PIPE SYSTEMS
BUILDING
SOLUTIONS

MAINCOR

Technical Manual

MAINFLOOR

Panel heating

MAINPEX Sliding sleeve system	MAINFLOOR Panel heating	MAINPRESS *Pressing System Heating/Sanitary*	MAINPOWER *Home drainage system*
MAINDRAIN Drain gutters	MAINAIR Residential ventilation system	MAINCON Corrugated pipe for electrical installations	MAINOX Stainless steel pressing system	MAINSTEEL Carbon steel pressing system

General

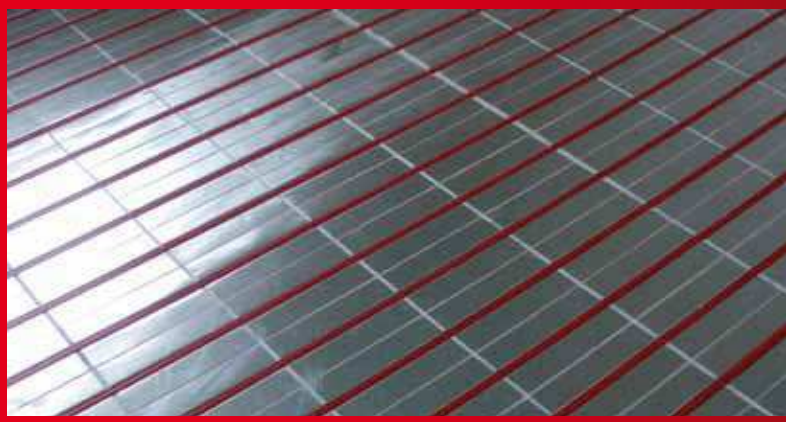
MAINFLOOR – PANEL HEATING SYSTEM

Stapler system

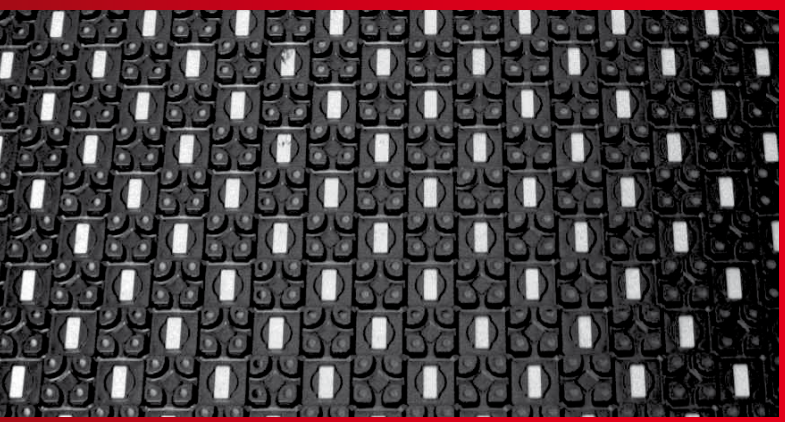
Stud system

Rail system

Dry construction



Renovation system



Wall heating

1. General facts on panel heating

In recent years, the concept of panel heating has become the leading heating system for residential and industrial buildings. What has been relatively complex back then can be created or retrofitted in nearly every building with minor effort today.

The clear advantages do not only include the comfortable sensation of warmth and the architectural freedom in terms of interior design, but moreover the focus is on the low supply temperature and the related energy savings.

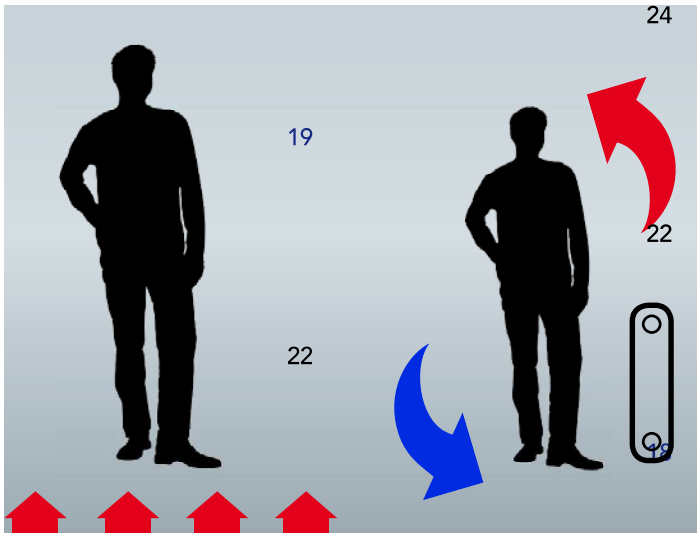
Low energy consumption means lower heating expenses and lower CO_2 emissions into the environment. Thus, regenerative energies and condensing boiler technology can be used ideally. Heat pump systems work extremely energetic and require low amounts of energy throughout the year.

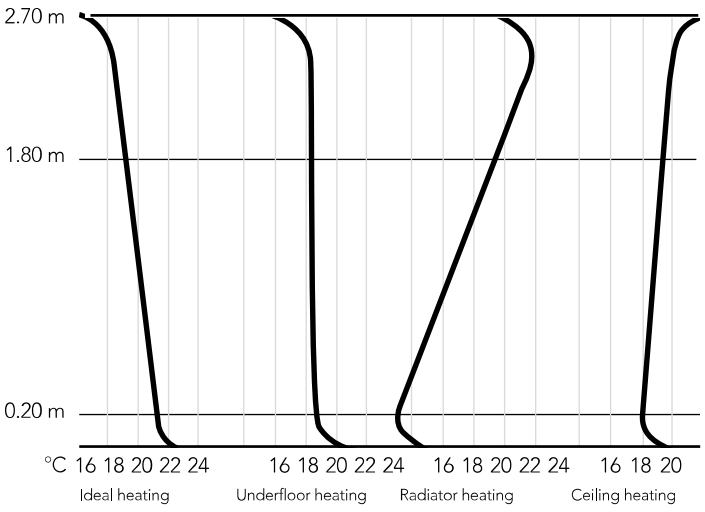
The energy savings of panel heating result from the radiant heat, which is emitted from adjacent parts to the user. In order to achieve the same comfort as a conventional radiator heating, it is possible to reduce the room temperature by 1-2°C.

Reducing the room temperature by only 2°C already results in annual cost savings of up to 12%.

Another reason for the use of underfloor heating (UFH) is the comfortable sensation of warmth. The heat exchange between the human body and the surrounding surfaces, the temperature of which is distributed evenly and slightly below the body temperature, is felt as being particularly pleasant.

Lower room temperatures result in a higher humidity. The heat emitted draft-free in the room from bottom to top with an almost ideal temperature profile can only be achieved to this extent by underfloor heating. Furthermore, the low heat radiation prevents dust dispersion.





Installation methods for underfloor heating systems

The bifilar (helical) tube guidance

Bifilar installation

Properties:

- is mainly used for tight installation clearances and/or geometrically difficult rooms
- easy tube guidance as mostly installed at 90°
- even distribution of warmth
- bending radii are to be taken into account

Area of use:

- all building types

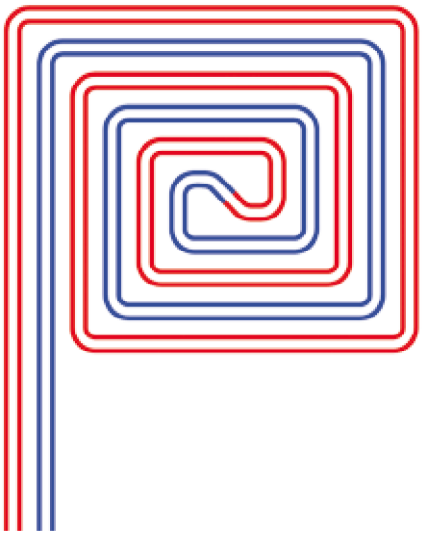


Fig.: Bifilar system

Meander installation

Properties:

- fast and easy installation option, particularly regarding rail installation
- starting with heating circuit at window and external wall
- slight temperature gradient between supply and return
- for installation in large window areas with upstream rim zone
- bending radius of the heating tube which is used must be observed, installation type for VA > 150

Area of use:

- all building types, primarily with industrial panel heating, wall heating, concrete core activation, sprung floor heating

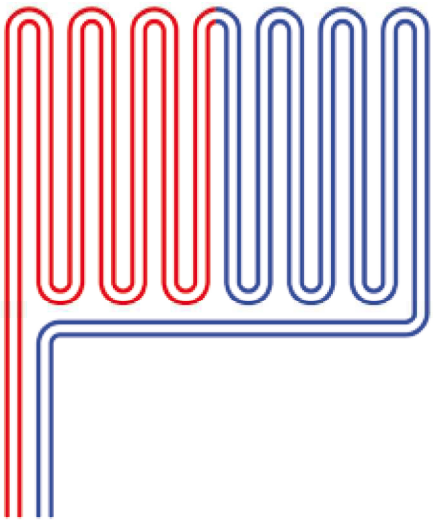
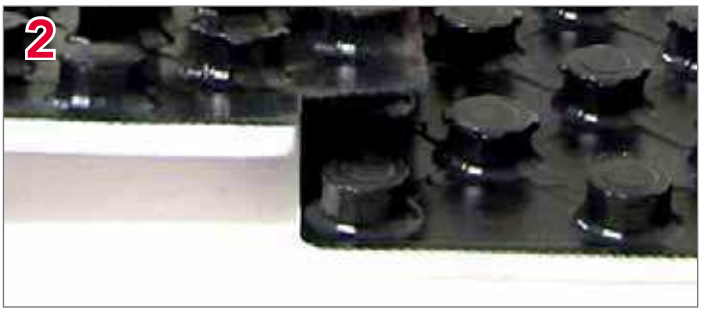


Fig.: Meander system

2.3 The stud system

The studded panel system allows for fast, easy and effective installation with ‚one man' installation. Through extended system components it is possible for all installation options to be optimally integrated, including within architecturally difficult buildings. Connection elements guarantee an efficient and almost waste-free installation.

- Fix the marginal insulating strips to the adjacent walls

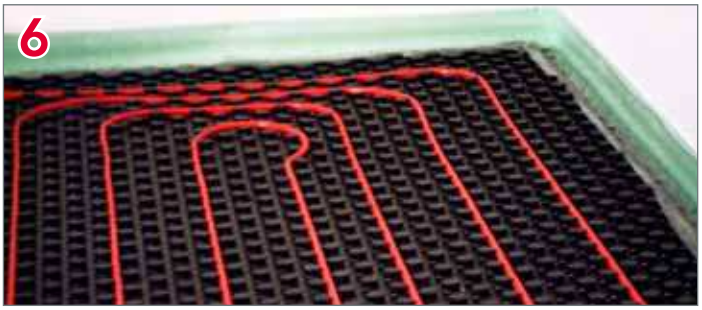


- Installation and connection of the panels through straightforward pressing of the push studs onto the receptor studs
- In this context comply with insulation regulations according to DIN EN 4108 and the EnEV

- Sealing of the studded panels in the edge areas with PE sealing strips

- The workman uses his feet to press the heating tube in between the studs

- Connection to the steel distributor



- Completed surface area with the stud system with bifilar tube guidance

Properties

MAINPEX studded panel system

- Completion according to the studded panel deep drawing procedure
- Increased step safety through sub foam layer and reinforced plastic coating
- Practical, waste-free installation through the ‚stud on stud' principle
- Completely secure hold of the heating pipe thanks to stud design
- Tube spacing in 50 mm grid
- One panel for several tube dimensions
  The special structure of the studs enables the flexible use of the studded panel system for heating tubes with dimensions of 14 to 17 mm
- Tube fasteners enable secure diagonal installation

Studded panel Premium NP 11 and studded panel without INsulation

- Ideal for low construction heights, e.g. for the renovation of old buildings
- Installation on thermal and footfall sound insulation
- Suitable for cement, anhydrite and flow screed

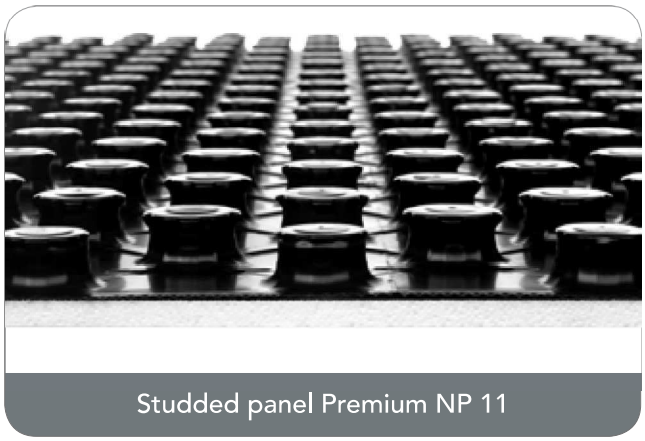
Premium NP 30-2 studded panel

- Highest level of tread resistance
- Optimum noise/sound insulation
- Studded panel made from deep draw, 1 mm thick polystyrene film
- Installation on thermal and footfall sound insulation
- Suitable for cement, anhydrite and flow screed

Standards

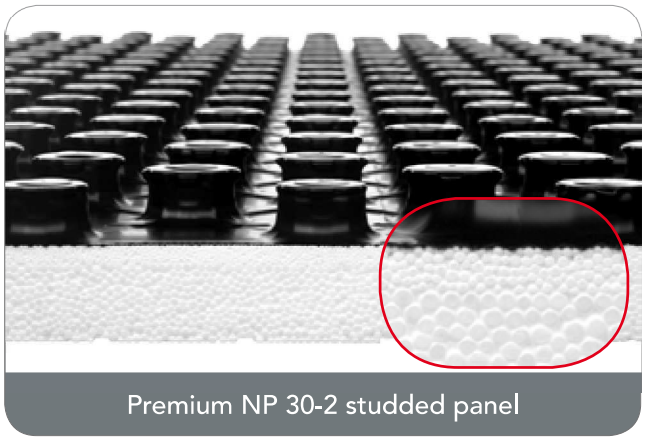
The Premium 30-2 studded panel corresponds with application according to DIN EN 13163 (interior insulation on floor panels and ceilings under screeds, DIN 4108-10). EPS insulation panels incl. deep draw film according to DIN 18560.

Studded panel without insulation



Studded panel Premium NP 11

Post-coated polystyrene hard foam (EPS) Thermal insulation panel



Premium NP 30-2 studded panel

Post-coated polystyrene hard foam (EPS) panel with highest level of footfall sound insulation

MAINPEX underfloor heating tube

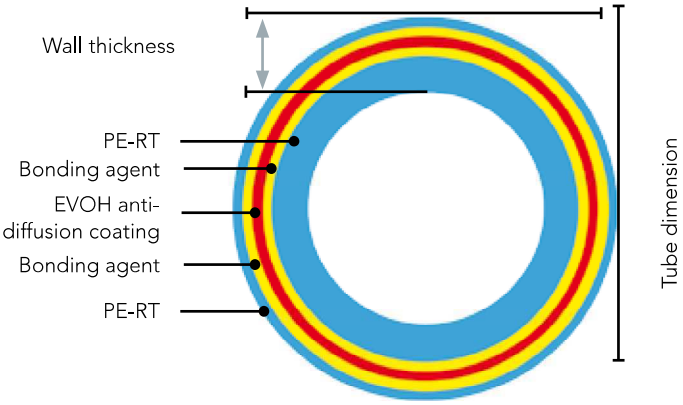
The UFH tube is available in different tube designs, such as diameter, material composition.
All MP-UFH tubes are oxygen impermeable in accordance with DIN 4726. Due to the following properties, the limit specified by this standard is fallen below significantly.

Tube types:

MPFR heating tube PE-RT

Material properties:

- PE-RT plastic tube
- 5 layer technology / 5 layer technology
- High acid resistance and temperature stability
- Co-extruded EVOH layer according to DIN 4724
- Pressure-resistant
- Corrosion-resistant
- Ethylene octene co-polymer / medium density
- High durability and fatigue strength
- Unique molecular structure with linear ethylene main chain and the octene side chains
- Particularly flexible and easy to install (oxygen impermeable according to DIN 4726)
- Extreme acid resistance and resistance to chemicals
- Very low flow resistance in the inner tube
- Extremely good thermal conductivity



Technical data:

Material	PE-RT Polyethylene-rised temperature
VPE/ring length	300 m and 600 m
Dimension	14 x 2 / 16 x 2 / 17 x 2 / 20 x 2
Surface roughness	40 nm

Heating tube

Properties	Values	Standard
Polyethylene	PE-RT	DIN 16833
Thermal conductivity	0.4 W/(mK)	DIN 16833
Coefficient of thermal expansion	1.95 x 10^{-4}/K	DIN 52612-1
Young's modulus	~ 500N/mm^2	DIN 53457 (4 point bending test)
Density	0.933 g/cm^3	ASTM D-1525
Tearing strength	34 MPa	ISO 527-2
Elongation at rupture	> 800%	ISO 527-2
Vicat softening temperature	122° C	ASTM D-1525
Continuous operating temperature	20...80° C	ISO 10508 class 4 / 5
Material class	B2 normal flammable	DIN 4102-4
Hardness, Shore D	53	ISO 868
Bending radius, bent freely	5xd mm (d=out. diam.)	DIN 4726
Oxygen diffusion barrier	40° C < 0.1 g/(m^3d)	DIN 4726
Certification	A 522	SKZ HR 3.16

Technical properties:

NW [mm]	Weight/m [g]	Liter/m [l]	Operating temperature [C°]	max. operating pressure [bar]	ISO 10508 [class]	Winding length [m]
17 x 2.0	103	0.133	60	9.8	1	1000
17 x 2.0	103	0.133	70	9.4	2	1000
17 x 2.0	103	0.133	60	9.4	4	1000
17 x 2.0	103	0.133	80	8.1	5	1000

Fields of application:

in the field of heating system installations according to

- DIN EN 12831 e.g. Radiator connection
- In the field of panel heating according to DIN EN 18560 and 1264 e.g. UFH
- Industrial underfloor heating and concrete core activation
- Open space heating
- Special applications

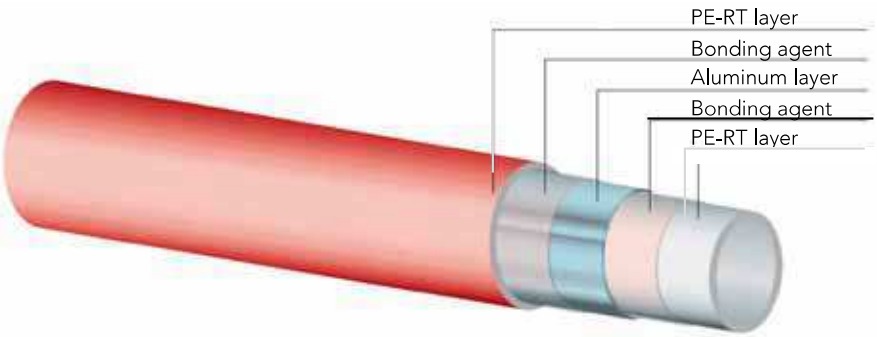
Tests:

- Complies with all current standards and regulations e.g. DIN 16833, DIN 4726
- Suitable for underfloor heating systems ISO 10508 class 4 / 5
- Monitored regularly by independent testing institutions, e.g. SKZ , DIN Certco

Creep rupture strength

- To determine the pressure resistance of plastic tubes depending on the medium temperature and operational duration

MAINPEX composite tube PE-RT/Aluminum/PE-RT



Material properties:

- 5-layer technology
- No spring-back effect
- Oxygen diffusion layer due to aluminum inliner
- High temperature stability
- Pressure-resistant
- Corrosion-resistant
- High durability and fatigue strength
- Particularly flexible and easy to install
- Can be installed in cold state
- extreme acid resistance and resistance to chemicals
- Very good flow resistance in the inner tube

Fields of application:

- In the field of heating installations according to DIN EN 12831 Radiator connection
- In the field of panel heating according to DIN EN 18560 and 1264 e.g. UFH
- Wall heating
- Heating and cooling blankets

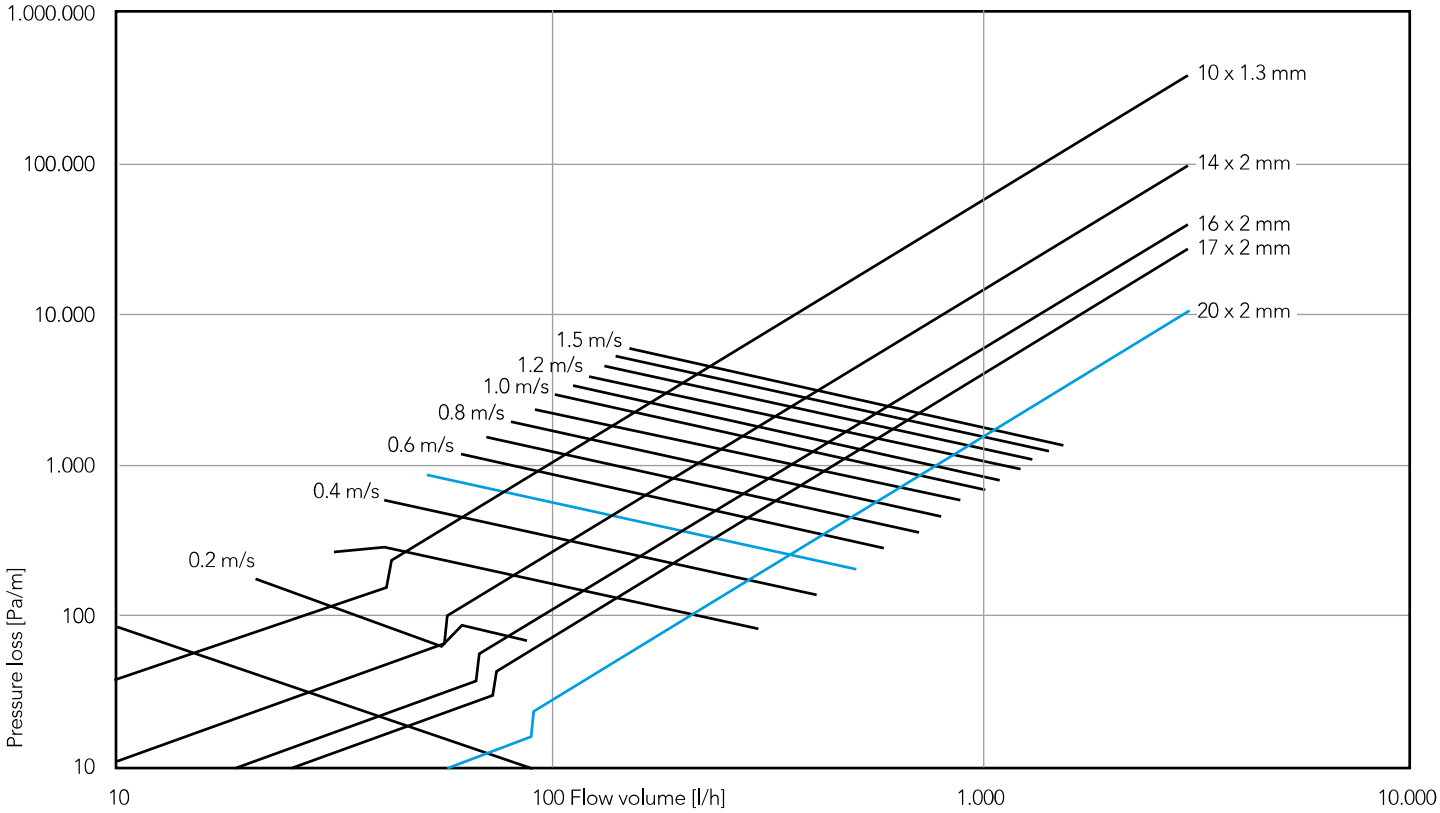
Tests:

- Complies with all current standards and regulations e.g. DIN 16833, DIN 4726
- Suitable for underfloor heating systems ISO 10508 class 4
- Suitable for heater connection according to ISO 10508 class 5
- Monitored regularly by independent testing institutions, e.g. SKZ

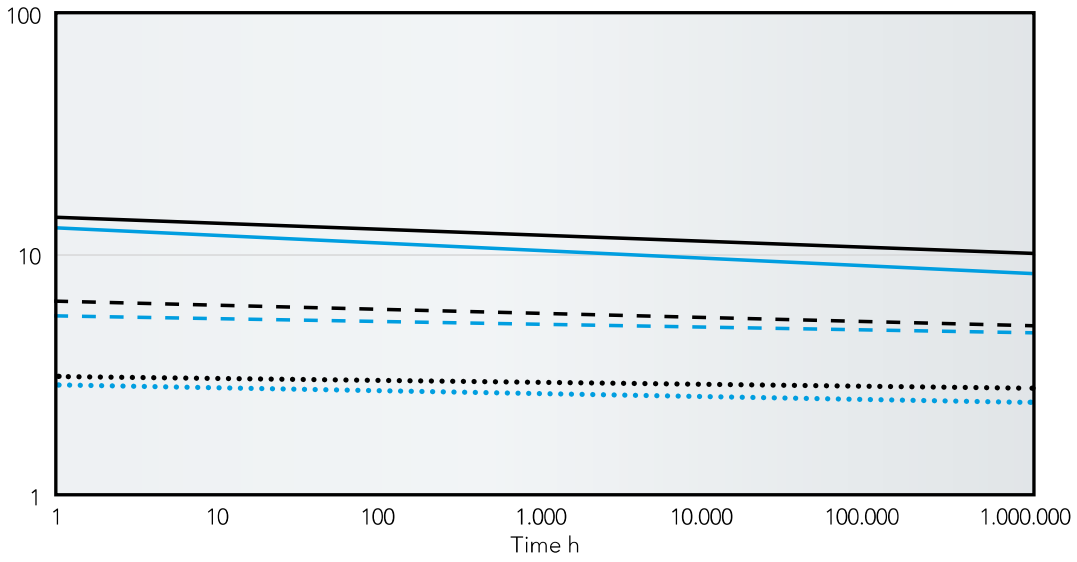
Technical data			
Designation	Multi layer composite tube	Linear expansion	0.3 x 10^{-4} 1/K
Material	PE-RT / AL / PE-RT	Thermal conductivity W (m K) at 60 °C	0.40
VPE/ring length	500 m	Max. Bending radius	5 x d
Color	Red	Fire protection category	B 2
Dimension	14 x 2.0	Surface roughness	40 nm
Max. temperature load	90 °C	Water content L/running meter	0.0785
Ma.x operating pressure in bars (ISO 10508) at 70° C	10 bar	Art. no.	10.114.203

Heating tube

Pressure loss table



Behavior of PE-RT vs. PEX over a period of time



PE-RT 110° C

PE-RT 80° C

PE-RT 20° C

PEX 110° C

PEX 80° C

PEX 20° C

The behavior of PE-RT pipes in comparison with PE-X pipes over a period of time Source: PE-RT 2388 from Bodycote – measurement report, PEX from DIN 16892

Design and project planning

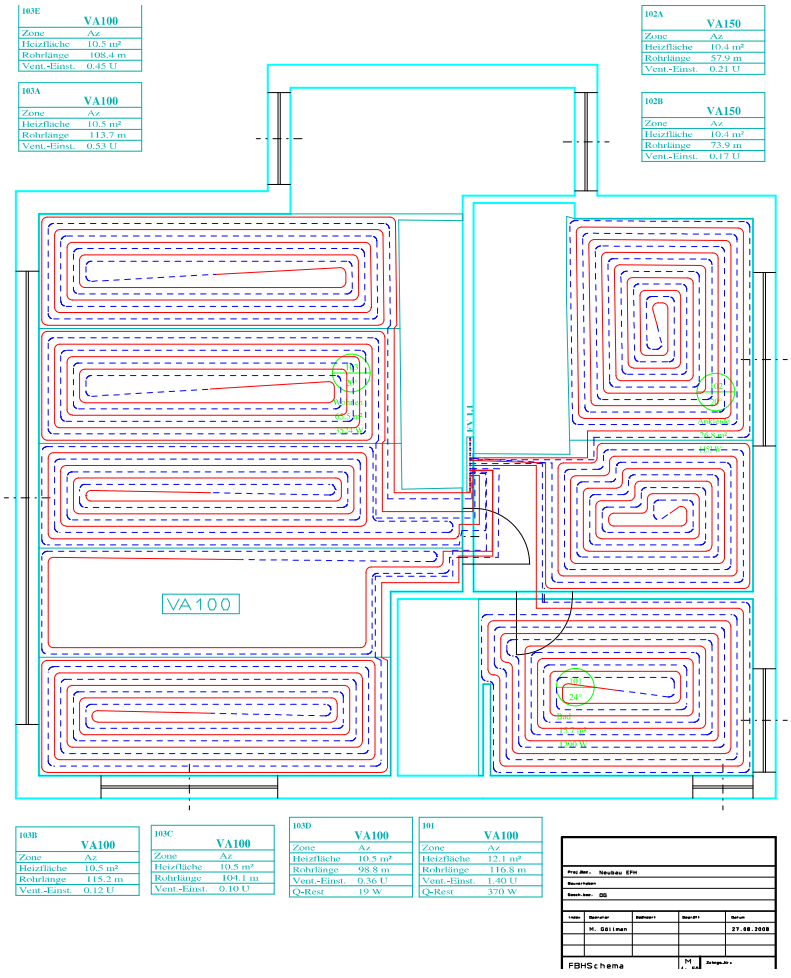
Quick calculation to determine the weights FBH

For determination of dimensions/quantities only, we offer an online calculation aid on our website.
This is activated with a password and can be used by our customers free of charge.

Project planning and design using the calculation service

Using the enclosed performance tables and diagrams you can deduct key bases with concern to the thermal calculation.

You are also invited to use our in-house calculation service.
We will design and plan the system individually for your building.
The FBH is designed according to DIN EN 1264 with indications of the dimensions, the installation clearances, the offer, as well as a graphic representation in the form of a CAD plan.
The calculation of the heating load of your building according to DIN EN 12831 forms the basis for the above.



Collect ATZE-THALERS
and win PRIZES!

shop.mainpex.de
shop.mainpex.at

MAINPEX GmbH & Co. KG
Silbersteinstraße 14
97424 Schweinfurt, Germany
Tel. +49 (0) 9721/65977-500
Fax +49 (0) 9721/65977-600
info@mainpex.de
www.mainpex.de

MAINPEX GesmbH
Bachwinkl 27
5761 Maria Alm am Steinernen Meer, Austria
Tel. +43 (0) 6584/22 -800
Fax +43 (0) 6584/22 -888
info@mainpex.at
www.mainpex.at

MP-THB-09/2011-10-EN