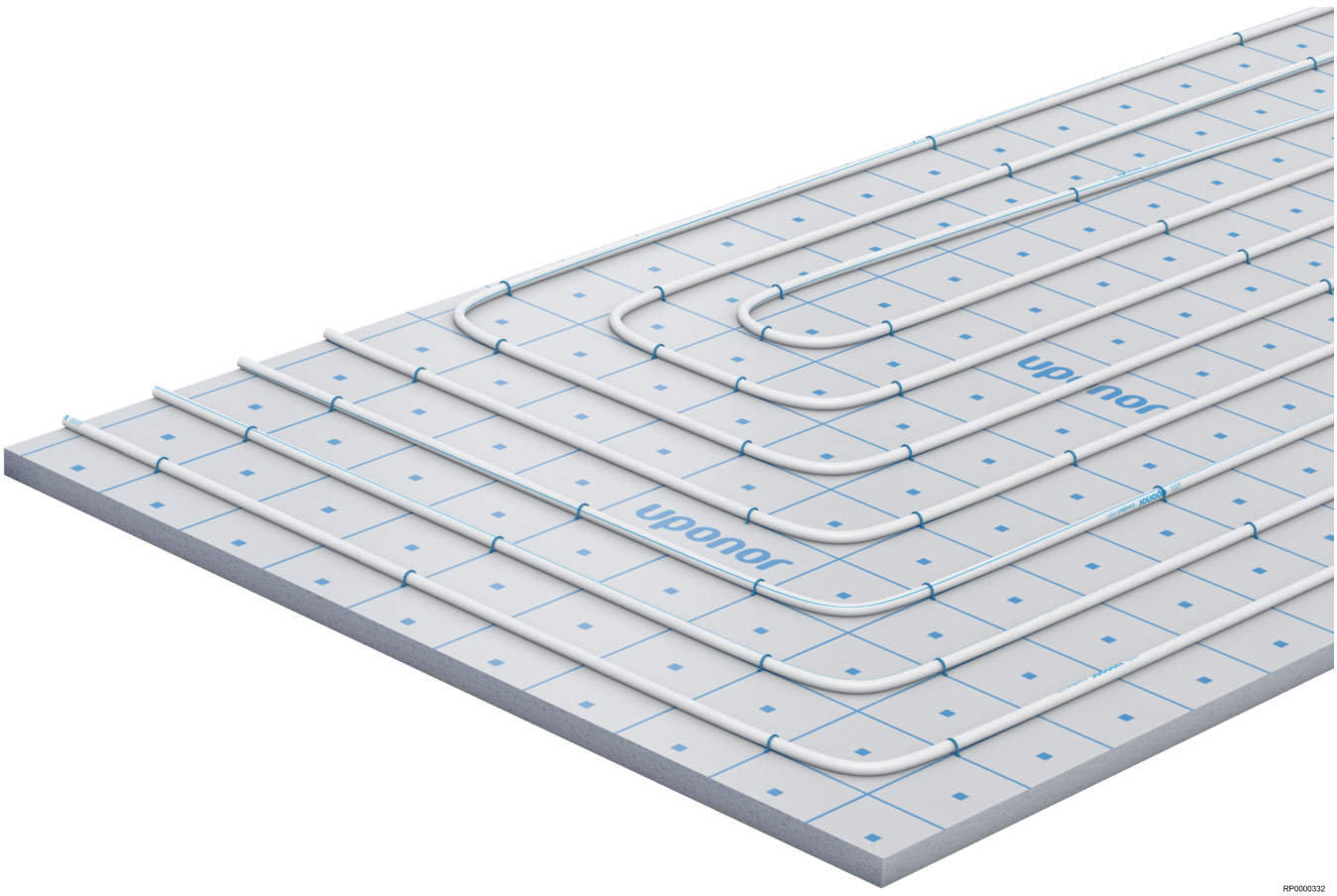
Uponor Tacker underfloor heating/ cooling system

EN Technical information



RP0000332

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1 System description

The Uponor Tacker is an economical underfloor heating and cooling system with components that fit together perfectly: Tacker panels with thermal and impact sound insulation are equipped with a tear-resistant surface and printed installation grid. This enables flexible and easy pipe installation with an oxygen diffusion barrier. A Universal pipe clip secures the pipe to the installation panel.

Flexible pipe routing means that the Uponor Tacker is ideal for rooms of any shape and provides comfortable heating across the floor. And the self-adhesive overlapping foil makes the Uponor Tacker suitable for cement and liquid screed.

1.1 Benefits

- **Easy and flexible**: very few optimally matched system components
- **Easy installation**: ergonomically designed Tacker tool
- **Versatile**: available in roll and panel formats with a variety of thermal and impact sound insulation layers
- **Secured**: universal pipe clips, adjusted in length to the different panel thicknesses to ensure a secure pipe position
- **Suitable**: low-height floor construction
- **Suitable**: can be used for all types of screeds

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 Tacker roll

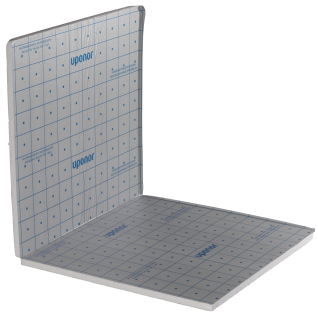
EPS DES

The Uponor Tacker roll is laminated, tear-resistant woven fabric film with printed installation grid and self-adhesive overlapping foil. It is available in versions 20-2, 30-2, 30-3, 35-3 and 40-3 and integrated with thermal and impact sound insulation as per DIN EN 13163 and DIN 4108-10. The foil covers the insulation layer as per DIN 18560.

The installation area is 1 x 10 m (10 m^2).

Uponor Tacker panel

EPS DEO



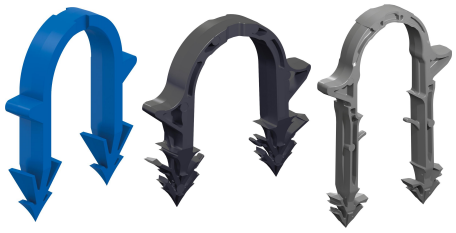
RP0000334

The Uponor Tacker panel is laminated, tear-resistant woven fabric film with printed installation grid and self-adhesive overlapping foil. It is available in versions 20-2, 30-2, 30-3, 35-3 and 40-3 for thermal insulation as per DIN EN 13163 and DIN 4108-10 and 20, 30 for without impact sound insulation.

The foil covers the insulation layer as per DIN 18560.

The installation area is 1 x 2 m (2 m^2).

Uponor Tacker clip

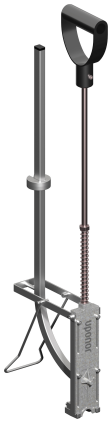


RP0000335

The Uponor Tacker clips are for fixing the Uponor pipes to the Uponor Tacker panels using an Uponor Tacker stapling tool.

They are available in three lengths: short (black), standard (blue) and long (grey), and the single-size clips fit for all pipe dimensions from 14 mm to 20 mm.

Uponor Tacker stapling tool



RP0000336

The Uponor Tacker stapling tool is ergonomic, accurate, and used with Uponor pipe clip magazines for reliable application.

High-capacity magazine with a curved design.

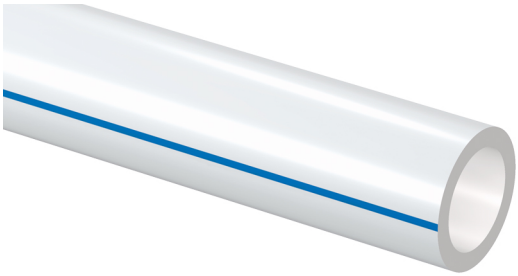
Uponor Comfort Pipe PLUS

RP0000302

Uponor Comfort Pipe PLUS is a highly flexible PE-Xa pipe with 5 layers available in the dimensions 14 x 2,0 mm, 16 x 2,0 mm, 17 x 2,0 mm and 20 x 2,0 mm.

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

Uponor Comfort Pipe



RP0000123

Uponor Comfort Pipe is a highly flexible PE-Xa pipe available in the dimension 16 x 1,8 mm.

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

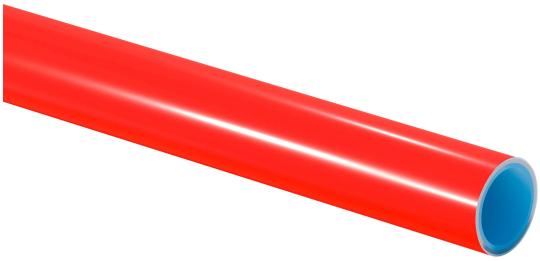
Uponor Smart UFH-pipe

RP0000347

Uponor Smart UFH-pipe is a PE-RT pipe and is an economical system for underfloor heating available in the dimensions 14 x 2,0 mm, 16 x 2,0 mm and 20 x 2,0 mm.

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

Uponor MLCP RED



RP0000337

Uponor MLCP RED is a composite pipe which is stable and easy to install, available in the dimensions 14 x 1,6 mm and 16 x 2,0 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.

RP0000338

Compression, Press, and Q&E joints are available to connect with respective pipes.

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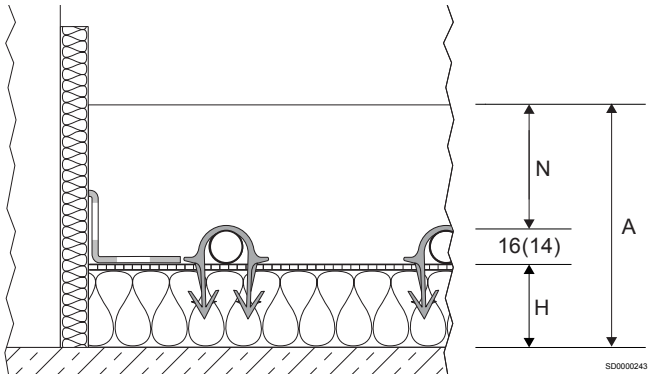
2 Planning/ design

2.1 Floor constructions



Item	Description
N	Minimum screed thickness
H	Insulation layer thickness (mm)
A	Structural height

As a result of combining insulations, the following constructions comply with the European minimum insulation requirements (refer to EN 1264-4 or EN 15377) for residential and non-residential buildings.

Additional planning information for special insulation requirements for non-residential buildings that deviate from this are described under “Thermal insulation requirements for radiant heating”.

The masses per unit area of the ceiling and the screed as well as the dynamic stiffness of the Uponor heat and impact sound insulation have to be considered in providing the proof of impact sound insulation. The rated impact sound improvement of the floorings is calculated from the weight per unit area of the screed and the dynamic stiffness of the insulation or indicated by an equivalent test report.

Floor construction tables

These abbreviations are used in the following construction tables:

Abbreviations	Description
CT	Cement screed
CAF	Anhydride liquid screed
ΔLw [dB]	Impact sound improvement factor of flooring
ΔLw,P [dB]	Impact sound improvement factor of tested flooring

Uponor Tacker 40-3

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of flooring ΔLw [dB]		Structural height A (2,0 kN/m²)[2]	
	H [mm]	$R_{\lambda, ins}$ [m² K/W]	CT N ≥ 45 [mm]	CAF[3] N ≥ 35 [mm]	CT N ≥ 45 [mm]	CAF[3] N ≥ 35 [mm]
Apartment ceiling separating heated rooms						
EN 1264-4	Tacker roll EPS DES 40 = 40	0,85	31	30	≥ 101 (99)	≥ 91 (89)
Floor slabs[1]), ceilings against unheated rooms in residential and non-residential buildings						
EN 1264-4	Tacker roll EPS DES 40 = 40 EPS 035 DEO dm 15 = 15 Total H = 55	1,28	31	30	≥ 116 (114)	≥ 106 (104)
Floor ceilings against outside air in residential and non-residential buildings (ϑi ≥ 19 °C)						
EN 1264-4	Tacker roll EPS DES 40 = 40 EPS 035 DEO dm 45 = 45 Total H = 85	2,14	31	30	≥ 146 (144)	≥ 136 (134)

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of flooring ΔLw [dB]		Structural height A (4,0 kN/m²)[2]	
	H [mm]	$R_{\lambda, ins}$ [m² K/W]	CT N ≥ 70 [mm]	CAF[3] N ≥ 60 [mm]	CT N ≥ 70 [mm]	CAF[3] N ≥ 60 [mm]
Apartment ceiling separating heated rooms						
EN 1264-4	Tacker roll EPS DES 40 = 40	0,85	33	32	≥ 126 (124)	≥ 116 (114)
Floor slabs[1], ceilings against unheated rooms in residential and non-residential buildings						
EN 1264-4	Tacker roll EPS DES 40 = 40 EPS 035 DEO dm 15 = 15 Total H = 55	1,28	33	32	≥ 141 (139)	≥ 131 (129)
Floor ceilings against outside air in residential and non-residential buildings (ϑi ≥ 19 °C)						
EN 1264-4	Tacker roll EPS DES 40 = 40 EPS 035 DEO dm 45 = 45 Total H = 85	2,14	33	32	≥ 171 (169)	≥ 161 (159)

[1] Observe additional construction height for structural waterproofing (refer to DIN 18533). Groundwater level ≥ 5 m.
[2] Observe dimensional tolerances at building site (refer to DIN 18202, Tab.2 and 3).
[3] Observe manufacturer's descriptions regarding the minimum screed thickness.

Uponor Tacker 35-3

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of flooring ΔLw [dB]		Structural height A (2,0 kN/m²)[2]	
	H [mm]	$R_{\lambda, ins}$ [m² K/W]	CT N ≥ 45 [mm]	CAF[3] N ≥ 35 [mm]	CT N ≥ 45 [mm]	CAF[3] N ≥ 35 [mm]
Apartment ceiling separating heated rooms						
EN 1264-4	Tacker roll EPS DES 35 = 35	0,75	31	30	≥ 96 (94)	≥ 86 (84)
Floor slabs[1], ceilings against unheated rooms in residential and non-residential buildings						
EN 1264-4	Tacker roll EPS DES 35 = 35 EPS 035 DEO dm 20 = 20 Total H = 55	1,32	31	30	≥ 116 (114)	≥ 106 (104)
Floor ceilings against outside air in residential and non-residential buildings (ϑi ≥ 19 °C)						
EN 1264-4	Tacker roll EPS DES 35 = 35 EPS 035 DEO dm 45 = 45 Total H = 80	2,04	31	30	≥ 141 (139)	≥ 131 (129)

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of flooring ΔLw [dB]		Structural height A (4,0 kN/m²)[2]	
	H [mm]	$R_{\lambda, ins}$ [m² K/W]	CT N ≥ 70 [mm]	CAF[3] N ≥ 60 [mm]	CT N ≥ 70 [mm]	CAF[3] N ≥ 60 [mm]
Apartment ceiling separating heated rooms						
EN 1264-4	Tacker roll EPS DES 35 = 35	0,75	33	32	≥ 121 (119)	≥ 111 (109)

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of flooring ΔLw [dB]		Structural height A (4,0 kN/m²)[2]	
	H [mm]	$R_{\lambda, ins}$ [m² K/W]	CT N ≥ 70 [mm]	CAF[3] N ≥ 60 [mm]	CT N ≥ 70 [mm]	CAF[3] N ≥ 60 [mm]
Floor slabs[1]), ceilings against unheated rooms in residential and non-residential buildings						
EN 1264-4	Tacker roll EPS DES 35 = 35 EPS 035 DEO dm 20 = 20 Total H = 55	1,32	33	32	≥ 141 (139)	≥ 131 (129)
Floor ceilings against outside air in residential and non-residential buildings (ϑi ≥ 19 °C)						
EN 1264-4	Tacker roll EPS DES 35 = 35 EPS 035 DEO dm 45 = 45 Total H = 80	2,04	33	32	≥ 166 (164)	≥ 156 (154)

[1] Observe additional construction height for structural waterproofing (refer to DIN 18533). Groundwater level ≥ 5 m.
[2] Observe dimensional tolerances at building site (refer to DIN 18202, Tab.2 and 3).
[3] Observe manufacturer's descriptions regarding the minimum screed thickness.

Uponor Tacker 30-2

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of flooring ΔLw [dB]		Structural height A (2,0 kN/m²)[2]	
	H [mm]	$R_{\lambda, ins}$ [m² K/W]	CT N ≥ 45 [mm]	CAF[3] N ≥ 35 [mm]	CT N ≥ 45 [mm]	CAF[3] N ≥ 35 [mm]
Apartment ceiling separating heated rooms						
EN 1264-4	Tacker roll EPS DES 30 = 30	0,75	29	28	≥ 91 (89)	≥ 81 (79)
Floor slabs[1]), ceilings against unheated rooms in residential and non-residential buildings						
EN 1264-4	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 20 = 20 Total H = 50	1,32	29	28	≥ 111 (109)	≥ 101 (99)
Floor ceilings against outside air in residential and non-residential buildings (ϑi ≥ 19 °C)						
EN 1264-4	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 45 = 45 Total H = 75	2,04	29	28	≥ 136 (134)	≥ 126 (124)

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of flooring ΔLw [dB]		Structural height A (5,0 kN/m²)[2]	
	H [mm]	$R_{\lambda, ins}$ [m² K/W]	CT N ≥ 75 [mm]	CAF[3] N ≥ 65 [mm]	CT N ≥ 75 [mm]	CAF[3] N ≥ 65 [mm]
Apartment ceiling separating heated rooms						
EN 1264-4	Tacker roll EPS DES 30 = 30	0,75	32	31	≥ 121 (119)	≥ 111 (109)
Floor slabs[1]), ceilings against unheated rooms in residential and non-residential buildings						
EN 1264-4	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 20 = 20 Total H = 50	1,32	32	31	≥ 141 (139)	≥ 131 (129)

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of flooring ΔLw [dB]		Structural height A (5,0 kN/m²)[2]	
	H [mm]	$R_{\lambda, ins}$ [m² K/W]	CT N ≥ 75 [mm]	CAF[3] N ≥ 65 [mm]	CT N ≥ 75 [mm]	CAF[3] N ≥ 65 [mm]
Floor ceilings against outside air in residential and non-residential buildings (ϑi ≥ 19 °C)						
EN 1264-4	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 45 = 45 Total H = 75	2,04	32	31	≥ 166 (164)	≥ 156 (154)

[1] Observe additional construction height for structural waterproofing (refer to DIN 18533). Groundwater level ≥ 5 m.
[2] Observe dimensional tolerances at building site (refer to DIN 18202, Tab.2 and 3).
[3] Observe manufacturer's descriptions regarding the minimum screed thickness.

Uponor Tacker 30-3

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of tested flooring ΔLw,P [dB]		Structural height A (2,0 kN/m²)[2]	
	H [mm]	$R_{\lambda, ins}$ [m² K/W]	CT N ≥ 45 [mm]	CAF[3] N ≥ 35 [mm]	CT N ≥ 45 [mm]	CAF[3] N ≥ 35 [mm]
Apartment ceiling separating heated rooms						
EN 1264-4	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 10 = 10 Total H = 40	0,94	29	28	≥ 101 (99)	≥ 91 (89)
Floor slabs[1]), ceilings against unheated rooms in residential and non-residential buildings						
EN 1264-4	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 25 = 25 Total H = 55	1,36	29	28	≥ 116 (114)	≥ 106 (104)
Floor ceilings against outside air in residential and non-residential buildings (ϑi ≥ 19 °C)						
EN 1264-4	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 50 = 50 Total H = 80	2,08	29	28	≥ 141 (139)	≥ 131 (129)

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of tested flooring ΔLw,P [dB]		Structural height A (5,0 kN/m²)[2]	
	H [mm]	$R_{\lambda, ins}$ [m² K/W]	CT N ≥ 75 [mm]	CAF[3] N ≥ 65 [mm]	CT N ≥ 75 [mm]	CAF[3] N ≥ 65 [mm]
Apartment ceiling separating heated rooms						
EN 1264-4	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 10 = 10 Total H = 40	0,94	31	31	≥ 126 (124)	≥ 116 (114)
Floor slabs[1]), ceilings against unheated rooms in residential and non-residential buildings						
EN 1264-4	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 25 = 25 Total H = 55	1,36	31	31	≥ 141 (139)	≥ 131 (129)
Floor ceilings against outside air in residential and non-residential buildings (ϑi ≥ 19 °C)						
EN 1264-4	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 50 = 50 Total H = 80	2,08	31	31	≥ 166 (164)	≥ 156 (154)

[1] Observe additional construction height for structural waterproofing (refer to DIN 18533). Groundwater level ≥ 5 m.
[2] Observe dimensional tolerances at building site (refer to DIN 18202, Tab.2 and 3).
[3] Observe manufacturer's descriptions regarding the minimum screed thickness.

Uponor Tacker 20-2

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of flooring ΔLw [dB]		Structural height A (2,0 kN/m²)[2]	
	H [mm]	$R_{\lambda, ins}$ [m² K/W]	CT N ≥ 45 [mm]	CAF[3] N ≥ 35 [mm]	CT N ≥ 45 [mm]	CAF[3] N ≥ 35 [mm]
Apartment ceiling separating heated rooms						
EN 1264-4	Tacker roll EPS DES 20 = 20 EPS 035 DEO dm 10 = 10 Total H = 30	0,79	27	26	≥ 91 (89)	≥ 81 (79)
Floor slabs[1], ceilings against unheated rooms in residential and non-residential buildings						
EN 1264-4	Tacker roll EPS DES 20 = 20 EPS 035 DEO dm 30 = 30 Total H = 50	1,36	27	26	≥ 111 (109)	≥ 101 (99)
Floor ceilings against outside air in residential and non-residential buildings (ϑi ≥ 19 °C)						
EN 1264-4	Tacker roll EPS DES 20 = 20 EPS 035 DEO dm 55 = 55 Total H = 75	2,07	27	26	≥ 136 (134)	≥ 126 (124)

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of flooring ΔLw [dB]		Structural height A (5,0 kN/m²)[2]	
	H [mm]	$R_{\lambda, ins}$ [m² K/W]	CT N ≥ 75 [mm]	CAF[3] N ≥ 65 [mm]	CT N ≥ 75 [mm]	CAF[3] N ≥ 65 [mm]
Apartment ceiling separating heated rooms						
EN 1264-4	Tacker roll EPS DES 20 = 20 EPS 035 DEO dm 10 = 10 Total H = 30	0,79	29	28	≥ 131 (129)	≥ 111 (109)
Floor slabs[1], ceilings against unheated rooms in residential and non-residential buildings						
EN 1264-4	Tacker roll EPS DES 20 = 20 EPS 035 DEO dm 30 = 30 Total H = 50	1,36	29	28	≥ 141 (139)	≥ 131 (129)
Floor ceilings against outside air in residential and non-residential buildings (ϑi ≥ 19 °C)						
EN 1264-4	Tacker roll EPS DES 20 = 20 EPS 035 DEO dm 55 = 55 Total H = 75	2,07	29	28	≥ 166 (164)	≥ 156 (154)

[1] Observe additional construction height for structural waterproofing (refer to DIN 18533). Groundwater level ≥ 5 m.
[2] Observe dimensional tolerances at building site (refer to DIN 18202, Tab.2 and 3).
[3] Observe manufacturer's descriptions regarding the minimum screed thickness.

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

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

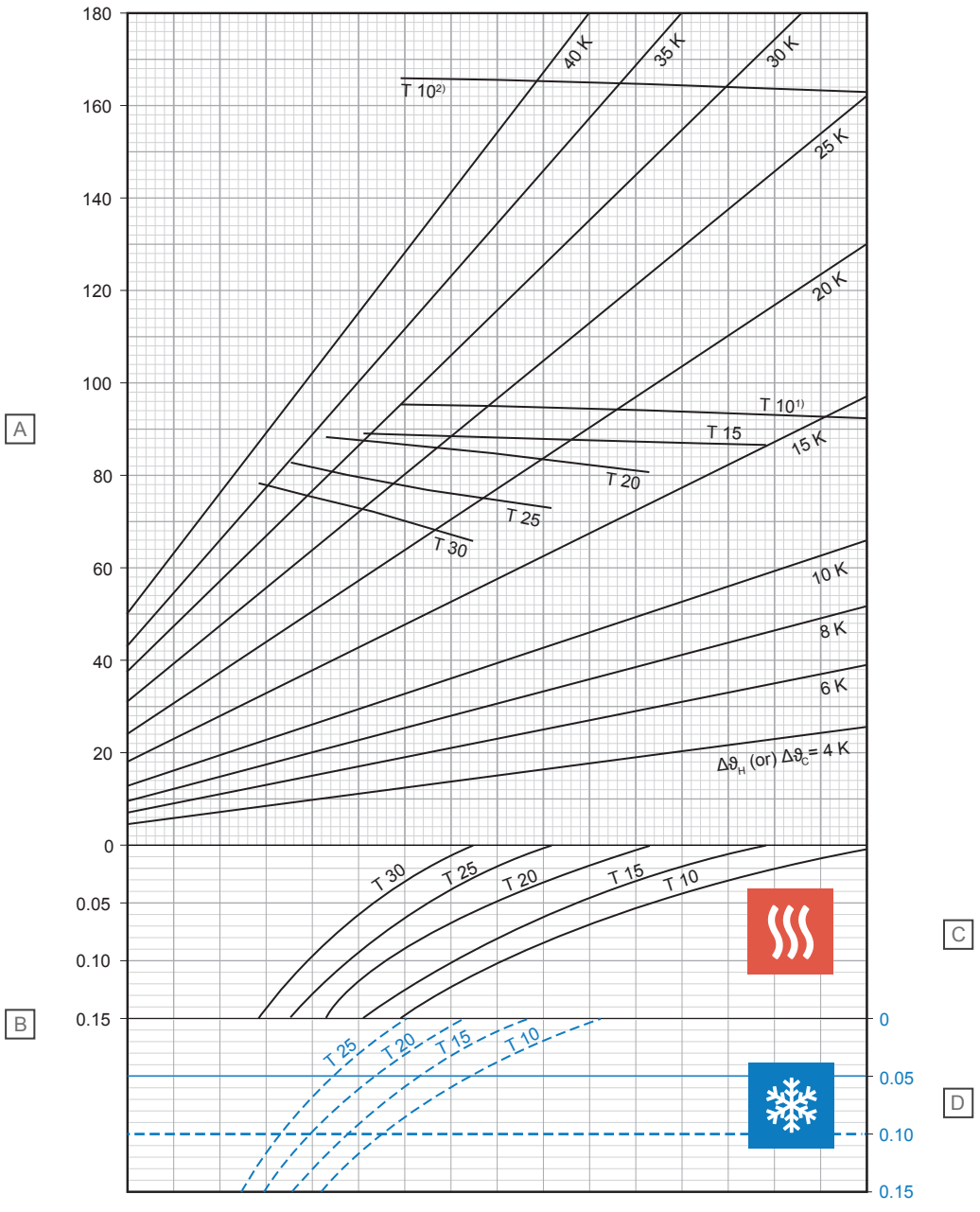
The following diagrams results are accurate and in accordance with EN 1264.

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 carped 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 Comfort Pipe PLUS 14 x 2,0 mm with screed load distribution layer (su = 35 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	92,3	13,7
15	86,4	15,0
20	80,5	16,3
25	72,9	17,2
30	65,5	17,9

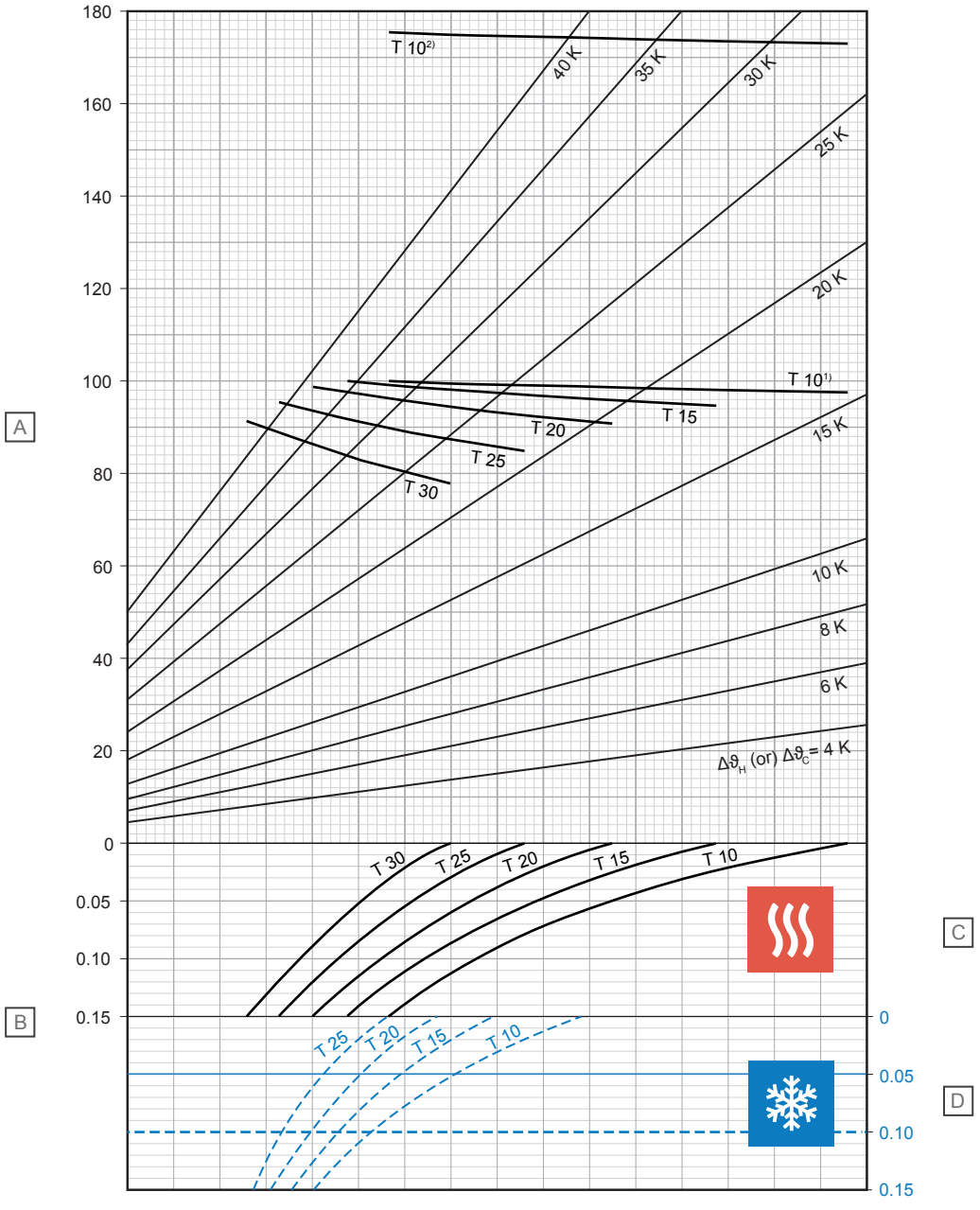
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	37,0	8
15	32,7	8
20	29,0	8
25	25,8	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

[2] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Comfort Pipe PLUS 14 x 2,0 mm with screed load distribution layer (su = 45 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	97,7	15,4
15	94,8	17,5
20	90,9	19,4
25	84,9	20,9
30	77,7	22,0

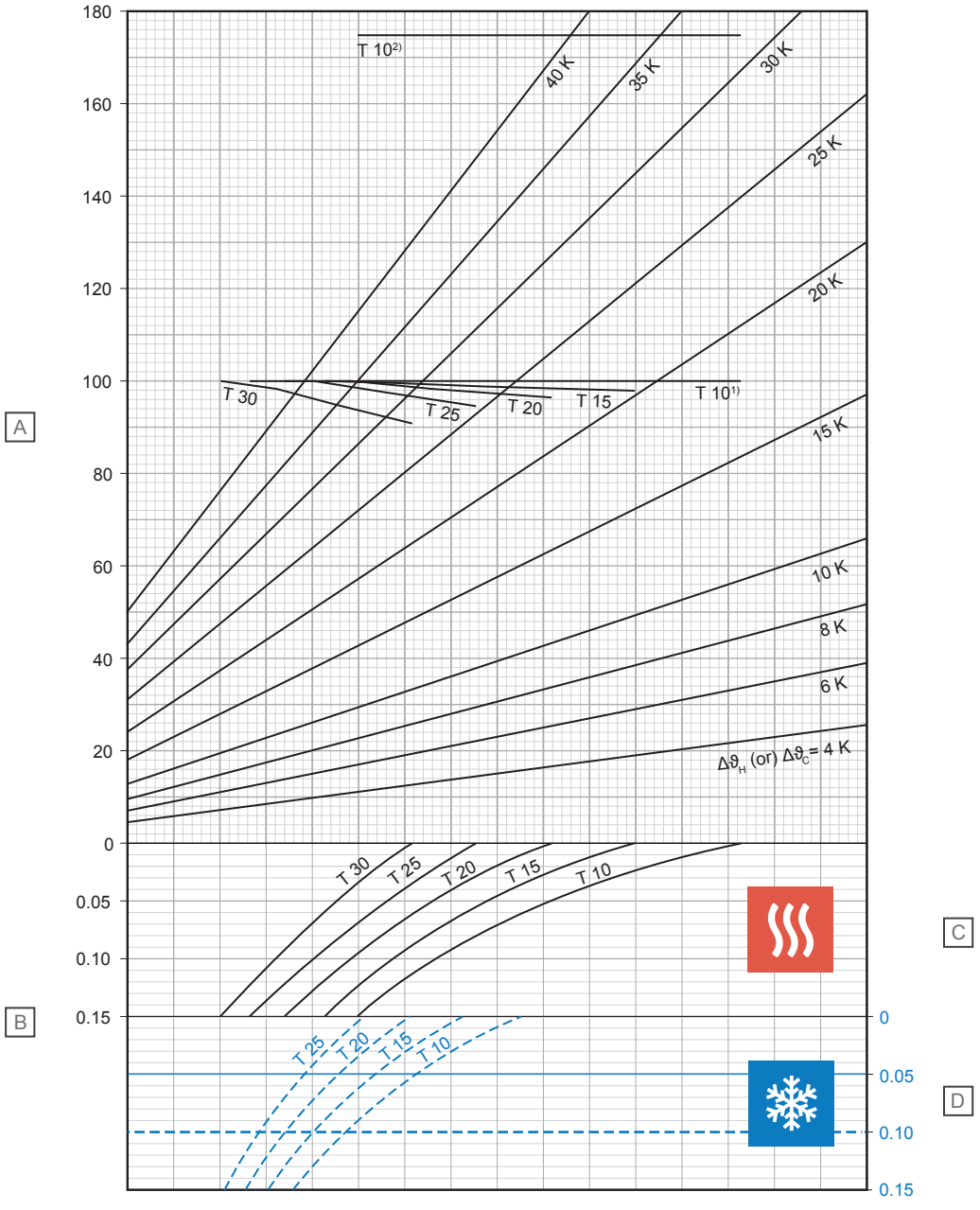
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	35,4	8
15	31,4	8
20	28,0	8
25	24,9	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Comfort Pipe PLUS 14 x 2,0 mm with screed load distribution layer (su = 65 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	17,9
15	98,1	20,2
20	96,6	22,7
25	94,7	25,5
30	90,9	27,9

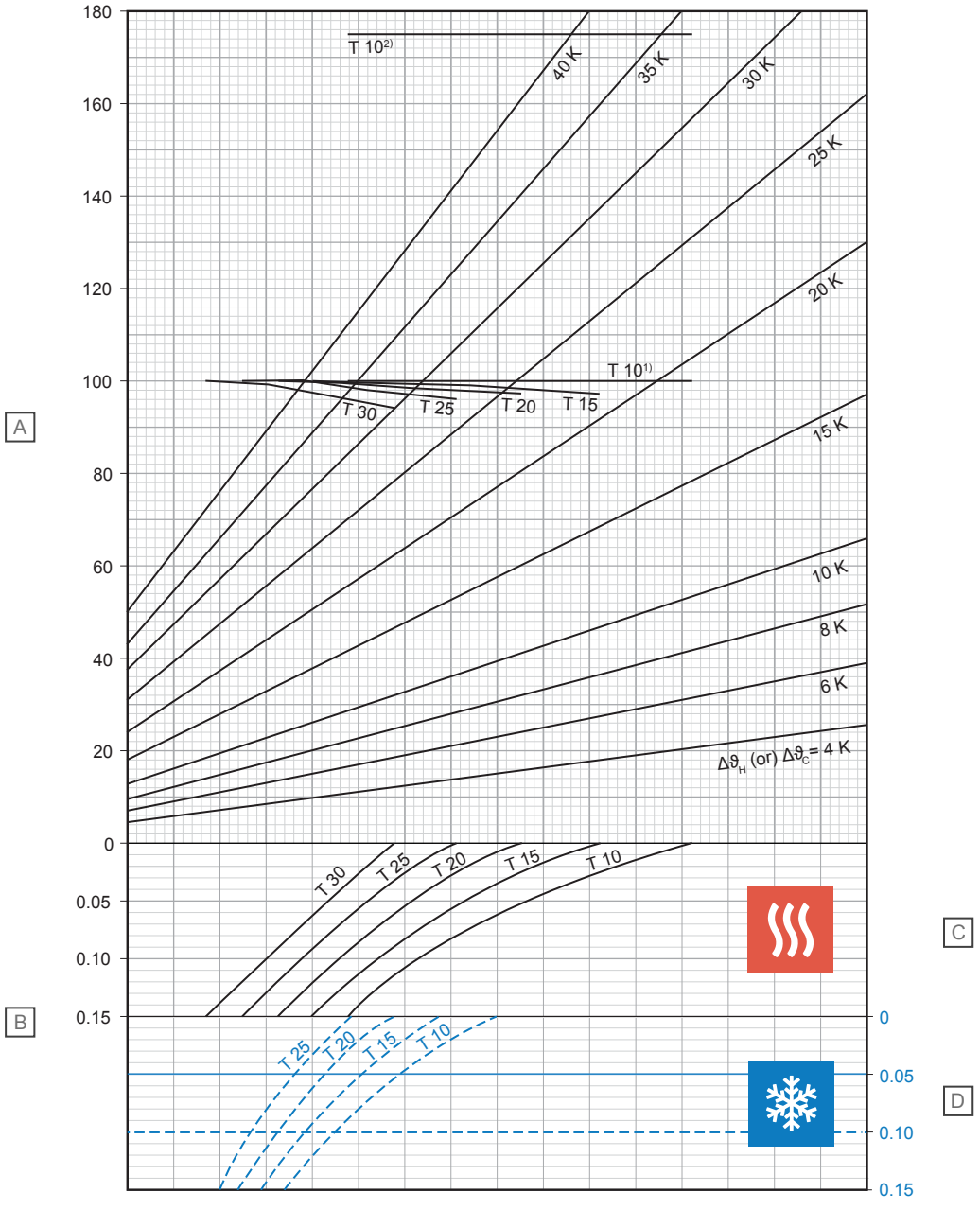
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	32,3	8
15	28,9	8
20	26	8
25	23,3	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Comfort Pipe PLUS 14 x 2,0 mm with screed load distribution layer (su = 75 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	19,0
15	98,8	21,5
20	97,5	24,1
25	96,1	27,0
30	94,2	30,0

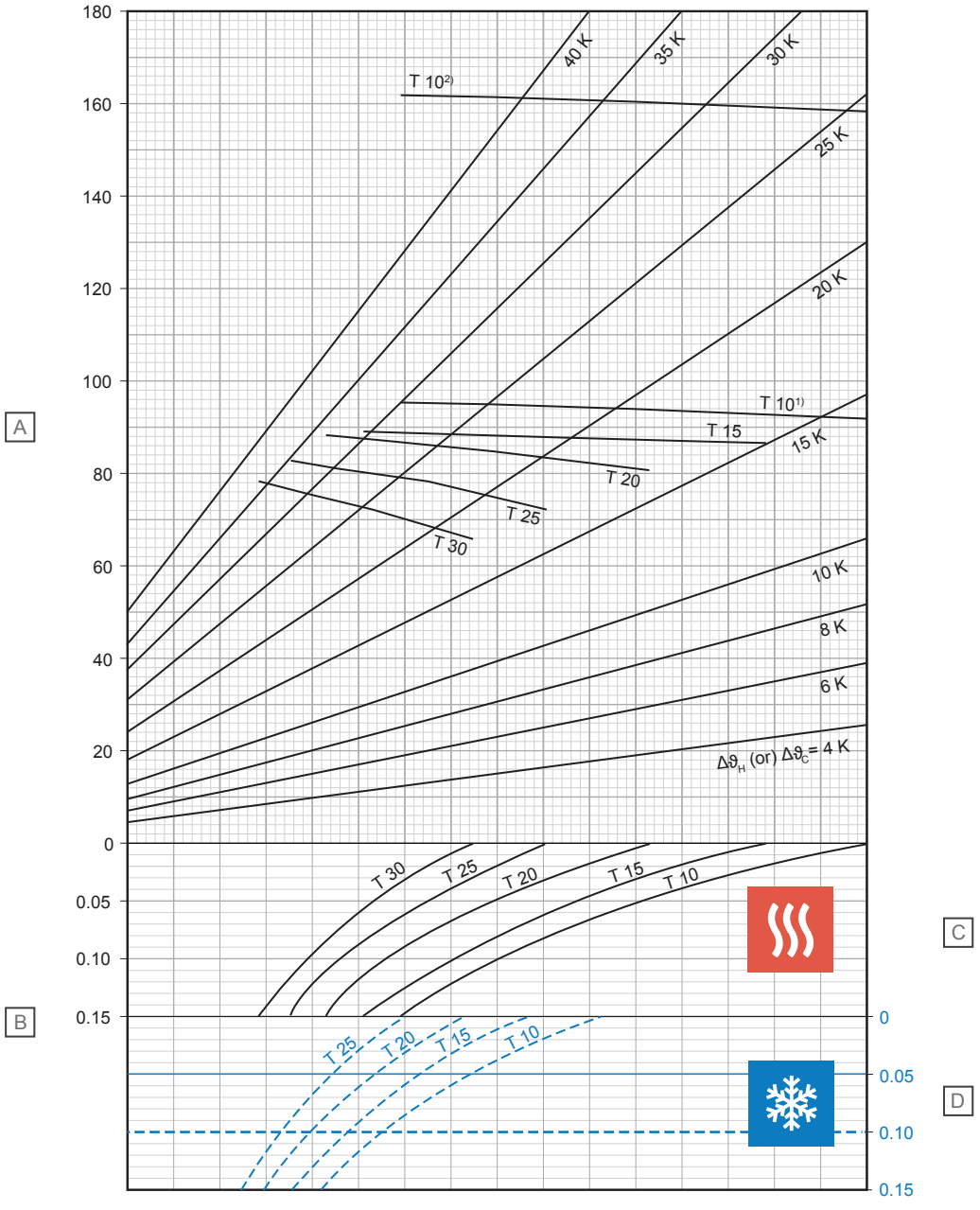
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	30,9	8
15	27,8	8
20	25,0	8
25	22,6	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

[2] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Comfort Pipe PLUS 16 x 2,0 mm with screed load distribution layer (su = 35 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	92,2	13,5
15	86,2	14,7
20	80,3	15,9
25	72,5	16,7
30	64,9	17,3

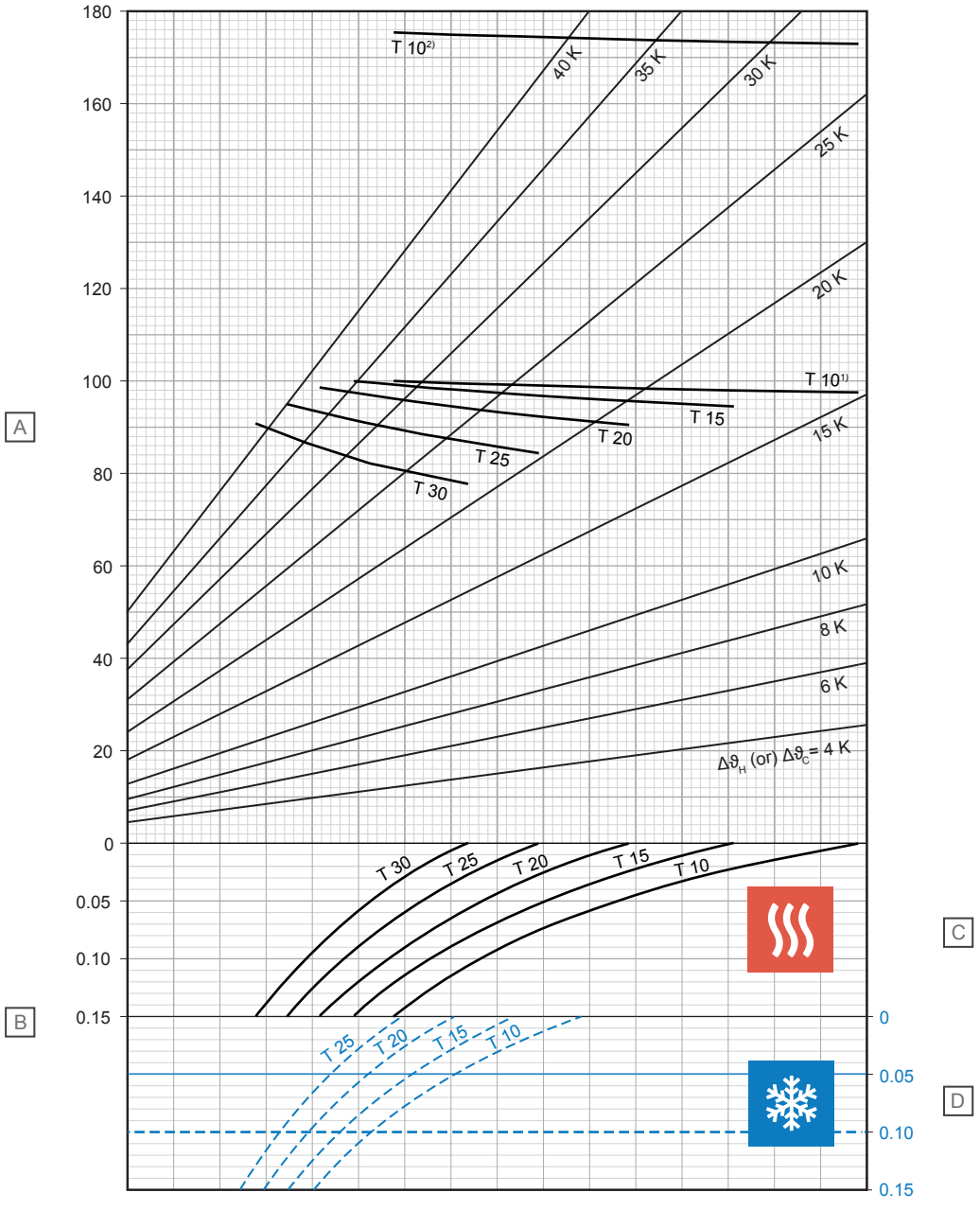
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	37,4	8
15	33,2	8
20	29,6	8
25	26,3	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Comfort Pipe PLUS 16 x 2,0 mm with screed load distribution layer (su = 45 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	97,7	15,2
15	94,7	17,1
20	90,6	18,9
25	84,4	20,3
30	77,0	21,3

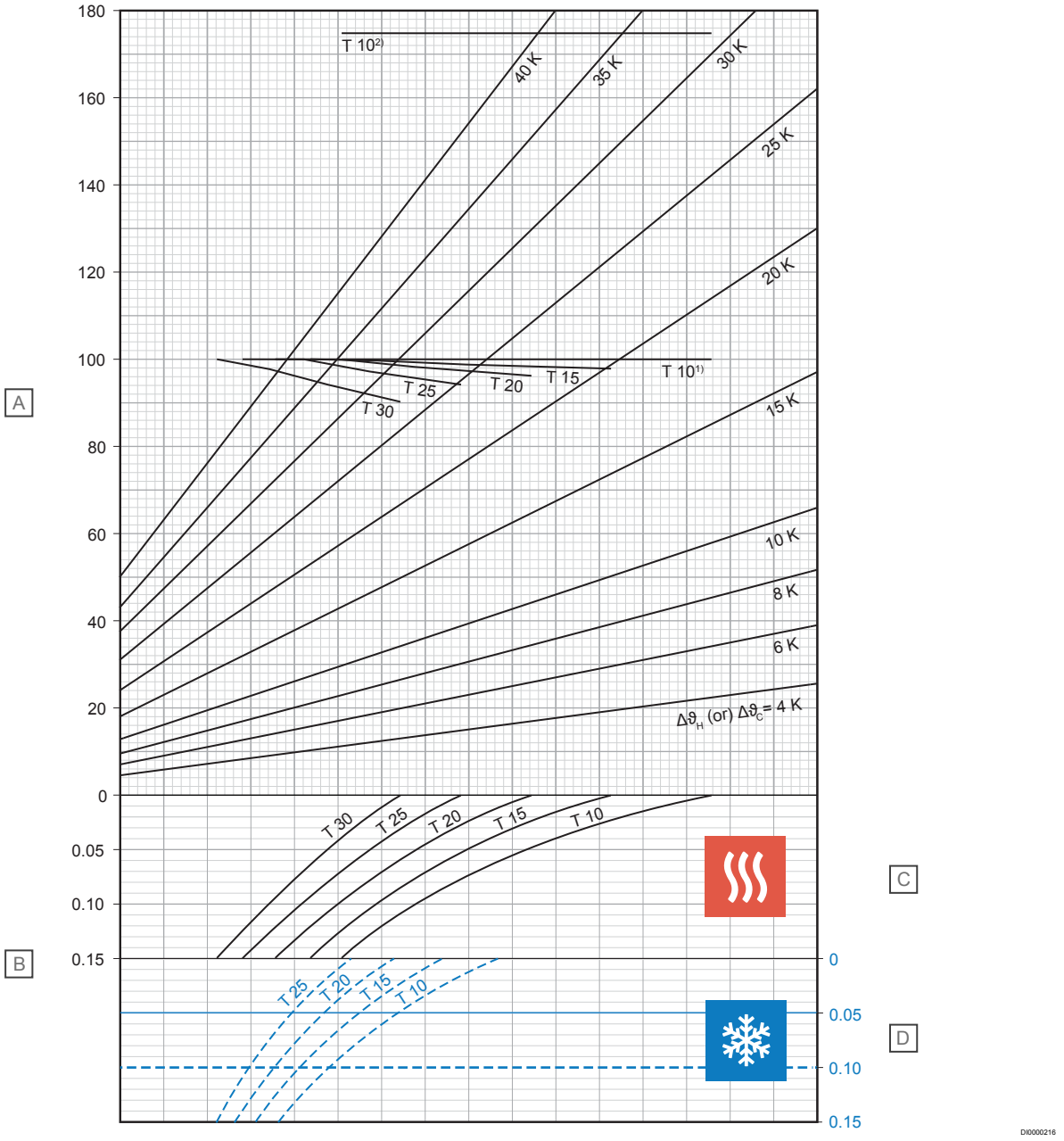
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	35,8	8
15	31,9	8
20	28,5	8
25	25,4	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

[2] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Comfort Pipe PLUS 16 x 2,0 mm with screed load distribution layer (su = 65 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	17,6
15	98,0	19,8
20	96,4	22,2
25	94,3	24,8
30	90,3	27,0

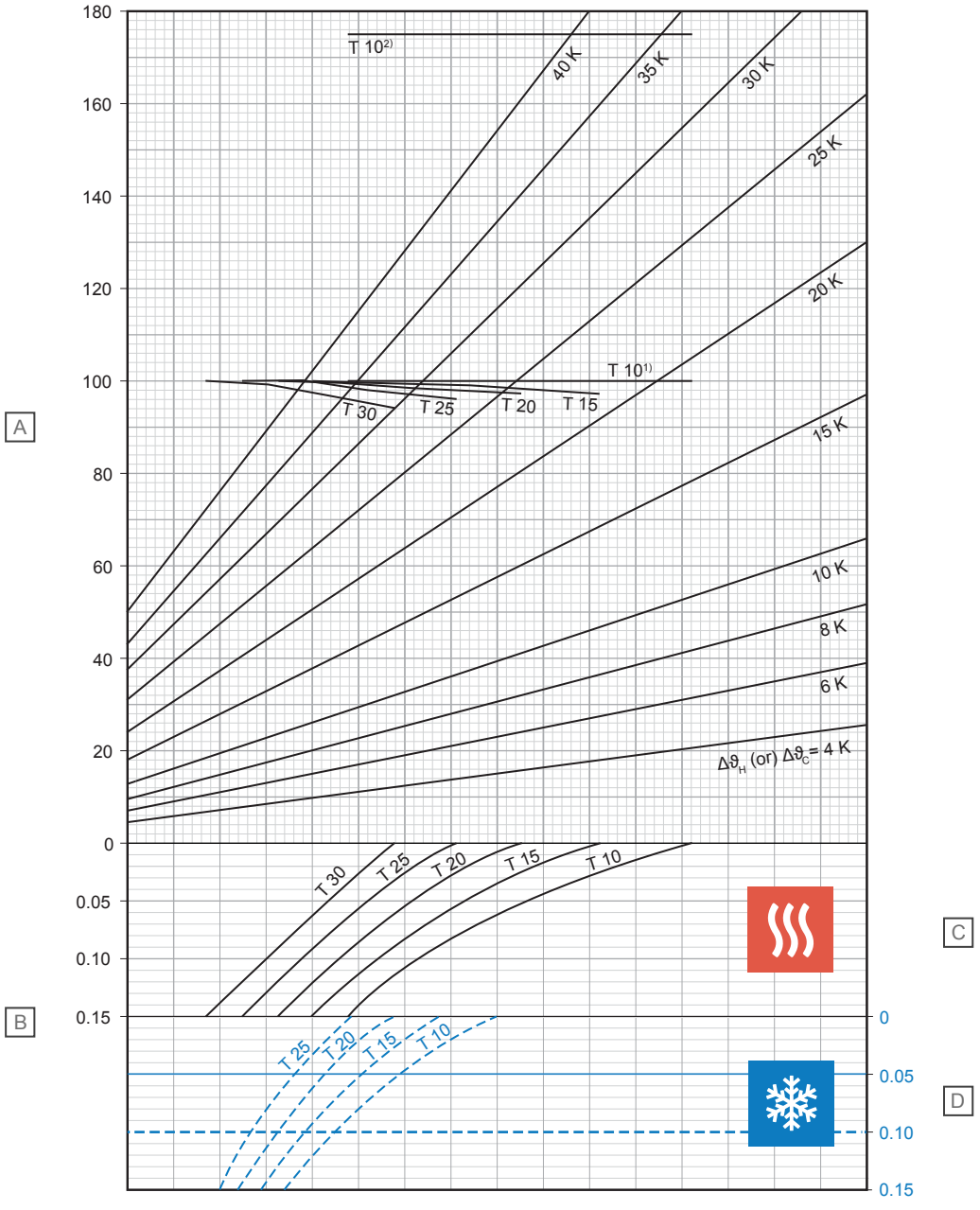
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	32,7	8
15	29,4	8
20	26,4	8
25	23,8	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

[2] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Comfort Pipe PLUS 16 x 2,0 mm with screed load distribution layer (su = 75 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	18,7
15	98,8	21,1
20	97,3	23,6
25	95,9	26,3
30	93,8	29,1

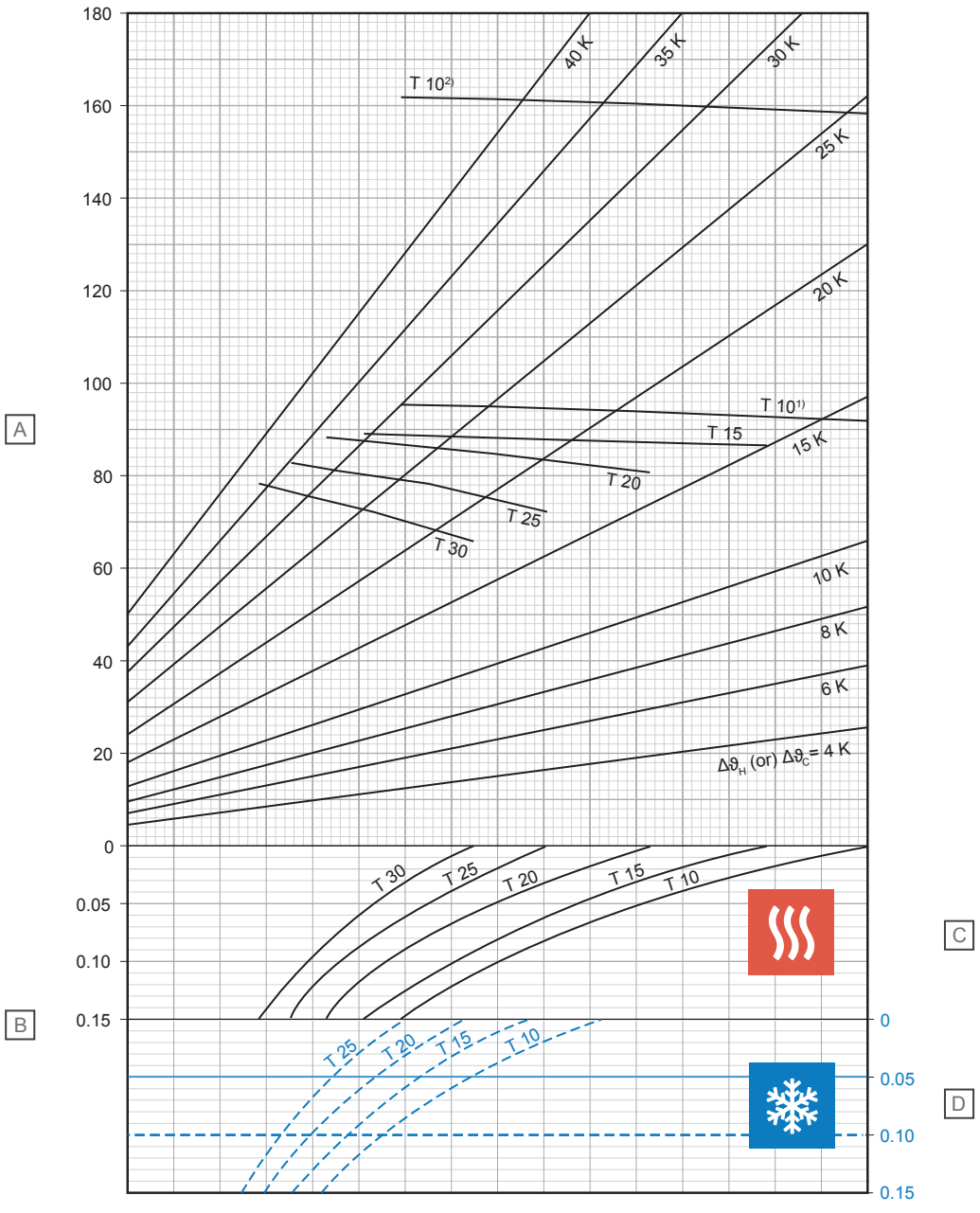
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	31,3	8
15	28,2	8
20	25,5	8
25	23,0	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Comfort Pipe PLUS 17 x 2,0 mm with screed load distribution layer (su = 35 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	92,2	13,4
15	86,2	14,6
20	80,1	15,7
25	72,3	16,4
30	64,7	17,0

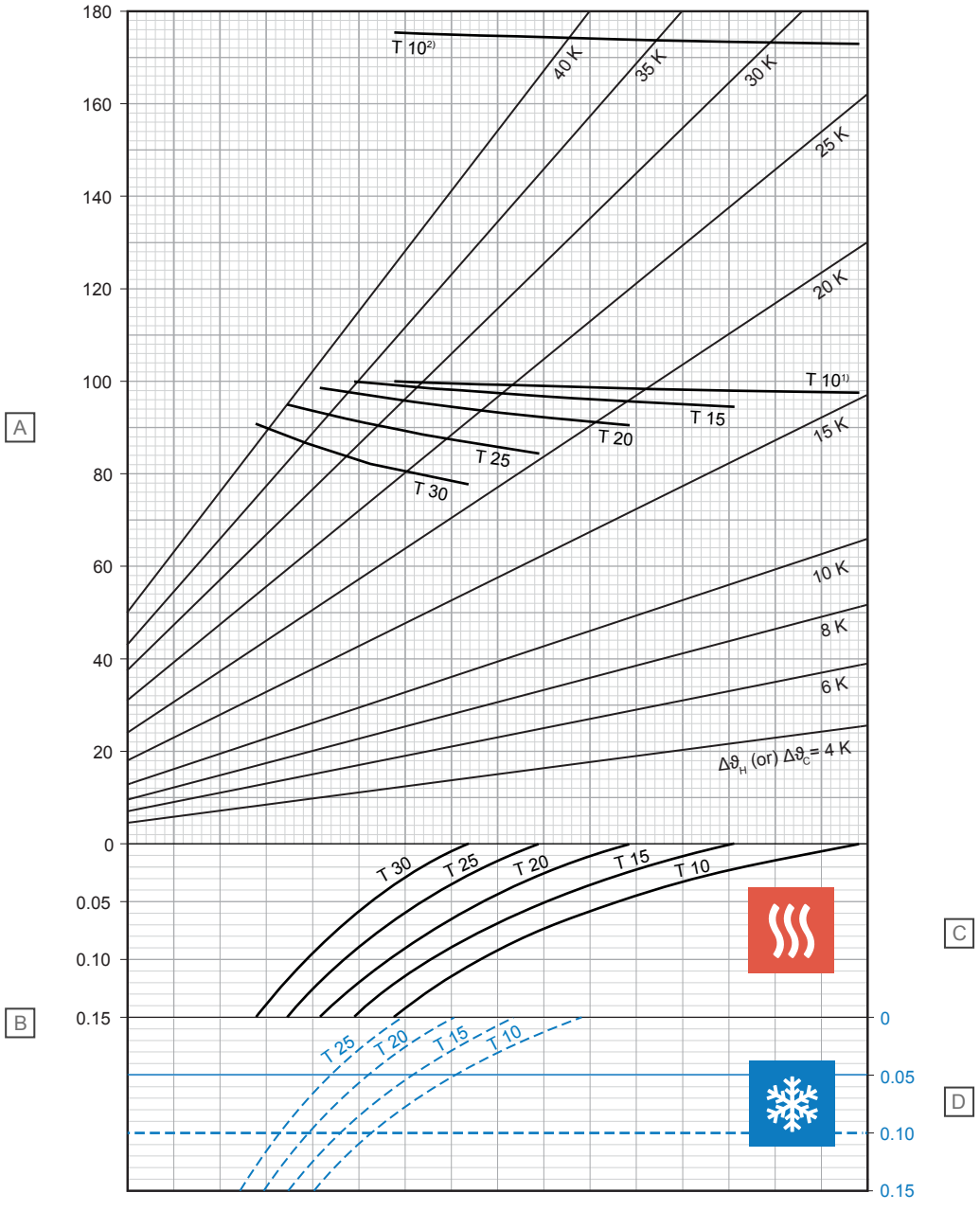
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	37,6	8
15	33,5	8
20	29,8	8
25	26,6	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

[2] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Comfort Pipe PLUS 17 x 2,0 mm with screed load distribution layer (su = 45 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	97,7	15,1
15	94,6	16,9
20	90,4	18,6
25	84,2	20,0
30	76,7	20,9

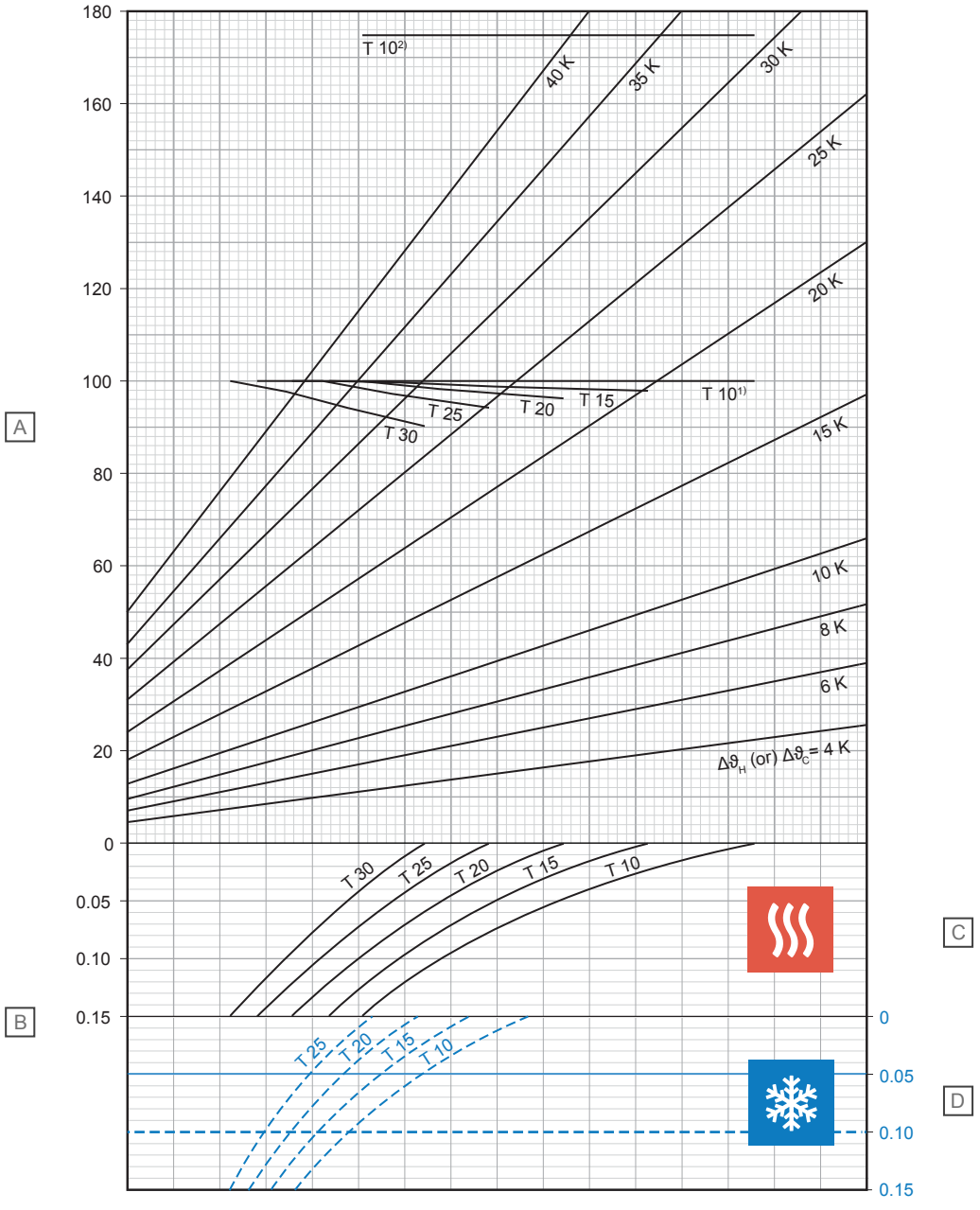
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	36,0	8
15	32,1	8
20	28,7	8
25	25,7	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Comfort Pipe PLUS 17 x 2,0 mm with screed load distribution layer (su = 65 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	17,5
15	98,0	19,6
20	96,3	21,9
25	94,1	24,4
30	90,0	26,6

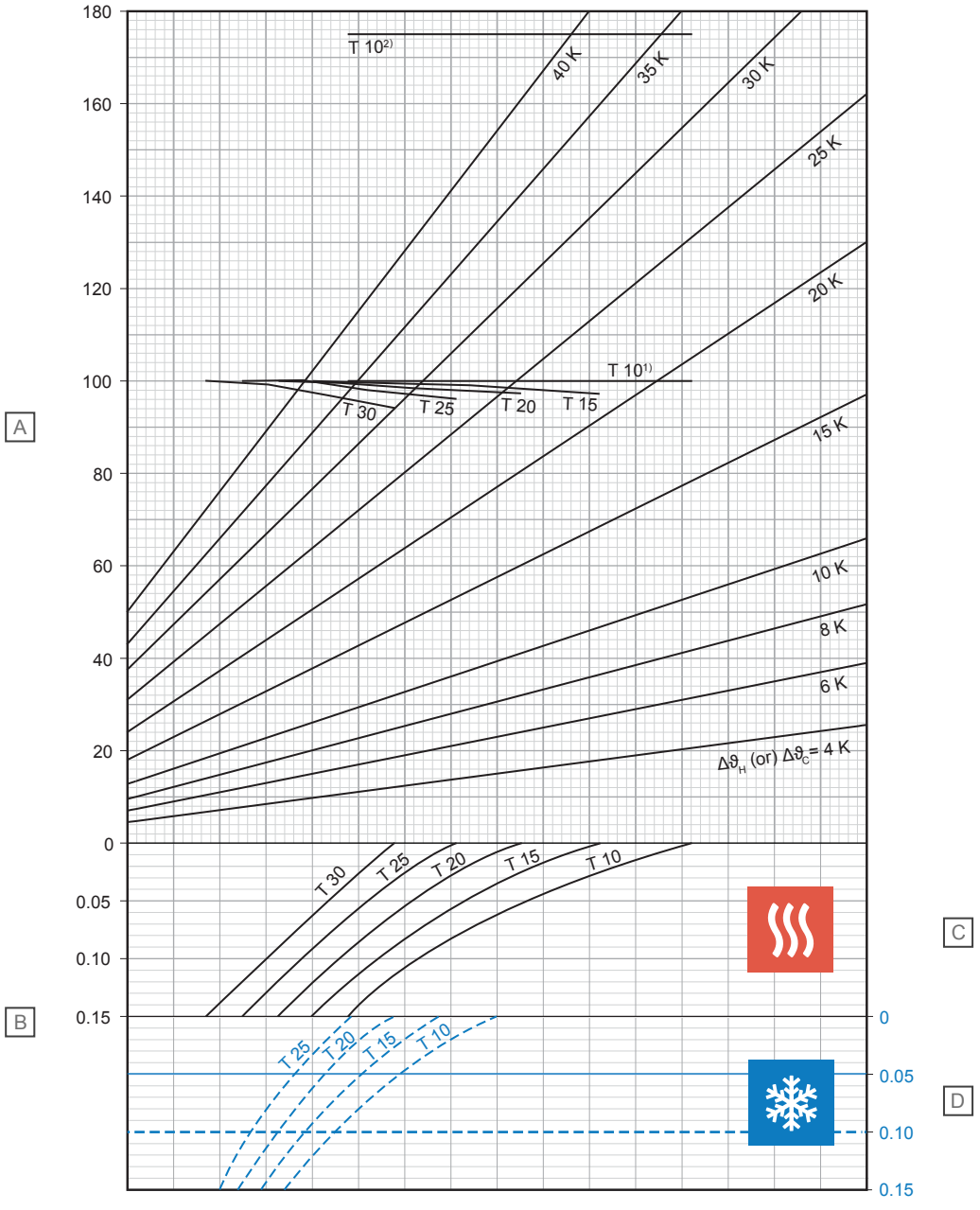
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	32,9	8
15	29,6	8
20	26,7	8
25	24,1	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Comfort Pipe PLUS 17 x 2,0 mm with screed load distribution layer (su = 75 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	18,6
15	98,7	20,8
20	97,3	23,3
25	95,8	25,9
30	93,5	28,7

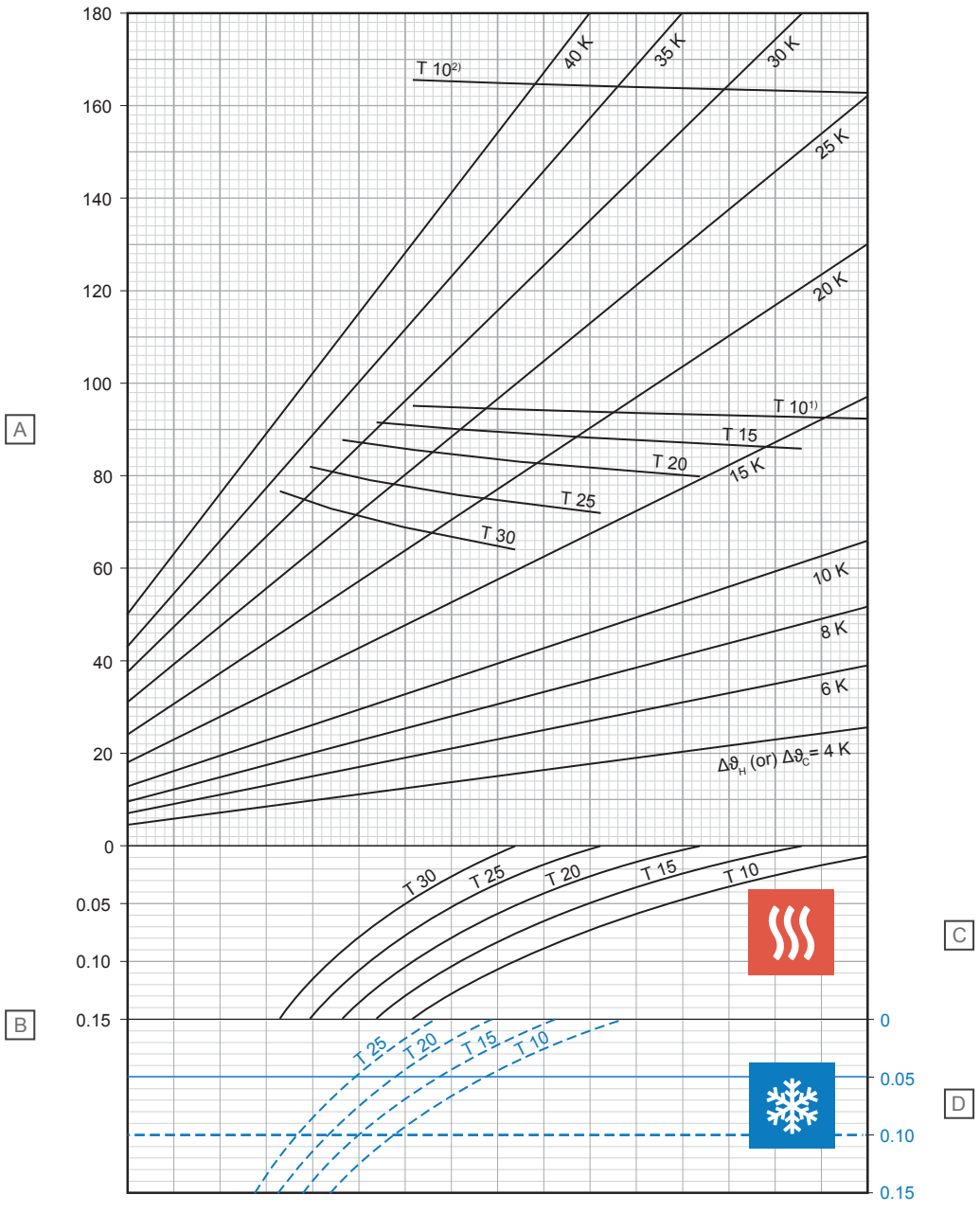
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	31,4	8
15	28,4	8
20	25,7	8
25	23,3	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Comfort Pipe PLUS 20 x 2,0 mm with screed load distribution layer (su = 35 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	92,1	13,1
15	85,9	14,1
20	79,7	15,1
25	71,8	15,7
30	63,8	16,1

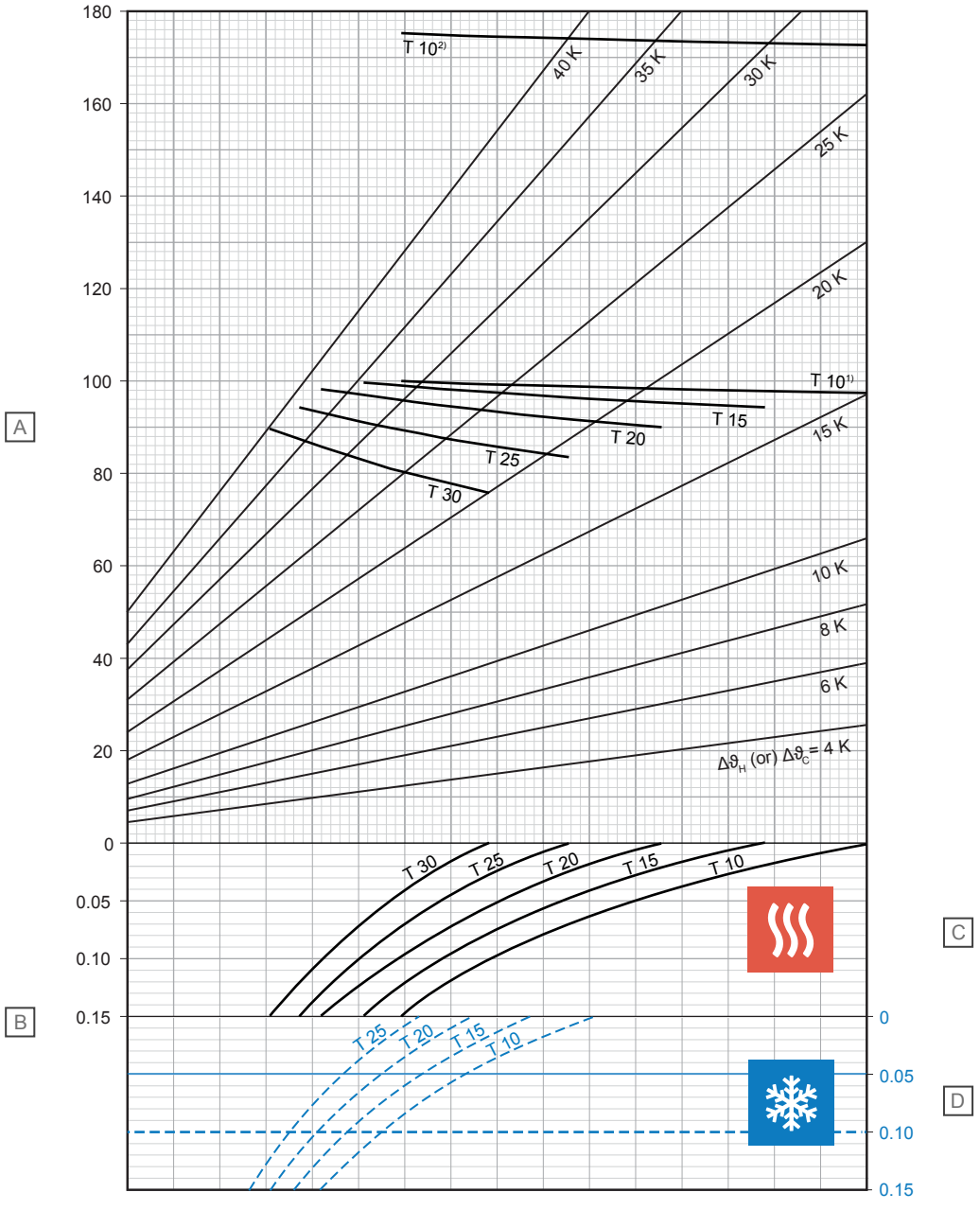
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	38,2	8
15	34,2	8
20	30,6	8
25	27,4	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

[2] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Comfort Pipe PLUS 20 x 2,0 mm with screed load distribution layer (su = 45 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	97,6	14,8
15	94,4	16,4
20	90,0	17,9
25	83,5	19,1
30	75,7	19,9

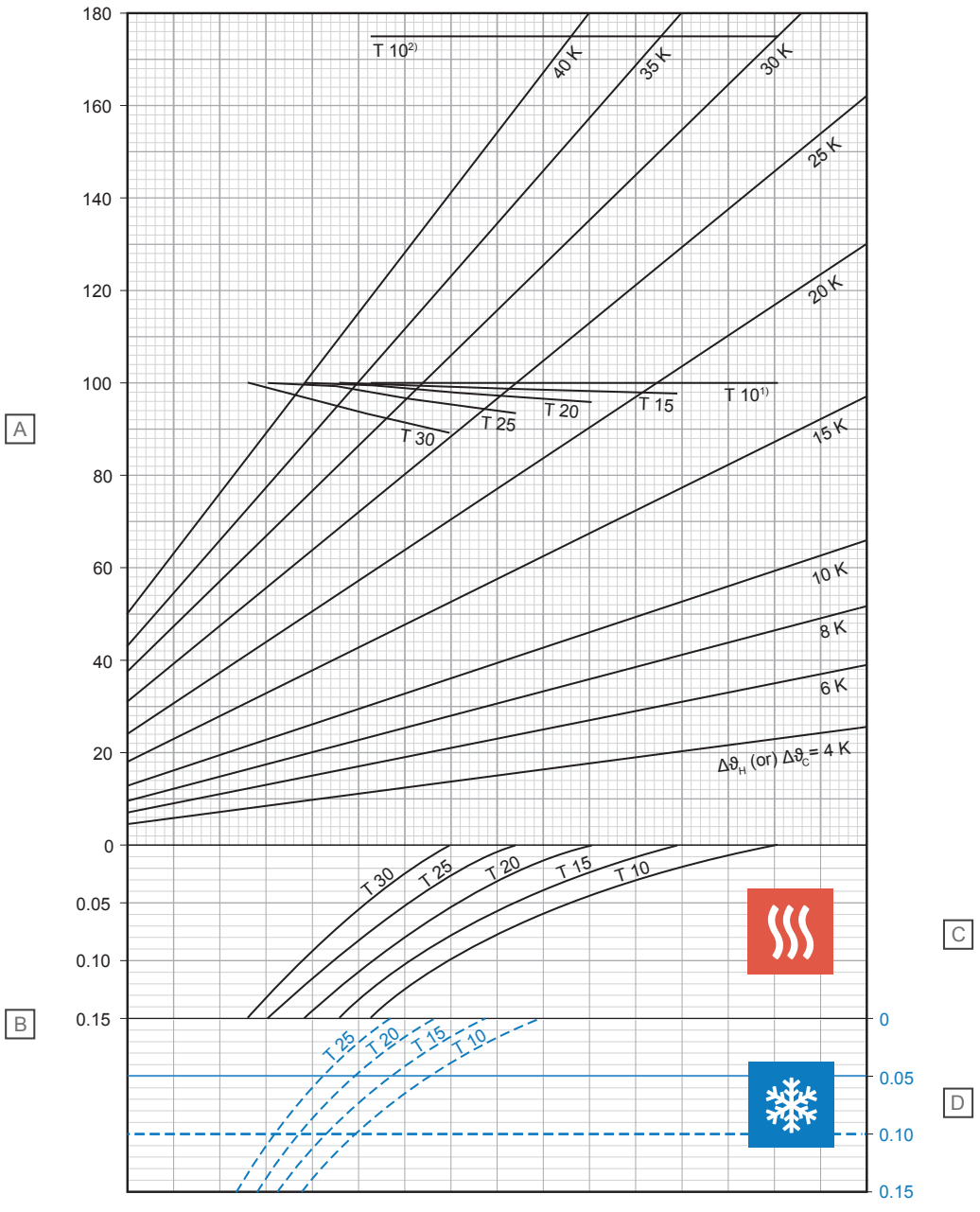
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	36,6	8
15	32,9	8
20	29,5	8
25	26,5	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Comfort Pipe PLUS 20 x 2,0 mm with screed load distribution layer (su = 65 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	17,1
15	97,9	19,0
20	96,0	21,1
25	93,6	23,4
30	89,2	25,3

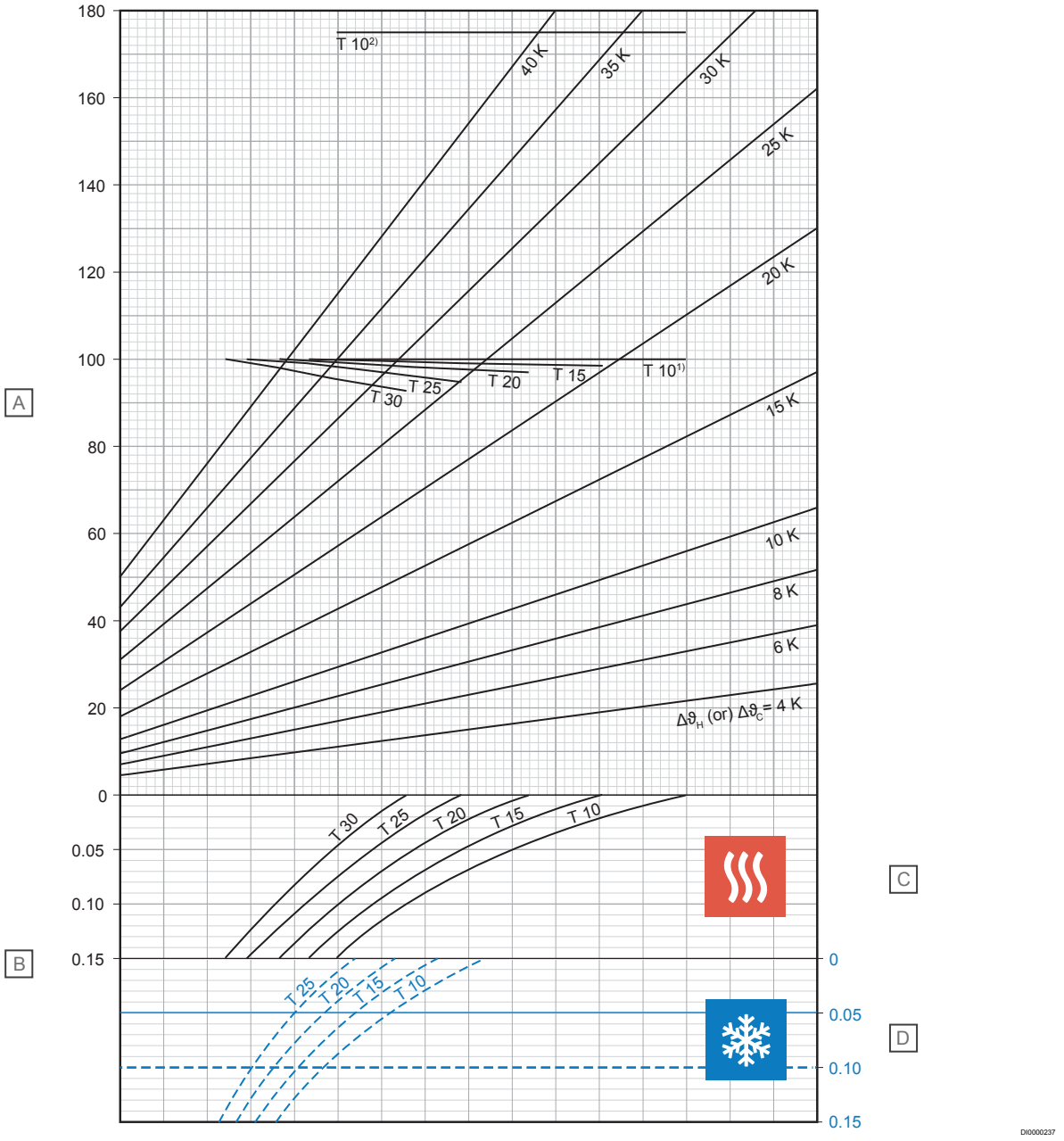
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	33,4	8
15	30,3	8
20	27,4	8
25	24,8	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

[2] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Comfort Pipe PLUS 20 x 2,0 mm with screed load distribution layer (su = 75 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	18,2
15	98,7	20,2
20	97,1	22,5
25	95,4	24,9
30	92,9	27,4

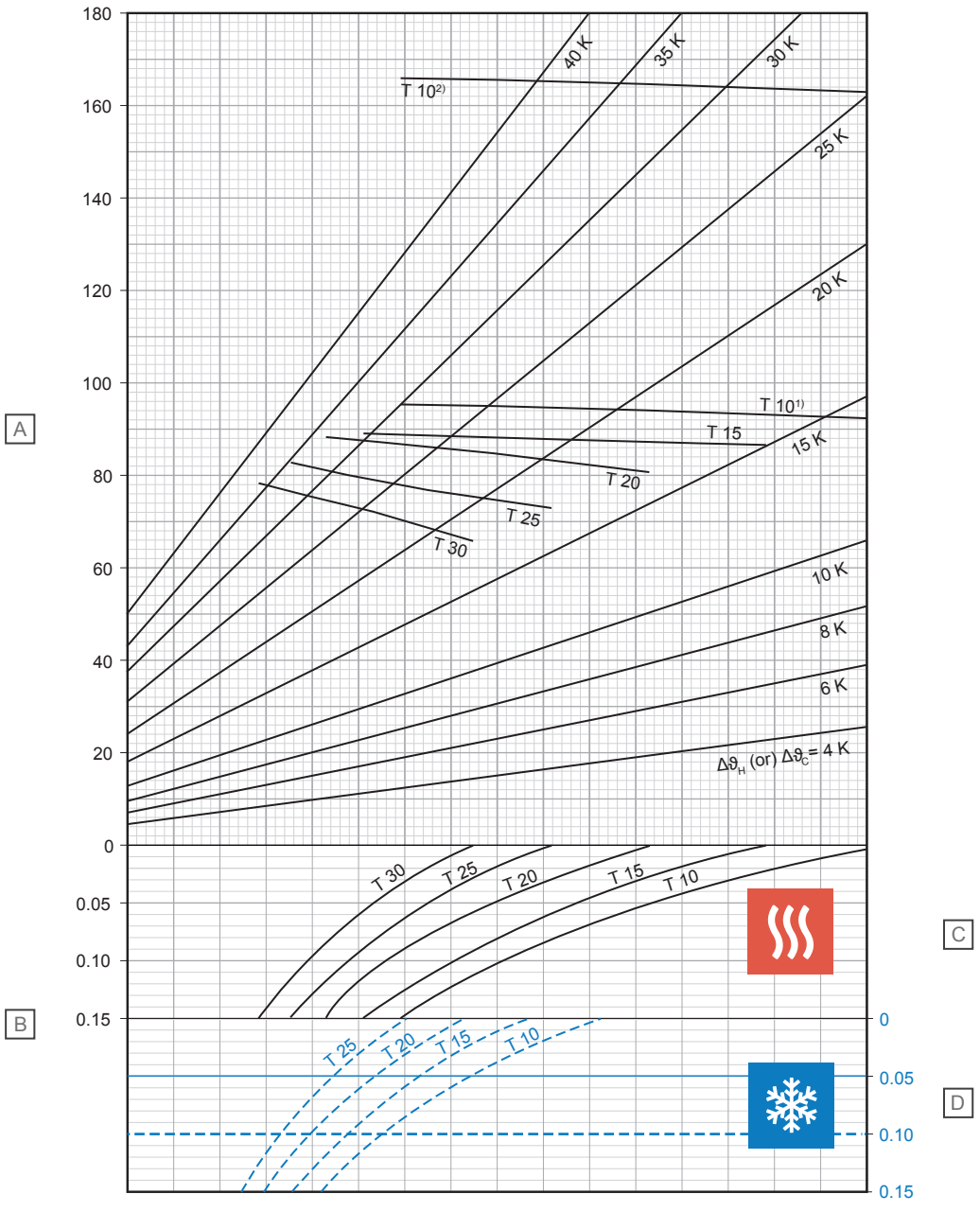
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	32,0	8
15	29,1	8
20	26,4	8
25	24,0	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Smart UFH-pipe 14 x 2,0 mm with screed load distribution layer (su = 35 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	92,3	13,7
15	86,4	15,0
20	80,5	16,3
25	72,9	17,2
30	65,5	17,9

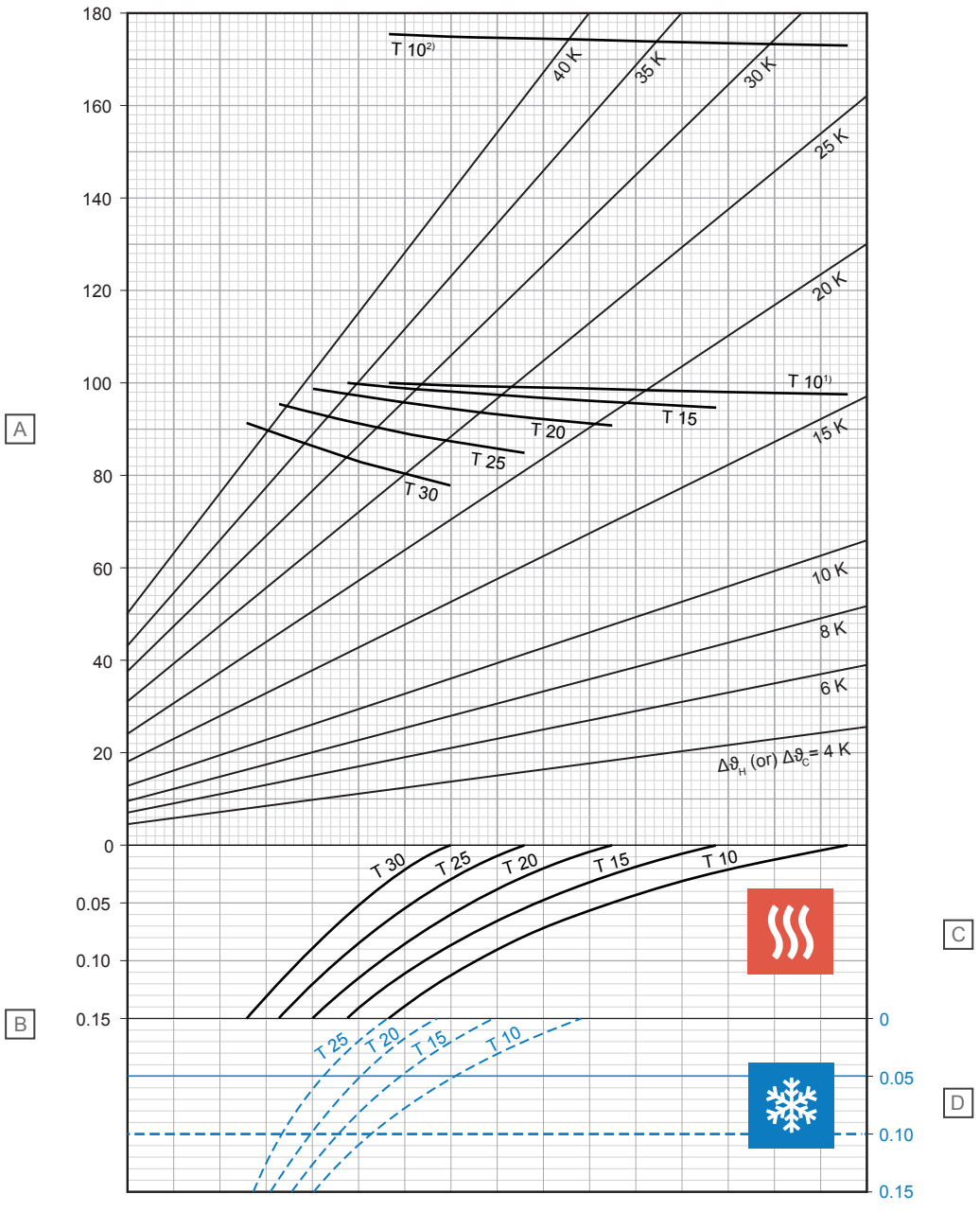
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	37,0	8
15	32,7	8
20	29,0	8
25	25,8	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

[2] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Smart UFH-pipe 14 x 2,0 mm with screed load distribution layer (su = 45 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	97,7	15,4
15	94,8	17,5
20	90,9	19,4
25	84,9	20,9
30	77,7	22,0

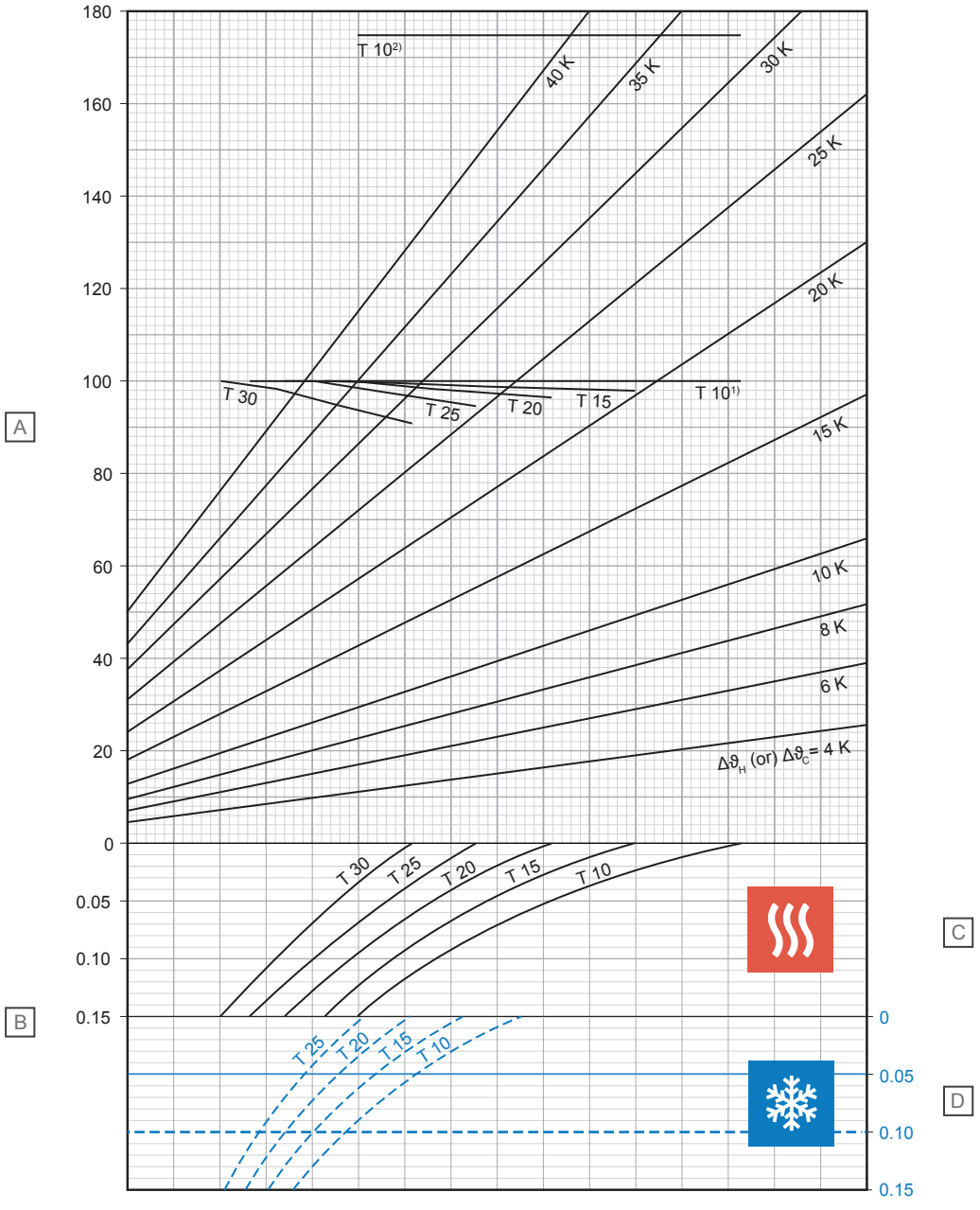
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	35,4	8
15	31,4	8
20	28,0	8
25	24,9	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Smart UFH-pipe 14 x 2,0 mm with screed load distribution layer (su = 65 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	17,9
15	98,1	20,2
20	96,6	22,7
25	94,7	25,5
30	90,9	27,9

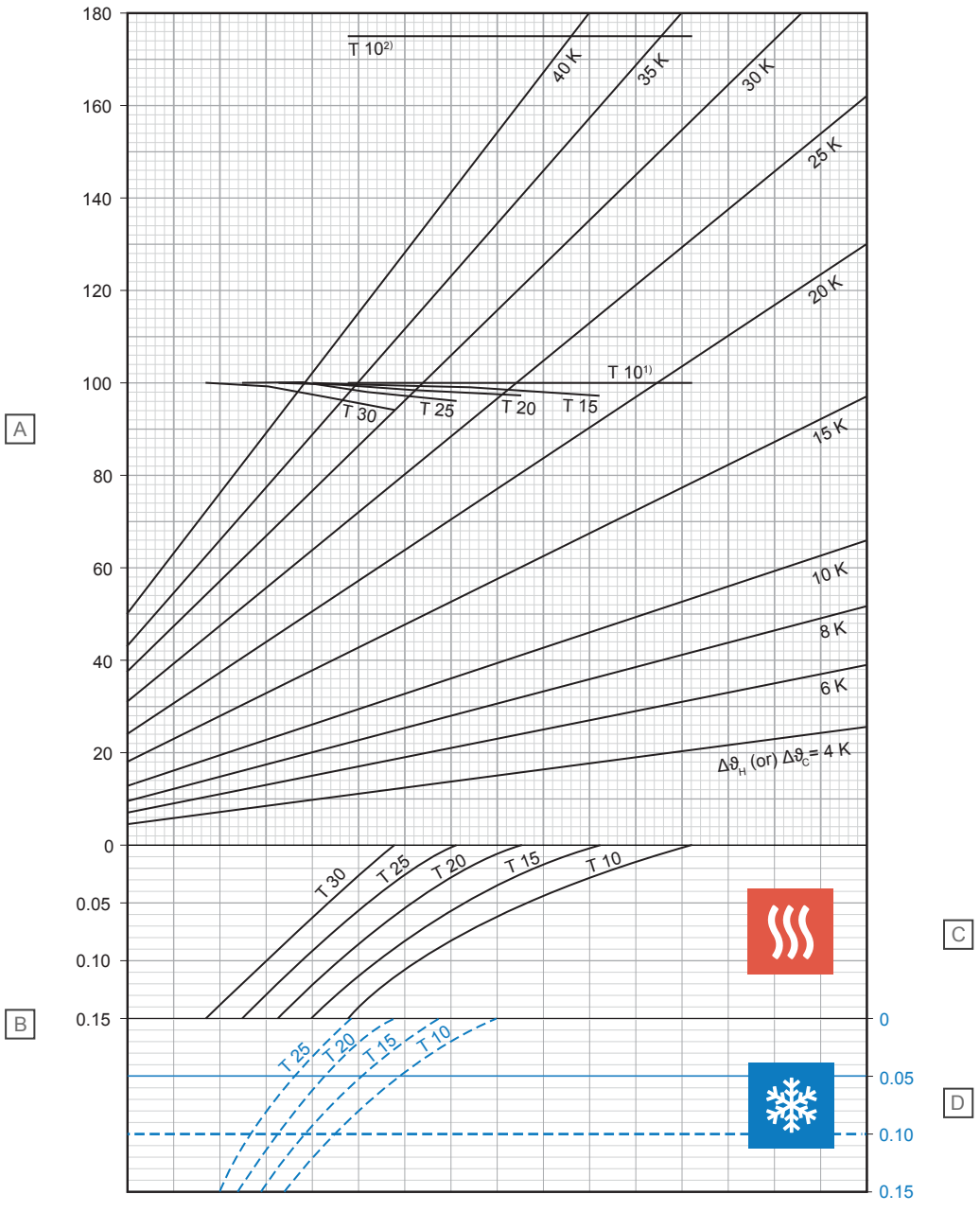
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	32,3	8
15	28,9	8
20	26	8
25	23,3	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Smart UFH-pipe 14 x 2,0 mm with screed load distribution layer (su = 75 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	19,0
15	98,8	21,5
20	97,5	24,1
25	96,1	27,0
30	94,2	30,0

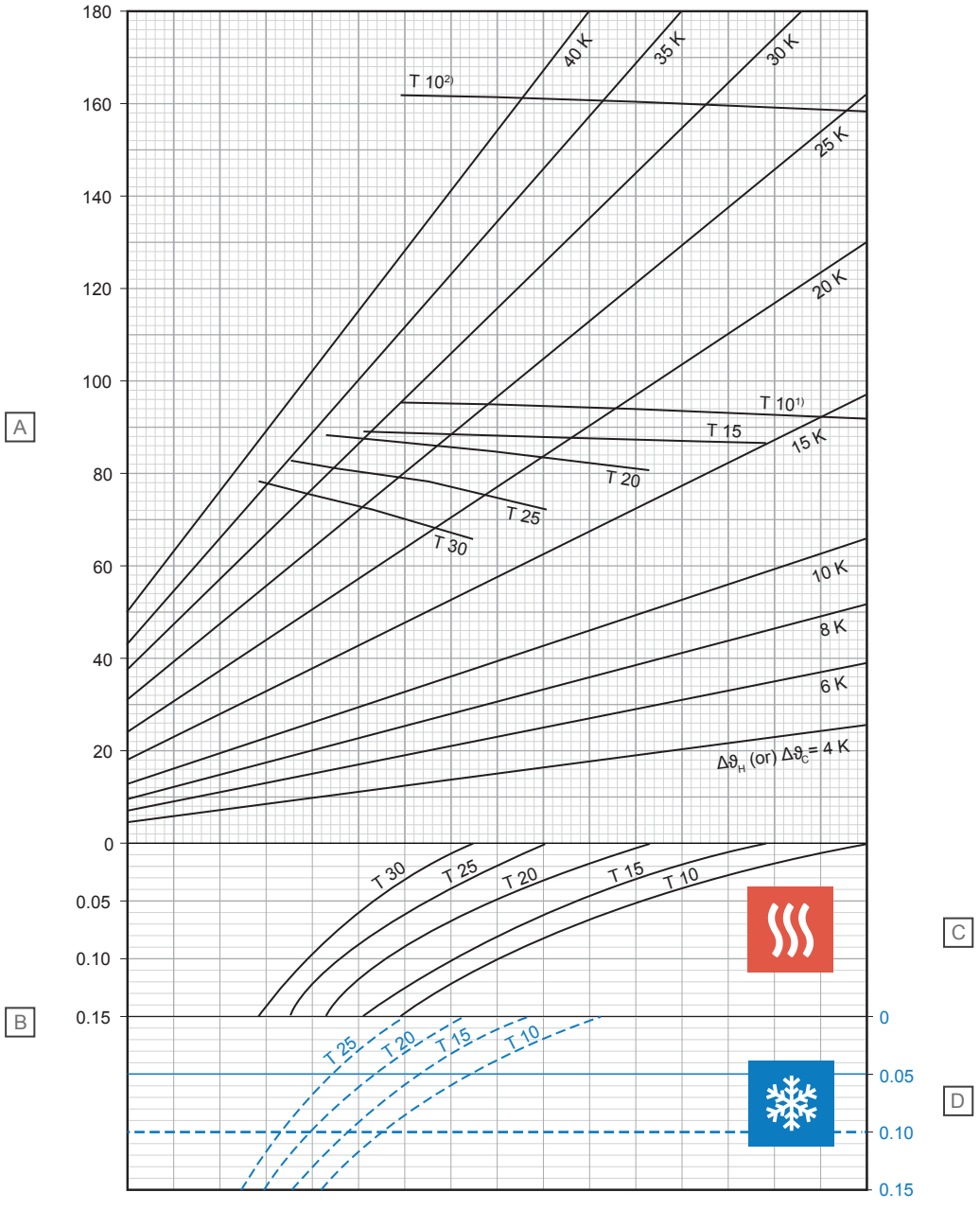
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	30,9	8
15	27,8	8
20	25,0	8
25	22,6	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

[2] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Smart UFH-pipe 16 x 2,0 mm with screed load distribution layer (su = 35 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	92,2	13,5
15	86,2	14,7
20	80,3	15,9
25	72,5	16,7
30	64,9	17,3

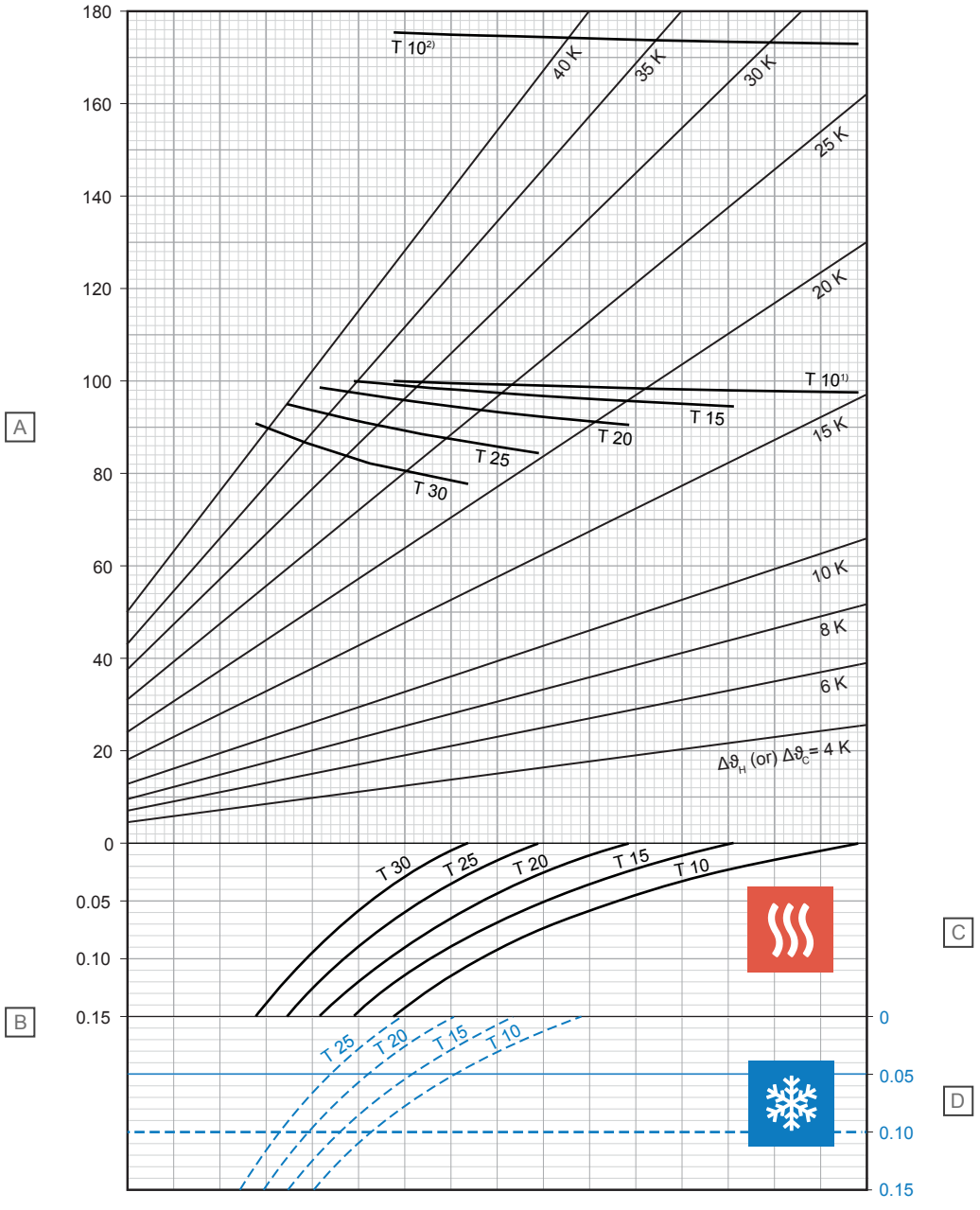
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	37,4	8
15	33,2	8
20	29,6	8
25	26,3	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Smart UFH-pipe 16 x 2,0 mm with screed load distribution layer (su = 45 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	97,7	15,2
15	94,7	17,1
20	90,6	18,9
25	84,4	20,3
30	77,0	21,3

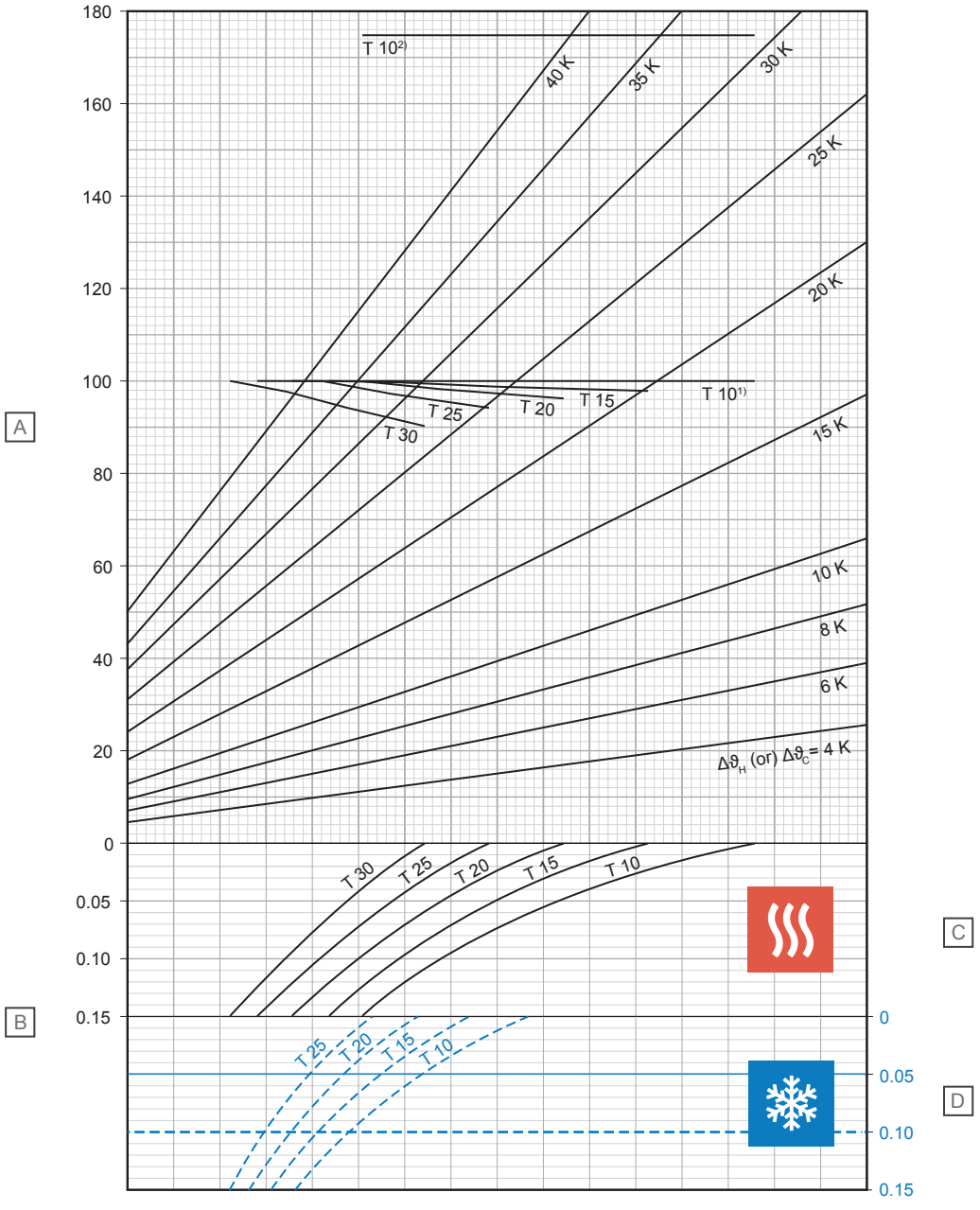
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	35,8	8
15	31,9	8
20	28,5	8
25	25,4	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

[2] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Smart UFH-pipe 16 x 2,0 mm with screed load distribution layer (su = 65 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	17,6
15	98,0	19,8
20	96,4	22,2
25	94,3	24,8
30	90,3	27,0

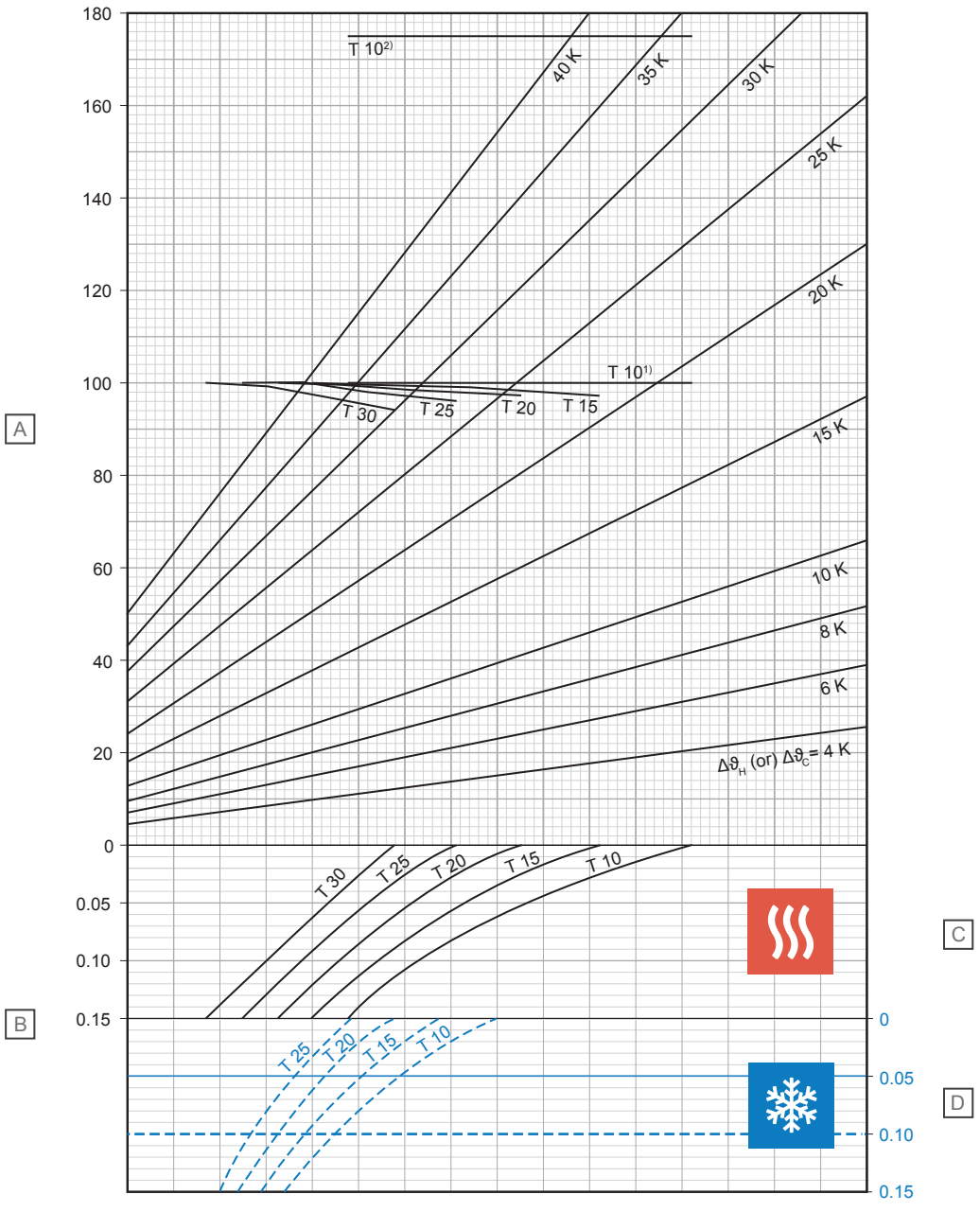
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	32,7	8
15	29,4	8
20	26,4	8
25	23,8	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

[2] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Smart UFH-pipe 16 x 2,0 mm with screed load distribution layer (su = 75 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	18,7
15	98,8	21,1
20	97,3	23,6
25	95,9	26,3
30	93,8	29,1

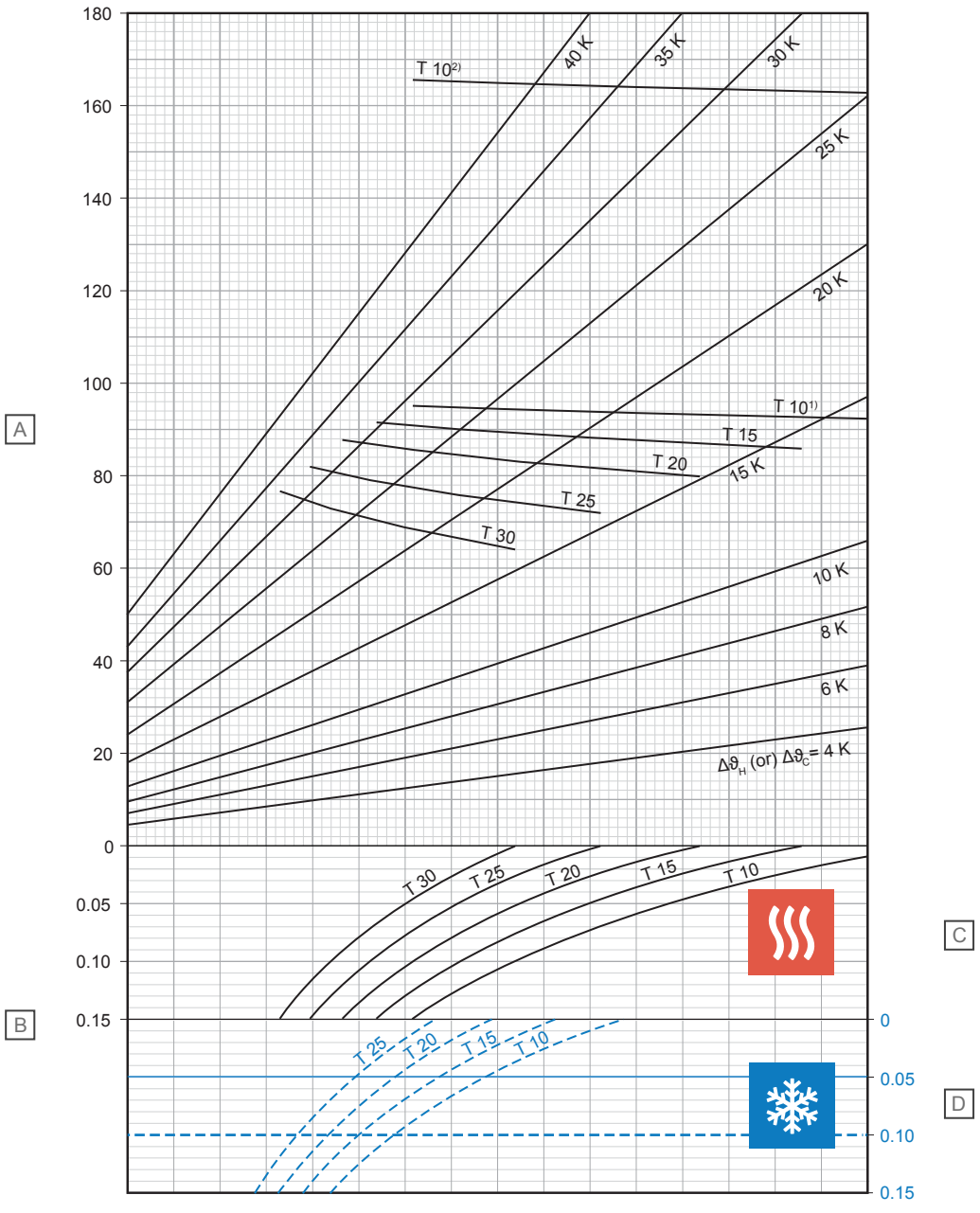
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	31,3	8
15	28,2	8
20	25,5	8
25	23,0	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Smart UFH-pipe 20 x 2,0 mm with screed load distribution layer (su = 35 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	92,1	13,1
15	85,9	14,1
20	79,7	15,1
25	71,8	15,7
30	63,8	16,1

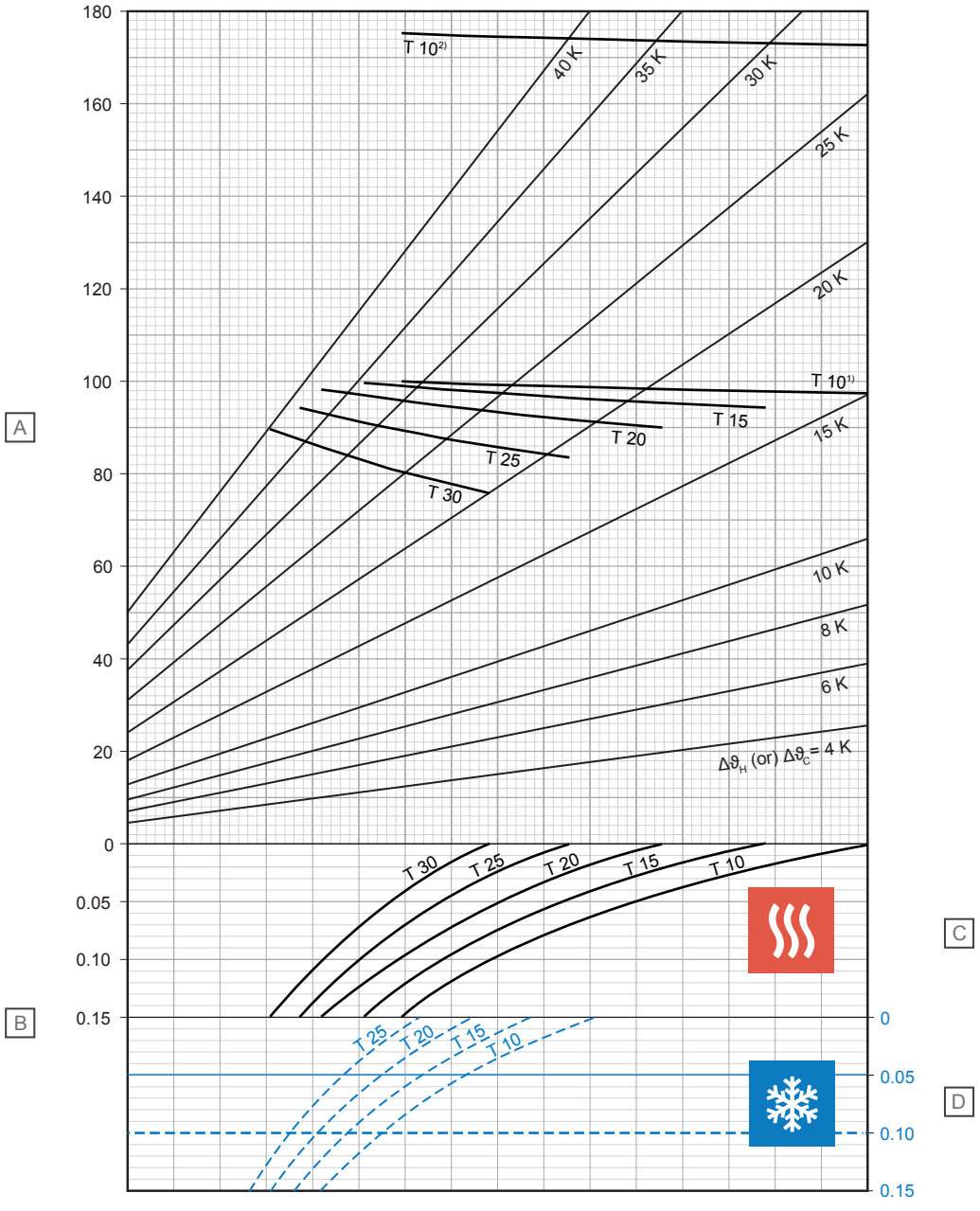
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	38,2	8
15	34,2	8
20	30,6	8
25	27,4	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

[2] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Smart UFH-pipe 20 x 2,0 mm with screed load distribution layer (su = 45 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	97,6	14,8
15	94,4	16,4
20	90,0	17,9
25	83,5	19,1
30	75,7	19,9

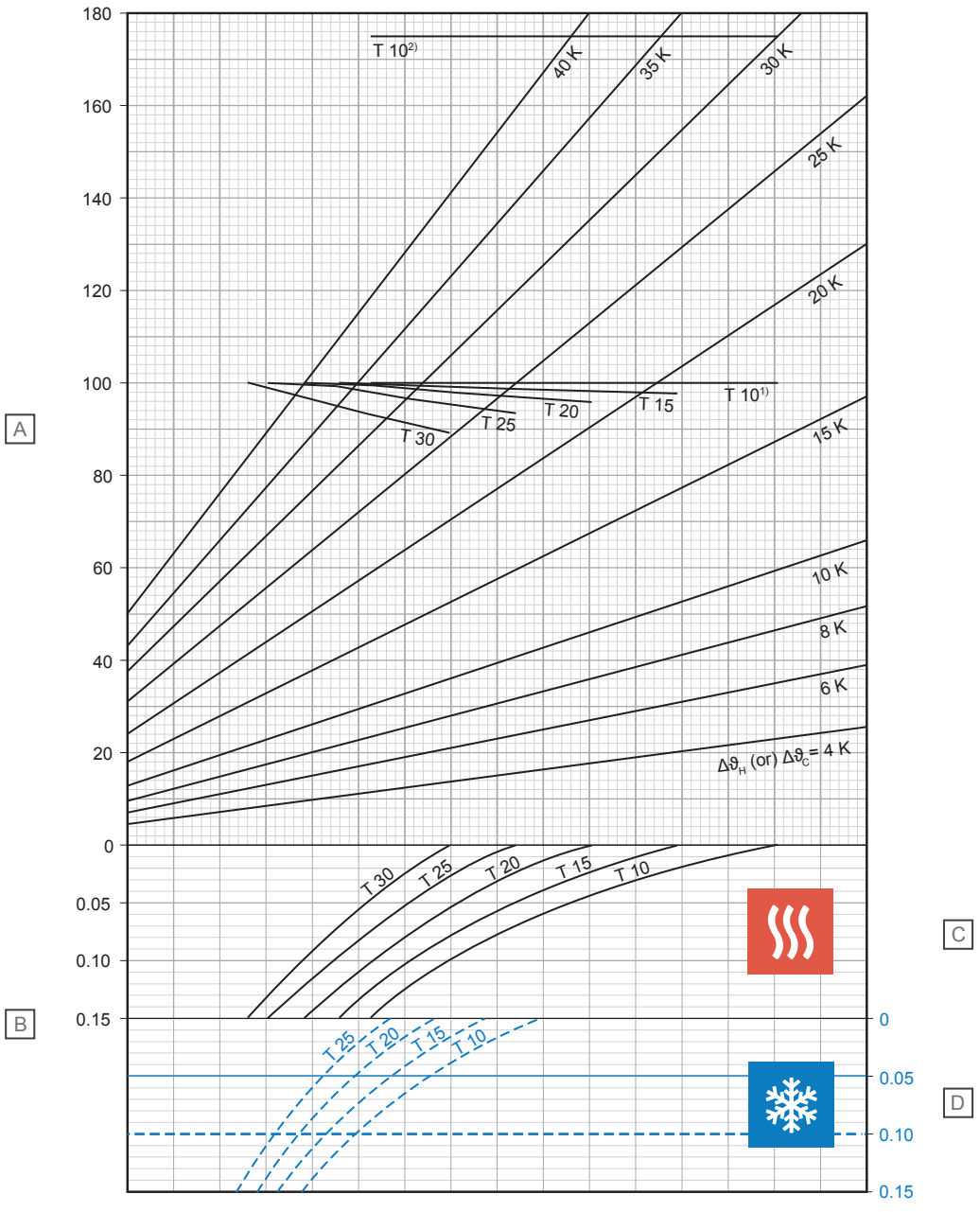
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	36,6	8
15	32,9	8
20	29,5	8
25	26,5	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Smart UFH-pipe 20 x 2,0 mm with screed load distribution layer (su = 65 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	17,1
15	97,9	19,0
20	96,0	21,1
25	93,6	23,4
30	89,2	25,3

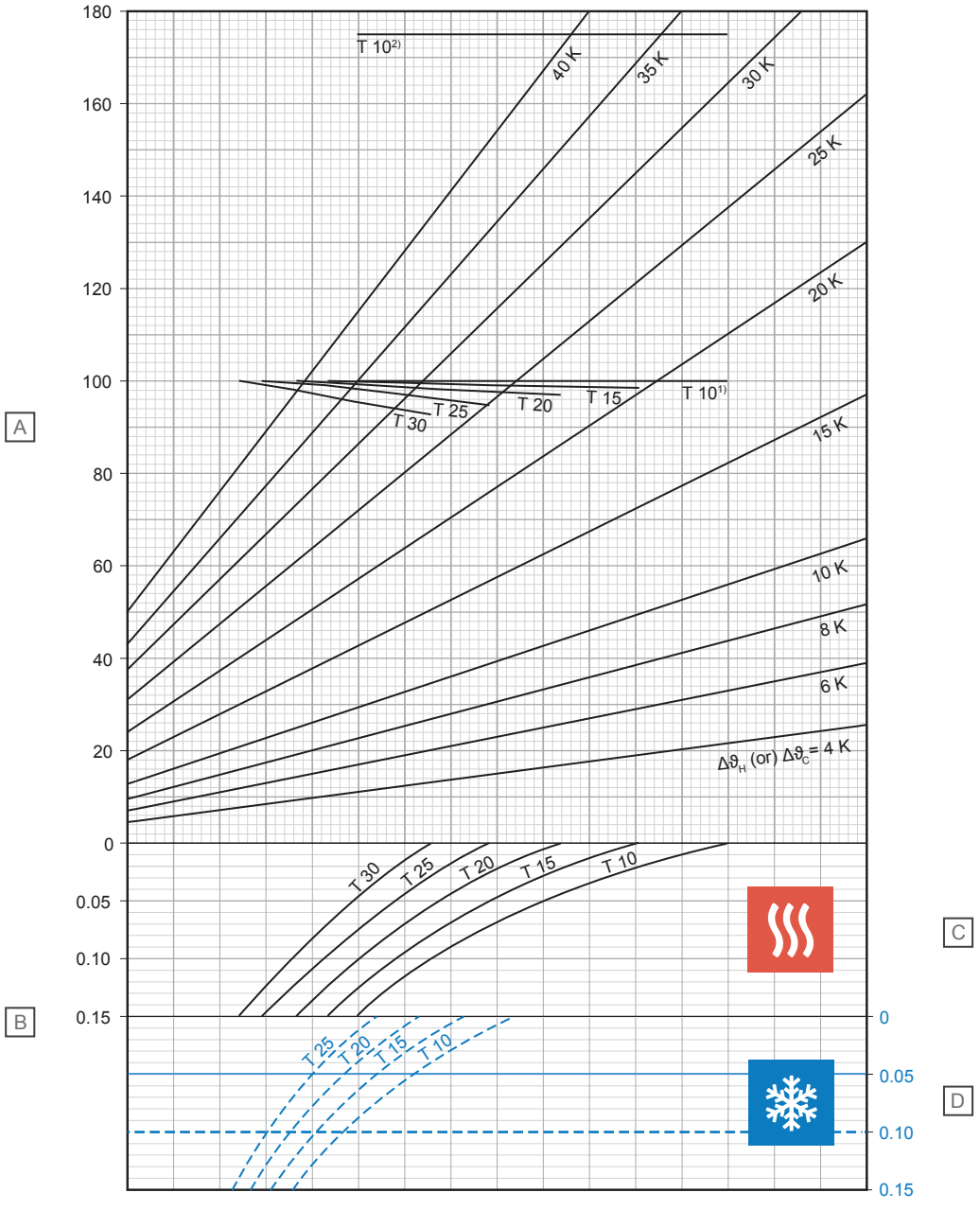
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	33,4	8
15	30,3	8
20	27,4	8
25	24,8	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

[2] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor Smart UFH-pipe 20 x 2,0 mm with screed load distribution layer (su = 75 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	18,2
15	98,7	20,2
20	97,1	22,5
25	95,4	24,9
30	92,9	27,4

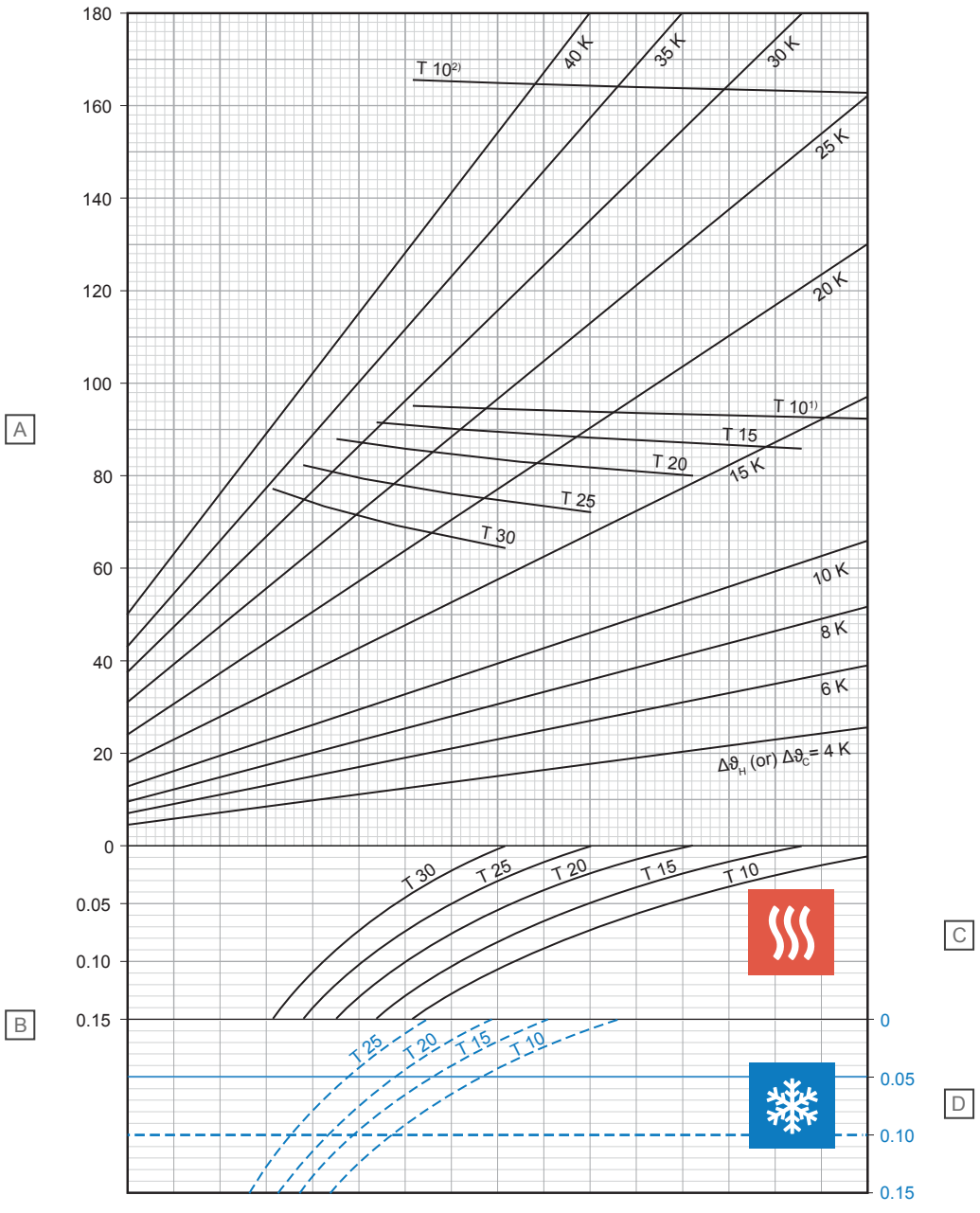
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	32,0	8
15	29,1	8
20	26,4	8
25	24,0	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor MLCP RED 14 x 1,6 mm with screed load distribution layer (su = 35 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	92,1	13,2
15	86,0	14,3
20	79,9	15,3
25	72,0	16,0
30	64,1	16,5

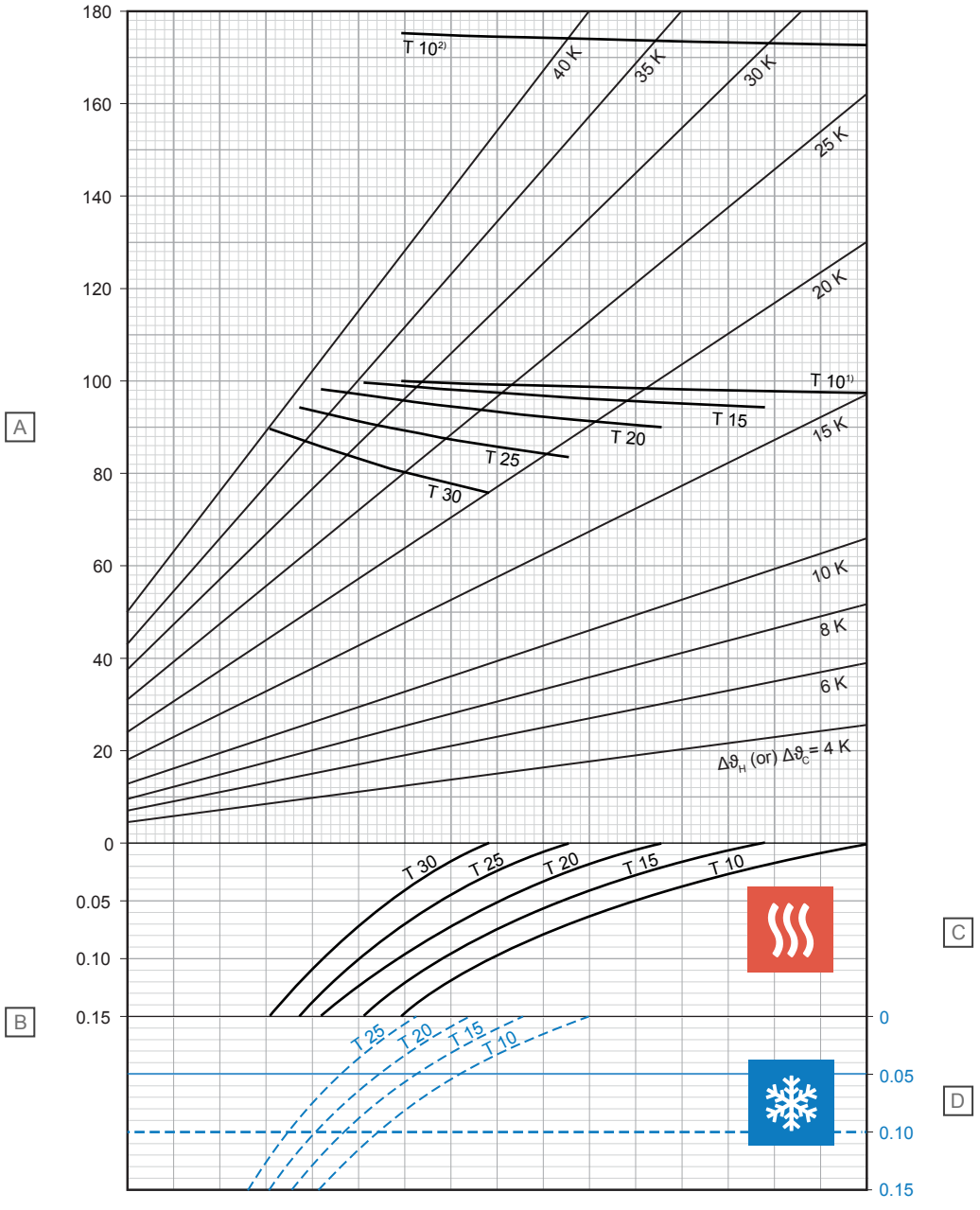
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	37,9	8
15	33,9	8
20	30,2	8
25	27,0	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor MLCP RED 14 x 1,6 mm with screed load distribution layer (su = 45 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	97,6	14,9
15	94,5	16,6
20	90,2	18,2
25	83,8	19,5
30	76,2	20,4

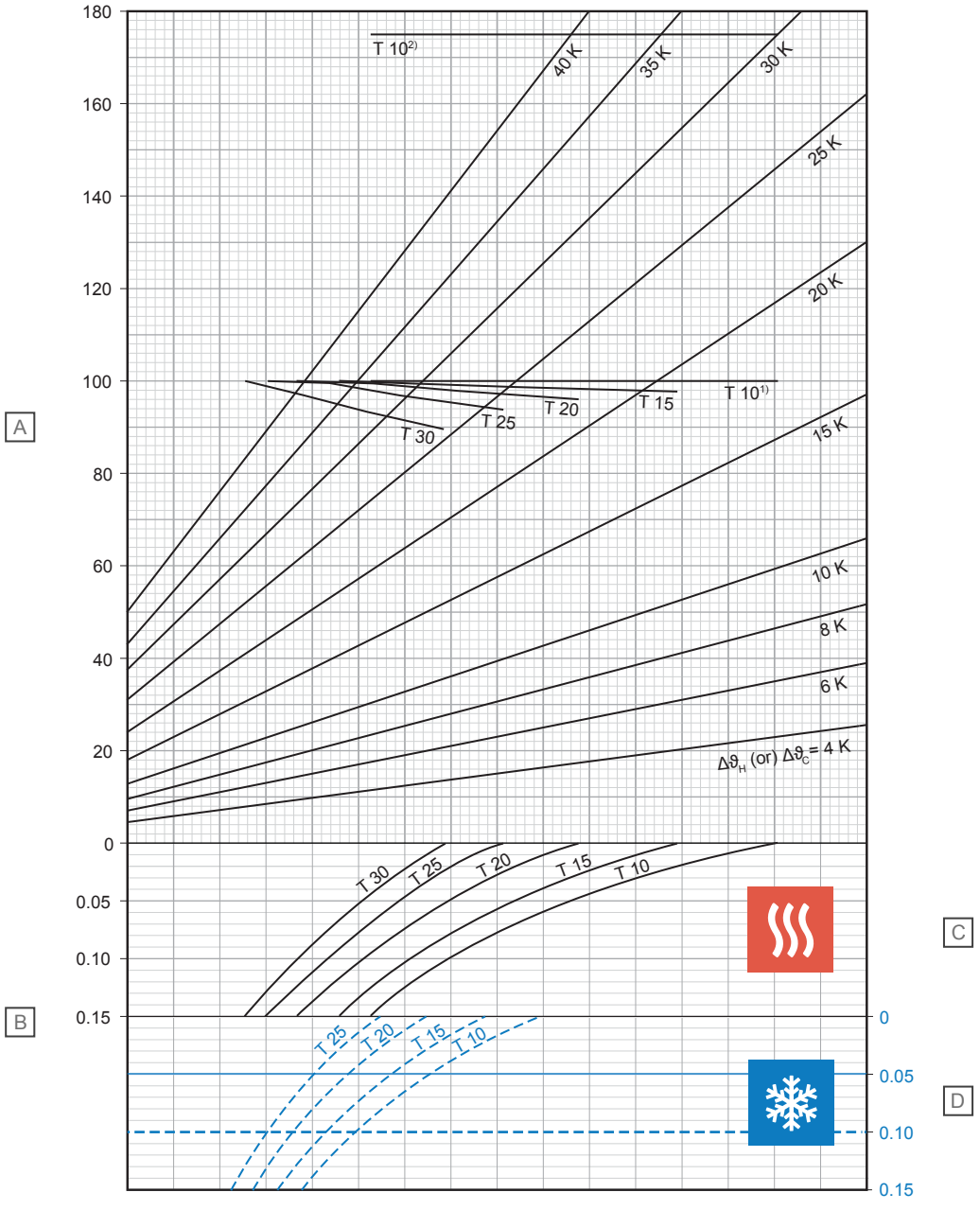
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	36,2	8
15	32,5	8
20	29,1	8
25	26,0	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor MLCP RED 14 x 1,6 mm with screed load distribution layer (su = 65 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	17,3
15	97,9	19,3
20	96,1	21,6
25	93,9	24,0
30	89,7	26,0

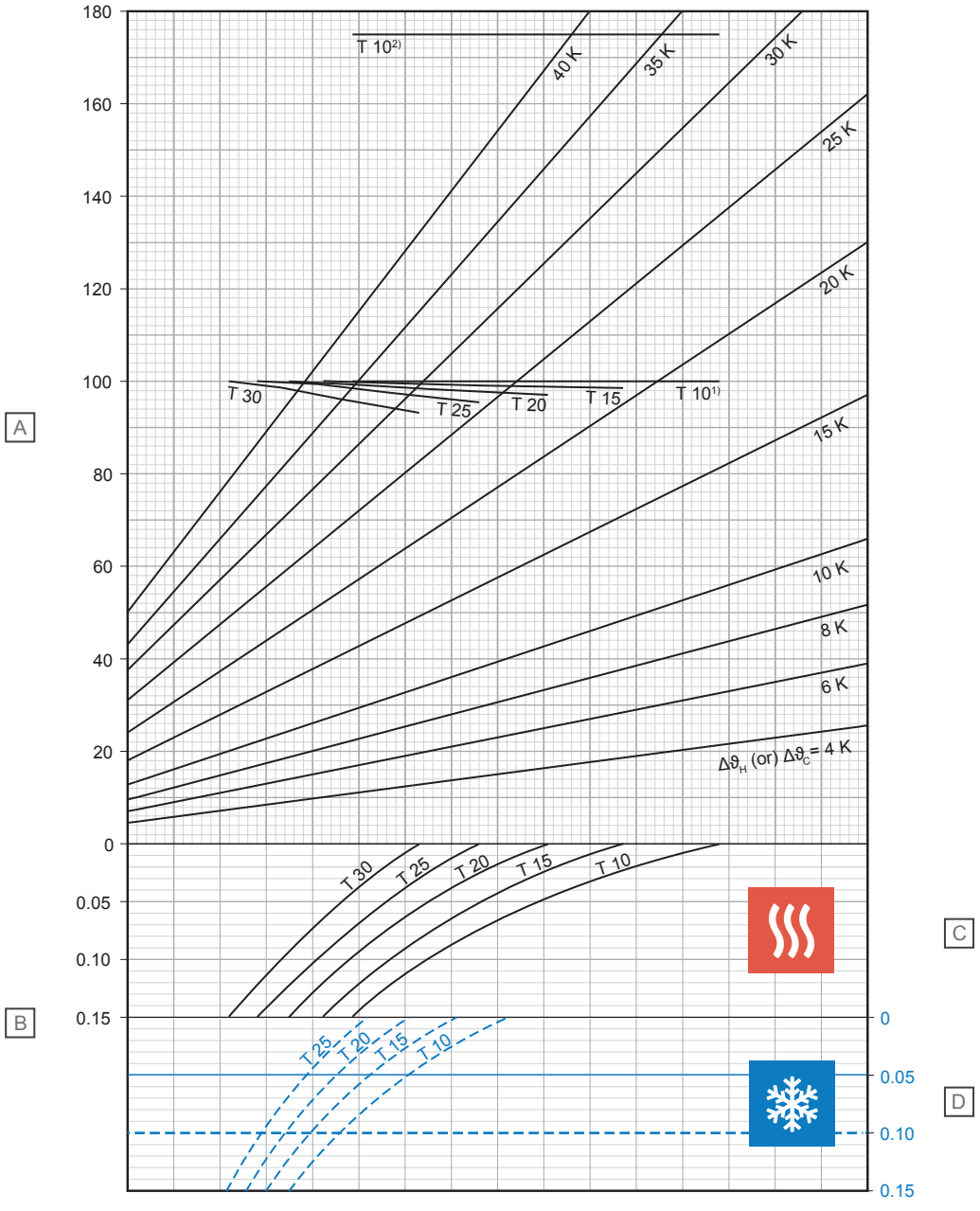
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	33,1	8
15	29,8	8
20	26,9	8
25	24,3	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor MLCP RED 14 x 1,6 mm with screed load distribution layer (su = 75 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	18,4
15	98,7	20,7
20	97,2	23,0
25	95,6	25,6
30	93,3	28,2

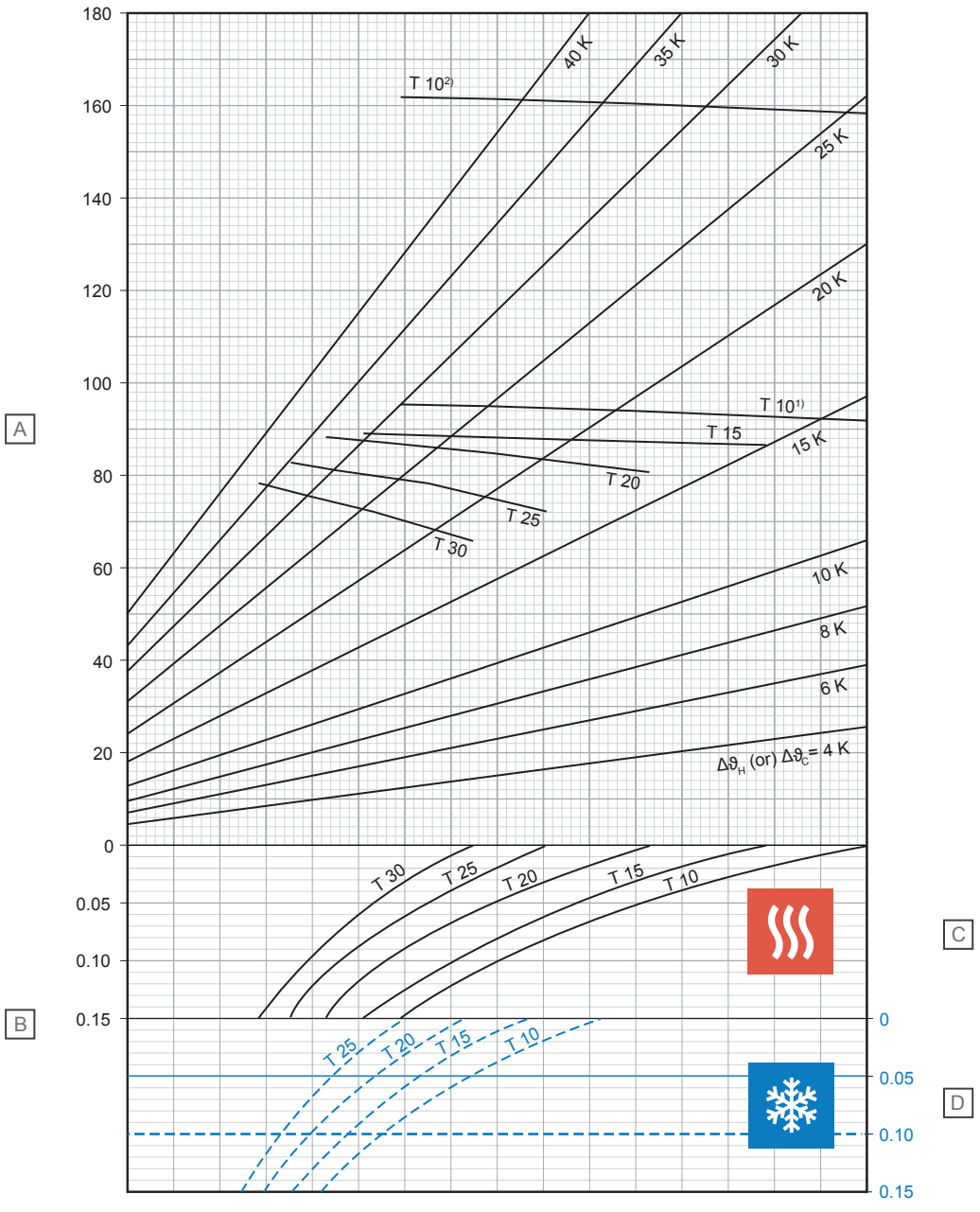
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	31,6	8
15	28,6	8
20	25,9	8
25	23,5	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor MLCP RED 16 x 2,0 mm with screed load distribution layer (su = 35 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	92,2	13,3
15	86,1	14,5
20	80,1	15,6
25	72,2	16,3
30	64,5	16,8

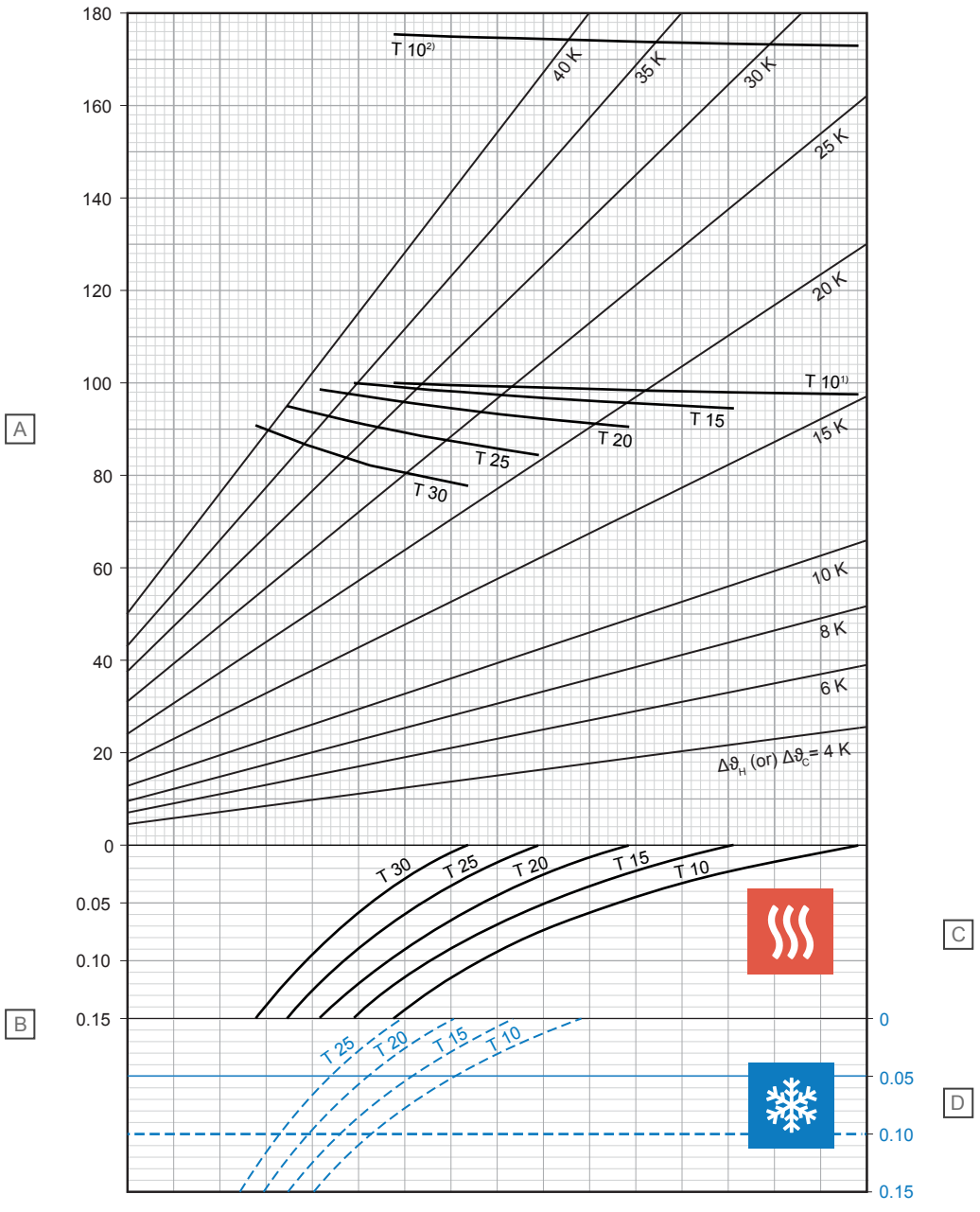
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	37,7	8
15	33,6	8
20	30,0	8
25	26,7	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor MLCP RED 16 x 2,0 mm with screed load distribution layer (su = 45 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	97,7	15,0
15	94,6	16,8
20	90,3	18,5
25	84,1	19,8
30	76,5	20,7

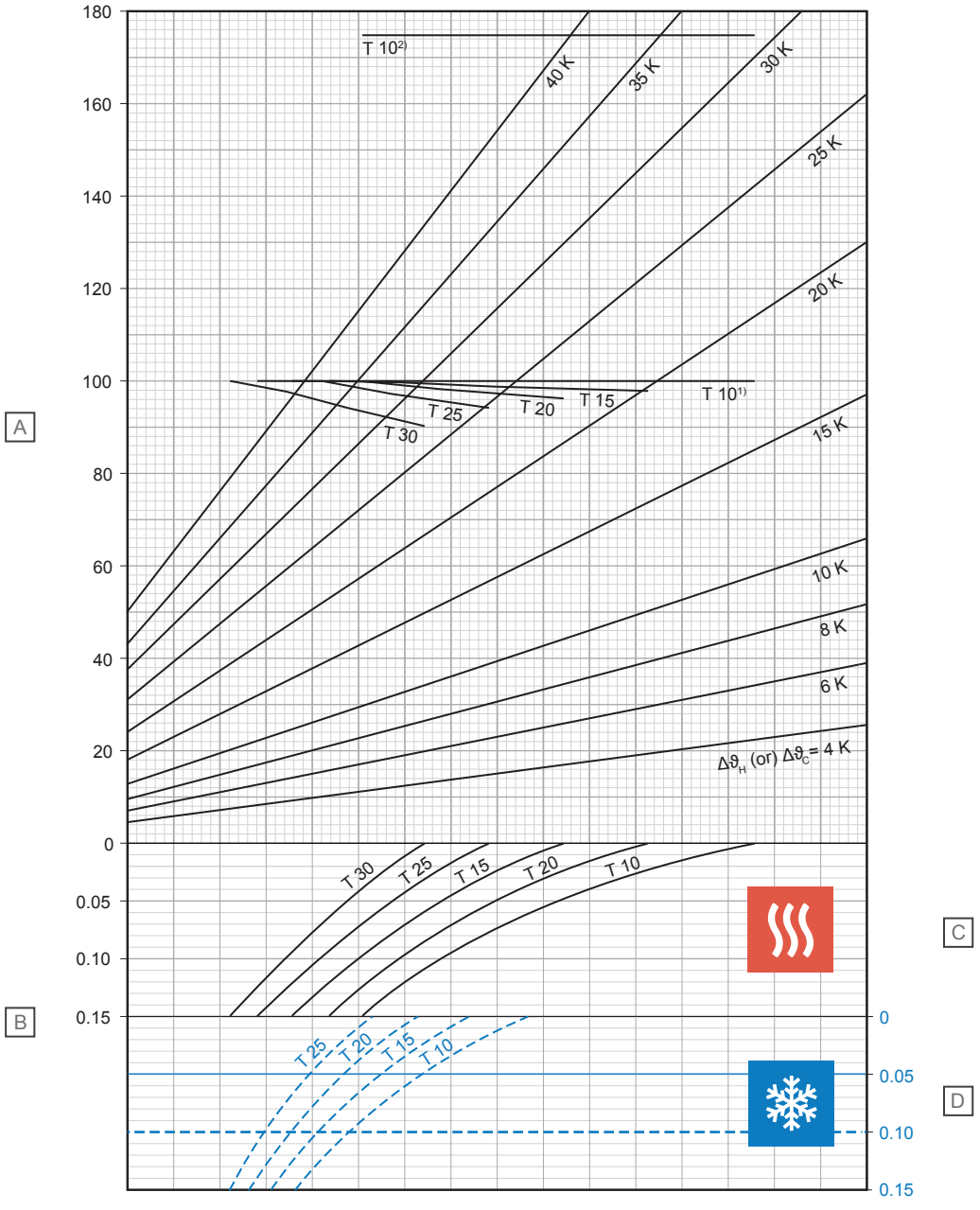
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	36,0	8
15	32,2	8
20	28,8	8
25	25,8	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

[2] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor MLCP RED 16 x 2,0 mm with screed load distribution layer (su = 65 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	17,4
15	98,0	19,5
20	96,2	21,8
25	94,1	24,3
30	89,9	26,4

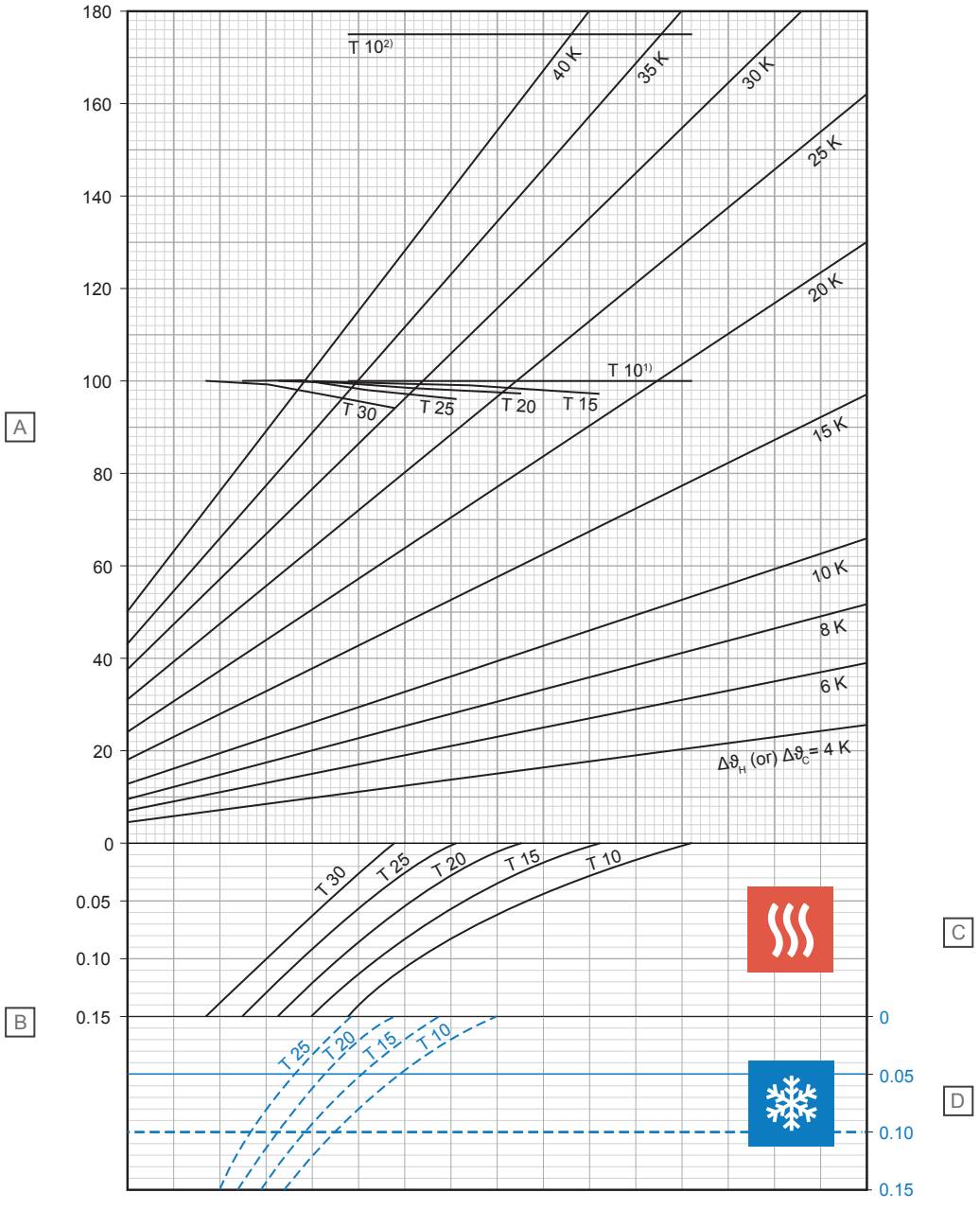
D - Cooling

T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	32,9	8
15	29,7	8
20	26,8	8
25	24,1	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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

Uponor MLCP RED 16 x 2,0 mm with screed load distribution layer (su = 75 mm with λu = 1,2 W/mK)



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)	$\Delta\vartheta_{H,N}$ (K)
10	100,0	18,5
15	98,7	20,8
20	97,3	23,2
25	95,7	25,8
30	93,5	28,5

D - Cooling

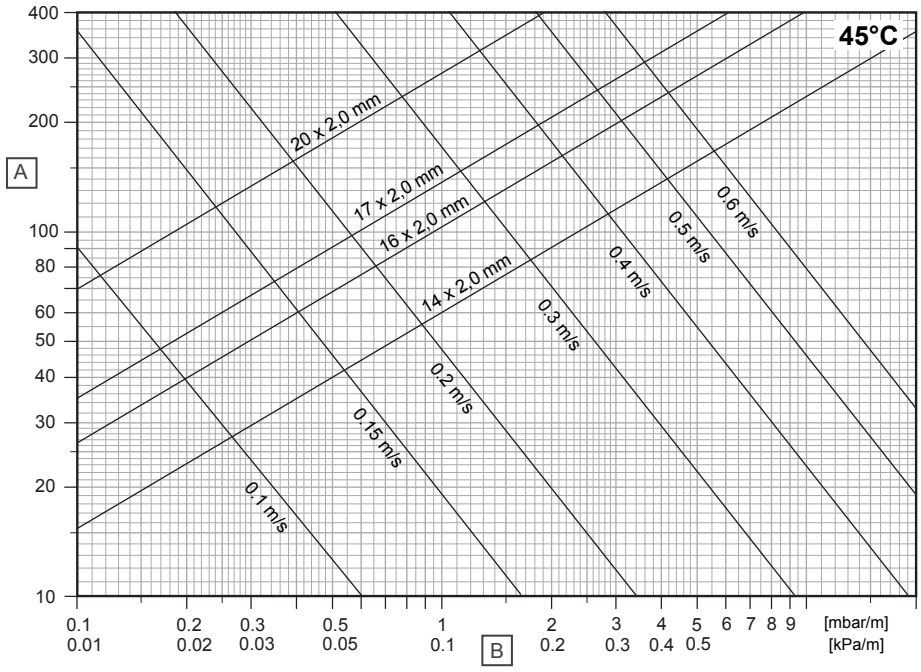
T (cm)	q_C (W/m²)	$\Delta\vartheta_{C,N}$ (K)
10	31,5	8
15	28,5	8
20	25,8	8
25	23,3	8

[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] Limit curve valid for ϑ_i 20 °C and $\vartheta_{F,max}$ 35 °C

2.3 Pressure drop diagrams

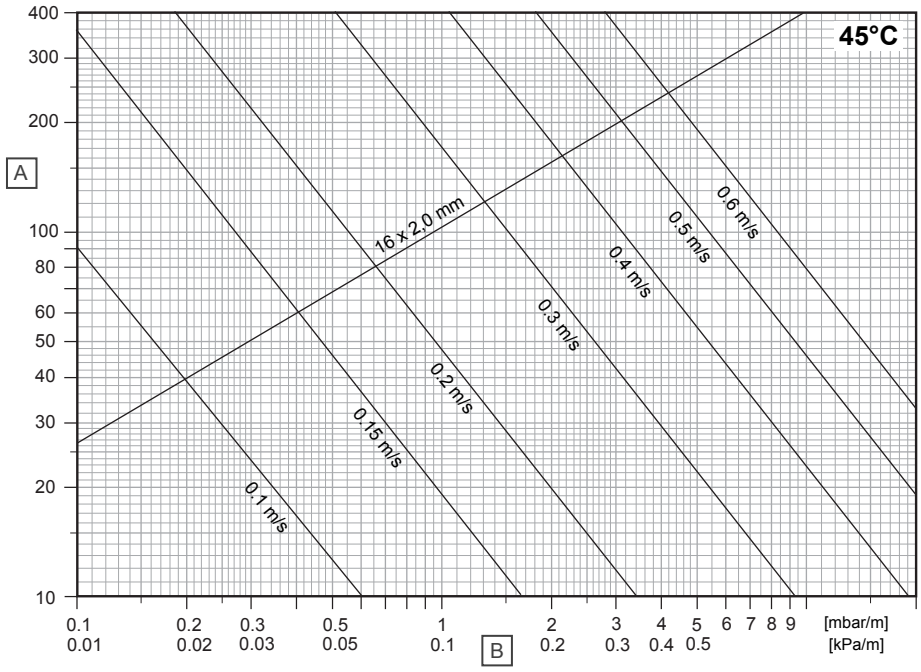
Uponor Comfort Pipe PLUS



DI0000264

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

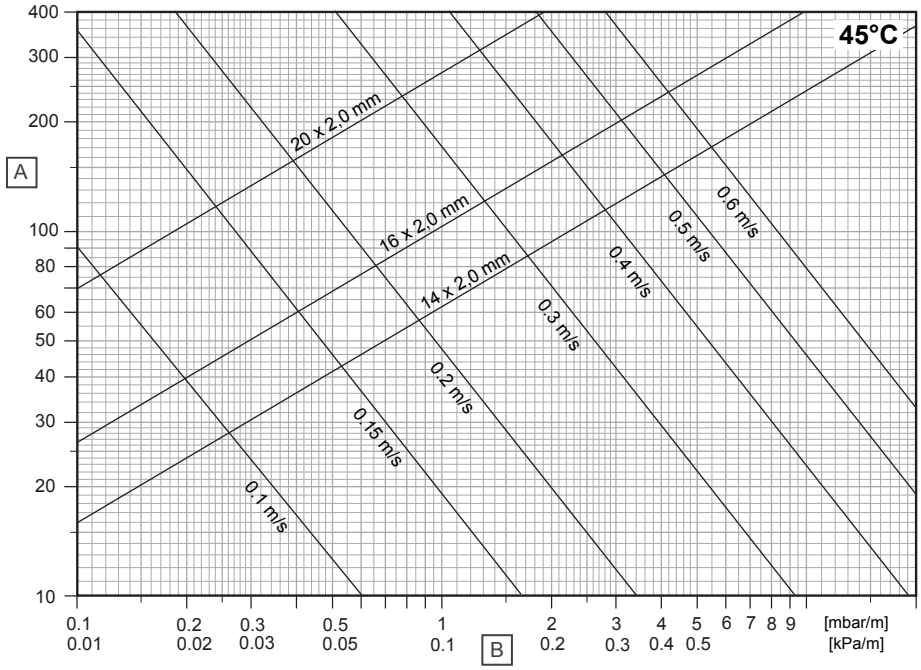
Uponor Comfort Pipe



DI0000262

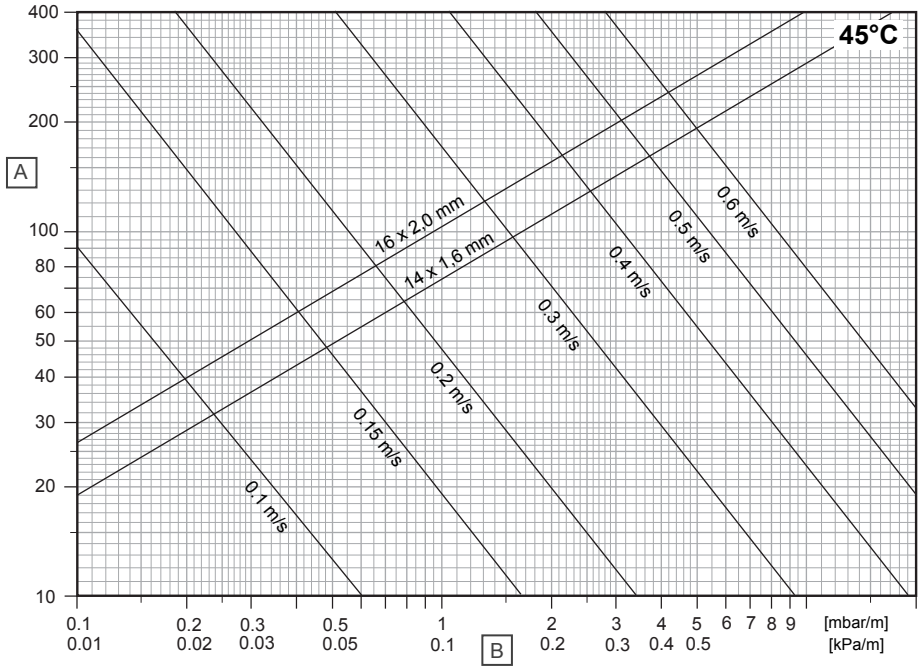
Item	Unit	Description
A	kg/h	Mass flow rate
B	R	Pressure gradient

Uponor Smart UFH-pipe



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

Uponor MLCP RED



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

3 Installation

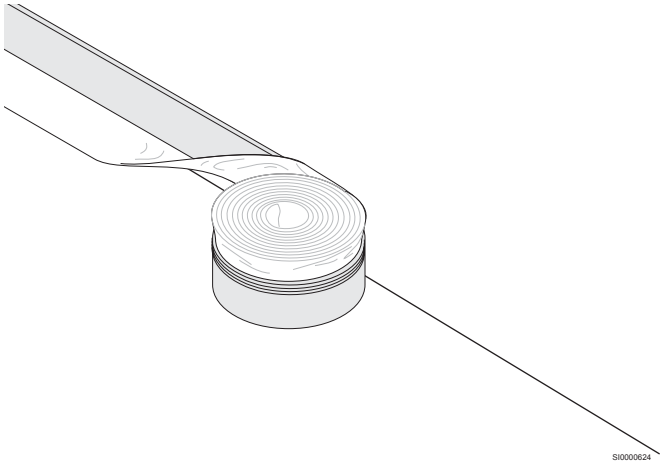
3.1 Installation process

Note

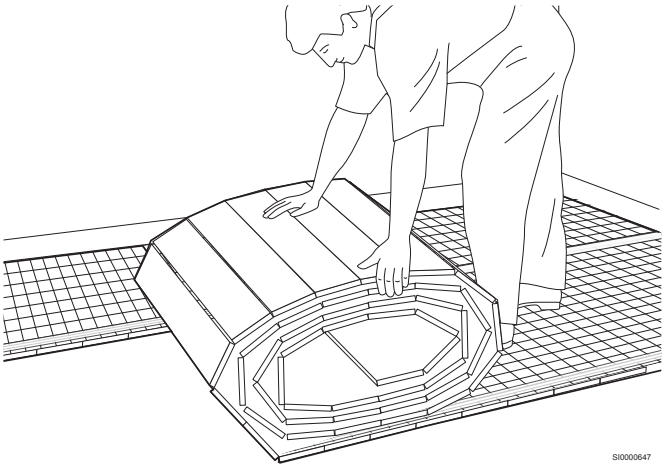
Installation must be performed by a qualified person in accordance with local standards and regulations.

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

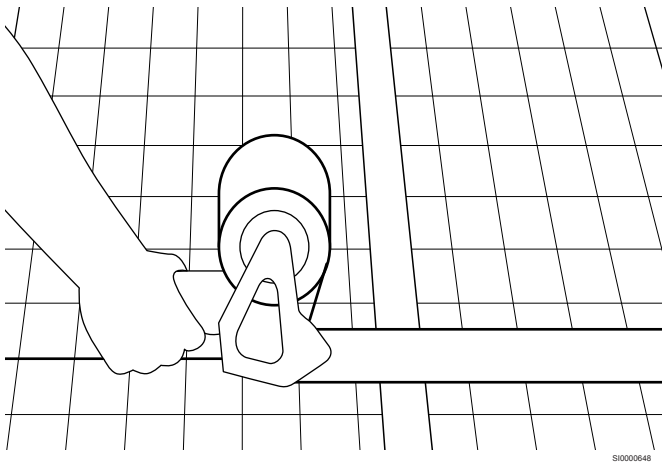
1. Edging strip installation



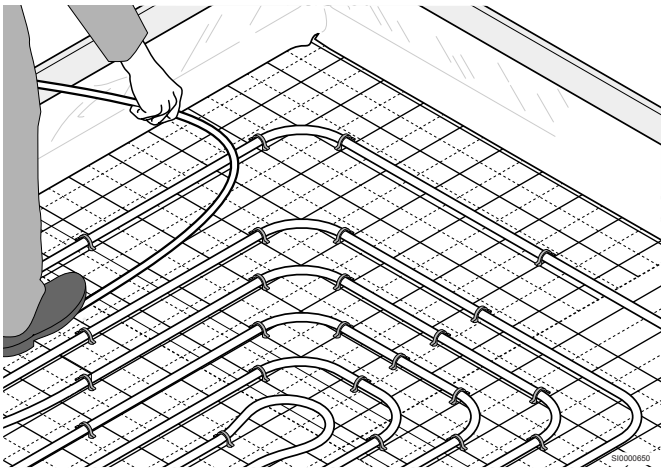
2. Panel installation



3. Join the gaps



4. Pipe installation



4 Technical data

4.1 Technical specifications

Uponor Tacker roll

Description	Value	Value	Value	Value	Value
Type	20-2	30-2	30-3	35-3	40-3
Material	EPS	EPS	EPS	EPS	EPS
Dimension	1000 x 1000 x 20 mm	1000 x 1000 x 30 mm	1000 x 1000 x 30 mm	1000 x 1000 x 35 mm	1000 x 1000 x 40 mm
Max. live load	5,0 kN/m^2	5,0 kN/m^2	4,0 kN/m^2	4,0 kN/m^2	4,0 kN/m^2
Thermal resistance	0,50 m^{2}K/W	0,75 m^{2}K/W	0,65 m^{2}K/W	0,75 m^{2}K/W	0,85 m^{2}K/W
Dynamic stiffness	30 MN/m^3	20 MN/m^3	20 MN/m^3	15 MN/m^3	15 MN/m^3
Reaction to fire (refer to EN 13501-1)	Class E	Class E	Class E	Class E	Class E
Foil grid	100 x 100 mm	100 x 100 mm	100 x 100 mm	100 x 100 mm	100 x 100 mm
Type of system	Wet system	Wet system	Wet system	Wet system	Wet system
Load distribution layer	Cement screed or anhydrite screed	Cement screed or anhydrite screed	Cement screed or anhydrite screed	Cement screed or anhydrite screed	Cement screed or anhydrite screed

Uponor Tacker panel

Description	Value	Value
Type	DEO 20	DEO 30
Material	EPS	EPS
Dimension	2000 x 1000 x 20 mm	2000 x 1000 x 30 mm
Max. live load	30,0 kN/m^2	30,0 kN/m^2
Thermal resistance	0,50 m^{2}K/W	0,85 m^{2}K/W
Dynamic stiffness	-	-
Reaction to fire (refer to EN 13501-1)	Class E	Class E
Foil grid	100 x 100 mm	100 x 100 mm
Type of system	Wet system	Wet system
Load distribution layer	Cement screed or anhydrite screed	Cement screed or anhydrite screed

Uponor Comfort Pipe PLUS

	Value	Value	Value	Value
Pipe designation	Uponor Comfort Pipe PLUS 14 x 2,0 mm	Uponor Comfort Pipe PLUS 16 x 2,0 mm	Uponor Comfort Pipe PLUS 17 x 2,0 mm	Uponor Comfort Pipe PLUS 20 x 2,0 mm
Pipe dimension	14 x 2,0 mm	16 x 2,0 mm	17 x 2,0 mm	20 x 2,0 mm
Pipe length	120; 240; 640; 960 m	120; 240; 640 m	60; 120; 240; 480; 640 m	60; 120; 240; 480; 600; 1000 m
Material	PE-Xa, five-layer pipe	PE-Xa, five-layer pipe	PE-Xa, five-layer pipe	PE-Xa, five-layer pipe
Colour	White with two blue longitudinal stripes	White with two blue longitudinal stripes	White with two blue longitudinal stripes	White with two blue longitudinal stripes
Manufacturing	Refer to EN ISO 15875	Refer to EN ISO 15875	Refer to EN ISO 15875	Refer to EN ISO 15875
Certificates	KOMO, DIN CERTCO	KOMO, DIN CERTCO	KOMO, DIN CERTCO	KOMO, DIN CERTCO
Area of application	Class 4 + 5 / 6 bar (EN ISO 15875)	Class 4 + 5 / 6 bar (EN ISO 15875)	Class 4 + 5 / 6 bar (EN ISO 15875)	Class 4 + 5 / 6 bar (EN ISO 15875)
Max. operating temperature[1)]	90 °C (EN ISO 15875)	90 °C (EN ISO 15875)	90 °C (EN ISO 15875)	90 °C (EN ISO 15875)
Max. operating pressure	6 bar at 70° C	6 bar at 70° C	6 bar at 70° C	6 bar at 70° C

	Value	Value	Value	Value
Pipe jointings	Uponor screw connection, Uponor Smart press coupling, Uponor Q&E technology	Uponor screw connection, Uponor Smart press coupling, Uponor Q&E technology	Uponor screw connection, Uponor Smart press coupling, Uponor Q&E technology	Uponor screw connection, Uponor Smart press coupling, Uponor Q&E technology
Weight	0,078 kg/m	0,091 kg/m	0,115 kg/m	0,115 kg/m
Water content	0,077 l/m	0,11 l/m	0,13 l/m	0,20 l/m
Oxygen tightness	Refer to ISO 17455; DIN 4726	Refer to ISO 17455; DIN 4726	Refer to ISO 17455; DIN 4726	Refer to ISO 17455; DIN 4726
Density	0,934 g/cm³	0,934 g/cm³	0,934 g/cm³	0,934 g/cm³
Material class	Class B2 and class E, DIN 4102 / EN 13501	Class B2 and class E, DIN 4102 / EN 13501	Class B2 and class E, DIN 4102 / EN 13501	Class B2 and class E, DIN 4102 / EN 13501
Min. bending radius	8 x D; free-hand bending (112 mm) 5 x D; supported bending (70 mm)	8 x D; free-hand bending (128 mm) 5 x D; supported bending (80 mm)	8 x D; free-hand bending (136 mm) 5 x D; supported bending (85 mm)	8 x D; free-hand bending (160 mm) 5 x D; supported bending (100 mm)
Pipe roughness	0,007 mm	0,007 mm	0,007 mm	0,007 mm
Ideal installation temperature	≥ 0 °C	≥ 0 °C	≥ 0 °C	≥ 0 °C
UV protection	Opaque cardboard (store remaining quantities in the cardboard box)	Opaque cardboard (store remaining quantities in the cardboard box)	Opaque cardboard (store remaining quantities in the cardboard box)	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).

Uponor Comfort Pipe

	Value
Pipe designation	Uponor Comfort Pipe 16 x 1,8 mm
Pipe dimension	16 x 1,8 mm
Pipe length	240; 640 m
Material	PE-Xa, five-layer pipe
Colour	White with one blue longitudinal stripe
Manufacturing	Refer to EN ISO 15875
Certificates	DIN CERTCO
Area of application	Class 4 + 5 / 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	0,091 kg/m
Water content	0,11 l/m
Oxygen tightness	Refer to ISO 17455; DIN 4726
Density	0,934 g/cm³
Material class	Class B2 and class E, DIN 4102 / EN 13501
Min. bending radius	8 x D; free-hand bending (128 mm) 5 x D; supported bending (80 mm)
Pipe roughness	0,007 mm
Ideal installation 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).

Uponor Smart UFH-pipe

	Value	Value	Value
Pipe designation	Uponor Smart UFH-pipe 14 x 2,0 mm	Uponor Smart UFH-pipe 16 x 2,0 mm	Uponor Smart UFH-pipe 20 x 2,0 mm
Pipe dimension	14 x 2,0 mm	16 x 2,0 mm	20 x 2,0 mm
Pipe length	240; 640 m	240; 640 m	240; 480 m
Material	PE-RT Type II, five-layer pipe	PE-RT Type II, five-layer pipe	PE-RT Type II, five-layer pipe

	Value	Value	Value
Colour	Natural colour	Natural colour	Natural colour
Manufacturing	Refer to EN ISO 22391	Refer to EN ISO 22391	Refer to EN ISO 22391
Certificates	KOMO, DIN CERTCO	KOMO, DIN CERTCO	KOMO, DIN CERTCO
Area of application	Class 4 + 5 / 6 bar (EN ISO 22391)	Class 4 + 5 / 6 bar (EN ISO 22391)	Class 4 + 5 / 6 bar (EN ISO 22391)
Max. operating temperature[1)]	90 °C (EN ISO 22391)	90 °C (EN ISO 22391)	90 °C (EN ISO 22391)
Max. operating pressure	6 bar at 70° C	6 bar at 70° C	6 bar at 70° C
Pipe jointings	Uponor screw connection Uponor Smart press coupling	Uponor screw connection	Uponor screw connection Uponor Smart press coupling
Weight	0,0726 kg/m	0,0846 kg/m	0,118 kg/m
Water content	0,079 l/m	0,113 l/m	0,196 l/m
Oxygen tightness	Refer to ISO 17455; DIN 4726	Refer to ISO 17455; DIN 4726	Refer to ISO 17455; DIN 4726
Density	0,941 g/cm³	0,941 g/cm³	0,941 g/cm³
Material class	Class B2 and class E, DIN 4102 / EN 13501	Class B2 and class E, DIN 4102 / EN 13501	Class B2 and class E, DIN 4102 / EN 13501
Min. bending radius	8 x D; free-hand bending (112 mm) 5 x D; supported bending (70 mm)	8 x D; free-hand bending (128 mm) 5 x D; supported bending (80 mm)	8 x D; free-hand bending (160 mm) 5 x D; supported bending (100 mm)
Pipe roughness	0,007 mm	0,007 mm	0,007 mm
Ideal installation temperature	≥ 0 °C	≥ 0 °C	≥ 0 °C
UV protection	Opaque cardboard (store remaining quantities in the cardboard box)	Opaque cardboard (store remaining quantities in the cardboard box)	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).

Uponor MLCP RED

Description	Value	Value
Pipe designation	Uponor MLCP RED 14 x 1,6 mm	Uponor MLCP RED 16 x 2,0 mm
Pipe dimension	14 x 1,6 mm	16 x 2,0 mm
Pipe length	240; 480 m	240; 480 m
Material	Multi-layer composite pipe (PE-RT - aluminium - PE-RT), monitored by SKZ (Southern German Plastics Centre), oxygen-tight refer to DIN 4726.	Multi-layer composite pipe (PE-RT - aluminium - PE-RT), monitored by SKZ (Southern German Plastics Centre), oxygen-tight refer to DIN 4726.
Colour	Red	Red
Manufacturing	Refer to EN ISO 21003	Refer to EN ISO 21003
Certificates	KOMO, DIN CERTCO	KOMO, DIN CERTCO
Area of application	Class 4 / 5 (ISO 10508)	Class 4 / 5 (ISO 10508)
Max. operating temperature	60 °C	60 °C
Max. operating pressure	4 bar	4 bar
Pipe jointings	Uponor screw connection	Uponor screw connection Uponor S-Press PLUS
Weight	0,076 kg/m	0,117 kg/m
Water volume	0,091 l/m	0,113 l/m
Oxygen tightness	Refer to ISO 17455; DIN 4726	Refer to ISO 17455; DIN 4726
Building material class	Class B2, refer to DIN 4102	Class B2, refer to DIN 4102
Min. bending radius	4xd if free bending (56 mm) 3xd if supported bend (42 mm)	4xd if free bending (64 mm) 3xd if supported bend (48 mm)
Pipe roughness	0,004 mm	0,004 mm
Best mounting temperature	≥ 0 °C	≥ 0 °C
UV protection	Brown cardboard (store remaining quantities in the cardboard box)	Brown cardboard (store remaining quantities in the cardboard box)

Uponor GmbH

Industriestraße 56,
D-97437 Hassfurt, Germany

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www.uponor.com