- 4 with dry-build element :	25.0 mm
and expanded polystyrene 035 DEO:	10.0 mm
Thermal resistivity:	R ≥ 0.75 (m² K)/W

3, 4 Surface heating above unheated rooms, rooms heated at irregular intervals or on flooring in direct contact with the ground

Insulation layer according to DIN EN 1264- 4 with dry-build element :	25.0 mm
and expanded polystyrene 035 DEO:	30.0 mm
Thermal resistivity:	R ≥ 1.25 (m² K)/W

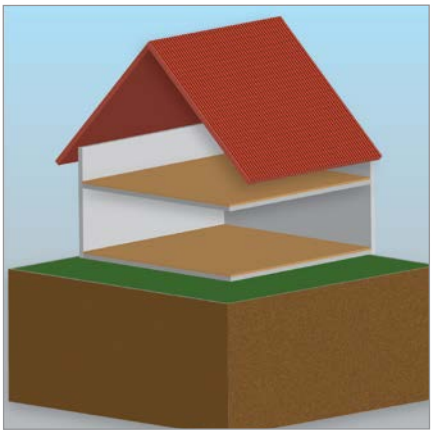
5, 6 Surface heating of a flooring with outside air from below

Insulation layer according to DIN EN 1264- 4 with dry-build element :	25.0 mm
and expanded polystyrene 035 DEO:	55.0 mm
Thermal resistivity:	R ≥ 2.0 (m² K)/W

Sealing of buildings according to DIN 18195 below the insulation layer: approx. 2 mm

Example of a floor construction according to points 3, 4

h_C = Floor covering e.g.	10 mm
h_S = Screed, e.g.	+ 25 mm
h_I = Insulation layer	+ 25 mm
h_{AI} = Additional insulation	+ 30 mm
Overall height, e.g.	90 mm



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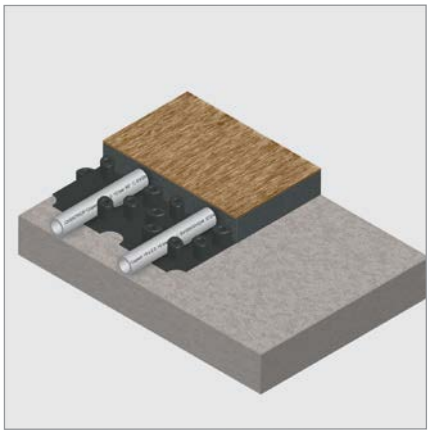

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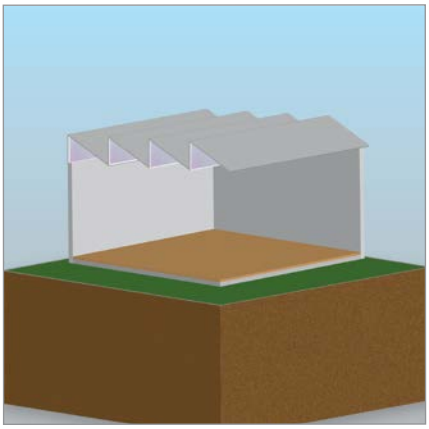

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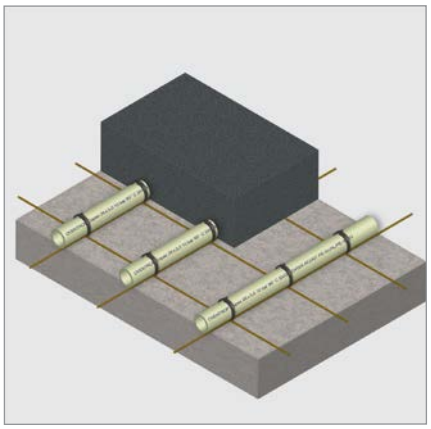


4

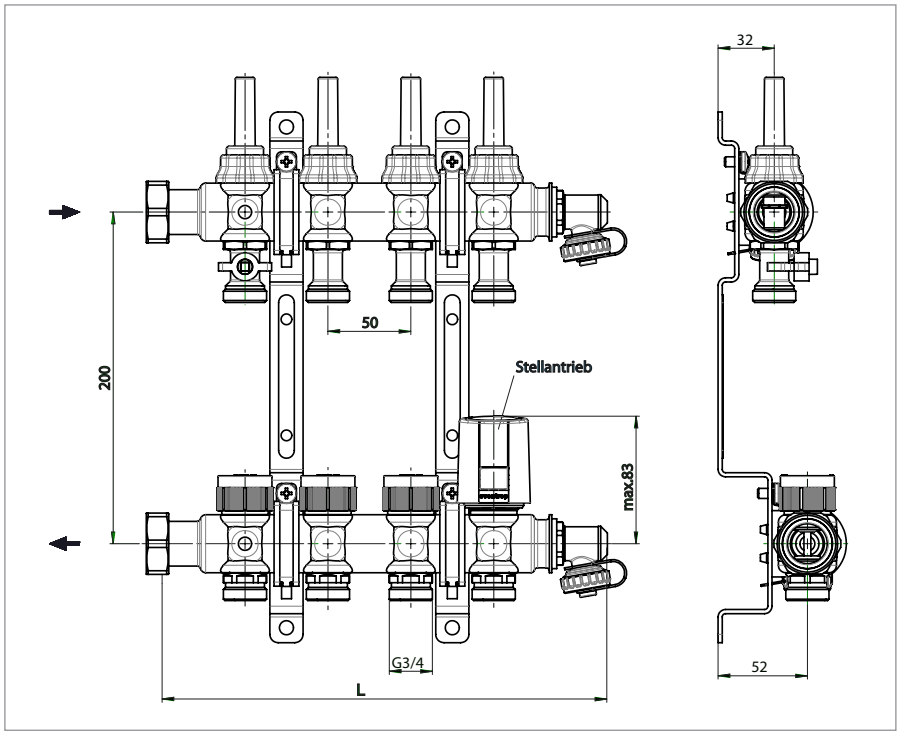
1, 2 Surface heating above a heated or unheated room without insulation layer
Together with the corresponding levelling compound, the system is laid directly onto the existing flooring or the bare floor as compound construction.

- The manufacturer's specifications of the levelling compound/screed must be observed.
- The overall height is related to a compound construction on the existing floor or the bare floor.
- In systems with additional insulation layers, the specifications of the manufacturer of the levelling compound/ screed must be strictly observed (for instance regarding an increase of the minimum covering).

3, 4 Industrial surface heating in direct contact with the ground
The brass distributors/collectors "Multidis SFI" are used for the connection of heating/cooling circuits in industrial surface heating/cooling systems.
The floor construction for the individual projects is specified by the specifying engineer and the structural engineer.

1

2



Item no.	Outlets	Length L with ball valve 1406383	Length (L) with ball valve 1406384
1405352	2	168 mm	248 mm
1405353	3	218 mm	298 mm
1405354	4	268 mm	348 mm
1405355	5	318 mm	398 mm
1405356	6	368mm	448 mm
1405357	7	418 mm	498 mm
1405358	8	468 mm	548 mm
1405359	9	518 mm	598 mm
1405360	10	568 mm	648 mm
1405361	11	618 mm	698 mm
1405362	12	668 mm	748 mm

3

The Oventrop stainless steel distributors/ collectors "Multidis SF" allow for the central distribution of heating or cooling water to the different circuits of each dwelling. They are designed for surface heating and cooling systems with circulation pump.

The supply and the return pipe may be connected either on the left or right hand side.
The brackets allow for the fixing of the distributor/collector into the cabinet or directly onto the wall. When using a heat meter, its lengths have to be taken into consideration when choosing the cabinet. To enlarge the depth of the cabinet, the frame and the door have to be pulled out. The ball valve DN 25 with temperature sensor connection M 30 x 1, item no. 1406708, can be used at the supply of the stainless steel distributor/collector "Multidis SF". Hydronic balancing of the installation is carried out with the help of the integrated inserts of the return collector.

1 Stainless steel distributor/collector "Multidis SF" with integrated flow measuring and regulating devices 0-5 l/min. in the flow distributor. As for this distributor/collector, item no. 14053.., the calculated flow rate is set at the handwheel of the flow measuring and regulating device. The set value can be read off the sight glass with scale (0-5 l/min.). Each heating/cooling circuit can be isolated without modification of the set flow rate which means that the set flow rate is restored after reopening of an isolated heating/cooling circuit. The functions "setting" and "isolation" are thus autonomous.

2 Stainless steel distributor/collector "Multidis SF" with integrated regulating inserts in the flow distributor. Regulation of this distributor/collector, item no. 14055.., is carried out according to a chart (see technical information sheet). The calculated flow rate is set at the concealed stem of the regulating insert. A reproducible presetting is possible.

The Oventrop calculation software "OVplan" is available for the design of a surface heating/cooling system with composition pipe "Copipe HSC". The valve inserts M 30 x 1.5 in the return collector which are convertible to thermostatic operation allow for an individual room temperature control prescribed in the German Energy Saving Directive. The Oventrop electrothermal actuators or thermostats with remote control which are available as accessories are used for this purpose.

3 Dimensions "Multidis SF"

1

2

1 Stainless steel distributor/collector “Mutlidis SFQ” with integrated flow indicators in the flow distributor and with “Q-Tech” for automatic hydronic balancing.

Regulation of this distributor/collector, item no. 14049.., is carried out by setting the heating circuit flow rate in l/min. The volume flow is set directly at the valve insert “QM”.

The flow range lies between 0.5 and 5 l/min.

The Oventrop calculation software “OVplan” is available for the design of a surface heating/cooling system with composition pipe “Copipe HSC”.

The valve inserts “QM” in the return collector which are convertible to thermostatic operation allow for an individual room temperature control prescribed in the German Energy Saving Directive. The Oventrop electrothermal actuators or thermostats with remote control which are available as accessories are used for this purpose.

2 Valve insert “QM” with “Q-Tech” for automatic hydronic balancing.
Flow range: 0.5-5 l/min.

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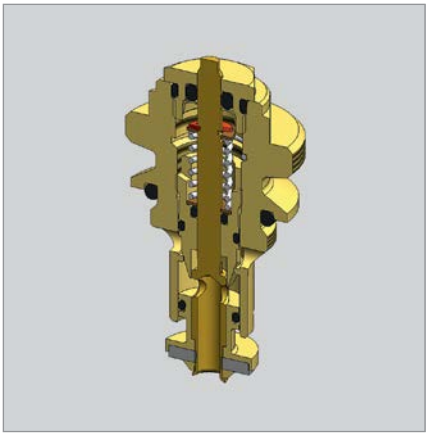

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1 Stainless steel distributor/collector “Multidis SFB” with heating circuit valves with presettable bypass and integrated regulating inserts in the flow distributor. The minimum flow rate which can be set via the bypass of the heating circuit valves guarantees a perfect operation of heat pumps and a basic heat load of the surface heating (no cooling down).

Regulation of this distributor/collector, item no. 14054.., is carried out according to a chart (see technical information sheet). The calculated flow rate is set at the concealed stem of the regulating insert. A reproducible presetting is possible.

The Oventrop calculation software “OVplan” is available for the design of a surface heating/cooling system with composition pipe “Copipe HSC”.

The valve inserts M 30 x 1.5 in the return collector which are convertible to thermostatic operation allow for an individual room temperature control prescribed in the German Energy Saving Directive. The Oventrop electrothermal actuators or thermostats with remote control which are available as accessories are used for this purpose.

2 Illustrated section bypass valve

“Multidis SFI” Brass distributor/collector for industrial surface heating and cooling systems

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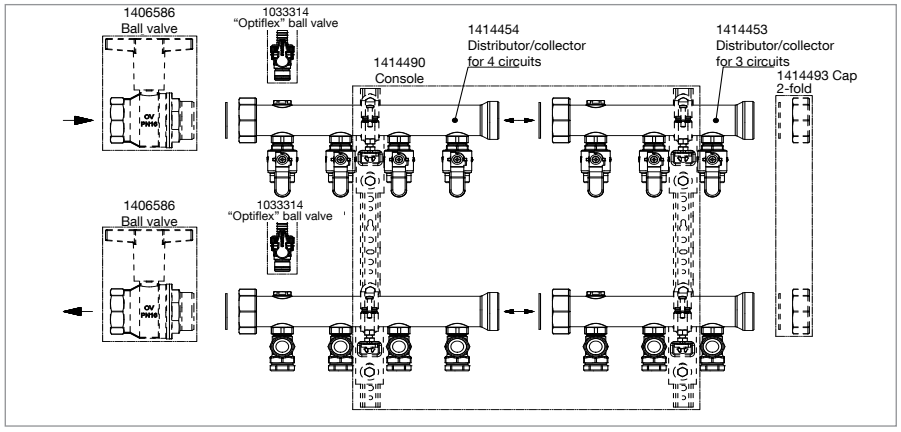

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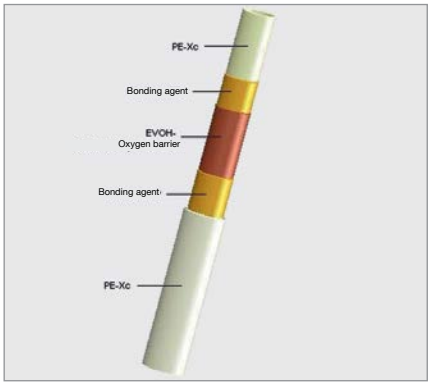

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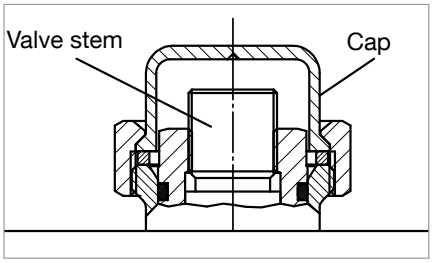

4

Surface heating systems for commercial and industrial buildings are becoming more and more important. As the ceilings of these buildings are usually very high, an even and economical distribution of the required temperature is needed. Utilising the large surface area together with a favourable vertical temperature profile fulfils this demand.

The integration of the surface heating system within the ground floor allows for an interior design that is free and flexible. Conventional visible heating systems have to be cleaned and serviced regularly, but industrial surface heating systems do not require individual maintenance. Surface heating in commercial and industrial buildings is therefore a heat distribution system which is economical and energy efficient and with technical effort it can also be used for cooling.

1 The brass distributors/collectors “Multidis SFI” allow for a central distribution of the heating or cooling water to the different circuits of an industrial surface heating/cooling system. It is recommended to equip the distributors/collectors with ball valves DN 50. They allow for the isolation of the supply and return pipe, for instance for maintenance work. Consoles with pipe clamps (including sound insulation supports) allow for a fixing of the distributors/collectors onto the wall.

The ball valve at the flow distributor and the regulating valve at the return collector allow for the isolation of each heating circuit.

2 Summary with system components
Five different distributor modules with two to six heating circuit connections allow for an individual combination of up to 20 circuits. The individual modules are interconnected with flat seals. The distributor/collector ends are closed with plugs.

3 PE-Xc plastic pipes “Copex” sized 20 x 2 mm and 26 x 3 mm can be connected to the heating circuit connections of the brass distributor/collector “Multidis SFI” with corresponding compression fittings. The pipes are made of cross-linked polyethylene according to DIN 4726.

The sheltered oxygen barrier protects the PE-Xc plastic pipes “Copex” against damage on site.

4 Hydronic balancing of the individual surface heating circuits has to be carried out in accordance with the VOB DIN 18380 standard. Regulation is carried out at the regulating valves integrated in the return collector of the “Multidis SFI”.

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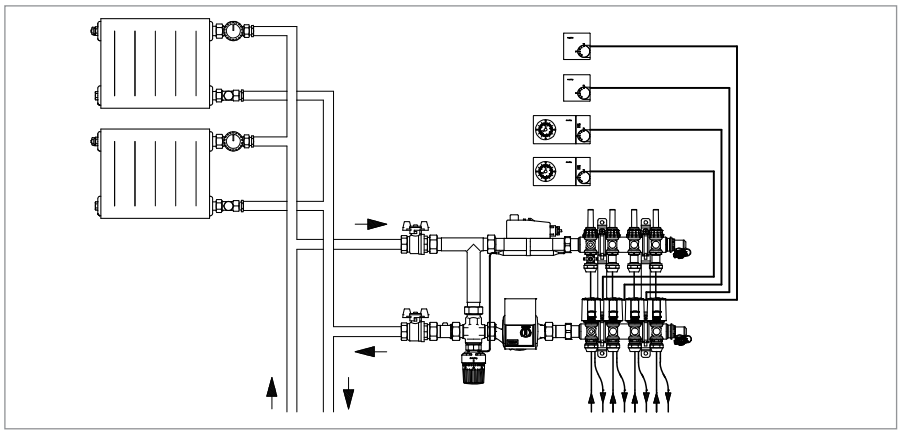

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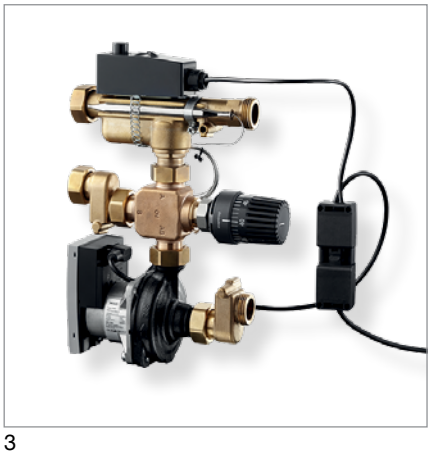

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Economy and comfort of a surface heating system can only be achieved if the correctly calculated pipe layout and floor construction is adhered to. Moreover, a temperature and volume flow control of the heating medium adapted to the surface heating must be taken into consideration. The main points of a regulation are the provision of a permissible flow temperature of the heating medium which should be separate to the boiler control and the distribution of the volume flows in the individual heating circuits of the stainless steel distributor/collector.

The control units “Regufloor H/HN” are fixed value control units for the connection to the stainless steel distributors/ collectors “Multidis SF” for surface heating systems which also serve the supply of a radiator circuit. The unit regulates the flow temperature of the heating medium to a constant value (fixed value control) by adding some of the return flow water of the return collector with the help of a temperature controller with contact sensor and a three-way valve.

The medium in the heating circuits of the surface heating system is circulated by an electronically controlled high-efficiency pump.

To protect the surface heating system against overheating, for instance in case of failure of the temperature controller, the control unit is equipped with a module which switches the pump off.

The advantage of the control units “Regufloor H/HN” is the option to integrate the flow temperature control of a surface heating into the heating circuit of a radiator system. The illustration on the left hand side shows the connection to the supply and return of a radiator system.

1 “Regufloor H” Control unit

2 System illustration “Regufloor H”

3 “Regufloor HN” Control unit

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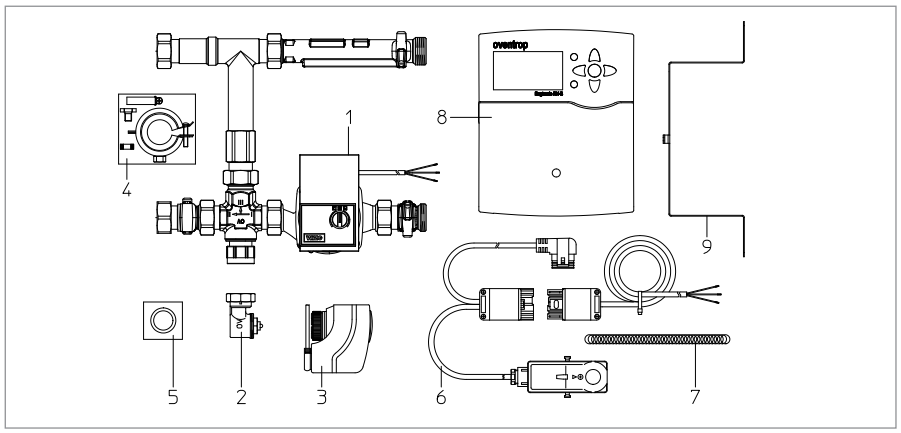

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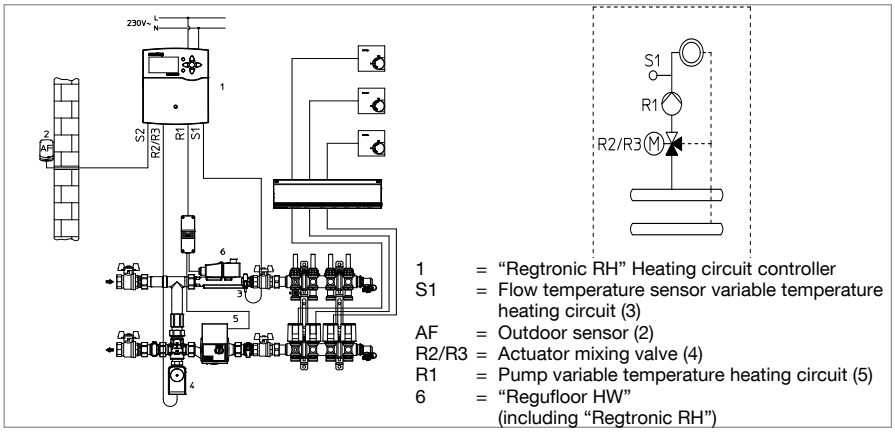

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1 The control unit “Regufloor HW” is used for flow temperature control of heating surfaces in central heating systems. The flow temperature control is weather guided, i.e. it depends on the outside temperature up to an adjustable maximum. This way, the maximum permissible flow temperature (e.g. 45 °C) for the surface heating can be maintained.

The heating circuit controller “Regtronic RH” of the “Regufloor HW” controls the position of the three-way diverting valve via an electromotive actuator and thus the flow temperature. This is dependent on the temperature measured by the outdoor sensor and the set heating curve of the heating circuit controller. The high-efficiency pump control is also weather guided, i.e. it is switched on during heat demand and operation of frost protection.

Individual time profiles for switching from day to night operation can be programmed for each day.

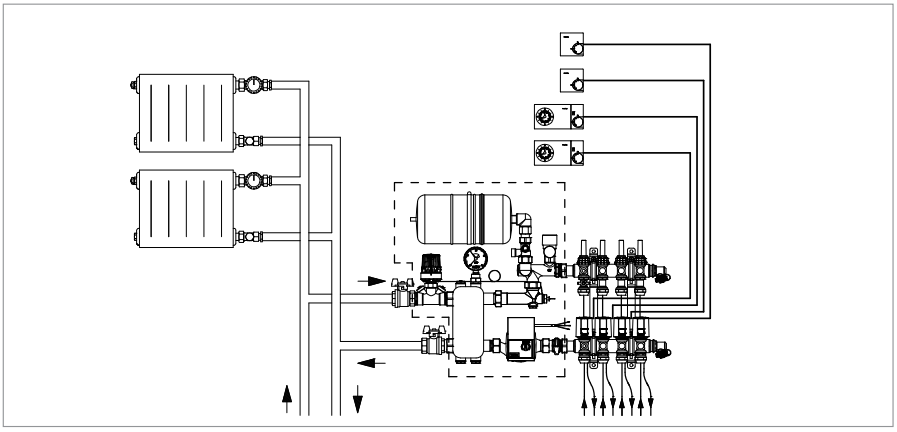
Some installations may call for the control of further functions. The heating circuit controller “Regtronic RH” offers a free choice of additional functions (e.g. hot potable water preparation, reheating demand, solid fuel boiler, circulation, thermal disinfection etc.).

2 Components of the control unit “Regufloor HW”

1 Control unit with three-way diverting valve and high-efficiency pump
2 Angle pattern adapter
3 Electromotive actuator, 230 V, 3 point control
4 Mounting set
5 Foil bag with two flat seals
6 Electric pipe contact safety switch with cabling, plug-in connector and pump plug
7 Fastening strap for electric pipe contact safety switch
8 “Regtronic RH” Heating circuit controller
9 Fixing plate for heating circuit controller

3 System illustration of a variable temperature heating circuit

1



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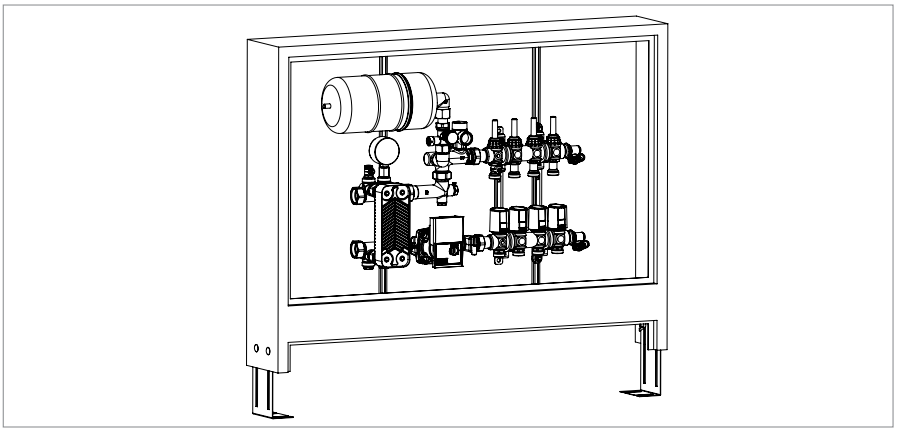


3

Years of experience have shown that unfavourable conditions in surface heating systems with plastic pipes may lead to corrosion problems caused by a penetration of oxygen.

In pure radiator systems, such corrosion problems normally do not entail problems as they may deposit in a number of stabilization zones.

In surface and especially underfloor heating systems, such deposits could impair the flow behaviour in the underfloor heating circuit. Malfunctions or even a breakdown of the circuit could be a result.

1 The heat exchanger of the control unit “Regufloor HX” divides the system into a primary and a secondary circuit. The primary circuit is the heating system and the secondary circuit is the surface heating circuit. This way, surface heating circuits with pipes without oxygen barrier can be connected. These can be found in old installations or, system related, in new installations. Due to the separation, a penetration of oxygen from the surface heating circuit into the boiler circuit is avoided. The other way round, a penetration of possible corrosion products from the boiler circuit into the surface heating circuit and thus a silting-up of the pipes is also avoided.

The regulating valve on the primary side serves to control the set flow temperature. The temperature is detected with the help of an immersion sensor on the secondary side.

The high-efficiency pump Wilo-Yonos PARA RS KU 15/16 controls the pump output according to the current heating water demand. Due to its plastic body, the pump is corrosion resistant.

2 Control unit “Regufloor HX” for flow temperature control in surface heating systems and for the separation of heating circuits into a primary and a secondary circuit in combination with the stainless steel distributors/collectors “Multidis SF”, item no. 14053.. and 14055.., consisting of:
Connection fittings, regulating valve, temperature controller with immersion sensor, heat exchanger, pressure gauge, diaphragm safety valve, diaphragm expansion tank and electronically controlled high-efficiency pump.

Installation is carried out on the left hand side of the distributor/collector.

3 Installation example
Control unit “Regufloor HX” with stainless steel distributor/collector in a surface-mounted cabinet.

Fixed value control units “Regumat F-130/180” DN 25 “Regumat FR-180” DN 25

1

The fixed value control units “Regumat F/FR-130/180” are designed for flow temperature control and limitation in combined radiator/surface heating systems. The flow temperature is controlled within a setting range of 20-50 °C. The high-efficiency pump of the “Regumat FR-180” is made of stainless steel/bronze to counteract the risk of corrosion in case of a system related oxygen input.

The sensor in the supply pipe regulates the mixing valve according to the set flow temperature. If the flow temperature is too high, the electric pipe contact safety switch switches off the pump and switches it on again when the temperature has dropped.

Advantages:

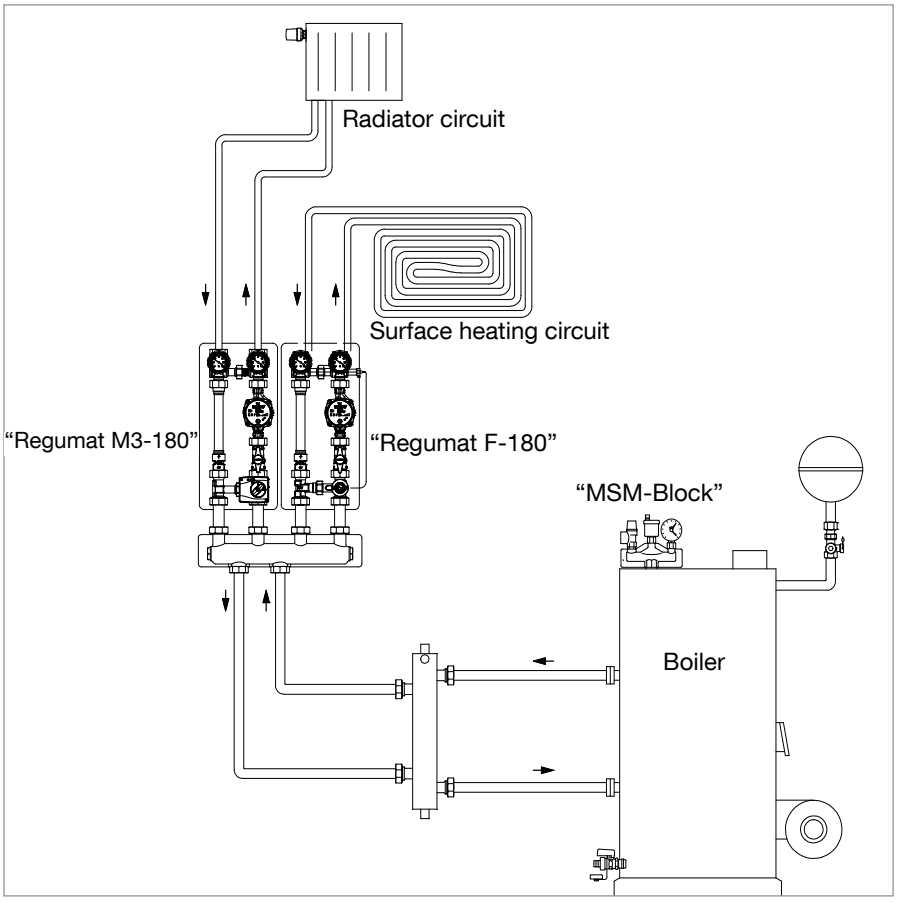
- Pre-assembled product group with high-efficiency pumps with a length of 130 or 180 mm
- High quality materials
- Thermal insulation made of expanded polypropylene supplied with each “Regumat F/FR”
- Easy installation by use of tailpipe sets
- Sensor integrated in the supply
- Including electric pipe contact safety switch

The product group consists of the following components:
Isolating set with integrated thermometers, check valve, three-way mixing valve, temperature controller with immersion sensor with a control range between 20 °C and 50 °C, high-efficiency pump, electric pipe contact safety switch and safety temperature limiter

1 “Regumat F-130” DN 25

2 System illustration

3 “Regumat FR-180” DN 25 with heat exchanger



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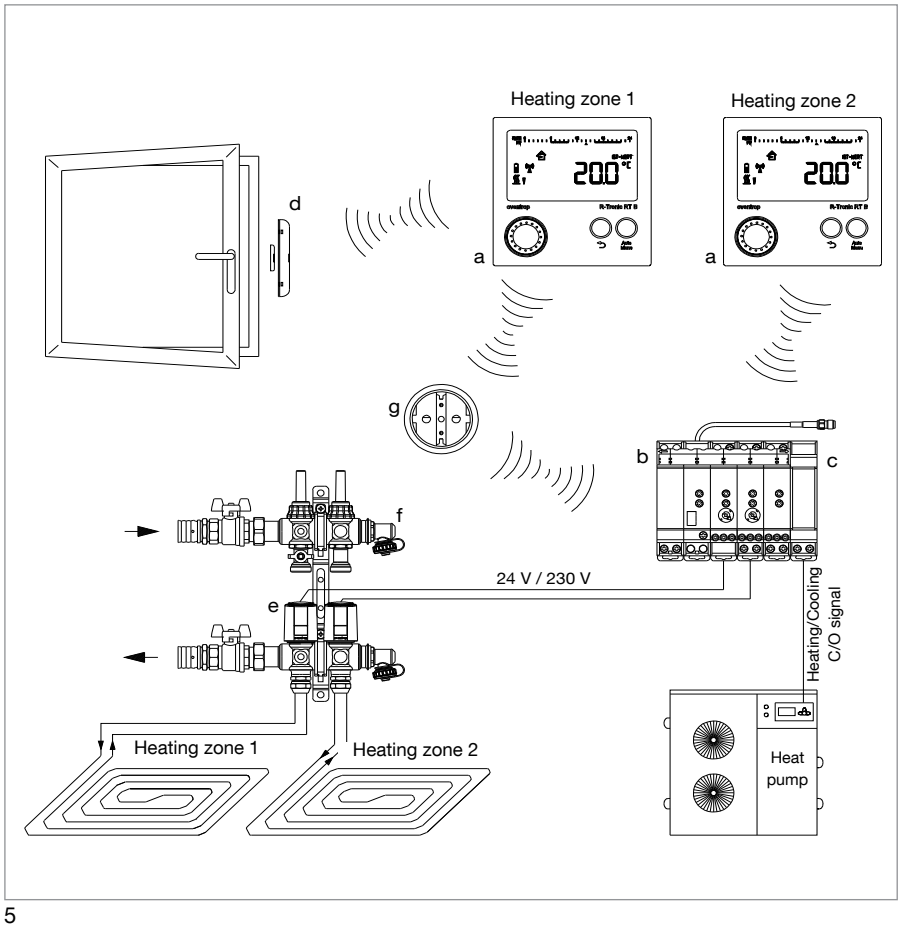


5

The German Energy Saving Directive (EnEV) calls for a central flow temperature control of the heating medium (for instance via the control unit “Regufloor”) and for an individual automatic room temperature control, for instance with room thermostats and actuators.
Such control systems even out any temperature differences (for instance when opening a window for a short time).
The Oventrop room thermostats and actuators fulfil these requirements. Wired and wireless devices are available. The wired devices are control components working as two point control (open/closed) or proportional (0-10 V) control.

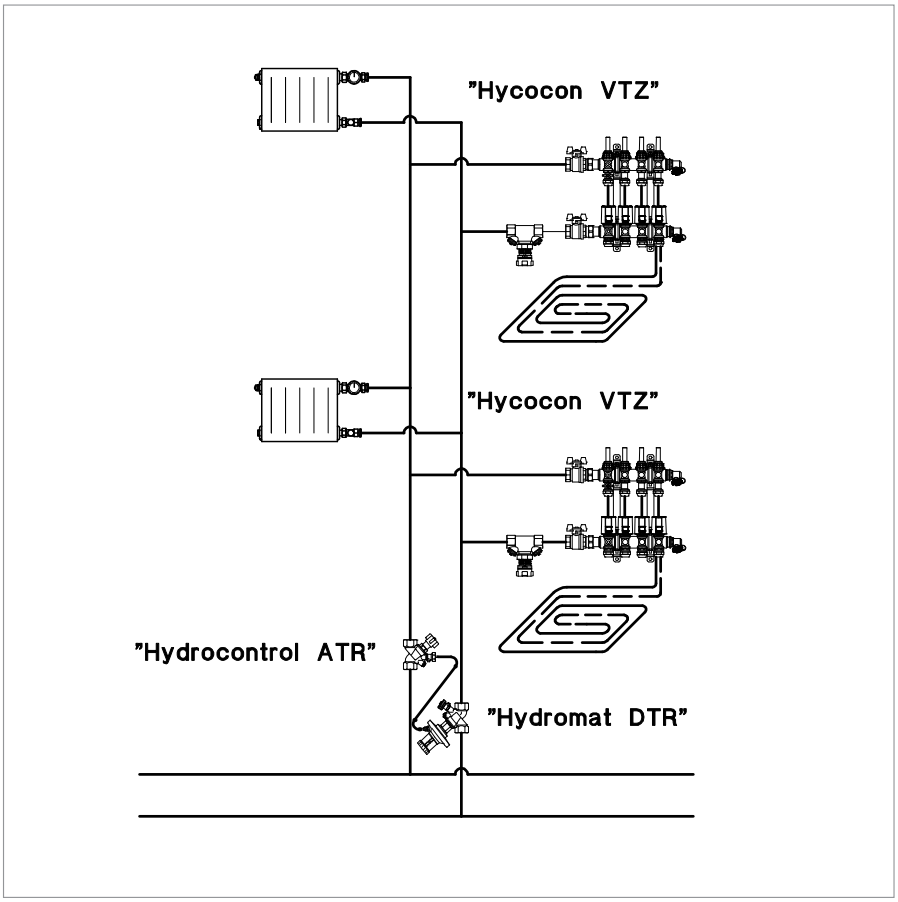
1 Room thermostat or room thermostat-clock (not illustrated) 230 V or 24 V with electrothermal actuator 230 V or 24 V for room temperature control via the individual heating circuits. By using the room thermostat-clock, time controlled temperature changes can be set.

2 Connecting block for room thermostats and actuators

3 “R-Tronic” Wireless thermostat

4 “R-Con” Wireless receiver

a “R-Tronic RT B”/”R-Tronic RTF B”/ “R-Tronic RTFC K” Wireless thermostat
b “R-Con” Wireless receiver
c “R-Con HC” Extension module heating/cooling
d “FK-C F” Wireless window contact
e “Aktor T 2P” (2 point) Electrothermal actuator
f “Multidis SF” Stainless steel distributor/collector
g “RP-S F” Wireless repeater



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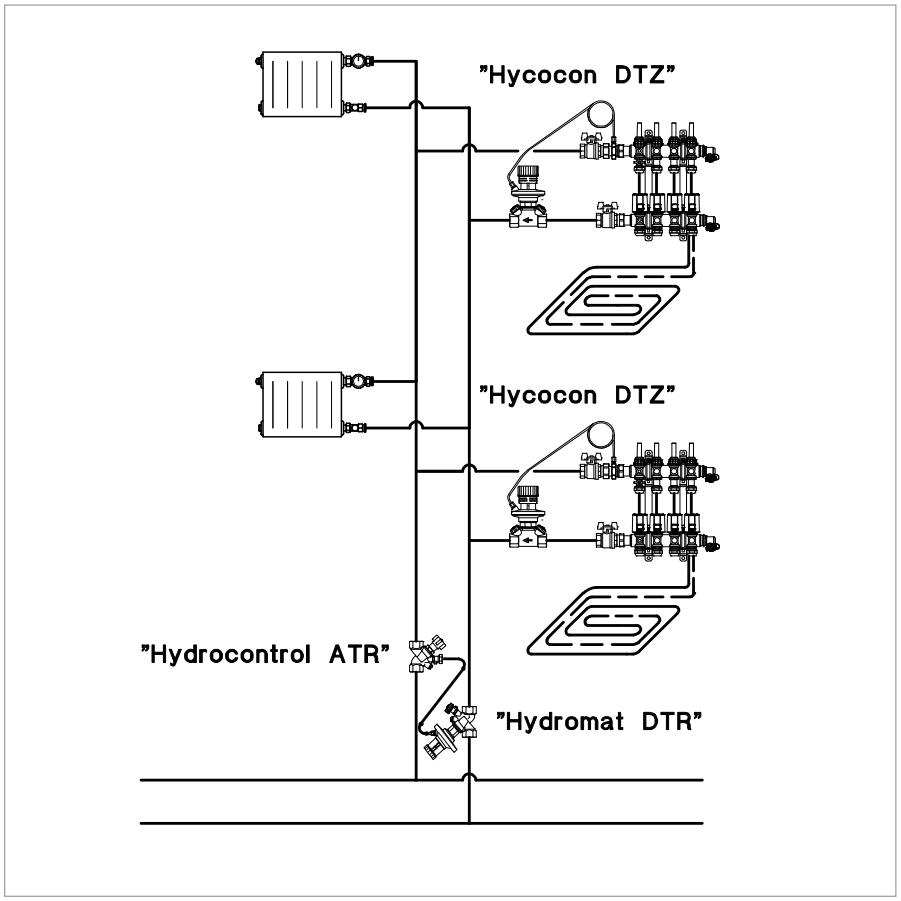
If the room temperature in sections of the heating system is reduced, it must be ensured that the other sections are not under- or oversupplied. This condition is governed by the pressure loss of the pipework and the installed components and can only be determined by a heat demand or pipework calculation. Oventrop offers adequate calculation programmes which, amongst others, will deliver the settings of the valve for hydronic balancing not only for the regulation of the volume flow to the stainless steel distributors/ collectors but also of the individual heating circuits connected to the stainless steel distributors/collectors.

1 Example of a two pipe heating system with surface heating areas and radiators connected to the risers.
Regulation of the volume flow to each individual stainless steel distributor/ collector of the surface heating system with double regulating and commissioning valves “Hycocon VTZ”.

2 The “Hycocon VTZ” is a double regulating and commissioning valve for manual hydronic balancing between several distributors/collectors or risers. The infinitely adjustable, reproducible presetting is lead sealable and lockable. The valves are not only available with female or male thread but also with press connection. The balanced volume flows can easily be controlled with the help of the Oventrop measuring system “OV-DMC 3”.

3 If the heat consumption of separate distributor/collector units shall be measured, for instance of separate dwellings, it is possible to install a heat meter connection set in front of the corresponding distributor/collector. These are offered by Oventrop together with the double regulating and commissioning valves “Hycocon VTZ”. For the connection of the supply and return pipe, the connection set is available in angle or straight pattern. The connection set is suitable for heat meters with a length of 110 mm (G ¾ male thread) and 130 mm (G 1 male thread).

4,5 Depending on the space available, the “Hycocon VTZ” allows for various installation positions, for instance turning of the heat meter by 90° if the depth is not sufficient.



1

In addition to manual hydronic balancing of the distributors/collectors with the help of double regulating and commissioning valves, hydronic balancing during low demand periods can also be carried out with the help of the automatic differential pressure regulators “Hycocon DTZ”. This protects the valves of the individual heating circuits from unacceptably high differential pressures.

1 Example of a two pipe heating system with radiators and surface heating areas connected to the risers. A differential pressure regulator “Hycocon DTZ” is installed in front of each surface heating area. The regulator is set to a nominal value to be determined (e.g. 150 mbar). The Δp regulator will maintain a constant differential pressure between the supply and return within a necessary proportional band.

2 The installation of an automatic differential pressure regulator “Hycocon DTZ” allows for an independent operation of the distributor/collector units. The permissible differential pressure between the supply and return is set at the “Hycocon DTZ”. The set value may be locked. A change in the system pressure has therefore no influence on the heating circuits of the distributor/collector units of the surface heating. Manual balancing is not necessary.

3,4 To install the differential pressure regulator together with a heat meter connection set, Oventrop offers angle and straight patterned connection sets (installation dimensions 110 mm and 130 mm).

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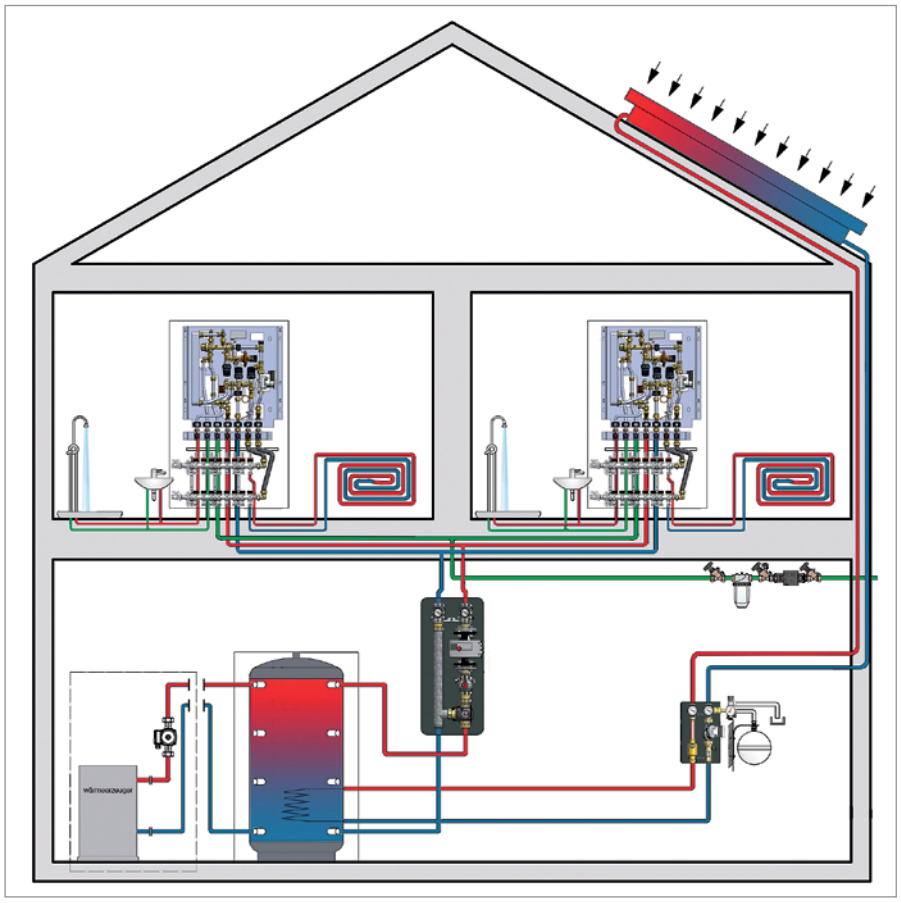


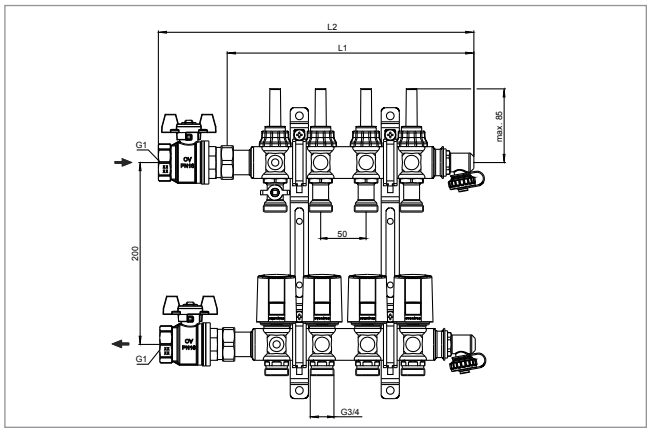
2

The station "Regudis W-HTF" which is mounted on a fixing sheet is a completely pre-assembled and leak tested station with constant or variable temperature heating circuit. It does not only supply a dwelling with hot water for the surface heating and radiators but also with cold and hot potable water.

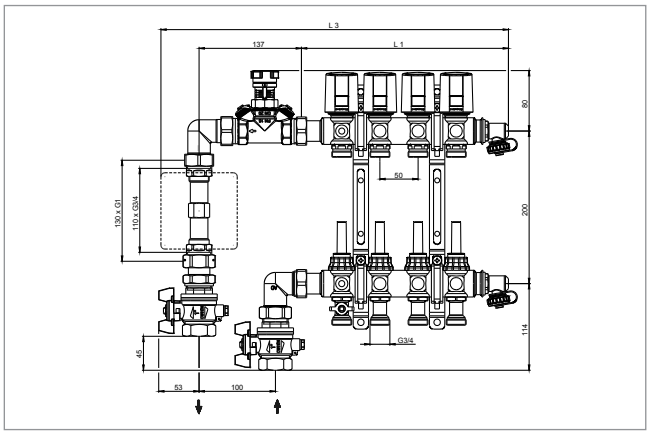
1 Station "Regudis W-HTF" a complete model for a dwelling with surface heating, radiators and potable water circulation consisting of:

- „Regudis W-HTF"
  Dwelling station with variable temperature heating circuit, high temperature circuit and circulation pipe, item no. 1341542
- "R-Con"
  Wireless receiver, 230 V, without plug, wiring on site, item no. 1150772
- Electrothermal actuator (two point) closed with current "off", 230 V, cable 2 m long, item no. 1012452
- Cabinet - surface mounting
  long model for the direct installation of the dwelling station and the surface heating distributor/collector, galvanised steel, door, frame and plinth white powder coated, removable plinth
  Dimensions:
  Width: 700 mm
  Height: 1440 + 125 mm
  Depth: 115 - 180 mm
  Item no. 1341175
- Derivative temperature control set to maintain the temperature in the "Regudis W-HTF" station to guarantee a quick supply of hot potable water outside the heating period, item no. 1341188
- Ball valve connector block
  7 ball valves mounted onto a bracket for the isolation of all connections of the "Regudis W-HTF" station
  Connections:
  To the station: G ¾ flat sealing male thread
  To the pipework: Rp ¾ female thread
  Item no. 1341185
- Ball valve connection set
  2 ball valves mounted onto a bracket for the isolation of the high temperature connection of the "Regudis W-HTF" station, item no. 1341183
- Ball valve connection set
  1 ball valve mounted onto a bracket for the isolation of the circulation pipe of the "Regudis W-HTF" station, item no.1341184
- Connection set stainless steel distributor/collector
  for the connection of the "Regudis W-HTF" station to the stainless steel distributor/collector "Multidis SF", item no. 1341187
- "Multidis SF" Stainless steel distributor/collector 10-fold
  for surface heating with integrated flow measuring and regulating devices, item no.1405360 (installation of distributors/collectors with up to 10 circuits into the cabinet item no.1341175)

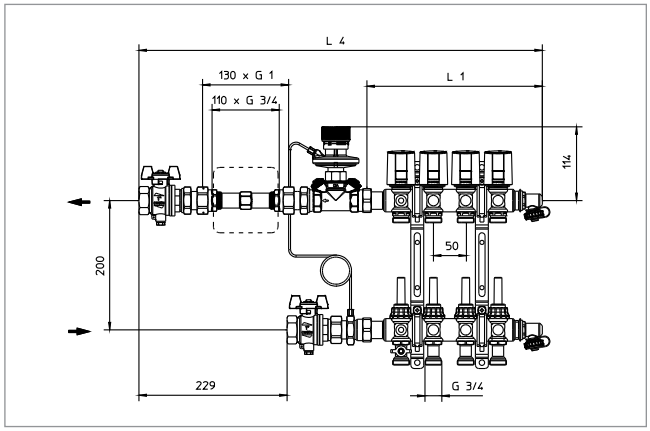
2 System illustration



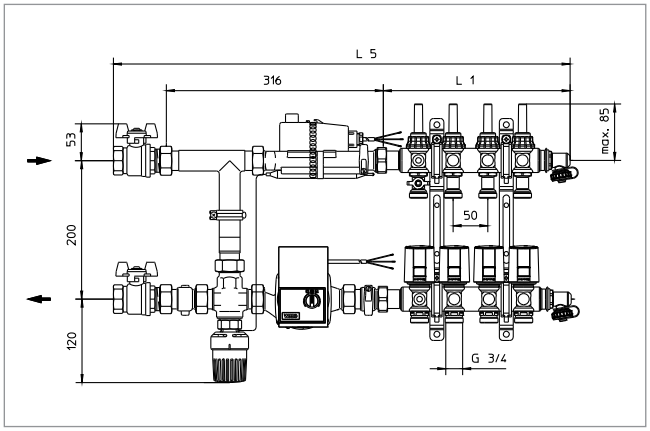
L2 with ball valve



L3 with heat meter connection set, angle pattern



L4 with heat meter connection set, straight pattern

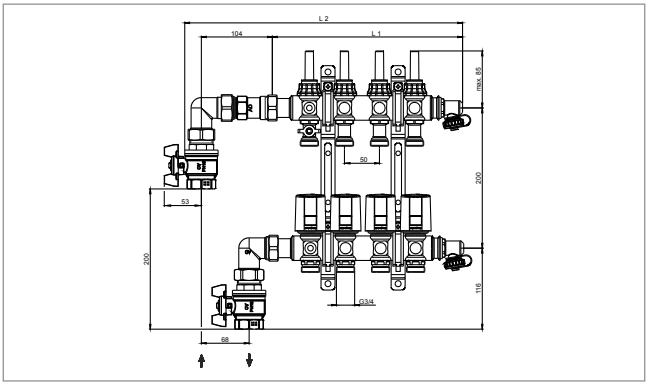


L5 with control unit and ball valve

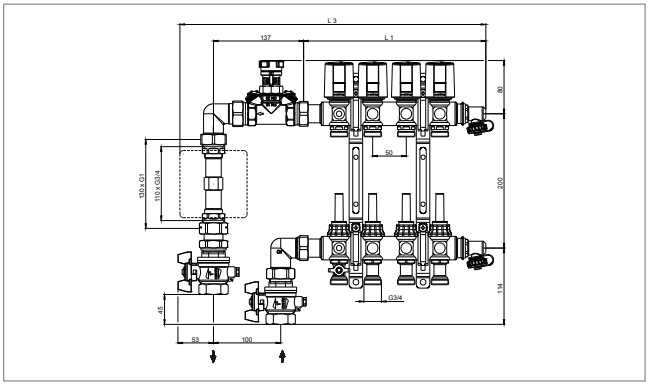
Item no.	Number of heating circuits	L1 Length of distributor/ collector	L2 with ball valve DN20	L2 with ball valve DN 25	L3 with heat meter connection set, angle pattern	L4 with heat meter connection set, straight pattern	L5 with control unit “Regufloor H” and ball valve DN 20	L5 with control unit “Regufloor H” and ball valve DN 25
1405352	2	168 mm	223 mm	248 mm	358 mm	523 mm	543 mm	568 mm
1405353	3	218 mm	273 mm	298 mm	408 mm	573 mm	593 mm	618 mm
1405354	4	268 mm	323 mm	348 mm	458 mm	623 mm	643 mm	668 mm
1405355	5	318 mm	373 mm	398 mm	508 mm	673 mm	693 mm	718 mm
1405356	6	368 mm	423 mm	448 mm	558 mm	723 mm	743 mm	768 mm
1405357	7	418 mm	473 mm	498 mm	608 mm	773 mm	793 mm	818 mm
1405358	8	468 mm	523 mm	548 mm	658 mm	823 mm	843 mm	868 mm
1405359	9	518 mm	573 mm	598 mm	708 mm	873 mm	893 mm	918 mm
1405360	10	568 mm	623 mm	648 mm	758 mm	923 mm	943 mm	968 mm
1405361	11	618 mm	673 mm	698 mm	808 mm	973 mm	993 mm	1.018 mm
1405362	12	668 mm	723 mm	748 mm	858 mm	1.023 mm	1.043 mm	1.068 mm

Recommendations for cabinets

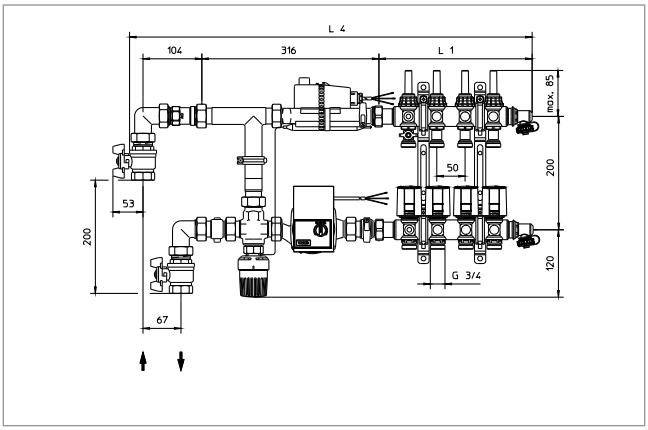
Cabinet, item no. 1401151, no. 1, inner width: 560 mm	Cabinet, item no. 1401153, no. 3, inner width: 900 mm
Cabinet, item no. 1401152, no. 2, inner width: 700 mm	Cabinet, item no. 1401154, no. 4, inner width: 1200 mm



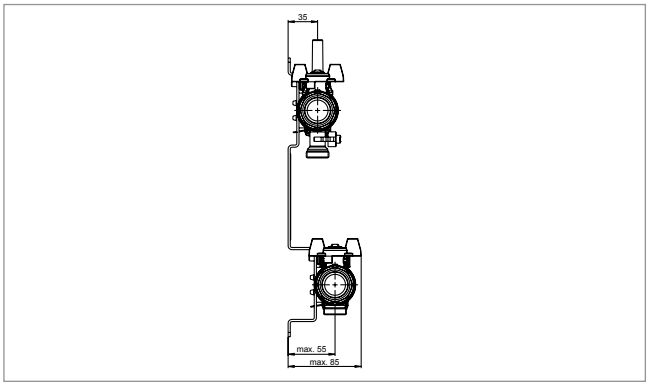
L2 with angle pattern connection set



L3 with heat meter connection set, angle pattern



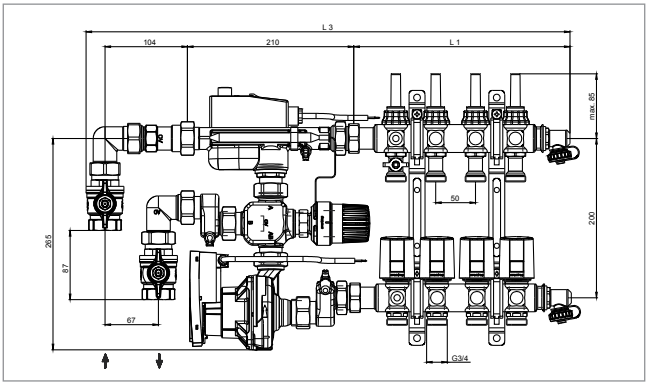
L4 with control unit and angle pattern connection set



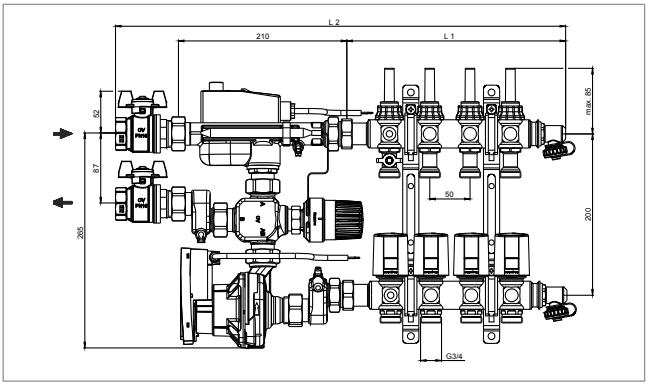
Item no.	Number of heating circuits	L1 Length of distributor/ connector	L2 with angle pattern connection set	L3 with heat meter connection set, angle pattern	L4 with control unit “Regufloor H” and angle pattern connection set
1405352	2	168	298	355	614
1405353	3	218	348	405	664
1405354	4	268	398	455	714
1405355	5	318	448	505	764
1405356	6	368	498	555	814
1405357	7	418	548	605	864
1405358	8	468	598	655	914
1405359	9	518	648	705	964
1405360	10	568	698	755	1014
1405361	11	618	748	805	1064
1405362	12	668	798	855	1114

Recommendations for surface-mounted cabinets

Surface-mounted cabinet, item no. 1401171, no. 1, inner width: 600 mm	Surface-mounted cabinet, item no. 1401173, no. 3, inner width: 1000 mm
Surface-mounted cabinet, item no. 1401172, no. 2, inner width: 750 mm	Surface-mounted cabinet, item no. 1401174, no. 4, inner width: 1250 mm

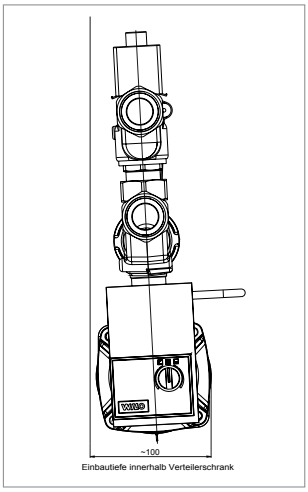


L3 with control unit and angle pattern connection set



L2 with control unit and ball valve

Item no.	Number of heating circuits	L1 Length of distributor/ collector	L3 with control unit "Regufloor HN" and angle pattern connection set
1405352	2	168	512
1405353	3	218	562
1405354	4	268	612
1405355	5	318	662
1405356	6	368	712
1405357	7	418	762
1405358	8	468	812
1405359	9	518	862
1405360	10	568	912
1405361	11	618	962
1405362	12	668	1012



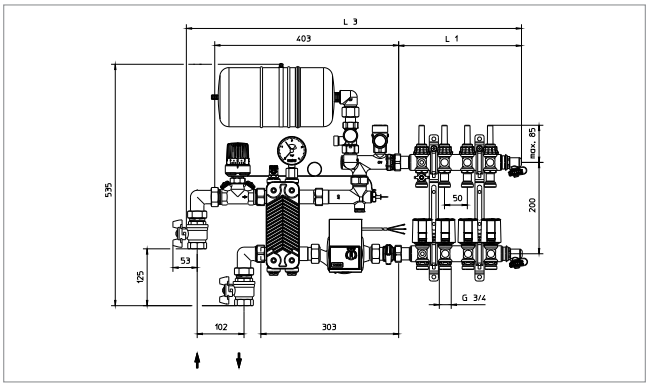
Recommendation for surface-mounted cabinets

Surface-mounted cabinet, item no. 1401171, no. 1, inner width: 600 mm	Surface-mounted cabinet, item no. 1401173, no. 3, inner width: 1000 mm
Surface-mounted cabinet, item no. 1401172, no. 2, inner width: 750 mm	Surface-mounted cabinet, item no. 1401174, no. 4, inner width: 1250 mm

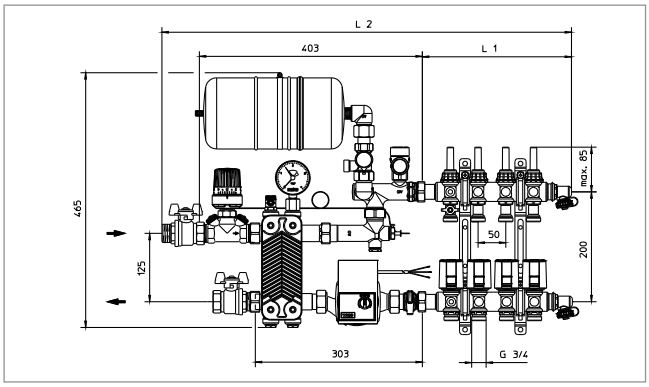
Item no.	Number of heating circuits	L1 Length of distributor/ collector	L2 with control unit "Regufloor HN" and ball valve DN 20	L2 with control unit "Regufloor HN" and ball valve DN 25
1405352	2	168	437	462
1405353	3	218	487	512
1405354	4	268	537	562
1405355	5	318	587	612
1405356	6	368	637	662
1405357	7	418	687	712
1405358	8	468	737	762
1405359	9	518	787	812
1405360	10	568	837	862
1405361	11	618	887	912
1405362	12	668	937	962

Recommendation for cabinets

Cabinet, item no. 1401151, no. 1, inner width: 560 mm	Cabinet, item no. 1401153, no. 3, inner width: 900 mm
Cabinet, item no. 1401152, no. 2, inner width: 700 mm	Cabinet, item no. 1401154, no. 4, inner width: 1200 mm

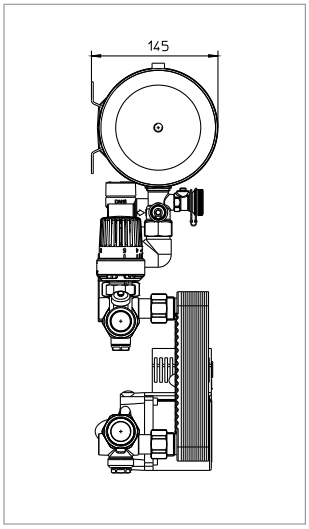


L3 with control unit and angle pattern connection set



L2 with control unit and ball valve

Item no.	Number of heating circuit	L1 Length of distributor/ collector	L3 with control unit "Regufloor HX" and angle pattern connection set
1405352	2	168	636
1405353	3	218	686
1405354	4	268	736
1405355	5	318	786
1405356	6	368	836
1405357	7	418	886
1405358	8	468	936
1405359	9	518	986
1405360	10	568	1036
1405361	11	618	1086
1405362	12	668	1136



Recommendation for surface-mounted cabinets

Surface-mounted cabinet, item no. 1401171, no. 1, inner width: 600 mm	Surface-mounted cabinet, item no. 1401173, no. 3, inner width: 1000 mm
Surface-mounted cabinet, item no. 1401172, no. 2, inner width: 750 mm	Surface-mounted cabinet, item no. 1401174, no. 4, inner width: 1250 mm

Item no.	Number of heating circuits	L1 Length of distributor/ collector	L2 with control unit "Regufloor HX" and ball valve DN 20	L2 with control unit "Regufloor HX" and ball valve DN 25
1405352	2	168	616	641
1405353	3	218	666	691
1405354	4	268	716	741
1405355	5	318	766	791
1405356	6	368	816	841
1405357	7	418	866	891
1405358	8	468	916	941
1405359	9	518	966	991
1405360	10	568	1016	1041
1405361	11	618	1066	1091
1405362	12	668	1116	1141

Recommendation for cabinets

Cabinet, item no. 1401151, no. 1, inner width: 560 mm	Cabinet, item no. 1401153, no. 3, inner width: 900 mm
Cabinet, item no. 1401152, no. 2, inner width: 700 mm	Cabinet, item no. 1401154, no. 4, inner width: 1200 mm

“Cofloor” Base mat system:

Laying distance	Required pipe per m^2 heating surface	Red: Recommended laying distances in the								
		Residential area						Bathroom		
		Residential area			Fringe area					
		14 x 2 mm	16 x 2 mm	17 x 2 mm	14 x 2 mm	16 x 2 mm	17 x 2 mm	14 x 2 mm	16 x 2 mm	17 x 2 mm
60 mm	16.7 m/ m^2									
120 mm	8.3 m/ m^2									
180 mm	5.6 m/ m^2									
240 mm	4.2 m/ m^2									
300 mm	3.3 m/ m^2									
360 mm	2.8 m/ m^2									

Approx. 0.04 pieces of edge insulating strip (item no. 1402090) are required per m^2 of base mat.

Note: The minimum bending radii of the PE-Xc pipes “Copex”, PE-RT pipes “Copert” and composition pipes “Copipe HSC” must be observed.
If necessary, the laying distance has to be increased where return loops are laid. With a laying distance of 60 mm, the pipes must be laid in a spiral pattern.

“Cofloor” Tacker system :

Laying distance	Tacker hooks item no. 1402591 pieces/m^2	Required pipe per m^2 heating surface	Red: Recommended laying distances in the								
			Residential area						Bathroom		
			Residential area			Fringe area					
			14 x 2 mm	16 x 2 mm	17 x 2 mm	14 x 2 mm	16 x 2 mm	17 x 2 mm	14 x 2 mm	16 x 2 mm	17 x 2 mm
50 mm	1.33	20 m/ m^2									
100 mm	0.66	10 m/ m^2									
150 mm	0.44	6.7 m/ m^2									
200 mm	0.33	5 m/ m^2									
250 mm	0.27	4 m/ m^2									
300 mm	0.22	3.3 m/ m^2									

Approx. 0.04 pieces of edge insulating strip (item no. 1402090) are required per m^2 of base mat roll/folded board.

Note: The minimum bending radii of the PE-Xc pipes “Copex”, PE-RT pipes “Copert” and composition pipes “Copipe HSC” must be observed.
If necessary, the laying distance has to be increased where return loops are laid. With a laying distance of 60 mm, the pipes must be laid in a spiral pattern.

Accessories

Quantity	Article	Item no.
	Expansion strip	1402091
	Protective tube	1501184
	Round profile made of polystyrene foam	1402092
	Pipe guiding elbow	1409085
	Marker point for measuring screed humidity	1409090
	Coil unwinder	1402096/98
	Compression fitting	1507975

“Cofloor” Clamping rail system:

Composition pipe “Copipe HSC”

	Article Folded board 35-3 Edge insulating strip Adhesive tape Clamping rail, 16 mm	**Item no.** 1402600 1402090 1402599 1402581	**Pieces, m/m²** 0,50 0,04 0,015 1,00	**Quantity**
Laying distance 5 cm	“Copipe HSC” pipe 16 x 2 mm (100 m)	1540155	20.00	
Laying distance 10 cm	“Copipe HSC” pipe 16 x 2 mm (100 m)	1540155	10.00	
Laying distance 15 cm	“Copipe HSC” pipe 16 x 2 mm (100 m)	1540155	6.67	
Laying distance 20 cm	“Copipe HSC” pipe 16 x 2 mm (100 m)	1540155	5.00	
Laying distance 25 cm	“Copipe HSC” pipe 16 x 2 mm (100 m)	1540155	4.00	
Laying distance 30 cm	“Copipe HSC” pipe 16 x 2 mm (100 m)	1540155	3.33	

PE-Xc plastic pipe “Copex”

	Article Folded board 35-3 Edge insulating strip Adhesive tape Clamping rail, 16 mm	**Item no.** 1402600 1402090 1402599 1402581	**Pieces, m/m²** 0.50 0.04 0.015 1.00	**Quantity**
Laying distance 5 cm	“Copex” pipe 16 x 2 mm (120 m)	1400151	20.00	
Laying distance 10 cm	“Copex” pipe 16 x 2 mm (120 m)	1400151	10.00	
Laying distance 15 cm	“Copex” pipe 16 x 2 mm (120 m)	1400151	6.67	
Laying distance 20 cm	“Copex” pipe 16 x 2 mm (120 m)	1400151	5.00	
Laying distance 25 cm	“Copex” pipe 16 x 2 mm (120 m)	1400151	4.00	
Laying distance 30 cm	“Copex” pipe 16 x 2 mm (120 m)	1400151	3.33	

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Sample form
Leakage test record of Oventrop “Cofloor” surface heating and cooling systems according to DIN EN 1264-4

Client : _____

Building / Real estate: _____

Section of the building floor / dwelling: _____

Section of the system: _____

Requirements
Tightness of the heating/cooling circuits of the surface heating/cooling system is tested by carrying out a water pressure test before laying the screed, plaster or levelling compound. Contrary to the VOB C (DIN 18380 standard), the test pressure must be at least 4 bar and must not exceed 6 bar. This pressure must be maintained throughout the laying of the screed/plaster*.

The leakage test is carried out section by section after having flushed the individual heating circuits. It must be ensured that the other sections of the system are protected against excess pressure (if necessary, by main isolation device in front of the distributor/ collector).

Alternatively, tightness can also be tested by carrying out a pressure test with compressed air. Here, the maximum pressure amounts to 3 bar.

Documentation

Maximum permissible operating pressure: _____ bar

Test pressure: _____ bar

Test cycle: _____ h

Tightness was tested and no lasting deformation was detected on any component.

Confirmation:

_____	_____	_____
Place / Date	Place / Date	Place / Date
_____	_____	_____
Builder / Client Stamp / Signature	Building supervisor / Architect Stamp / Signature	Installer Stamp / Signature

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Sample form
Incremental heating record as functional test for the “Cofloor” base mat, tacker and clamping rail systems

Client: _____

Building / Real Estate: _____

Section of the building/ floor / dwelling: _____

Section of the system: _____

Requirements
Incremental heating must be carried out in order to check the function of the heated or cooled floor construction. It serves the installer as documented evidence for the realisation of a flawless installation. When using concrete screed, the construction work should only be continued 21 days after having laid the screed and 7 days after having laid calcium sulphate screed (or according to the instructions of the manufacturer).

According to the DIN EN 1264-4 standard, a flow temperature between 20 °C and 25 °C must be maintained for at least 3 days. After that, the maximum design flow temperature must be maintained for at least 4 days. Indications of the manufacturer (e.g. for liquid screed) deviating from the standard or this record must be observed and recorded.

Documentation

1) Type of screed (product): _____
Binding agent used: _____
Fixed setting time: _____ days

2) Completion of laying of heating screed (date): _____

3) Start of incremental heating (date): _____
At a constant flow temperature t_F = 25 °C, to be maintained for at least 3 days (by manual control if required)

4) Increase to maximum design flow temperature (date): _____
Maximum flow temperature t_F = ... °C, to be maintained for at least 4 days

5) End of incremental heating (date): _____
Where there is a risk of frost, adequate protective measures (e.g. operation of frost protection) have to be taken.

6) Incremental heating was interrupted. Yes ☐ No ☐
if “Yes”: from ..... to .....

7) Rooms were aired draught free and all windows and external doors were closed after having inactivated the surface heating/cooling system.
Yes ☐ No ☐

8) The heated/cooled surface was not covered during incremental heating.
Yes ☐ No ☐

9) With an outside temperature of ..... °C, the system was released for further construction work.
☐ The system was switched off.
☐ The surface was heated with a flow temperature of ..... °C.

Attention
Depending on the heating capacity of the heat generator, incremental heating may possibly have to be carried out section by section. In this case, all heating circuits of one screed field have to be heated at the same time.
Incremental heating does not guarantee that the screed is dry enough to start flooring work.
When switching off the surface heating after the heating-up period, the screed has to be protected from draught and a quick cooling down until is has cooled down completely.

Confirmation:

_____	_____	_____
Place / Date	Place / Date	Place / Date
_____	_____	_____
Builder / Client Stamp / Signature	Building supervisor / Architect Stamp / Signature	Installer Stamp / Signature

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Sample form
Incremental heating record as functional test for the "Cofloor" dry-build system

Client: _____

Building / Real Estate: _____

Section of the building/ floor / dwelling: _____

Section of the system: _____

Requirements
Incremental heating must be carried out in order to check the function of the heated or cooled floor, wall or ceiling construction.

Incremental heating of dry-build systems is only started after all filling and adhesive bonding work has been completed. The filler and bonding agent have to be cured. The indications of the manufacturer must be observed.
The maximum design flow temperature (in general up to 45 °C) has to be maintained for 1 day.
Where there is a risk of frost, the system has to remain in operation. Indications of the manufacturer deviating from the standard or this record must be observed and be recorded.

Documentation

1) Type of heat distributing layer (product): _____
Binding agent used: _____

2) Completion of laying the heat distributing layer (date): _____

3) Start of incremental heating (date): _____
At constant maximum design flow temperature t_F max = ... °C (by manual control if required)

4) End of incremental heating (date):___ _____
Where there is a risk of frost, adequate protective measures (e.g. operation of frost protection) have to be taken.

5) Rooms were aired draught free and all windows and external doors were closed after having inactivated the surface heating/cooling system. Yes ☐ No ☐

6) The heated/cooled surface was not covered during incremental heating.
Yes ☐ No ☐

7) With an outside temperature of ..... °C, the system was released for further construction work.
☐ The system was switched off.
☐ The heat distributing layer was heated with a flow temperature of ..... °C.

Attention
Depending on the heating capacity of the heat generator, incremental heating may possibly have to be carried out section by section. In this case, all heating circuits of one dry screed field or the dry-build board have to be heated at the same time.
When switching off the surface heating after the heating-up period, the screed has to be protected from draught and a quick cooling down until is has cooled down completely.

Confirmation:

_____	_____	_____
Place / Date	Place / Date	Place / Date
_____	_____	_____
Builder / Client Stamp / Signature	Building supervisor / Architect Stamp / Signature	Installer Stamp / Signature

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Sample form
Incremental heating record as functional test for the “Cofloor” base mat system NP-R

Client: _____

Building / Real Estate: _____

Section of the building / floor / dwelling: _____

Section of the system: _____

Requirements
Incremental heating must be carried out in order to check the function of the heated/cooled construction. Before starting incremental heating, the waiting period according to the indications of the levelling compound/screed manufacturer must be observed (at least 2 days). In general, a flow temperature of 25 °C has be maintained for 1 day. After that, the maximum design flow temperature (in general up to 45 °C) has to be maintained for at least 1 day. Where there is a risk of frost, the system has to remain in operation. Indications of the levelling compound/screed manufacturer (such as waiting periods, temperature) deviating from the standard or this record must be observed and recorded.

Documentation

1) Type of levelling compound/screed (product): _____

2) Completion of laying the levelling compound/screed (date): _____

3) Start of incremental heating (date): _____
At a constant flow temperature t_F = 25 °C (by manual control if required)

4) Increase to maximum design flow temperature (date): _____
At constant maximum design flow temperature t_F max = ... °C (by manual control if required)

5) End of incremental heating (date): _____
Where there is a risk of frost, adequate protective measures (e.g. operation of frost protection) have to be taken.

6) Incremental heating was interrupted. Yes ☐ No ☐
if “Yes”: from ..... to .....

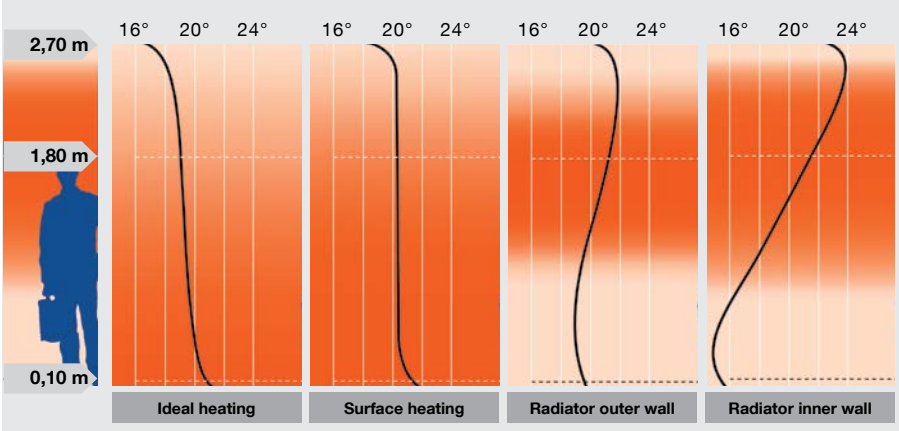
7) Rooms were aired draught free and all windows and external doors were closed after having inactivated the surface heating/cooling system. Yes ☐ No ☐

8) With an outside temperature of ..... °C, the system was released for further construction work.
☐ The system was switched off.
☐ The surface was heated with a flow temperature of ..... °C.

Attention
Incremental heating does not guarantee that the levelling compound/screed is dry enough to start flooring work. This has to be decided by the flooring company. **When switching off the surface heating after the heating-up period, the heating surface has to be protected from draught and a quick cooling down until it has cooled down completely.**

Confirmation:

_____	_____	_____
Place / Date	Place / Date	Place / Date
_____	_____	_____
Builder / Client Stamp / Signature	Building supervisor / Architect Stamp / Signature	Installer Stamp / Signature



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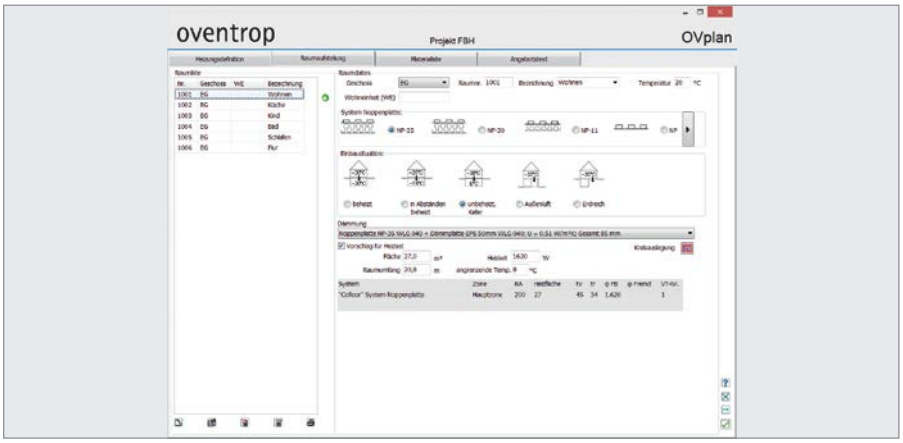

2

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3

1 The almost ideal “temperature profile” from floor to ceiling.

Compared to other heating systems, the surface heating can be referred to as the heating system with the ideal temperature profile. Depending on its usage, the hot water surface heating system offers the advantage that an energy saving of 6 to 12% may be achieved due to the lower temperature of the heating medium and the lower room temperature.

2 Working supports

3 As system supplier of the surface heating and cooling system “Cofloor”, Oventrop offers high quality system solutions guaranteeing maximum benefit for the installation and the later comfort. This does, at the same time, mean an obligation to observe a multitude of rules and standards.

Oventrop supports its partners regarding planning, calculation, completion and regulation. Current information material such as catalogues, technical data sheets and colour leaflets as well as DVDs and software are available.

Room climate

Hydronics

Stations
Storage cylinders
Pipes

Potable water

Oil
Solar

Smart Home
Smart Building

Subject to technical modifications without notice.
Private persons may purchase our products from their qualified installer.

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