

Uponor Minitec underfloor heating/ cooling system

EN Technical information

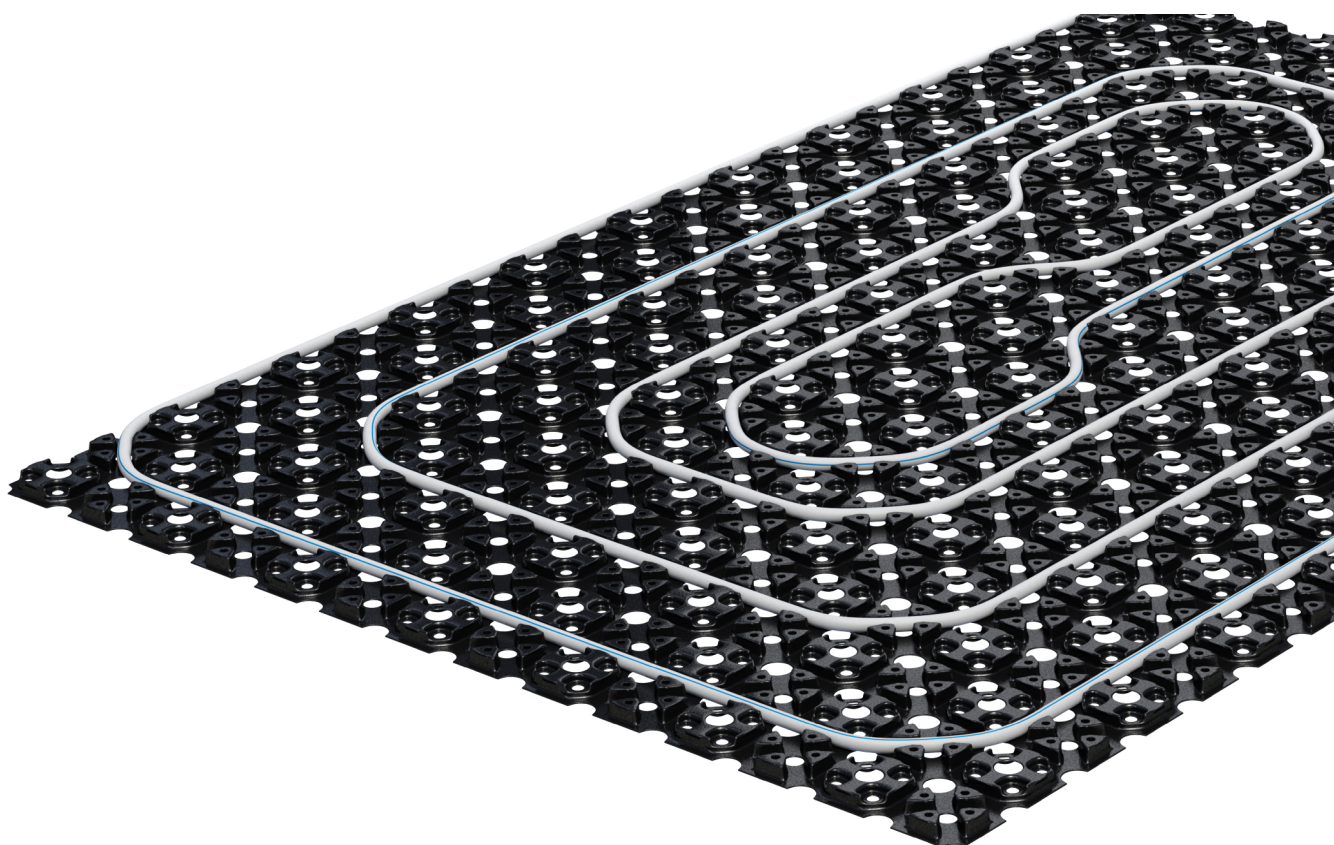


Table of contents

| | | |
|----------|--|-----------|
| 1 | System description..... | 3 |
| 1.1 | Benefits..... | 3 |
| 1.2 | Components..... | 3 |
| 1.3 | Copyright and disclaimer..... | 4 |
| 2 | Planning/ design..... | 5 |
| 2.1 | Floor constructions..... | 5 |
| 2.2 | Dimensioning diagrams..... | 7 |
| 2.3 | Pressure drop diagram Uponor Minitec Comfort Pipe 9,9 x 1,1 mm..... | 13 |
| 3 | Installation..... | 14 |
| 3.1 | Installation process..... | 14 |
| 4 | Technical data..... | 15 |
| 4.1 | Technical specifications..... | 15 |

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.

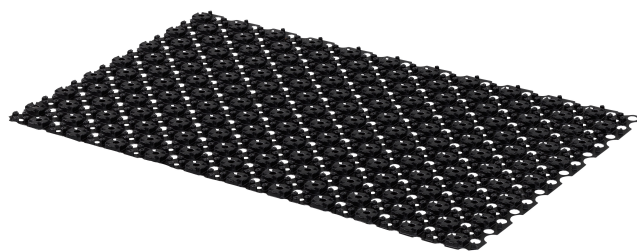
Uponor Minitec low-profile system allows you to fit an entire area or a specific room, such as a bathroom, with minimal construction height.



Note

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

Uponor Minitec nubfoil



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.

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



RP0000123

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

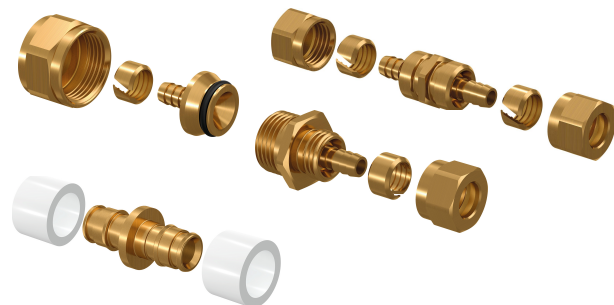
The pipe fulfils the requirements for oxygen diffusion tightness as per DIN 4726.

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

“Uponor” is a registered trademark of Uponor Corporation.

Uponor has prepared this document solely for information purposes, images are only representations of the products. The content (text and images) of the document is protected by worldwide copyright laws and treaty provisions. You agree to comply with these when using the document. Modification or use of any of the content for any other purpose is a violation of Uponor’s copyright, trademark, and other proprietary rights.

While Uponor has made all effort to ensure that the document is accurate, the company does not guarantee or warrant the accuracy of the information. Uponor reserves the right to change the product portfolio and the related documentation without prior notification, in line with its policy of continuous improvement and development.

This is a generic, European-wide document version. The document may show products that are not available in your location for technical, legal, commercial, or other reasons. Therefore, check the Uponor product/price list in advance whether the product is deliverable in your location.

Always make sure that the system or product complies with current local standards and regulations. Uponor cannot guarantee the full compliance of the product portfolio and related documents with all local regulations, standards, or working methods.

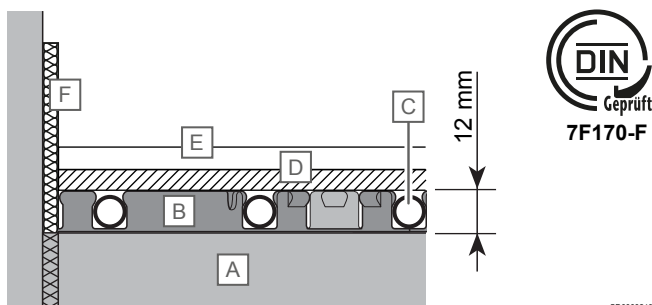
Uponor disclaims all warranties related to the content of this document, expressed or implied, to the fullest extent permissible unless otherwise agreed or statutory.

Uponor is under no circumstances liable for any indirect, special, incidental, or consequential damage/loss that results from the use or inability to use the product portfolio and related documents.

For any questions or queries, please visit the local Uponor website or speak to your Uponor representative.

2 Planning/ design

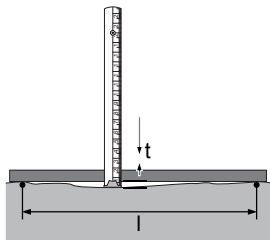
2.1 Floor constructions



| 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.


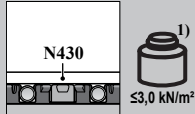
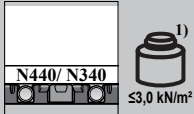
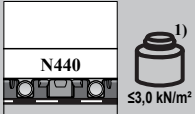
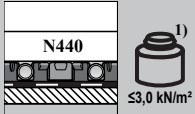


Uponor PI Minitec


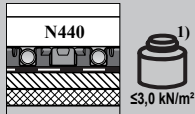
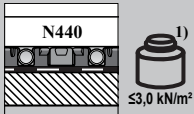
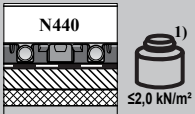
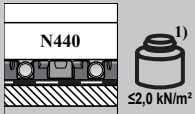


www.uponor.com/services/download-centre

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/m² | ≥ 40/ 36 kg/m² | ≥ 64 kg/m² | ≥ 64 - 66 kg/m² |
| 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/m² | ≥ 64 - 68 kg/m² | ≥ 74 kg/m² | ≥ 74 kg/m² |
| 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.

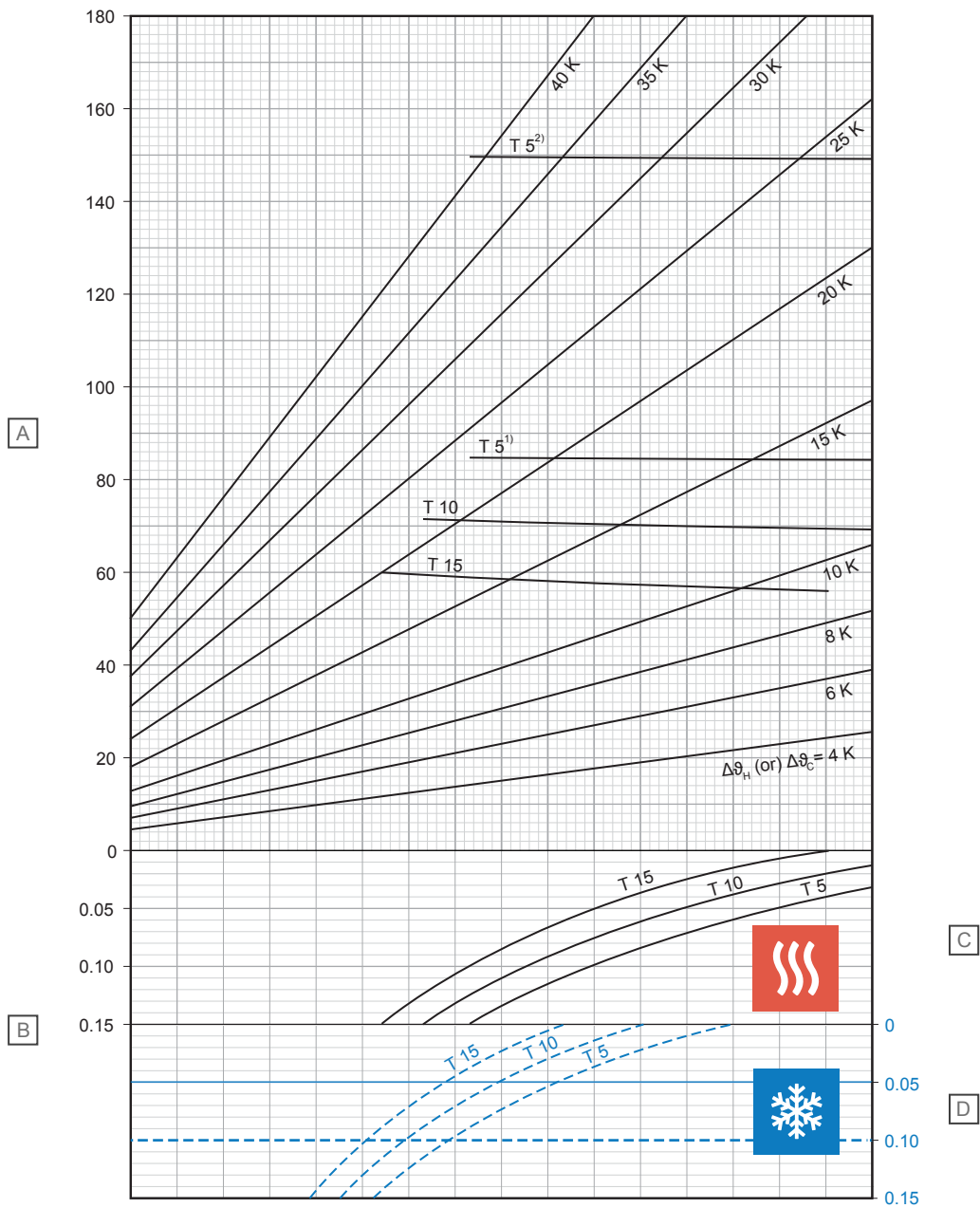
The following diagrams results are accurate and in accordance with EN 1264.

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

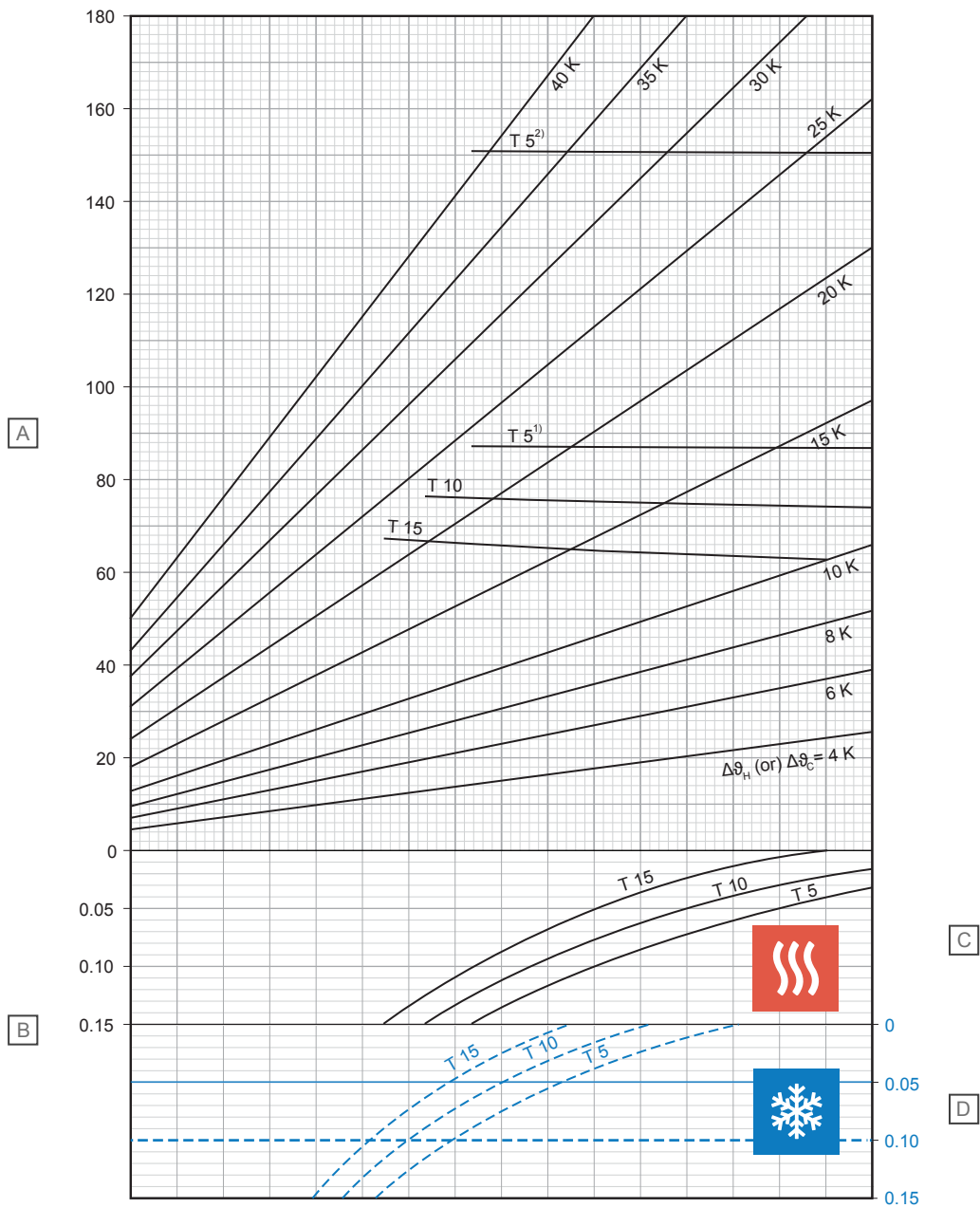
| T (cm) | q_H (W/m ²) | $\Delta\theta_{H,N}$ (K) |
|--------|---------------------------|--------------------------|
| 5 | 84,1 | 9,8 |
| 10 | 68,6 | 9,4 |
| 15 | 55,7 | 9,0 |

D - Cooling

| T (cm) | q_C (W/m ²) | $\Delta\theta_{C,N}$ (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)



D10000288

| 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

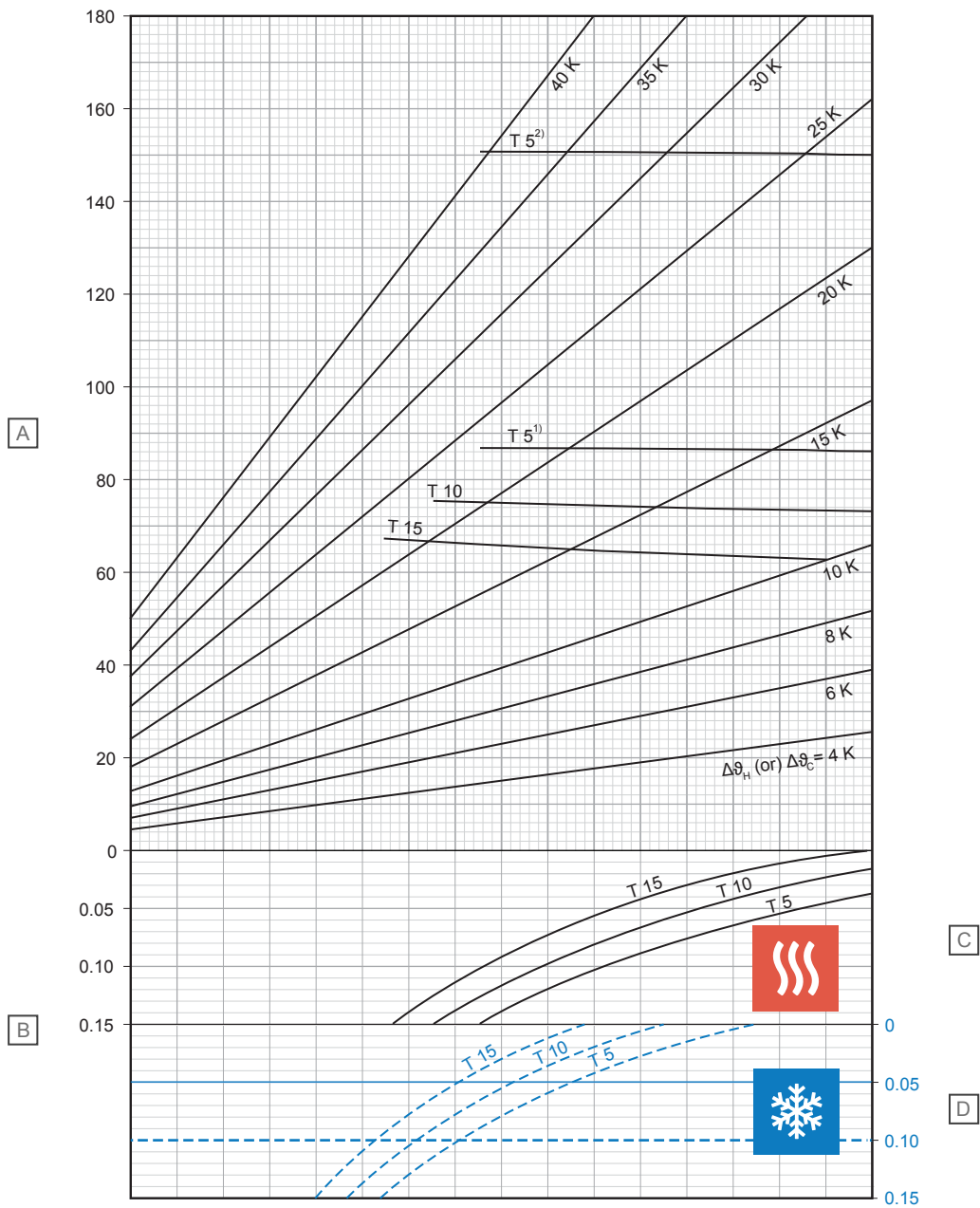
| T (cm) | q_H (W/m^2) | $\Delta\theta_{H,N}$ (K) |
|--------|--------------------------|--------------------------|
| 5 | 86,7 | 10,0 |
| 10 | 73,5 | 10,0 |
| 15 | 62,6 | 10,0 |

D - Cooling

| T (cm) | q_C (W/m^2) | $\Delta\theta_{C,N}$ (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

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/m² | Specific thermal heating or cooling output [q_H or q_C] |
| B | m²K/W | Thermal resistance [$R_{\lambda,B}$] |

C - Heating

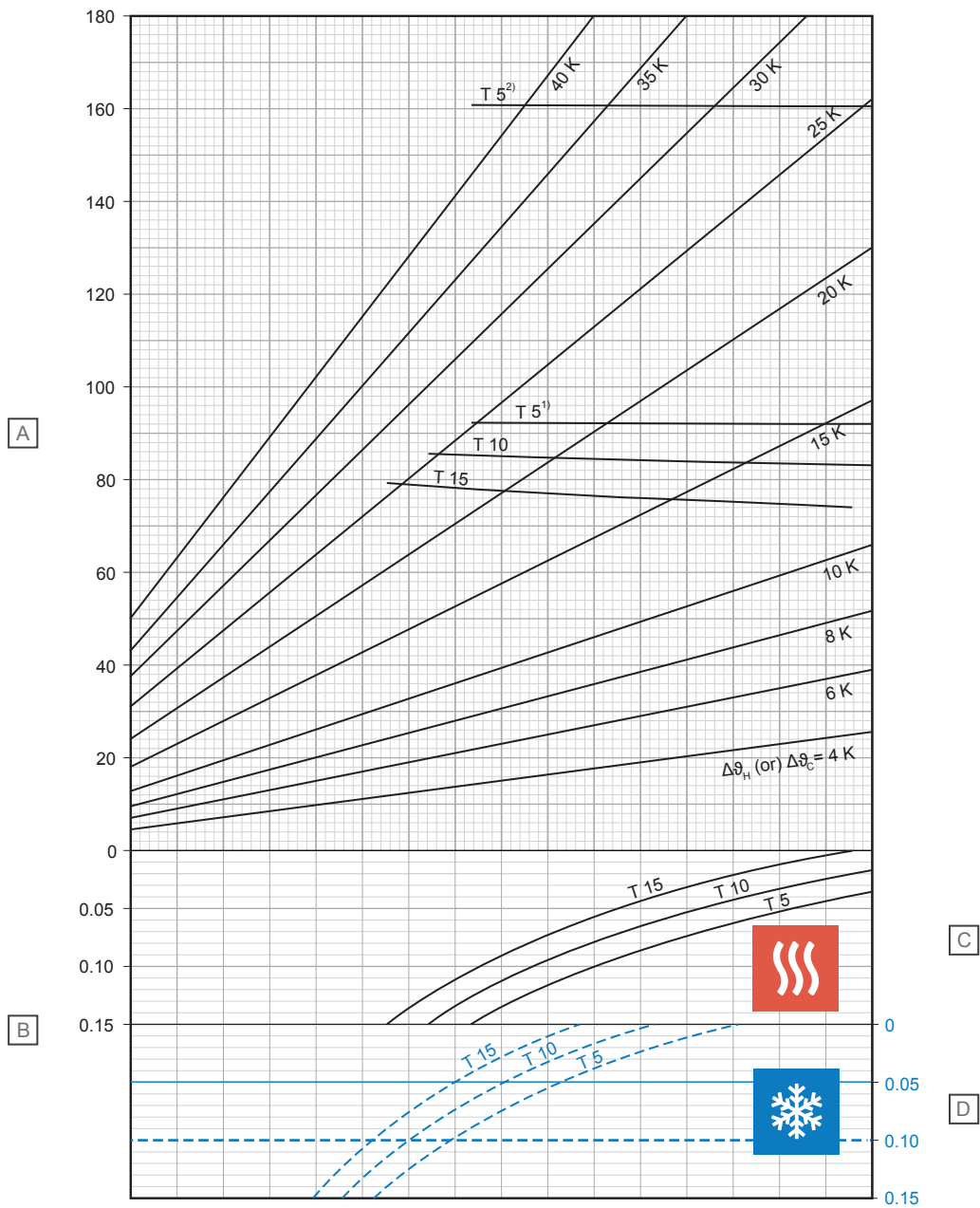
| T (cm) | q_H (W/m²) | $\Delta\theta_{H,N}$ (K) |
|--------|--------------|--------------------------|
| 5 | 86,2 | 9,6 |
| 10 | 72,5 | 9,5 |
| 15 | 61,2 | 9,4 |

D - Cooling

| T (cm) | q_C (W/m²) | $\Delta\theta_{C,N}$ (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

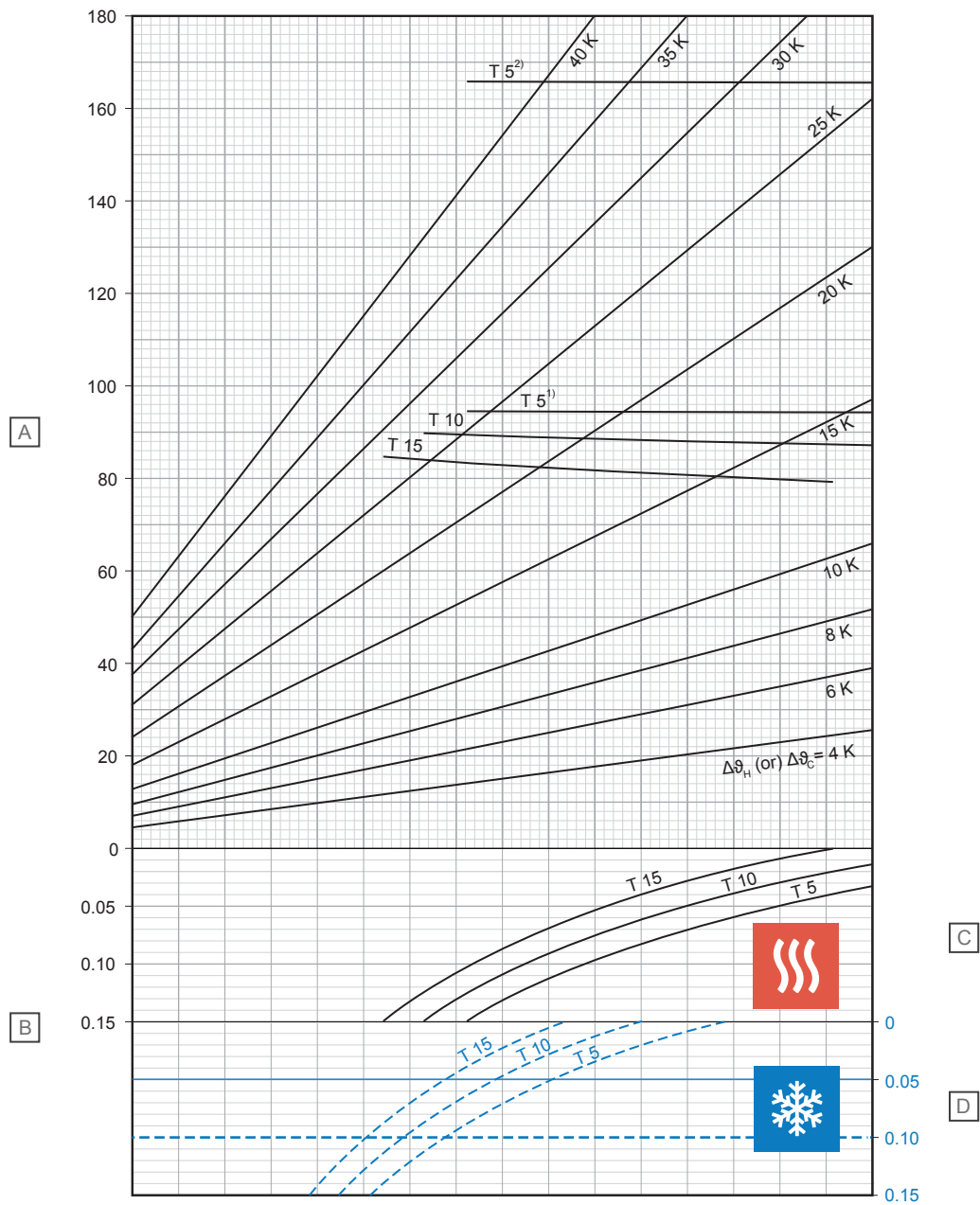
| T (cm) | q_H (W/m ²) | $\Delta\vartheta_{H,N}$ (K) |
|--------|---------------------------|-----------------------------|
| 5 | 92,0 | 10,5 |
| 10 | 82,6 | 11,0 |
| 15 | 73,9 | 11,5 |

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

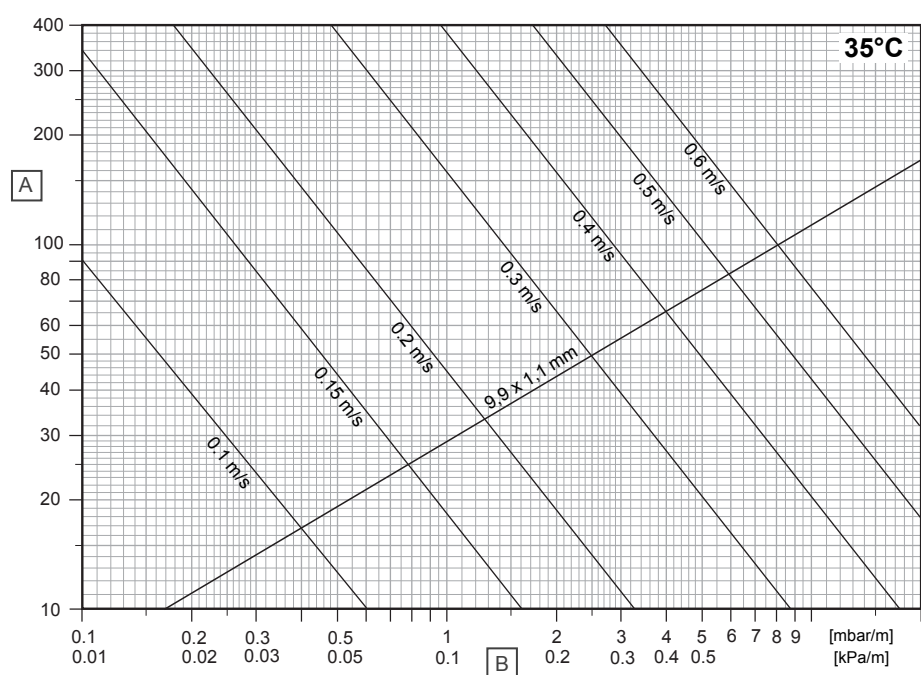
| T (cm) | $q_H (\text{W/m}^2)$ | $\Delta\theta_{H,N} (\text{K})$ |
|--------|----------------------|---------------------------------|
| 5 | 94,3 | 11,1 |
| 10 | 86,8 | 11,8 |
| 15 | 79,2 | 12,6 |

D - Cooling

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

¹⁾ Limit curve valid for $\vartheta_i 20^\circ\text{C}$ and $\vartheta_{F, \max} 29^\circ\text{C}$ or $\vartheta_i 24^\circ\text{C}$ and $\vartheta_{F, \max} 33^\circ\text{C}$

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

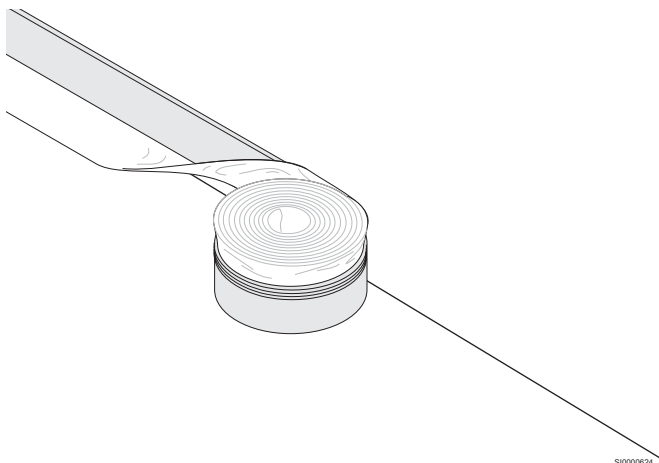


Note

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

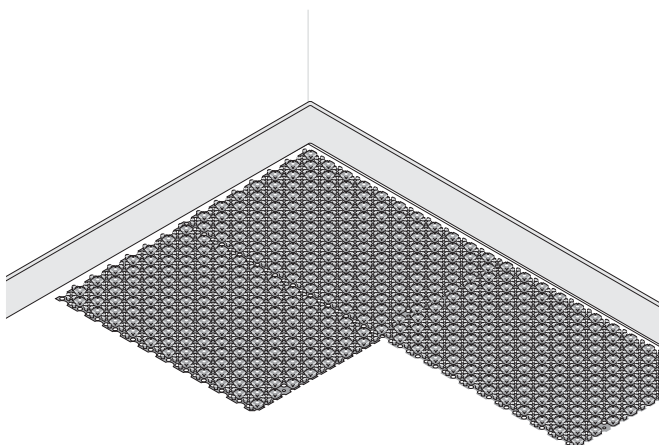
As a guidance, always read and follow the instructions given in respective Uponor installation manual.

1. Edging strip installation



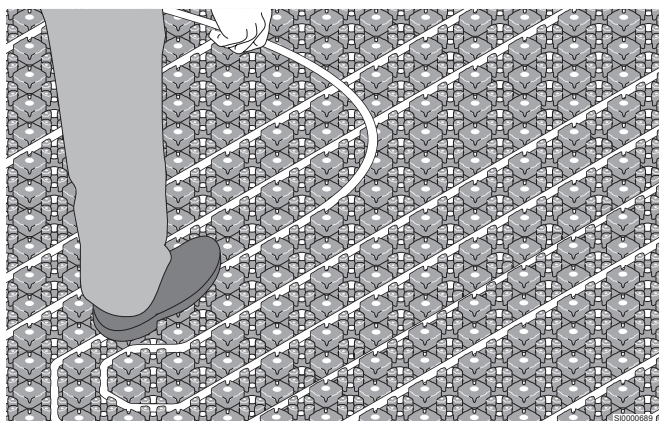
SI0000624

2. Panel installation



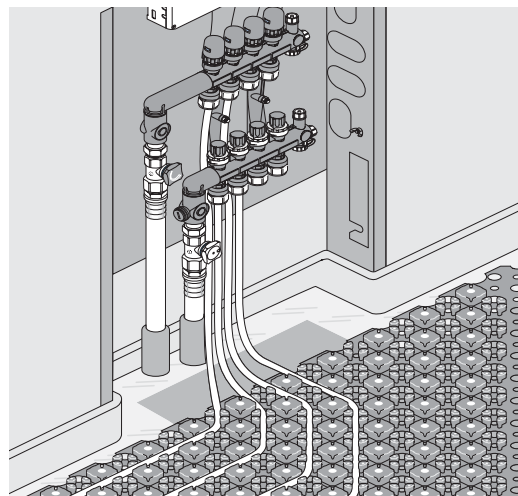
SI0000681

3. Pipe installation



SI0000689

4. Connecting pipes to the manifold



SI0000690

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 |
| Material | PE-Xa |
| 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 | 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) |



Uponor GmbH

Industriestraße 56,
D-97437 Hassfurt, Germany

1141747 v1_02_2024_EN
Production: Uponor/SKA

Uponor reserves the right to make changes, without prior notification,
to the specification of incorporated components in line with its policy of
continuous improvement and development.



www.uponor.com