

PRINETO®

Ideal for reconstruction!



PRINETO thin-bed
underfloor heating
system

IVT
WÜRTH  GROUP



PRINETO thin-bed underfloor heating system

Underfloor heating for modernisation

Underfloor heating significantly improves the indoor environment quality of housing. However, complex laying work and low ceiling heights put many people off such modernisation work. Impress your customers with the **PRINETO** thin-bed underfloor heating system. With a maximum height of only two centimetres, it is extremely thin and can be laid quickly and cleanly on all existing flooring. Thanks to the mature technology, **PRINETO** thin-bed

underfloor heating systems are child's play to lay, and delight customers with a high thermal conductivity and heating capacity even at extremely low temperatures.

Open up completely new possibilities for your customers during renovation and modernisation of their property – thanks to **PRINETO** thin-bed underfloor heating.

Advantages of the PRINETO thin-bed underfloor heating system

- Suitable for modernisation with low-temperature surface heating
- Extremely flat floor structure – the overall height is only around 22 mm from the lower edge of the knobbed foil
- Lower weight per square metre (approx. 40 kg/m² with a height of 22 mm)
- Faster bonding and drying thanks to special levelling - screed
- Only 30 minutes reaction time with the room-temperature regulation
- High thermal conductivity of the levelling screed (1.4 W/mK)
- Large specific heating capacities even at low room temperatures
- High comfort level and even underfloor heating thanks to small laying spacing of only about 5 cm
- Suitable for all rooms with accommodation-type use (maximum useful load 3 kN/m²)
- ÖKO-FLEX heating pipe PE-HDS, particularly flexibel and eco-friendly - up to 35 % less Energy during production

Please heed the general instructions on installing underfloor heating included in the **PRINETO** catalogue as well

as the laying instructions provided by thin-bed screed manufacturers.

PRINETO thin-bed underfloor heating – the system components

PRINETO Knobbed foil 12

Art.-no. 878 386 229

Self-adhesive knobbed foil for the toolless and reliable fixing of surface heating pipe 12 x 2.0. Laying spacing 5 and 7 cm (diagonal). Made of non-deformable foil with knobs that can bear walking on, for reliable installation, suitable for building sites. Its perforation ensures better bonding of the screed with the substrate. The knobbed overlap at the side allows simple and tight board connection.

PRINETO Expansion joint profile 80 x 10, self-adhesive

Art.-no. 878 386 233

The new expansion joint profile compensates changes in shape of the heating screed and is used to separate different heating circuits e.g. in doorways and as a predetermined breakage point for shortening the screed according to DIN 18560-2. Its self-adhesive base allows it to be fixed to the unfinished floor or floor covering.

PRINETO Surface heating pipe 12 x 2.0, highly flexible

Art.-no. 878 311 320

Especially flexible surface heating pipe PE-MDX of the dimension 12 x 2.0 for simple 1-man laying. Saves time and costs. It is of course oxygen-tight according to DIN 4724.

PRINETO Clamp/screw-connection 12-V Euro

Art.-no. 878 386 234

For the reliable connection of the **PRINETO** surface heating pipe to the heating circuit distributor, thread $\frac{3}{4}$ " Euro-cone inner thread.

PRINETO Coupling 12 / 16-12

Art.-no. 878 386 180/878 340 220

For the safe connection of **PRINETO** surface heating pipes to each other or to **PRINETO** heating, Nanoflex or Stabil pipe 16. The patented sliding sleeve connection allows pipelines to be connected reliably and inseparably to each other permanently. That saves on material and eases the strain on both the wallet and the environment.





For optimum laying, the substrate must be able to bear the load and be free of cracks, its surface must be even and clean. To fix the **PRINETO** edge insulating strip 50x5 mm (art.-no. 878 386 232) in place, remove the protective backing and press the self-adhesive side onto the projecting components.

To lay **PRINETO** knobbed foil 12 (art.-no. 878 386 231), start in the "top left-hand" corner of the room opposite the door. Lay both sides with "half" press cuts into the corner.



When the foil has been adjusted correctly, remove the protective backing and press the knobbed foil with the self-adhesive side facing downwards onto the floor. The next board is aligned on the right, also with half press cuts at the top and on the left. Stick the left-hand side of the film over the respective row of the starting board, producing a fixed composite foil. Continue laying this way until you reach the right-hand wall.

TIP

The foil only has to be laid in the areas to be heated. This means you save complicated cutting in difficult edge areas.



Start laying the **PRINETO** heating pipe 12 at the upper heat distributor box or at the mechanical individual-room controller (MIC). Protect the pipes at the ducts to the distributor cabinet by protective pipes or pipe-guiding bends. Use **PRINETO** clamp/screw-connections 12 V Euro (art.-no. 878 386 234) to attach the pipes to the distributor. The surface heating pipe can be connected using the **PRINETO** coupling 12 (art. no. 878 340 220) in connection with the **PRINETO** sliding sleeve 12 (art.-no. 878 530 080). This saves you expensive pipe cut-off surplus.



Depending on the type of laying and spacing, press the pipe between the knobs using your foot. The smallest bending radius is 75 mm. Then flush and bleed every heating circuit separately, carry out a pressure test on all the heating circuits connected to the distributor. Screed is laid on site. We recommend you use the special screed type Würth CERAFIX 201. Finally, hydraulic adjustment of the heating circuits and functional heating is carried out.

Pressure losses for **PRINETO** surface heating installations

Dimension 12 x 2.0 at 40°C [FHR 12]

Spread in K	4			5			6			7					
	Q	m	w	R	m	w	R	m	w	R	m	w	R		
	kg/h	m/s	Pa/m	kg/h	m/s	Pa/m	kg/h	m/s	Pa/m	kg/h	m/s	Pa/m	kg/h	m/s	Pa/m
10	2.15	0.01	0.80	1.72	0.01	0.54	1.43	0.01	0.39	1.23	0.01	0.30			
20	4.30	0.02	2.69	3.44	0.02	1.82	2.87	0.02	1.33	2.46	0.01	1.01			
30	6.45	0.04	5.48	5.16	0.03	3.71	4.30	0.02	2.69	3.69	0.02	2.06			
40	8.60	0.05	9.06	6.88	0.04	6.13	5.73	0.03	4.46	4.91	0.03	3.40			
50	10.75	0.06	13.39	8.60	0.05	9.06	7.17	0.04	6.59	6.14	0.03	5.03			
60	12.90	0.07	18.42	10.32	0.06	12.47	8.60	0.05	9.06	7.37	0.04	6.92			
70	15.05	0.08	24.13	12.04	0.07	16.33	10.03	0.06	11.87	8.60	0.05	9.06			
80	17.20	0.10	30.48	13.76	0.08	20.63	11.46	0.06	14.99	9.83	0.05	11.45			
90	19.35	0.11	37.46	15.48	0.09	25.35	12.90	0.07	18.42	11.06	0.06	14.07			
100	21.50	0.12	45.04	17.20	0.10	30.48	14.33	0.08	22.15	12.28	0.07	16.92			
110	23.65	0.13	53.21	18.92	0.10	36.01	15.76	0.09	26.17	13.51	0.07	19.99			
120	25.80	0.14	61.97	20.64	0.11	41.93	17.20	0.10	30.48	14.74	0.08	23.27			
130	27.94	0.15	71.28	22.36	0.12	48.24	18.63	0.10	35.06	15.97	0.09	26.77			
140	30.09	0.17	81.15	24.08	0.13	54.92	20.06	0.11	39.92	17.20	0.10	30.48			
150	32.24	0.18	91.57	25.80	0.14	61.97	21.50	0.12	45.04	18.43	0.10	34.39			
160	34.39	0.19	102.52	27.52	0.15	69.38	22.93	0.13	50.42	19.65	0.11	38.50			
170	36.54	0.20	113.99	29.23	0.16	77.14	24.36	0.13	56.07	20.88	0.12	42.81			
180	38.69	0.21	125.98	30.95	0.17	85.26	25.80	0.14	61.97	22.11	0.12	47.32			
190	40.84	0.23	138.49	32.67	0.18	93.72	27.23	0.15	68.12	23.34	0.13	52.01			
200	42.99	0.24	151.49	34.39	0.19	102.52	28.66	0.16	74.51	24.57	0.14	56.90			
210	45.14	0.25	165.00	36.11	0.20	111.66	30.09	0.17	81.15	25.80	0.14	61.97			
220	47.29	0.26	178.99	37.83	0.21	121.13	31.53	0.17	88.04	27.02	0.15	67.22			
230	49.44	0.27	193.47	39.55	0.22	130.92	32.96	0.18	95.16	28.25	0.16	72.66			
240	51.59	0.29	208.43	41.27	0.23	141.05	34.39	0.19	102.52	29.48	0.16	78.28			
250	53.74	0.30	223.86	42.99	0.24	151.49	35.83	0.20	110.11	30.71	0.17	84.08			
260	55.89	0.31	239.77	44.71	0.25	162.26	37.26	0.21	117.93	31.94	0.18	90.05			
270	58.04	0.32	256.14	46.43	0.26	173.33	38.69	0.21	125.98	33.17	0.18	96.20			
280	60.19	0.33	272.97	48.15	0.27	184.72	40.13	0.22	134.26	34.39	0.19	102.52			
290	62.34	0.34	290.26	49.87	0.28	196.42	41.56	0.23	142.77	35.62	0.20	109.01			
300	64.49	0.36	308.00	51.59	0.29	208.43	42.99	0.24	151.49	36.85	0.20	115.67			
310	66.64	0.37	326.19	53.31	0.29	220.74	44.43	0.25	160.44	38.08	0.21	122.51			
320	68.79	0.38	344.83	55.03	0.30	233.35	45.86	0.25	169.61	39.31	0.22	129.51			
330	70.94	0.39	363.91	56.75	0.31	246.26	47.29	0.26	178.99	40.54	0.22	136.67			
340	73.09	0.40	383.42	58.47	0.32	259.47	48.72	0.27	188.59	41.76	0.23	144.00			
350	75.24	0.42	403.38	60.19	0.33	272.97	50.16	0.28	198.40	42.99	0.24	151.49			
360	77.39	0.43	423.76	61.91	0.34	286.77	51.59	0.29	208.43	44.22	0.24	159.15			
370	79.54	0.44	444.57	63.63	0.35	300.85	53.02	0.29	218.67	45.45	0.25	166.97			
380	81.69	0.45	465.81	65.35	0.36	315.22	54.46	0.30	229.11	46.68	0.26	174.94			
390	83.83	0.46	487.48	67.07	0.37	329.88	55.89	0.31	239.77	47.91	0.26	183.08			
400	85.98	0.48	509.56	68.79	0.38	344.83	57.32	0.32	250.63	49.13	0.27	191.37			
410	88.13	0.49	532.06	70.51	0.39	360.06	58.76	0.32	261.70	50.36	0.28	199.82			
420	90.28	0.50	554.98	72.23	0.40	375.56	60.19	0.33	272.97	51.59	0.29	208.43			
430				73.95	0.41	391.35	61.62	0.34	284.45	52.82	0.29	217.19			
440				75.67	0.42	407.42	63.06	0.35	296.12	54.05	0.30	226.11			
450				77.39	0.43	423.76	64.49	0.36	308.00	55.28	0.31	235.18			
460				79.11	0.44	440.38	65.92	0.36	320.08	56.50	0.31	244.40			
470				80.83	0.45	457.27	67.35	0.37	332.36	57.73	0.32	253.77			
480				82.55	0.46	474.43	68.79	0.38	344.83	58.96	0.33	263.30			
490				84.26	0.47	491.86	70.22	0.39	357.50	60.19	0.33	272.97			
500				85.98	0.48	509.56	71.65	0.40	370.36	61.42	0.34	282.80			
510				87.70	0.48	527.53	73.09	0.40	383.42	62.65	0.35	292.77			
520				89.42	0.49	545.76	74.52	0.41	396.68	63.87	0.35	302.89			
530				91.14	0.50	564.26	75.95	0.42	410.12	65.10	0.36	313.15			
540							77.39	0.43	423.76	66.33	0.37	323.57			
550							78.82	0.44	437.59	67.56	0.37	334.13			
560							80.25	0.44	451.61	68.79	0.38	344.83			
570							81.69	0.45	465.81	70.02	0.39	355.68			
580							83.12	0.46	480.21	71.24	0.39	366.67			
590							84.55	0.47	494.79	72.47	0.40	377.80			
600							85.98	0.48	509.56	73.70	0.41	389.08			
610							87.42	0.48	524.52	74.93	0.41	400.50			
620							88.85	0.49	539.66	76.16	0.42	412.06			
630							90.28	0.50	554.98	77.39	0.43	423.76			
640										78.61	0.43	435.60			
650										79.84	0.44	447.58			
660										81.07	0.45	459.70			
670										82.30	0.45	471.96			
680										83.53	0.46	484.36			
690										84.76	0.47	496.89			
700										85.98	0.48	509.56			
710										87.21	0.48	522.37			
720										88.44	0.49	535.31			
730										89.67	0.50	548.39			
740										90.90	0.50	561.60			

Capacity table for thin-bed system 12 x 2.0

(10 mm pipe overlap using KNAUF 425 with 1.40 W/mK, direct bonding to concrete)

Spread: 5.0 K; Δp : 250 hPa; thermal conductivity resistance of the floor covering $R_{\lambda,B} = 0.015 \text{ m}^2\text{K/W}$ (natural stone, tiles, stoneware)

Room temperature θ_i in °C	Planning data		Average heating water temperature θ_{Hm} in °C 27.0			Average heating water temperature θ_{Hm} in °C 27.0	
	Laying spacing VA cm	Pipe requirement l_p m/m ²	Max. heat flow density q W/m ²	Average floor temp. θ_e °C	Max. heating circuit area A_{HK} m ²	Max. heat flow density q W/m ²	Average floor temp. θ_e °C
15	5	20.0	101	24.1	3.6	127	26.2
	10	10.0	86	22.8	5.1	107	24.6
	15	6.7	73	21.7	6.5	91	23.3
	20	5.0	61	20.7	8.0	76	22.0
	25	4.0	53	20.0	9.4	66	21.2
18	5	20.0	76	25.0	4.3	101	27.1
	10	10.0	64	24.0	6.0	86	25.8
	15	6.7	55	23.2	7.7	73	24.7
	20	5.0	46	22.4	9.4	61	23.7
	25	4.0	40	21.9	10.9	53	23.0
20	5	20.0	59	25.6	4.9	84	27.7
	10	10.0	50	24.8	6.9	71	26.6
	15	6.7	42	24.1	8.8	61	25.7
	20	5.0	35	23.5	10.7	51	24.8
	25	4.0	31	23.1	12.4	44	24.3
22	5	20.0	42	26.1	5.9	68	28.3
	10	10.0	36	25.5	8.2	57	27.4
	15	6.7	30	25.0	10.4	48	26.7
	20	5.0	25	24.6	12.5	41	26.0
	25	4.0	22	24.3	14.5	35	25.5
24	5	20.0	25	26.6	7.6	51	28.8
	10	10.0	21	26.2	10.5	43	28.2
	15	6.7	18	25.9	13.1	36	27.6
	20	5.0	15	25.6	15.6	30	27.0
	25	4.0	13	25.4	17.9	26	26.7

Spread: 5.0 K; Δp : 250 hPa; thermal conductivity resistance of the floor covering $R_{\lambda,B} = 0.05 \text{ m}^2\text{K/W}$ (parquet, needle felt, synthetic fibre)

Room temperature θ_i in °C	Planning data		Average heating water temperature θ_{Hm} in °C 27.0			Average heating water temperature θ_{Hm} in °C 27.0	
	Laying spacing VA cm	Pipe requirement l_p m/m ²	Max. heat flow density q W/m ²	Average floor temp. θ_e °C	Max. heating circuit area A_{HK} m ²	Max. heat flow density q W/m ²	Average floor temp. θ_e °C
15	5	20.0	78	22.2	4.2	97	23.8
	10	10.0	66	21.2	5.9	83	22.6
	15	6.7	57	20.4	7.4	72	21.7
	20	5.0	50	19.8	8.9	62	20.8
	25	4.0	43	19.2	10.4	54	20.2
18	5	20.0	58	23.5	5.0	78	25.2
	10	10.0	50	22.7	7.0	66	24.2
	15	6.7	43	22.2	8.7	57	23.4
	20	5.0	37	21.7	10.4	50	22.8
	25	4.0	33	21.2	12.1	43	22.2
20	5	20.0	45	24.4	5.7	65	26.1
	10	10.0	39	23.8	7.9	55	25.2
	15	6.7	33	23.3	9.9	48	24.6
	20	5.0	29	22.9	11.8	41	24.0
	25	4.0	25	22.6	13.6	36	23.6
22	5	20.0	32	25.2	6.7	52	26.9
	10	10.0	28	24.8	9.4	44	26.3
	15	6.7	24	24.5	11.6	38	25.8
	20	5.0	21	24.2	13.7	33	25.3
	25	4.0	18	23.9	15.8	29	24.9
24	5	20.0	19	26.0	8.5	39	27.8
	10	10.0	17	25.7	11.8	33	27.3
	15	6.7	14	25.5	14.4	29	26.9
	20	5.0	12	25.4	16.9	25	26.5
	25	4.0	11	25.2	19.2	22	26.2

Spread: 5.0 K; Δp : 250 hPa; thermal conductivity resistance of the floor covering $R_{\lambda,B} = 0.10 \text{ m}^2\text{K/W}$ (carpet, loop-pile carpet)

Room temperature θ_i in °C	Planning data		Average heating water temperature θ_{Hm} in °C 27.0			Average heating water temperature θ_{Hm} in °C 27.0	
	Laying spacing VA cm	Pipe requirement l_p m/m ²	Max. heat flow density q W/m ²	Average floor temp. θ_e °C	Max. heating circuit area A_{HK} m ²	Max. heat flow density q W/m ²	Average floor temp. θ_e °C
15	5	20.0	57	20.4	5.0	72	21.7
	10	10.0	50	19.8	6.9	63	20.9
	15	6.7	45	19.3	8.5	56	20.3
	20	5.0	40	18.9	10.0	50	19.8
	25	4.0	35	18.5	11.6	44	19.3
18	5	20.0	43	22.2	5.8	57	23.4
	10	10.0	38	21.7	8.0	50	22.8
	15	6.7	33	21.3	9.9	45	22.3
	20	5.0	30	21.0	11.6	40	21.9
	25	4.0	27	20.7	13.3	35	21.5
20	5	20.0	34	23.3	6.6	48	24.6
	10	10.0	29	23.0	9.1	42	24.1
	15	6.7	26	22.6	11.1	37	23.7
	20	5.0	23	22.4	13.1	33	23.3
	25	4.0	21	22.1	14.9	29	23.0
22	5	20.0	24	24.5	7.8	38	25.8
	10	10.0	21	24.2	10.6	34	25.3
	15	6.7	19	24.0	13.0	30	25.0
	20	5.0	17	23.8	15.1	27	24.7
	25	4.0	15	23.6	17.1	24	24.4
24	5	20.0	14	25.5	9.6	29	26.9
	10	10.0	13	25.4	13.0	25	26.6
	15	6.7	11	25.2	15.8	22	26.3
	20	5.0	10	25.1	18.2	20	26.1
	25	4.0	9	25.0	20.5	18	25.9

the floor without insulation against the heated room, Rλ underfloor 0.75 m²K/W)

Temperature temp.	Average heating water temperature θHm in °C 30.0			Average heating water temperature θHm in °C 33.0			Average heating water temperature θHm in °C 36.0		
	Max. heating circuit area A _{HK} m²	Max. heat flow density q W/m²	Average floor temp. θ _f °C	Max. heating circuit area A _{HK} m²	Max. heat flow density q W/m²	Average floor temp. θ _f °C	Max. heating circuit area A _{HK} m²	Max. heat flow density q W/m²	Average floor temp. θ _f °C
	3.1	152	28.2	2.8	177	30.1	2.5		
	4.4	129	26.3	3.9	150	28.0	3.5		
	5.6	109	24.7	5.0	127	26.2	4.5		
	6.9	91	23.3	6.1	106	24.5	5.5		
	8.0	79	22.3	7.1	92	23.4	6.4		
	3.5	127	29.2	3.1	152	31.2	2.7		
	5.0	107	27.6	4.3	129	29.3	3.8		
	6.3	91	26.3	5.5	109	27.7	4.9		
	7.7	76	25.0	6.7	91	26.3	5.9		
	9.0	66	24.2	7.8	79	25.3	6.9		
	3.9	110	29.8	3.3	135	31.8	2.9		
	5.5	93	28.4	4.7	114	30.2	4.1		
	7.0	79	27.2	5.9	97	28.8	5.2		
	8.5	66	26.2	7.2	81	27.4	6.3		
	9.9	57	25.4	8.4	70	26.5	7.3		
	4.4	93	30.4	3.6	118	32.5	3.1		
	6.2	79	29.2	5.1	100	31.0	4.4		
	7.8	67	28.2	6.4	85	29.8	5.5		
	9.5	56	27.3	7.8	71	28.6	6.7		
	11.0	48	26.6	9.1	62	27.8	7.8		
	5.1	76	31.0	4.0	101	33.1	3.4		
	7.2	64	30.0	5.7	86	31.8	4.8		
	9.0	55	29.2	7.1	73	30.7	6.0		
	10.8	46	28.4	8.6	61	29.7	7.2		
	12.5	40	27.9	9.9	53	29.0	8.4		

Temperature temp.	Average heating water temperature θHm in °C 30.0			Average heating water temperature θHm in °C 33.0			Average heating water temperature θHm in °C 36.0		
	Max. heating circuit area A _{HK} m²	Max. heat flow density q W/m²	Average floor temp. θ _f °C	Max. heating circuit area A _{HK} m²	Max. heat flow density q W/m²	Average floor temp. θ _f °C	Max. heating circuit area A _{HK} m²	Max. heat flow density q W/m²	Average floor temp. θ _f °C
	3.6	117	25.3	3.2	136	26.9	2.9		
	5.1	99	23.9	4.5	116	25.3	4.1		
	6.4	86	22.9	5.6	100	24.0	5.1		
	7.6	75	21.9	6.7	87	22.9	6.1		
	8.9	65	21.1	7.8	76	22.0	7.1		
	4.1	97	26.8	3.5	117	28.3	3.1		
	5.8	83	25.6	5.0	99	26.9	4.4		
	7.2	72	24.7	6.2	86	25.9	5.5		
	8.6	62	23.8	7.4	75	24.9	6.6		
	9.9	54	23.2	8.6	65	24.1	7.6		
	4.5	84	27.7	3.8	104	29.3	3.3		
	6.3	72	26.6	5.4	88	28.0	4.7		
	7.9	62	25.8	6.7	77	27.1	5.8		
	9.4	54	25.1	7.9	66	26.2	7.0		
	10.8	47	24.5	9.2	58	25.5	8.0		
	5.1	71	28.6	4.2	91	30.2	3.6		
	7.1	61	27.7	5.8	77	29.1	5.0		
	8.8	53	27.0	7.2	67	28.2	6.2		
	10.4	46	26.4	8.6	58	27.5	7.4		
	12.0	40	25.9	9.9	51	26.8	8.5		
	5.8	58	29.5	4.6	78	31.2	3.9		
	8.1	50	28.7	6.4	66	30.2	5.4		
	10.0	43	28.2	7.9	57	29.4	6.7		
	11.8	37	27.7	9.4	50	28.8	7.9		
	13.5	33	27.2	10.8	43	28.2	9.1		

Temperature temp.	Average heating water temperature θHm in °C 30.0			Average heating water temperature θHm in °C 33.0			Average heating water temperature θHm in °C 36.0		
	Max. heating circuit area A _{HK} m²	Max. heat flow density q W/m²	Average floor temp. θ _f °C	Max. heating circuit area A _{HK} m²	Max. heat flow density q W/m²	Average floor temp. θ _f °C	Max. heating circuit area A _{HK} m²	Max. heat flow density q W/m²	Average floor temp. θ _f °C
	4.3	86	22.9	3.8	101	24.0	3.4		
	5.9	76	22.0	5.2	88	23.0	4.7		
	7.3	67	21.3	6.4	78	22.2	5.8		
	8.6	60	20.6	7.5	70	21.5	6.8		
	9.8	53	20.1	8.7	62	20.8	7.8		
	4.8	72	24.7	4.2	86	25.9	3.7		
	6.6	63	23.9	5.7	76	25.0	5.1		
	8.1	56	23.3	7.0	67	24.3	6.2		
	9.6	50	22.8	8.2	60	23.6	7.3		
	10.9	44	22.3	9.4	53	23.1	8.4		
	5.3	62	25.8	4.5	77	27.1	3.9		
	7.2	55	25.2	6.1	67	26.3	5.4		
	8.9	48	24.7	7.5	60	25.6	6.6		
	10.4	43	24.2	8.8	53	25.1	7.7		
	11.9	38	23.8	10.1	47	24.5	8.8		
	5.9	53	27.0	4.8	67	28.3	4.2		
	8.0	46	26.5	6.6	59	27.6	5.7		
	9.8	41	26.0	8.1	52	27.0	7.0		
	11.5	36	25.6	9.5	46	26.5	8.2		
	13.1	32	25.2	10.8	41	26.0	9.3		
	6.7	43	28.2	5.3	57	29.4	4.5		
	9.1	38	27.7	7.2	50	28.8	6.1		
	11.1	33	27.3	8.9	45	28.3	7.5		
	12.9	30	27.0	10.3	40	27.9	8.7		
	14.6	27	26.7	11.7	35	27.5	9.9		

Marking: θ_{Fm} - θ_i > 9K, or θ_{Fm} > 29°C

Marking: for bathrooms θ_{Fm} > 33°C



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