

# SCHEDA TECNICA



## PANNELLO RADIANTE

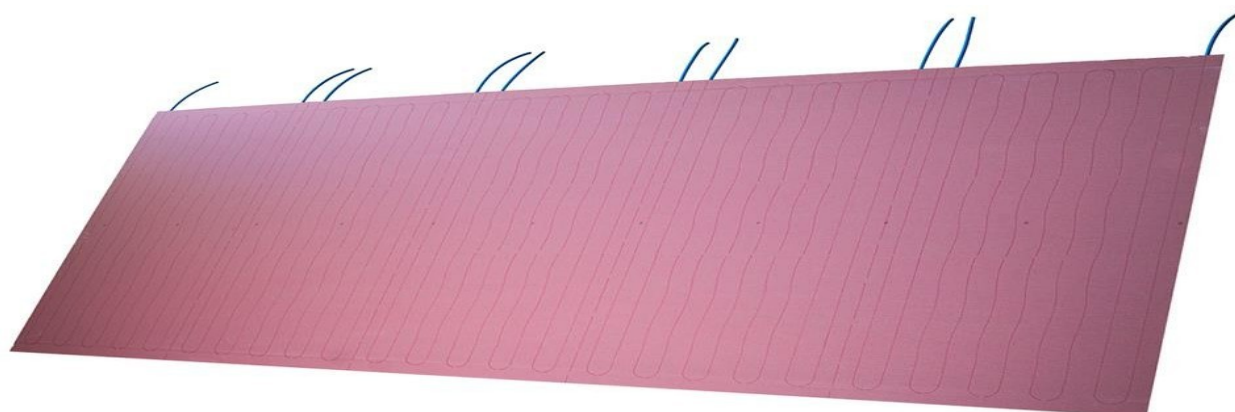
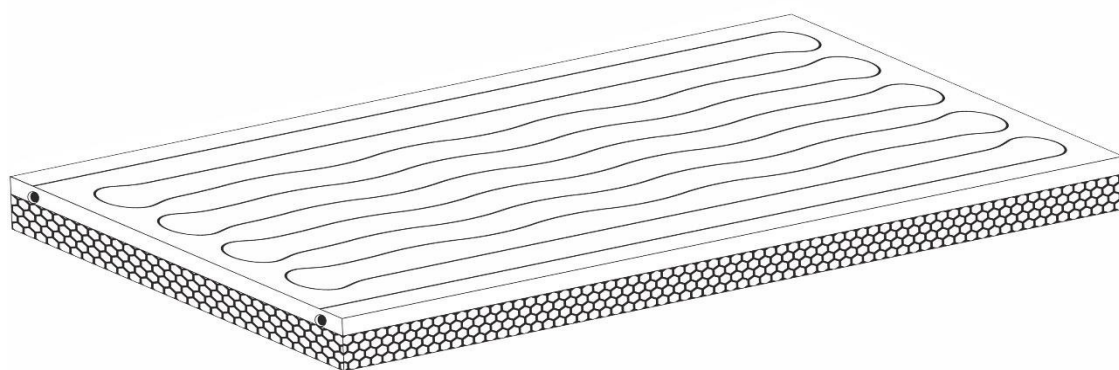
### PANEL APA R20/22



PANNELLO RADIANTE AD ACQUA PREFABBRICATO IN CARTONGESSO IGNIFUGO PER  
RISCALDAMENTO/RAFFRESCAMENTO RADIANTE A SOFFITTO E A PARETE

**PANEL APA R20/22**

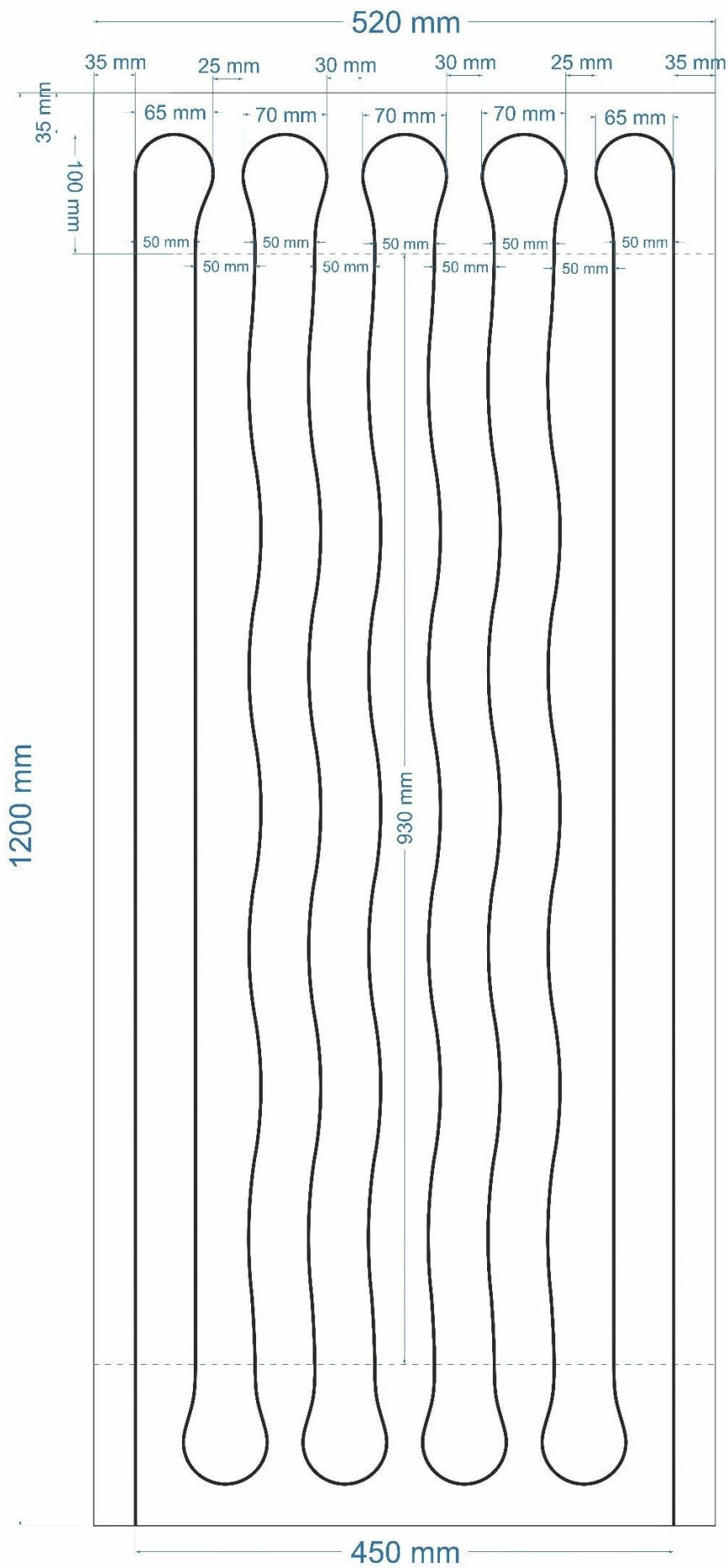
Il pannello radiante prefabbricato costituito da una lastra in cartongesso ignifugo di spessore 15 mm, che contiene un circuito del tipo a spirale con tubo in PE-XC Ø 8\*1 (con barriera ossigeno posizionata a distanza di 50 mm l'una dall'altra) e un pannello in polistirene di spessore 27 mm con densità di 26 kg/m<sup>3</sup>. La superficie del pannello radiante presenta buona resistenza meccanica, resistenza all'umidità e resistenza al fuoco.

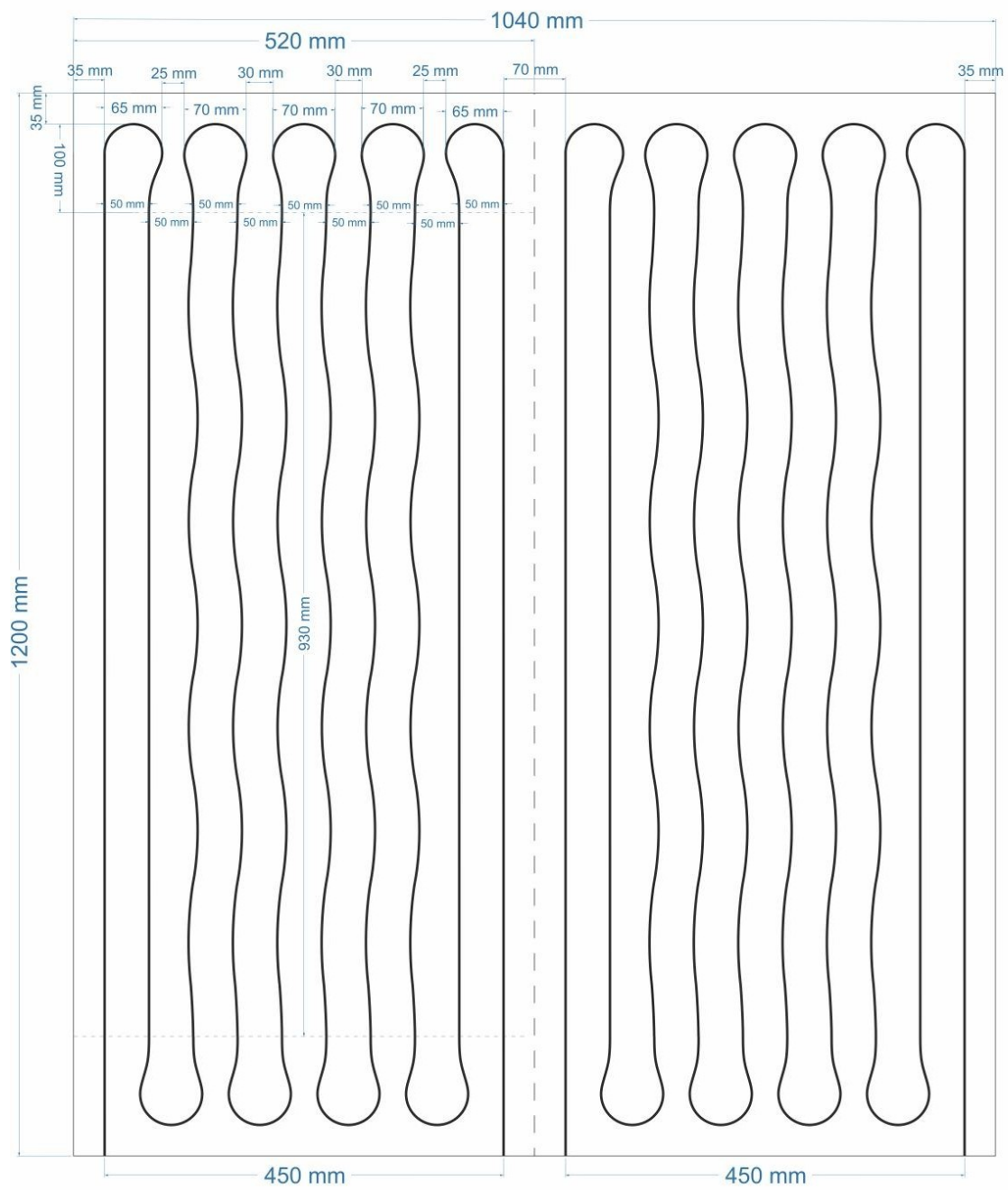


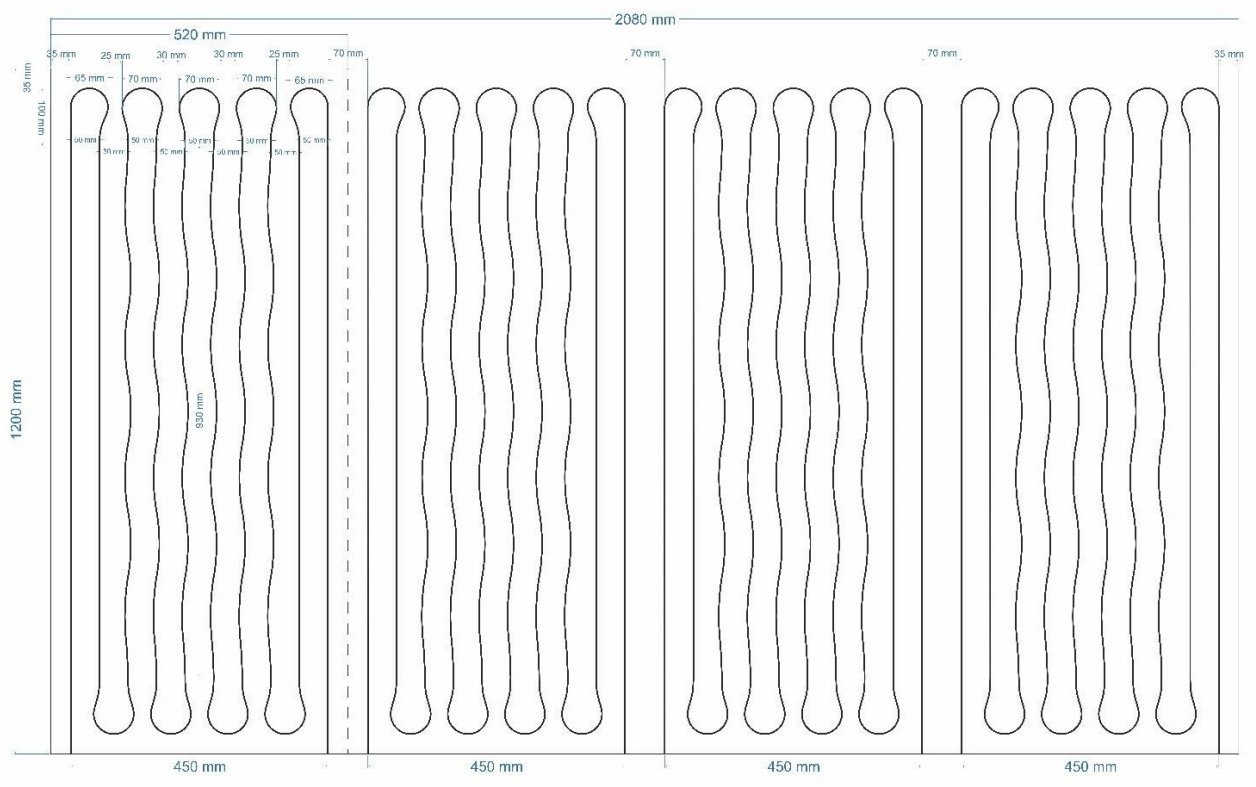
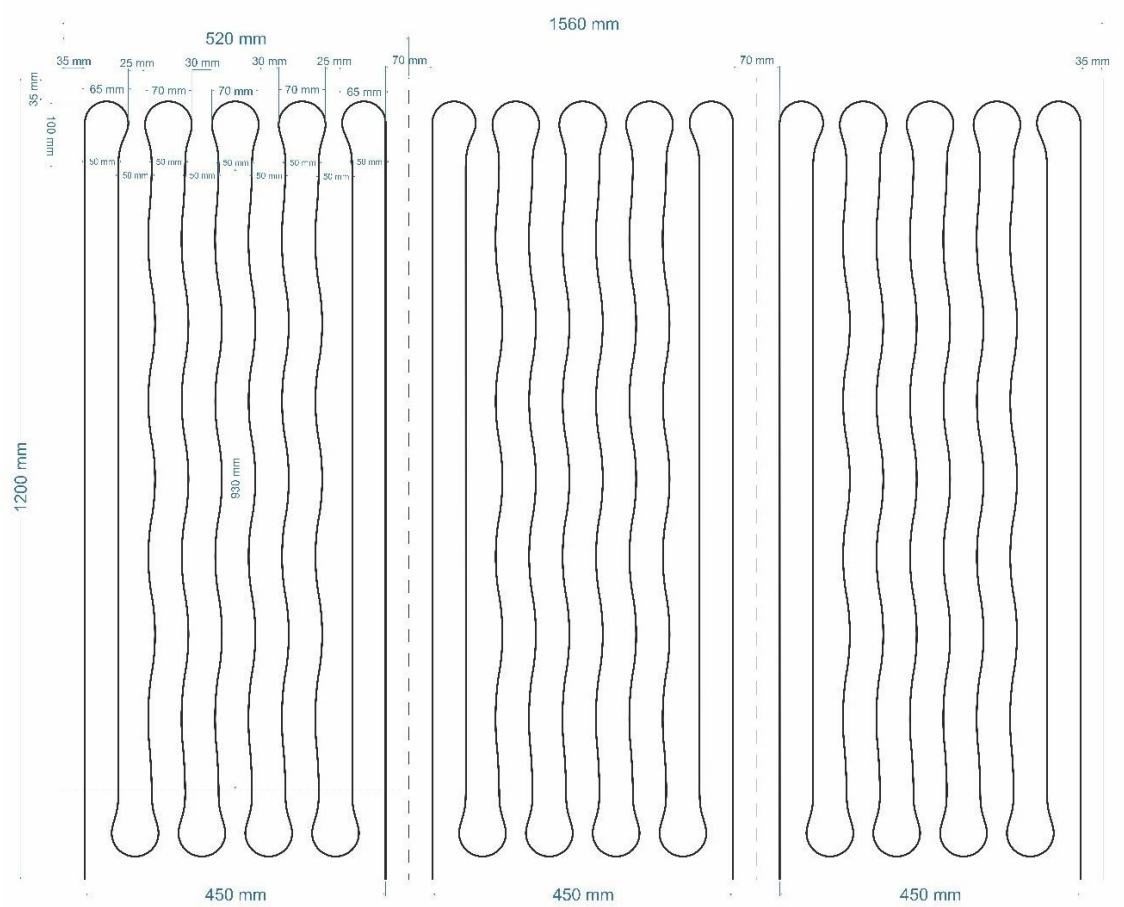
CAMPO DI APPLICAZIONE	
RESIDENZIALE E NON RESIDENZIALE	TIPO DI MONTAGGIO
Case nuove e in fase di ristrutturazione	Soffitto
Case in legno	Parete
Case passive	
Case su struttura metallica	
Appartamenti nuovi e in fase di ristrutturazione	
Uffici	
Scuole	
Ospedali	

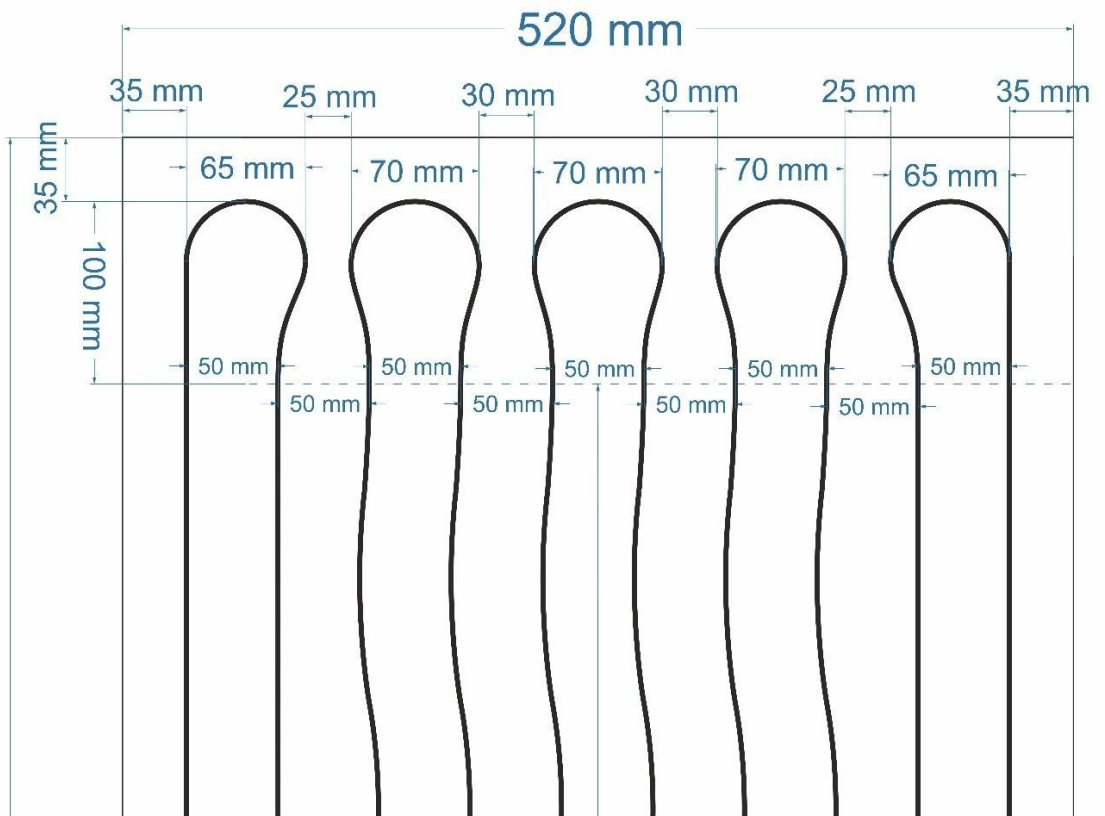
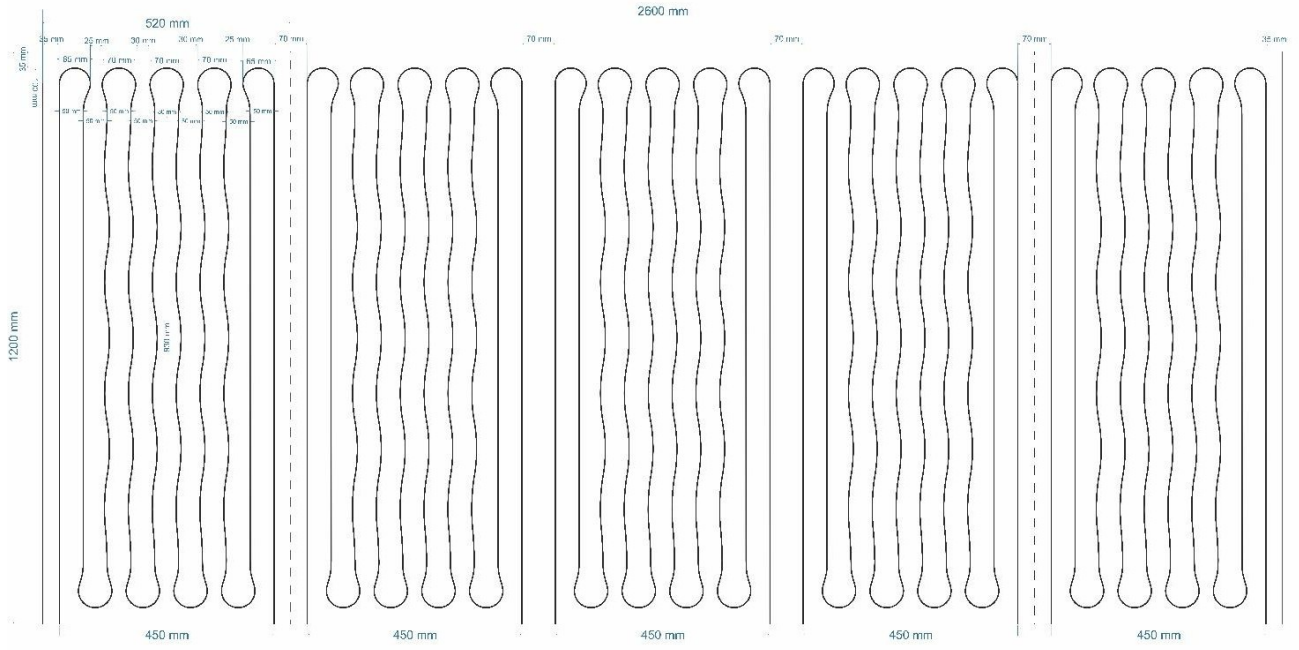
<u>Pannello radiante APA R20/22</u>	
<u>Dimensioni esterne</u>	<u>2600X1200X42</u>
<u>SPESSORE TOTALE</u>	<u>42 mm</u>
<u>SPESSORE LASTRA CARTONGESSO</u>	<u>15 mm</u>
<u>SPESSORE POLISTIRENE</u>	<u>27 mm ESP200</u>
<u>CONDUTTIVITÀ TERMICA DELLA PLACCA IN CARTONGESSO</u>	<u>W/MK 0,3</u>
<u>CONDUTTIVITÀ TERMICA ISOLAMENTO</u>	<u>W/MK 0.33</u>
<u>CLASSE DI REAZIONE AL FUOCO</u>	<u>A1</u>
<u>DIAMETRO TUBO</u>	<u>8*1 mm</u>
<u>MATERIALE DEL TUBO</u>	<u>PE-XC con barriera ossigeno</u>
<u>DISTANZA DI MONTAGGIO</u>	<u>50mm</u>
<u>TIPO DI CIRCUITO</u>	<u>A serpentina</u>
<u>TOLLERANZA</u>	<u>± 0,5</u>
<u>TEMPERATURA DI FUNZIONAMENTO</u>	<u>Riscaldamento 25-32 °C Raffrescamento 14-20 °C</u>

Lunghezza (mm)	Larghezza (mm)	Spessore (mm)	Peso (kg)	Lunghezza circuito (mt)	Contenuto acqua (ml)	Superficie (m <sup>2</sup> )
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 per la determinazione della capacità riscaldante delle superfici calde per ambienti secondo 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  $\Delta T = 15 \text{ K}$ :

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

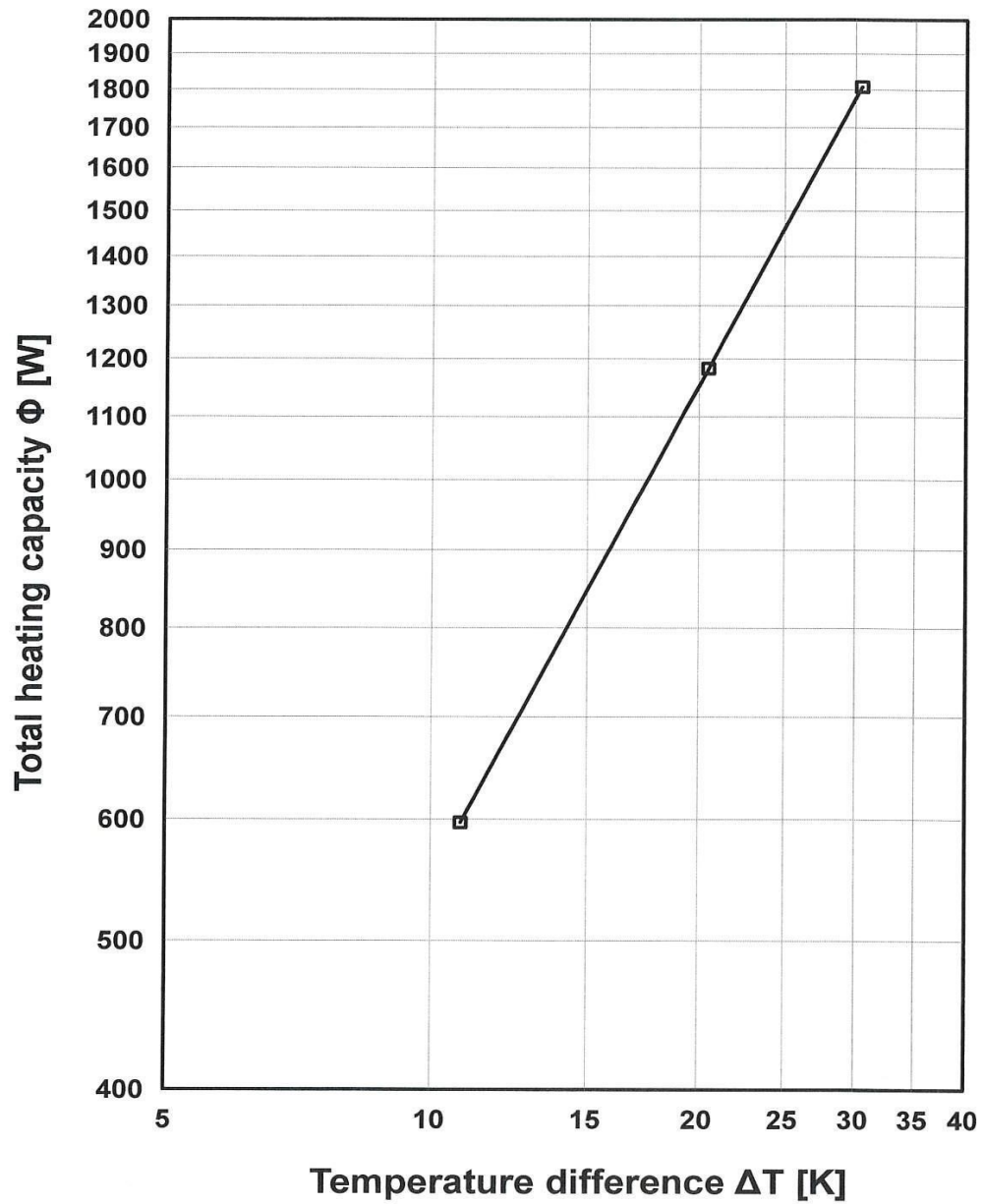
Stuttgart, 08.02.2022

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

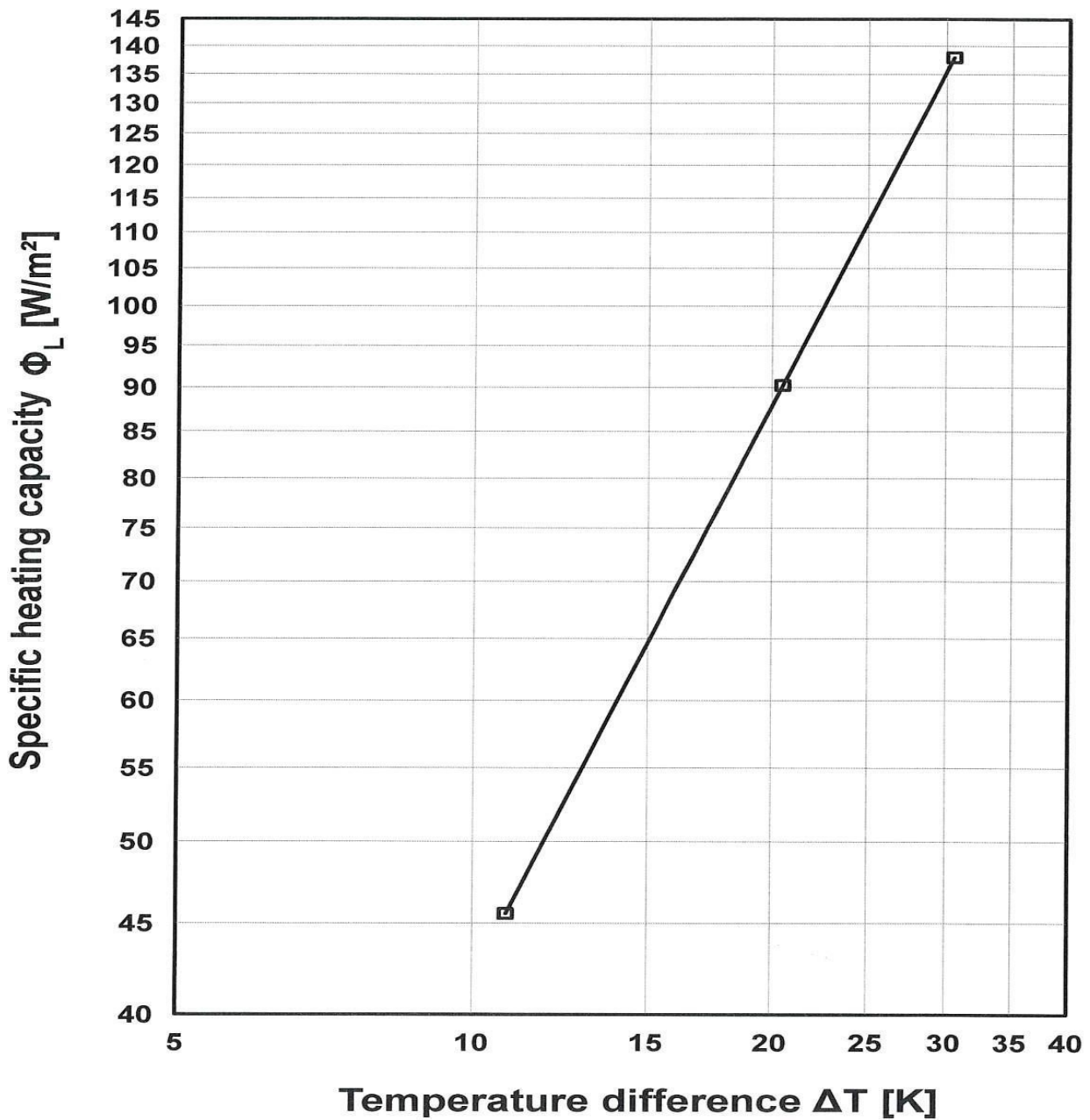
  
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M. Sc. Andrea Heindl  
(Test Manager)



Characteristic equation of thermal output:



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



**8. Measurement protocol**

<b>Results of test</b>					
	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 <sub>ref</sub>	°C	20,01	20,01	19,99
Inlet water temperature	t <sub>1</sub>	°C	42,48	31,81	53,52
Outlet water temperature	t <sub>2</sub>	°C	38,55	29,83	47,52
Water temperature drop	t <sub>1</sub> - t <sub>2</sub>	K	3,93	1,98	6,00
Inlet water enthalpy	h <sub>1</sub>	kJ/kg	177,85	133,26	224,01
Outlet water enthalpy	h <sub>2</sub>	kJ/kg	161,42	124,97	198,93
Enthalpy difference	h <sub>1</sub> - h <sub>2</sub>	kJ/kg	16,43	8,29	25,08
Mean water temperature	t <sub>m</sub>	°C	40,51	30,82	50,52
Temperature difference	ΔT	K	20,51	10,81	30,53
Water flow rate	q <sub>m</sub>	kg/h	258,1	258,1	258,2
Measured thermal output	Φ <sub>me</sub>	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 <sub>L</sub>	W/m <sup>2</sup>	90,2	45,6	138,0
<b>Control temperatures</b>					
	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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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

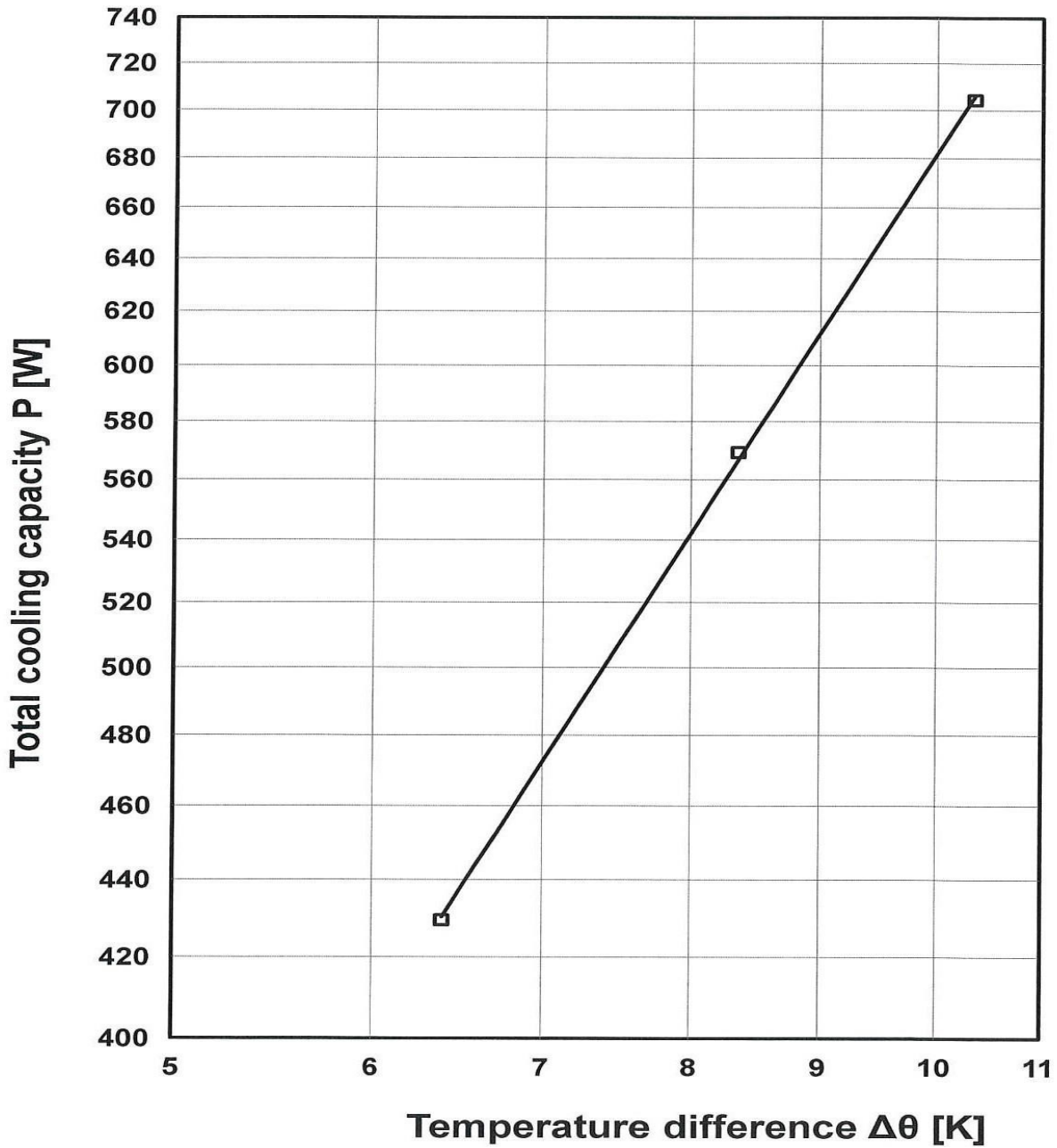
Handwritten signature of Thomas Haase in blue ink, positioned above a dotted line.

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

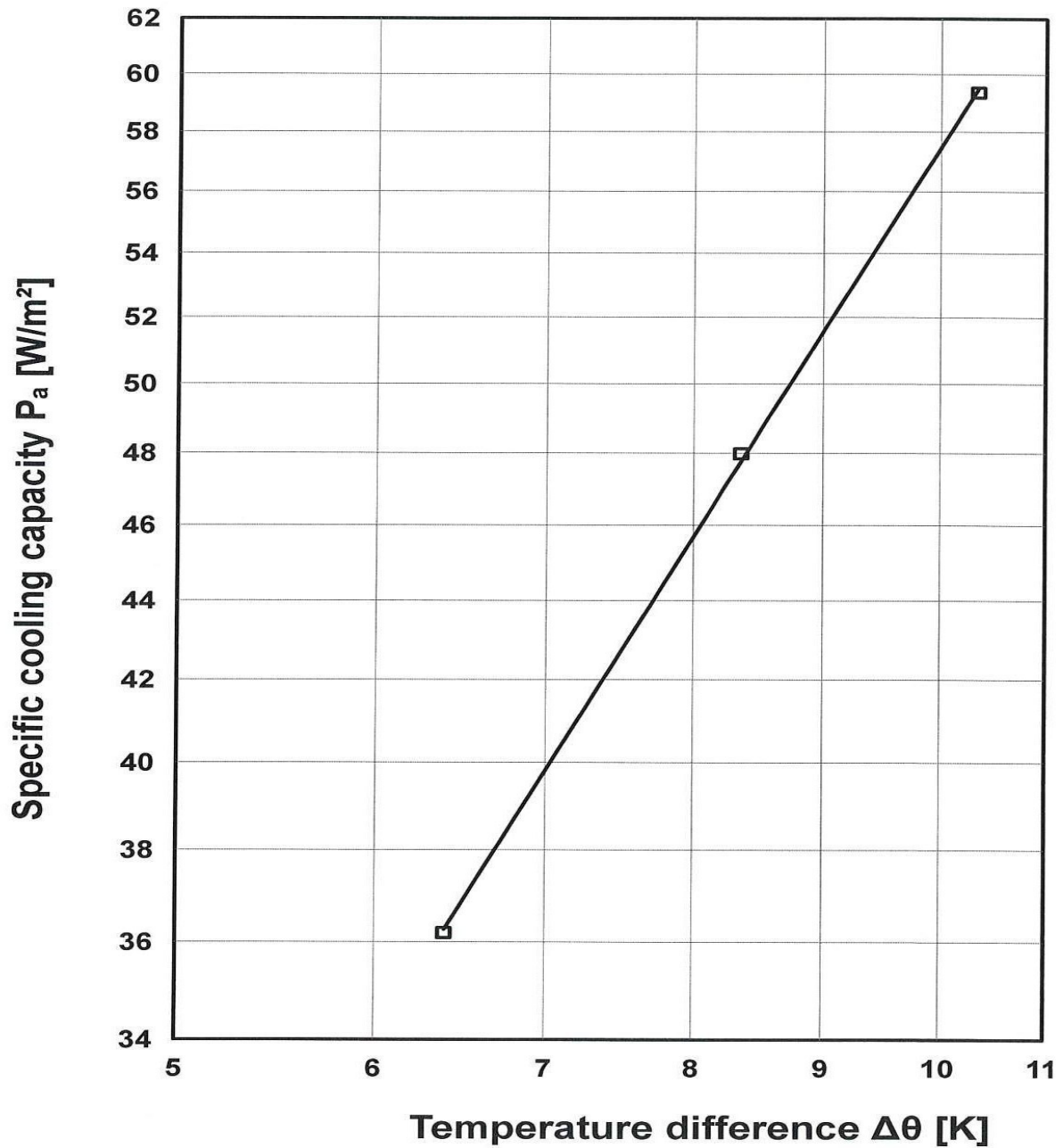
Handwritten signature of Andrea Heindl in blue ink, positioned above a dotted line.

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	$\theta_{w1}$	16,66	18,92	14,45
	Water outlet	$\theta_{w2}$	18,76	20,50	17,04
	Globe	$\theta_g$	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	$\theta_{sw1}$	26,2	26,2	26,1
	Surface wall 2	$\theta_{sw2}$	26,2	26,2	26,2
	Surface wall 3	$\theta_{sw3}$	26,2	26,2	26,2
	Surface wall 4	$\theta_{sw4}$	26,2	26,2	26,2
	Surface inside floor	$\theta_{floor}$	26,1	26,1	26,1
	Surface inside ceiling	$\theta_{ceiling}$	26,1	26,1	26,1
	Air - void	$\theta_{a-void}$	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]		$\theta_{ref}$	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 <sup>2</sup> ]	$P_t$	38,7	29,2	47,9
	Specific - installation area [W/m <sup>2</sup> ]	$P_i$	40,6	30,6	50,3
	Specific - active area [W/m <sup>2</sup> ]	$P_a$	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]		$\Delta Q$	6,9	-1,2	7,9
Heat balance maximum value [W]		$0,05 \cdot P$	+/- 28,5	+/- 21,5	+/- 35,2

# TEST REPORT per determinare la capacità di riscaldamento/raffrescamento di superfici calde/fredde secondo EN 14240

Riscaldamento/raffrescamento a soffitto  
Pannello radiante ad acqua in cartongesso

Pannello radiante ad acqua in cartongesso, tubo PE-XC Ø 8\*1 mm interasse di installazione tra i tubi: 50 mm.

## Test report

Nr: 21.58.CIO.002/A02 - RISCALDAMENTO

## Resa termica - riscaldamento

Temperatura in andata del pannello radiante	W/m <sup>2</sup>	
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	

Capacità nominale: 64,6 W/m<sup>2</sup> ( $\Delta t$ : 15K)

(rapporto della superficie attiva: 100%; superficie attiva: 14,01m<sup>2</sup>)



# Test report

Nr: 21.58.CIO.001/A01 - RAFFRESCAMENTO

## Resa termica – raffrescamento

Temperatura in andata del pannello radiante	W/m <sup>2</sup>	
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	

Capacità nominale: 45,7 W/m<sup>2</sup> ( $\Delta t$ : 8K)

(rapporto della superficie attiva: 100%; superficie attiva: 14,01m<sup>2</sup>)

**Panelradiant S.R.L.**

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