

Uponor Minitec underfloor heating/ cooling system

EN Technical information

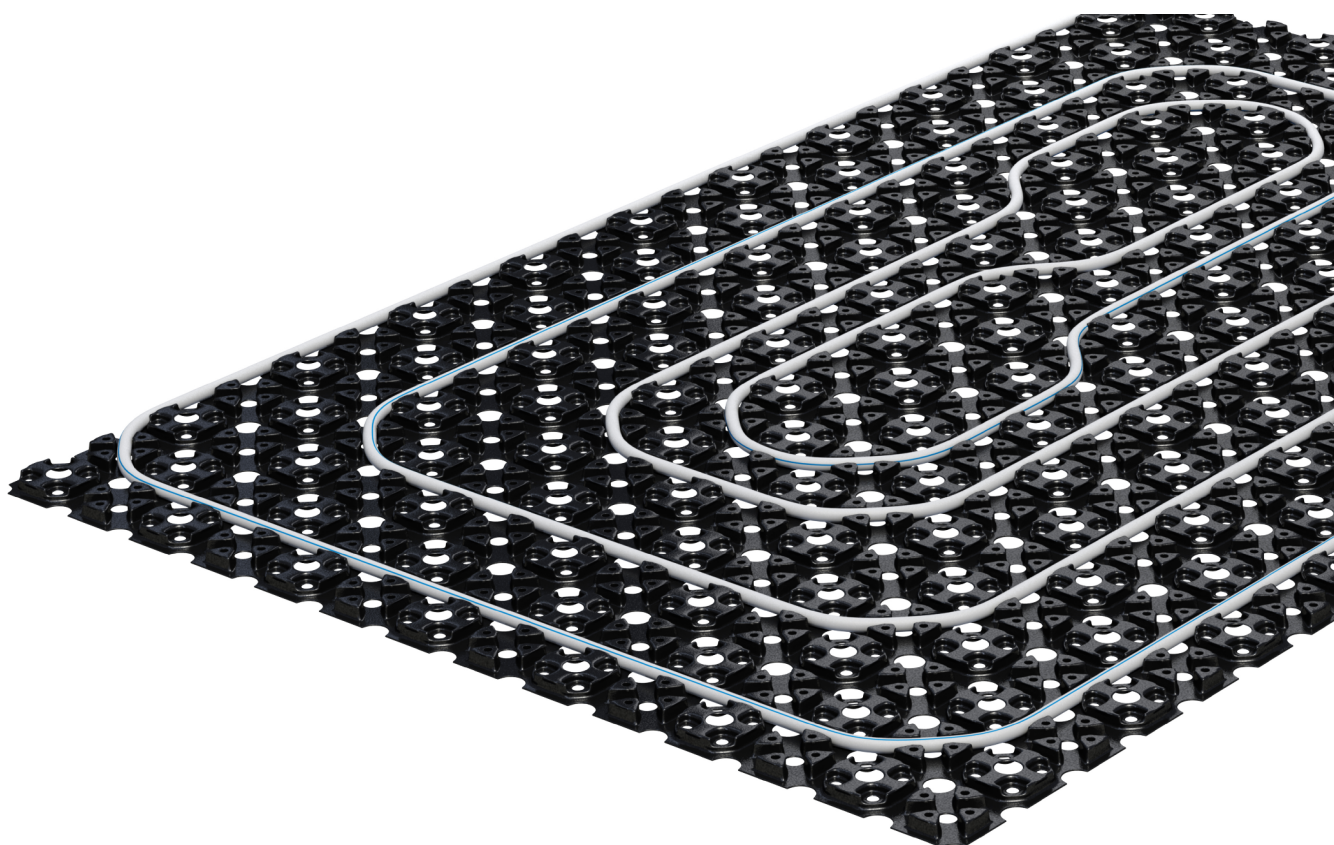


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1 System description



The Uponor Minitec is a low-profile underfloor heating and cooling system with a height of just 12 mm and a perfect solution for renovation.

The Uponor Minitec low-profile system consists of a Uponor self-adhesive nubfoil and Uponor Minitec Comfort Pipe 9,9 mm system pipes. The Uponor self-adhesive nubfoil with Uponor Minitec Comfort Pipe can be easily installed on top of the existing screed, wood floor or tiles and also on thermal and impact sound insulation, for more details refer to "Uponor Minitec construction examples" table. The very low covering allows fast heat-up times and fast reaction times at a low supply temperature.

Uponor Minitec low-profile system allows you to fit an entire area or a specific room, such as a bathroom, with minimal construction height.

1.1 Benefits

- **Easy:** fast, efficient installation by one installer
- **Comfort:** short heat-up times, fast temperature-control response
- **Low profile:** ideal for integration into renovations
- **Energy saving:** low operating temperatures
- **Reliable:** long-lifetime proven technology

1.2 Components



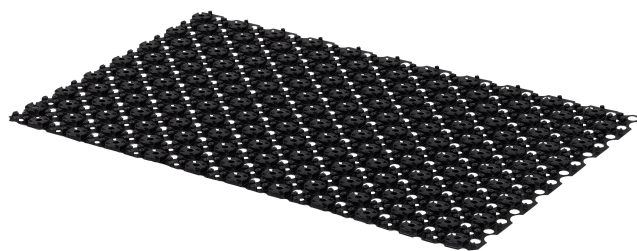
Note

For more detailed information, product range and documentation, please visit the Uponor website: www.uponor.com.

Note

For detailed information about the product range, dimensions and availability, please refer to the Uponor price list.

Uponor Minitec nubfoil



The Uponor Minitec nubfoil is a polystyrol panel suitable for residential and commercial building renovations. It is available as a two-sided overlapping foil with reduced nubs for easy overlapping.

The pipe spacing is based on the heating or cooling requirements: 5 cm, 10 cm or 15 cm.

Uponor Fluvia T pump group Push-12



RP0000040

The Uponor Fluvia T pump group Push-12 is ideal for individual rooms and small heated surfaces, as well as for connecting radiant heating to a high-temperature system.

For more information about the product range, dimensions and availability, please refer to the Uponor price list.

Uponor Minitec Comfort Pipe



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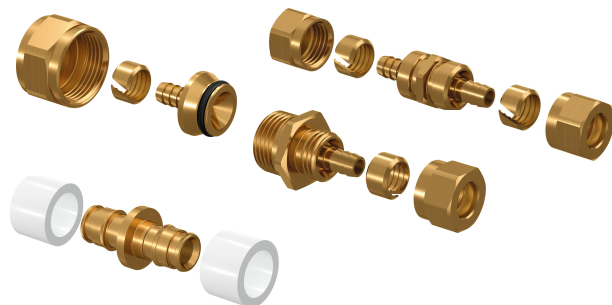
Uponor Minitec Comfort Pipe is a highly flexible PE-Xa pipe in dimension 9,9 x 1,1 mm.

The pipe fulfils the requirements for oxygen diffusion tightness as per DIN 4726.

Uponor jointing technology

Note

Only use fittings recommended by Uponor or its representatives.



RP0000351

Uponor Q&E fittings have been specially developed for use with Uponor pipes.

Compression fittings designed for these Uponor pipes are also available.

1.3 Copyright and disclaimer

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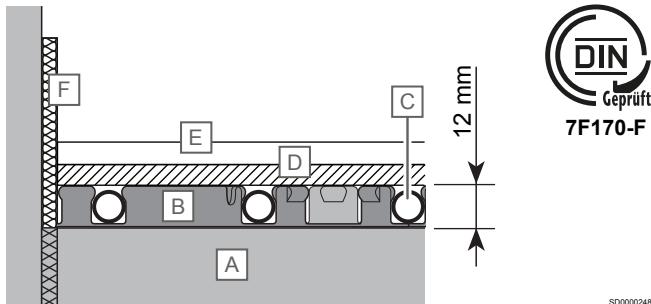
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2 Planning/ design

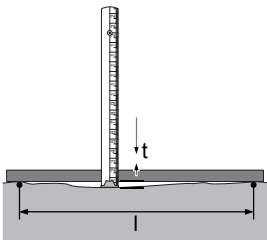
2.1 Floor constructions



Item	Description
A	Existing floor
B	Uponor Minitec nubfoil
C	Uponor Minitec Comfort Pipe
D	Leveling material
E	Parquet/ tile/ carpet
F	Uponor Minitec edging strip

Load-bearing subsurface

Uponor Minitec is the ideal underfloor heating and cooling system for laying on top of the existing screed, suitable wooden construction and tiles. The existing underground is the load-bearing subsurface for the Minitec system. The installer should inspect the subsurface for suitability and evenness and check if it is free of any deficiencies. To accept the existing underground, it must be sufficiently dry and have a level surface. It is not allowed to show bumps, pipes, cables or similar. Repair cracks according to the trade standards. The screed measurement tolerances must follow DIN 18202 as shown in the table below:



For parquet/ laminate flooring, wooden beam construction with a max. deflection of $l/500$ is permitted.

For tiles/ natural stone flooring, the ground must be free from unevenness.

Limit values for flatness deviations

	Gauges as limit values [t] in mm with measuring point distances [l] in m				
	to 0,1	1 ¹⁾	4 ¹⁾	10 ¹⁾	15 ¹⁾
Finished floors - for example screeds for direct use, to install floor coverings, tile, coverings applied with adhesive	1	3	9	12	15

1) Intermediate values can be interpolated.

Levelling materials

A leveling material is necessary if the load-bearing subsurface does not meet the necessary flatness tolerances. The requirement applies to screeds and wooden floors. For example, older properties often have floorboards that can cause damage and necessary repair. It is a prerequisite for all measures that the floorboards must be unbroken, attached tightly, and load-bearing. Screwing down the floorboards can correct some of the unevenness.

The floorboards must be sealed with a leveling material if they have cracks or knotholes. It is necessary to clean and paint the repaired floorboard with primer before applying the levelling material. The thickness of leveling can range from ≥ 3 mm.

In case of floorboards that have "warped upwards," leveling materials and load distribution sheets will not be able to rectify the problem.

Levelling compounds

Uponor Minitec can be used with levelling compounds and flooring materials from different manufacturers, for example, Knauf. For more information, refer to the Uponor PI Minitec manual for the materials list. Additionally, it is possible to combine different insulation systems.


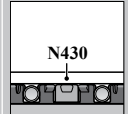
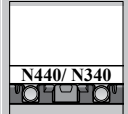
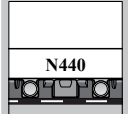
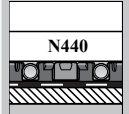


Uponor PI Minitec


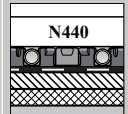
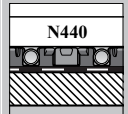
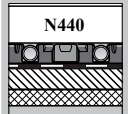
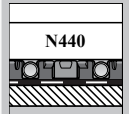


www.uponor.com/services/download-centre

Uponor Minitec construction examples

					
Connection to the substrate		composite with screed	composite with screed	to separation layer	on 10 mm insulation
Total thickness		≥ 16 mm	≥ 20 mm	≥ 32 mm	≥ 42 mm
Self-levelling compound thickness above Minitec nubfoil		≥ 4 mm	≥ 8 mm	≥ 20 mm	≥ 20 mm
Uponor Minitec nubfoil		12 mm (Primer)	12 mm (Primer)	12 mm (synthetic coated craft paper)	12 mm (synthetic coated craft paper)
Weight of screed disc		≥ 28 kg/m ²	≥ 40/ 36 kg/m ²	≥ 64 kg/m ²	≥ 64 - 66 kg/m ²
Impact sound improvement factor of tested flooring		-	-	-	20 dB (Knauf WF)
Thermal insulation		-	-	-	Yes
Fire class		-	-	F 30	F 60
Covering plate		-	-	-	-
Certificates		-	-	P-2103/ 206/ 21-MPA BS	P-2103/ 206/ 21-MPA BS

1) The thickness of the screed may need to be increased for static reasons.

					
Connection to the substrate		on 10 mm insulation	on 20 mm insulation	on 12 mm insulation	on 12 mm insulation
Total thickness		≥ 51,5 mm	≥ 52 mm	≥ 58,5 mm	≥ 49 mm
Self-levelling compound thickness above Minitec nubfoil		≥ 20 mm	≥ 20 mm	≥ 25 mm	≥ 25 mm
Uponor Minitec nubfoil		12 mm (synthetic coated craft paper)	12 mm (synthetic coated craft paper)	12 mm (synthetic coated craft paper)	12 mm (synthetic coated craft paper)
Weight of screed disc		≥ 64 - 66 kg/m ²	≥ 64 - 68 kg/m ²	≥ 74 kg/m ²	≥ 74 kg/m ²
Impact sound improvement factor of tested flooring		20 dB (Knauf WF)	20 dB (Knauf WF)	28 dB (Knauf TP-GP-12)	28 dB (Knauf TP-GP-12)
Thermal insulation		Yes	Yes	Yes	Yes
Fire class		F 90	F 60	F 90 ²⁾	F 30
Covering plate		9,5 mm building plate	-	9,5 mm building plate	-
Certificates		P-2103/ 206/ 21-MPA BS	P-2103/ 206/ 21-MPA BS	P-2103/ 206/ 21-MPA BS	P-2103/ 206/ 21-MPA BS

1) The thickness of the screed may need to be increased for static reasons.

2) Fire protection is only approved for ceilings with wooden beams.

General information on fire protection:

- For structures with fire resistance requirements, the maximum permissible surface load is 2 kN/m².
- **Edge insulation strips:** thickness ≥ 12 mm, non-flammable, melting point ≥ 1000 °C, raw density approx. 80 kg/m³.
- The Uponor Minitec must be with a wall distance of ≥ 12 cm.
- For Knauf building boards, fill joints with Knauf joint filler.
- General building inspection certificates are available from Knauf upon request.

More technical information about thin-layer heated screed systems can be found at www.knauf.de.

Joints

External joints/ edge insulating strips

To form external joints, edge insulating strips act as a reinforcement between the load distribution layer and the ascending building elements. The existing external joint must be inspected and continued up to the new floor covering and levelling material.

The edge insulation strips must extend up to the upper surface of the floor covering from the load-bearing subsurface. A protruding part of the edge insulating strip should not be removed until the floor covering has been laid.

Expansion joints

The expansion joints in the existing screed layer need to be extended with the Uponor Minitec expansion joint profiles to the top of the levelling layer. Refer to DIN 18560 for detailed construction.

2.2 Dimensioning diagrams

Bathrooms, showers, toilets and the like are excluded when determining the design flow temperature.

The limit curves must not be exceeded.

$\Delta\vartheta_{H,G}$ is found through the limit curve for the occupied zone with the smallest pipe spacing.

The design supply water temperature maximum must be:

$$\Delta\vartheta_{V,des} = \Delta\vartheta_{H,G} + \Delta\vartheta_i + 2.5 \text{ K.}$$

In cooling mode the supply water temperature depends on the dew point temperature, therefore a humidity sensor has to be installed.

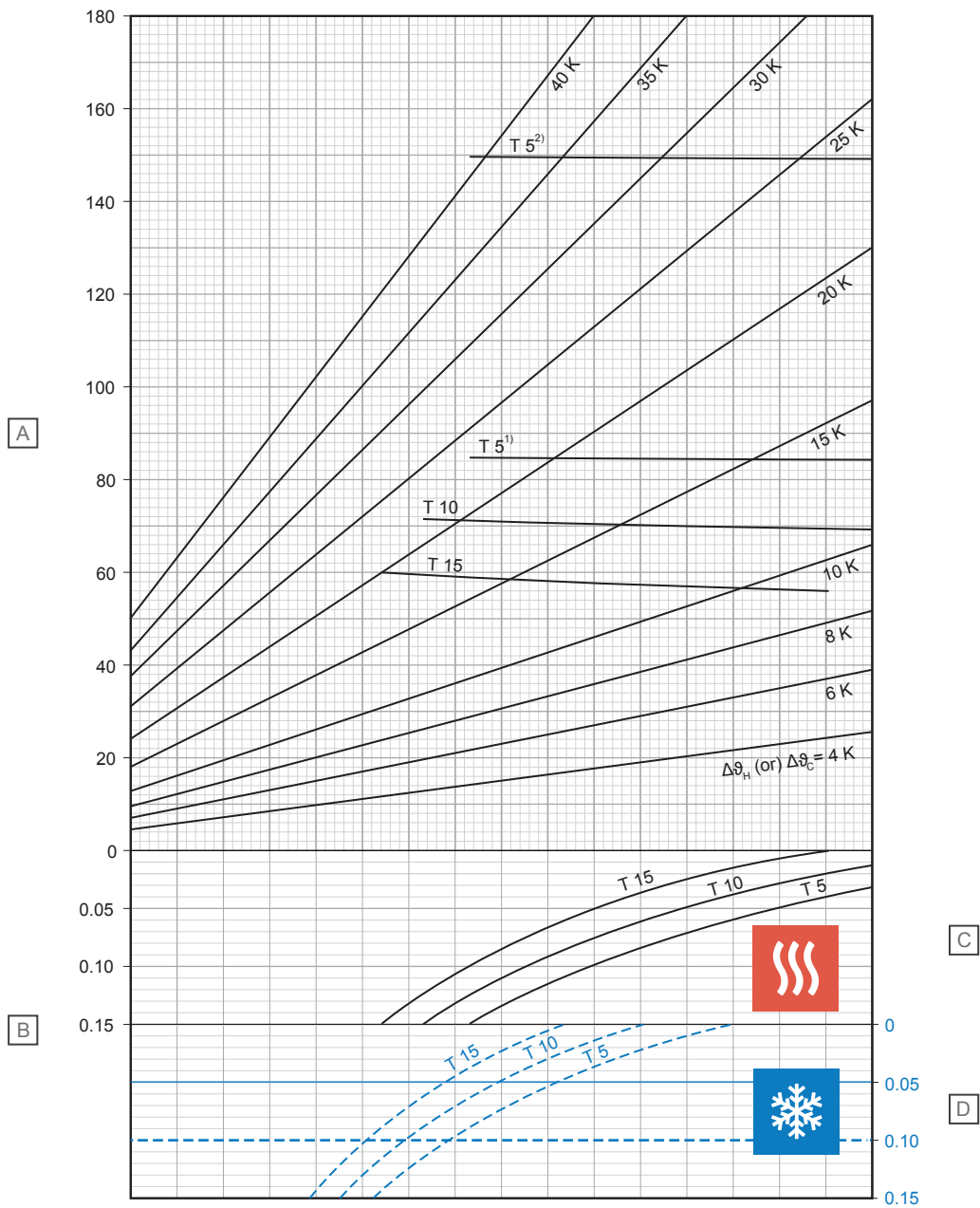
The following diagrams results are accurate and in accordance with EN 1264.

Abbreviations

These abbreviations are used in the following diagrams:

Abbreviations	Unit	Description
$A_{F,max}$	m ²	Maximum surface area of the heating/ cooling area
q_c	W/m ²	Specific thermal output of embedded cooling systems
q_{des}	W/m ²	Design specific thermal output of floor heating systems
$q_{G,max}$	W/m ²	Maximum limit of specific thermal output of floor heating systems
q_H	W/m ²	Specific thermal output of embedded heating systems, excluding floor heating
q_N	W/m ²	Standard thermal output of floor heating systems
$R_{\lambda,B}$	m ² K/W	Thermal resistance of floor covering effective thermal resistance of carpet covering
$R_{\lambda,ins}$	m ² K/W	Thermal resistance of thermal insulation
s_u	mm	Thickness of the layer above the pipe
T	cm	Pipe spacing
$\vartheta_{F,max}$	°C	Maximum floor surface temperature
ϑ_H	°C	Average temperature of the heating medium
ϑ_i	°C	Standard indoor room temperature
$\Delta\vartheta_c$	K	Temperature difference between room and cooling medium for cooling systems
$\Delta\vartheta_{C,N}$	K	Standard temperature difference between room and cooling medium for cooling systems
$\Delta\vartheta_H$	K	Temperature difference between heating medium and room
$\Delta\vartheta_{H,G}$	K	Limit temperature difference between heating medium and room for floor heating systems
$\Delta\vartheta_{H,N}$	K	Standard temperature difference between heating medium and room for heating systems, with the exception of floor heating
$\Delta\vartheta_{V,des}$	K	Design temperature difference between flow of heating medium and room of floor heating systems, determined by room with q_{max}
λ_u	W/mK	Thermal conductivity

Uponor Minitec Comfort Pipe 9,9 x 1,1 mm with screed load distribution layer (su = 4 mm with $\lambda_u = 1,2 \text{ W/mK}$, Knauf N430)



D10000287

Item	Unit	Description
A	W/m ²	Specific thermal heating or cooling output [q_H or q_C]
B	m ² K/W	Thermal resistance [$R_{\lambda,B}$]

C - Heating

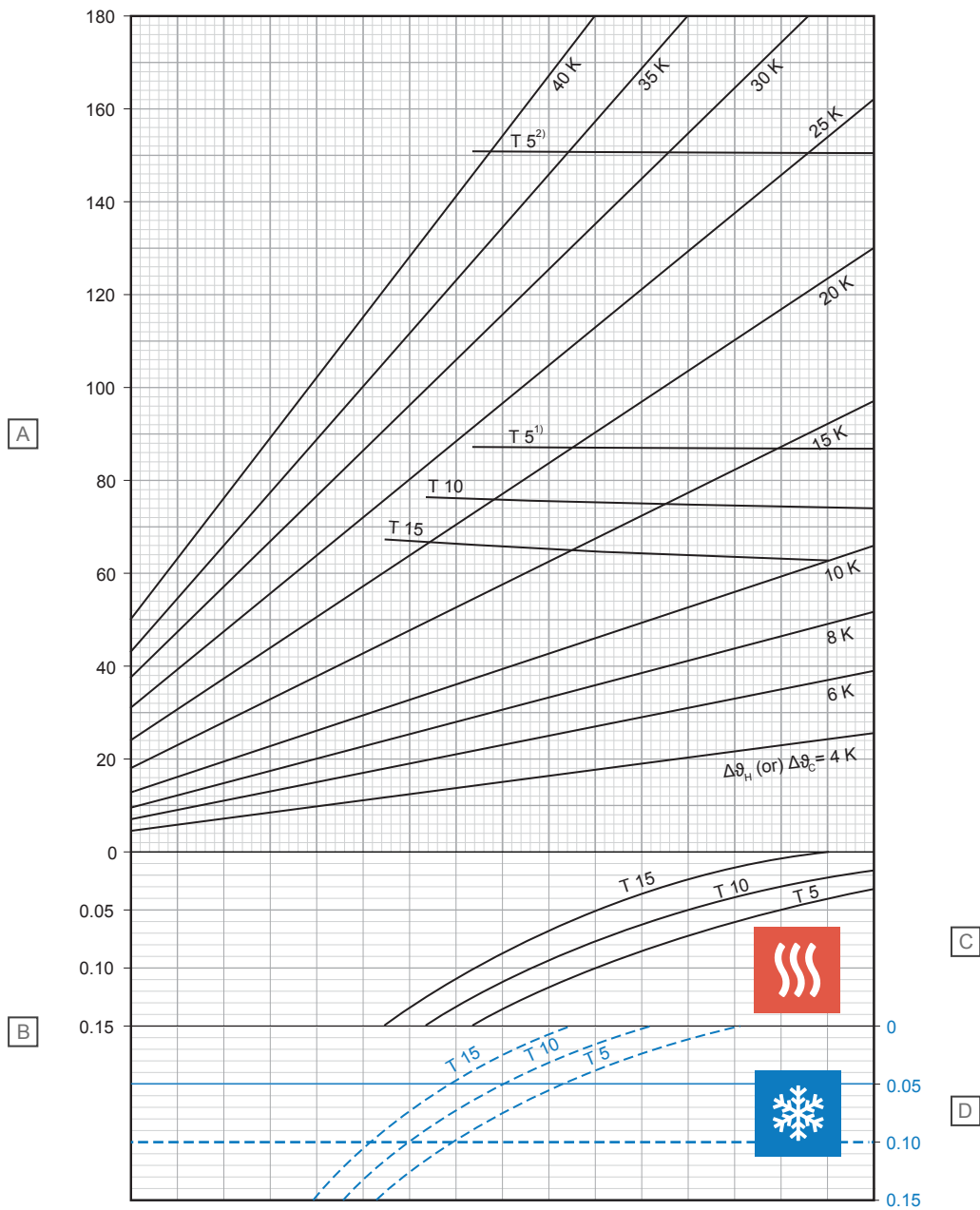
T (cm)	q_H (W/m ²)	$\Delta\vartheta_{H,N}$ (K)
5	84,1	9,8
10	68,6	9,4
15	55,7	9,0

D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (K)
5	44,2	8
10	39,1	8
15	34,6	8

¹⁾ Limit curve valid for ϑ_i 20 °C and $\vartheta_{F, \max}$ 29 °C or ϑ_i 24 °C and $\vartheta_{F, \max}$ 33 °C

Uponor Minitec Comfort Pipe 9,9 x 1,1 mm with screed load distribution layer (su = 8 mm with $\lambda_u = 1,1 \text{ W/mK}$, Knauf N340)



Item	Unit	Description
A	W/m ²	Specific thermal heating or cooling output [q_H or q_C]
B	m ² K/W	Thermal resistance [$R_{\lambda,B}$]

C - Heating

T (cm)	q_H (W/m ²)	$\Delta\vartheta_{H,N}$ (K)
5	86,7	10,0
10	73,5	10,0
15	62,6	10,0

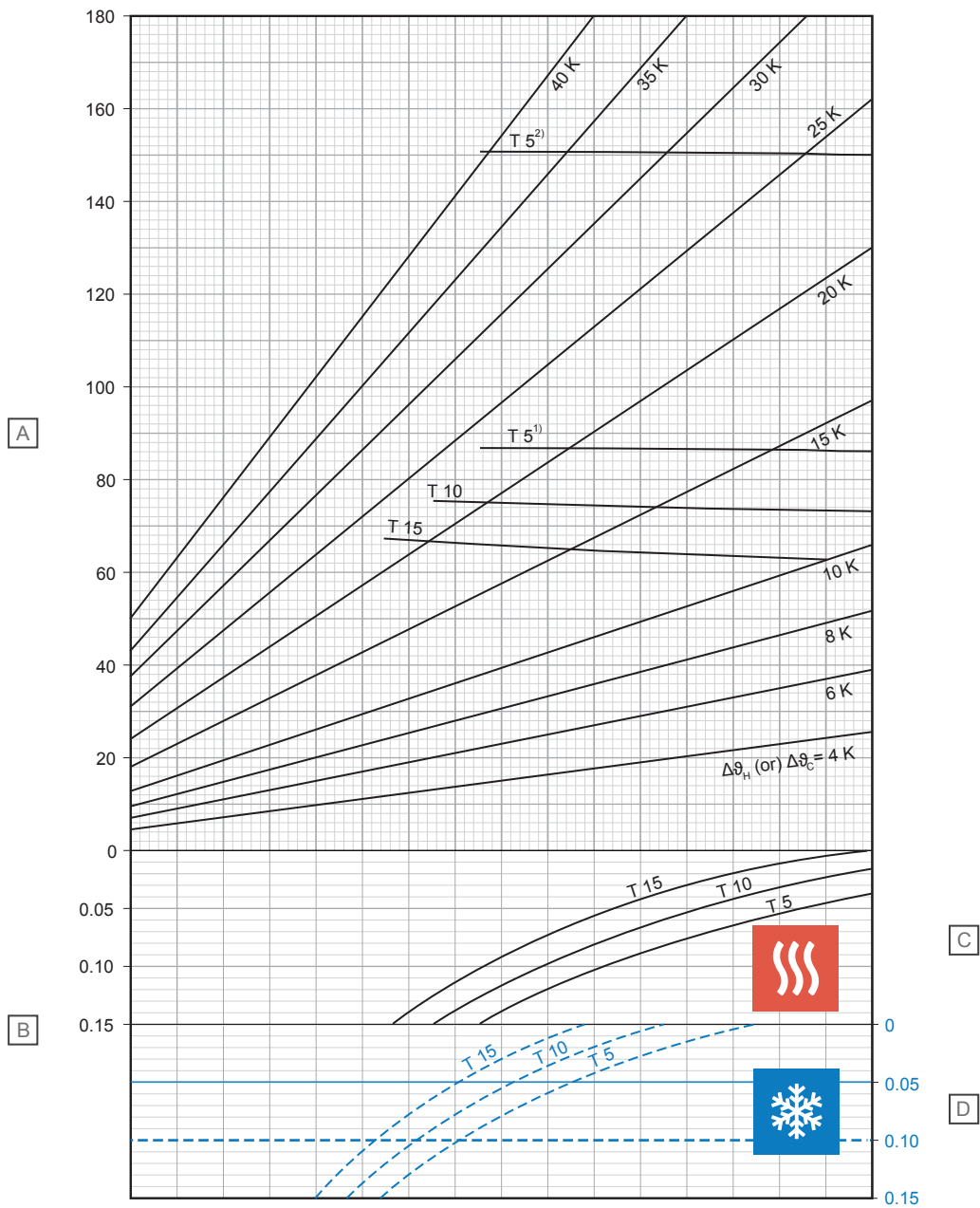
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (K)
5	44,4	8
10	39,4	8
15	34,9	8

¹⁾ Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 29 °C or ϑ_i 24 °C and $\vartheta_{F,max}$ 33 °C

D10000288

Uponor Minitec Comfort Pipe 9,9 x 1,1 mm with screed load distribution layer (su = 8 mm with $\lambda_u = 1,2 \text{ W/mK}$, Knauf N440)



D10000289

Item	Unit	Description
A	W/m ²	Specific thermal heating or cooling output [q_H or q_C]
B	m ² K/W	Thermal resistance [$R_{\lambda,B}$]

C - Heating

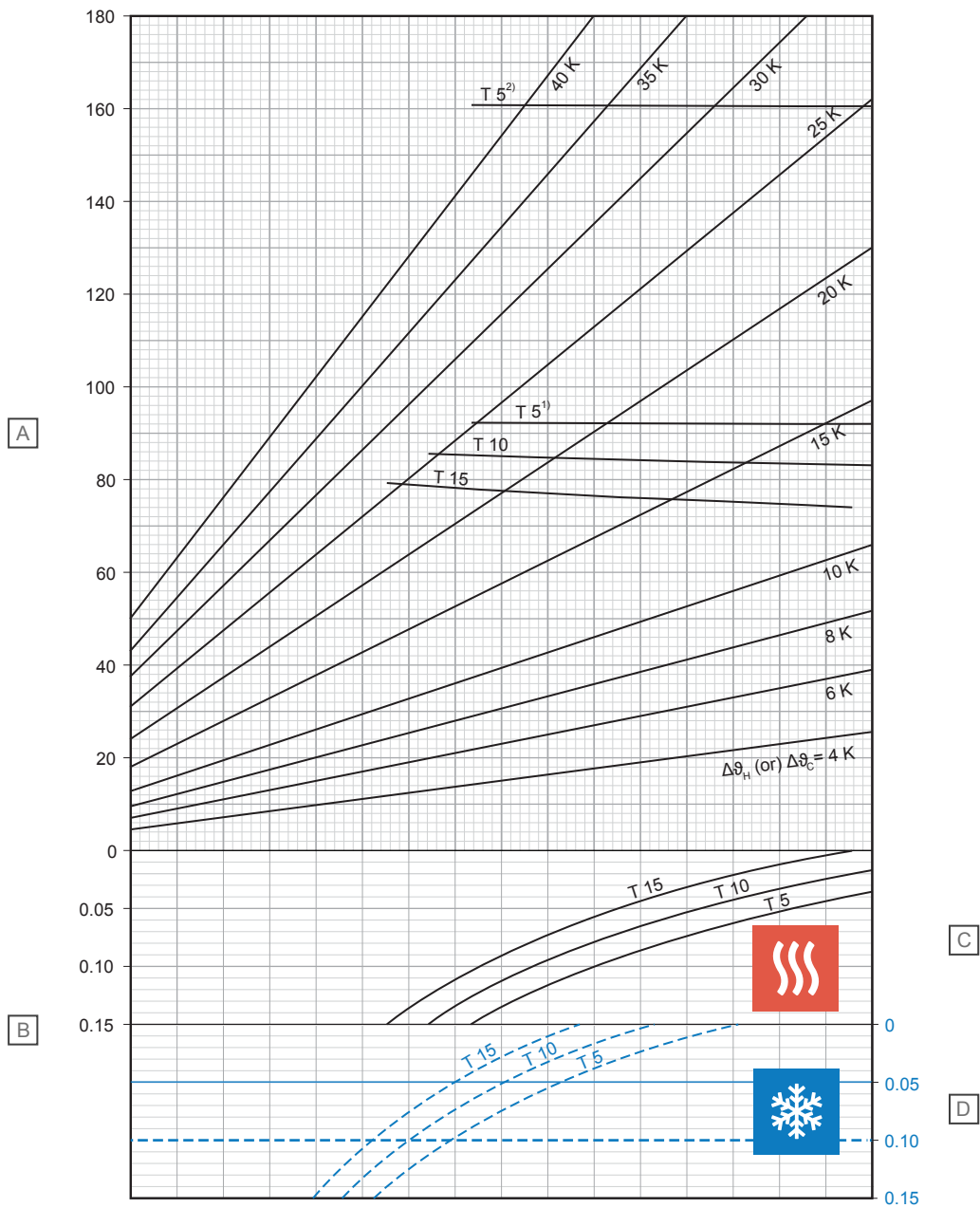
T (cm)	q_H (W/m ²)	$\Delta\theta_{H,N}$ (K)
5	86,2	9,6
10	72,5	9,5
15	61,2	9,4

D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\theta_{C,N}$ (K)
5	45,5	8
10	40,3	8
15	35,8	8

¹⁾ Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 29 °C or ϑ_i 24 °C and $\vartheta_{F,max}$ 33 °C

Uponor Minitec Comfort Pipe 9,9 x 1,1 mm with screed load distribution layer (su = 20 mm with $\lambda_u = 1,2 \text{ W/mK}$, Knauf N440)



D10000290

Item	Unit	Description
A	W/m ²	Specific thermal heating or cooling output [q_H or q_C]
B	m ² K/W	Thermal resistance [$R_{\lambda,B}$]

C - Heating

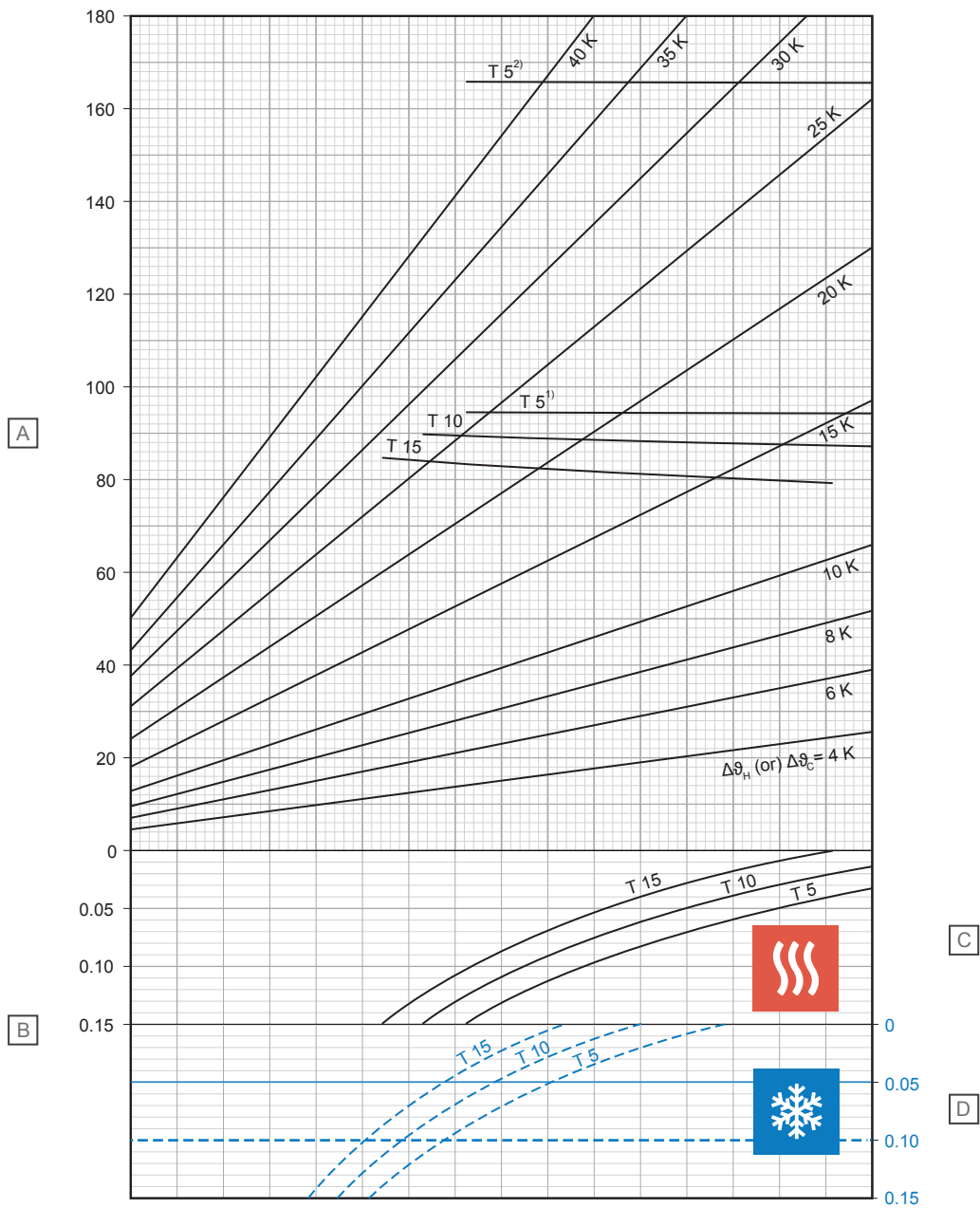
T (cm)	q_H (W/m ²)	$\Delta\vartheta_{H,N}$ (K)
5	92,0	10,5
10	82,6	11,0
15	73,9	11,5

D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (K)
5	44,6	8
10	39,8	8
15	35,4	8

¹⁾ Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 29 °C or ϑ_i 24 °C and $\vartheta_{F,max}$ 33 °C

Uponor Minitec Comfort Pipe 9,9 x 1,1 mm with screed load distribution layer (su = 25 mm with $\lambda_u = 1,2 \text{ W/mK}$, Knauf N440)



D10000291

Item	Unit	Description
A	W/m^2	Specific thermal heating or cooling output [q_H or q_C]
B	$\text{m}^2\text{K/W}$	Thermal resistance [$R_{\lambda,B}$]

C - Heating

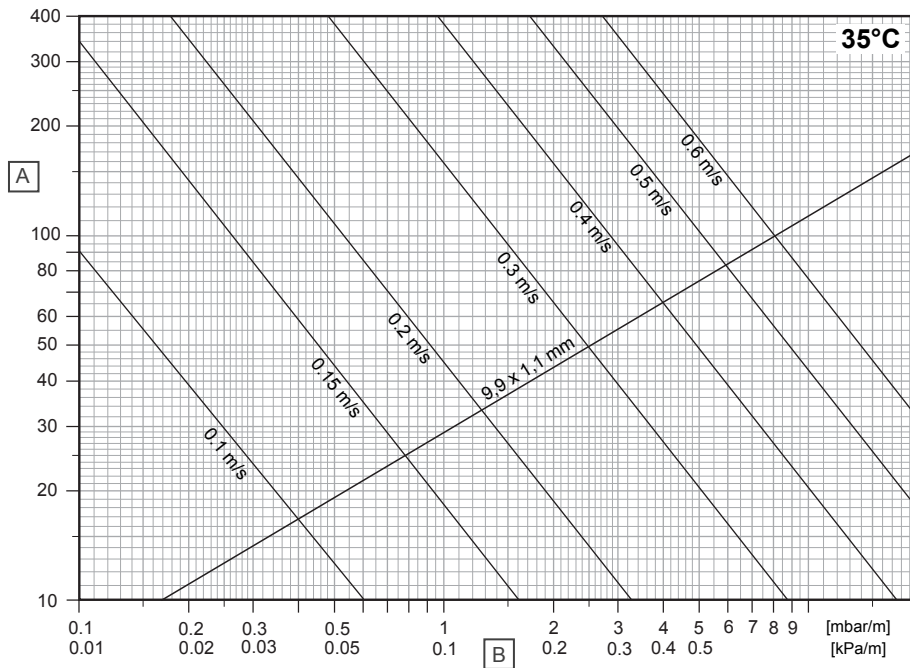
T (cm)	q_H (W/m^2)	$\Delta\theta_{H,N}$ (K)
5	94,3	11,1
10	86,8	11,8
15	79,2	12,6

D - Cooling

T (cm)	q_C (W/m^2)	$\Delta\theta_{C,N}$ (K)
5	43,8	8
10	39,1	8
15	34,9	8

¹⁾ Limit curve valid for ϑ_i 20 °C and $\vartheta_{F, \max}$ 29 °C or ϑ_i 24 °C and $\vartheta_{F, \max}$ 33 °C

2.3 Pressure drop diagram Uponor Minitec Comfort Pipe 9,9 x 1,1 mm



D10000211

Item	Unit	Description
A	kg/h	Mass flow rate
B	R	Pressure gradient

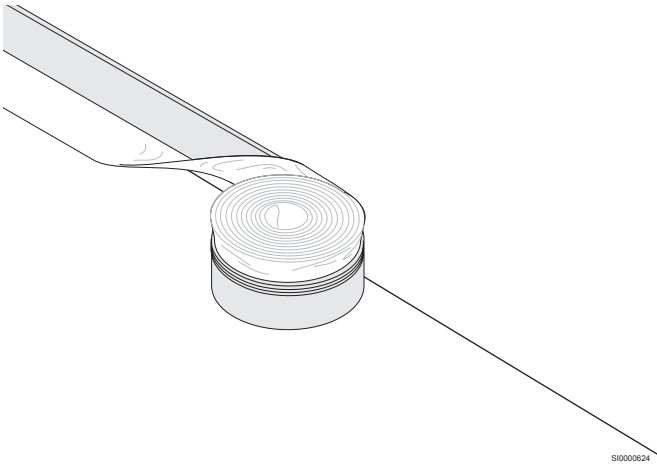
3 Installation

3.1 Installation process

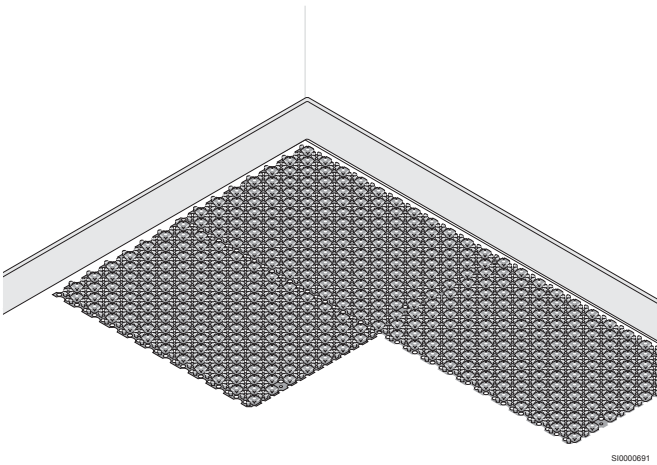
Note
Installation must be performed by a qualified person in accordance with local standards and regulations.

As a guidance, always read and follow the instructions given in respective Uponor installation manual.

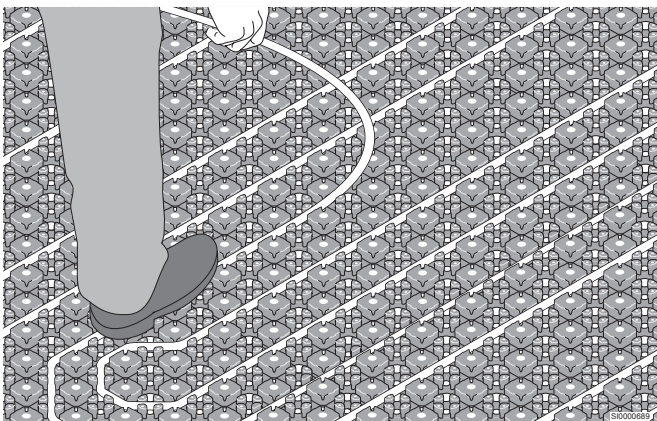
1. Edging strip installation



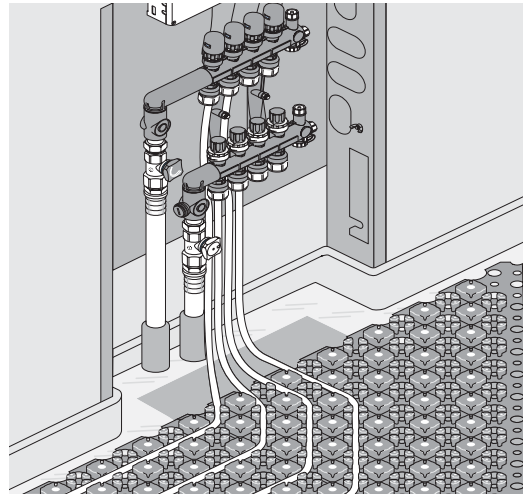
2. Panel installation



3. Pipe installation



4. Connecting pipes to the manifold



4 Technical data

4.1 Technical specifications

Uponor Minitec nubfoil

Description	Value
Product name	Uponor Minitec nubfoil
Material	Polystyrol
Dimension	1100 x 700 x 12 mm
Max. live load	5 kN/m ²
Reaction to fire (refer to EN 13501-1)	Class E
Pipe spacing	5, 10, 15 cm
Type of system	Wet system
Load distribution layer	Leveling material, for example Knauf N440

Uponor Minitec Comfort Pipe

Description	Value
Product name	Uponor Comfort Pipe 9,9 x 1,1 mm
Pipe dimension	9,9 x 1,1 mm
Pipe length	60; 120; 240; 480 m
Material	PE-Xa, four-layer pipe
Colour	Natural with a blue longitudinal stripe
Manufacturing	Refer to EN ISO 15875
Certificates	DIN CERTCO
Area of application	Class 4 / 6 bar (EN ISO 15875)
Max. operating temperature ¹⁾	90 °C (EN ISO 15875)
Max. operating pressure	6 bar at 70° C
Pipe jointings	Uponor screw connection Uponor Q&E technology
Weight	0,039 kg/m
Water volume	0,044 l/m
Oxygen tightness	Refer to ISO 17455; DIN 4726
Density	0,934 g/cm ³ /more flexible
Building material class	E according to EN 13501-1
Min. bending radius	8xd if free bending (80 mm) 5xd if supported bend (50 mm)
Pipe roughness	0,007 mm
Best mounting temperature	≥ 0 °C
UV protection	Opaque cardboard (store remaining quantities in the cardboard box)

1) When more than one design temperature appears for any class, the times should be aggregated (e.g. the design temperature profile for 50 years class 5 is: 20 °C for 14 years followed by 60 °C for 25 years, 80 °C for 10 years, 90 °C for 1 year and 100 °C for 100h).

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