

FISA TEHNICA



PANOU RADIANT

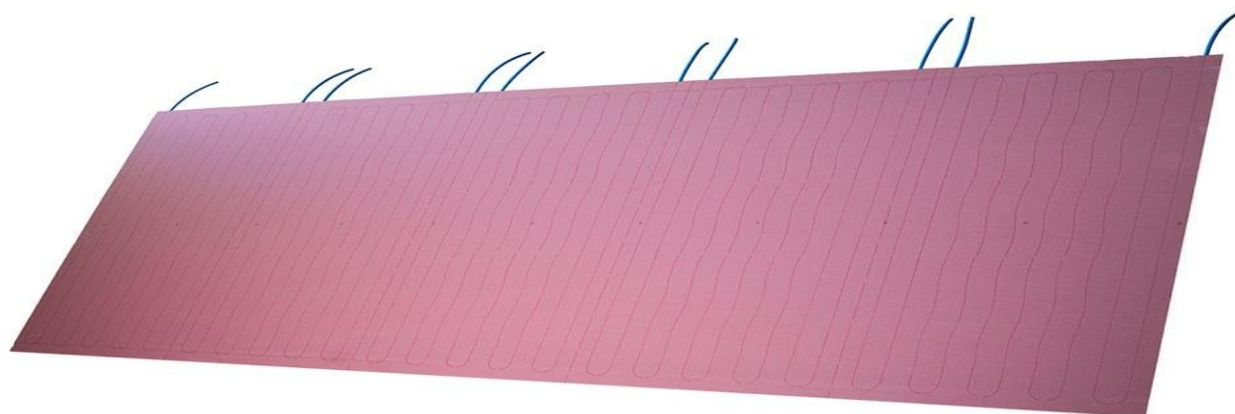
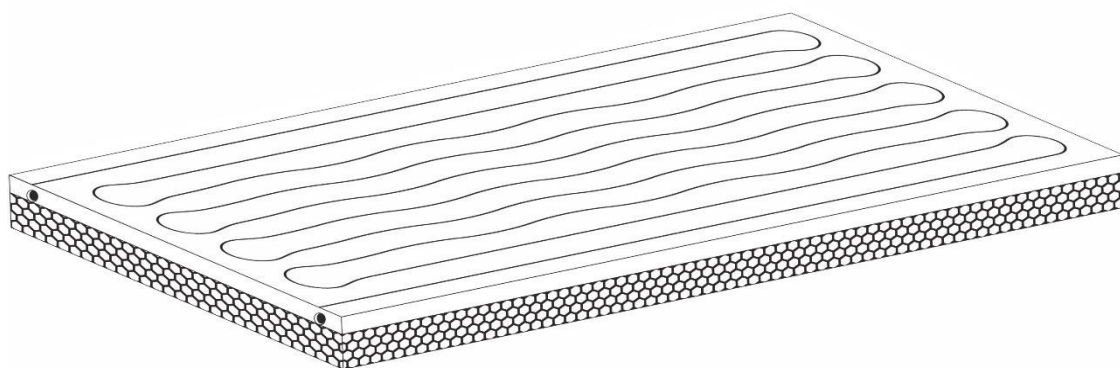
PANEL APA R20/22



PANOU RADIANT CU APA PREFABRICAT DIN GIPS-CARTON IGNIFUGAT PENTRU INCALZIRE/RACIRE RADIANTA PRIN TAVAN SI PRIN PERETE

PANEL APA R20/22

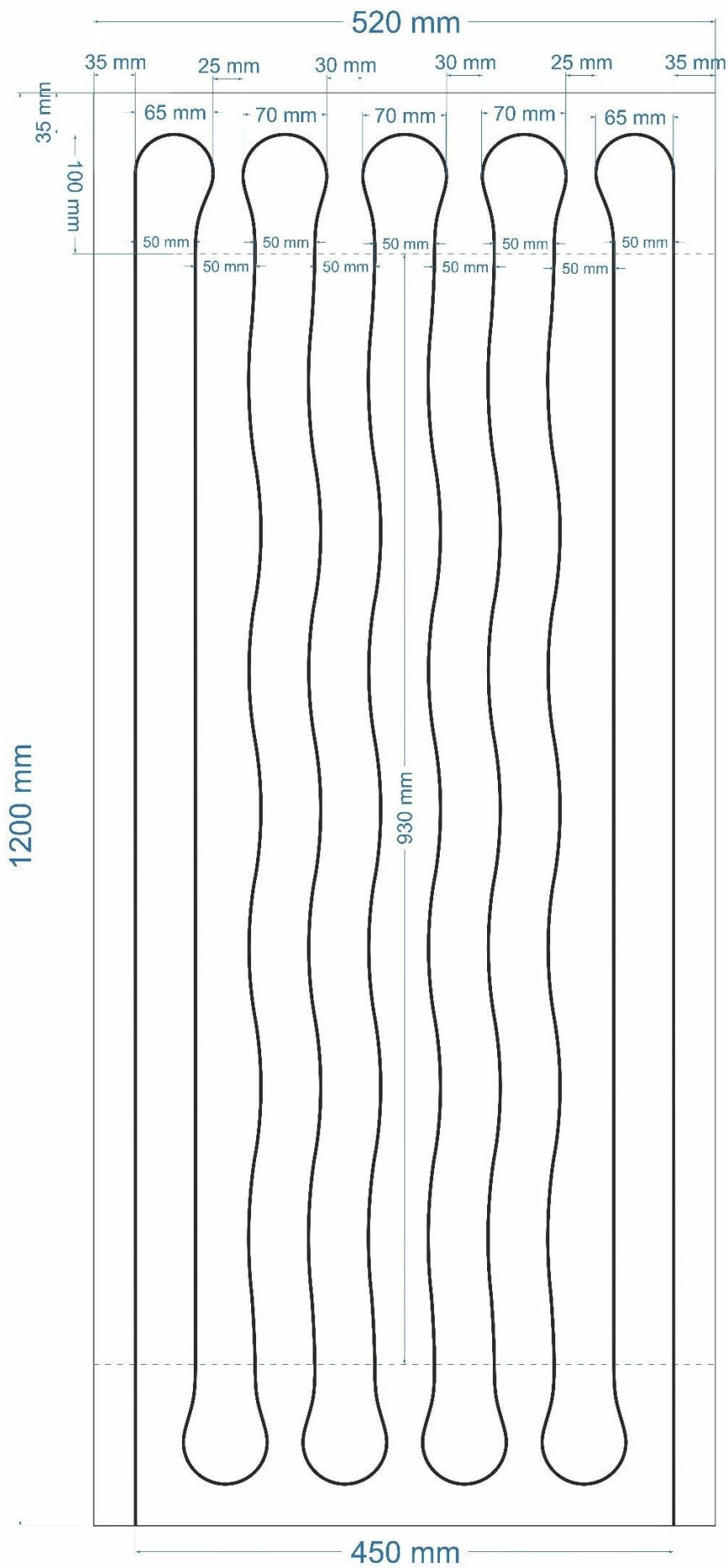
Panoul radiant prefabricat alcatuit dintr-o placa de gips-carton ignifuga, grosime 15 mm, ce contine un circuit de tip spirala cu teava PE-XC $\varnothing 8*1$ (cu bariera de oxigen pozitionata la 50 mm distanta una de cealalta) si o placa de polistiren grosime 27 mm cu densitatea de 26 kg/mc. Suprafata panoului radiant are o buna rezistenta mecanica, rezistenta la umiditate si antiincendiu.

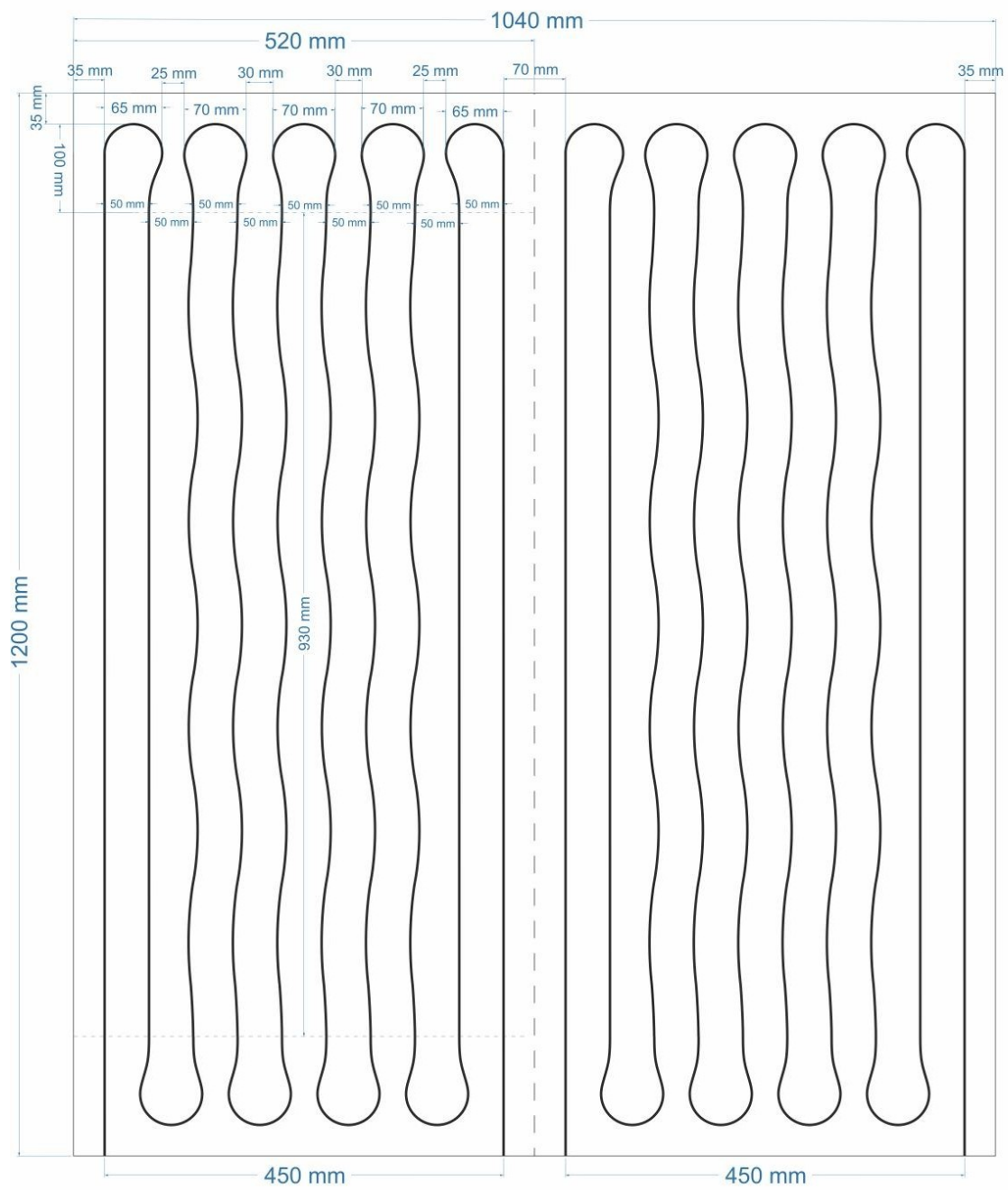


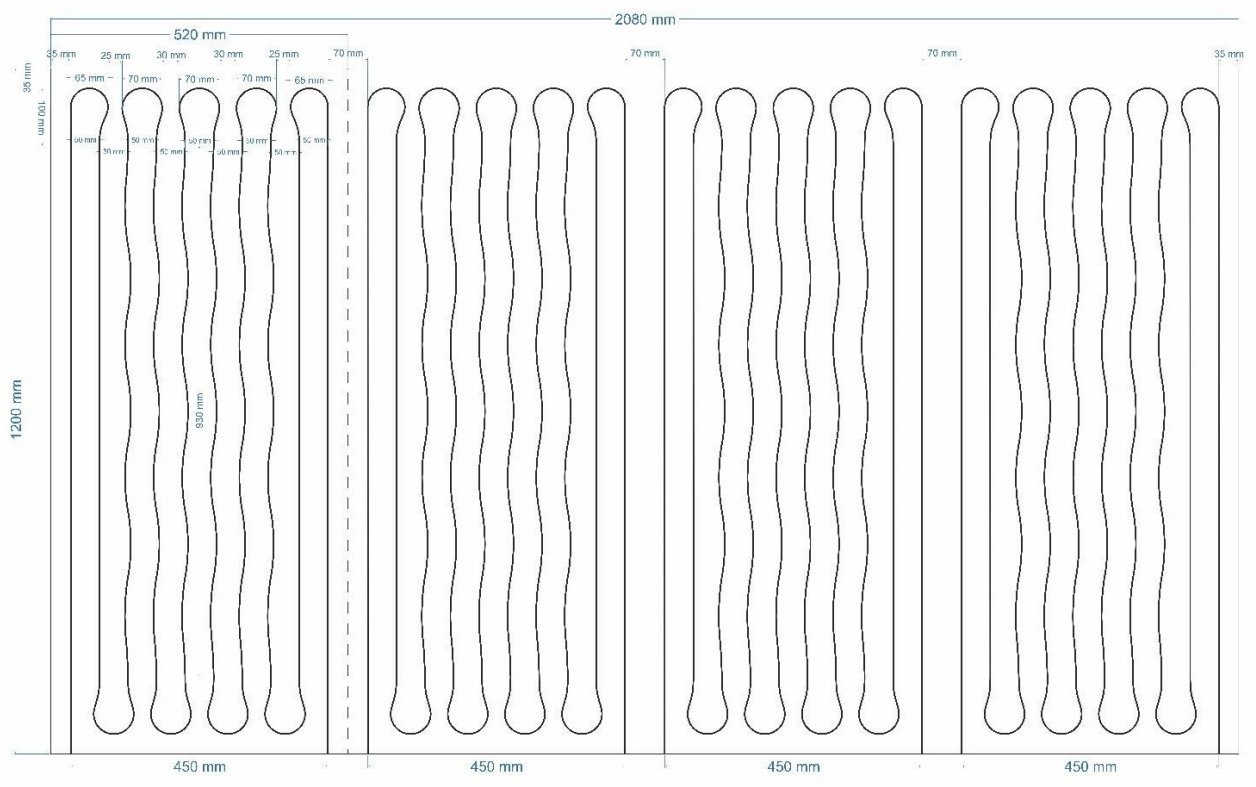
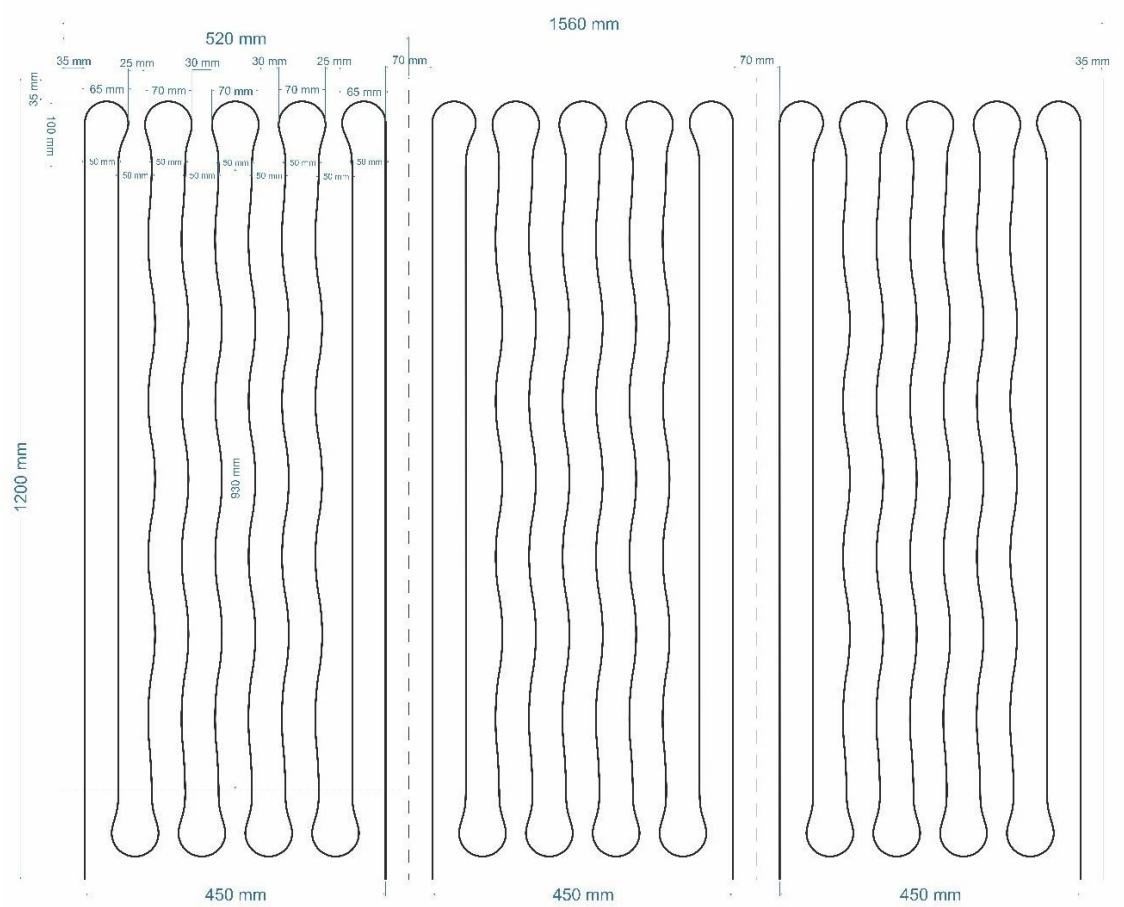
DOMENIUL DE APLICARE	
REZIDENTIALE SI NEREZIDENTIALE	TIPUL MONTARII
Case noi si in faza de renovare	Tavan
Case din lemn	Perete
Case pasive	
Case pe structura metalica	
Apartamente noi si in faza de renovare	
Birouri	
Scoli	
Spitale	

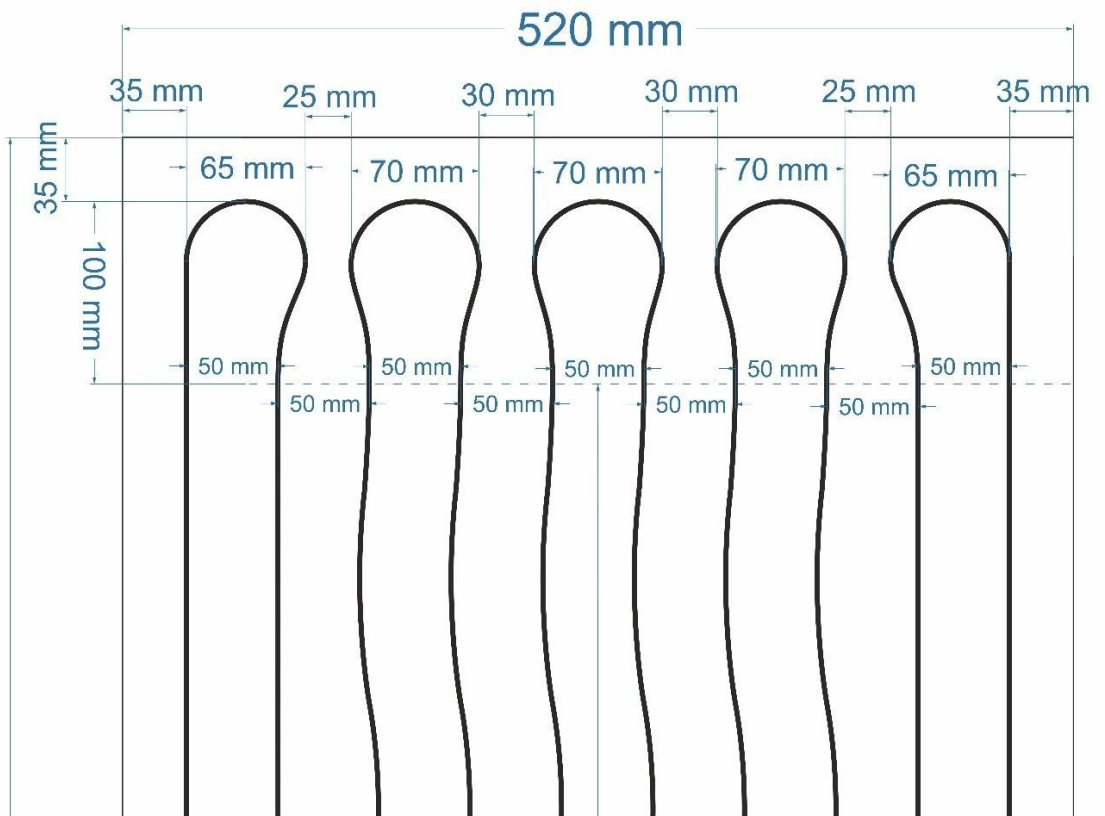
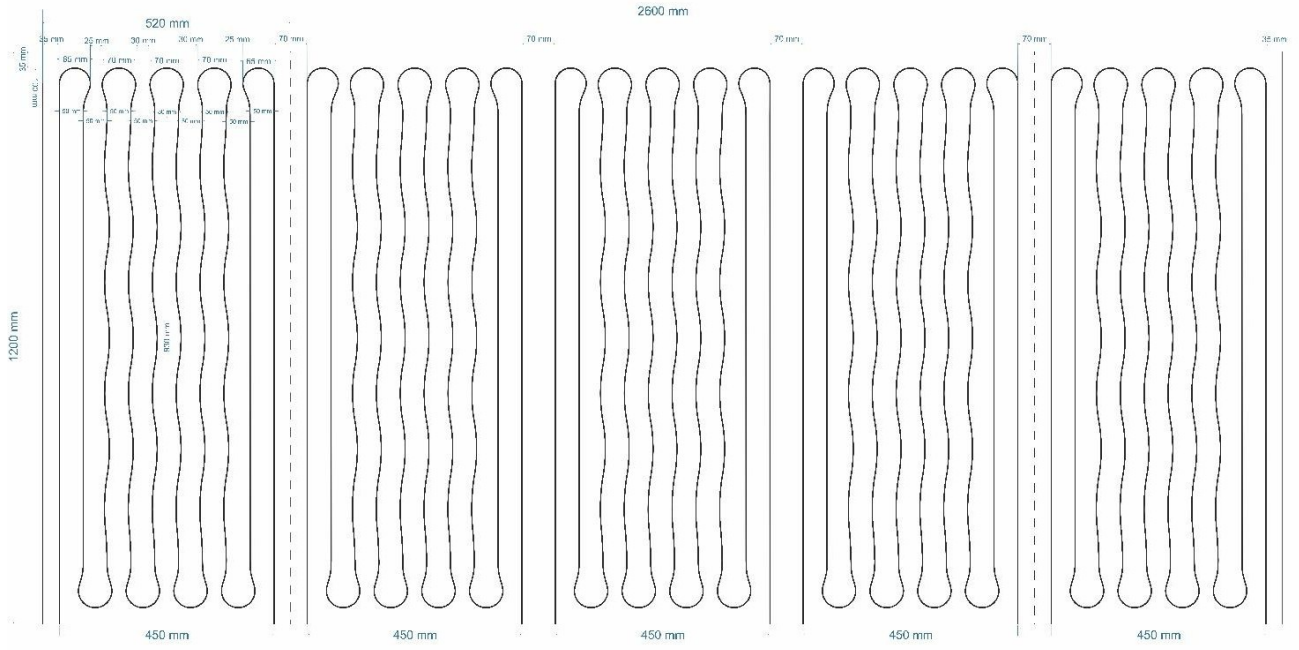
<u>Panou radiant APA R20/22</u>	
<u>Dimensiuni externe</u>	<u>2600X1200X42</u>
<u>GROSIME TOTALA</u>	<u>42 mm</u>
<u>GROSIME PLACA GIPS-CARTON</u>	<u>15 mm</u>
<u>GROSIME POLISTIREN</u>	<u>27 mm ESP200</u>
<u>CONDUCTIVITATE TERMICA PLACA DE GIPS-CARTON</u>	<u>W/MK 0,3</u>
<u>CONDUCTIVITATE TERMICA IZOLAMENT</u>	<u>W/MK 0.33</u>
<u>CLASA DE REACTIE LA FOC</u>	<u>A1</u>
<u>DIAMETRU TEAVA</u>	<u>8*1 mm</u>
<u>MATERIAL TEAVA</u>	<u>PE-XC cu bariera de oxigen</u>
<u>DISTANTA DE MONTAJ</u>	<u>50mm</u>
<u>TIP CIRCUIT</u>	<u>Serpuit</u>
<u>TOLERANTA</u>	<u>± 0,5</u>
<u>TEMPERATURA DE FUNCTIONARE</u>	<u>Incalzire 25-32 °C Racire 14-20 °C</u>

Lungime (mm)	Latime (mm)	Grosime (mm)	Greutate (kg)	Lungime circuit (mt)	continut apa (ml)	Suprafata (mP)
1200	2600	42	41	60	1,90	3.12
1200	2080	42	32.80	48	1,52	2.49
1200	1650	42	24.60	36	1,14	1.87
1200	1040	42	16.4	24	0,76	1.24
1200	520	42	8.20	12	0,38	0.62









TEST REPORT pentru determinarea capacitatii de incalzire a suprafetelor calde pentru incaperi in
conformitate cu EN 14240



21.58.CIO.002/A1

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7. Test results

The values presented in this test report are rounding values based on exact measured values. Hence, in case of any recalculation using these values, the results can differ from the data given in this test report.

All test results relate only to the items tested.

Graphic characteristics are located on pages 6 and 7, the measurement protocol is shown on page 8.

Characteristic equation of thermal output related to active area:

$$\Phi_L = k \cdot \Delta T^n \text{ [W/m}^2\text{]}$$


Coefficient $k = 3,591$

Exponent $n = 1,067$

Standard thermal output related to active area at $\Delta T = 15 \text{ K}$:

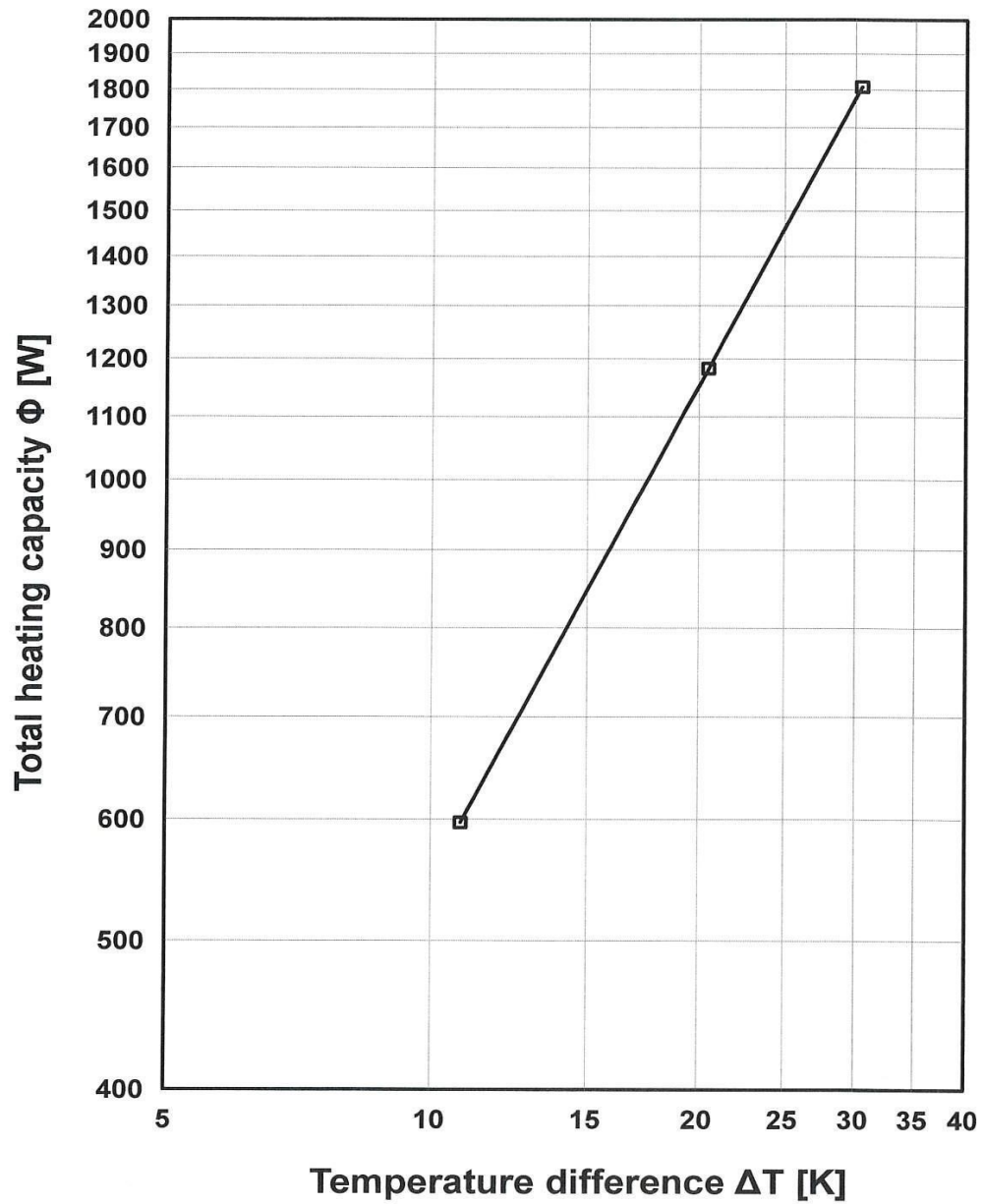
$$\Phi_L = 64,6 \text{ W/m}^2$$

Stuttgart, 08.02.2022

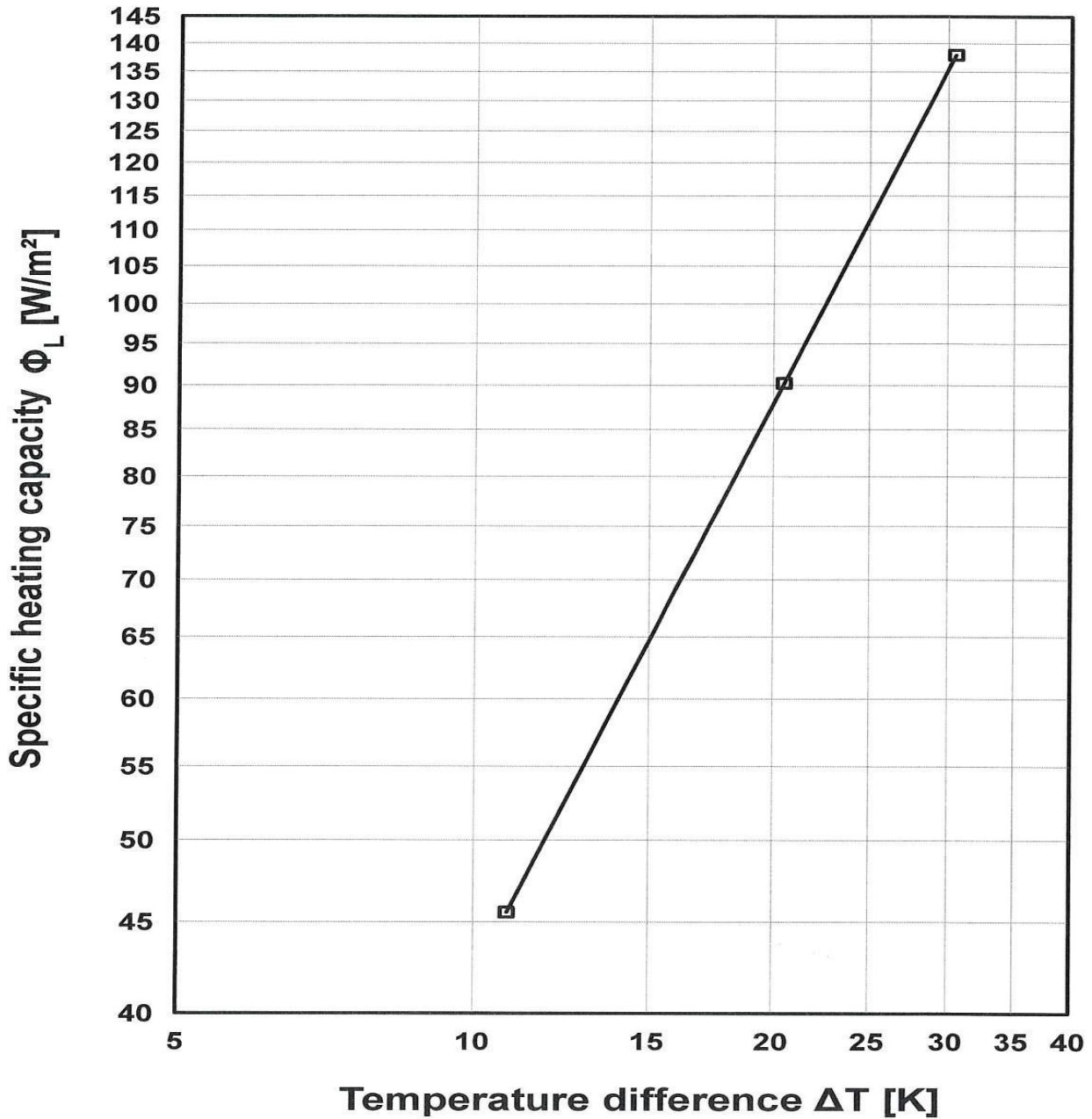

.....
Dipl.-Ing. (BA) Thomas Haase
(Technical Manager of the Laboratory)


.....
M. Sc. Andrea Heindl
(Test Manager)

Characteristic equation of thermal output:



Characteristic equation of specific thermal output, related to active area:



8. Measurement protocol

Results of test					
	Symbol	Unit	Measuring point		
			1	2	3
Date of measurement			24.11.2021	24.11.2021	25.11.2021
Air pressure	p	kPa	98,60	98,31	97,83
Reference room temperature	t _{ref}	°C	20,01	20,01	19,99
Inlet water temperature	t ₁	°C	42,48	31,81	53,52
Outlet water temperature	t ₂	°C	38,55	29,83	47,52
Water temperature drop	t ₁ - t ₂	K	3,93	1,98	6,00
Inlet water enthalpy	h ₁	kJ/kg	177,85	133,26	224,01
Outlet water enthalpy	h ₂	kJ/kg	161,42	124,97	198,93
Enthalpy difference	h ₁ - h ₂	kJ/kg	16,43	8,29	25,08
Mean water temperature	t _m	°C	40,51	30,82	50,52
Temperature difference	ΔT	K	20,51	10,81	30,53
Water flow rate	q _m	kg/h	258,1	258,1	258,2
Measured thermal output	Φ _{me}	W	1178,0	594,5	1798,8
Output corrected for barometric pressure*	Φ	W	1182,5	597,0	1807,7
Thermal output related to active surface	Φ _L	W/m ²	90,2	45,6	138,0
Control temperatures					
	Unit	Measuring point			
		1	2	3	
Air temperature 0,25 m above floor	°C	19,1	19,5	18,6	
Air temperature 0,75 m above floor	°C	19,3	19,6	19,0	
Air temperature 1,7 m above floor	°C	20,2	20,1	20,2	
Air temperature in the void	°C	32,2	26,5	38,3	
Surface temperature wall 1	°C	18,3	19,1	17,6	
Surface temperature wall 2	°C	18,3	19,1	17,6	
Surface temperature wall 3	°C	18,4	19,1	17,7	
Surface temperature wall 4	°C	18,3	19,1	17,6	
Surface temperature wall 5 (floor)	°C	18,5	19,1	17,8	
Surface temperature wall 6 (ceiling)	°C	18,2	19,0	17,5	

* $\Phi = \Phi_{me} \cdot (0,65 + 0,35 \cdot (101,325/p)^{0,4})$



21.58.CIO.001

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7. Test results

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All test results relate only to the items tested.

Graphic characteristics are located on pages 6 and 7, the measurement protocol is shown on page 8.

Characteristic equation of cooling capacity related to active area at nominal cooling water flow rate:

$$P_a = k \cdot \Delta\theta^n \text{ [W/m}^2\text{]}$$

Coefficient $k = 5,381$

Exponent $n = 1,029$

Nominal cooling capacity related to active area at $\Delta\theta_N = 8 \text{ K}$ and nominal cooling water flow rate:

$$P_a = 45,7 \text{ W/m}^2$$

Stuttgart, 06.12.2021

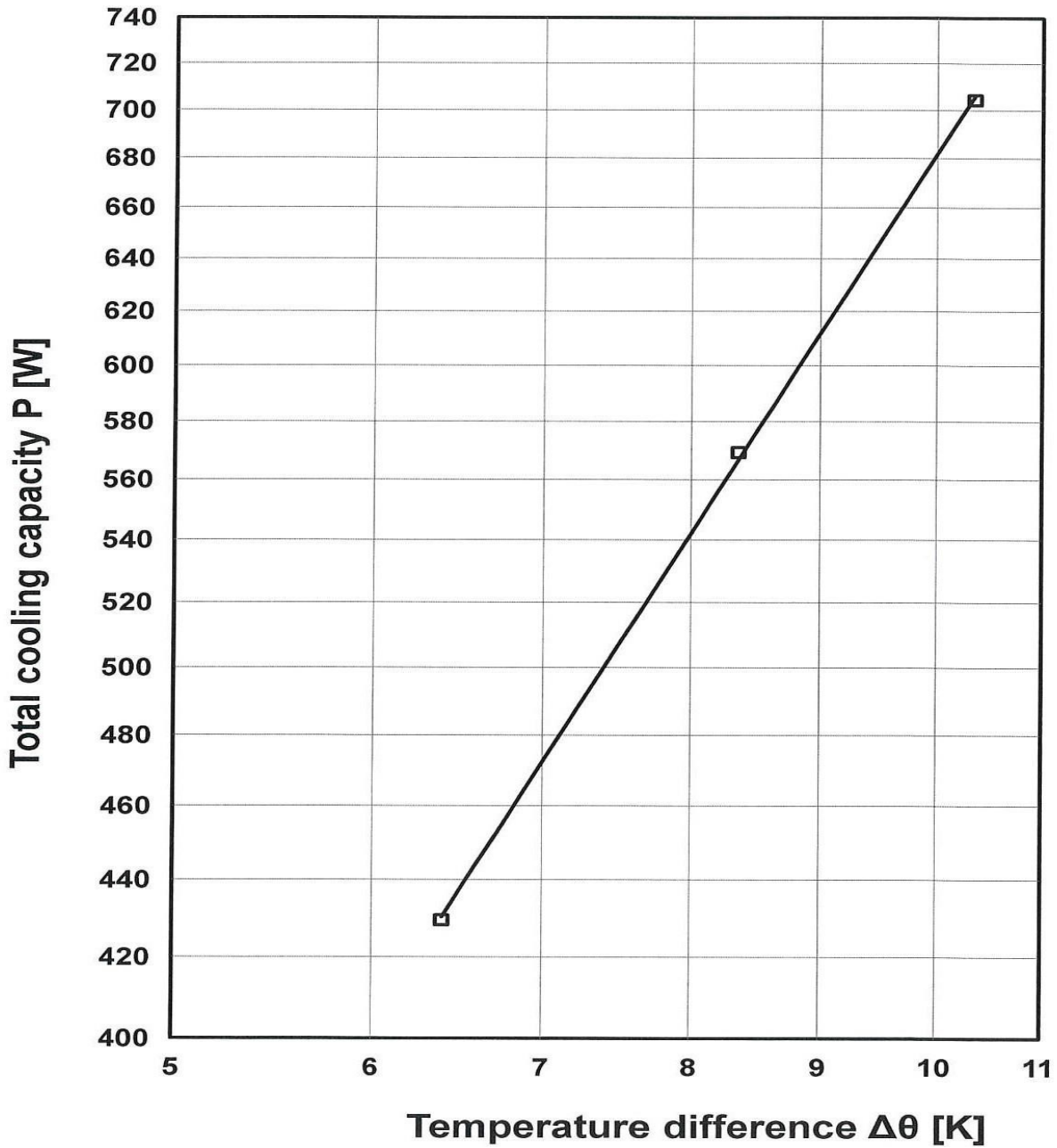
Handwritten signature of Thomas Haase in blue ink, positioned above a horizontal dotted line.

Dipl.-Ing. (BA) Thomas Haase
(Technical Manager of the Laboratory)

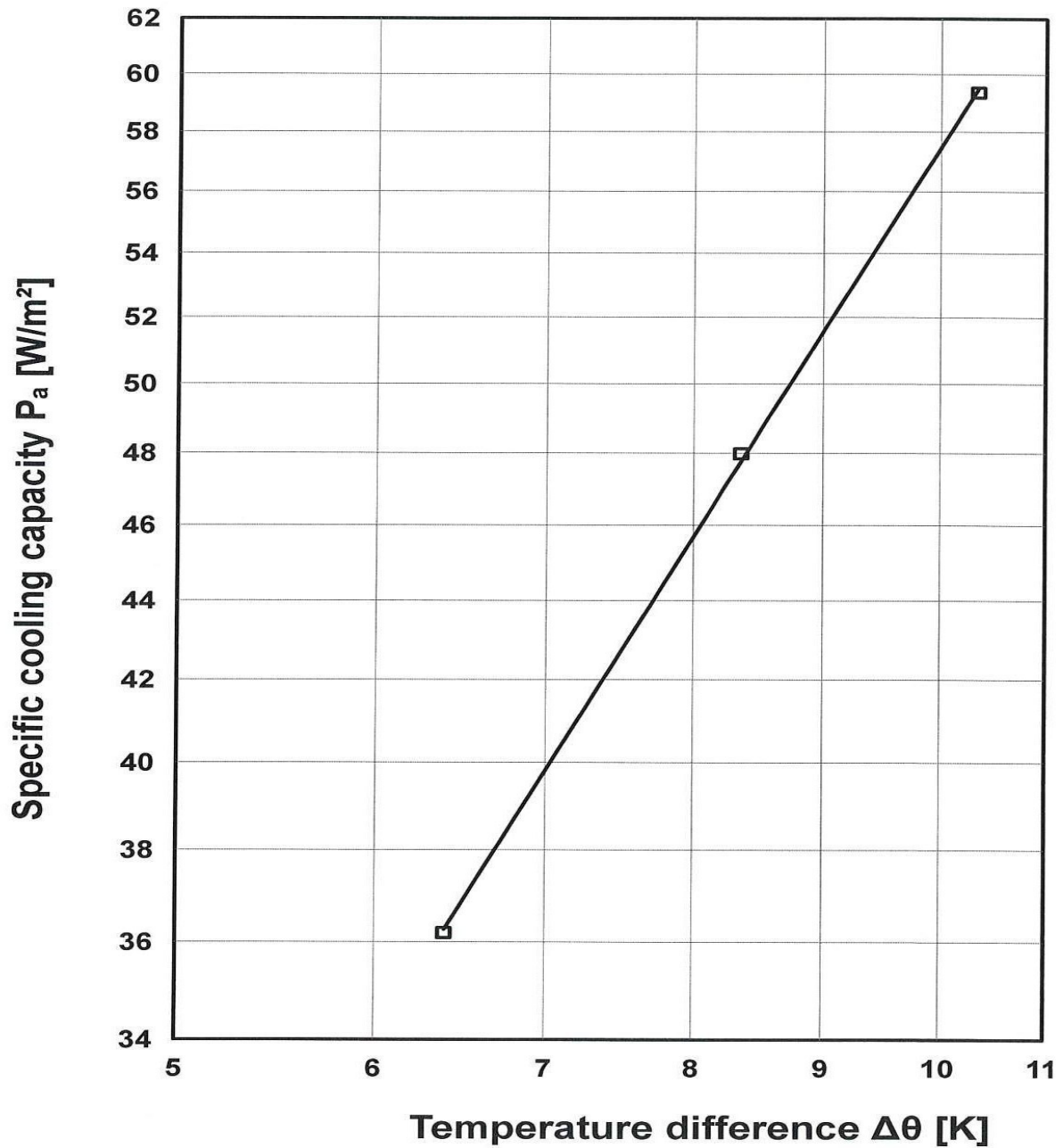
Handwritten signature of Andrea Heindl in blue ink, positioned above a horizontal dotted line.

M. Sc. Andrea Heindl
(Test Manager)

Characteristic equation of cooling capacity:



Characteristic equation of specific cooling capacity, related to active area:



8. Measurement protocol

Results of measurements					
Number of measuring point			1	2	3
Date of measurement			23.11.2021	23.11.2021	24.11.2021
Cooling water flow rate [kg/h]		q_w	233,6	233,5	233,4
Temperatures [°C]	Water inlet	θ_{w1}	16,66	18,92	14,45
	Water outlet	θ_{w2}	18,76	20,50	17,04
	Globe	θ_g	26,07	26,10	26,09
	Air - 1,7 m	$\theta_{a1,7}$	26,3	26,3	26,3
	Air - 1,1 m	$\theta_{a1,1}$	26,4	26,3	26,4
	Air - 0,1 m	$\theta_{a0,1}$	26,3	26,3	26,4
	Surface wall 1	θ_{sw1}	26,2	26,2	26,1
	Surface wall 2	θ_{sw2}	26,2	26,2	26,2
	Surface wall 3	θ_{sw3}	26,2	26,2	26,2
	Surface wall 4	θ_{sw4}	26,2	26,2	26,2
	Surface inside floor	θ_{floor}	26,1	26,1	26,1
	Surface inside ceiling	$\theta_{ceiling}$	26,1	26,1	26,1
	Air - void	θ_{a-void}	21,7	22,6	20,8
Heating capacity - dummies [W]		P_s	554,0	411,0	687,0
Calculations from measurements					
Number of measuring point			1	2	3
Reference temperature [°C]		θ_{ref}	26,07	26,10	26,09
$\Delta\theta$ [K]	Water temperature rise	$\Delta\theta_w$	2,10	1,58	2,59
	Reference mean water	$\Delta\theta$	8,35	6,39	10,34
Cooling capacity	Specific - test room area [W/m ²]	P_t	38,7	29,2	47,9
	Specific - installation area [W/m ²]	P_i	40,6	30,6	50,3
	Specific - active area [W/m ²]	P_a	48,0	36,2	59,4
	Total [W]	P	569,2	429,4	704,2
Heat transfer/ test room periphery [W]		P_B	22,2	17,3	25,2
Heat balance [W]		ΔQ	6,9	-1,2	7,9
Heat balance maximum value [W]		$0,05 \cdot P$	+/- 28,5	+/- 21,5	+/- 35,2

TEST REPORT pentru determinarea capacitatii de incalzire /racire a suprafetelor calde/reci
in conformitate cu EN 14240

Incalzire/racire prin tavan
Panou radiant cu apa din gips-carton

Panoul radiant cu apa din gips-carton, teava PE-XC Ø 8*1 mm distanta de montaj intre tevi: 50 mm.

Test report

Nr: 21.58.CIO.002/A02 - INCALZIRE

Randament termic - incalzire

Temperatura in tur al panoului radiant	W/m ²	
8k (28°C)	33,02	
9K (29°C)	37,44	
10K (30°C)	41,90	
11K (31°C)	46,38	
12K (32°C)	50,89	
13K (33°C)	55,43	
14K (34°C)	59,99	
15K (35°C)	64,50	
16K (36°C)	69,18	
17K (37°C)	73,80	
18K (38°C)	78,44	
19K (39°C)	83,10	
20K (40°C)	87,78	
21K (41°C)	92,47	
22K (42°C)	97,18	
23K (43°C)	101,90	
24K (44°C)	106,63	

Capacitate nominala: 64,6 W/m² (Δt: 15K)

(raportul suprafetei active: 100%; suprafata activa: 14,01m²)

Test report

Nr: 21.58.CIO.001/A01 - RACIRE

Randament termic – răcire

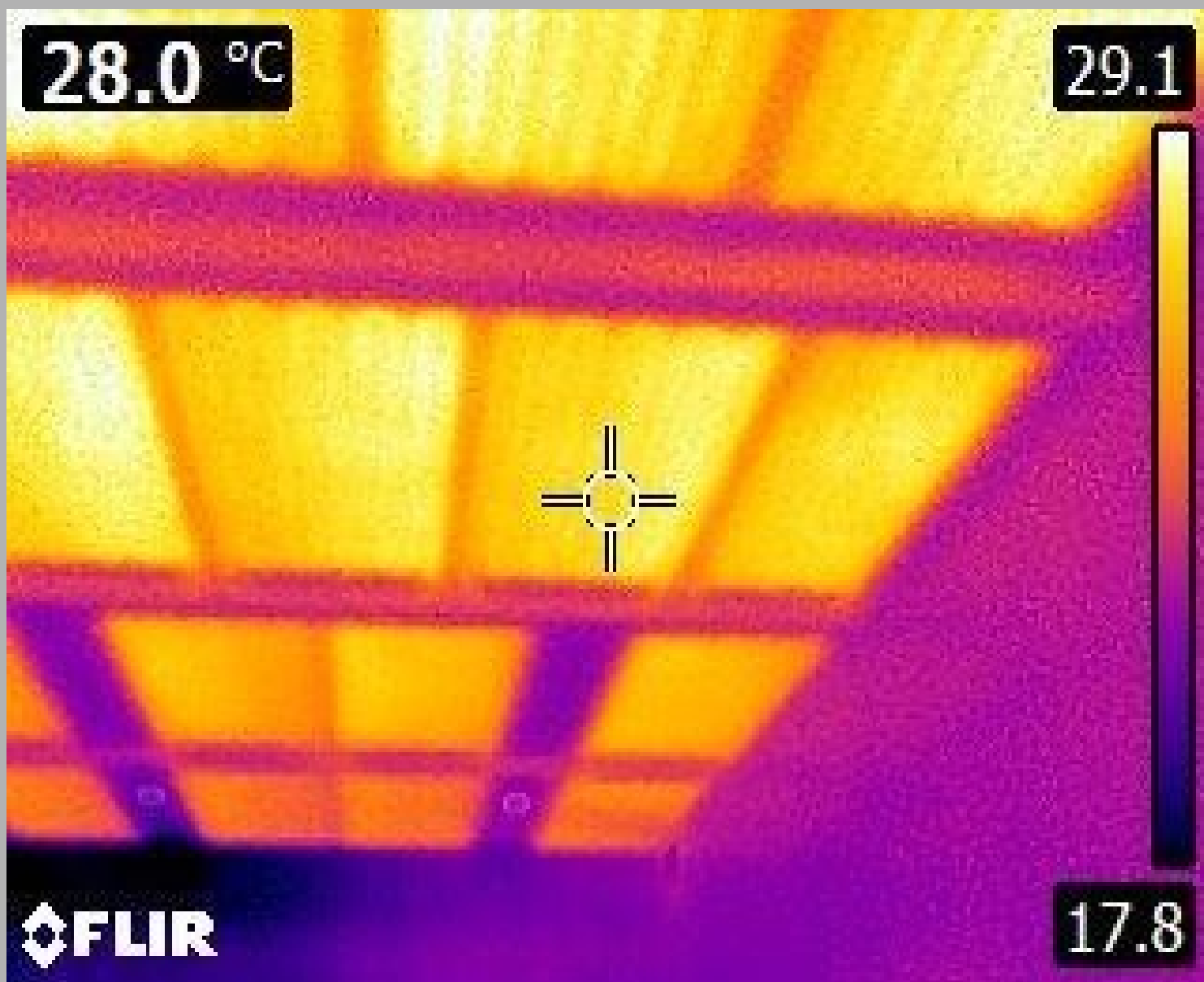
Temperatura in tur al panoului radiant	W/m ²	
12k (14°C)	69,39	
11K (15°C)	63,45	
10K (16°C)	57,52	
9K (17°C)	51,61	
8K (18°C)	45,72	
7K (19°C)	39,85	
6K (20°C)	34	
5K (21°C)	28,19	
4K (22°C)	22,40	

Capacitate nominala: 45,7 W/m² (Δt : 8K)

(raportul suprafetei active: 100%; suprafata activa: 14,01m²)

Panelradiant S.R.L.

ORADEA (BH)



Panelradiant S.R.L.
Str. Principatele Unite, nr. 18, Oradea, Romania
tel: +39 3291660693
+40 744956730
e-mail: panouriradianteapa@gmail.com
web: www.panelradiant.ro

