Product Service

Choose certainty.
Add value.

Technical report no. 7134 8988

Rev. 0

Dated 11th May 2009

Client:	MIK International AG Berggarten 1 56427 Siershahn
Manufacturing place	Several
Test subject:	Product: Water heated heating panels Type: MIK Thermo W 500 x 1200mm, uninsulated, MIK Thermo W 500 x 1200 mm, insulated, MIK Thermo W 600 x 1200 mm, insulated, PremiumFloor Therme 500 x 600 mm (2x), insulated Rexlan Polymerbeton-Heizplatte 480 x 1200 x 55 mm, insulated Schonlau Bonus, 500 x 1200 mm, uninsulated
Test specification:	Test in compliance with client's requirement according to DLG FokusTEST Warmth distribution and energy requirement 09/2002
Purpose of examination:	• Investigation of energy requirement • Cooling time • Warmth distribution on the surface
Test result:	The results of the investigation are listed under point 3.

This technical report may only be quoted in full. Any use for advertising purposes must be granted in writing. This report is the result of a single examination of the object in question and is not generally applicable evaluation of the quality of other products in regular production.

Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany

1 Description of equipment

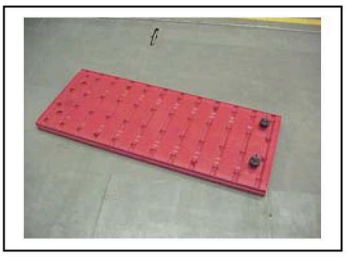
1.1 Function

Manufacturer's instruction for intended use:
Warming equipment for animals, warmth transmission through bodily contact

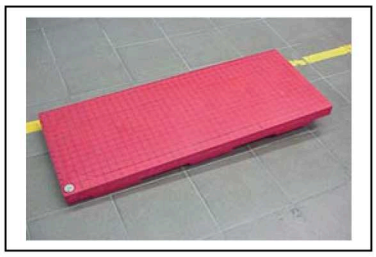
Manufacturer's instruction for predictable misuse:
Equipment does not replace any form of space heating

1.2 Technical data:

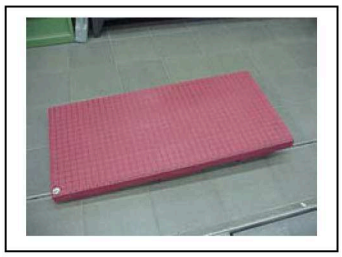
Name	Width	Length	Thickness	Weight	Insulation
MIK Thermo W	500 mm	1200 mm	50 mm	5.35 kg	no
MIK Thermo W	500 mm	1200 mm	75 mm	6.75 kg	yes
MIK Thermo W	600 mm	1200 mm	75 mm	7.55 kg	yes
Premium Therme	500 mm	600 mm	73 mm	5.25 kg	yes
Rexlan	480 mm	1200 mm	55 mm	50 kg	yes
Schonlau Bonus	500 mm	1200 mm	50 mm	9.45 kg	no



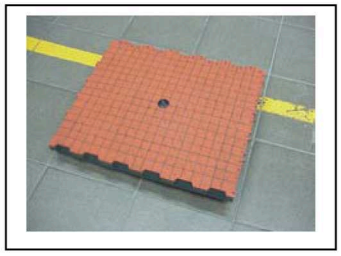
MIK Thermo W 500 x 1200 mm
uninsulated, rear side



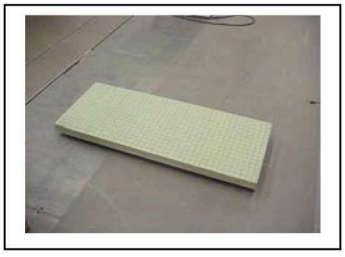
MIK Thermo W 500 x 1200 mm
insulated



MIK Thermo W 600 x 1200 mm
insulated



PremiumFloor Therme
500 x 600 mm, insulated



Rexlan 480 x 1200 x 55 mm,
insulated

Schonlau Bonus
500 x 1200 mm, uninsulated

Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany

2 Terms of reference

2.1 Date of assignment, client reference

23rd October 2008 – 27th January 2009, Mr Hannappel

2.2 Test unit input

20th November 2008 – 27th January 2009 and 24th April 2009

2.3 Date of test

50. KW 08 - 19. KW 09

2.4 Place of test

TÜV SÜD Product Service GmbH, Test laboratory Eschborn

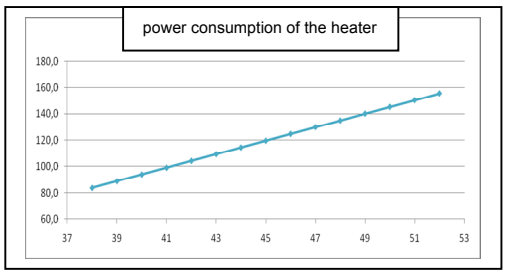
2.5 Variations or exceptions to the test process

None

3 Test results

Investigation of energy requirement:

a) Investigation of the power consumption of the heater in the operating loop by means of a PolySience Wasserbad Digital Temperature Controller. The flow and return hoses were connected and the ambient temperature was held at 20°C.
The inlet temperature was then set in 2 grade steps to 38°C then up to 52°C and the power consumption was measured after reaching a constant state for at least two hours. For this purpose a Yokogawa Digital Power Meter WT110 was used.



Power used for 38°C inlet temperature	83.7 W
Power used for 52°C inlet temperature	155.5 W
Difference of power input per °C (idealised)	5.13 W

Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany

b) Investigation of the power input of the heating panels when heating by means of a Digital Power Meter WT110 from the Yokogawa company. The flow and return hoses were connected to the heating panel, surface temperature of the panel was kept at approx. 40°C and the surrounding temperature was kept at approx. 20°C. For checking and measuring the temperatures the Digital Thermometer FLUKE 51, Yokogawa XL100 and the RAYTEK laser pistol RAYNGER MX4 were used. A measuring distance of 25 cm was ensured by using a guide rail.

The consumption of the heater was then subtracted from the established total consumption. Here the set inlet temperature and the power consumption resulting from it as well as correction value were taken into account.

	Usage in Wh	Usage per m² in Wh
MIK Thermo W 500 x 1200 mm, uninsulated,	250.0 Wh	416.7 Wh
MIK Thermo W 500 x 1200 mm, insulated	196.3 Wh	327.2 Wh
MIK Thermo W 600 x 1200 mm, insulated	228.0 Wh	316.7 Wh
PremiumFloor Therme 500 x 600 mm (2x), insulated	257.1 Wh	428.5 Wh
Rexlan 480 x 1200 mm, insulated	224.8 Wh	390.3 Wh
Schonlau Bonus, 500 x 1200 mm, uninsulated	289.6 Wh	482.7 Wh

c) Cooling time (cooling phase of the heating panels)

The panel which was pre-heated to approx. 41°C was separated from the heat source and allowed to cool down. The ambient temperature amounted to approx. 20°C. It was determined, how long it took until the panel cooled down from 40°C to 30°C on the surface.

	Cooling time approx.
MIK Thermo W 500 x 1200 mm, uninsulated,	2:00 h
MIK Thermo W 500 x 1200 mm, insulated	2:30 h
MIK Thermo W 600 x 1200 mm, insulated	2:45 h
PremiumFloor Therme 600 x 500 mm (2x), insulated	2:00 h
Rexlan 480 x 1200 mm, insulated	1:45 h
Schonlau Bonus, 500 x 1200 mm, uninsulated	2:08 h

d) Warmth distribution

The heating panels were mounted horizontally in a support and supplied with hot water from the heating source. The inlet temperature was boosted until a surface temperature of of approx. 40°C was reached. The set temperature was held for at least ten hours. The ambient temperature of 20°C was ensured by using a climate chamber.
On the surfaces of the heating panels a grid of 3X3 cm was drawn. The temperatures were measured with a measuring distance of 25 cm using a Raytek RAYNGER MX4 laser pistol.

Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de
TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany



Mounting rack, hot water production and measuring pistol


The single measured values and the surface diagrams resulting from them are represented in attachments 1 to 6.

4 Summary of measured values

	Thermo W 500 x 1200 mm, uninsulated	Thermo W 500 x 1200 mm, insulated	Thermo W 600 x 1200 mm, insulated	Premium Therme 500 x 600 mm (2x), insulated	Rexlan 480 x 1200 mm insulated	Schonlau Bonus, 500 x 1200 mm uninsulated
Surface share with advantageous temperatures (37 - 43°C)	100 %	100%	100%	88%	68%	100%
Surface share with optimum temperatures (39 - 41°C)	86%	82%	81%	45%	30%	82%
Coefficient of variation	0.014	0.016	0.014	0.043	0.102	0.020
Variance σ^2	0.315	0.432	0.331	2.977	16.586	0.663
Standard deviation σ	0.562	0.657	0.576	1.725	4.073	0.814

Room temperature [°C]	20.1	20.6	20.2	20.3	20.1	20.0
Inlet temperature [°C]	46.1	46.0	44.8	51.7	53.1	48.0
Return temperature [°C]	44.9	44.9	43.6	50.2	50.1	46.4
Ø – Surface temp. [°C]	40.5	40.5	40.5	40.5	40.0	40.0
Maximum temperature [°C]	41.9	41.7	41.5	45.6	47.0	41.5
Minimum temperature [°C]	37.9	36.5	35.8	35.5	25.2	37.3

Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany

Standard deviation, coefficient of variation and variance:

Statistical specific values, which specify the spead of the measured temperature values around the mean value (average surface temperature). The smaller these values are, the lower the temperature fluctuations are on a heating panel.

5 Note

This technical report does not authorise the introduction of a quality mark from TÜV SÜD Product Service GmbH.

TÜV SÜD Product Service GmbH	TÜV SÜD Product Service GmbH
Technical report tested	Tester
p.p. Dipl.-Ing. Edgar Harnisch Test Factory Frankfurt	*p.p. Ralph Teichert* Test Factory Frankfurt

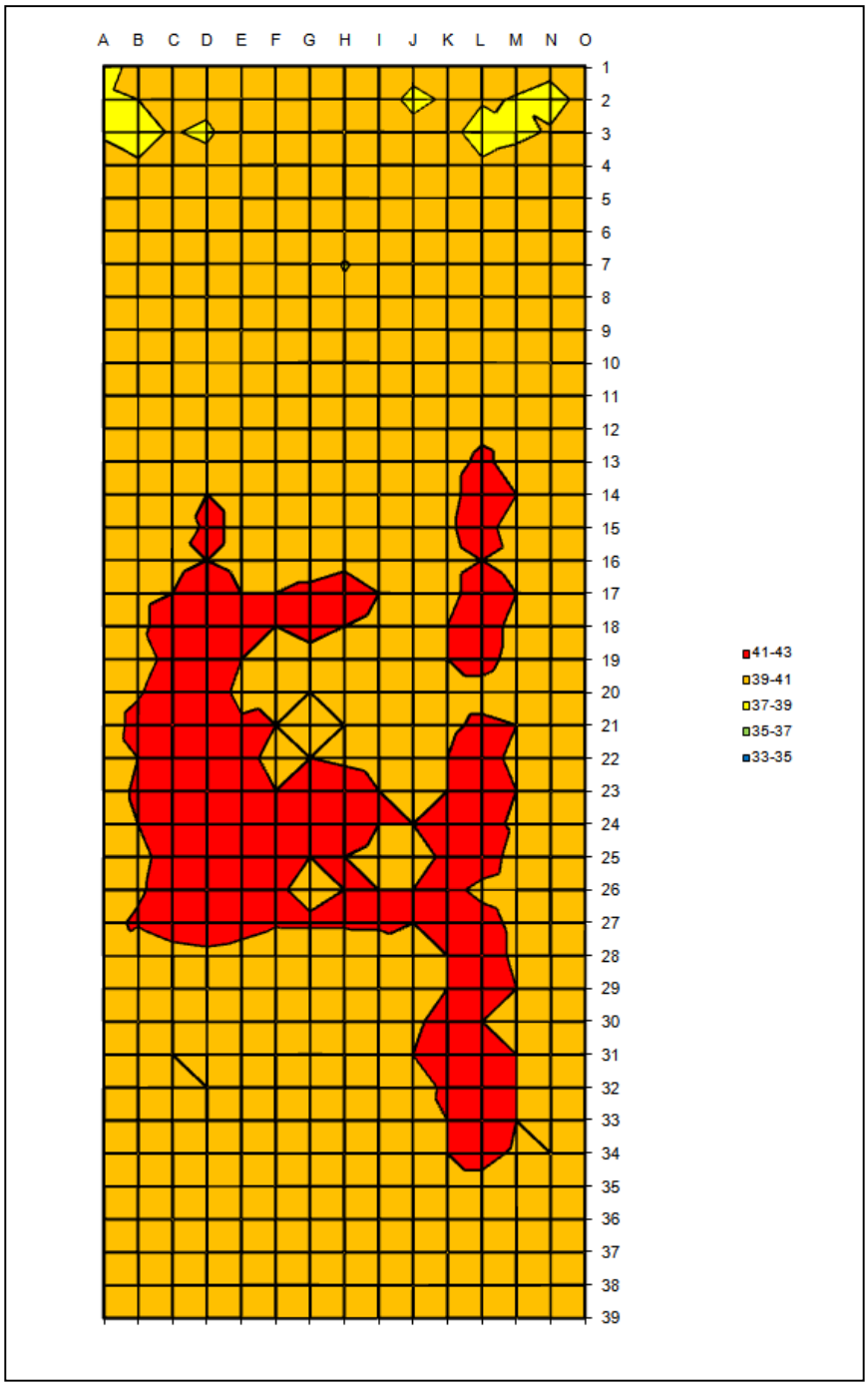
Attachments: Readings and diagrams

Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany

Attachment 1:

Warmth distribution on the heating panel MIK Thermo W 500 x 1200 mm, uninsulated



Compiler:
Ralph Teichert
Compilation date: 11.05.2009

Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany

Warmth distribution on the heating panel MIK Thermo W 500 x 1200 mm, uninsulated

Measured values:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	38.1	39.7	40	40.4	39.8	40.3	40.4	40.7	40.6	40.2	39.6	39.8	39.6	39.3	39.1
2	38.7	39	39.4	39.6	40.1	39.7	40.3	40.6	40.4	38.1	39.4	39.2	38.9	38.6	39.3
3	38.9	38.6	39.1	38.6	40.2	40.2	40.6	41	40.8	40	39.7	37.9	38.7	39.1	39.3
4	39.3	39.1	39.5	39.7	39.8	40.4	40.4	40.6	40.5	39.8	39.4	39.3	39.5	39.4	39.6
5	39.4	39.1	39.4	39.7	40.1	40	40.1	40.3	40	39.1	39.6	39.7	39.6	39.7	39.5
6	39.6	39.4	40.1	40.3	40.1	39.9	40	40.3	40	39.8	39.8	40.3	40	40	40
7	39.8	39.9	40.4	40.5	40.1	40.2	40.3	38.8	39.8	40.3	40.1	40.5	40.4	40.1	40.1
8	39.9	39.8	40.6	40.8	40.7	40.4	40.4	39.5	40.3	40.4	40.4	40.8	40.7	40.4	39.8
9	40	39.7	40.6	40.6	40.8	40.3	40.6	40.6	40.6	40.1	40.6	40.7	40.6	40.2	40
10	40.1	40.2	40.4	40.1	39.8	40.6	40.8	40.8	40.7	40.7	40.7	40.5	40.1	40.4	40.1
11	40.2	40.1	40.6	40.9	40.6	40.6	40.6	40.7	40.7	40.8	40.7	40.8	40.8	40.2	40.2
12	40.4	39.8	40.7	40.8	40.9	40.7	40.7	40.6	40.6	40.4	40.7	40.9	40.8	40.2	40.4
13	40.4	40.4	40.6	41	40.7	40.7	40.8	40.8	40.6	40.5	40.8	41.1	40.8	40.5	40.2
14	40.6	40.5	40.8	41	40.9	40.8	40.8	40.7	40.8	40.5	40.8	41.3	41	40.6	40.4
15	40.4	40.3	40.6	41.1	40.9	40.9	40.7	40.5	40.5	40.6	40.9	41.3	40.6	40.6	40.1
16	40.5	40.4	40.9	41	40.9	40.8	40.8	40.9	40.7	40.8	40.8	41	40.8	40.5	40.3
17	40.6	40.9	41	41.2	41	41	41.1	41.2	41	40.9	40.8	41.3	41	40.7	40.5
18	40.5	40.9	41.2	41.3	41	41	41.1	41	40.9	40.8	41	41.3	40.8	40.8	40.4
19	40.5	40.6	41.3	41.3	41	40.8	40.9	40.8	40.9	40.6	41	41.2	40.8	40.6	40.4
20	40.5	40.9	41.5	41.4	40.8	40.9	41	40.7	40.8	40.8	40.8	40.8	40.6	40.5	40.4
21	40.5	41.3	41.9	41.5	41.1	41	40.8	41	40.8	40.9	40.9	41.1	41	40.6	40.5
22	40.6	41	41.7	41.5	41.2	40.8	41	40.9	40.8	40.7	41	41.3	40.8	40.6	40.4
23	40.7	41.1	41.6	41.8	41.2	41	41.1	41.3	41	40.9	41	41.3	41	40.8	40.4
24	40.7	41	41.3	41.4	41.2	41.1	41	41.2	41	41	41.1	41.2	40.9	40.6	40.6
25	40.7	40.8	41.3	41.4	41.1	41.1	41	41	40.9	40.8	41.1	41.4	40.7	40.7	40.4
26	40.6	40.9	41.3	41.7	41.2	41.1	40.8	41	41	41	41.2	40.8	40.6	40.6	40.4
27	40.8	41.1	41.4	41.5	41.3	41.1	41.1	41.1	41.1	41	41.1	41.3	40.8	40.8	40.5
28	40.7	40.14	40.7	40.8	40.7	40.1	40.4	40.4	40.6	40.8	41	41.5	40.8	40.7	39.8
29	40.7	40.4	40.9	41	40.7	40.4	40.4	40.4	40.8	40.6	41	41.3	41	40.5	40.3
30	40.6	40.9	40.8	40.4	40.8	40.8	40.6	40.8	40.8	40.9	41.2	41	40.5	40.7	40.4
31	40.6	40.8	41	40.7	40.8	40.8	40.4	40.8	40.7	41	41.3	41.3	41	40.9	40.5
32	40.6	40.7	40.6	41	40.8	40.7	40.4	40.7	40.6	40.5	41.2	41.5	41	40.5	40.4
33	40.7	40.8	40.6	40.8	40.7	40.6	40.5	40.6	40.7	40.6	41	41.5	41	40.7	40.6
34	40.5	40.9	40.8	40.8	40.6	40.3	40.4	40.7	40.8	40.7	41	41.2	40.9	41	40.6
35	40.6	40.5	40.5	40.2	40.1	40.4	40.4	40.5	40.7	40.8	40.8	40.8	40.4	40.5	40.4
36	40.5	40.4	40.6	40.4	40.5	40.4	40.3	40.8	40.9	40.9	40.8	40.8	40.6	40.4	40.3
37	40.3	40.2	40.2	40.4	40.4	40.4	40.5	40.9	40.8	40.9	41	40.8	40.5	40	40.3
38	40	39.6	40	40.1	40.2	40.4	40.5	40.8	40.8	40.8	40.6	40.4	40.1	39.8	40.1
39	39.8	39.8	40	39.8	40.1	40.1	40	40.3	40.6	40.4	40.6	40.1	40.4	39.8	39.8

Room temperature [°C]	20.1
Inlet temperature [°C]	46.1
Return temperature [°C]	44.9
Ø – Surface temperature [°C]	40.5
Maximum temperature [°C]	41.9
Minimum temperature [°C]	37.9

Surface share with advantageous temperature (37 - 43°C)	100%
Surface share with optimum temperature (39 - 41°C)	86%
Coefficient of variation	0.014
Variance σ^2	0.315
Standard deviation σ	0.562

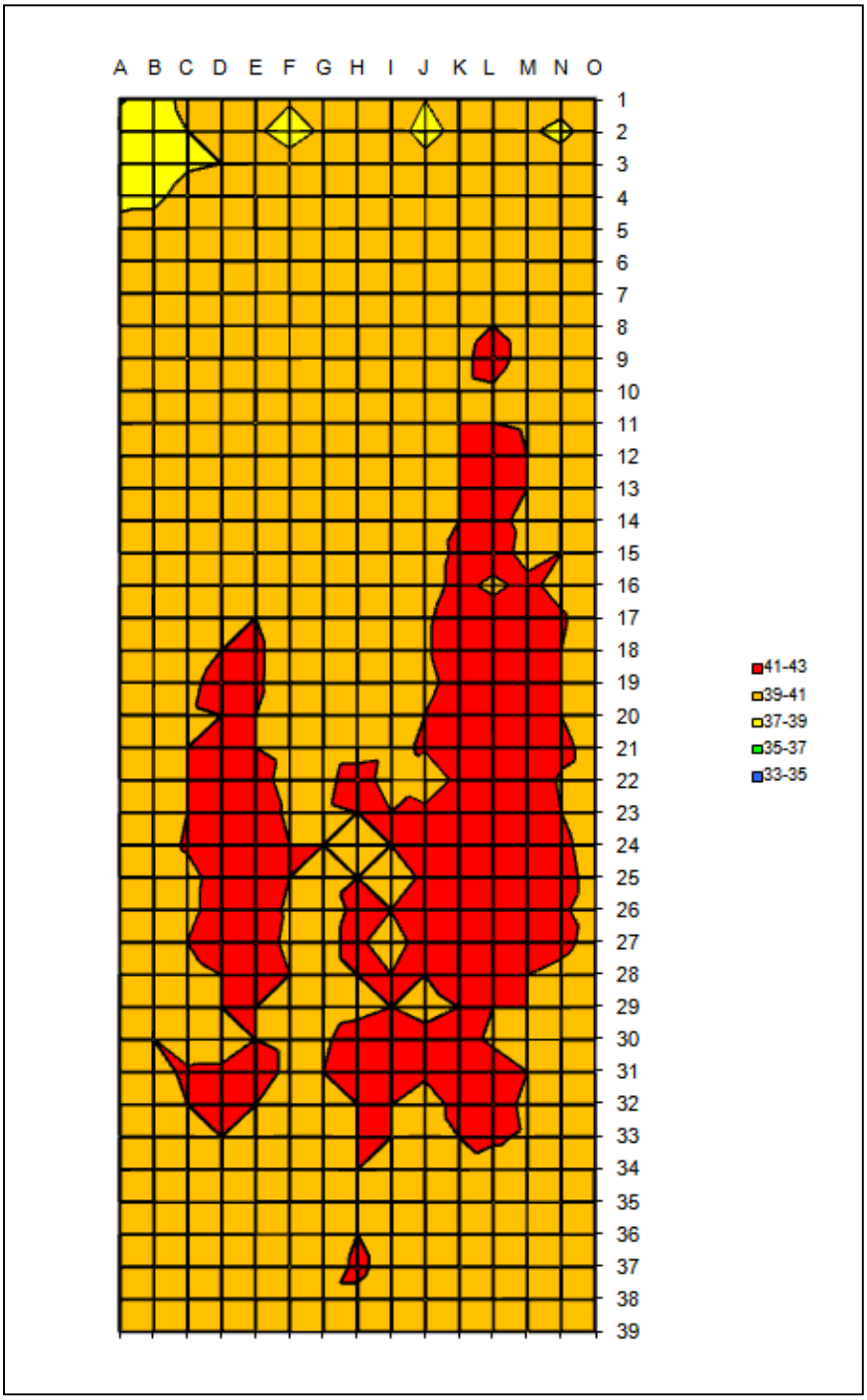
current consumption per panel	current consumption per m²	Cooling time approx.
250.0 Wh	416.7 Wh	2:00 h

Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany

Attachment 2

Warmth distribution on the heating panel MIK Thermo W 500 x 1200 mm, insulated



Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany

Warmth distribution on the heating panel MIK Thermo W 500 x 1200 mm, insulated

Measured values:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	36.5	38.5	39.3	39.8	39.5	39.2	39.2	39.5	40.3	39	40	39.7	39.5	39.3	39.2
2	38.6	38.4	39	39.1	39.3	38	39.3	39.8	40.2	37.9	39.8	39.8	39.1	38.8	39.3
3	38.6	38.5	38.9	39	39.3	39.8	39.6	39.8	40.3	39.8	39.8	39.7	39.2	39.3	39.5
4	38.8	38.8	39.3	39.2	39.5	39.4	39.7	39.9	40.3	39.4	39.6	39.5	39.5	39.7	39.8
5	39.2	39.3	39.3	39.3	39.3	39.3	39	39.7	39.8	39.3	39.8	40	39.8	40	40
6	39.4	39.5	39.5	40	39.4	39.3	39.5	39.7	39.8	39.8	40	40.2	40.4	40.2	40.2
7	39.7	39.9	40	40.3	39.5	39.6	39.6	40	39.8	40	40.4	40.8	40.5	40.4	40.3
8	39.8	39.9	40.3	40.3	40.1	39.6	39.8	40.1	40	40.1	40.7	41	40.7	40.6	40.2
9	39.8	39.8	40.5	40.4	40.5	39.5	40	40.3	40.2	40.1	40.8	41.3	40.7	40.3	40.1
10	40	40.1	40.1	40.2	40.5	40.2	40.2	40.6	40.4	40.4	40.8	40.9	40.4	40.7	40.3
11	39.8	40.3	40.3	40.3	40.8	40.4	40.3	40.5	40.5	40.5	41	41	40.9	40.7	40.3
12	39.9	40	40.5	40.8	40.8	40.4	40.3	40.5	40.4	40.2	41	41.4	41	40.6	40.2
13	40.1	40	40.5	40.8	40.8	40.4	40.4	40.5	40.5	40.5	41	41.2	41	40.7	40.3
14	40.3	40.3	40.6	40.9	40.8	40.4	40.5	40.5	40.5	40.6	41	41.2	40.8	40.9	40.3
15	40	40.2	40.4	40.5	41	40.6	40.5	40.4	40.4	40.5	41.2	41.4	40.7	41	40.2
16	40	40.3	40.4	40.9	40.9	40.6	40.6	40.7	40.5	40.7	41.2	40.8	41.2	40.7	40.4
17	40.2	40.5	40.7	40.9	41	40.7	40.7	40.9	40.7	40.9	41.3	41.4	41.3	41.1	40.5
18	40.3	40	40.6	41	41.1	40.7	40.7	41	40.7	40.9	41.4	41.5	41.4	41	40.5
19	40.2	40	40.8	41.3	41.1	40.6	40.7	40.7	40.6	40.7	41.4	41.4	41.5	41	40.5
20	40.4	40.6	40.9	41	41	40.7	40.7	40.4	40.7	41	41.5	41.3	41.1	41	40.5
21	40.1	40.7	41	41	41	40.8	40.7	40.7	40.8	41.1	41.5	41.7	41.5	41.2	40.7
22	40.3	40.3	41	41.3	41.3	40.7	40.8	41.3	40.7	40.1	41.3	41.7	41.5	40.9	40.7
23	40.3	40.4	41	41.3	41.3	40.9	40.9	41	41	41.3	41.5	41.5	41.4	41	40.5
24	40.4	40.6	41.1	41.3	41.3	41	41	40.8	41	41.3	41.5	41.5	41.5	41.2	40.6
25	40.5	40.5	40.7	41.4	41.3	41	40.9	41	40.7	41.1	41.7	41.7	41.2	41.3	40.7
26	40.5	40.5	40.7	41.5	41.3	40.9	40.8	41.1	41	41.3	41.6	41.4	41.3	41.1	40.7
27	40.5	40.6	41	41.5	41.4	40.8	40.9	41.1	40.7	41.3	41.5	41.5	41.4	41.3	40.6
28	40.5	40	40.7	41	41.2	41	40.9	41	41	41	41.3	41	41	40.7	40.2
29	40.7	40.7	40.9	41	41	40.7	40.7	40.8	41	40.8	41	41	41	40.5	40.1
30	40.8	41	40.5	40.7	41	40.9	40.9	41.3	41.3	41.2	41.2	40.9	40.3	40.5	40.2
31	40.7	40.8	41.1	41.1	41.2	40.9	41	41	41.2	41.1	41.2	41.3	41	40.7	40.2
32	40.6	40.5	41	41	41	40.7	40.7	41	41	40.7	41.2	41.4	40.8	40.5	40.1
33	40.8	40.8	40.8	41	40.9	40.8	40.8	41	41	40.7	41	41.1	40.9	40.7	40.4
34	40.9	40.7	40.8	40.8	40.7	40.7	40.7	41	40.7	40.7	40.9	40.7	40.7	40.4	40.3
35	40.7	40.5	40.3	40.2	40.4	40.7	40.7	40.9	40.7	40.6	40.6	40.7	39.8	40.3	40.2
36	40.7	40.4	40.3	40.3	40.4	40.3	40.7	41	40.8	40.7	40.7	40.4	40.2	39.8	40
37	40.5	40.3	40.2	40.3	40.5	40.9	40.7	41.1	40.8	40.7	40.7	40.3	39.7	39.8	39.7
38	40.4	39.9	40.3	40.4	40.5	40.8	40.9	40.9	40.7	40.8	40.5	40	39.7	39.3	39.5
39	40	39.8	40.3	40.4	40.3	40.3	40.1	40.6	40.4	40.4	40.5	39.9	39.9	39.2	39.2

Room temperature [°C]	20.6
Inlet temperature [°C]	46.0
Return temperature [°C]	44.9
Ø – Surface temperature [°C]	40.5
Maximum temperature [°C]	41.7
Minimum temperature [°C]	36.5

Surface share with advantageous temperature (37 - 43°C)	100%
Surface share with optimum temperature (39 - 41°C)	82%
Coefficient of variation	0.016
Variance σ^2	0.432
Standard deviation σ	0.657

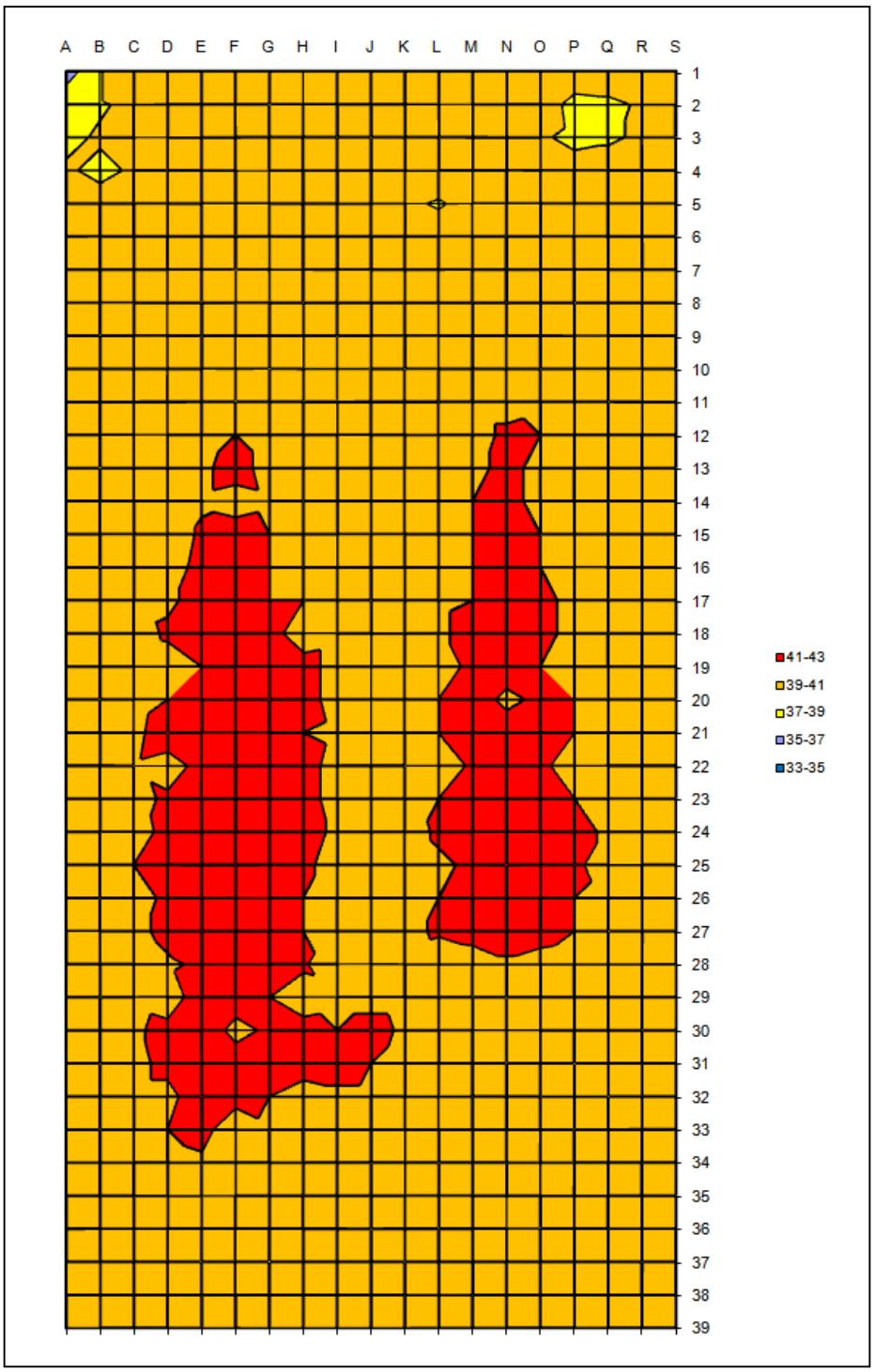
current consumption per panel	current consumption per m²	Cooling time approx.
196.3 Wh	327.2 Wh	2:30 h

Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany

Attachment 3

Warmth distribution on the heating panel MIK Thermo W 600 x 1200 mm, insulated



Compiler:
Ralph Teichert
Compilation date: 11.05.2009

Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany

Product Service

Warmth distribution on the heating panel MIK Thermo W 600 x 1200 mm, insulated

Measured values:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	35.8	38.9	40	40	40.3	40.2	40.5	40.3	40.6	40.6	40.7	40.5	40.6	39.8	39.6	39.6	39.6	39.8	39.3
2	38.5	38.9	39.2	39.7	40	40.2	40.5	40	40.6	40.5	40.4	39.8	40	39.6	39.5	38.7	38.8	39.1	39.1
3	38.8	39.1	39.1	39	39.6	39.9	40.3	40.5	40.7	40.7	40.5	40.3	39.9	39.5	39.1	38.8	38.9	39.1	39.3
4	39.1	38.8	39.1	39.4	39.5	39.6	39.4	40.3	40.3	40.3	40	40.1	39.7	39.6	39.1	39.3	39.3	39.4	39.3
5	39.3	39.3	39.4	39.3	39.7	39.8	39.8	40	40	39.9	39.3	38.8	39.6	39.8	39.6	39.5	39.6	39.5	39.5
6	39.1	39.5	39.6	39.6	40	40.3	40	39.9	39.9	39.9	39.8	39.8	39.7	40.3	39.9	39.6	40	39.8	39.7
7	39.6	39.7	39.7	39.9	40.3	40.5	38.9	40.2	40	40	39.8	40.1	40.3	40.6	40.3	40.3	40.2	40	39.8
8	39.5	39.8	39.8	39.9	40.8	40.4	40.5	40.5	40.3	40	40	40.2	40.6	40.8	40.6	40.6	40.3	40	39.7
9	39.8	40.2	40	39.8	40.9	40.7	40.6	40.3	40.3	40.1	40	40.2	40.6	40.8	40.7	40.2	40.3	40	39.8
10	39.8	40.2	40	40.3	40.8	40.3	40.8	40	39.1	40.3	40.4	40.3	40.7	40.6	40.9	40.6	40.3	40	40
11	39.6	40.1	40.1	40.4	40.8	41	40.7	40.6	40.1	40.2	40.2	40.6	40.8	40.8	40.9	40.7	40.7	40.1	39.8
12	39.9	40.3	40.2	39.9	40.8	41	40.8	40.6	40.1	40.2	40.3	40.3	40.8	41.1	41	40.6	40.5	40.2	40
13	39.9	40.6	40.3	40.6	40.9	41.2	40.8	40.7	40.4	40.2	40.3	40.5	40.9	41.1	40.9	40.7	40.6	40.3	40.2
14	39.9	40.5	40.5	40.6	40.9	40.8	40.9	40.9	40.6	40.2	40.3	40.8	41	41.1	40.9	40.7	40.6	40.3	40.2
15	39.9	40.4	40.5	40.6	41.1	41.2	41	40.8	40.5	40.1	40.4	40.7	41	41.1	41	40.7	40.5	40.3	40.2
16	40.1	40.7	40.6	40.7	41.2	41.2	41	41	40.5	40.6	40.6	40.7	41	41.2	41	40.5	40.6	40.4	40.2
17	40.2	40.7	40.8	40.9	41.2	41.5	41	41	40.7	40.8	40.7	40.9	41	41.1	41.1	40.9	40.8	40.5	40.2
18	40.2	40.7	40.7	41.1	41.2	41.5	41.2	40.7	40.8	40.5	40.6	40.9	41.2	41.2	41.1	40.9	40.8	40.5	40.1
19	40.2	40.6	40.6	40.7	41	41.4	41.1	41.2	40.8	40.3	40.6	40.6	41.2	41.2	41	40.8	40.7	40.6	40.1
20	40.2	40.8	40.7	41	41.1	41.1	41.4	41.2	40.8	40.2	40.6	41	41.2	40.9	41.1	41	40.6	40.6	40.2
21	40.1	40.7	40.8	41.4	41.2	41	41.2	41	40.9	40.4	40.7	41	41.2	41.2	41.1	41	40.8	40.6	40.1
22	40.3	40.7	40.9	40.7	41.2	41.5	41.3	41.2	40.8	40.5	40.8	40.6	41.1	41.3	41.2	40.5	40.7	40.6	40.1
23	40.2	40.8	40.8	41.1	41.4	41.4	41.2	41.2	40.8	40.5	40.8	41	41.1	41.3	41.2	41	40.6	40.6	40.3
24	40.3	40.8	40.7	41.2	41.3	41.5	41.3	41.2	40.9	40.7	40.7	41.1	41.1	41.2	41.1	41.2	40.9	40.6	40.3
25	40.3	40.7	41	41.2	41.4	41.5	41.2	41.1	40.8	40.6	40.7	40.9	41.1	41.5	41	41.2	40.5	40.6	40.3
26	40.3	40.8	40.8	41.1	41.4	41	41.2	41	40.8	40.6	40.8	41	41.1	41.2	41.2	41	40.8	40.6	40.3
27	40.5	40.6	40.8	41.2	41.5	41.4	41.3	41	40.8	40.8	40.8	41.1	41.3	41.3	41.3	41	41	40.6	40.1
28	41	40.8	40.6	40.9	41.1	41	41.1	41.1	40.3	40	40.7	40.5	40.6	40.9	40.7	40.6	40.4	40.3	39.6
29	40.8	41	40.8	40.6	41.4	41.3	41	40.7	40.8	40.8	40.8	40.6	40.9	41	40.8	40.6	40.4	40.3	39.9
30	40.8	41	40.9	41.2	41.4	40.8	41.1	41.2	41	41.2	40.9	40.7	40.6	40	40.6	40.8	40.5	40.4	39.8
31	40.7	41	40.8	41.2	41.2	41.3	41.2	41.2	41.2	41	40.8	40.8	40.9	41	40.8	40.9	40.5	40.3	39.8
32	40.8	40.8	40.8	40.8	41.4	41.2	41	40.8	40.9	40.9	40.6	40.3	40.8	40.9	40.8	40.5	40.6	40.3	39.9
33	40.8	41	40.8	41	41.2	40.6	40.9	40.9	40.8	40.8	40.6	40.5	40.6	40.6	40.6	40.7	40.4	40.3	40
34	40.6	40.7	40.7	40.8	40.9	40.3	40.6	40.7	40.8	40.9	40.5	40.6	40.4	40.5	40.1	40.5	40.3	40.3	39.8
35	40.6	40.6	40.6	40.3	40.1	40.2	40.6	40.7	40.7	40.8	40.5	40.4	40.5	40.2	40.1	40	40.1	40.2	39.9
36	40.7	40.5	40.3	40.2	40.3	40.5	40.6	40.6	40.8	41	40.6	40.8	40.6	39.7	40.3	40	40	39.9	39.8
37	40.6	40.4	40.3	40.2	40.6	40.5	40.9	40.7	40.8	40.8	40.8	40.7	40.6	40.4	40.3	40.1	39.8	39.9	39.7
38	40.6	40.2	40	40.2	40.5	40.5	40.7	40.6	40.7	40.6	40.6	40.2	40.4	40.2	40.3	40	39.7	39.7	39.6
39	40.1	40.2	40	40	40.1	40	40.3	39.9	40.1	40.2	40.1	39.8	40	40.2	40.3	39.7	39.7	39.7	39.3

Room temperature [°C]	20.2
Inlet temperature [°C]	44.8
Return temperature [°C]	43.6
Ø – Surface temperature [°C]	40.5
Maximum temperature [°C]	41.5
Minimum temperature [°C]	35.8

Surface share with advantageous temperature (37 - 43°C)	100%
Surface share with optimum temperature (39 - 41°C)	81%
Coefficient of variation	0.014
Variance σ^2	0.331
Standard deviation σ	0.576

current consumption per panel	current consumption per m²	Cooling time approx.
228.0 Wh	316.7 Wh	2:45 h

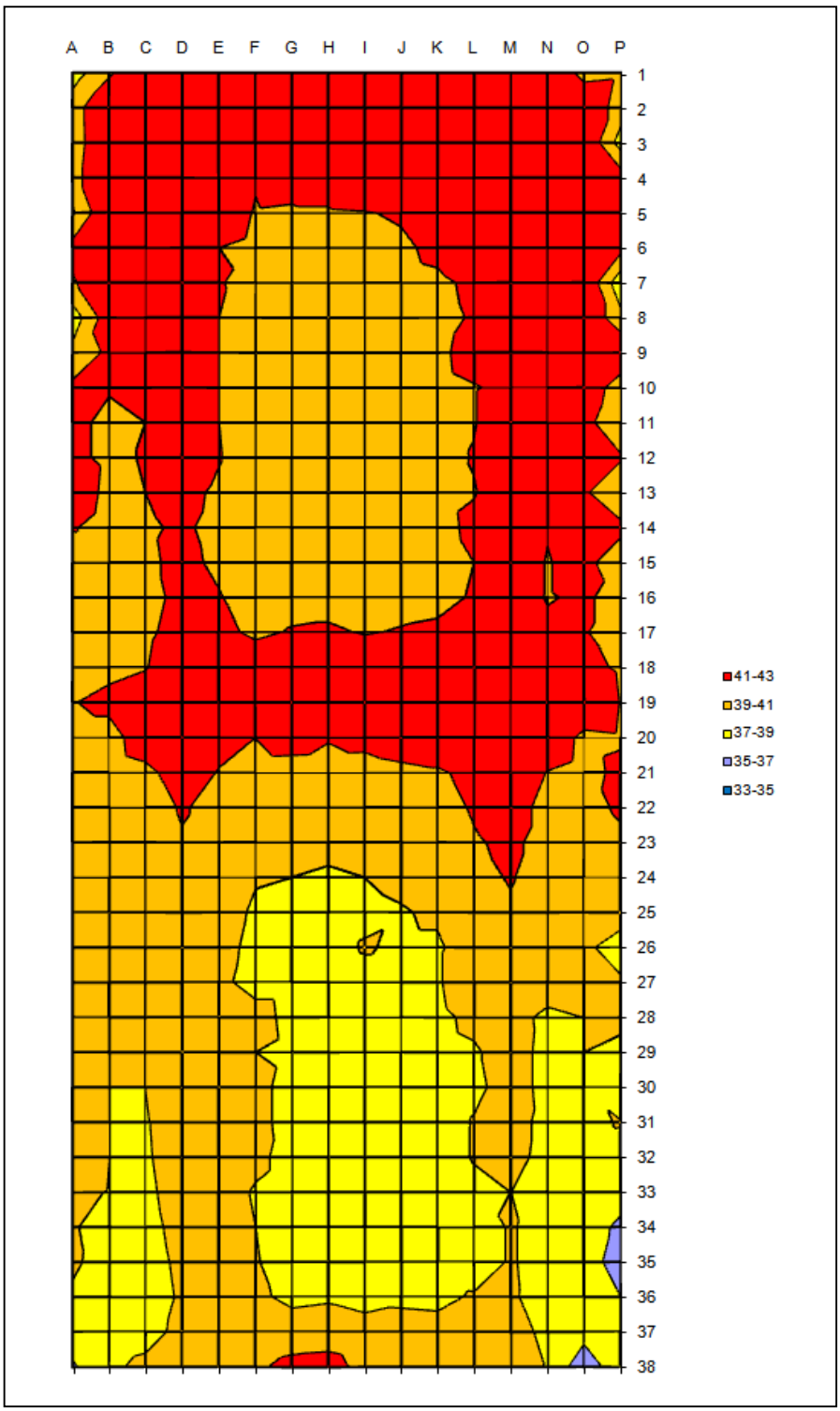
Compiler:
Ralph Teichert
Compilation date: 11.05.2009

Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany

Attachment 4

Warmth distribution on the heating panel PremiumFloor Therme 500 x 600 mm (2x), insulated



Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany

Warmth distribution on the heating panel PremiumFloor Therme 500 x 600 mm, insulated

Measured values:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	38	40.6	43.8	43.2	44	42.3	43.6	43.3	43.4	43.8	44	44	41.9	43.7	40.2	40.5
2	40	43.5	44.3	45.6	44.9	44.2	44	44	43.6	44.1	44.2	45	45.2	44.4	43.9	39.9
3	39.9	43.9	44.9	44.8	45	44.1	44	43.6	43	43.9	44.2	44.6	45.2	44.6	44.3	38.1
4	40.2	43.8	44.7	42.7	42.2	41.1	41.6	41.9	42.6	41.9	42	42.5	43.3	44.5	43.8	41.9
5	38.6	43.7	42.5	42.4	41.8	40.9	40.8	40.8	40.9	41.2	41.8	42.1	42.9	43.1	43.8	42.6
6	41.6	43.8	41.8	42.3	41	40.7	40.3	40.5	40.4	40.7	41.4	42.2	42.8	42.4	43.8	41.6
7	40.7	43.6	41.5	42.5	41.2	39.9	40.2	39.9	40	40.5	40.7	41.3	42.7	41.3	43.8	37.5
8	37.8	42.2	41.5	42.2	41	40.2	39.9	40.1	39.5	39.9	40.4	41.2	42.4	41.9	43.8	39.5
9	39.4	41.4	41.4	41.9	41	40.4	39.7	39.9	39.5	39.9	40.6	41.7	42.2	41.6	42.2	42.9
10	41.4	41.1	41.2	41.9	41	40.2	39.7	39.8	39.5	39.7	40.5	40.9	41.3	41.4	42.7	39.7
11	41.3	40.7	41	41.6	41	39.9	39.5	39.7	39.2	39.7	40.5	40.9	42.1	41.3	41.7	39.2
12	41.3	40.7	41.1	42.1	41.1	39.9	39.6	39.9	39.5	39.9	40.3	41.1	42.1	41.6	41.7	41.2
13	41.9	40.6	41	41.5	40.7	39.9	39.7	40	39.5	39.9	40.5	40.9	42	41.5	41.3	39
14	41.1	40.4	40.8	41.2	40.6	39.8	39.7	40	39.5	39.8	40.4	41.4	41.9	41.1	41.2	41.5
15	39.9	40.3	40.7	41.4	40.7	39.9	40.2	40.3	39.9	40.3	40.3	41	42	40.9	41.6	39.7
16	40.2	40.4	40.5	41.4	41.1	40.2	40.5	40.5	40.2	40.5	40.7	41.1	41.8	40.9	41.2	40.5
17	40.4	40.5	40.7	41.6	41.4	40.7	41.1	41.2	40.9	41.1	41.2	41.6	41.8	41.3	41.2	39.5
18	39.2	40.5	40.9	42.1	42.1	42	42.1	42.3	42.1	42.3	41.9	42.5	42.3	41.5	41.6	40.7
19	40.9	41.5	41.9	42.3	42.3	42.2	42.8	42.8	43.1	42.8	42.6	42.2	41.4	43.2	43.3	40.9
20	40.2	40.2	42.1	42.6	41.6	41	42.1	41.2	41.9	42.8	42.6	42.1	42	42.6	40.4	40.7
21	40.7	40	40.5	41.9	40.9	40	39.9	39.8	39.7	40.2	40.7	41.6	42.1	40.9	40.2	41.5
22	40.6	39.7	39.7	41.2	40.2	39.5	39.6	39.3	39.5	39.9	40.2	41.2	42	40.2	40.5	41.2
23	40.5	39.7	39.7	40.8	40.2	39	39.3	39.2	39.3	39.7	39.8	40.8	41.4	40.2	40.2	40.7
24	39.1	39.7	39.8	40.6	39.2	39.1	39	38.9	39	39.3	39.4	40.6	41.1	40.2	39.9	39.7
25	39.5	39.7	39.4	40.5	39.6	38.8	38.7	38.5	38.7	38.9	39.2	40.2	40.8	40.1	39.9	40.9
26	40.1	39.5	39.6	40.5	39.5	38.6	38.7	38.5	39.1	38.8	38.8	39.7	40.9	40.1	39.8	37
27	39.6	39.6	39.5	40	39.3	38.5	38.5	38.4	38.6	38.6	38.8	40.2	40.8	39.9	39.7	39.5
28	39	39.3	39.2	40.1	40.1	39.5	38.6	38	38	37.4	38.6	39.4	39.6	38.6	39	39.2
29	39.6	39.2	39.2	40.8	40.2	39	38.7	37.9	37.5	37.7	38.5	38.8	39.7	38.5	39	38.8
30	40.1	39	39	40.7	40.7	39.4	38.5	37.8	37.3	37.5	38.2	38.6	39.7	38.5	38.8	36.9
31	39.9	39	38.8	40.3	40.3	39.4	38.5	38	37.8	37.7	38	39.1	39.5	38.6	38.6	39.1
32	40.4	39	38.7	40.2	40.2	39.5	38.2	38	37.7	37.6	38.2	39.1	39.4	38.6	38.5	38.4
33	39.5	38.9	38.5	40	39.9	38.8	38.2	37.8	37.6	37.6	37.9	38.6	39	38.2	38.4	38
34	39.1	38.5	38.3	39.7	39.7	39	38.2	38	37.8	37.8	37.9	37.7	39.2	38	38.2	36.5
35	39.2	38.4	38	39.5	39.5	39.1	38.3	38.4	37.9	38.1	38	37.7	39.2	38	38	36
36	38.8	38	37.8	39.3	39.3	39.4	38.5	38.7	38.2	38.6	38.5	39.2	39.3	37.9	37.8	37
37	38.3	37.6	38	39.7	39.4	39.7	40	40.2	39.9	39.8	39.7	40.2	39.8	38.5	37.7	37.3
38	36.7	38.5	39.6	39.8	40.6	40.7	41.5	41.6	40.5	40.5	40.7	40.7	39.8	38.9	35.5	38.4

Room temperature [°C]	20.3
Inlet temperature [°C]	51.7
Return temperature [°C]	50.2
Ø – Surface temperature [°C]	40.5
Maximum temperature [°C]	45.6
Minimum temperature [°C]	35.5

Surface share with advantageous temperature (37 - 43°C)	88%
Surface share with optimum temperature (39 - 41°C)	44%
Coefficient of variation	0.043
Variance σ²	2.977
Standard deviation σ	1.725

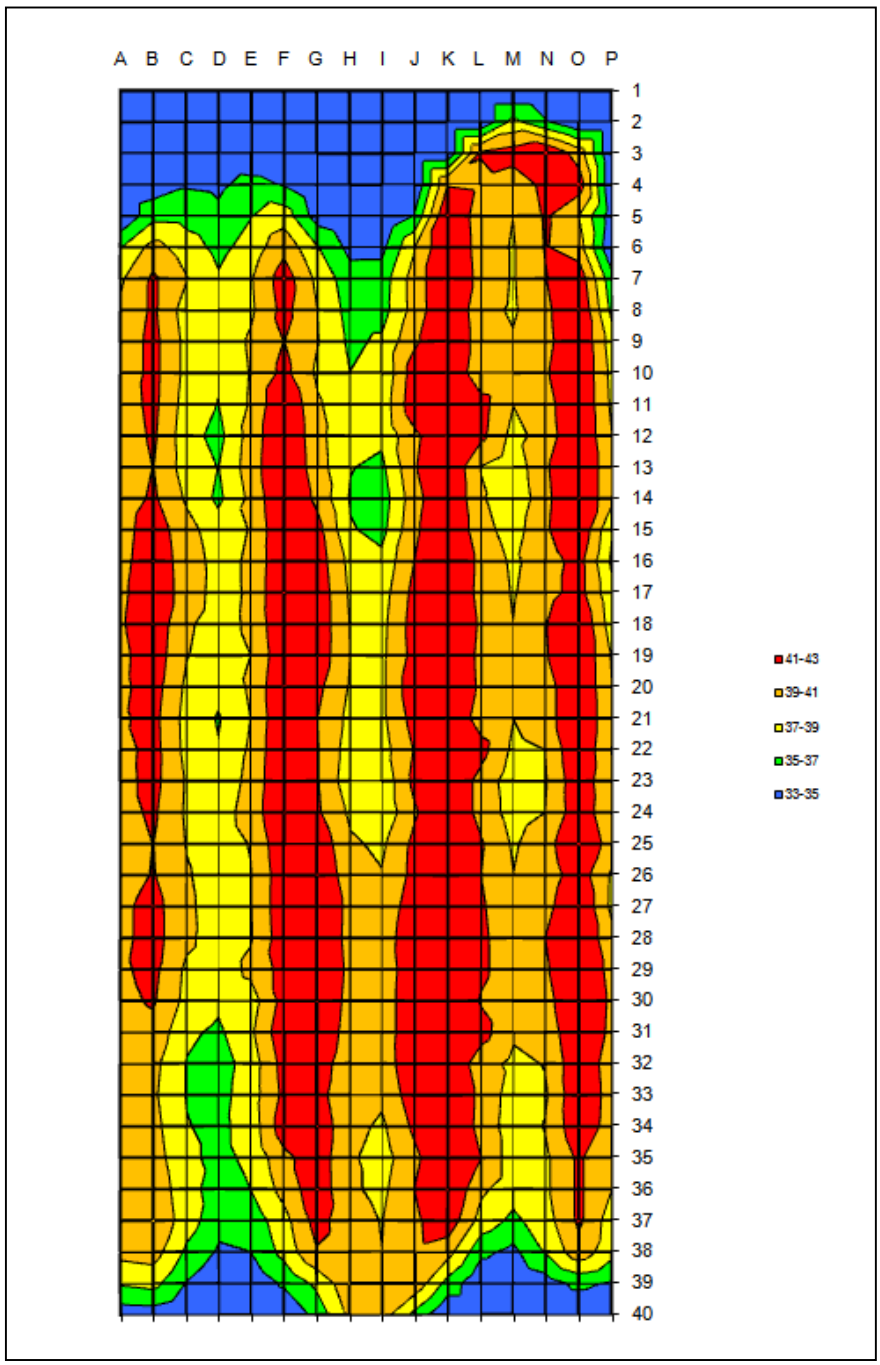
current consumption per panel	current consumption per m²	Cooling time approx.
257.1 Wh	428.5 Wh	2:00 h

Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany

Attachment 5

Warmth distribution on the heating panel Rexlan Polymerbeton-Heizplatte 480 x 1200 mm, insulated.



Compiler:
Ralph Teichert
Compilation date: 11.05.2009

Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany

Warmth distribution on the heating panel Rexlan Polymerbeton-Heizplatte 480 x 1200 mm, insulated.

Measured values:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	26	26.6	27.6	27.5	27.2	26.2	25.5	25.2	25.9	26.6	27.3	29	30.6	30	28.8	27.1
2	27.3	28.6	30.4	30.4	29.1	27.3	26.6	26.1	26.7	27.2	29.1	33.4	38.6	36.3	32	28.8
3	29.3	31.8	34.5	34.7	33.1	30.5	29.4	28.5	28.6	29.8	33.7	42.3	43	44	41.2	30.7
4	31.8	35	36	35.8	36.9	36	32.3	30.8	30.7	33.2	42	41.7	41	42.7	43.2	33.1
5	33	37.5	37.4	36.6	38.1	39.2	35.2	33.4	33.7	36.3	44.3	41.1	40.2	42.4	40.1	35
6	38	40.9	39.2	37.6	39	41.6	38.3	35.6	35.6	40	45	41.3	40	42.3	41	34.3
7	39.8	42.5	40.3	38.4	40	43.2	39.7	37	37.1	41.1	46.2	41.5	40	42.1	43.5	36.8
8	40.5	42.5	39.2	38.4	39.8	42.8	40.2	37.4	37.3	41	44.6	40.9	39.9	41.7	44.8	37.6
9	40.7	42.8	39.6	38.6	40.5	42.2	40.3	37.8	38.5	41.8	45.8	41.2	40.4	41.5	45.6	39.1
10	40.7	42.8	39.6	38.5	40.3	42.7	39.8	38.2	38.4	43.3	45.7	40.7	40.4	41.9	45.6	39.6
11	41.1	42.7	39.3	38.1	40.4	44.2	40.5	38.6	38.9	43.6	46.7	42.9	40.2	41.3	45.6	39.8
12	40.8	42.5	39	37.5	41	44.6	40.9	38.3	38.6	41.7	46.8	42.7	39.5	41	45.5	40.2
13	40.7	42.2	39.2	38.1	41.2	44.7	41.1	38.3	37.7	42	46.4	40.1	38.8	41.9	45.4	40.7
14	41	42.5	39.9	37.7	40.7	44.8	41.7	38	37.1	41.4	46.5	40.5	38.3	41.7	44.7	40.7
15	41.2	43.4	40.9	39.1	40.3	44.1	42.9	38.4	37.5	41.8	46.6	41	39.2	41.9	44	38.3
16	41.4	43.6	41.2	39.5	40.5	44	43.3	39.6	38.7	42.2	46.7	41.7	39.8	41.2	42.9	37.8
17	41.7	43.6	41.3	39.4	40.5	44.2	43.6	39.9	39.3	42.8	46.8	41.6	40	41.5	42.9	38.7
18	41.9	43.6	40.5	39.3	40.6	43.9	43.6	40.1	39.6	43.1	46.8	41.9	40.2	42.1	44.7	39.1
19	41.6	43.4	40.3	39.2	40.2	43.7	43.5	40.2	39.7	42.9	46.3	41.7	40.3	42	45.1	40
20	41.7	43.1	39.8	38.7	40.5	44.1	42.7	40	39.7	43.6	46	41.8	40.3	41.2	44.8	40.2
21	41.9	42.8	39.5	38	40.2	44.1	42.2	39.6	39.7	43	45.5	41.2	40.2	41.2	44.8	40.5
22	41.4	42.9	39.6	38.3	40.5	44.4	42.3	39.2	39.3	42.3	46.5	42.9	39.7	40.2	44.1	40.1
23	41.5	42.8	40	39	40.7	44.7	42.3	38.9	38.6	42.7	46.2	41.5	39	40	43.6	40.4
24	41.5	42.5	39.9	39.3	41	44.6	42.5	39.8	38.6	41.9	46.4	41.5	39.3	40.2	43.4	40.7
25	40.7	42.2	40.1	39.2	40.3	43.8	43.7	40.5	39.8	42.7	46.6	42.4	39.9	41.4	44.1	41.3
26	41.2	42.3	40.4	39.2	40.1	43.5	44.4	40.9	40.3	42.8	46.8	42.2	40.2	41	43.3	39.8
27	41.7	42.9	40.6	39.2	40.1	43.6	44.4	41.6	40.8	43.3	46.8	42.5	40.4	41.5	44.3	39.7
28	41.7	42.9	40.7	39	40	43.4	44.8	41.5	41.2	43.5	47	42.7	40.6	42.2	44.8	40.7
29	41.9	42.7	39.8	38.9	40.7	42.9	44.6	41.7	40.9	43.6	46.8	42.7	40.7	41.9	44.8	41.5
30	41.7	42.4	39.6	38.6	39.2	42.9	44.5	41.5	41.1	43.6	46.6	42	40.6	41.4	44.5	41.8
31	41.2	41.6	38.6	37.8	39.8	43.6	43.9	41.3	41.1	43.6	46	43	40.5	40.8	44.1	41.7
32	40.7	40.7	38.1	37.2	39.1	42.9	43.2	41	41	43.8	45.3	41	39.7	40.3	43.7	41.2
33	40.4	40.5	38.1	37.5	39.2	42.6	43	40.4	40.6	43.3	46.3	41.7	39.2	39.9	43.8	41.4
34	40.3	40.8	38.3	37.7	39	43.3	43.4	40.9	39.8	42.6	46.4	41.6	39	40.3	43.6	41.3
35	40.5	41.1	38.6	37.7	38.6	41.6	43.3	40.5	39.3	41.7	46	42.2	39	39.8	42.5	40.2
36	41	41.6	38.9	37.3	38.2	40.9	43.4	40.5	39.7	42.2	45.7	40.6	39	39.8	42.5	40.2
37	41.2	41.9	39.2	36.8	37	39.4	42.9	41	40.1	41.8	43.5	39.4	37.7	39.3	42.5	39.1
38	40.8	41.1	37.8	35.9	36.2	38.8	42	41.1	40.2	41.7	40.9	36.7	35.6	38.3	41.4	38.9
39	38.4	38.8	36.1	34.5	34.7	36.5	38.6	41.5	41.5	41.5	37.4	34.4	33.6	35.2	36.7	35.9
40	35	35.1	33.5	32.8	32.6	34.1	36.8	40.5	41	37.5	34.2	33.6	32.6	32.9	33.7	33.2

Room temperature [°C]	20.1
Inlet temperature [°C]	53.1
Return temperature [°C]	50.1
Ø – Surface temperature [°C]	40.0
Maximum temperature [°C]	47.0
Minimum temperature [°C]	25.2

Surface share with advantageous temperature (37 - 43°C)	68%
Surface share with optimum temperature (39 - 41°C)	30%
Coefficient of variation	0.102
Variance σ²	16.586
Standard deviation σ	4.073

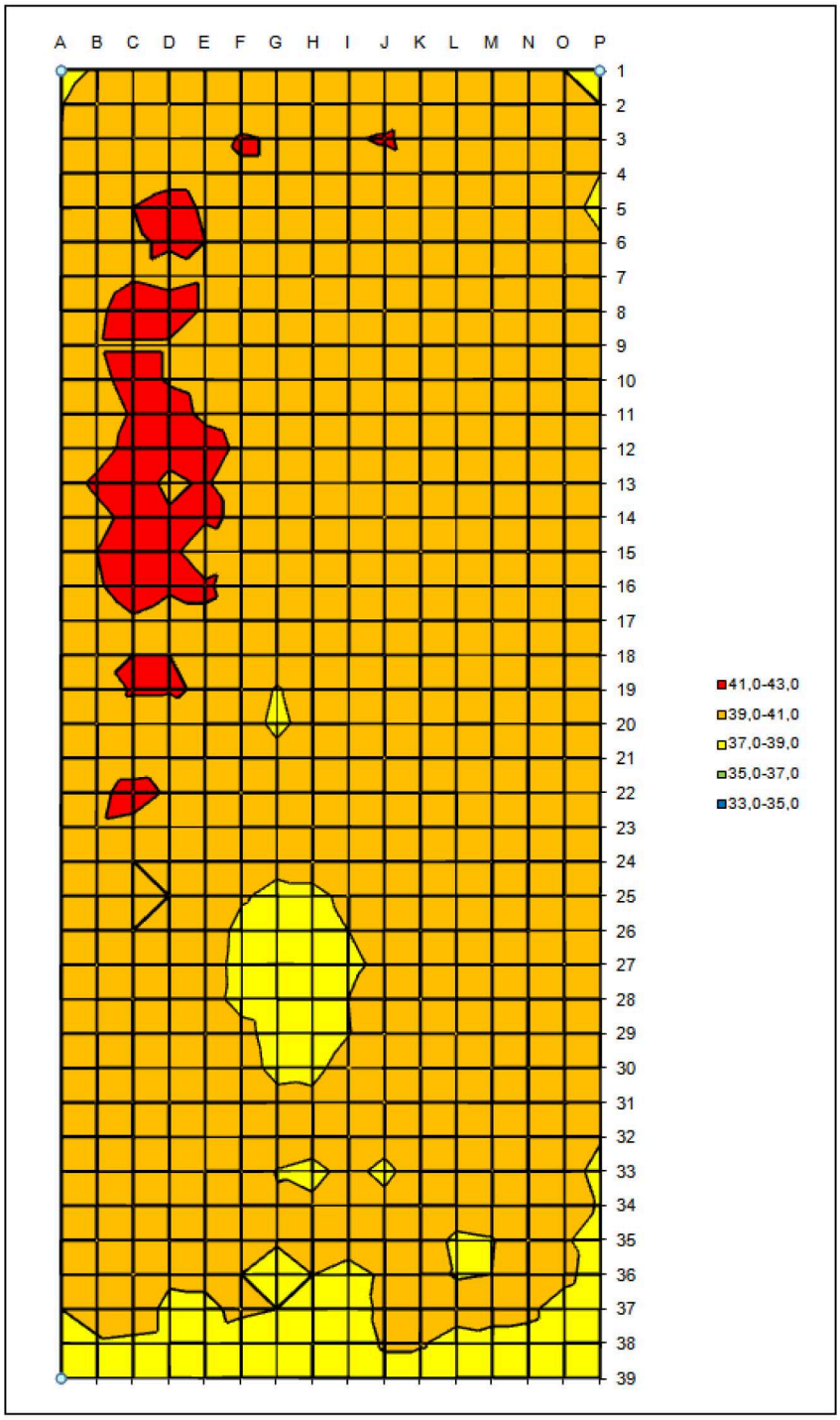
current consumption per panel	current consumption per m²	Cooling time approx.
224.8 Wh	390.3 Wh	1:45 h

Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany

Attachment 6

Warmth distribution on the Schonlau Bonus, 500 x 1200 mm, uninsulated



Compiler:
Ralph Teichert
Compilation date: 11.05.2009

Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany

Product Service

Warmth distribution on the Schonlau Bonus, 500 x 1200 mm, uninsulated.

Measured values:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	38.2	39.2	39.7	39.9	40.2	40.0	39.9	40.5	40.2	39.5	40.2	39.5	39.8	39.4	39.0	38.7
2	38.9	40.2	39.6	40.1	40.0	40.1	40.2	41.0	40.3	40.0	40.7	40.2	40.2	39.5	39.2	39.0
3	39.0	39.9	40.4	39.2	40.3	41.1	40.9	40.9	40.9	41.1	40.7	40.6	40.3	39.7	39.6	39.2
4	39.4	40.5	40.5	40.7	40.7	40.9	40.9	40.6	40.5	40.5	40.8	40.7	40.2	39.5	39.9	39.0
5	39.2	40.9	41.0	41.3	40.9	40.8	40.8	40.3	40.5	40.6	40.2	40.2	40.5	40.2	39.9	38.2
6	39.7	40.7	40.9	41.1	41.0	40.9	40.7	40.7	40.7	40.4	40.6	40.5	40.5	40.6	40.0	39.3
7	40.4	40.5	40.9	40.7	40.9	40.3	40.6	40.9	40.4	40.2	40.2	40.0	40.2	40.6	40.7	40.0
8	40.1	40.8	41.5	41.4	40.9	41.0	40.9	40.3	39.8	40.5	40.2	40.0	40.5	40.1	40.8	39.1
9	39.7	40.9	40.9	40.9	40.2	40.9	40.7	40.5	39.7	40.1	40.4	40.4	40.2	40.5	40.7	39.6
10	40.2	40.7	41.4	40.9	40.7	40.5	39.9	40.3	39.9	39.9	40.2	40.0	40.6	40.6	40.8	39.4
11	39.8	40.4	41.1	41.4	40.8	40.6	40.5	40.6	40.4	40.1	40.3	40.0	40.4	40.7	40.7	40.6
12	39.2	40.5	41.4	41.3	41.4	40.8	40.7	40.7	40.2	40.4	40.5	40.6	40.7	40.8	40.7	39.9
13	40.5	41.2	41.4	40.8	41.1	40.4	40.7	40.2	40.0	40.1	40.7	40.6	40.6	40.6	40.7	39.5
14	40.1	40.7	41.3	41.1	41.1	40.9	40.7	40.7	39.7	40.6	40.3	40.0	40.7	40.7	40.4	39.7
15	39.3	41.0	41.3	41.2	40.5	40.8	40.3	40.5	40.2	40.2	40.5	39.9	40.6	40.8	40.5	39.7
16	40.1	40.9	41.4	41.1	41.1	40.7	40.3	40.2	40.5	40.3	40.2	40.2	40.7	40.5	40.6	39.5
17	40.4	40.5	40.9	40.7	40.9	40.8	40.7	40.6	40.1	40.2	40.6	40.5	40.7	40.2	40.4	39.9
18	39.7	40.9	41.0	41.0	40.7	40.5	40.5	40.6	40.2	40.3	40.3	40.2	40.1	40.6	40.5	39.1
19	39.5	40.4	41.1	41.1	40.9	40.8	38.7	40.4	39.7	40.3	40.5	40.4	40.7	40.8	40.6	39.7
20	39.1	40.6	40.5	40.0	40.7	40.5	38.2	40.2	39.9	40.0	40.0	40.1	40.4	40.2	40.5	39.9
21	40.2	40.5	40.5	40.6	40.8	40.5	39.9	39.9	39.9	40.4	40.2	40.2	40.6	40.6	40.6	39.6
22	39.4	40.8	41.3	40.9	40.7	41.0	40.3	40.0	39.5	40.0	40.3	40.2	39.9	40.4	39.7	39.4
23	39.7	40.9	40.8	40.2	40.2	40.4	39.8	40.3	39.5	39.7	40.2	40.4	40.5	40.5	40.2	40.1
24	40.1	40.4	41.0	40.9	40.6	40.2	39.8	40.3	39.4	40.0	40.2	39.7	40.5	40.6	40.5	39.9
25	40.2	40.5	40.8	41.0	40.6	39.3	38.2	38.2	39.7	39.7	40.2	39.7	40.2	40.3	40.4	39.1
26	40.2	40.7	41.0	40.8	40.5	38.2	37.6	37.8	39.0	39.2	40.2	40.0	40.0	40.2	39.7	39.5
27	40.1	40.9	40.8	40.6	40.2	38.1	37.3	37.8	38.6	39.4	39.9	40.0	40.2	39.9	40.3	39.6
28	39.9	40.2	40.9	40.5	39.9	38.2	37.8	37.8	39.0	40.0	40.3	39.9	40.2	40.3	40.3	39.0
29	40.4	40.7	40.7	40.7	40.6	39.7	38.0	37.6	38.9	40.1	39.9	40.2	40.0	40.0	39.9	39.5
30	39.2	40.7	40.6	39.5	40.2	40.1	38.2	38.4	39.9	38.9	40.2	39.7	40.3	40.3	39.6	39.2
31	40.0	40.7	40.9	40.9	40.5	40.2	39.8	39.5	39.4	40.1	39.9	39.8	40.1	40.2	40.0	39.2
32	40.1	40.5	40.7	40.3	39.4	39.9	39.9	39.8	39.9	39.7	39.9	39.9	39.7	40.2	39.8	39.1
33	39.2	40.2	40.2	39.6	40.0	40.0	38.9	38.5	39.5	38.5	39.9	40.0	40.2	40.1	39.5	38.6
34	39.2	39.7	40.1	39.9	39.7	39.7	39.2	39.3	39.0	39.5	40.0	39.8	39.7	39.9	39.5	38.9
35	39.2	39.9	39.7	39.8	39.6	39.0	39.1	39.4	39.6	39.7	39.7	38.7	38.9	40.0	39.4	37.3
36	39.4	39.3	40.0	39.2	39.2	39.0	38.5	39.0	38.5	39.2	39.4	38.9	39.0	39.5	39.3	38.4
37	39.0	39.3	39.6	38.7	38.8	39.2	39.0	38.7	38.3	39.3	39.4	39.5	39.3	39.2	38.5	38.2
38	38.4	38.9	38.8	38.7	38.7	38.4	37.3	38.7	38.4	39.1	39.1	38.5	38.7	38.7	38.5	38.2
39	37.6	38.0	37.8	37.8	38.4	38.3	37.9	38.5	38.4	38.7	38.3	38.4	38.7	38.3	38.0	37.3

Room temperature [°C]	20.1
Inlet temperature [°C]	48.0
Return temperature [°C]	46.4
Ø – Surface temperature [°C]	40.0
Maximum temperature [°C]	41.5
Minimum temperature [°C]	37.3

Surface share with advantageous temperature (37 - 43°C)	100%
Surface share with optimum temperature (39 - 41°C)	82%
Coefficient of variation	0.020
Variance σ²	0.663
Standard deviation σ	0.814

current consumption per panel	current consumption per m²	Cooling time approx.
289.6 Wh	482.7 Wh	2:08 h

Phone: + 49 6196 9601-60
Fax: + 49 6196 9601-63
E-Mail: ralph.teichert@tuev-sued.de

TÜV SÜD Product Service GmbH
Branch Frankfurt
Mergenthalerallee 27
65760 Eschborn Germany