THERMAL OUTPUT

UG19D512

COMISA QUALITY COMES FIRST

50 COMISA 1969/2019

TYPE WET EPS
Test report HB12 P375

TEST REPORT FOR SPECIFIC THERMAL OUTPUT
OF FLOOR HEATING CONSTRUCTION IN ACC. TO EN 1264
LOAD DISTRIBUTION LAYER: 12 mm, PIPE: 12 x 1.3 mm

EN

IGE
Institut für
GebäudenEnergetik

Universität Stuttgart

Lehrstuhl für
Heiz-und
Raumlufttechnik

Stuttgard, 02.04.2009

Deutscher Akkreditierungs Rat
DAR

SPECIFIC THERMAL OUTPUT TESTING IN ACC. TO EN 1264 PART. 2, FLOOR HEATING SYSTEM

1. TEST METHOD

Initial test of floor heating system

2. INSTITUT:

Institüt für GebäudeEnergetik Lehrstuhl für Heiz - und Raumlufttechnik der Universität Stuttgard
Pfaffenwaldring 35 - D-70569 Stuttgard-Vaihingen

3. CLIENT:

COMISA S.p.A. - Via Neziole, 27 - 25055 - Pisogne (Bs) - ITALY

4. MANUFACTURER:

The Client

5. SYSTEM DESCRIPTION

trademark:	SISTEMA WET EPS		
construction:	Type A		
spacing in m:	0,100	0,200	0,300

Pipe:

material:	JANOlen 12 x 1.3mm PE-RT Type 1 (producer: Jansen Switzerland)
diameter:	0,012 m
thickness:	0,0013 m
eff. heat conductivity:	0,35 W/mK

Systeme layer plate: plate whithin nubs of polystyrol

heat conductivity of nubs:	0,4 W/m K		
volume of nubs in %:	51,25	49,47	48,91

Load distribution layer:

material:	Concrete floor		
thickness:	0,012 m		
heat conductivity:	1,20 W/m K		
effettive heat conducity in W/mK	0,61	0,63	0,63

6. TEST RESULTS:

Limit specific thermal output in W/m2	73,0	66,0	51,3
Limit temperature difference in K:	9,0	49,47	48,91

7. PROCEDURE OF TESTING:

The system was tested on 17.7.2012 (program data HB09 P278.xls) by calculation method.
An additional experimentell testing is not necessary.

8. CALCULATION RESULTS:

Characteristic curves: $q = k_H * \Delta\theta_H$

ADD. FLOOR COVERING	0,00	0,05	0,10	0,15	m² K/W
Spacing T	Equivalent coefficient for heat transfer kH				
0,100 m	8,143	5,650	4,290	3,491	W/m² K
0,200 m	4,592	3,603	2,966	2,552	W/m² K
0,300 m	3,353	2,758	2,374	2,101	W/m2 K

Prof. Dr.-Ing. M. Schmidt

Universität Stuttgart
Institut für GebäudeEnergetik
Pfaffenwaldring 35 · 70569 Stuttgart
Tel.: (+49)711 / 685 620 85
Fax: (+49)711 / 685 620 96
www.ige.uni-stuttgart.de

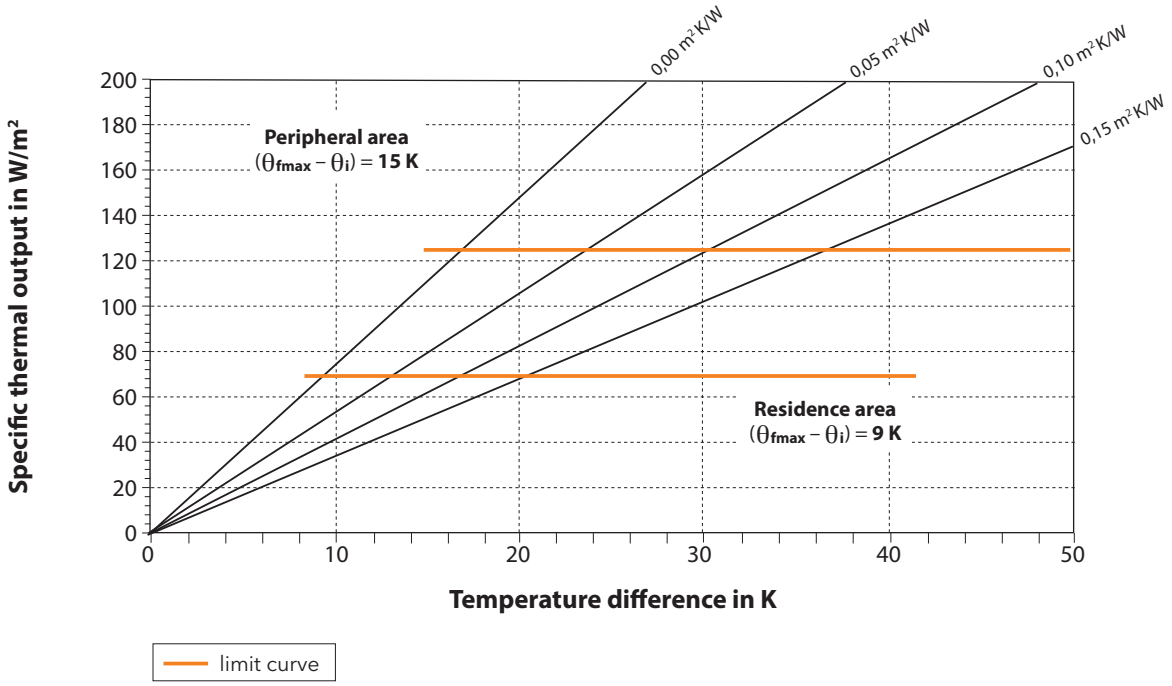
Dr.-Ing. Chr. Beck

SPECIFIC THERMAL OUTPUT TESTING IN ACC. TO EN 1264 PART. 2, FLOOR HEATING SYSTEM

LIMIT CURVES **Spacing T = 0,100 m**

$\Delta\theta_{fmax}$	FLOOR COVERING	0,00	0,05	0,10	0,15	m² K / W
9	Limit temperature difference	**9,0**	13,2	17,6	21,8	K
K	Limit specific thermal output	**73,0**	74,3	75,3	76,0	W / m²
15	Limit temperature difference	15,7	23,1	30,8	38,2	K
K	Limit temperature difference	128,1	130,3	132,1	133,4	W / m²

Spacing T = 0,100 m

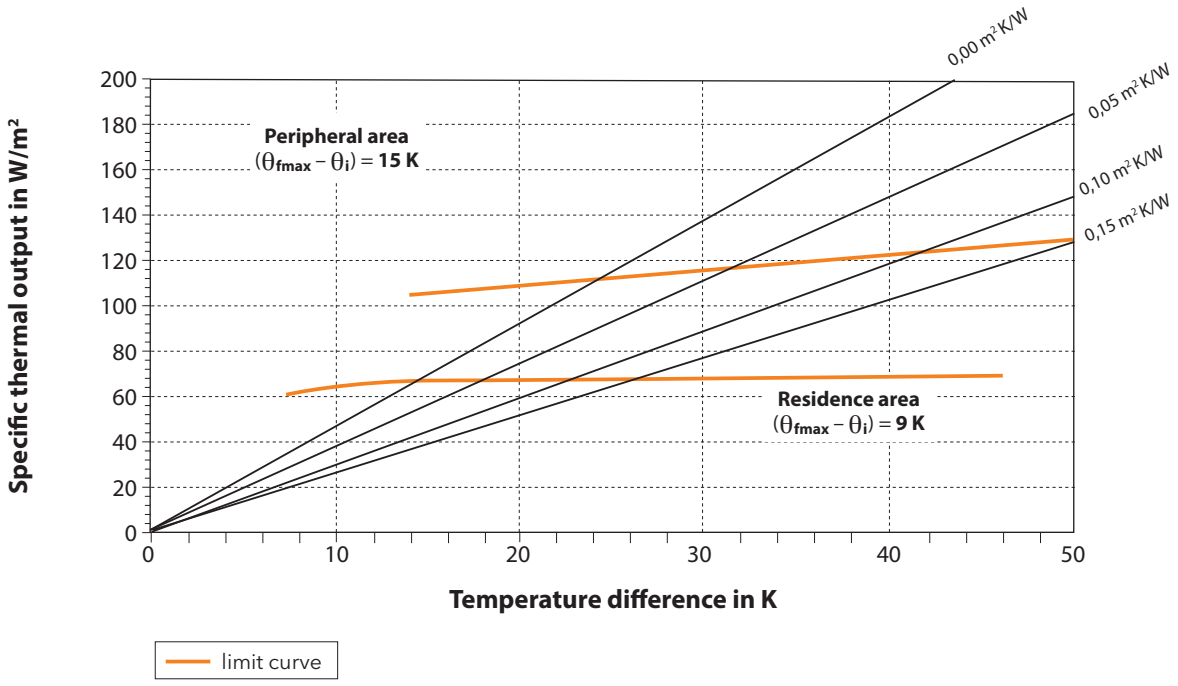


CALCULATION FACTORS	Spacing T = 0,050 m				
Resistance of floor covering	0,000	0,050	0,100	0,150	m² K / M
Factor B	7,140	7,005	6,932	6,889	W / m² K
Factor a_B	1,058	0,764	0,598	0,491	
Spacing factor a_T	1,230	1,188	1,156	1,134	
Spacing exponent m_T			- 0,333		
Covering factor $a_Ü$	1,063	1,050	1,039	1,034	
Covering exponent $m_Ü$			0,000		
Pipe factor A_D	1,029	1,025	1,022	1,018	
Pipe exponent m_D			- 2,000		
Limit curve coefficient B_G			66,000		
Limit curve exponent n_G			0,046		

LIMIT CURVES **Spacing T = 0,200 m**

$\Delta\theta_{fmax}$	FLOOR COVERING	0,00	0,05	0,10	0,15	m² K / W
9	Limit temperature difference	**14,4**	19,0	23,8	28,3	K
K	Limit specific thermal output	**66,0**	68,5	70,5	72,1	W / m²
15	Limit temperature difference	25,2	33,3	41,7	49,6	K
K	Limit temperature difference	115,8	120,1	123,6	126,4	W / m²

Spacing T = 0,200 m

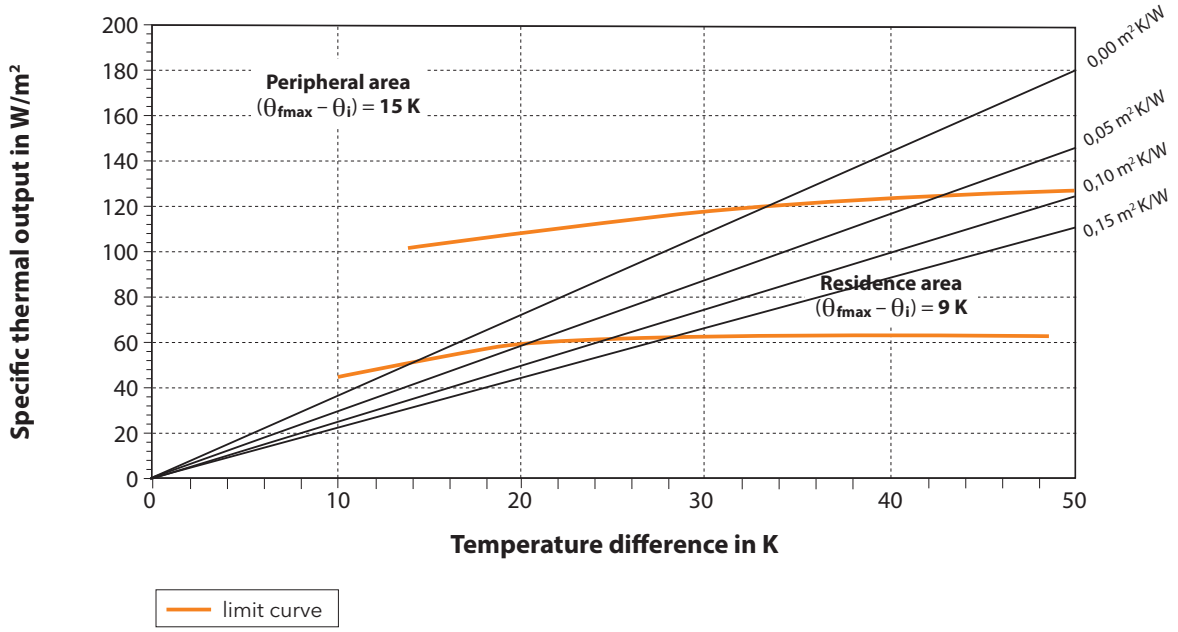


CALCULATION FACTORS	Spacing T = 0,100 m				
Resistance of floor covering	0,000	0,050	0,100	0,150	m² K / M
Factor B	7,196	7,089	7,021	6,976	W / m² K
Factor a_B	0,837	0,642	0,520	0,438	
Spacing factor a_T	1,230	1,188	1,156	1,134	
Spacing exponent m_T			- 1,667		
Covering factor $a_Ü$	1,051	1,041	1,032	1,028	
Covering exponent $m_Ü$			3,300		
Pipe factor A_D	1,046	1,040	1,035	1,030	
Pipe exponent m_D			- 2,000		
Limit curve coefficient B_G			46,670		
Limit curve exponent n_G			0,130		

LIMIT CURVES **Spacing T = 0,300 m**

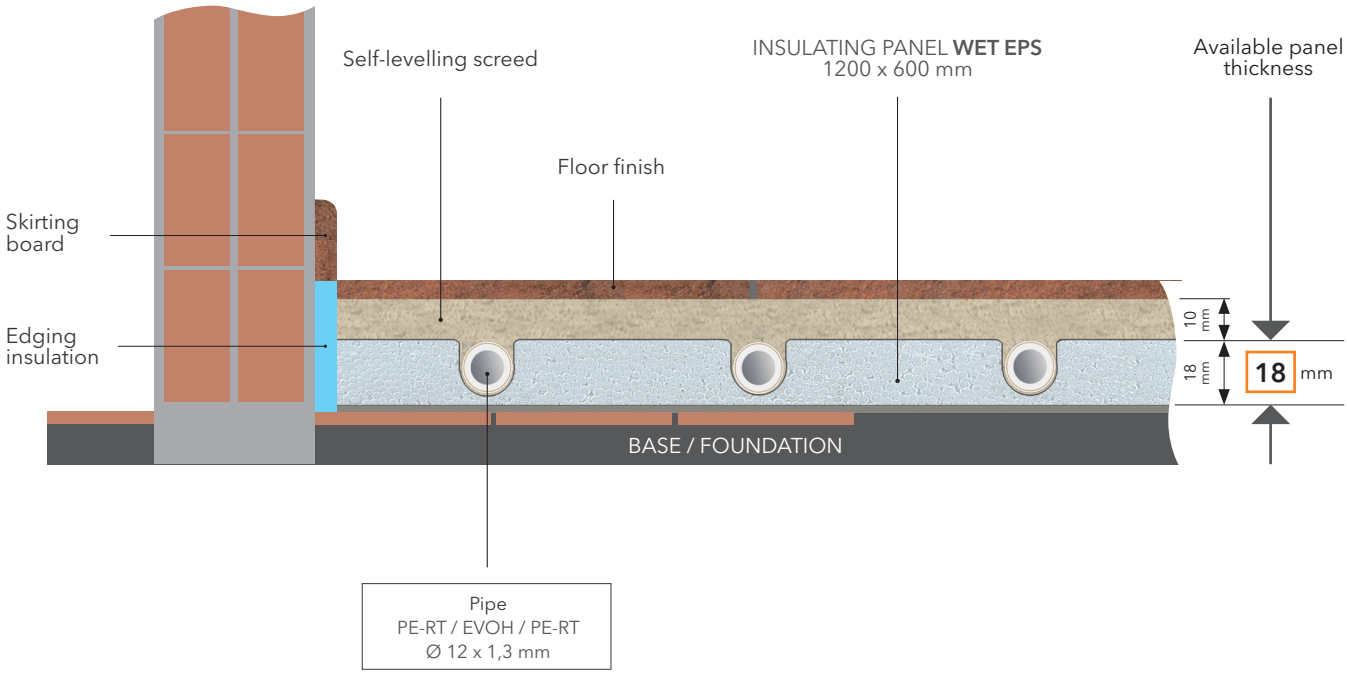
$\Delta\theta_{fmax}$	FLOOR COVERING	0,00	0,05	0,10	0,15	m² K / W
9	Limit temperature difference	**15,3**	19,9	24,3	28,6	K
K	Limit specific thermal output	**51,3**	54,8	57,7	60,1	W / m²
15	Limit temperature difference	26,8	34,9	42,6	50,2	K
K	Limit temperature difference	90,0	96,2	101,2	105,5	W / m²

Spacing T = 0,300 m



CALCULATION FACTORS	Spacing T = 0,150 m				
Resistance of floor covering	0,000	0,050	0,100	0,150	m² K / M
Factor B	7,244	7,147	7,085	7,041	W / m² K
Factor a_B	0,840	0,644	0,522	0,439	
Spacing factor a_T	1,230	1,188	1,156	1,134	
Spacing exponent m_T			-3,000		
Covering factor $a_Ü$	1,040	1,031	1,024	1,021	
Covering exponent $m_Ü$			3,300		
Pipe factor A_D	1,053	1,049	1,044	1,039	
Pipe exponent m_D			-2,000		
Limit curve coefficient B_G			25,740		
Limit curve exponent n_G			0,253		

9. CONSTRUCTION DRAWING OF TEST SAMPLE:



10. PICTURE OF TEST AREA:

The test area was built on 25.3.2009 in the Institut. The used material was sended directy by the client.
The construction is equal to the nominal construction of the drawing and the technical documents.

11. CONFORMITY OF THE TECHNICAL DOCUMENTS

The system is type A of DIN 18560 part. 2.
The sketch on the tecnical documents are in acc. to EN 1264 part. 4.
The official technical documents should be sended to the Institut within 6 months.

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Test report L.1207.P.921.COM

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LOAD DISTRIBUTION LAYER: 12 mm, PIPE: 12 x 1.3 mm

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TEST METHODE:

The currently valid versions of the following documents form the basis from the basisi for inspection and certifcation:
DIN EN 1264-2: Prüfverfahren (1/2009)
DIN EN 1264-4: Installation (11/2009)
DIN EN 1264-5: Berechnungsverfahren (1/2009)
Zertifizierungsprogramm DIN CERTCO: (Raumflächen-integrierte Heiz- und Kühlsysteme mit Wasserdurchströmung"

TEST ITEM:

Type WET EPS, load distribution layer: 12 mm

START - END OF TESTS:

23.7.2012 - 23.07.2012

MANUFACTURER:

The Client

TRADEMARK:

WET EPS

SYSTEM DESCRIPTION:

Nassverlegesystem mit Kundtoff-Rohren (siehe Abbildungen im Anhang dieses Berichtes)

SYSTEM CONSTRUCTION:

Type A in acc. to DIN EN 1264

DISTIBUTION LAYER:

screed: 12 mm

PIPE:

JANOlen 12x1.3 mm PE-RT Typ 1 (producer: Jansen Switzerland)

INSERTS:

-

PIPE FIXATION:

Pipe embedded in the system place (slot)

SPACING:

100 mm, 200mm, 300 mm

TEST SAMPLE:

testing by calculation methode

DATE OF RECEIPT:

18.6.2012

SPECIFIC THERMAL OUTPUT TESTING IN ACC. TO EN 1264 PART. 2, FLOOR HEATING SYSTEM

1. DECRIPTION OF THE TEST METHOD:

The heating output of the looked floor system can be determined to EN 1264 part. 2.
In part. 5 of EN 1264 instructions are given which changes are to be expcted in the output (heating case and chilled case), if the arrangement of the space surfaces is changed. Thus the arrangement on the ground is, e.g., in the chilled case the case with the lowest output values, while in the heating case the arrangement on the ground proves the highest values.

2. TEST RESULTS:

2.1 PROCEDURE OF TESTING:
The standard specific thermal output the heating case is calculated to EN 1264 for 4 standard layers (R_1 to R_4):

R_λ = 0,0; 0,05; 0,1 and 0,15 m^2 K/W

These theoretical values of the resistance cover the really seeming floor covering to a great extent, so that for the laters use with these values or interpolations the system can be laid out.

2.2 RESULTS OF HEATING CASE IN ACC. TO EN 1264 PART. 2:
Characteristic curves: $q = k_H * \Delta\theta_H$

ADD. FLOOR COVERING	0,00	0,05	0,10	0,15	m^2 K/W
Spacing T	Equivalent coefficient for heat transfer k_H				
0,100 m	8,143	5,650	4,290	3,491	W/m² K
0,200 m	4,592	3,603	2,966	2,552	W/m² K
0,300 m	3,353	2,758	2,374	2,101	W/m^2 K

2.3 RESULTS OF CHILLED CASE IN ACC. TO EN 1264 PART. 5:

The results for the floor heating system in acc. to EN 1264 part. 2 has to be transmitted by calculation method in acc. to EN 1264 part. 5

ADD. FLOOR COVERING	α (W/m2 K)	$\Delta R_\mu = 1/\alpha$ - 1/10,8 (m^2 K/W)
Spacing T	Equivalent coefficient for heat transfer k_H	
Floor	10,8	0,000 0
Floor	6,5	0,061 0
Wall	8,0	0,032 4
Wall	8,0	0,032 4
Ceiling	6,5	0,061 3
Ceiling	10,8	0,000 0

3 CHARACTERISTIC CURVES FOR THE CASE OF CHILLED FLOOR

The cooling output of a floor system is reduced with the otherwise same conditions compared with the output of an under-floor heating system. A cause for this are the changed conditions on the heat transfer by convection on the surface of the floor. From part 5 on EN 1264 the respective heat transfer coefficients are known.

For the looked floor type WET EPS (covering: 12mm, pipe: PE-RT, 12x1.3mm) the following output values arise.

$q = k_H * \Delta\theta_H$ with $\Delta\theta$ Temperature difference

RA	0,10	0,20	030
K_{H1}	5,272	3,461	2,696
K_{H2}	4,095	2,882	2,325
K_{H3}	3,347	2,469	2,043
K_{H4}	2,830	2,159	1,823

Coefficient s of the characteristic curves for the different standard layers as a function of the pipe distance RA

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Universität Stuttgart
Institut für GebäudeEnergetik
Pfaffenwaldring 35 · 70569 Stuttgart
Tel.: (+49)711 / 685 620 85
Fax: (+49)711 / 685 620 96
www.ige.uni-stuttgart.de

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The figures 1 to 3 show this connection again in graphic form.

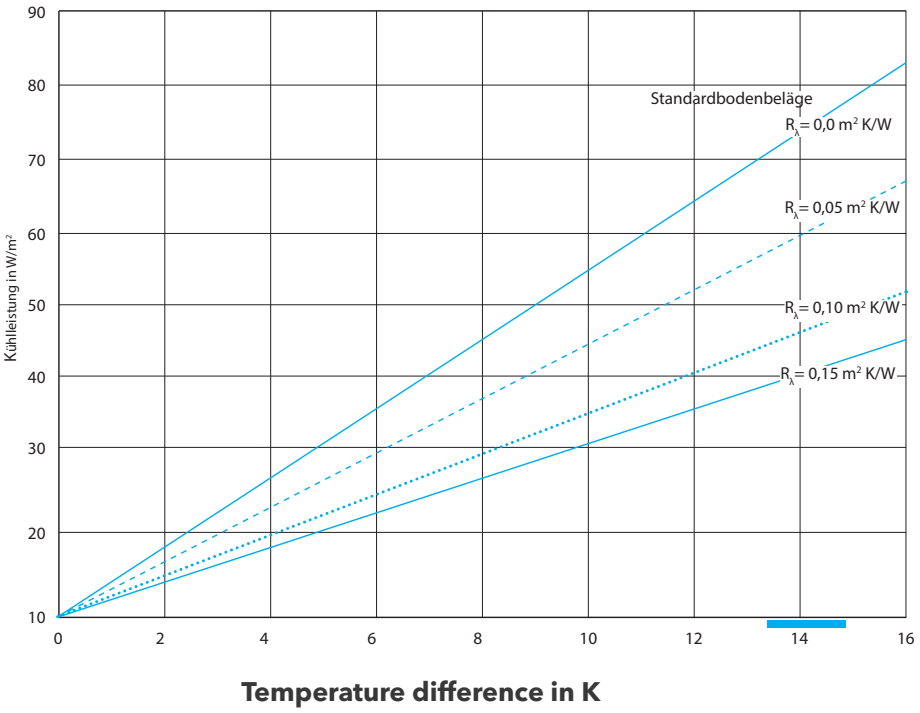

Figure 1: cooling output in dependence of the temperature distance room - water for pipe distance RA **100 mm**

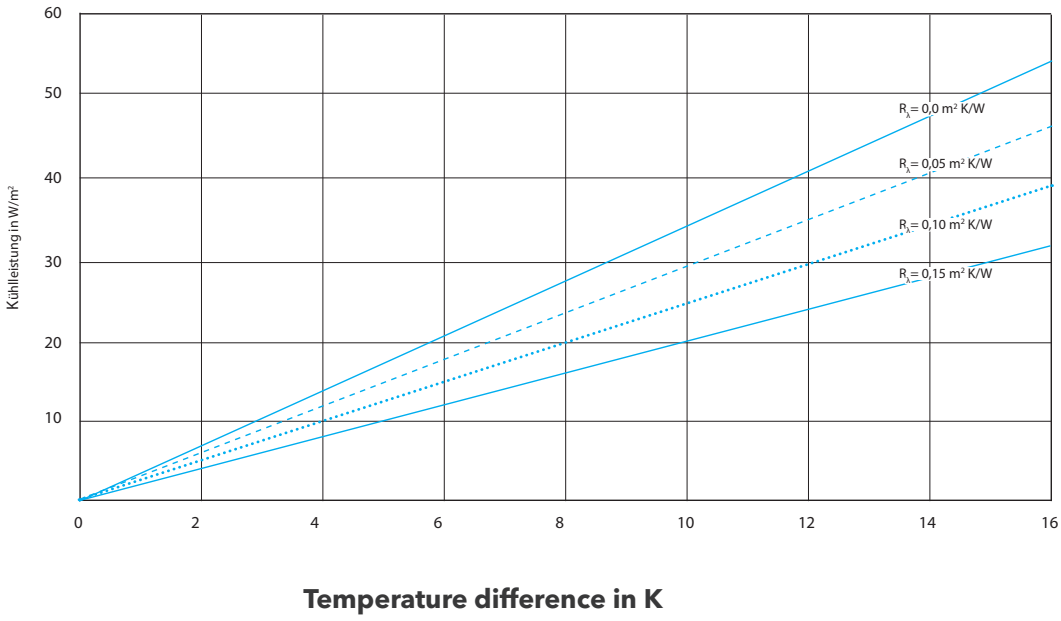

Figure 2: cooling output in dependence of the temperature distance room - water for pipe distance RA **200 mm**

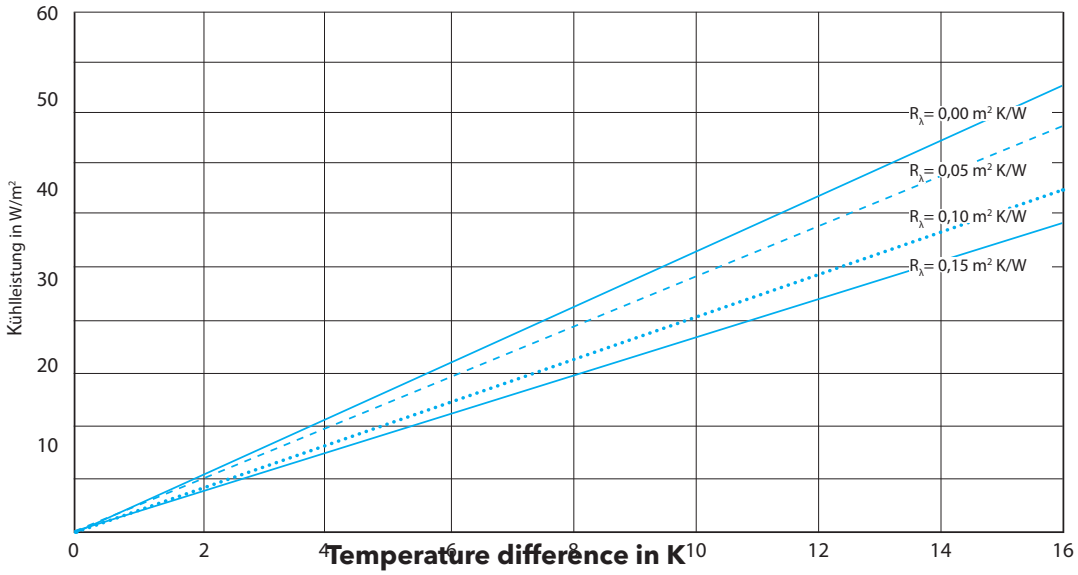

Figure 3: cooling output in dependence of the temperature distance room - water for pipe distance RA **300 mm**

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