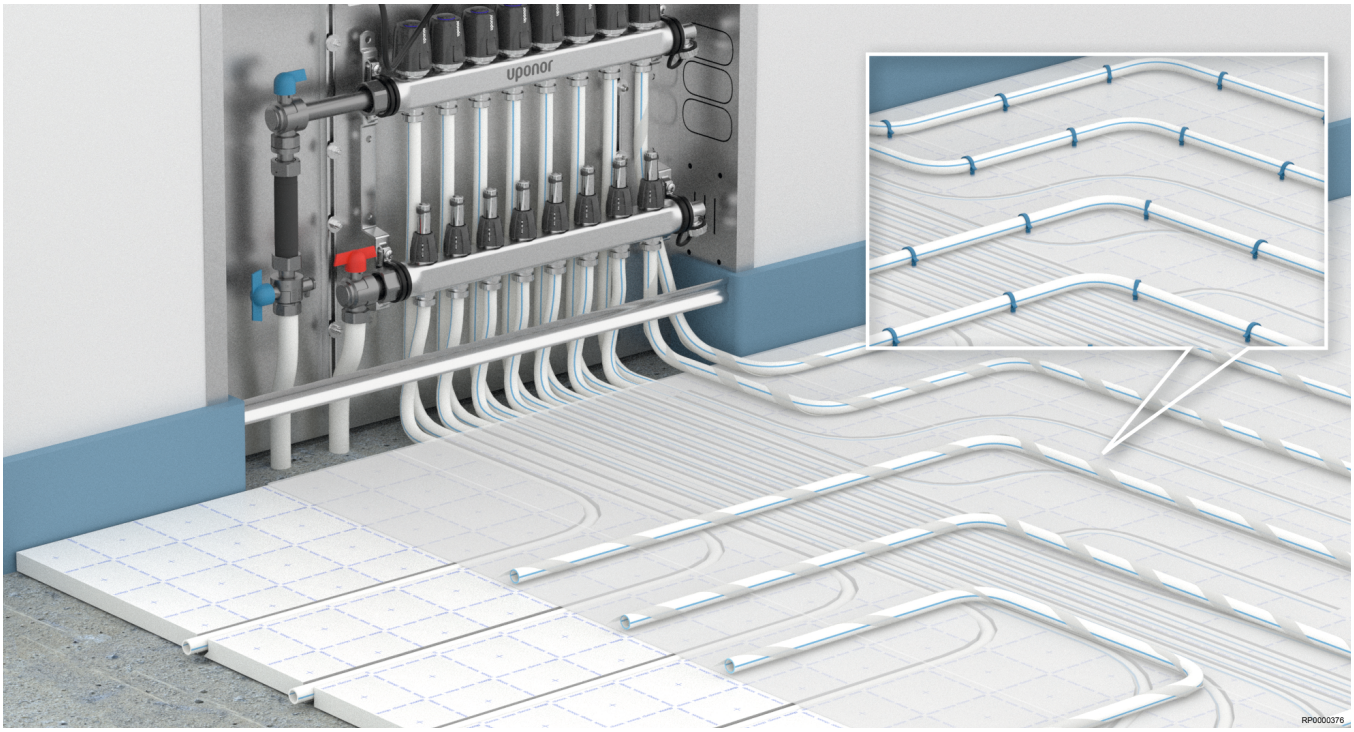
Uponor Vario Heat Protect

EN Technical information



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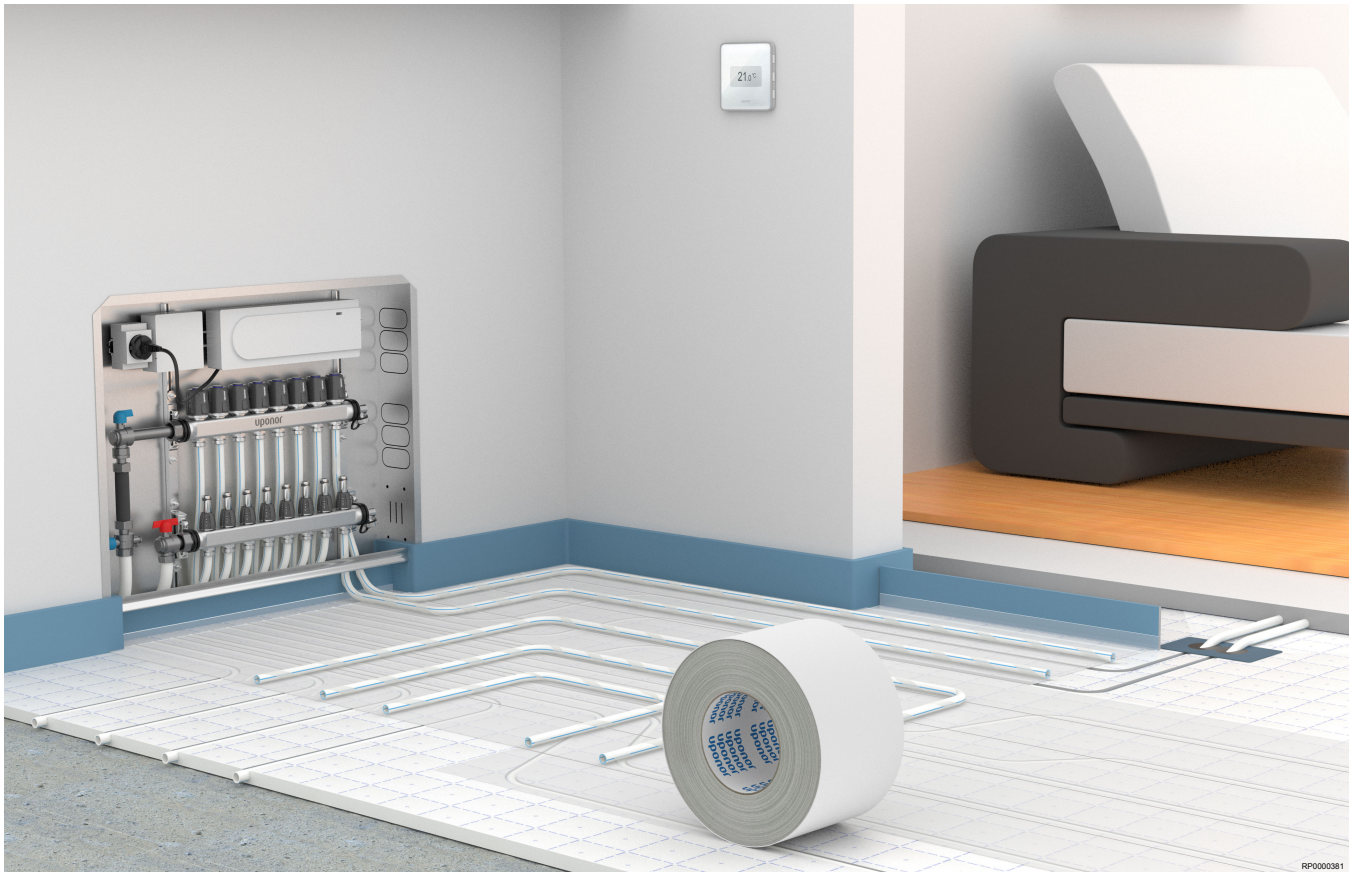
1 System description



The Uponor Vario Heat Protect is a system installed in front of the manifold to prevent uncontrolled overheating in hallways and passageways. It lowers the heat loss through pipes to the room by up to 80% compared to standard installations. Additionally, the system makes sure that the surface temperature of the top floor is not more than the maximum permissible limit (29 °C).

The system is suitable for two different floor constructions and consists of:

- Vario Heat Protect panel EPS DES 30-2 mm
- Vario Heat Protect panel EPS DES 35-3 mm
- Vario Heat Protect tape
- Vario Heat Protect seal

It can be used with Uponor underfloor heating pipes of 14 and 16 mm dimensions, and is compatible with standard Uponor underfloor heating systems, for example Klett, Tacker and Nubos.

The Uponor Vario Heat Protect constructions are thoroughly tested and proven for typical live loads and offer the same impact sound insulation properties as the Klett, Tacker and Nubos system panels. They stand out for their extremely simple installation on the construction site.

1.1 Benefits

- Lowers the surface temperature to prevent uncontrolled heating.
- Lowers the heat output by up to 80%.
- Two different floor construction heights are possible: 30 mm and 35 mm.
- Underfloor heating pipes with 14 mm and 16 mm dimensions can be used.
- Compatible with standard Uponor underfloor heating systems (Klett, Tacker, Nubos).
- Offers the same sound insulation properties (EN ISO 10140) as the related system panels Uponor Klett, Tacker and Nubos.
- Offers equivalent thermal properties (EN 18560) and can handle the same live loads.

1.2 Components

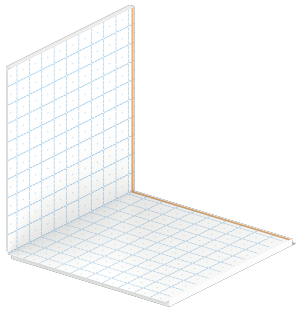
Note

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 Vario Heat Protect panel EPS DES



RP0000377

The Uponor Vario Heat Protect panels EPS DES 30-2 mm and EPS DES 35-3 mm are ideal for quick and easy installation of heating circuit connection lines within the insulation level. The panels are installed directly in front of the distribution manifold and can accommodate 12 and more heating circuits.

The panel is suitable for use with Uponor Comfort Pipe PLUS, Uponor Klett Comfort Pipe PLUS, Uponor Comfort Pipe, Uponor Smart UFH-pipe, Uponor MLCP RED and Uponor Klett MLCP RED pipes with 14 and 16 mm dimensions.

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

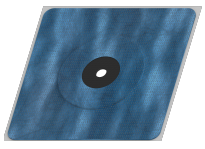
The live load capacity is equivalent to the Uponor system panels Klett, Tacker and Nubos.

Uponor Vario Heat Protect tape

RP0000378

The tape is ideal for covering pipes installed on the Vario Heat Protect panel. It is with Klett hooks on the underside and loops on the top side, providing a base for installing 14 and 16 mm PE-Xa, PE-RT and MLCP RED pipes.

Uponor Vario Heat Protect seal



RP0000379

The seal is ideal for tighten the pipes installed on the Vario Heat Protect panel against screed water. It has an adhesive bottom.

The seal is compatible with Uponor underfloor heating systems using 14 and 16 mm PE-Xa, PE-RT and MLCP RED pipes.

Uponor Siccus PS Cutter

RP0000380

The Uponor Siccus PS Cutter is a thermal cutting tool for EPS/XPS, designed without a head and compatible with Siccus heads in sizes 10 mm, 14 mm and 16 mm. The cutter operates at 230V and 50/60Hz.

Uponor Comfort Pipe PLUS

RP0000302

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

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

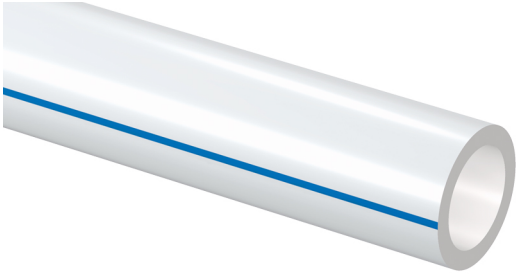
Uponor Klett Comfort Pipe PLUS

RP0000124

The Uponor Klett Comfort Pipe PLUS is a highly flexible PE-Xa pipe spiral wound with hook tape with 5 layers in dimensions 14 x 2,0 mm and 16 x 2,0 mm.

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

Uponor Comfort Pipe



RP0000123

The 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.

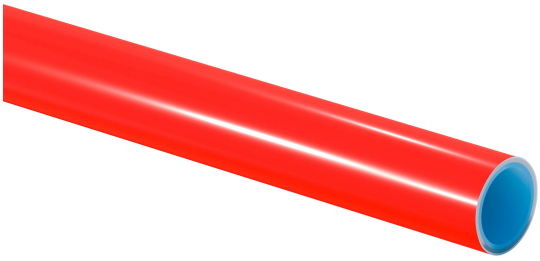
Uponor Smart UFH-pipe

RP0000347

The 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 and 16 x 2,0 mm.

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

Uponor MLCP RED



RP0000337

The 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 Klett MLCP RED

RP0000268

The Uponor Klett MLCP RED is a composite pipe spiral wound with hook tape which is stable and easy to install, available in the dimensions 16 x 2,0 mm.

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

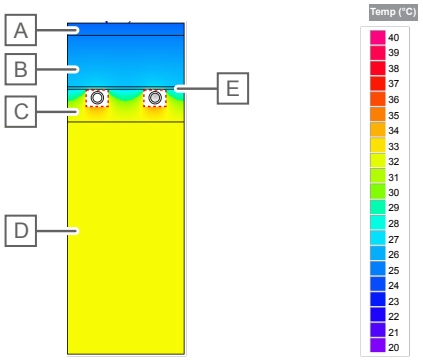
1.3 Thermographic simulations

Installing the connecting pipes within the insulation layer (image above) lowers the surface temperature from 29 °C to 25 °C.

With dynamic considerations, it is possible to lower the heat output to the room by up to 80% and energy consumption by up to 26%.

Vario Heat Protect system with heating pipes embedded in the Vario Heat Protect EPS panel

Typical operation temperatures: supply/return = 40/30 °C



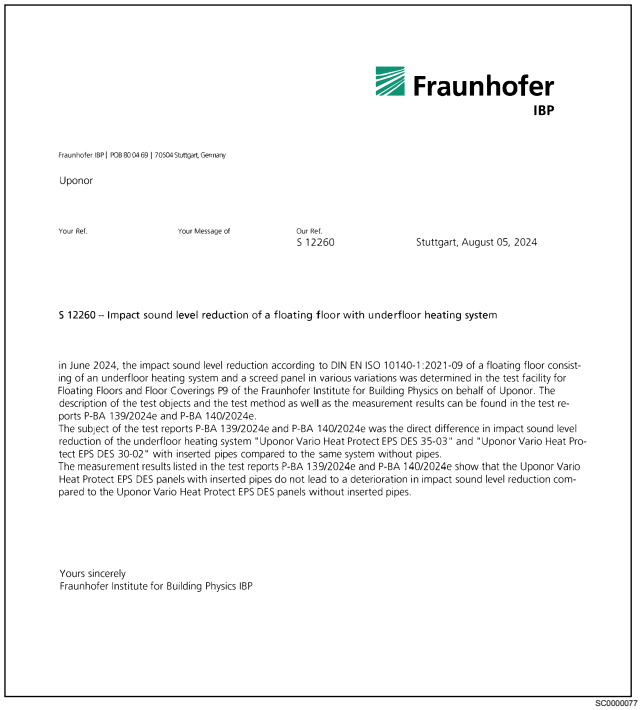
SD0000392

Item	Description
A	Tiles (10 mm)
B	Screed (45 mm)
C	Uponor Vario Heat Protect panel EPS DES 30 mm
D	Concrete (200 mm)
E	Uponor Vario Heat Protect tape (1 mm)

1.4 Sound reduction level

During the design of the Vario Heat Protect solution, special attention was given to make sure that the impact sound improvement level met or exceeded the requirements of the respective underfloor heating systems (Uponor Klett, Tacker, or Nubos).

This was fully examined through a series of tests at the Fraunhofer Institute, leading to the result that the Uponor Vario Heat Protect EPS DES panels with embedded underfloor heating pipes show no reduction in impact sound insulation compared to the same panels without pipes.



Fraunhofer IBP

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Uponor

Your Ref. | Your Message of | Our Ref. S 12260 | Stuttgart, August 05, 2024

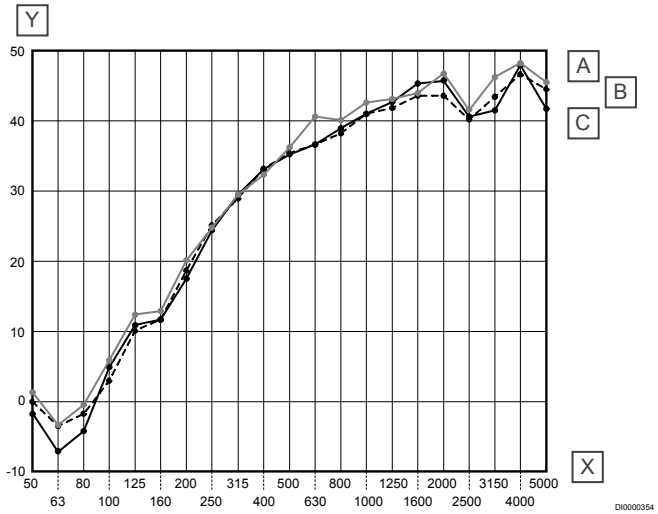
S 12260 – Impact sound level reduction of a floating floor with underfloor heating system

in June 2024, the impact sound level reduction according to DIN EN ISO 10140-1:2021-09 of a floating floor consisting of an underfloor heating system and a screed panel in various variations was determined in the test facility for Floating Floors and Floor Coverings P9 of the Fraunhofer Institute for Building Physics on behalf of Uponor. The description of the test objects and the test method as well as the measurement results can be found in the test reports P-BA 139/2024e and P-BA 140/2024e.
The subject of the test reports P-BA 139/2024e and P-BA 140/2024e was the direct difference in impact sound level reduction of the underfloor heating system "Uponor Vario Heat Protect EPS DES 35-03" and "Uponor Vario Heat Protect EPS DES 30-02" with inserted pipes compared to the same system without pipes.
The measurement results listed in the test reports P-BA 139/2024e and P-BA 140/2024e show that the Uponor Vario Heat Protect EPS DES panels with inserted pipes do not lead to a deterioration in impact sound level reduction compared to the Uponor Vario Heat Protect EPS DES panels without inserted pipes.

Yours sincerely
Fraunhofer Institute for Building Physics IBP

SC0000077

The following frequency measurement comparison demonstrates the consistency between the tested samples (Vario Heat Protect panels with and without underfloor heating pipes):



Item	Description
X	Frequency [Hz]
Y	Impact sound reduction [ΔL (dB)]
A	EPS DES 35-3 with 4 pipes VA5
B	EPS DES 35-3 with 2 pipes VA5
C	EPS DES 35-3 without pipes

1.5 Copyright and disclaimer

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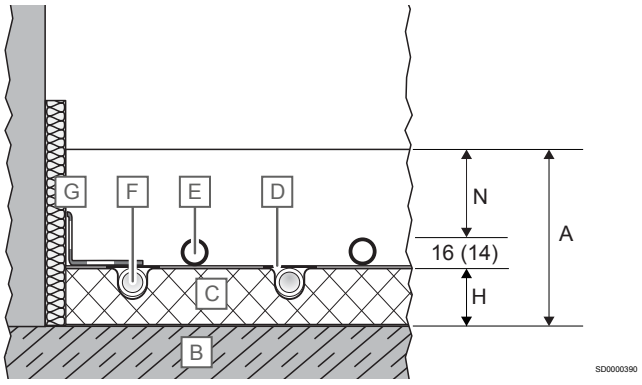
For any questions or queries, please visit the local Uponor website or speak to your Uponor representative.

2 Planning/design

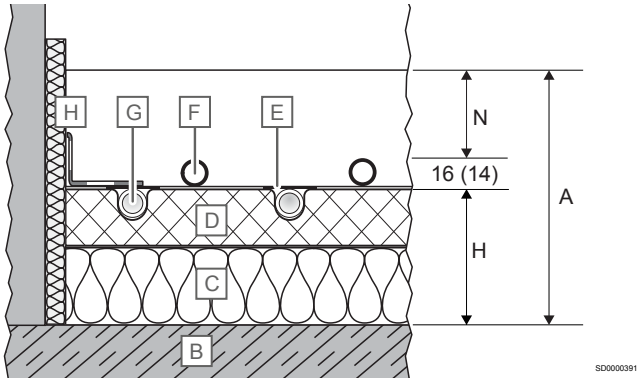
2.1 Floor construction

Panels direct on the floor



Item	Description
N	Minimum screed thickness above the pipe
H	Insulation layer thickness (mm)
A	Structural height
B	Existing subfloor
C	Uponor Vario Heat Protect panel EPS DES 30-2 mm or 35-3 mm
D	Uponor Vario Heat Protect tape
E	Uponor Klett Comfort Pipe PLUS/Uponor Klett MLCP RED/Uponor Comfort Pipe PLUS/Uponor MLCP RED
F	Uponor Klett Comfort Pipe PLUS/Uponor Klett MLCP RED/Uponor Comfort Pipe PLUS/Uponor MLCP RED (connecting pipe to other heating loop)
G	Edging strip

Panels with additional insulation on the floor



Item	Description
N	Minimum screed thickness above the pipe
H	Insulation layer thickness (mm)
A	Structural height
B	Existing subfloor
C	Uponor Vario Heat Protect panel EPS DES 30-2 mm or 35-3 mm
D	Uponor Vario Heat Protect tape
E	Uponor Klett Comfort Pipe PLUS/Uponor Klett MLCP RED/Uponor Comfort Pipe PLUS/Uponor MLCP RED
F	Uponor Klett Comfort Pipe PLUS/Uponor Klett MLCP RED/Uponor Comfort Pipe PLUS/Uponor MLCP RED (connecting pipe to other heating loop)
G	Uponor Klett Comfort Pipe PLUS/Uponor Klett MLCP RED/Uponor Comfort Pipe PLUS/Uponor MLCP RED (connecting pipe to other heating loop)
H	Edging strip

Floor construction tables

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.

These abbreviations are used in the following construction tables:

Abbreviations	Description
ΔLw [dB]	Impact sound improvement factor of flooring
VHP	Vario Heat Protect

Uponor Vario Heat Protect

Integrated impact sound insulation

Uponor Vario Heat Protect panel EPS DES

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	VHP EPS DES 30-2 = 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	VHP EPS DES 30-2 = 30 EPS-DEO 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	VHP EPS DES 30-2 = 30 EPS-DEO 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_{λ}, 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	VHP EPS DES 30-2 = 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	VHP EPS DES 30-2 = 30 EPS-DEO 20 = 20 Total H = 50	1,32	32	31	≥ 141 (139)	≥ 131 (129)
Floor ceilings against outside air in residential and non-residential buildings (ϑi ≥ 19 °C)						
EN 1264-4	VHP EPS DES 30-2 = 30 EPS-DEO 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 Vario Heat Protect panel EPS DES

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	VHP EPS DES 35-3 = 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	VHP EPS DES 35-3 = 35 EPS-DEO 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	VHP EPS DES 35-3 = 35 EPS-DEO 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	VHP EPS DES 35-3 = 35	0,75	33	32	≥ 121 (119)	≥ 111 (109)
Floor slabs[1]), ceilings against unheated rooms in residential and non-residential buildings						
EN 1264-4	VHP EPS DES 35-3 = 35 EPS-DEO 20 = 20 Total H = 55	1,32	33	32	≥ 141 (139)	≥ 131 (119)
Floor ceilings against outside air in residential and non-residential buildings (ϑi ≥ 19 °C)						
EN 1264-4	VHP EPS DES 35-3 = 35 EPS-DEO 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.

3 Installation

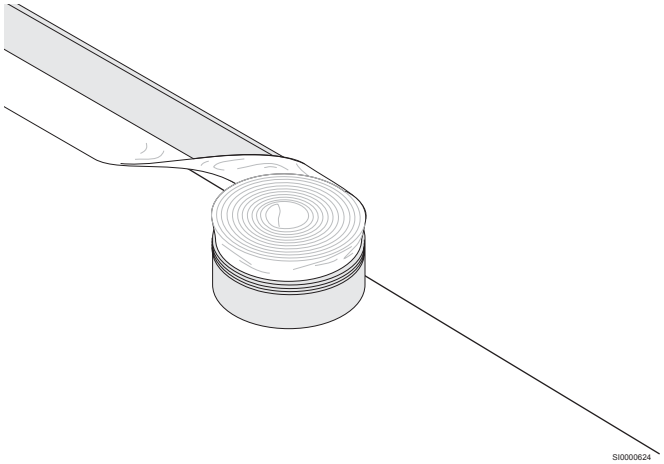
3.1 Installation process

Note

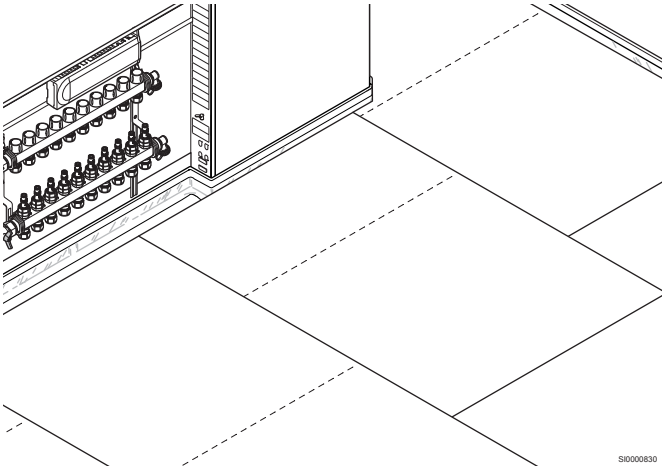
The installation must be performed by a qualified person in accordance with local standards and regulations.

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

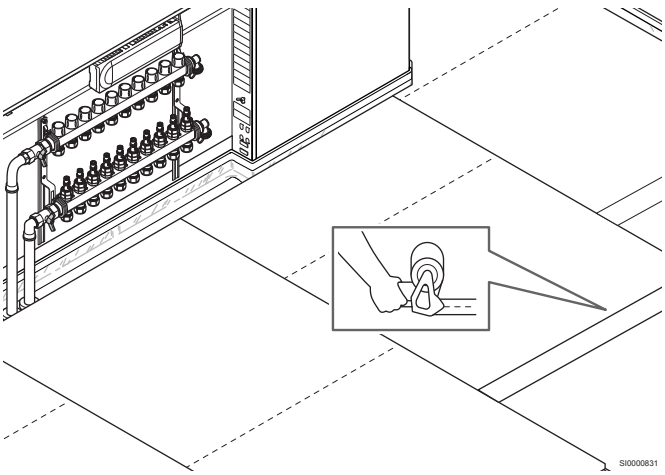
1. Multi-edging strip installation



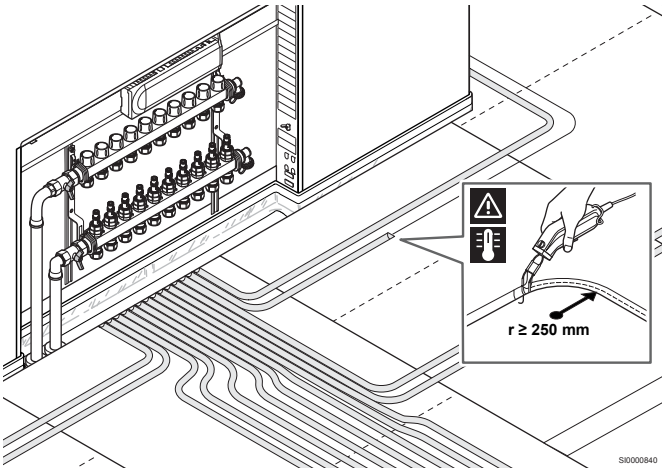
2. Panels installation



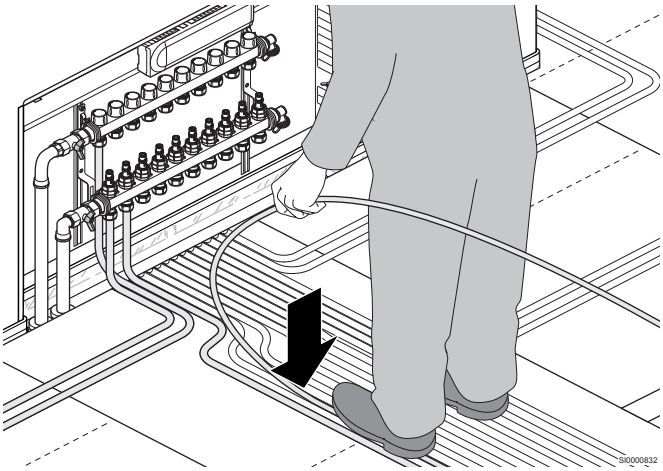
3. Join the gaps



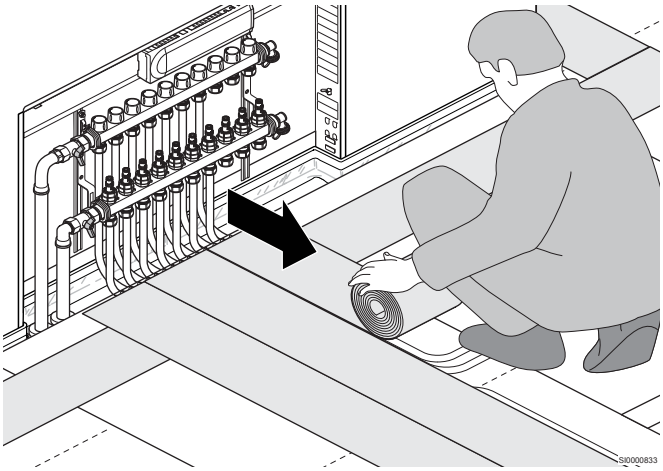
4. Engrave the grooves



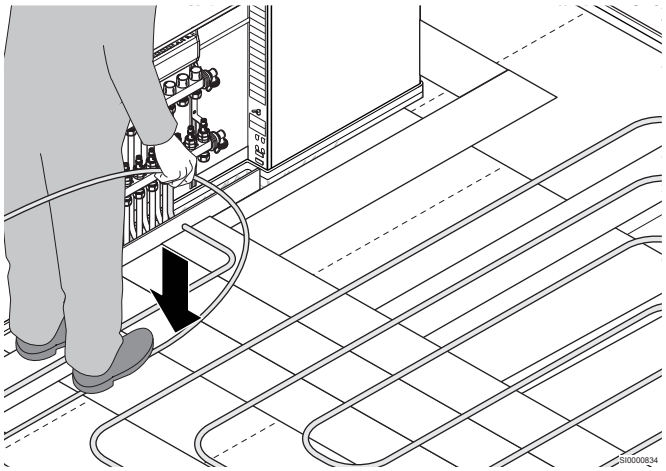
5. Connection pipes installation



6. Join the gaps



7. Final circuit pipes installation



4 Technical data

4.1 Technical specifications

Uponor Vario Heat Protect panel EPS DES

Description	30 – 2	35 – 3
Type	Uponor Vario Heat Protect panel EPS DES 30-2 mm with impact sound insulation	Uponor Vario Heat Protect panel EPS DES 35-3 mm with impact sound insulation
Material	EPS with PP foil on top and bottom	EPS with PP foil on top and bottom
Dimension	1200 x 600 x 30 mm	1200 x 600 x 35 mm
Max. live load	5,0 kN/m^2	4,0 kN/m^2
Thermal resistance	0,75 m^{2}K/W	0,75 m^{2}K/W
Dynamic stiffness	20 MN/m^3	15 MN/m^3
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
Pipe designation	Uponor Comfort Pipe PLUS 14 x 2,0 mm	Uponor Comfort Pipe PLUS 16 x 2,0 mm
Pipe dimension	14 x 2,0 mm	16 x 2,0 mm
Pipe length	120; 240; 640; 960 m	120; 240; 640 m
Material	PE-Xa, five-layer pipe	PE-Xa, five-layer pipe
Colour	White with two blue longitudinal stripes	White with two blue longitudinal stripes
Manufacturing	Refer to EN ISO 15875	Refer to EN ISO 15875
Certificates	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)
Max. operating temperature[1)]	90 °C (EN ISO 15875)	90 °C (EN ISO 15875)
Max. operating pressure	6 bar at 70° C	6 bar at 70° C
Pipe jointings	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
Water content	0,077 l/m	0,11 l/m
Oxygen tightness	Refer to ISO 17455; DIN 4726	Refer to ISO 17455; DIN 4726
Density	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
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)
Pipe roughness	0,007 mm	0,007 mm
Ideal installation temperature	≥ 0 °C	≥ 0 °C
UV protection	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 Klett Comfort Pipe PLUS

	14 x 2,0 mm	16 x 2,0 mm
Pipe designation	Uponor Klett Comfort Pipe PLUS	Uponor Klett Comfort Pipe PLUS
Pipe dimension	14 x 2,0 mm	16 x 2,0 mm
Pipe length	240 m; 640 m	240 m; 640 m

	14 x 2,0 mm	16 x 2,0 mm
Material	PE-Xa, five-layer pipe	PE-Xa, five-layer pipe
Colour	White with two blue longitudinal stripes	White with two blue longitudinal stripes
Manufacturing	Refer to EN ISO 15875	Refer to EN ISO 15875
Certificates	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)
Max. operating temperature[1)]	90 °C (EN ISO 15875)	90 °C (EN ISO 15875)
Pipe jointings	Uponor screw connection Uponor Smart press coupling	Uponor screw connection, Uponor Smart press coupling, Uponor Q&E technology
Weight	0,09 kg/m	0,1 kg/m
Water content	0,077 l/m	0,11 l/m
Oxygen tightness	Refer to ISO 17455; DIN 4726	Refer to ISO 17455; DIN 4726
Density	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
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)
Pipe roughness	0,007 mm	0,007 mm
Ideal installation temperature	> 0 °C	> 0 °C
UV protection	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
Colour	White with one blue longitudinal stripe
Manufacturing	Refer to EN ISO 15875
Certificates	DIN CERTCO
Area of application	Class 4 / 6 bar (EN ISO 15875)
Max. operating temperature[1)]	90 °C (EN ISO 15875)
Max. operating pressure	6 bar at 70° C
Pipe jointings	Uponor screw connection, Uponor Smart press coupling, 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
Pipe designation	Uponor Smart UFH-pipe 14 x 2,0 mm	Uponor Smart UFH-pipe 16 x 2,0 mm
Pipe dimension	14 x 2,0 mm	16 x 2,0 mm
Pipe length	240; 640 m	240; 640 m
Material	PE-RT Type II, five-layer pipe	PE-RT Type II, five-layer pipe
Colour	Natural colour	Natural colour
Manufacturing	Refer to EN ISO 22391	Refer to EN ISO 22391
Certificates	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)
Max. operating temperature[1)]	90 °C (EN ISO 22391)	90 °C (EN ISO 22391)
Max. operating pressure	6 bar at 70° C	6 bar at 70° C
Pipe jointings	Uponor screw connection Uponor Smart press coupling	Uponor screw connection Uponor Smart press coupling
Weight	0,0726 kg/m	0,0846 kg/m
Water content	0,079 l/m	0,113 l/m
Oxygen tightness	Refer to ISO 17455; DIN 4726	Refer to ISO 17455; DIN 4726
Density	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
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)
Pipe roughness	0,007 mm	0,007 mm
Ideal installation temperature	≥ 0 °C	≥ 0 °C
UV protection	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 MLCP RED press coupling	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 Klett MLCP RED

Description	Value
Pipe designation	Uponor Klett MLCP RED
Pipe dimension	16 x 2,0 mm
Pipe length	240 m; 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.
Colour	Red
Manufacturing	Refer to EN ISO 21003
Certificates	KOMO, DIN CERTCO
Area of application	Class 4 / 5 (ISO 10508)
Max. operating temperature	60 °C
Max. operating pressure	4 bar
Pipe jointings	Uponor screw connection Uponor S-Press PLUS
Weight	0,076 kg/m
Water volume	0,091 l/m
Oxygen tightness	Refer to ISO 17455; DIN 4726
Building material class	B2 according to DIN 4102
Min. bending radius	4xd if free bending (64 mm) 3xd if supported bend (48 mm)
Pipe roughness	0,004 mm
Best mounting temperature	≥ 0 °C
UV protection	Brown cardboard (store remaining quantities in the cardboard box)

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