

Uponor Tacker underfloor heating/ cooling system

EN Technical information

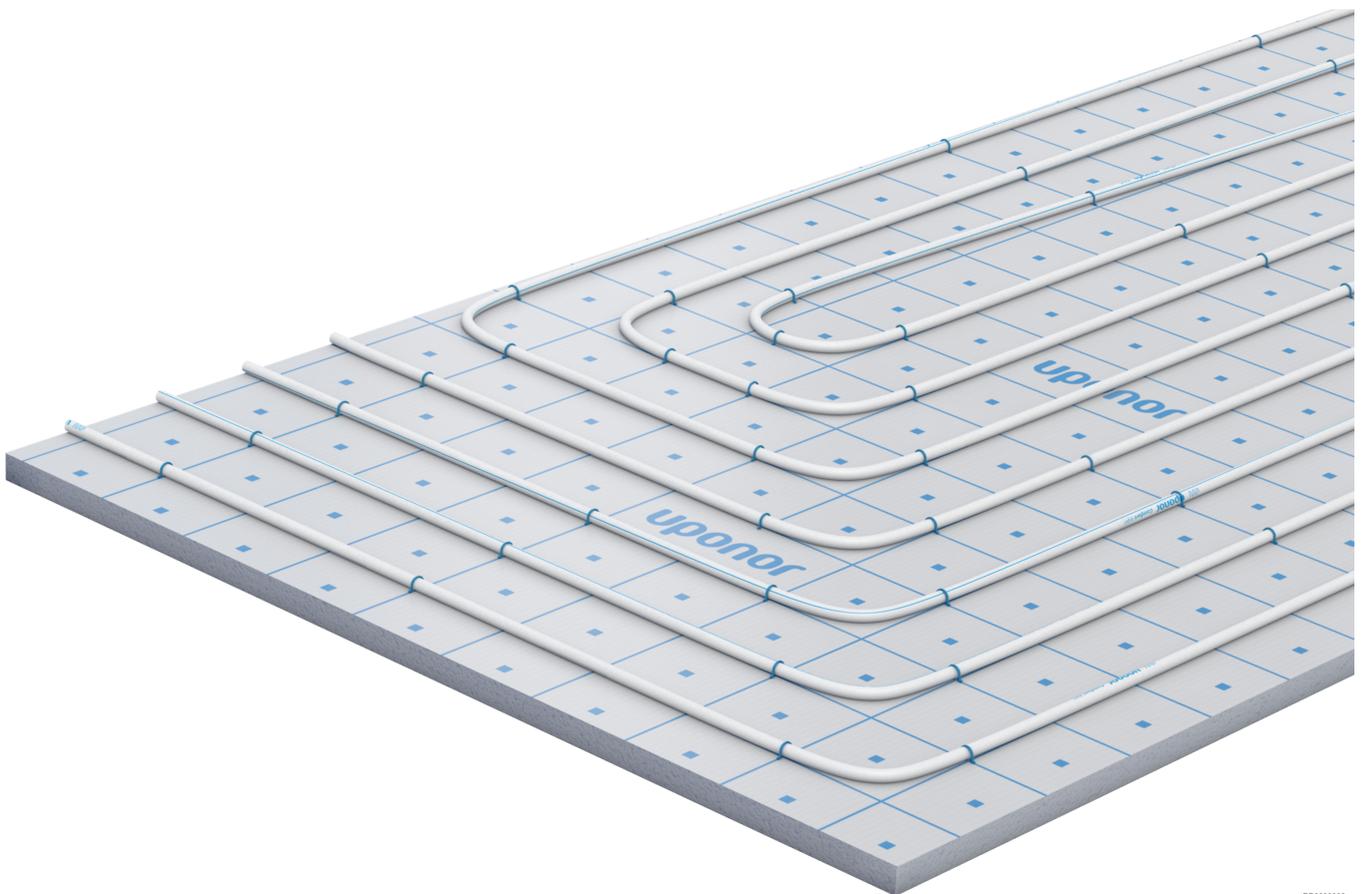


Table of contents

1	System description.....	3
1.1	Benefits.....	3
1.2	Components.....	3
1.3	Copyright and disclaimer.....	5
2	Planning/ design.....	6
2.1	Floor constructions.....	6
2.2	Dimensioning diagrams.....	10
2.3	Pressure drop diagrams.....	48
3	Installation.....	50
3.1	Installation process.....	50
4	Technical data.....	51
4.1	Technical specifications.....	51

1 System description



RP0000331

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



RP0000333

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 m²).

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 m²).

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



RP0000302

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



RP0000302

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.

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.

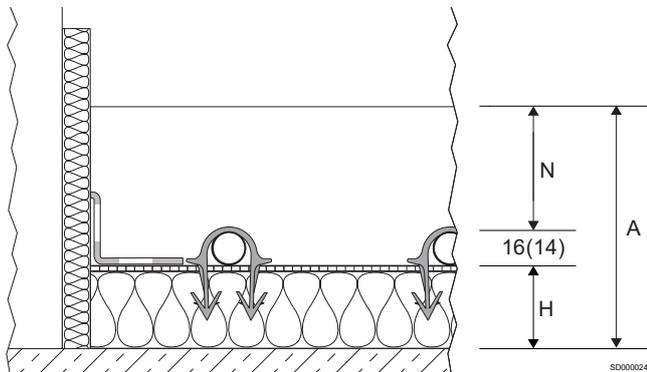
Uponor disclaims all warranties related to the content of this document, expressed or implied, to the fullest extent permissible unless otherwise agreed or statutory.

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



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:

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.

Abbreviations	Description
CT	Cement screed
CAF	Anhydride liquid screed
ΔLw [dB]	Impact sound improvement factor of flooring
$\Delta Lw,P$ [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/m ²) 	
	H [mm]	$R_{\lambda, ins}$ [m ² 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						
	Tacker roll EPS DES 40 = 40	0,85	31	30	≥ 101 (99)	≥ 91 (89)
EN 1264-4						
Floor slabs¹⁾, ceilings against unheated rooms in residential and non-residential buildings						
	Tacker roll EPS DES 40 = 40 EPS 035 DEO dm 15 = 15 Total H = 55	1,28	31	30	≥ 116 (114)	≥ 106 (104)
EN 1264-4						
Floor ceilings against outside air in residential and non-residential buildings ($\vartheta_i \geq 19$ °C)						
	Tacker roll EPS DES 40 = 40 EPS 035 DEO dm 45 = 45 Total H = 85	2,14	31	30	≥ 146 (144)	≥ 136 (134)
EN 1264-4						

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of flooring ΔL_w [dB]		Structural height A (4,0 kN/m ²) ²⁾	
	H [mm]		$R_{\lambda, ins}$ [m ² K/W]	CT N \geq 70 [mm]	CAF ³⁾ N \geq 60 [mm]	CT N \geq 70 [mm]

Apartment ceiling separating heated rooms

	Tacker roll EPS DES 40 = 40	0,85	33	32	\geq 126 (124)	\geq 116 (114)
EN 1264-4						

Floor slabs¹⁾, ceilings against unheated rooms in residential and non-residential buildings

	Tacker roll EPS DES 40 = 40 EPS 035 DEO dm 15 = 15 Total H = 55	1,28	33	32	\geq 141 (139)	\geq 131 (129)
EN 1264-4						

Floor ceilings against outside air in residential and non-residential buildings ($\vartheta_i \geq 19$ °C)

	Tacker roll EPS DES 40 = 40 EPS 035 DEO dm 45 = 45 Total H = 85	2,14	33	32	\geq 171 (169)	\geq 161 (159)
EN 1264-4						

¹⁾ Observe additional construction height for structural waterproofing (refer to DIN 18533). Groundwater level \geq 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 ΔL_w [dB]		Structural height A (2,0 kN/m ²) ²⁾	
	H [mm]		$R_{\lambda, ins}$ [m ² K/W]	CT N \geq 45 [mm]	CAF ³⁾ N \geq 35 [mm]	CT N \geq 45 [mm]

Apartment ceiling separating heated rooms

	Tacker roll EPS DES 35 = 35	0,75	31	30	\geq 96 (94)	\geq 86 (84)
EN 1264-4						

Floor slabs¹⁾, ceilings against unheated rooms in residential and non-residential buildings

	Tacker roll EPS DES 35 = 35 EPS 035 DEO dm 20 = 20 Total H = 55	1,32	31	30	\geq 116 (114)	\geq 106 (104)
EN 1264-4						

Floor ceilings against outside air in residential and non-residential buildings ($\vartheta_i \geq 19$ °C)

	Tacker roll EPS DES 35 = 35 EPS 035 DEO dm 45 = 45 Total H = 80	2,04	31	30	\geq 141 (139)	\geq 131 (129)
EN 1264-4						

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of flooring ΔL_w [dB]		Structural height A (4,0 kN/m ²) ²⁾	
	H [mm]		$R_{\lambda, ins}$ [m ² K/W]	CT N \geq 70 [mm]	CAF ³⁾ N \geq 60 [mm]	CT N \geq 70 [mm]

Apartment ceiling separating heated rooms

	Tacker roll EPS DES 35 = 35	0,75	33	32	\geq 121 (119)	\geq 111 (109)
EN 1264-4						

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of flooring ΔL_w [dB]		Structural height A (4,0 kN/m ²) ²⁾	
	H [mm]		$R_{\lambda, ins}$ [m ² K/W]	CT N \geq 70 [mm]	CAF ³⁾ N \geq 60 [mm]	CT N \geq 70 [mm]

Floor slabs¹⁾, ceilings against unheated rooms in residential and non-residential buildings

	Tacker roll EPS DES 35 = 35 EPS 035 DEO dm 20 = 20 Total H = 55	1,32	33	32	\geq 141 (139)	\geq 131 (129)
EN 1264-4						

Floor ceilings against outside air in residential and non-residential buildings ($\theta_i \geq 19$ °C)

	Tacker roll EPS DES 35 = 35 EPS 035 DEO dm 45 = 45 Total H = 80	2,04	33	32	\geq 166 (164)	\geq 156 (154)
EN 1264-4						

¹⁾ Observe additional construction height for structural waterproofing (refer to DIN 18533). Groundwater level \geq 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 ΔL_w [dB]		Structural height A (2,0 kN/m ²) ²⁾	
	H [mm]		$R_{\lambda, ins}$ [m ² K/W]	CT N \geq 45 [mm]	CAF ³⁾ N \geq 35 [mm]	CT N \geq 45 [mm]

Apartment ceiling separating heated rooms

	Tacker roll EPS DES 30 = 30	0,75	29	28	\geq 91 (89)	\geq 81 (79)
EN 1264-4						

Floor slabs¹⁾, ceilings against unheated rooms in residential and non-residential buildings

	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 20 = 20 Total H = 50	1,32	29	28	\geq 111 (109)	\geq 101 (99)
EN 1264-4						

Floor ceilings against outside air in residential and non-residential buildings ($\theta_i \geq 19$ °C)

	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 45 = 45 Total H = 75	2,04	29	28	\geq 136 (134)	\geq 126 (124)
EN 1264-4						

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of flooring ΔL_w [dB]		Structural height A (5,0 kN/m ²) ²⁾	
	H [mm]		$R_{\lambda, ins}$ [m ² K/W]	CT N \geq 75 [mm]	CAF ³⁾ N \geq 65 [mm]	CT N \geq 75 [mm]

Apartment ceiling separating heated rooms

	Tacker roll EPS DES 30 = 30	0,75	32	31	\geq 121 (119)	\geq 111 (109)
EN 1264-4						

Floor slabs¹⁾, ceilings against unheated rooms in residential and non-residential buildings

	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 20 = 20 Total H = 50	1,32	32	31	\geq 141 (139)	\geq 131 (129)
EN 1264-4						

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of flooring ΔL_w [dB]		Structural height A (5,0 kN/m ²) ²⁾	
	H [mm]		$R_{\lambda, ins}$ [m ² K/W]	CT N \geq 75 [mm]	CAF ³⁾ N \geq 65 [mm]	CT N \geq 75 [mm]
						

Floor ceilings against outside air in residential and non-residential buildings ($\vartheta_i \geq 19$ °C)

	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 45 = 45 Total H = 75	2,04	32	31	\geq 166 (164)	\geq 156 (154)
EN 1264-4						

¹⁾ Observe additional construction height for structural waterproofing (refer to DIN 18533). Groundwater level \geq 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 $\Delta L_{w,P}$ [dB]		Structural height A (2,0 kN/m ²) ²⁾	
	H [mm]		$R_{\lambda, ins}$ [m ² K/W]	CT N \geq 45 [mm]	CAF ³⁾ N \geq 35 [mm]	CT N \geq 45 [mm]
						

Apartment ceiling separating heated rooms

	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 10 = 10 Total H = 40	0,94	29	28	\geq 101 (99)	\geq 91 (89)
EN 1264-4						

Floor slabs¹⁾, ceilings against unheated rooms in residential and non-residential buildings

	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 25 = 25 Total H = 55	1,36	29	28	\geq 116 (114)	\geq 106 (104)
EN 1264-4						

Floor ceilings against outside air in residential and non-residential buildings ($\vartheta_i \geq 19$ °C)

	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 50 = 50 Total H = 80	2,08	29	28	\geq 141 (139)	\geq 131 (129)
EN 1264-4						

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of tested flooring $\Delta L_{w,P}$ [dB]		Structural height A (5,0 kN/m ²) ²⁾	
	H [mm]		$R_{\lambda, ins}$ [m ² K/W]	CT N \geq 75 [mm]	CAF ³⁾ N \geq 65 [mm]	CT N \geq 75 [mm]
						

Apartment ceiling separating heated rooms

	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 10 = 10 Total H = 40	0,94	31	31	\geq 126 (124)	\geq 116 (114)
EN 1264-4						

Floor slabs¹⁾, ceilings against unheated rooms in residential and non-residential buildings

	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 25 = 25 Total H = 55	1,36	31	31	\geq 141 (139)	\geq 131 (129)
EN 1264-4						

Floor ceilings against outside air in residential and non-residential buildings ($\vartheta_i \geq 19$ °C)

	Tacker roll EPS DES 30 = 30 EPS 035 DEO dm 50 = 50 Total H = 80	2,08	31	31	\geq 166 (164)	\geq 156 (154)
EN 1264-4						

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 ΔL_w [dB]		Structural height A (2,0 kN/m ²) ²⁾	
	H [mm]		$R_{\lambda, ins}$ [m ² K/W]	CT N ≥ 45 [mm]	CAF ³⁾ N ≥ 35 [mm]	CT N ≥ 45 [mm]
Apartment ceiling separating heated rooms						
	Tacker roll EPS DES 20 = 20 EPS 035 DEO dm 10 = 10 Total H = 30	0,79	27	26	≥ 91 (89)	≥ 81 (79)
EN 1264-4						
Floor slabs¹⁾, ceilings against unheated rooms in residential and non-residential buildings						
	Tacker roll EPS DES 20 = 20 EPS 035 DEO dm 30 = 30 Total H = 50	1,36	27	26	≥ 111 (109)	≥ 101 (99)
EN 1264-4						
Floor ceilings against outside air in residential and non-residential buildings ($\vartheta_i \geq 19$ °C)						
	Tacker roll EPS DES 20 = 20 EPS 035 DEO dm 55 = 55 Total H = 75	2,07	27	26	≥ 136 (134)	≥ 126 (124)
EN 1264-4						

Thermal insulation requirements	Insulation layer thickness	Thermal resistance of insulation	Impact sound improvement factor of flooring ΔL_w [dB]		Structural height A (5,0 kN/m ²) ²⁾	
	H [mm]		$R_{\lambda, ins}$ [m ² K/W]	CT N ≥ 75 [mm]	CAF ³⁾ N ≥ 65 [mm]	CT N ≥ 75 [mm]
Apartment ceiling separating heated rooms						
	Tacker roll EPS DES 20 = 20 EPS 035 DEO dm 10 = 10 Total H = 30	0,79	29	28	≥ 131 (129)	≥ 111 (109)
EN 1264-4						
Floor slabs¹⁾, ceilings against unheated rooms in residential and non-residential buildings						
	Tacker roll EPS DES 20 = 20 EPS 035 DEO dm 30 = 30 Total H = 50	1,36	29	28	≥ 141 (139)	≥ 131 (129)
EN 1264-4						
Floor ceilings against outside air in residential and non-residential buildings ($\vartheta_i \geq 19$ °C)						
	Tacker roll EPS DES 20 = 20 EPS 035 DEO dm 55 = 55 Total H = 75	2,07	29	28	≥ 166 (164)	≥ 156 (154)
EN 1264-4						

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:

$$\Delta \vartheta_{V,des} = \Delta \vartheta_{H,G} + \Delta \vartheta_1 + 2.5 \text{ K.}$$

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

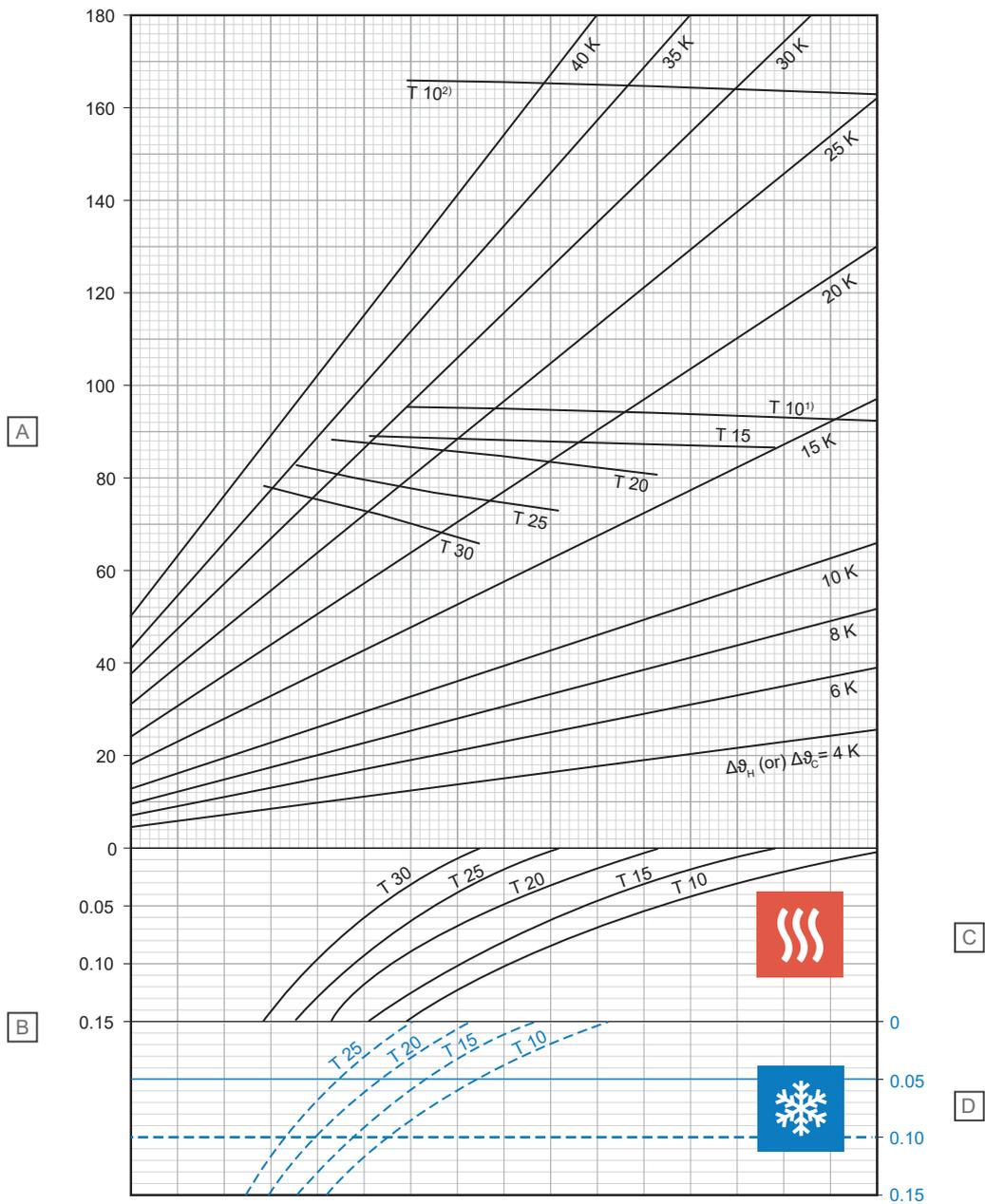
The following diagrams results are accurate and in accordance with EN 1264.

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 carpeted 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
$\vartheta_{F,max}$	$^{\circ}C$	Maximum floor surface temperature
ϑ_H	$^{\circ}C$	Average temperature of the heating medium
ϑ_i	$^{\circ}C$	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 $\lambda_u = 1,2 \text{ W/mK}$)



D10000214

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 _{A,B}]

C - Heating

T (cm)	q _H (W/m ²)	Δθ _{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

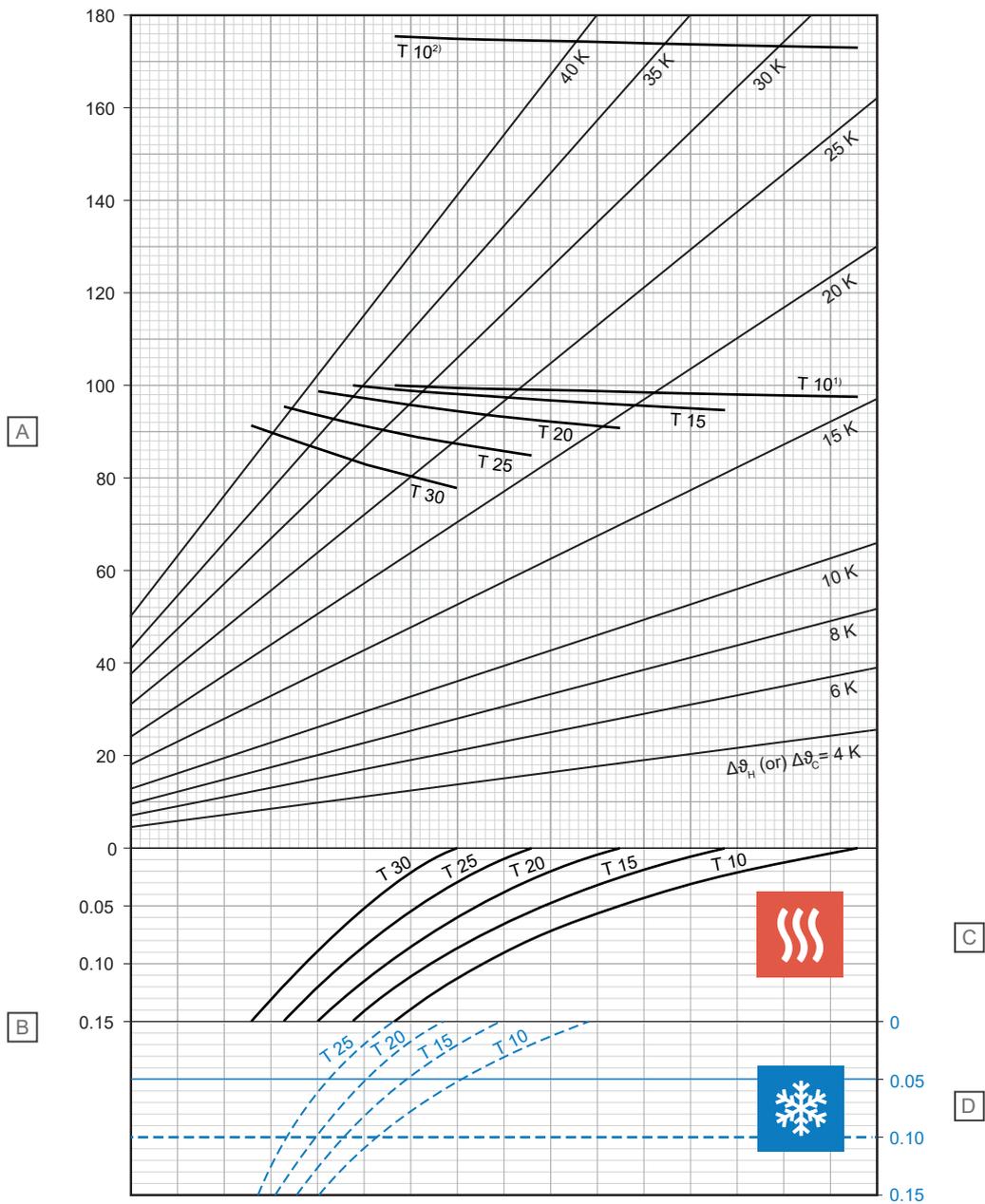
D - Cooling

T (cm)	q _C (W/m ²)	Δθ _{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 θ_{F, max} 29 °C or θ_i 24 °C and θ_{F, max} 33 °C

²⁾ Limit curve valid for θ_i 20 °C and θ_{F, max} 35 °C

Uponor Comfort Pipe PLUS 14 x 2,0 mm with screed load distribution layer (su = 45 mm with $\lambda_u = 1,2 \text{ W/mK}$)



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)
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

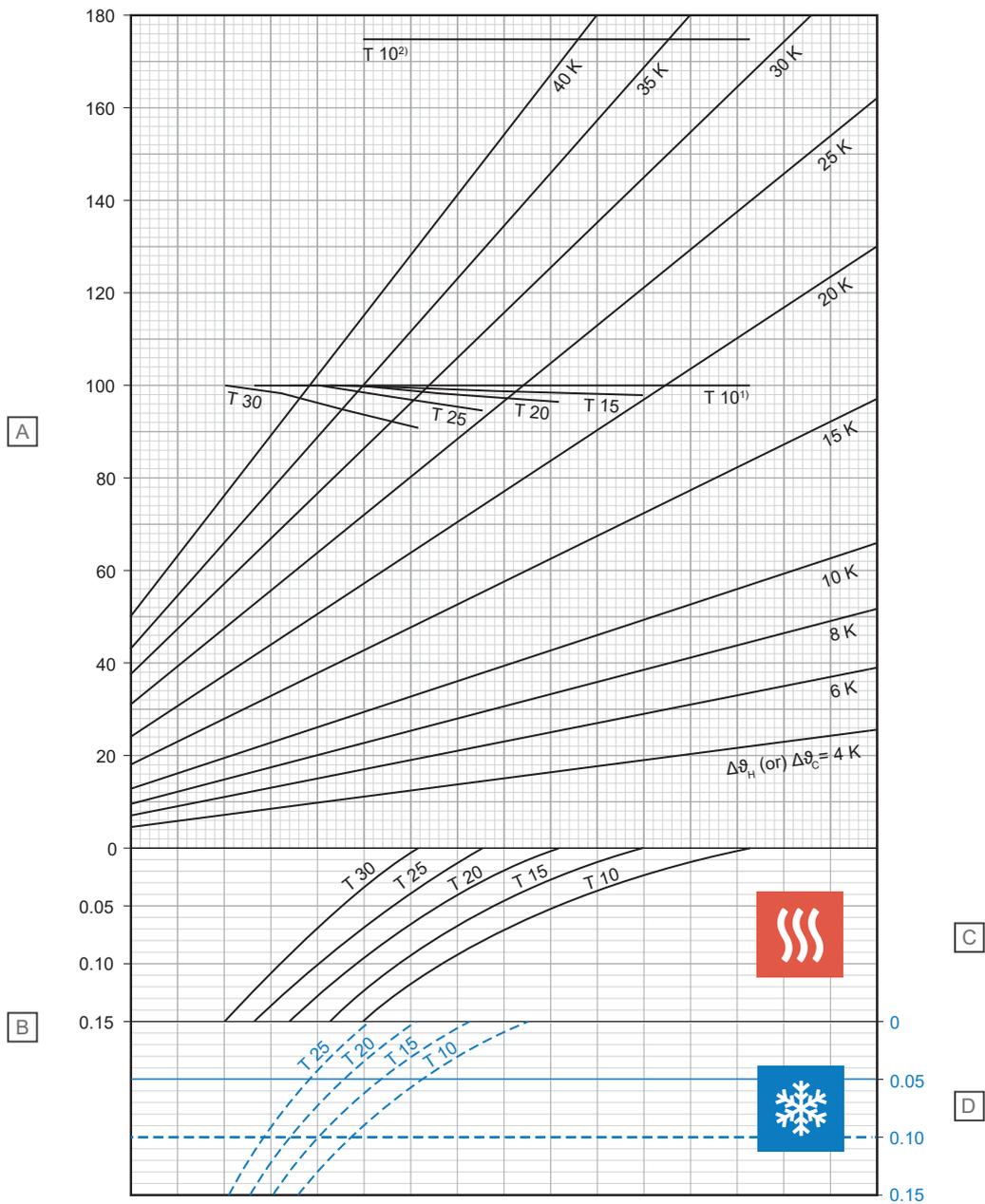
T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (K)
10	35,4	8
15	31,4	8
20	28,0	8
25	24,9	8

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

D10000215

Uponor Comfort Pipe PLUS 14 x 2,0 mm with screed load distribution layer (su = 65 mm with $\lambda_u = 1,2 \text{ W/mK}$)



D10000216

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)
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

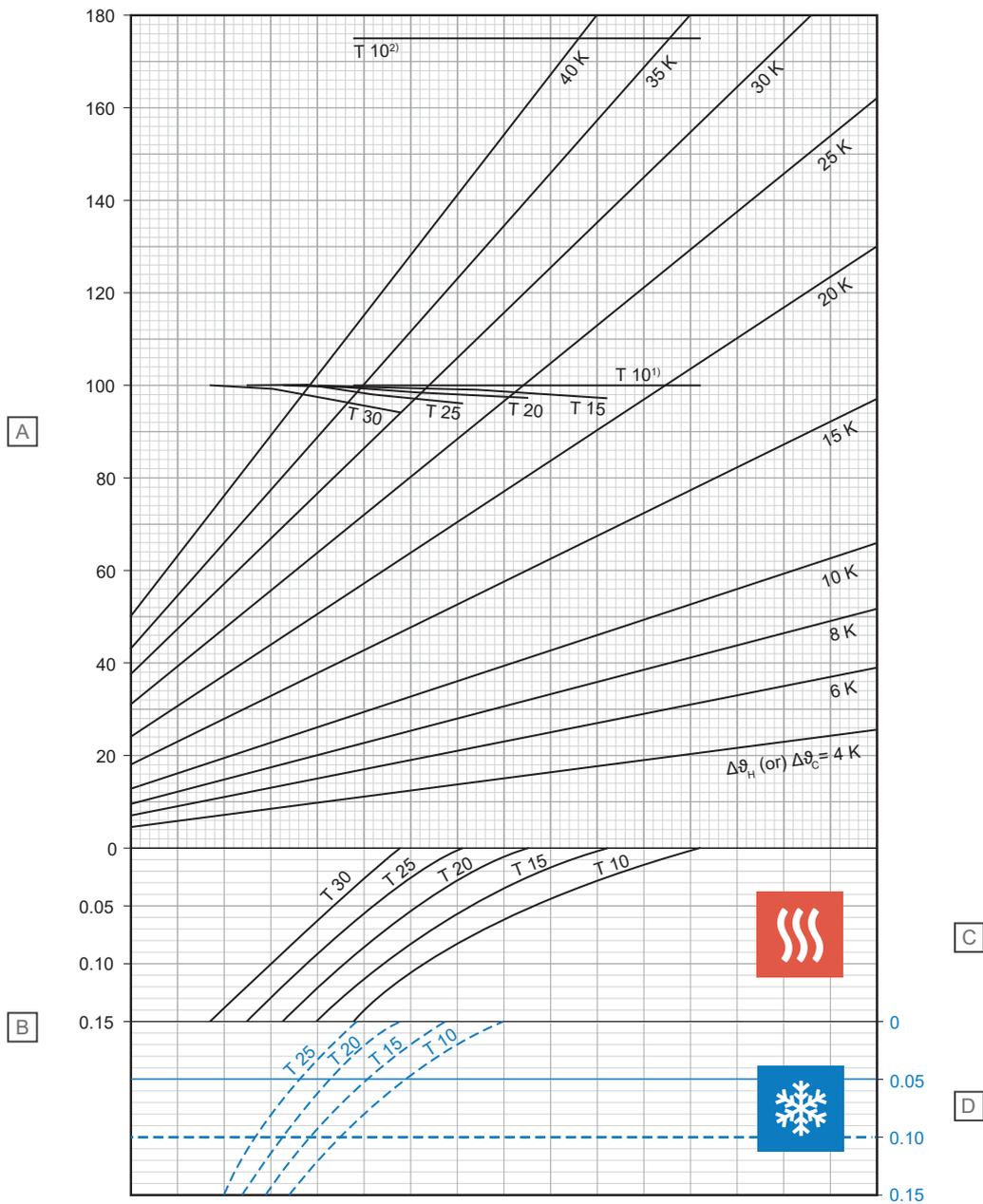
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda u = 1,2 \text{ W/mK}$)



D10000217

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 _{A,B}]

C - Heating

T (cm)	q _H (W/m ²)	Δθ _{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

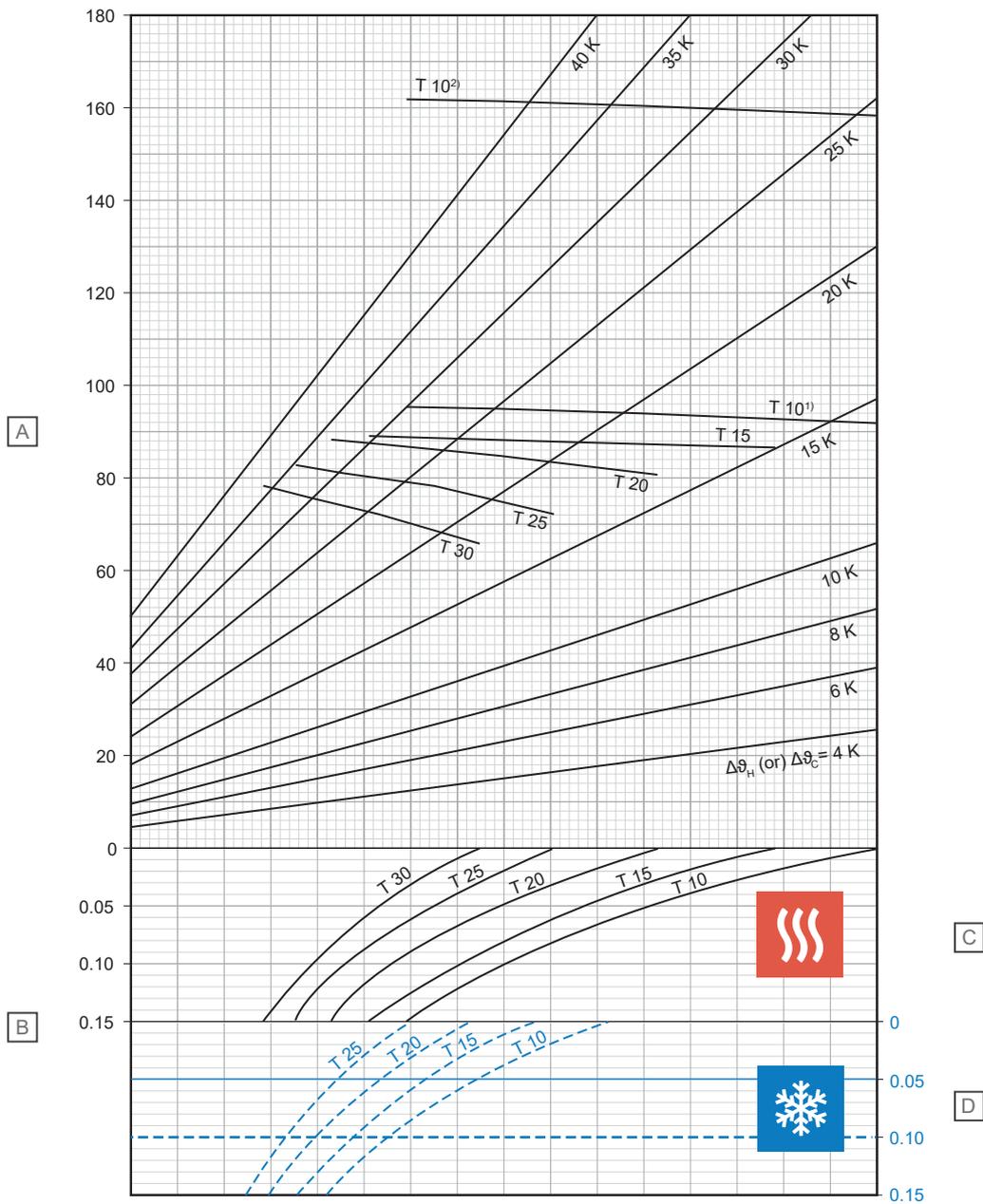
D - Cooling

T (cm)	q _C (W/m ²)	Δθ _{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 $\lambda_u = 1,2 \text{ W/mK}$)



D10000218

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)
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

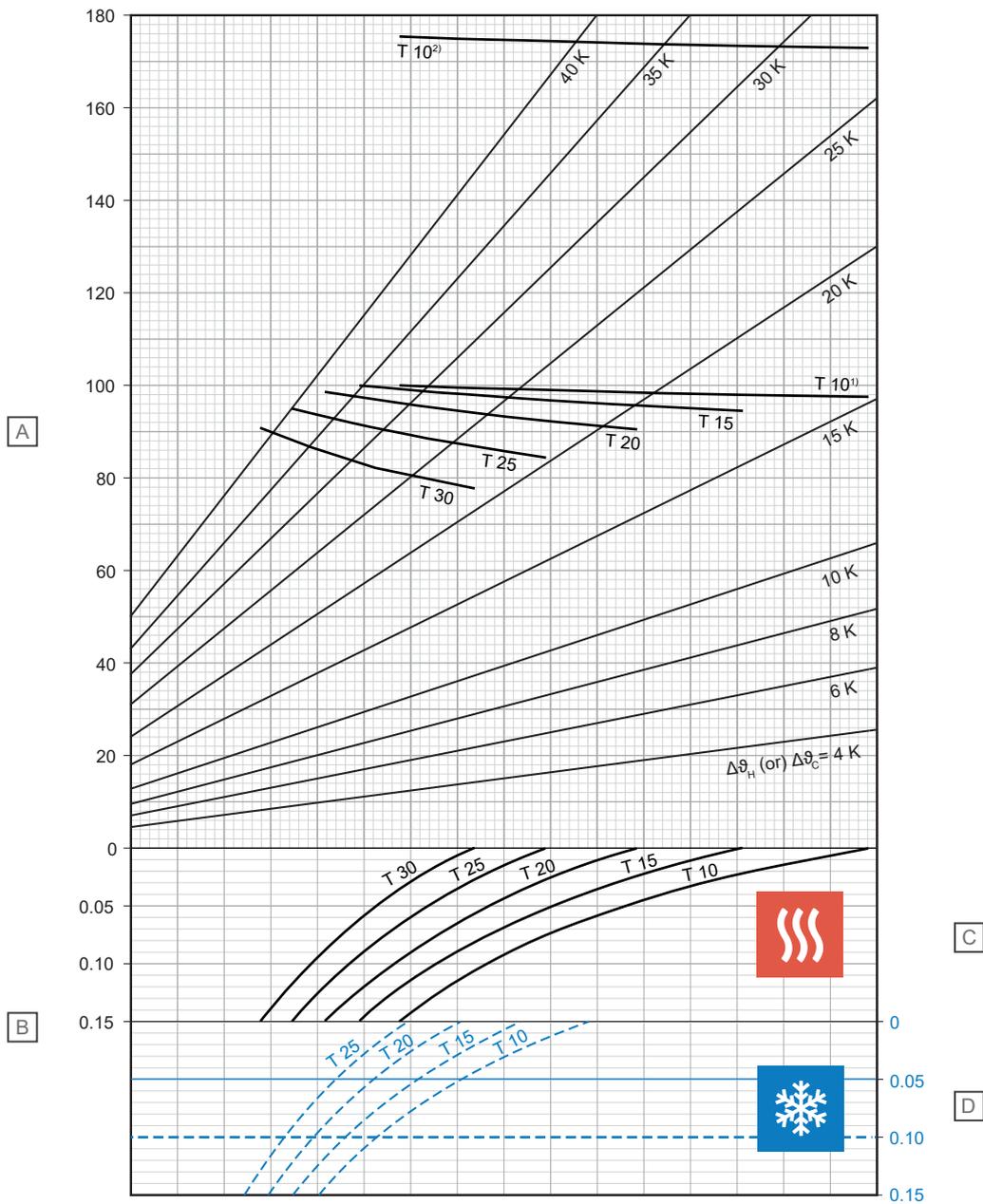
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



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 _{A,B}]

C - Heating

T (cm)	q _H (W/m ²)	Δθ _{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

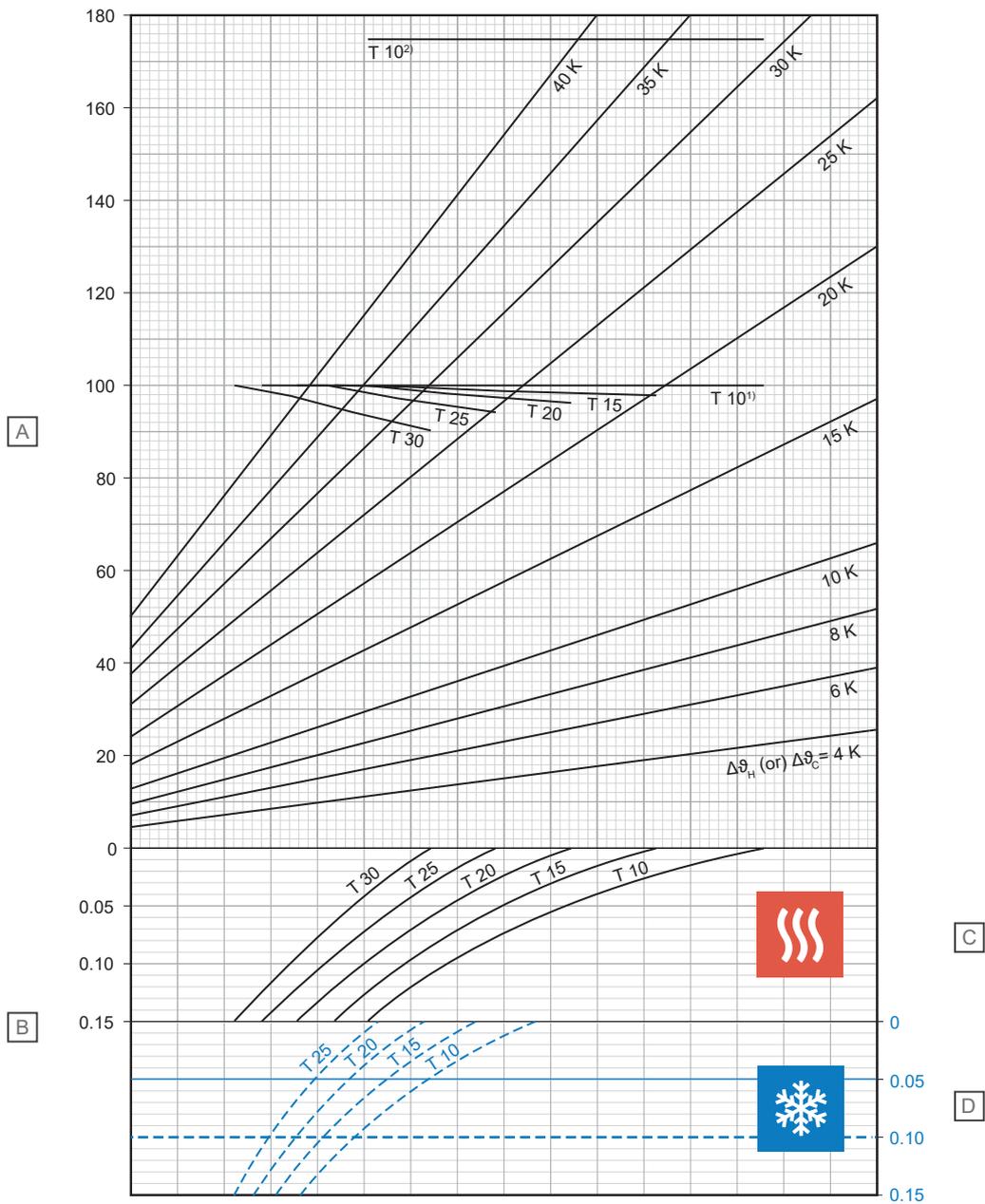
D - Cooling

T (cm)	q _C (W/m ²)	Δθ _{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 $\lambda_u = 1,2 \text{ W/mK}$)



D10000216

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)
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

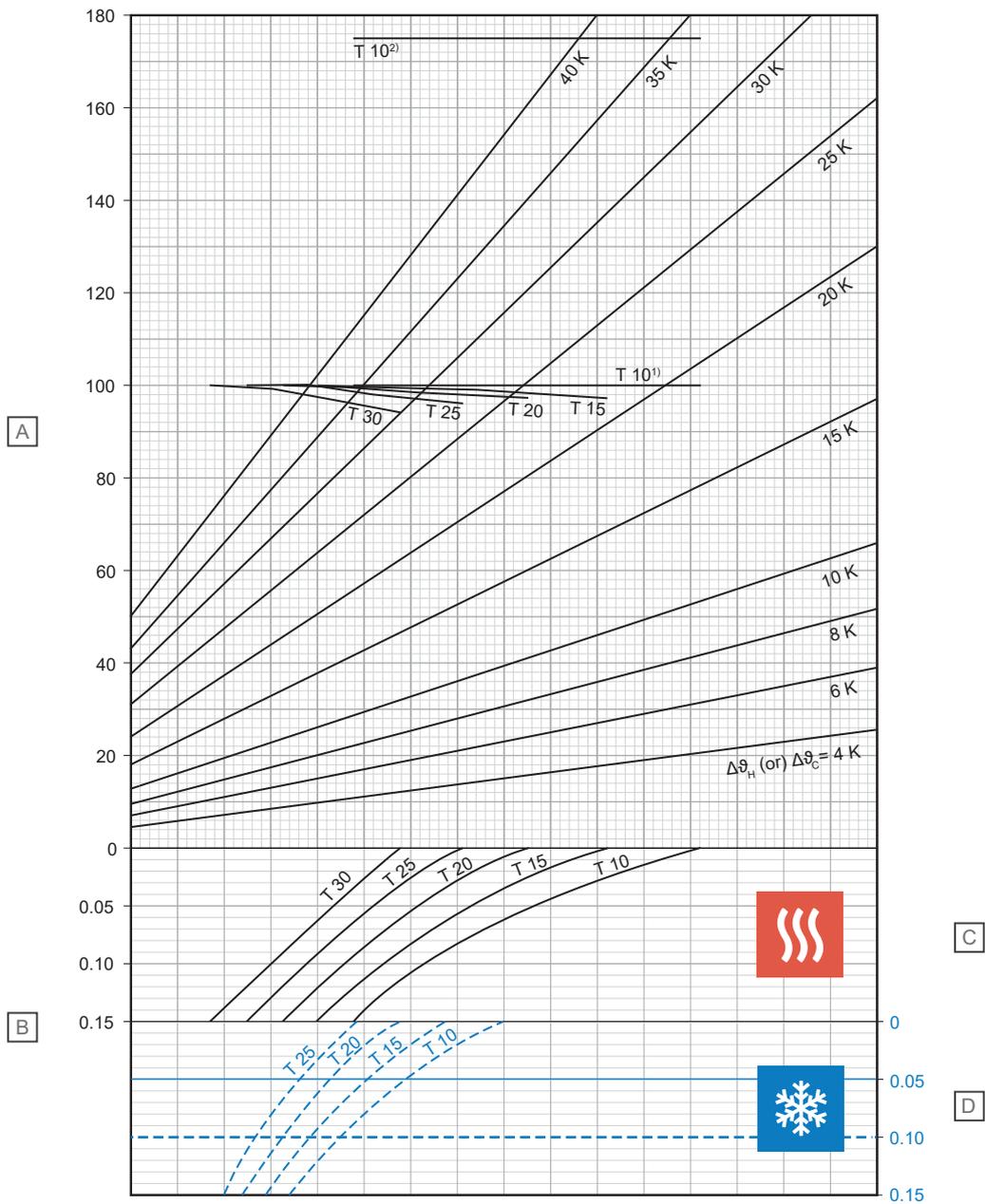
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda u = 1,2 \text{ W/mK}$)



D10000221

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)
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

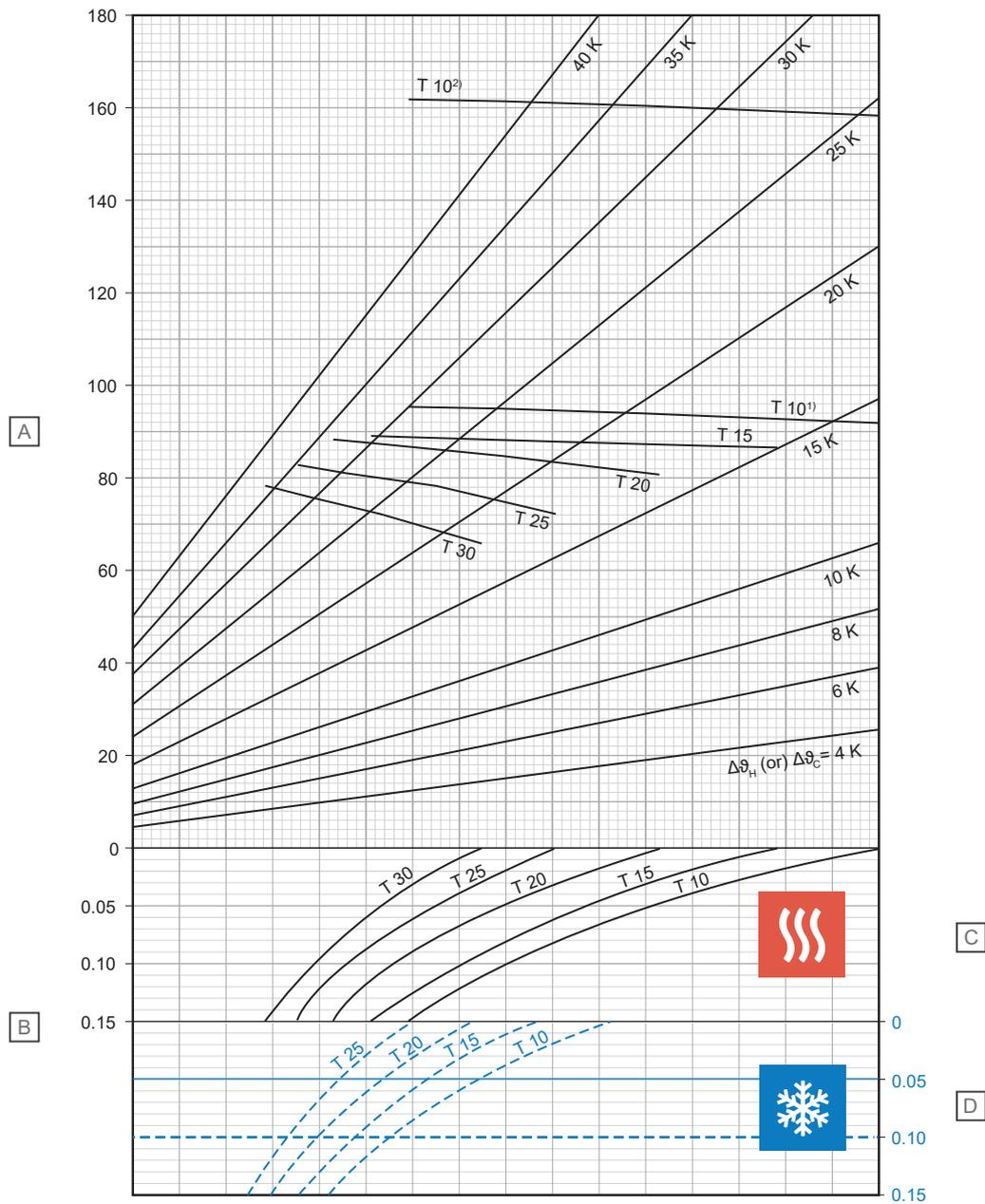
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\theta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



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)
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

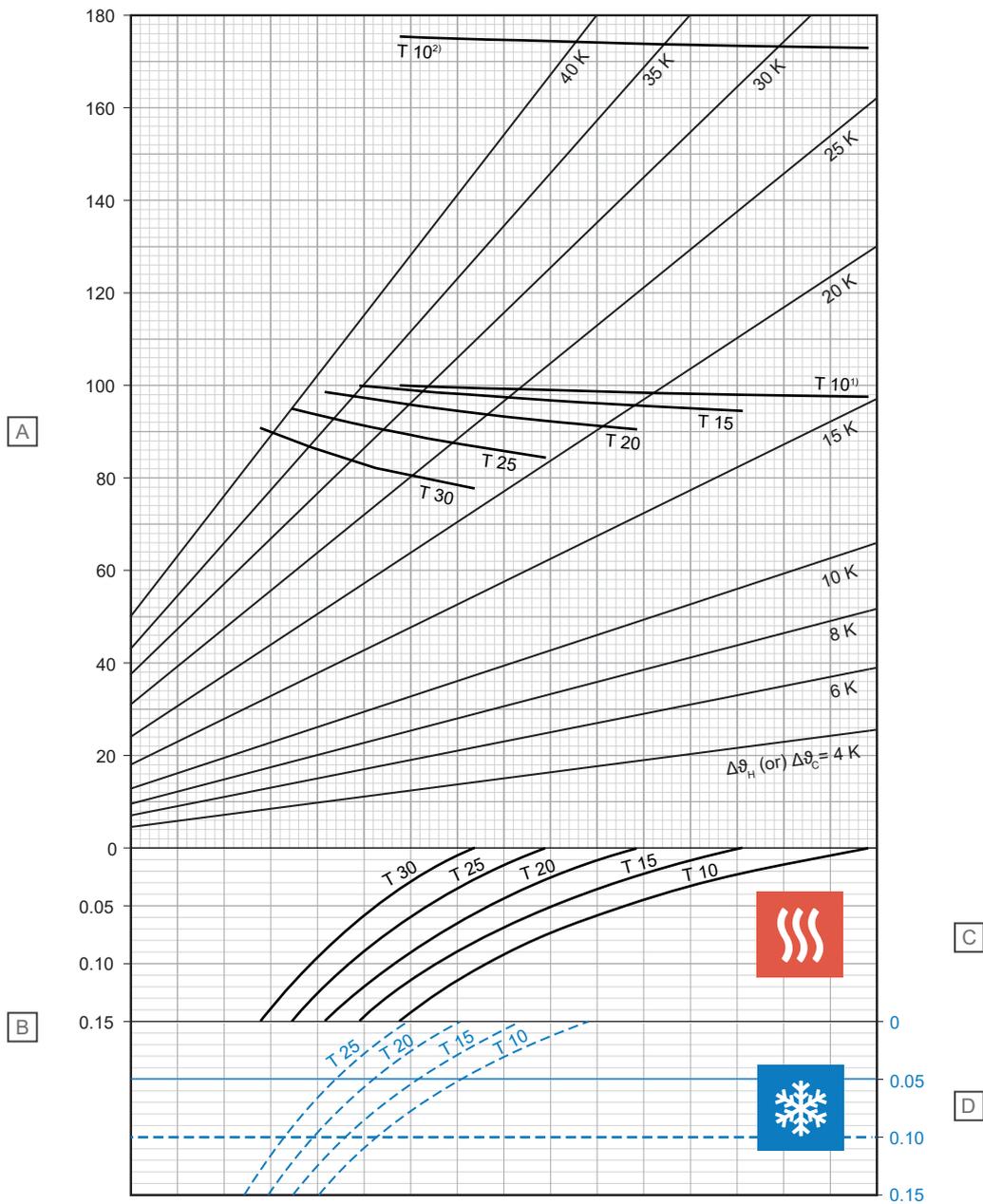
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



D0000231

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)
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

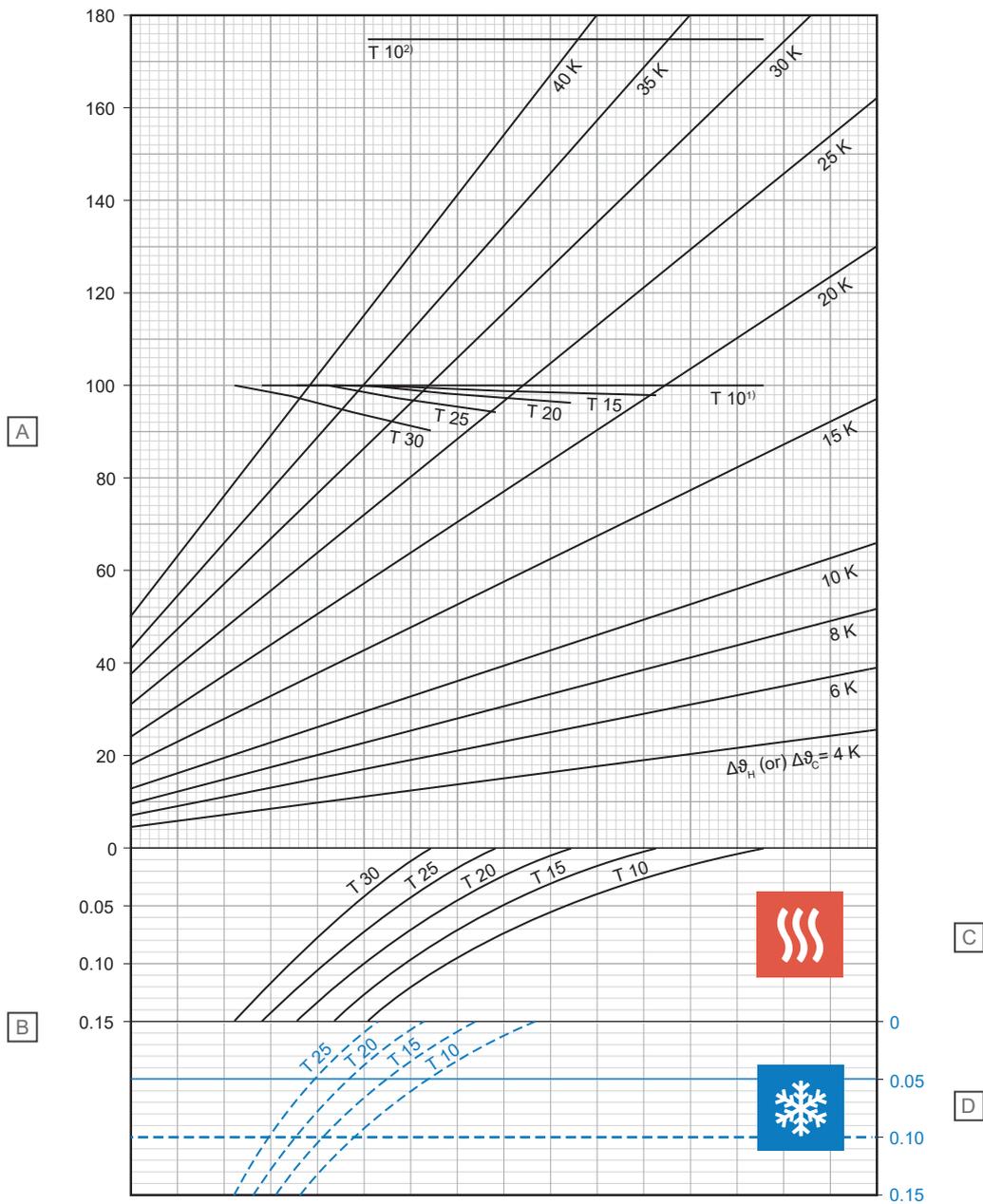
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



D0000232

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)	$\Delta\vartheta_{H,N}$ (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

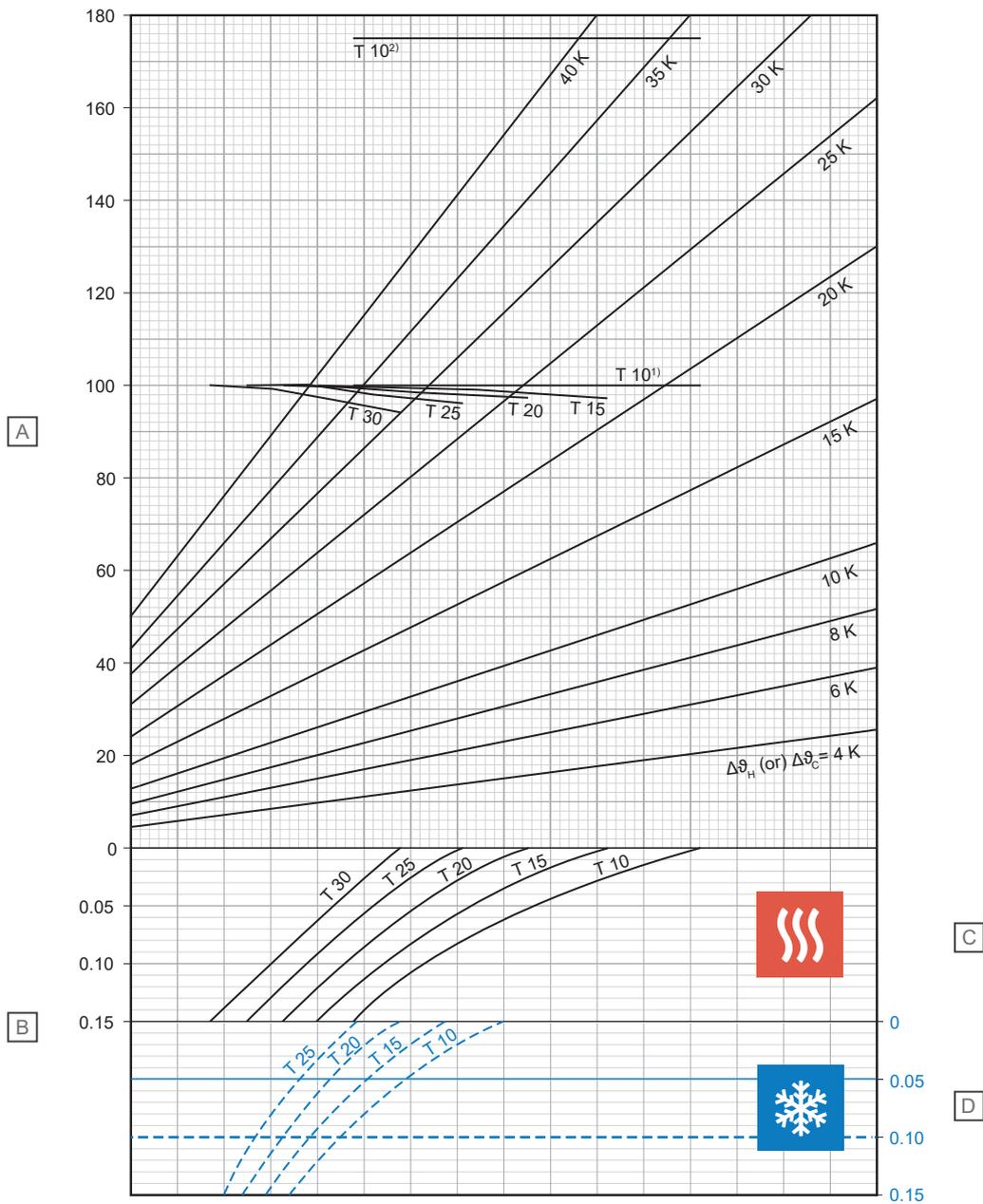
D - Cooling

T (cm)	q_C (W/m^2)	$\Delta\vartheta_{C,N}$ (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 $\lambda u = 1,2 \text{ W/mK}$)



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)
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

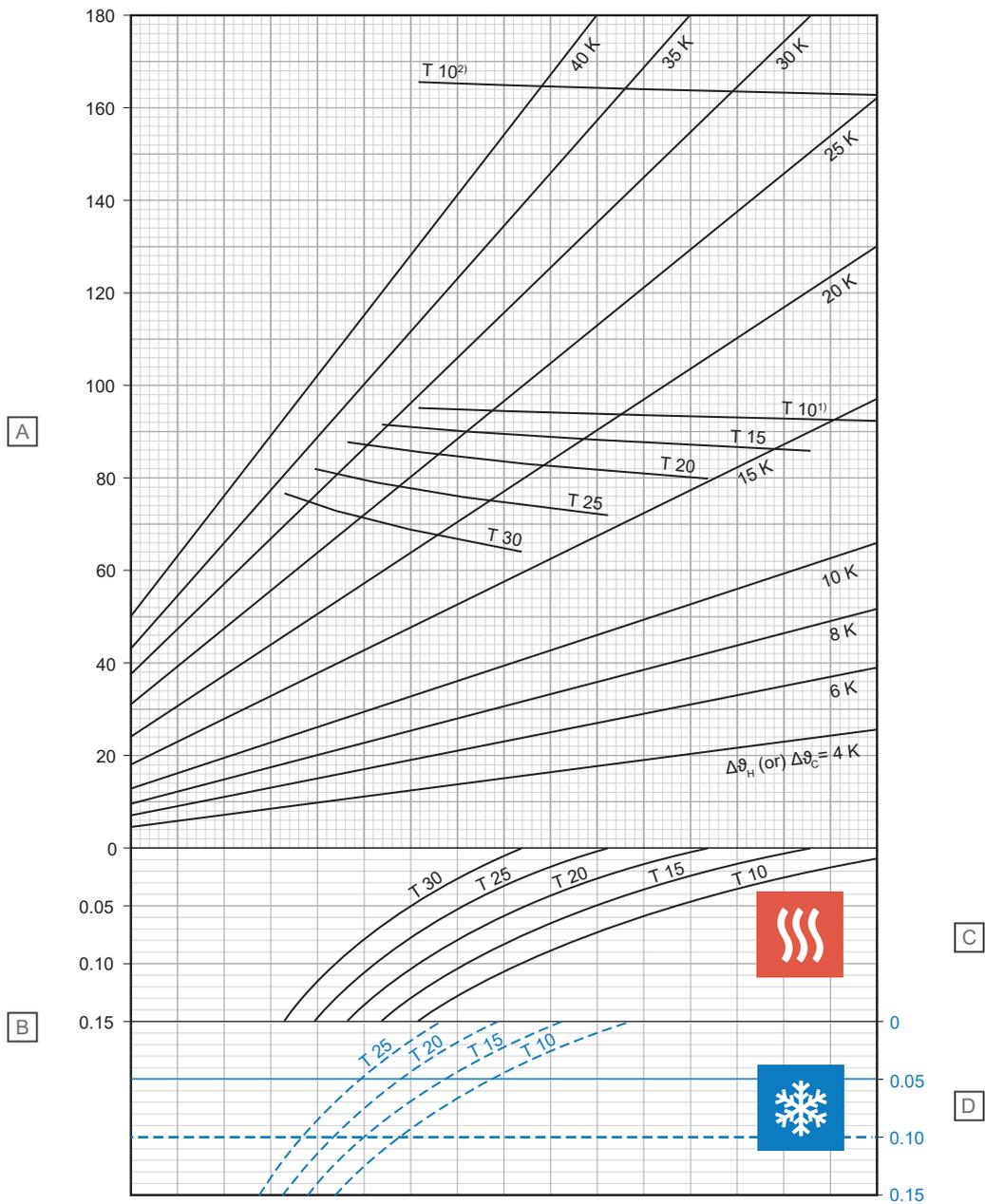
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\theta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



D0000234

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)
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

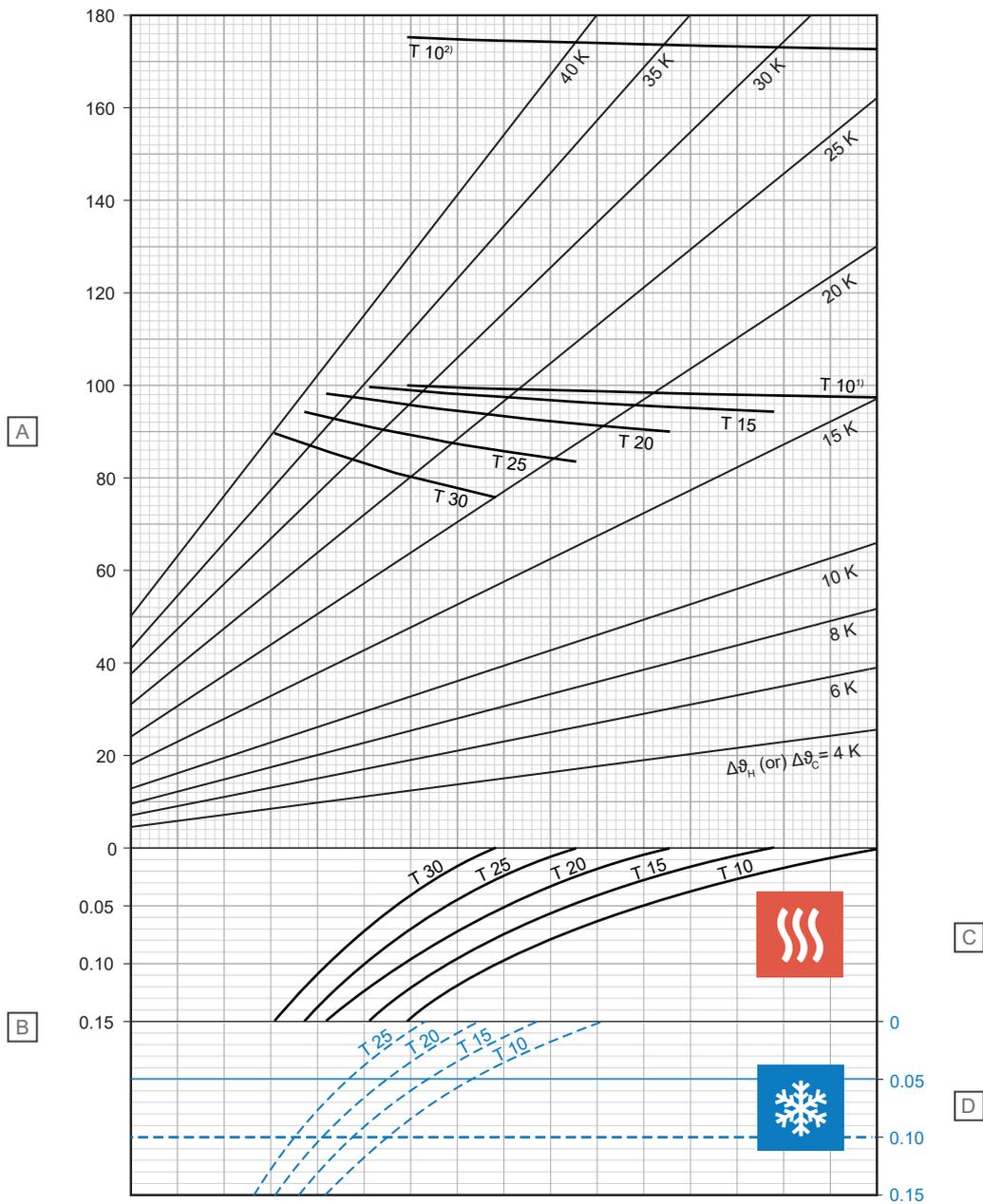
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



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)
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

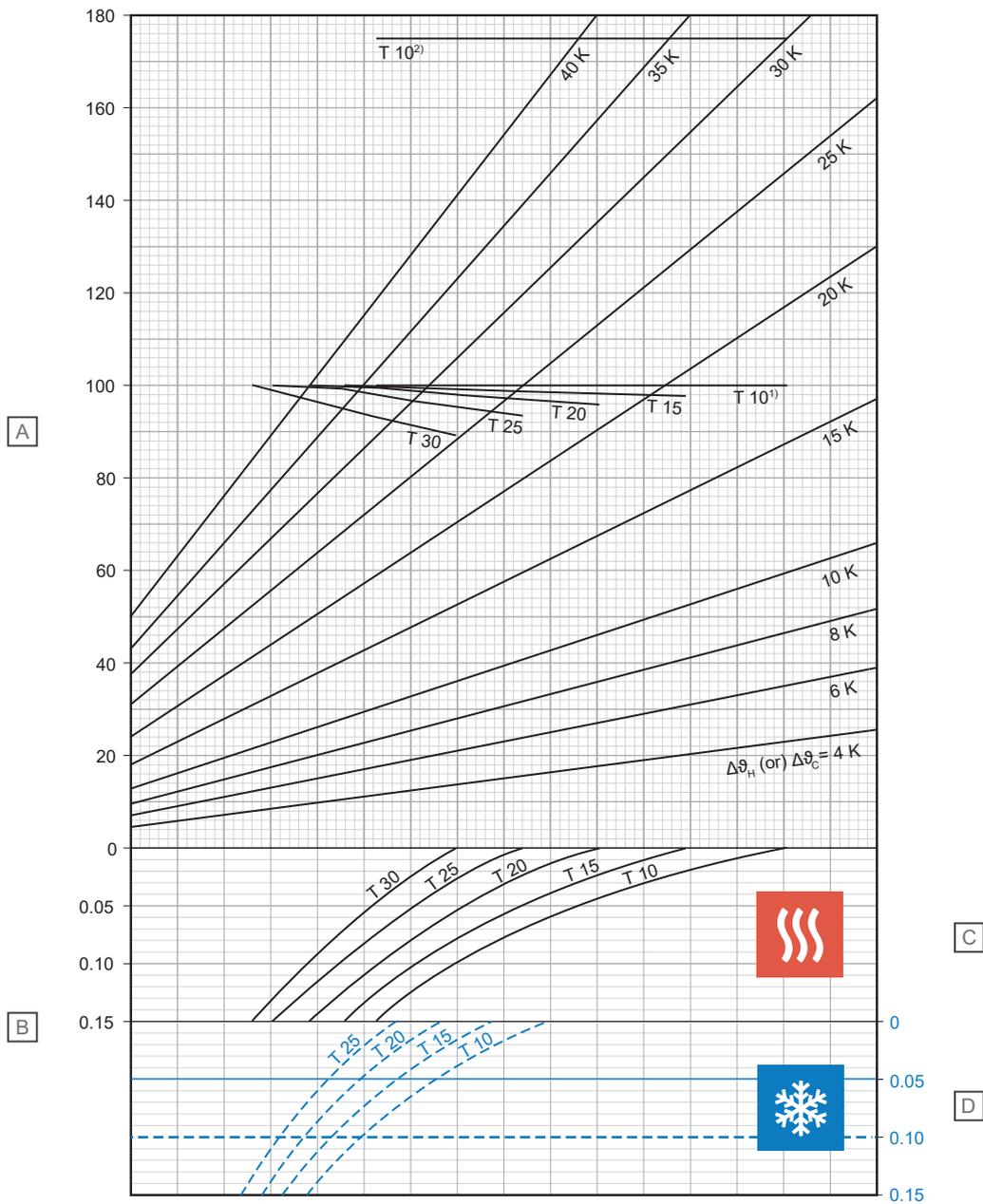
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda u = 1,2 \text{ W/mK}$)



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 _{A,B}]

C - Heating

T (cm)	q _H (W/m ²)	Δθ _{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

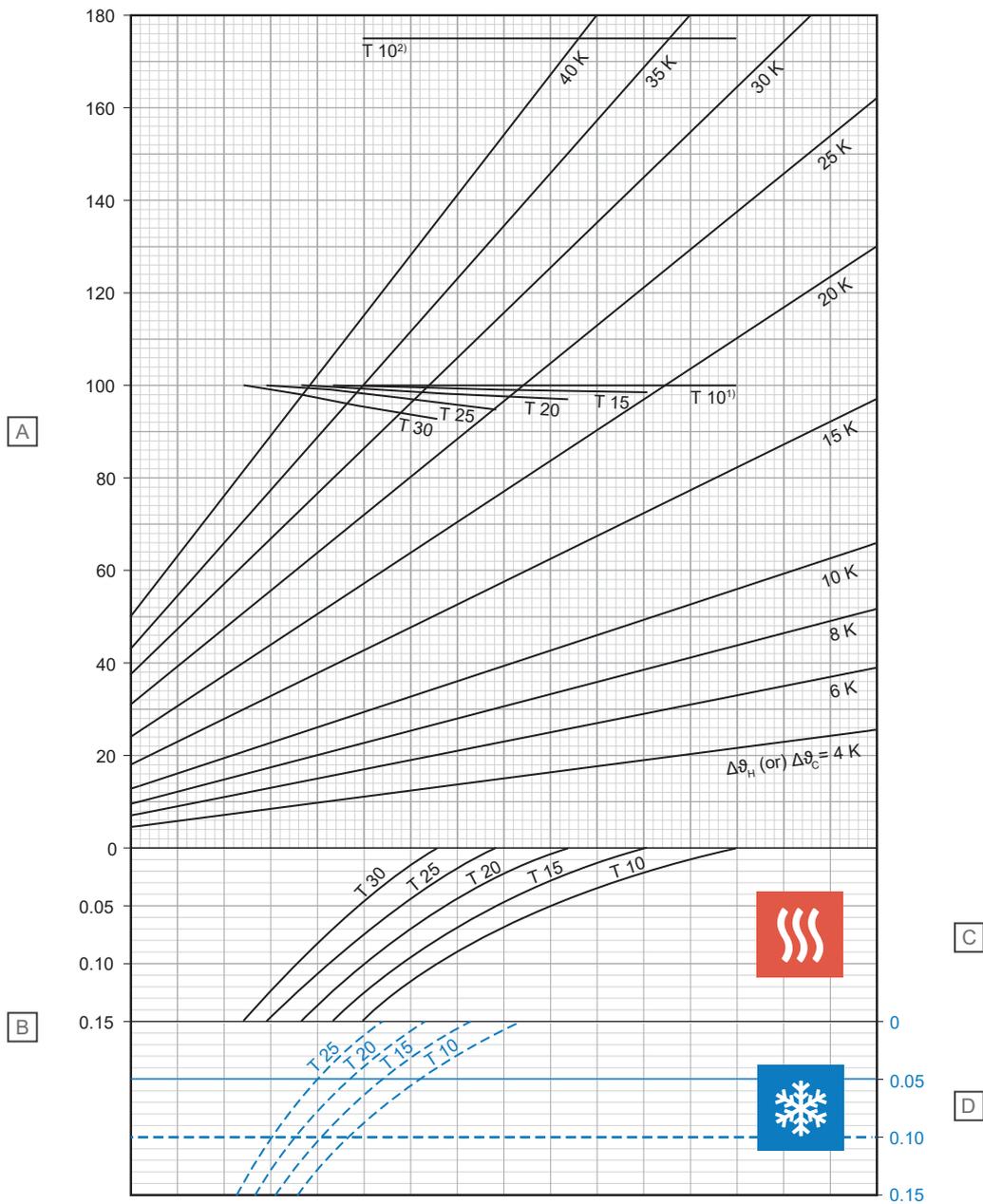
D - Cooling

T (cm)	q _C (W/m ²)	Δθ _{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 $\lambda u = 1,2 \text{ W/mK}$)



D0000237

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)
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

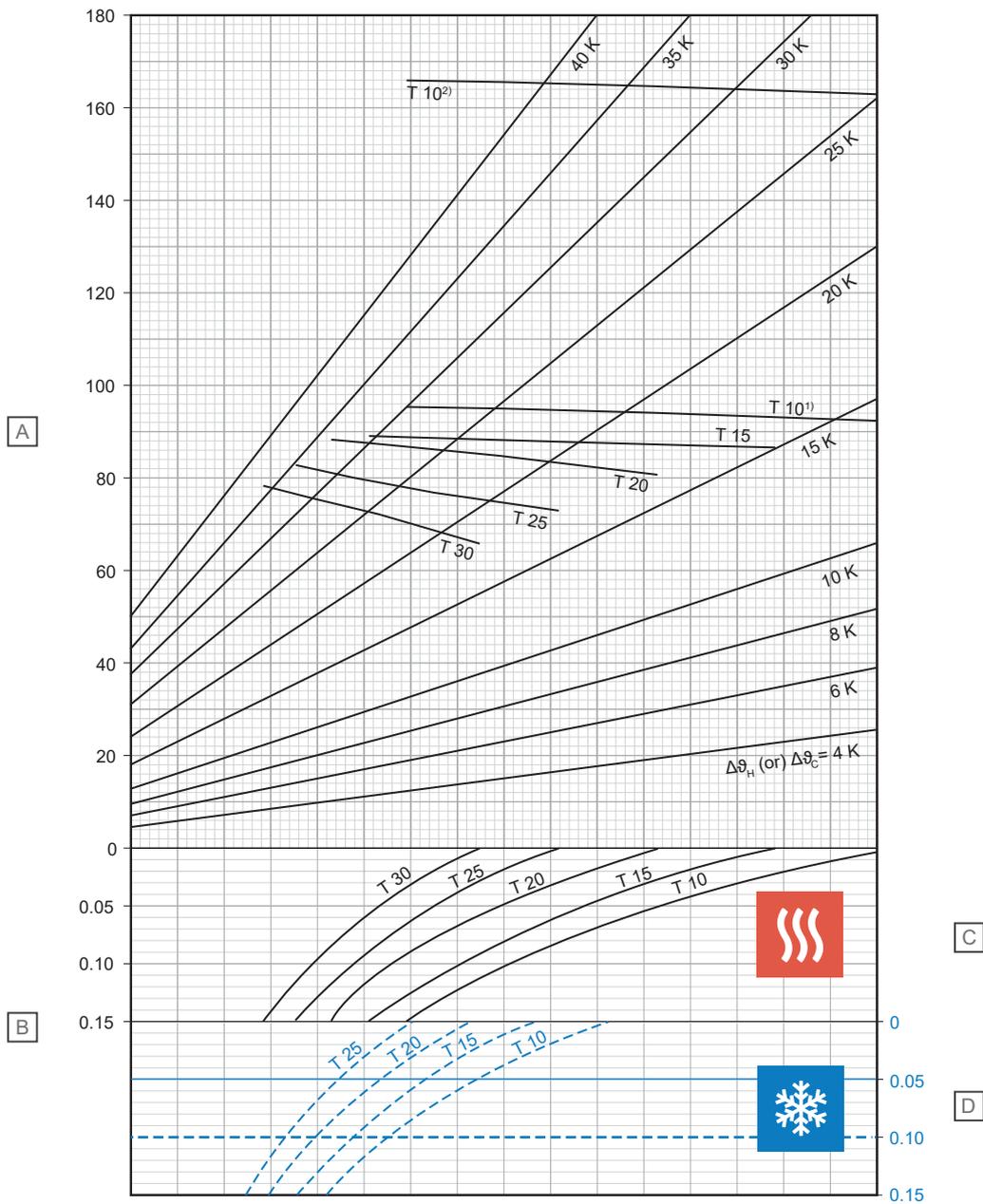
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



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)
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

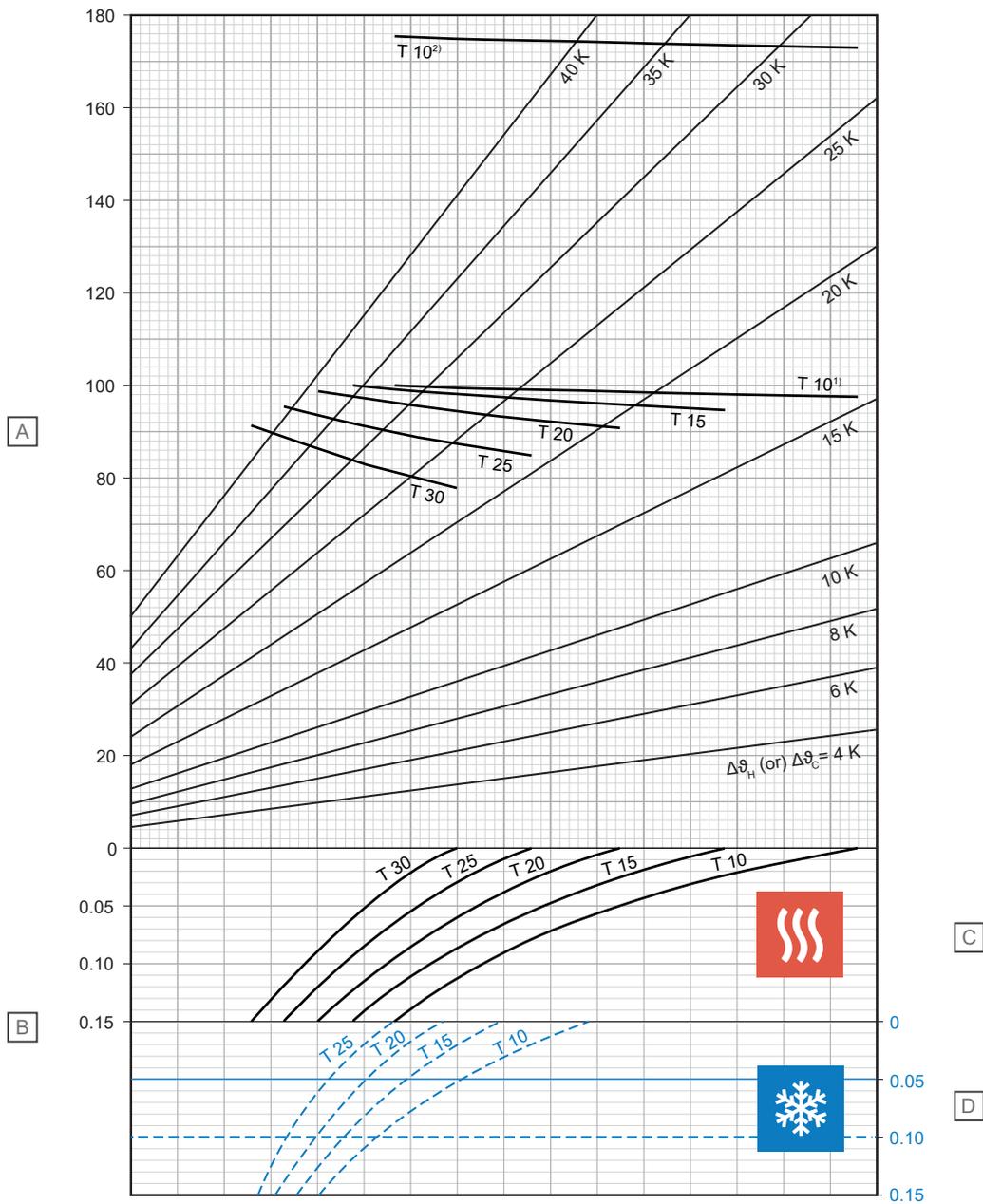
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



D10000215

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 _{A,B}]

C - Heating

T (cm)	q _H (W/m ²)	Δθ _{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

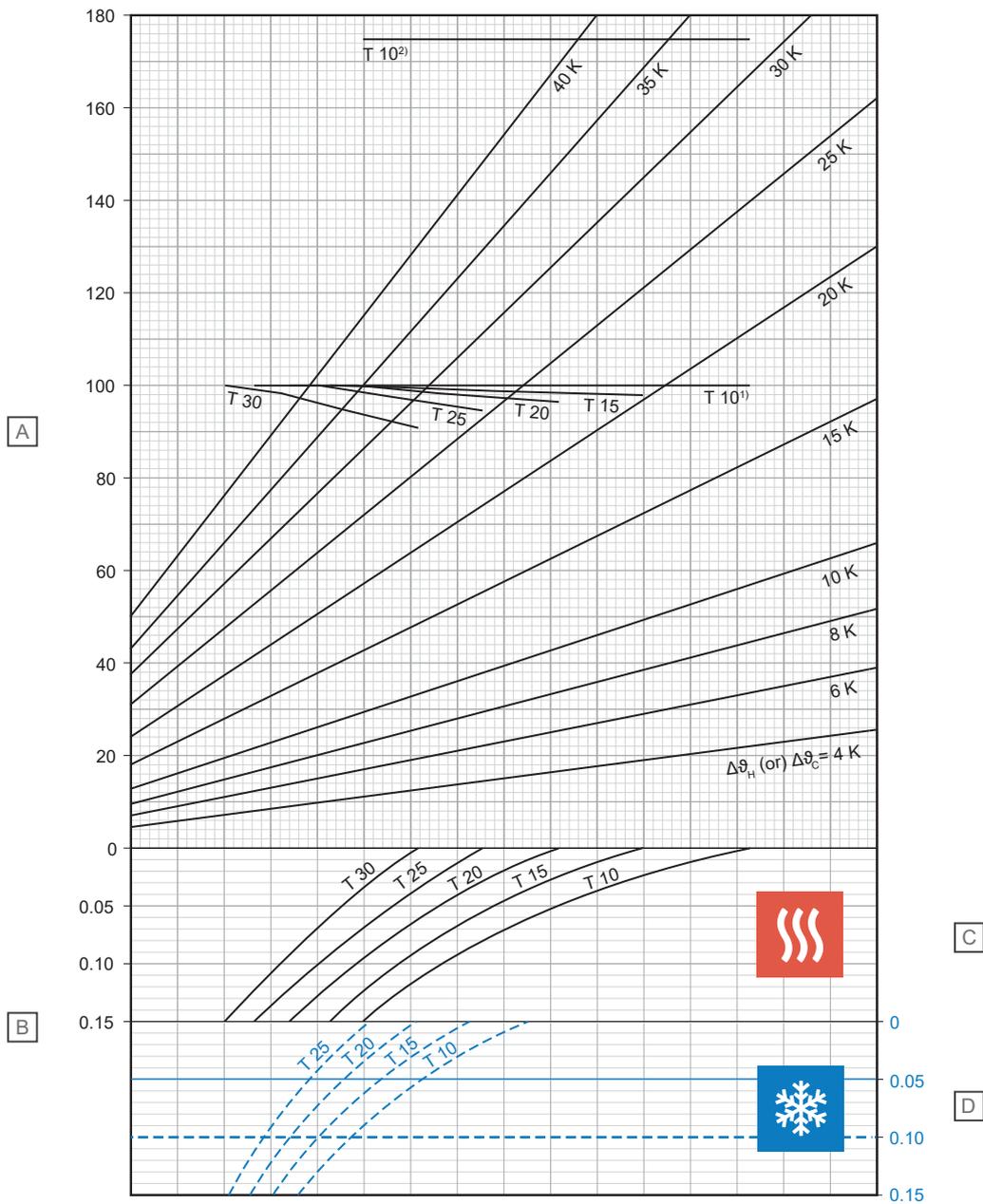
D - Cooling

T (cm)	q _C (W/m ²)	Δθ _{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 θ_{F, max} 29 °C or θ_i 24 °C and θ_{F, max} 33 °C

²⁾ Limit curve valid for θ_i 20 °C and θ_{F, max} 35 °C

Uponor Smart UFH-pipe 14 x 2,0 mm with screed load distribution layer (su = 65 mm with $\lambda_u = 1,2 \text{ W/mK}$)



D10000216

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)
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

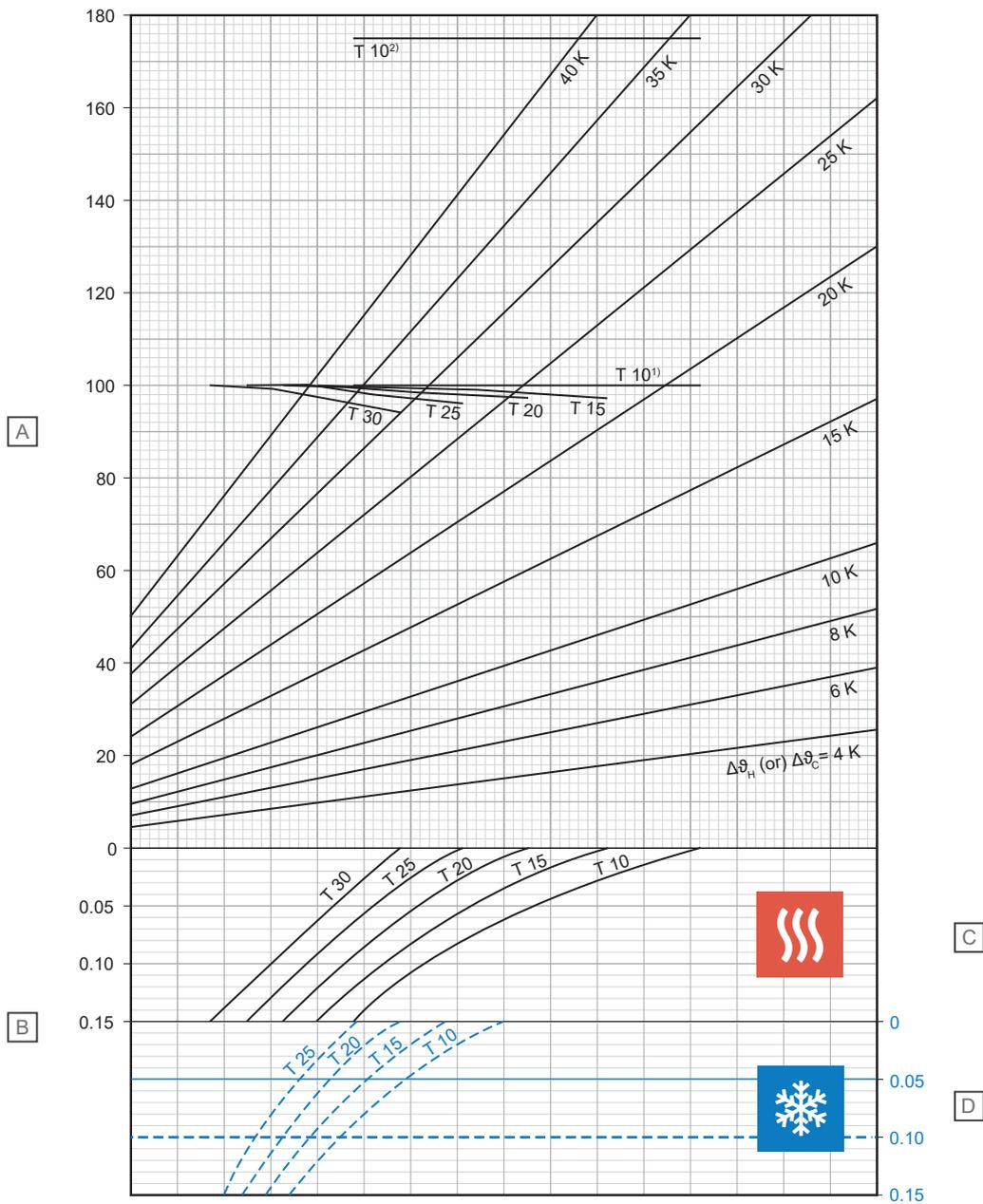
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



D10000217

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 _{A,B}]

C - Heating

T (cm)	q _H (W/m ²)	Δθ _{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

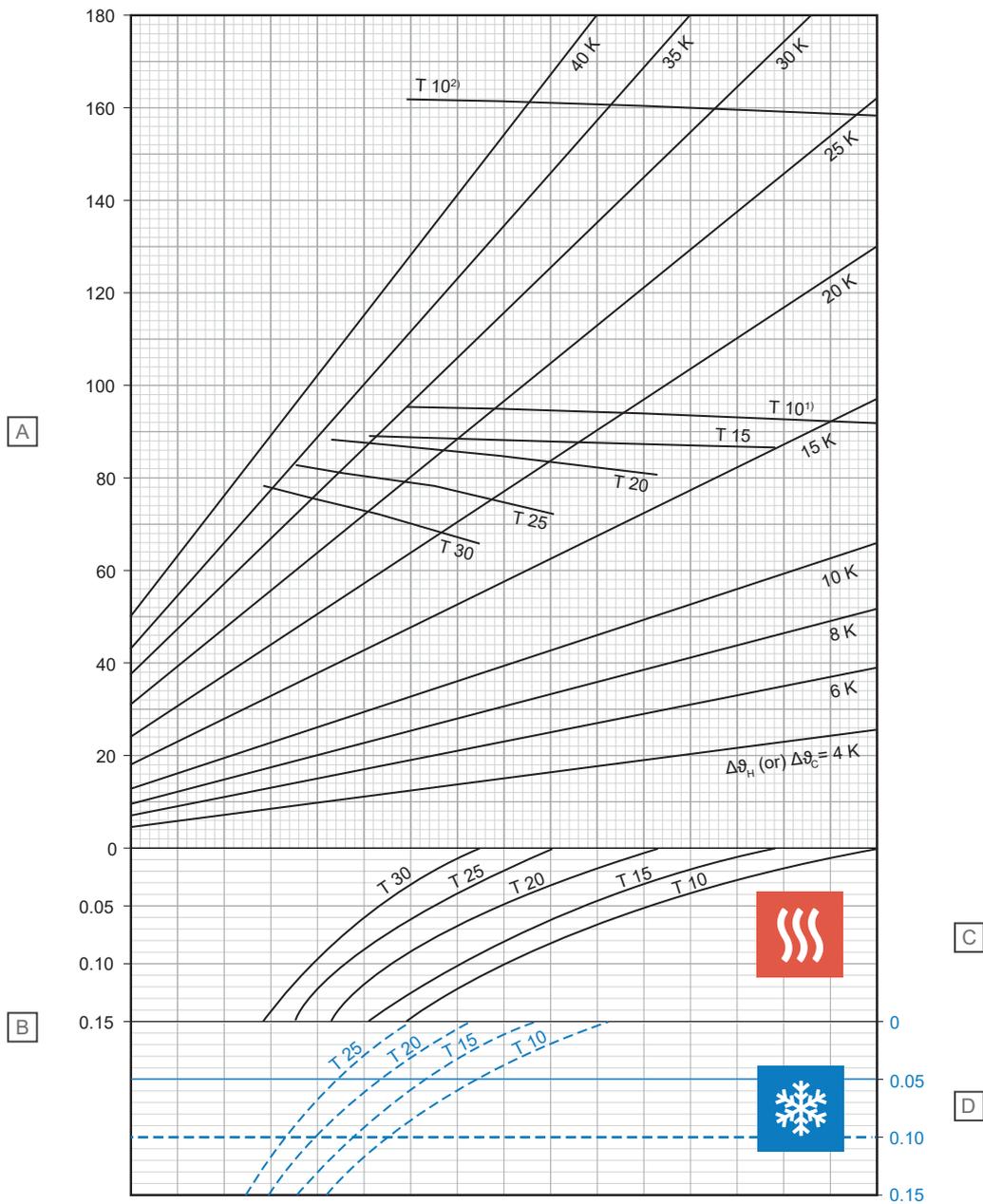
D - Cooling

T (cm)	q _C (W/m ²)	Δθ _{C,N} (K)
10	30,9	8
15	27,8	8
20	25,0	8
25	22,6	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⁾ Limit curve valid for $\vartheta_i 20^\circ\text{C}$ and $\vartheta_{F, \max} 35^\circ\text{C}$

Uponor Smart UFH-pipe 16 x 2,0 mm with screed load distribution layer (su = 35 mm with $\lambda_u = 1,2 \text{ W/mK}$)



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)
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

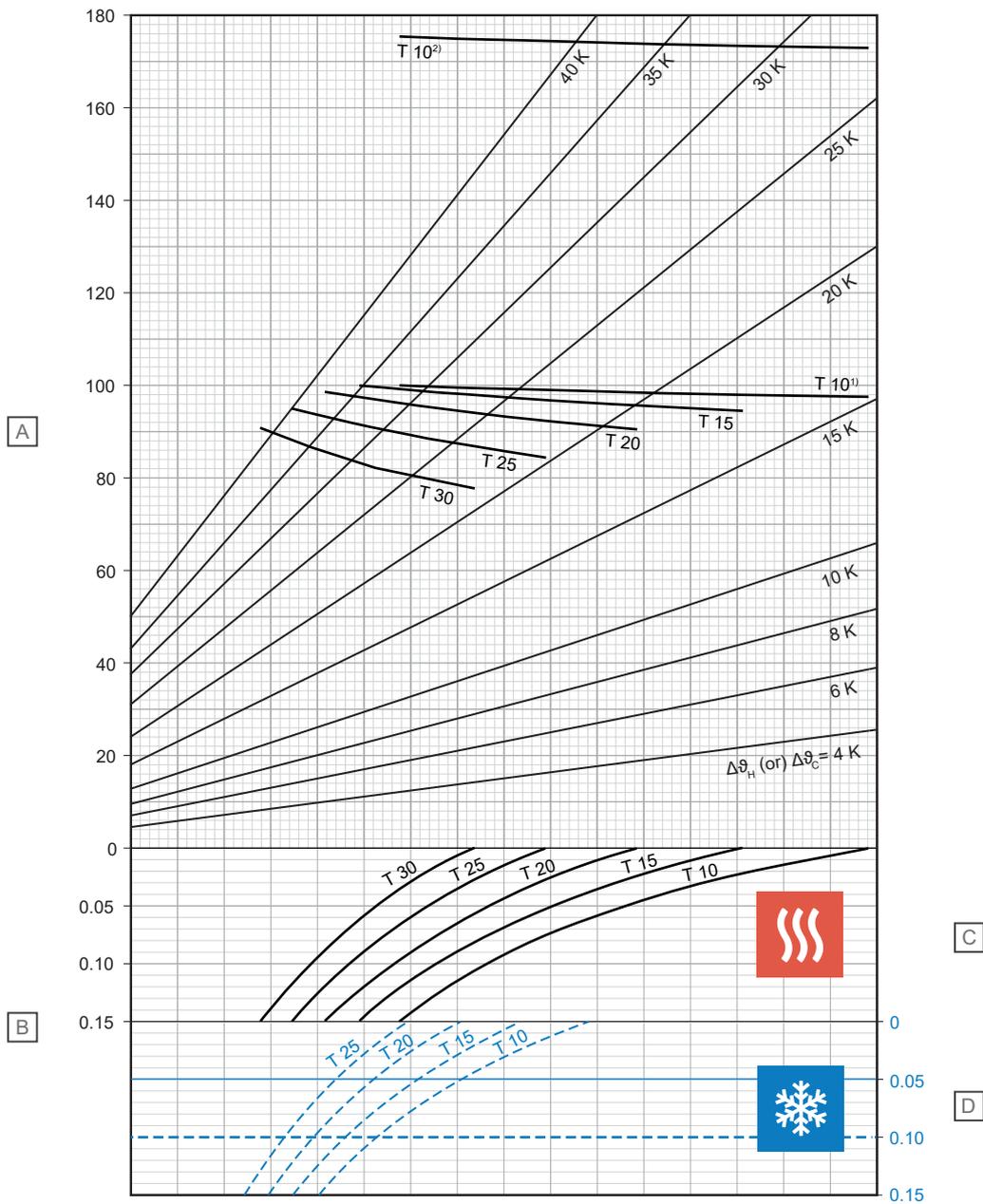
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\theta_{C,N}$ (K)
10	37,4	8
15	33,2	8
20	29,6	8
25	26,3	8

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

²⁾ Limit curve valid for $\vartheta_i 20 \text{ }^\circ\text{C}$ and $\vartheta_{F,max} 35 \text{ }^\circ\text{C}$

Uponor Smart UFH-pipe 16 x 2,0 mm with screed load distribution layer (su = 45 mm with $\lambda_u = 1,2 \text{ W/mK}$)



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)
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

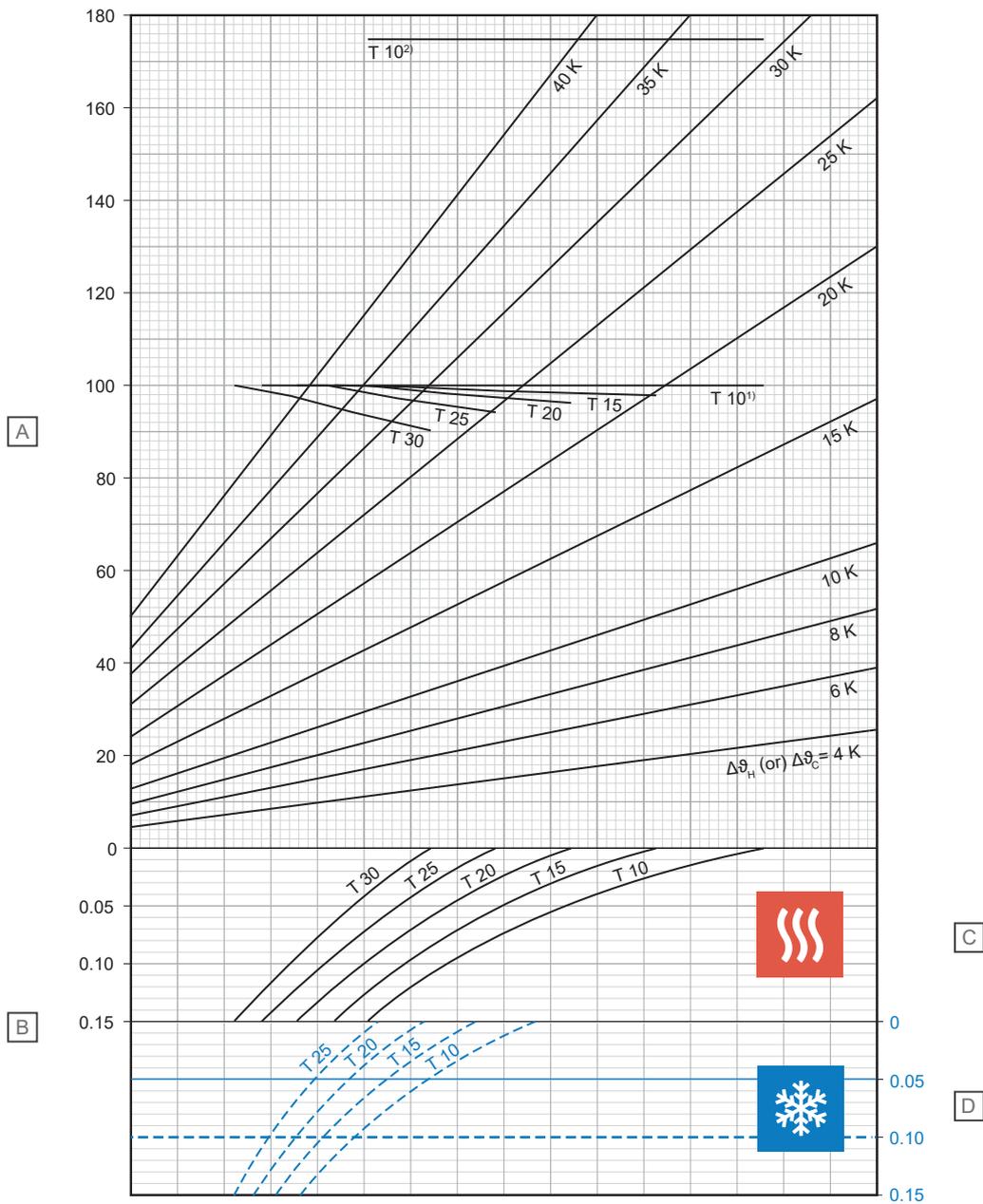
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (K)
10	35,8	8
15	31,9	8
20	28,5	8
25	25,4	8

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

²) Limit curve valid for $\vartheta_i 20 \text{ }^\circ\text{C}$ and $\vartheta_{F,max} 35 \text{ }^\circ\text{C}$

Uponor Smart UFH-pipe 16 x 2,0 mm with screed load distribution layer (su = 65 mm with $\lambda_u = 1,2 \text{ W/mK}$)



D10000216

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)
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

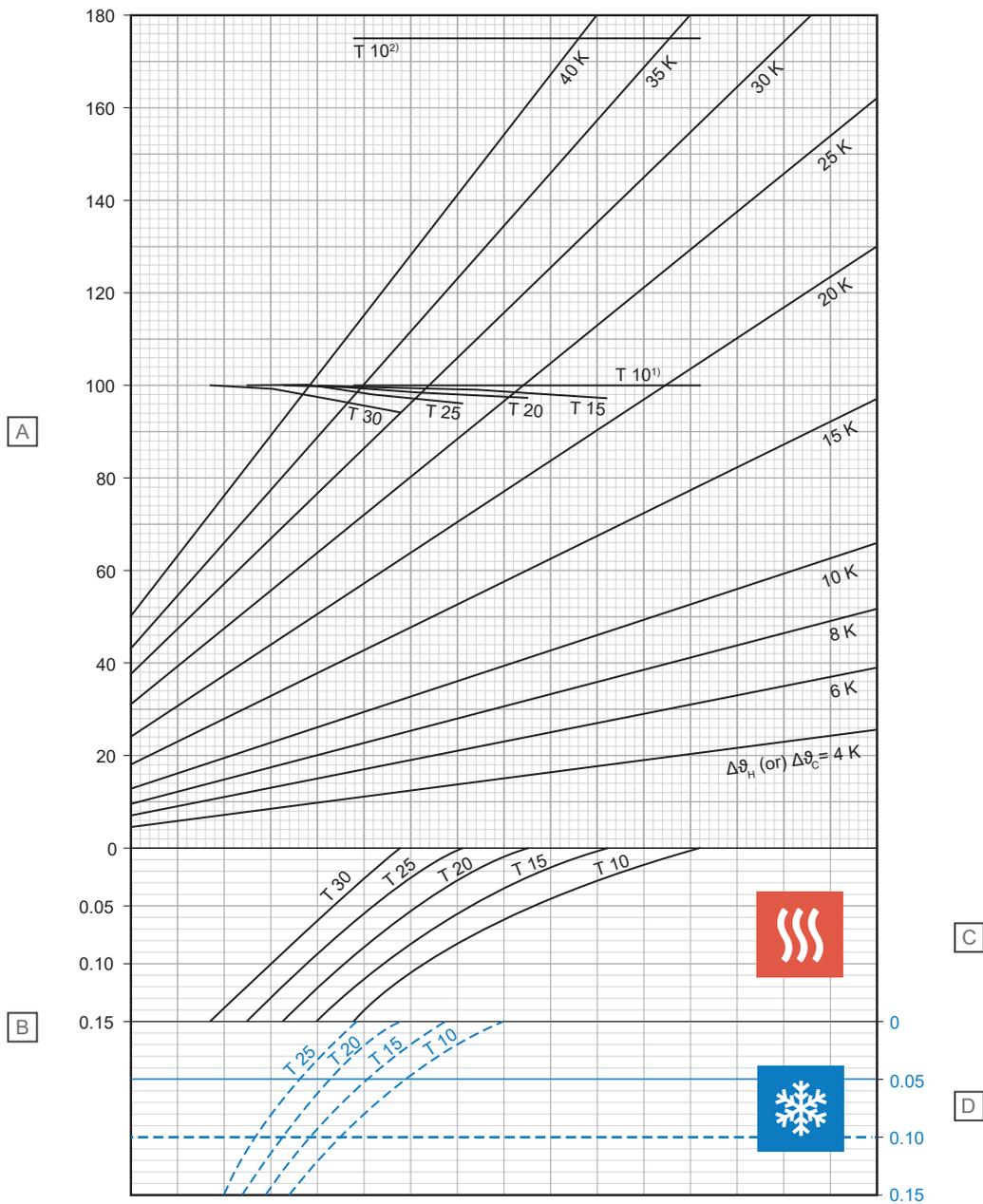
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



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)
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

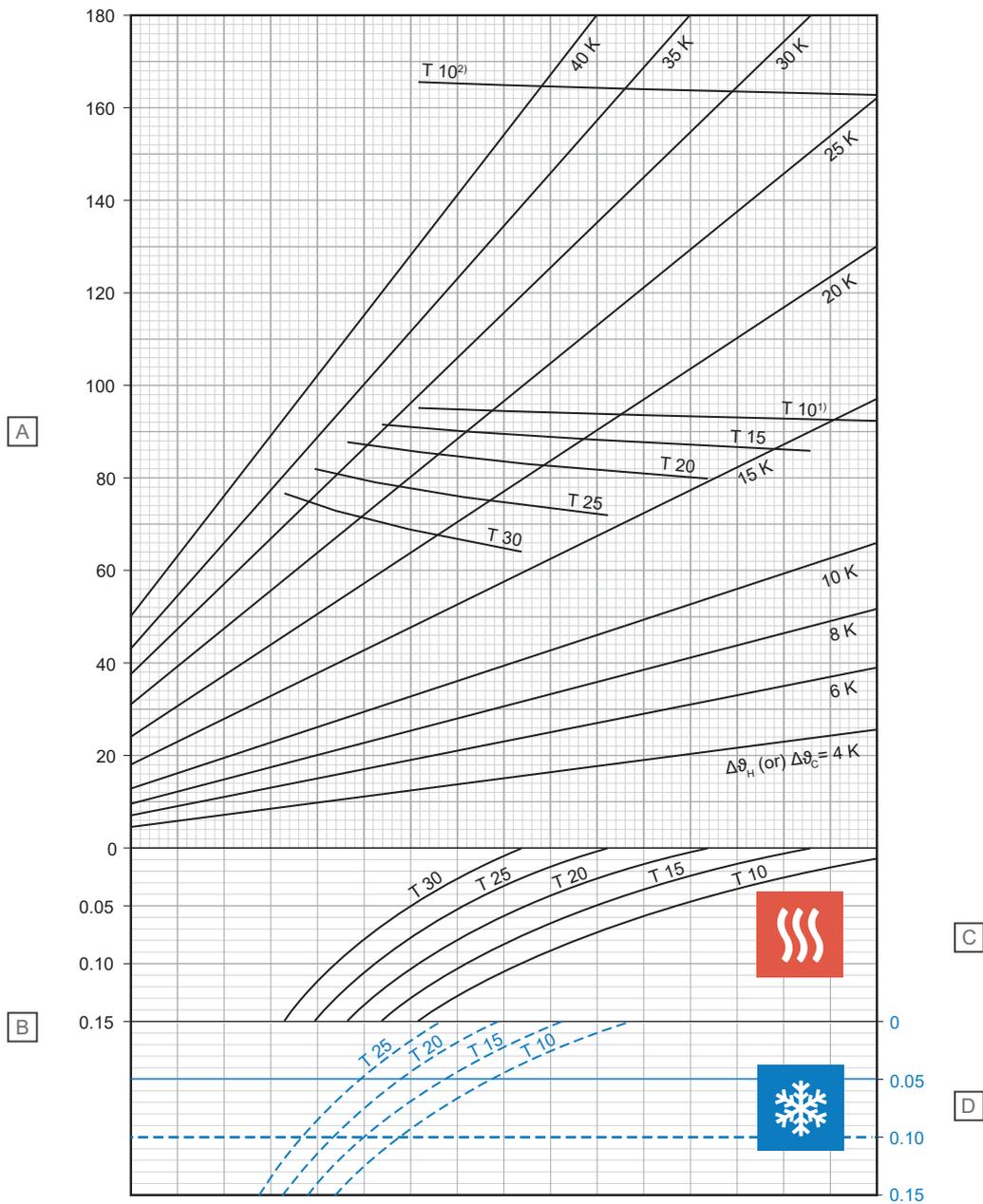
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



D0000234

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)
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

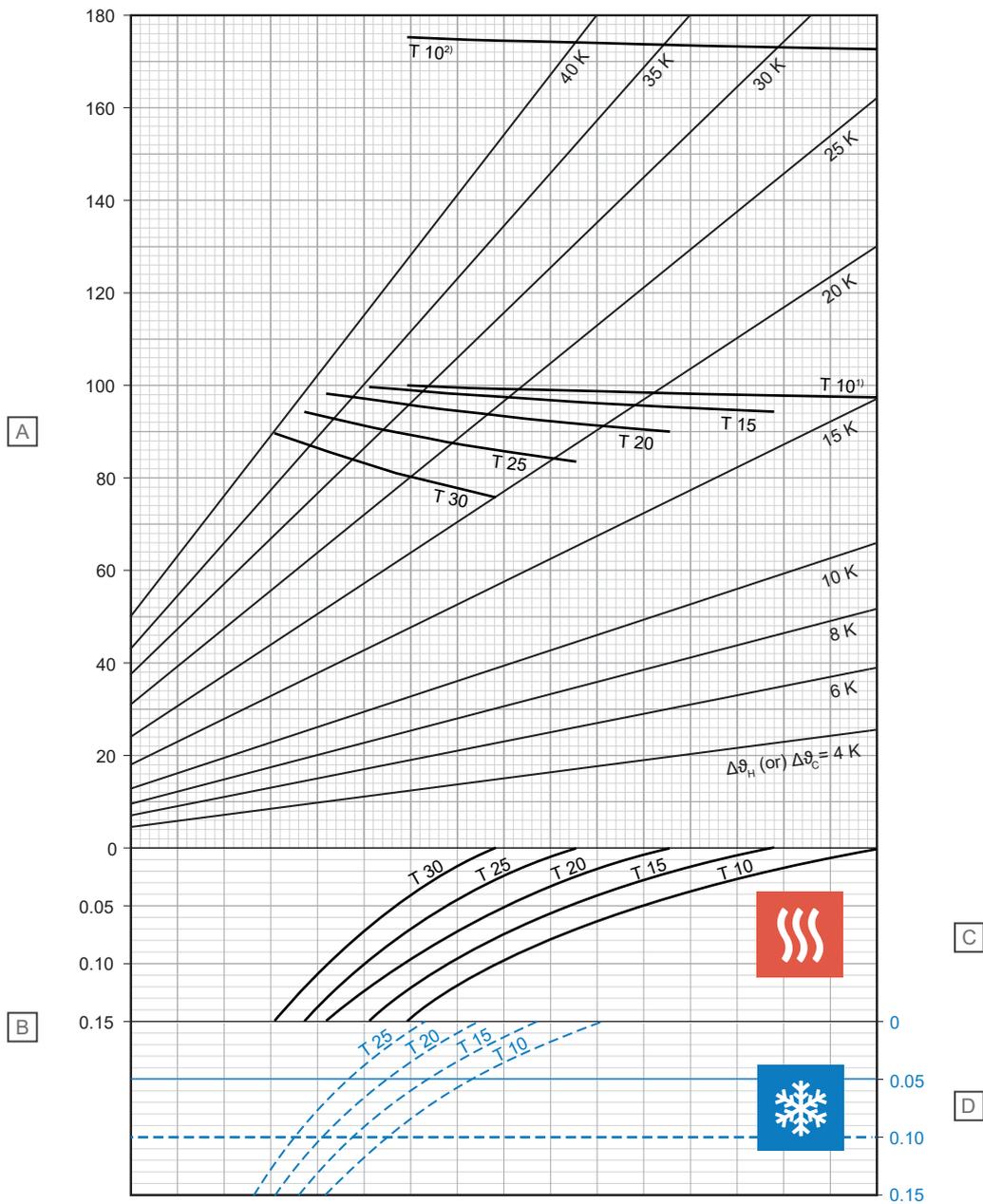
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\theta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



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)
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

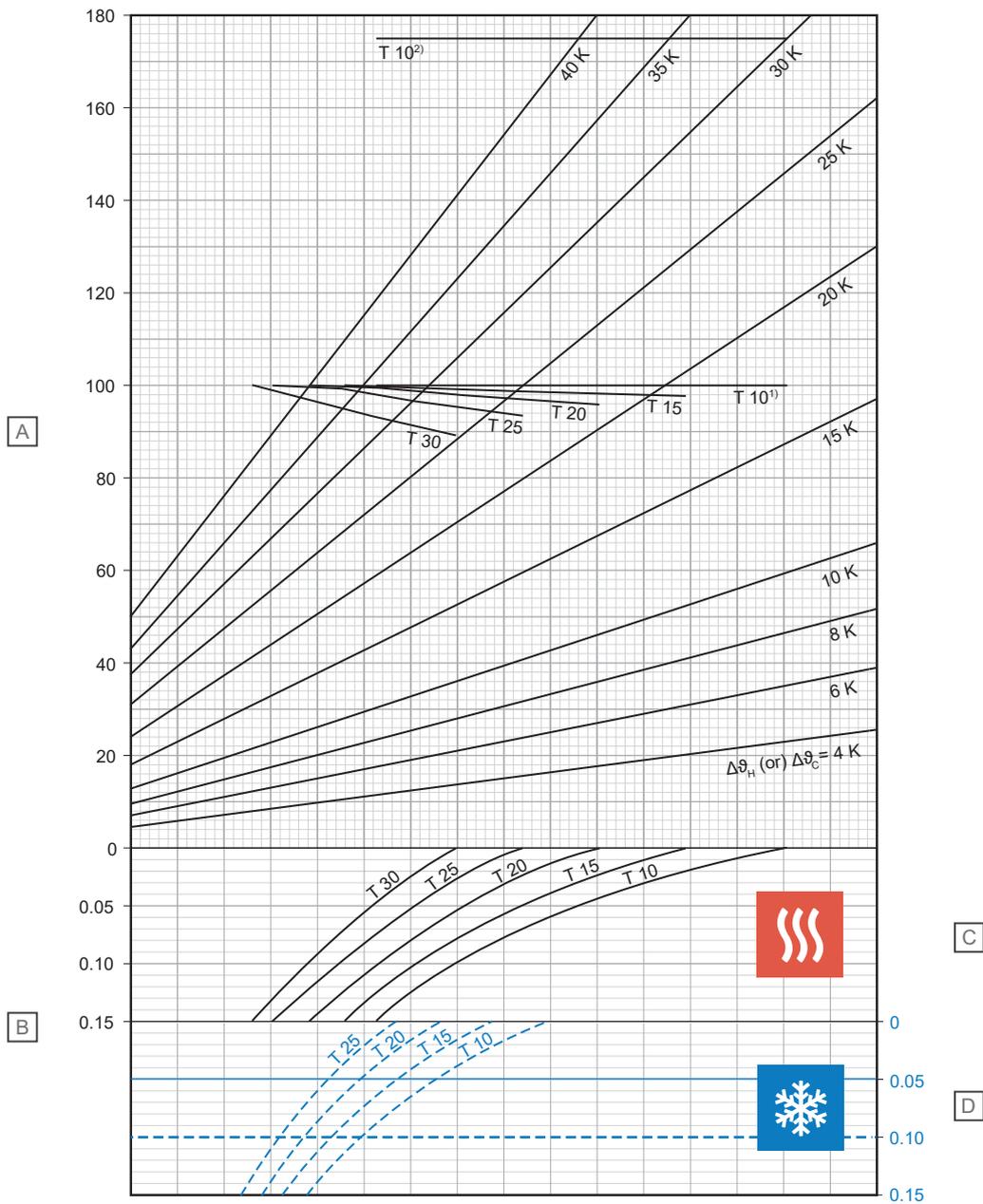
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\theta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



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)
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

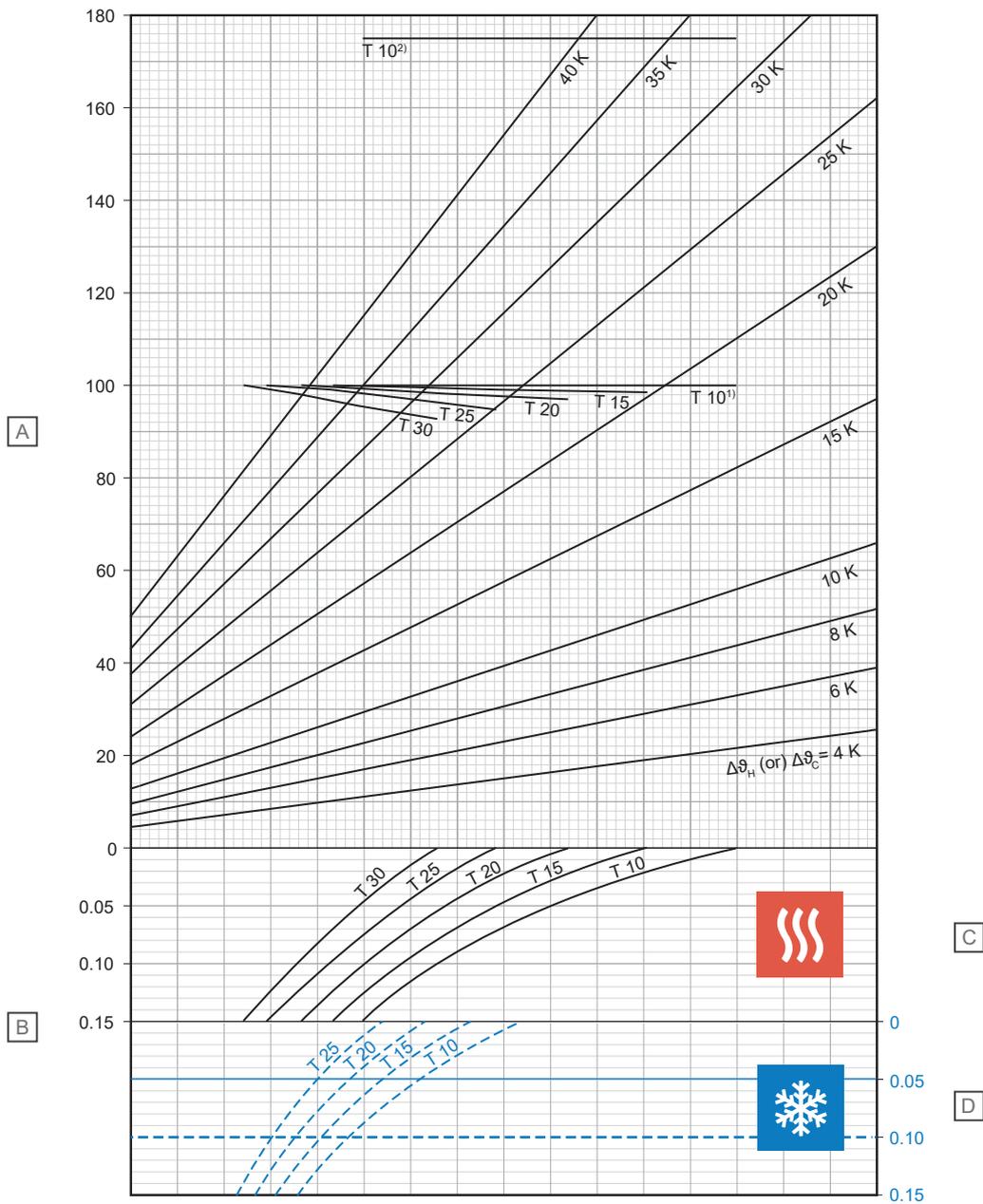
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



D0000237

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 _{A,B}]

C - Heating

T (cm)	q _H (W/m ²)	Δθ _{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

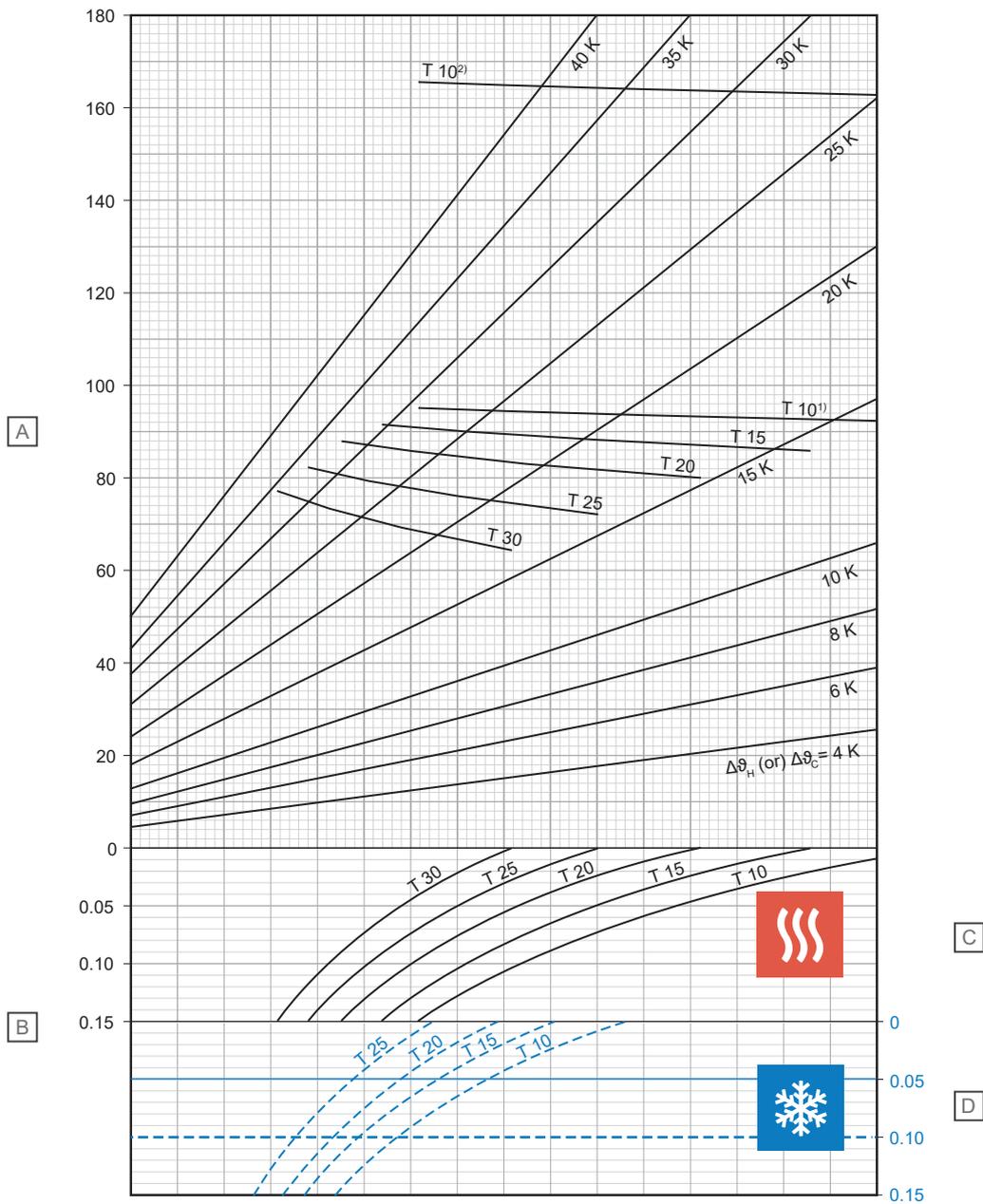
D - Cooling

T (cm)	q _C (W/m ²)	Δθ _{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 θ_{F, max} 29 °C or θ_i 24 °C and θ_{F, max} 33 °C

²⁾ Limit curve valid for θ_i 20 °C and θ_{F, max} 35 °C

Uponor MLCP RED 14 x 1,6 mm with screed load distribution layer (su = 35 mm with $\lambda_u = 1,2 \text{ W/mK}$)



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)
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

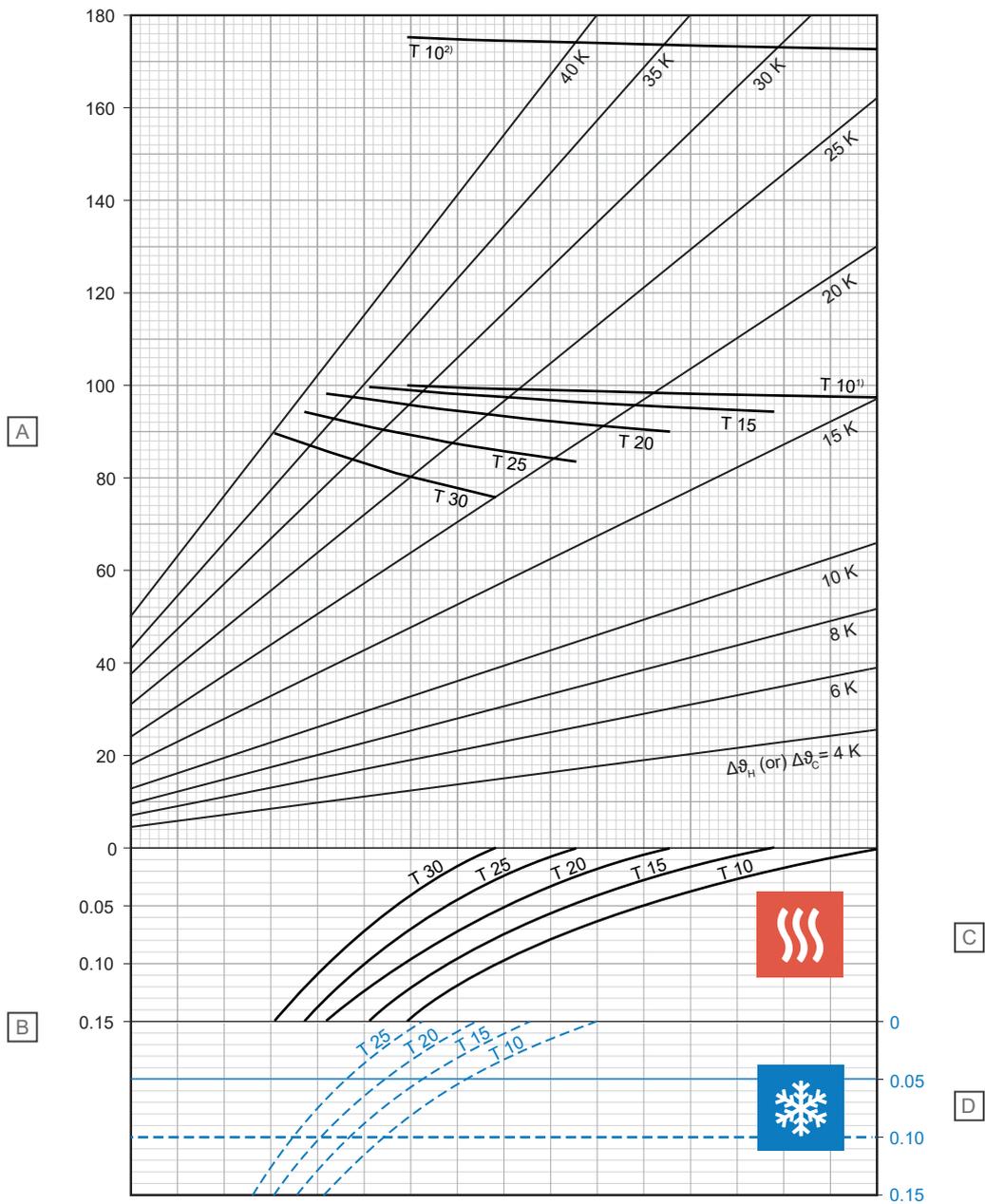
T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (K)
10	37,9	8
15	33,9	8
20	30,2	8
25	27,0	8

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

D0000238

Uponor MLCP RED 14 x 1,6 mm with screed load distribution layer (su = 45 mm with $\lambda_u = 1,2 \text{ W/mK}$)



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)
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

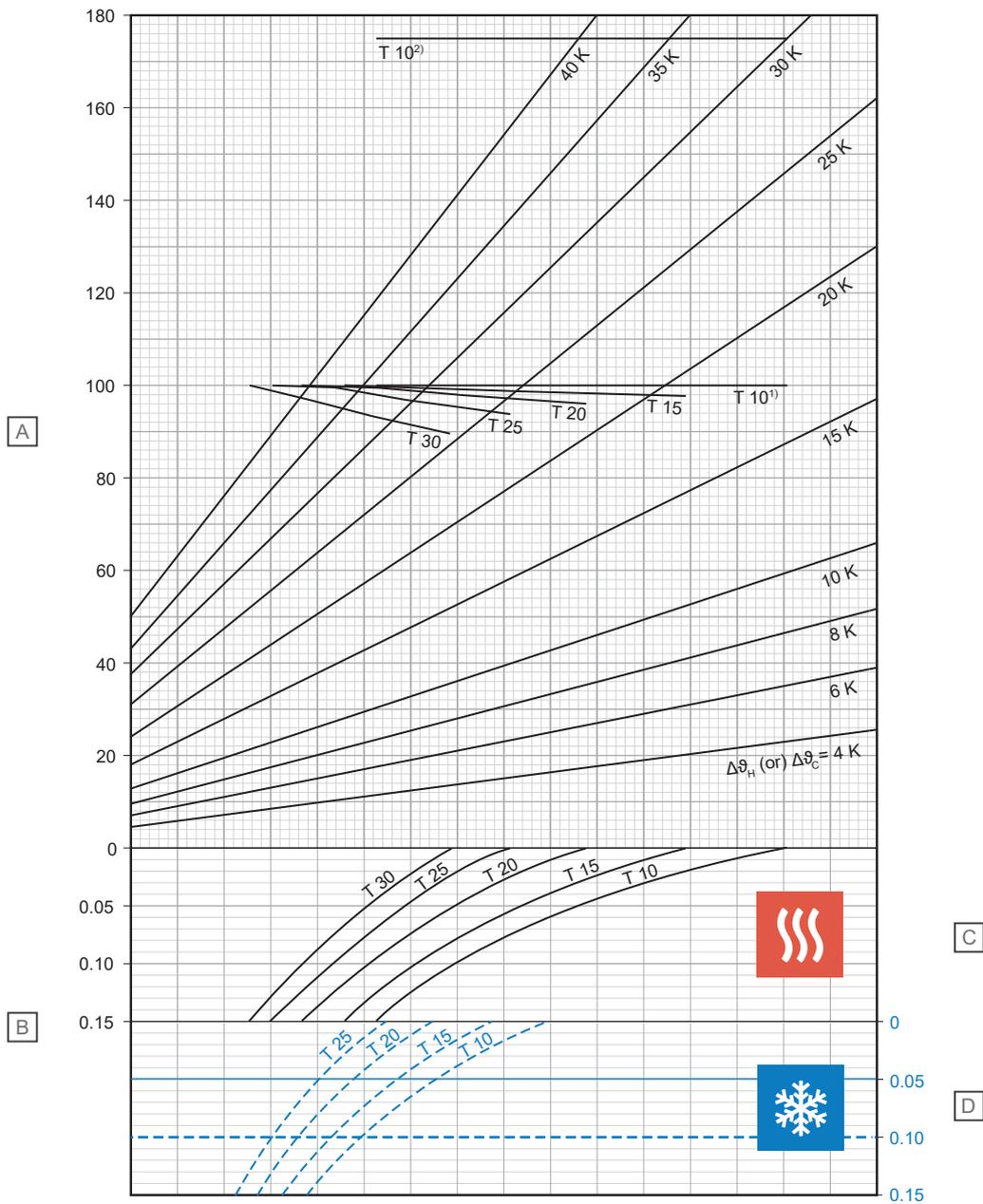
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



D0000240

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)
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

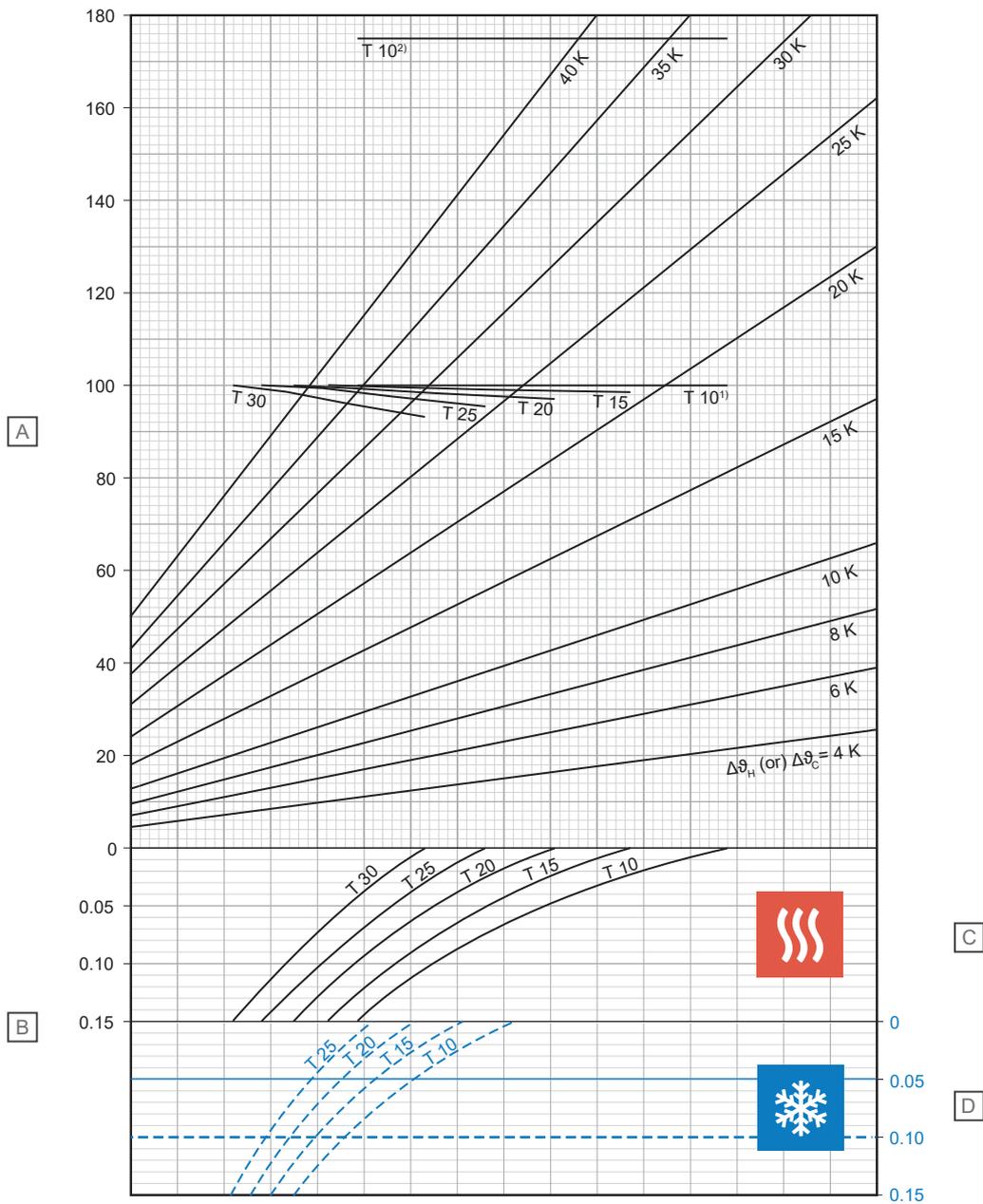
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



D0000241

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 _{A,B}]

C - Heating

T (cm)	q _H (W/m ²)	Δθ _{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

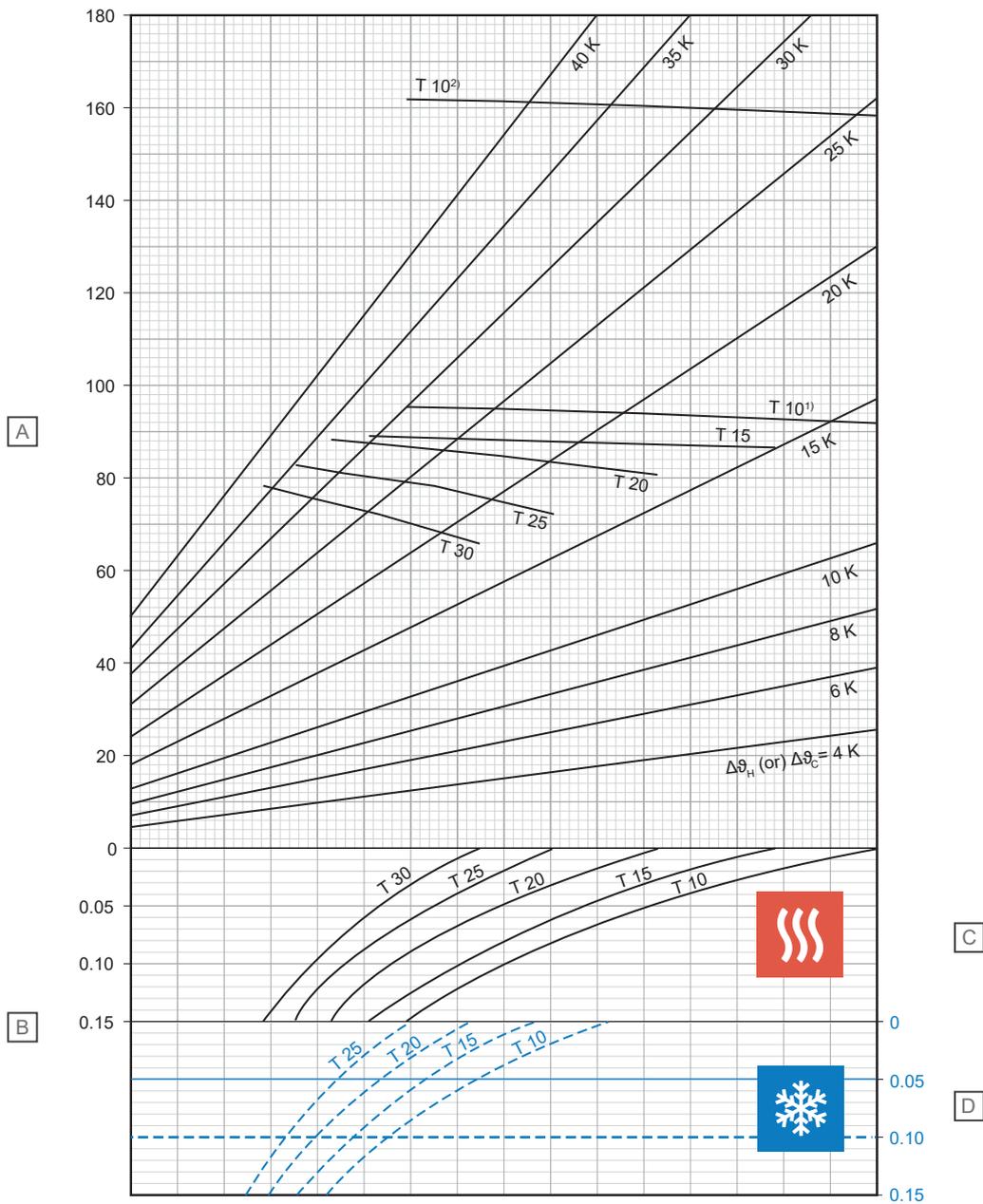
D - Cooling

T (cm)	q _C (W/m ²)	Δθ _{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 θ_{F, max} 29 °C or θ_i 24 °C and θ_{F, max} 33 °C

²⁾ Limit curve valid for θ_i 20 °C and θ_{F, max} 35 °C

Uponor MLCP RED 16 x 2,0 mm with screed load distribution layer (su = 35 mm with $\lambda_u = 1,2 \text{ W/mK}$)



D10000222

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)
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

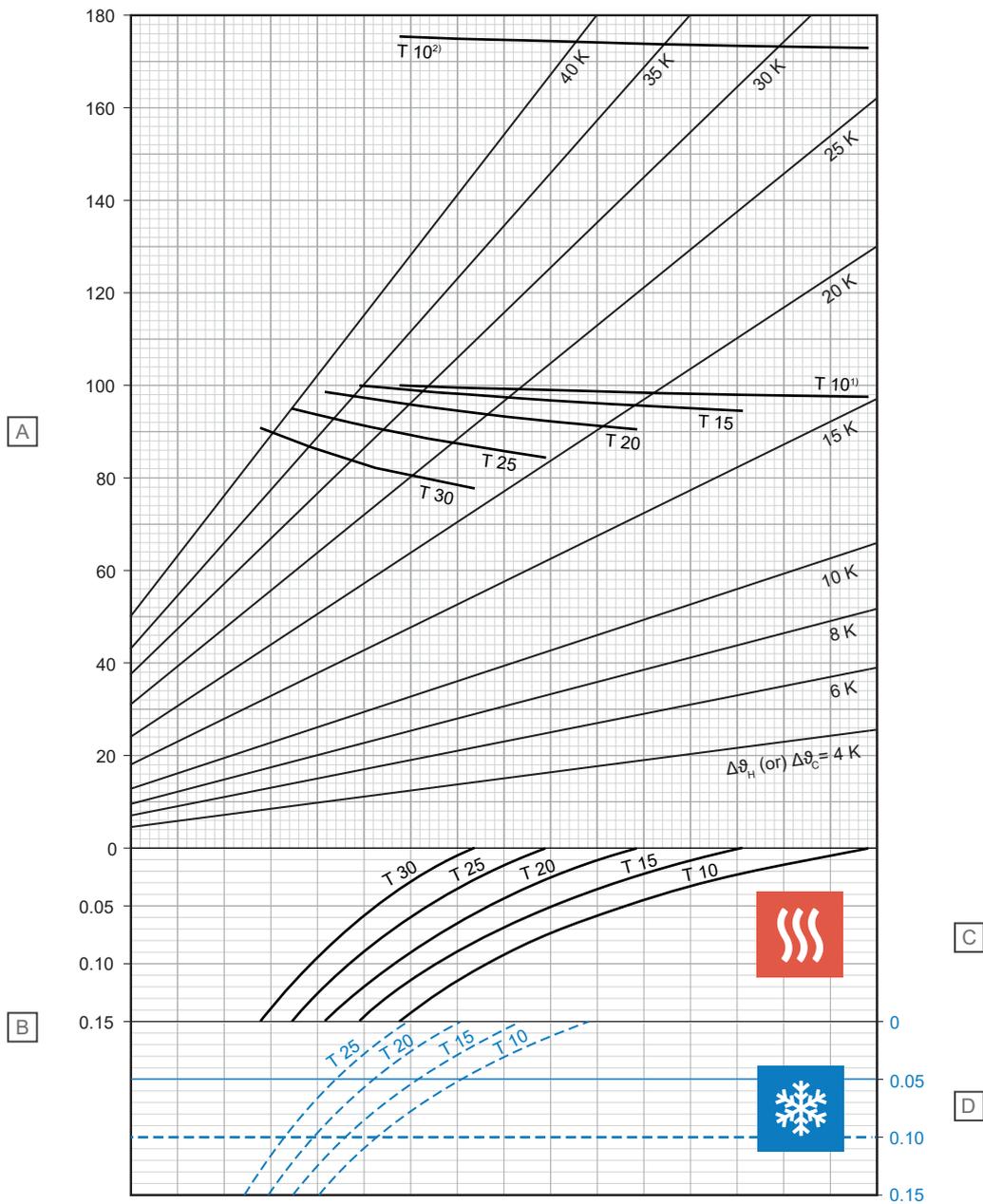
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



D10000223

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)
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

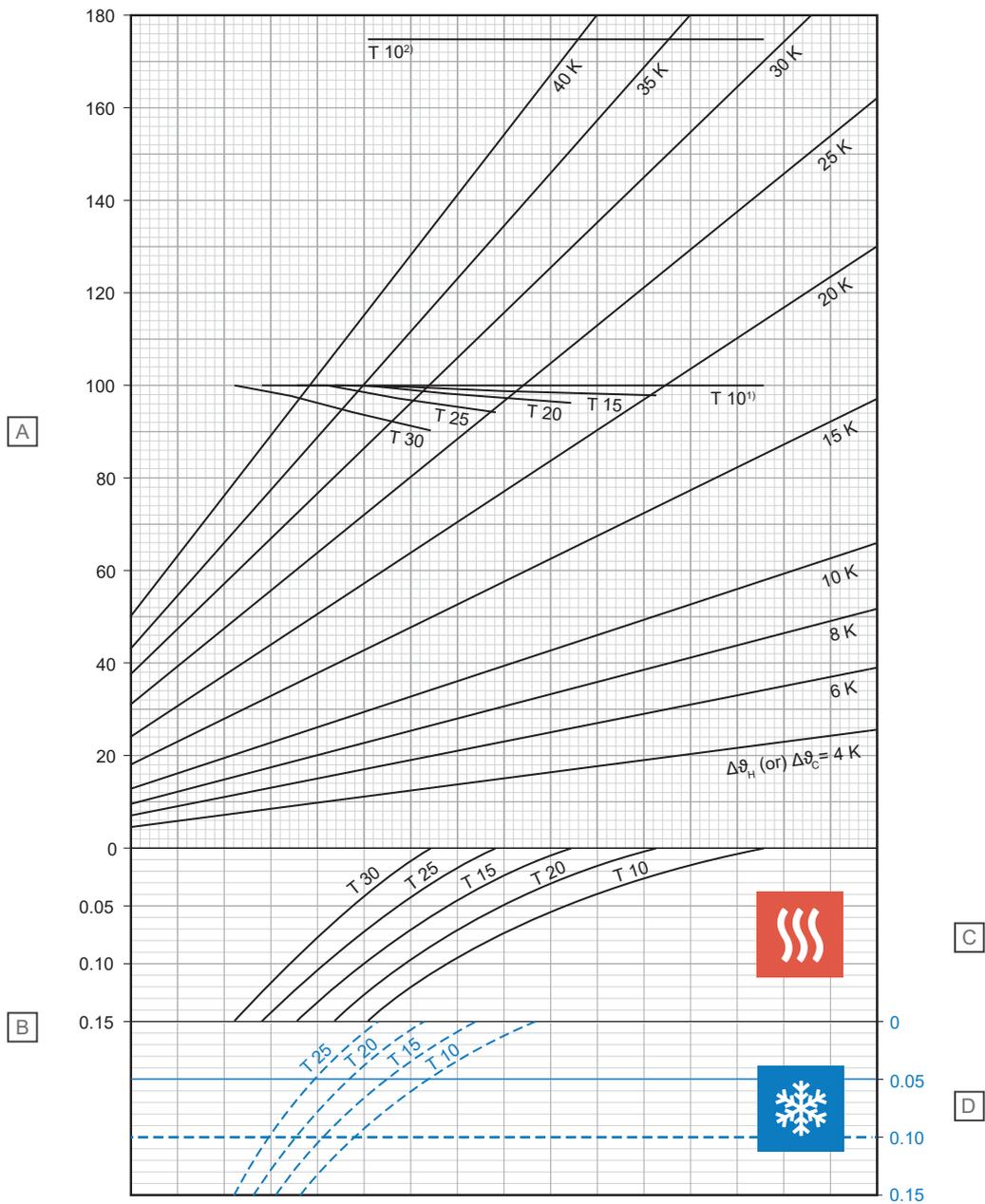
D - Cooling

T (cm)	q_C (W/m ²)	$\Delta\vartheta_{C,N}$ (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 $\lambda_u = 1,2 \text{ W/mK}$)



D10000224

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)	$\Delta\vartheta_{H,N}$ (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

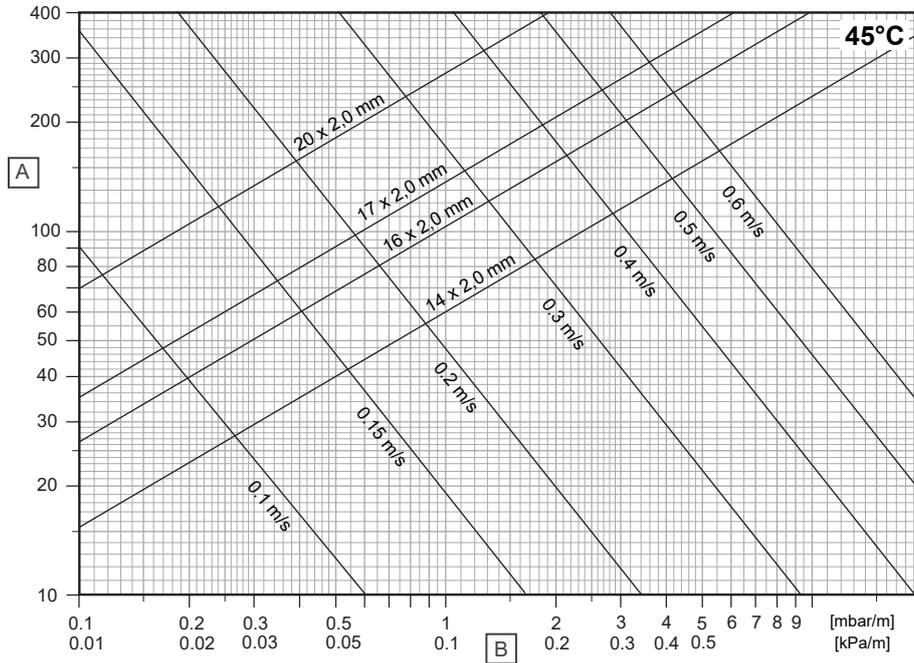
T (cm)	q_C (W/m^2)	$\Delta\vartheta_{C,N}$ (K)
10	32,9	8
15	29,7	8
20	26,8	8
25	24,1	8

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

2.3 Pressure drop diagrams

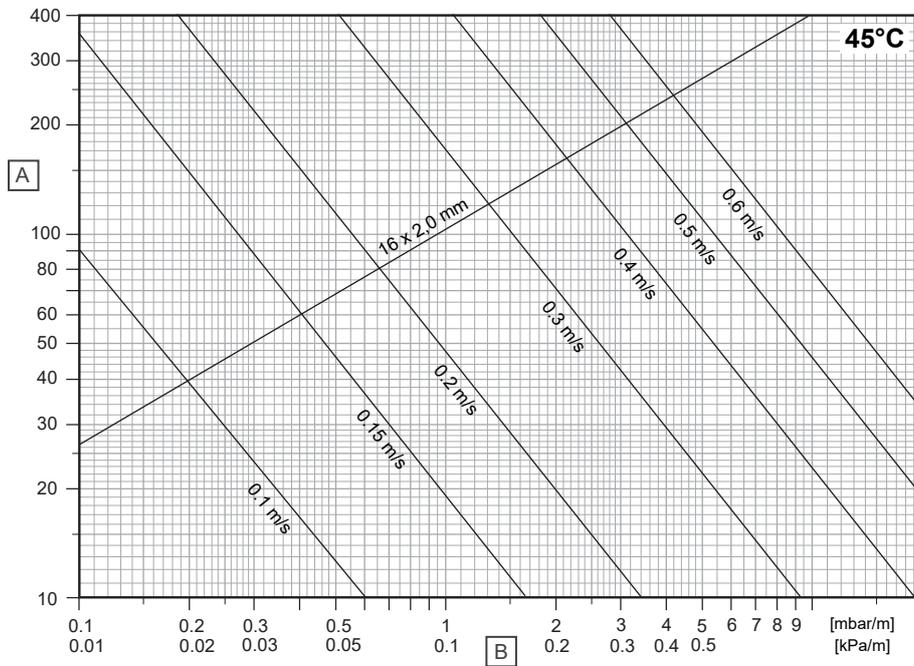
Uponor Comfort Pipe PLUS



D10000264

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

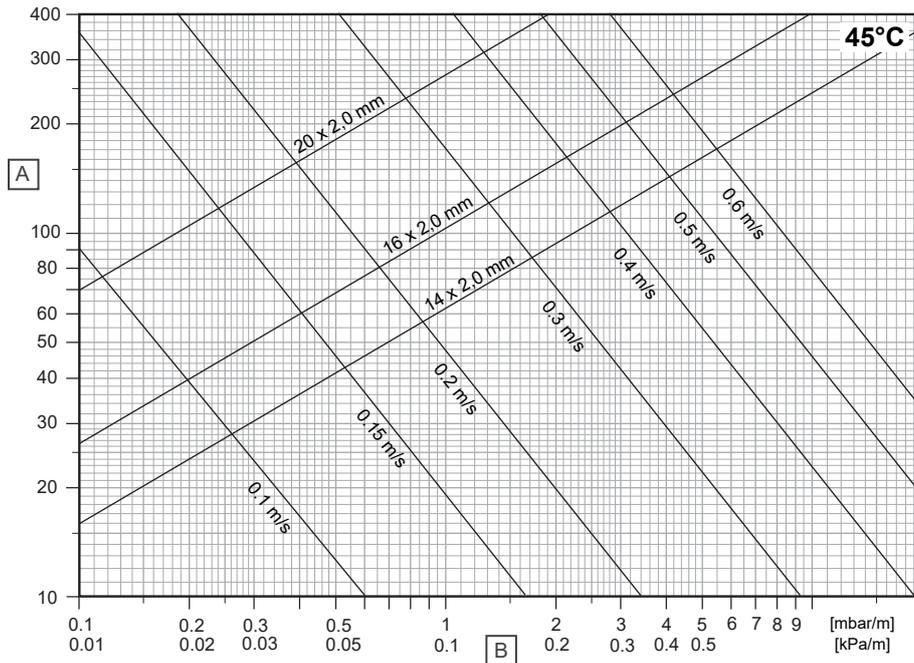
Uponor Comfort Pipe



D10000262

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

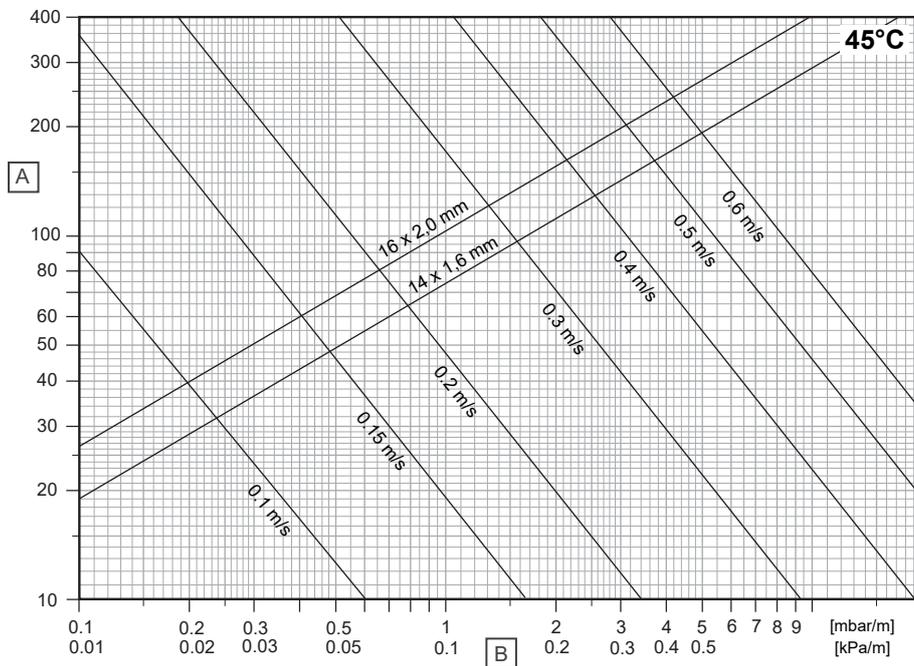
Uponor Smart UFH-pipe



D10000265

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

Uponor MLCP RED



D10000266

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

3 Installation

3.1 Installation process

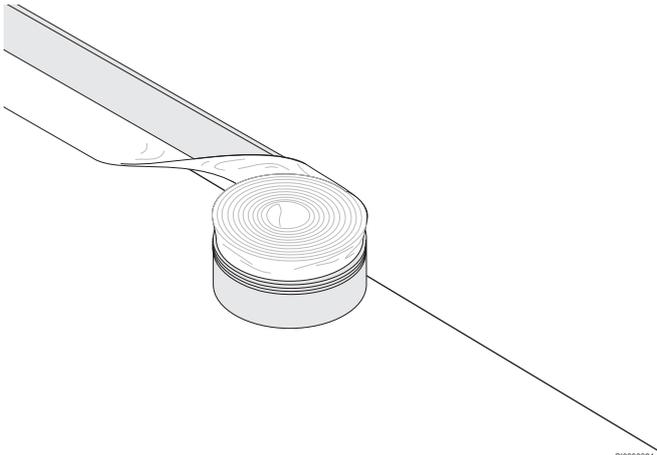


Note

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

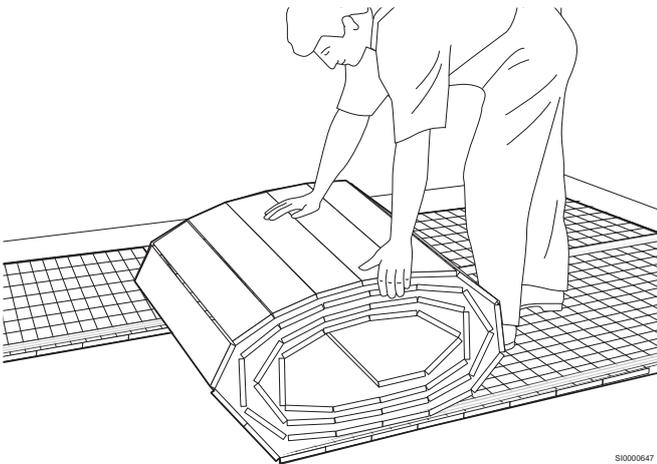
As a guidance, always read and follow the instructions given in respective Uponor installation manual.

1. Edging strip installation



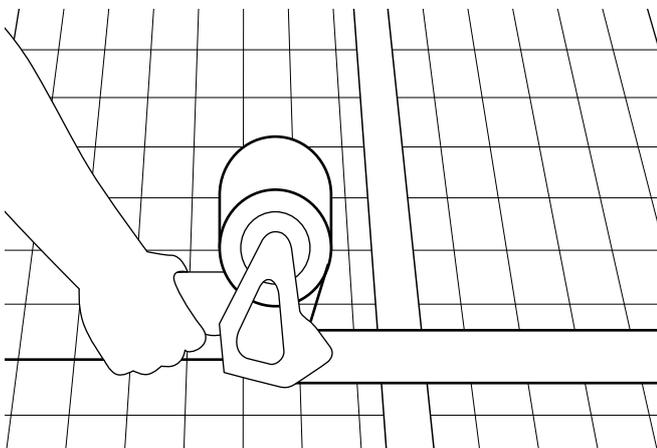
SI0000624

2. Panel installation



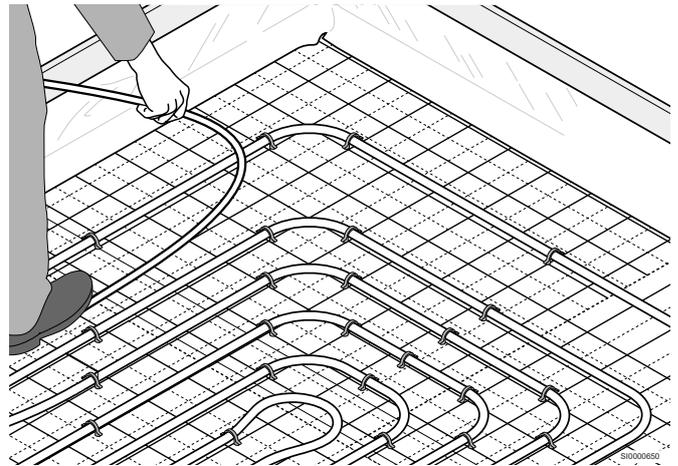
SI0000647

3. Join the gaps



SI0000648

4. Pipe installation



SI0000650

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				
Foil grid	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				

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	120; 240; 480; 640 m	120; 240; 480; 600 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			
Manufacturing	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	90 °C (EN ISO 15875)			
Max. operating pressure	6 bar at 70° C			
Pipe jointings	Uponor screw connection Uponor Q&E technology			
Weight	0,078 kg/m	0,091 kg/m	0,115 kg/m	0,115 kg/m

	Value	Value	Value	Value
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			
Density	0,934 g/cm ³	0,934 g/cm ³	0,934 g/cm ³	0,934 g/cm ³
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)

Uponor Comfort Pipe

	Value
Pipe designation	Uponor Comfort Pipe 16 x 1,8 mm
Pipe dimension	16 x 1,8 mm
Pipe length	120; 240; 640 m
Material	PE-Xa, five-layer pipe
Colour	White with two blue longitudinal stripes
Manufacturing	Refer to EN ISO 15875
Certificates	KOMO, DIN CERTCO
Area of application	Class 4 + 5 / 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	0,076 kg/m
Water content	0,121 l/m
Oxygen tightness	Refer to ISO 17455; DIN 4726
Density	0,934 g/cm ³
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)

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
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 15875)	Class 4 + 5 / 6 bar (EN ISO 15875)	Class 4 + 5 / 6 bar (EN ISO 15875)
Max. operating temperature	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

	Value	Value	Value
Pipe jointings	Uponor screw connection Uponor Q&E technology	Uponor screw connection Uponor Q&E technology	Uponor screw connection Uponor Q&E technology
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/cm ³	0,941 g/cm ³	0,941 g/cm ³
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)

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 Q&E technology	Uponor screw connection Uponor Q&E technology
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

Uponor GmbH

Industriestraße 56,
D-97437 Hassfurt, Germany

1140931 v1_11_2023_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