THERMAL OUTPUT

UG19D541

COMISA®
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50 COMISA 1969/2019

TYPE DRY FG
Test report L.1207.P.920.COM

TEST REPORT FOR SPECIFIC THERMAL OUTPUT
OF FLOOR HEATING CONSTRUCTION IN ACC. TO EN 1264
LOAD DISTRIBUTION LAYER: 3 mm, PIPE: 10 x 1.3 mm

EN

IGE
Institüt für
GebäudenEnergetik

Lehrstuhl für
Heiz-und
Raumlufttechnik

Universität Stuttgart

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

The currently valid versions of the following documents form the basis for inspection and certification:
DIN EN 1264-2: Prüfverfahren (1/2009)
DIN EN 1264-4: Installation (11/2009)
DIN EN 1264-5: Berechnungsverfahren (1/2009)

2. INSTITUT:

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

3. CLIENT:

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

4. MANUFACTURER:

Pipe: Jansen (Switzerland)
Panel: GF-Systemelement: der Auftraggeber

5. SYSTEM DESCRIPTION

trademark:	SISTEMA DRY FG
construction:	Type A
spacing in m:	0,100

Pipe:

material:	JANOlen 10 x 1.2 mm PE-RT/EVOH/PE-RT
diameter:	0,010 m
thickness:	0,0013 m

Pipe embedded in the system plate (slot) and a thin layer of compensation

Test sample:
appr. 40 Inch x 40 Inch, plus master insulation boards with given resistance of $R\lambda$,B= 0,14 und $R\lambda$= 0,09 m²K/W

6. PROCEDURE OF TESTING

The temperature field of the floor surface is measured in order to determine the values $\vartheta_{F,m}$ and $\vartheta_{F,max}$
The measurement is carried out when steady state conditions are reached and a temperature of both cooling plates of ϑ_i= 20 °C ± 0,5 K is maintained. Under these conditions the average temperature of the heating medium ϑ_H is set to achieve a maximum floor surface temperature of $\vartheta_{F,max}$=29°C (i.e. $\vartheta_{F,max}$-ϑ_i=9K) and in this case the difference between the average temperature of the heating medium and the temperature of the cooling plates ϑ_H -ϑ_i= $\Delta\ \vartheta_H$= $\Delta\ \vartheta_{H,N}$ (standard value) applies.

Given that ($\vartheta_{F,max}$–ϑ_i)=9K is maintained and the average temperature difference of the floor surface and the room is determined, this temperature difference is used within the basic characteristic curve and gives the standard specific thermal output.The standard specific thermal output q_N, together with the above determined corresponding value of the standard temperature difference $\Delta\ \vartheta_{H,N}$, gives the equation for the caracteristic curve for $R_{\lambda,B}$=0.

7. TEST RESULTS:

Standard specific thermal output calculated on basic characteristic curve in acc. to DIN EN 1264

measuring point

F,1	24,93	°C	F,10	23,88	°C	F,1	25,14	°C	F,10	24,64	°C
F,2	26,28	°C	F,11	25,20	°C	F,2	26,64	°C	F,11	25,43	°C
F,3	28,96	°C	F,12	29,04	°C	F,3	29,09	°C	F,12	28,88	°C
F,4	25,19	°C	F,13	25,30	°C	F,4	26,86	°C	F,13	27,31	°C
F,5	23,98	°C	F,14	23,79	°C	F,5	26,10	°C	F,14	25,58	°C
F,6	24,91	°C	F,15	24,53	°C	F,6	27,04	°C	F,15	26,20	°C
F,7	28,94	°C	F,16	28,85	°C	F,7	28,88	°C	F,16	29,11	°C
F,8	24,67	°C	F,17	25,54	°C	F,8	25,82	°C	F,17	26,93	°C
F,9	23,58	°C	F,18	24,62	°C	F,9	24,68	°C	F,18	25,37	°C

water inlet temperature
water outlet temperature

C,in	19,90	°C	C,in	19,91	°C
C,out	19,99	°C	C,out	20,06	°C
V	34,30	°C	V	48,29	°C
R	34,14	°C	R	47,93	°C

average surface temperature
max. floor surface temperature
cooling plate temperature

excess temperature

F,m	25,85	°C	F,m	25,85	°C
F,max	28,95	°C	F,max	28,95	°C
i	19,95	°C	i	19,95	°C
F,max-qi	9,00	°C	F,max-qi	9,00	°C
F,m-qi	5,90	°C	F,m-qi	5,90	°C
H	14,28	°C	H	14,28	°C

Experimental test results for EN 1264 - 2

H,N	q_n
14,28	62,9

Kennlinien des Systems q = K_H *					
$R_{,B}$	0	0,05	0,10	0,15	m²K/W
K_H	4,406	3,558	2,985	2,570	W/m²k

Characteristic curves

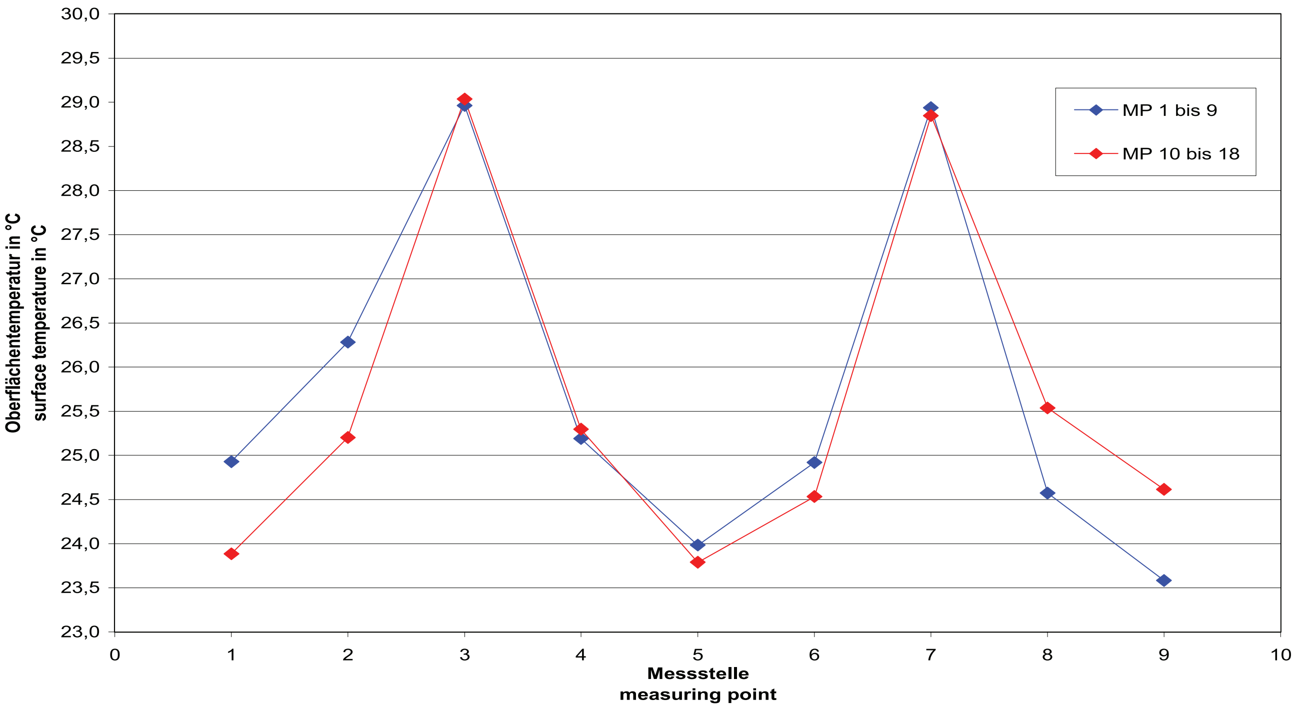
Grenzwärmestromdichte Aufenthaltsbereich: ($_{F,max}$-$_i$) = 9K					
$R_{,B}$	0	0,05	0,10	0,15	m²K/W
q_G	62,9	66,6	70,7	75,3	W/m²
$_{H,G}$	14,3	18,7	23,7	29,3	K

Limit specific thermal output in the ***residence area***

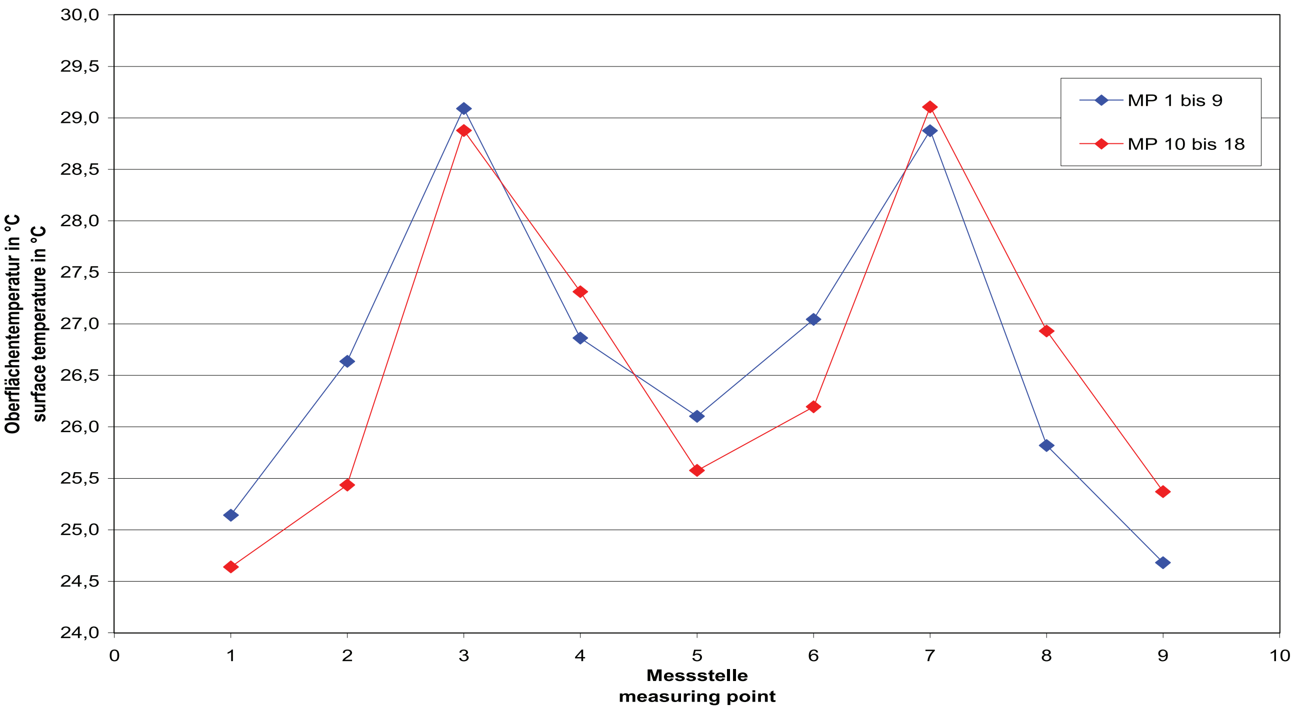
Grenzwärmestromdichte Randzone: ($_{F,max}$-$_i$) = 15K					
$R_{,B}$	0	0,05	0,10	0,15	m²K/W
$q_{G,R}$	110,3	116,7	124,0	132,1	W/m²
$_{H,G}$	25,0	32,8	41,5	51,4	K

Limit specific thermal output in the ***peripheral area***

Surface temperature without floor covering



Surface temperature with floor covering Rλ, B = 0,14 m²K/W



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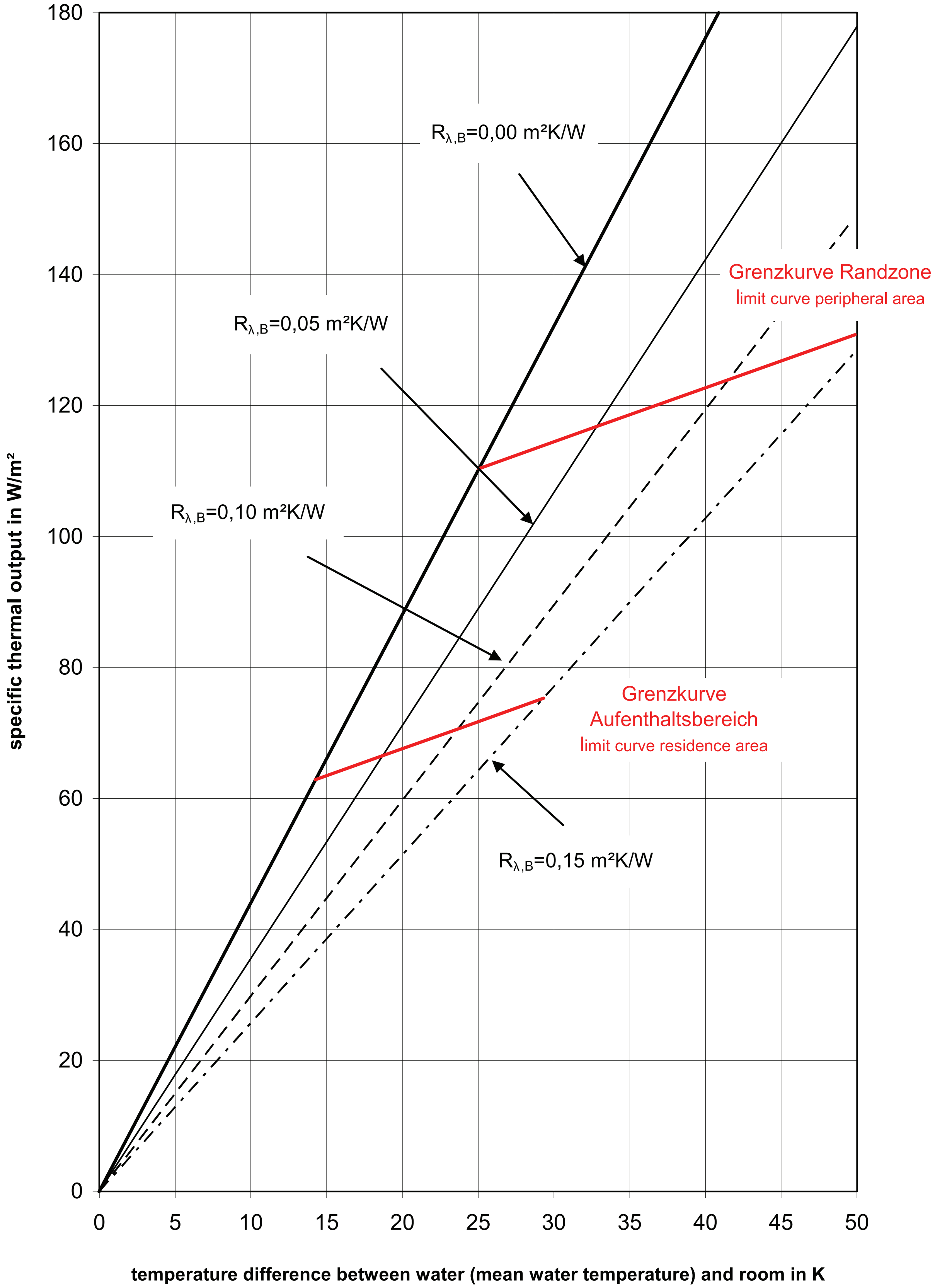
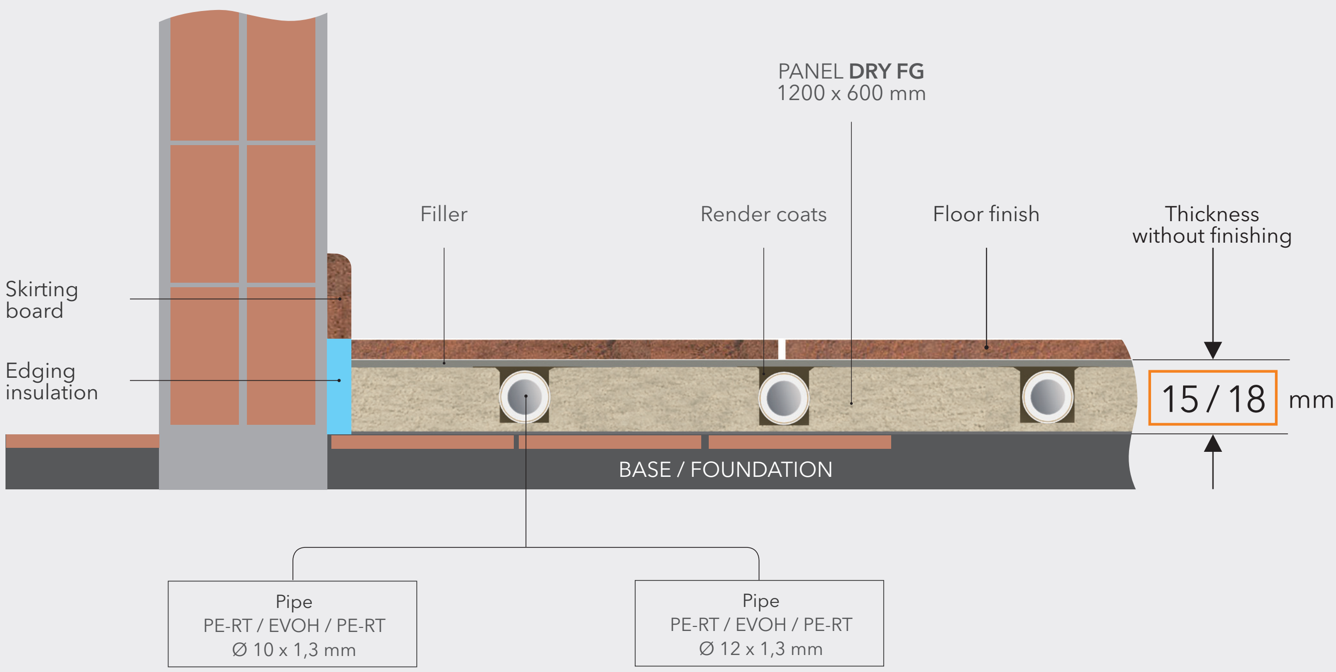
HEATING SYSTEM

Characteristic curves of the floor heating system

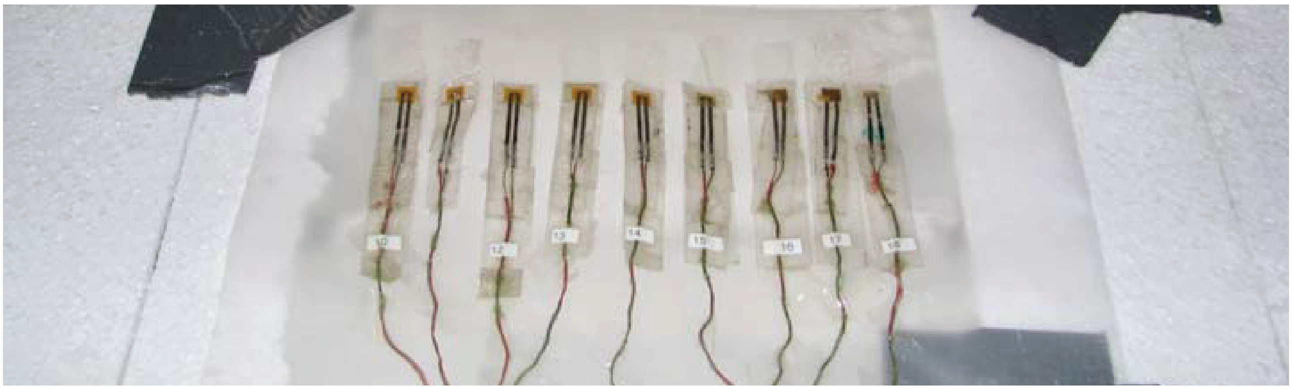


8. CONSTRUCTION DRAWING OF TEST SAMPLE:



9. PICTURE OF TEST AREA:

The test area was built 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.



10. 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.

THERMAL OUTPUT

UG19D512

TYPE WET EPS
Test report L.1207.P.923.COM

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OF FLOOR HEATING CONSTRUCTION IN ACC. TO EN 1264
LOAD DISTRIBUTION LAYER: 3 mm, PIPE: 10 x 1.3 mm

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Stuttgart, 30.04.2009

The report shall not be reproduced expect in full without the written approval of the testing lab. The test results relase only to the items tested
The test laboratoryis accredit in acc. to ISO/IEC 17025 by DAR.
Acceptances from certification bodies: DINCERTOCO / RAL / AFNOR / BSI / AENOR

Deutscher Akkreditierungs Rat

TEST METHOD:

The currently valid versions of the following documents form the basis from the basisi for inspection and certifcation:
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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 DRY FG, thin layer of compensation: appr. 3mm

START - END OF TESTS:

24.7.2012 - 24.07.2012

MANUFACTURER:

The Client

TRADEMARK:

DRY FG

SYSTEM DESCRIPTION:

Sondersystem mit Kunststoff-Rohren (siehe Abbildungen im Anhang dieses Berichtes)

SYSTEM CONSTRUCTION:

special system in acc. to DIN EN 1264

DISTIBUTION LAYER:

compensation layer: appr. 3mm

PIPE:

multilayer pipe 10 x 1.3mm PE-RT/EVOH/ PE-RT (producer: Saicompert, Switzerland)

INSERTS:

-

PIPE FIXATION:

Pipe embedded in the system place (slot)

SPACING:

100 mm

TEST SAMPLE:

appr. 40 Inch x 40 Inch, plus master insulation boards with given resistance of $R\lambda$,B= 0,14 und $R\alpha$= 0,09 m²K/W

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:

Characteristics of the system q= K_h • ♀					
$R_{x,B}$	0	0,05	0,1	0,15	W/m² K
K_H	4,406	3,558	2,985	2,570	W/m² 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)	$\Delta R_\mu = 1/\alpha - 1/10{,}8$ (m² 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.

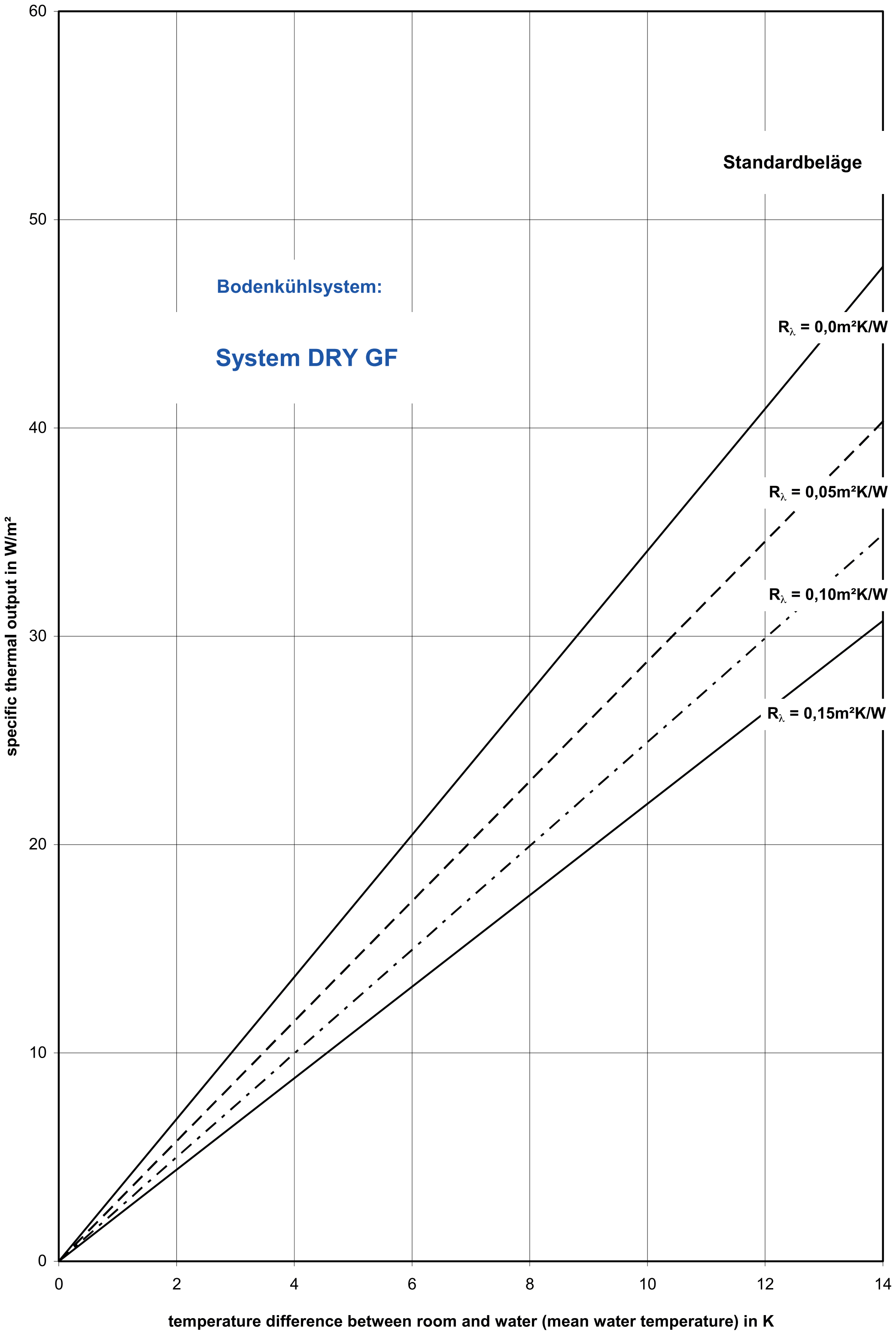
For the looked floor type WET EPS (covering: appr. 3mm, pipe: PE-RT, 10 x 1.3) the following output values arise.
$q = k_H * \Delta\theta_H$ with $\Delta\theta$ Temperature difference

Characteristics of the system q= K_h • ♀					
$R_{x,B}$	0	0,05	0,1	0,15	m²K/W
K_H	3,410	2,880	2,492	2,196	W/m² K

COOLING SYSTEM

Specific thermal output testing **DRY FG SYSTEM**
Test report no. **L.1207.P.923.COM**

Cooling output in dependence of the temperature distance room - water for pipe distance RA 100 mm



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