



Cert. n° 0545

Compliant with  
the European Standard EN 14037

# Heating/Air Conditioning Radiant panel

## Pulsar IX

TECHNICAL MANUAL

# Pulsar

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**SABIANA** is the leading company in Europe in the design, production and sale of radiant panels operating on hot water, high temperature hot water and steam.

Since 1971, over 5 million square metres of panels installed in different environments (small, medium and large industries, hangars, gyms and theatres, small and large offices) prove the quality of the **SABIANA** radiant heating system and products.

Heat by radiation means absolute silence, no movement of air and a uniform temperature in the entire environment. In effect, being distributed better, the heat is more pleasant and comfort is optimised, without increasing the air temperature. The result is a feeling of absolute comfort with an air temperature that is 3°C lower than the operative temperature perceived by people.

The efficiency of the **SABIANA** radiant panels is also economic. In fact, besides the energy savings due to the fact that the operative temperature is different from the air temperature, this totally static product does not, unlike the traditional systems, have an electric motor and does not require maintenance nor the consumption of electricity.

This translates into long-lasting efficiency. The **SABIANA** radiant panels have a practically unlimited duration.

The **SABIANA** radiant panels can be described as the hygienic heating system par excellence. The system does not create noise nor movement of air and therefore dust. In addition, it avoids annoying streams of air and the circulation of germs, dust and fragrances and thus represents an important contribution to the prevention of allergies and illnesses.



## Thermal performance

- The **Pulsar** radiant panel is totally static (no circulation of air and no movement of dust).
- Very low thermal gradient between the floor and the ceiling.
- Extremely fast response to changes in settings, without thermal inertia.
- The operating principle of **Pulsar** radiant panels is reversible, and thus cooling operation is possible using the radiant ceiling panels, by connection to a chiller or heat pump.

## Appearance

- None of the peripheral walls are affected by the installation.
- The **Pulsar** radiant panel can be perfectly integrated into all types of false ceiling.
- The visible side is perfectly smooth, adapting to any type of architecture.
- Other RAL colours available on request.

## Modularity

- Given its modular dimensions and the design of the water connections, **Pulsar** panels can be installed in sequence with ceiling light panels, in complete compliance with the regulations on artificial lighting.

## Hygiene

- The design of the **Pulsar** panel allows it to be installed in any building, including hospitals and clinics. Indeed, its completely smooth visible surface is recommended, as it allows sanitisation by spraying for combating nosocomial illnesses in hospitals.
- The radiation concept, by avoiding considerable movements of air, prevents the spreading of microbes and bacteriological pollution.

## Safety

- **Pulsar** radiant panels are inaccessible to the people in the room. Therefore there is no risk of burning or electric shock in schools and paramedical environments.
- No risk of vandalism, in any environment.

## Comfort

- By design, the **Pulsar** radiant panel guarantees a uniform temperature in all seasons.
- The **Pulsar** radiant panel is a totally static heating system without the circulation of air and without lifting dust.
- The operation of **Pulsar** is completely silent.
- In summer, the **Pulsar** panel can be used for cooling without creating steams of air and with a uniform temperature throughout the environment.

## Savings

- The heating requirement of a building heated with **Pulsar** radiant panels is, according to the EN 12831 standard, much lower than the requirement with traditional heating systems.
- The experience acquired by **SABIANA** in the field of radiant panels guarantees the reliability of **Pulsar** over time.
- **Pulsar** does not require special maintenance and consequently has no maintenance costs.

## Assembly

- The dimensions of **Pulsar** radiant panels make them easy to handle on site.
- The panels are connected by flexible pipes without welding.



CONNECTIONS SUPPLIED NOT MOUNTED



## Technical description

**SABIANA Pulsar** radiant panels are supplied in four sizes, which can be perfectly integrated into any false ceiling. Indeed, the lengths of 1.20, 1.80, 2.40 and 3.00 m ensure optimum integration into 600 x 600 mm modular ceilings, the standard dimension for false ceiling panels in Europe.

The visible side is perfectly flat, meaning that **Pulsar** radiant panels can match all types of false ceiling panels available on the market.

As standard, the panels are supplied in RAL 9016 colour, with a satin finish created by an epoxy-polyester coat dried in a furnace at 180 °C. Other RAL colours are also available for the architect to choose from.

The **Pulsar** radiant panels are made of a radiating galvanized steel plate, 1 mm thick.

On the panel is fixed a stainless steel pipe with 15 mm of external diameter.

The tube features are:

tube IX made of stainless steel 0,8 mm thick, EN 1.4512-AISI 409 100% tested with 40 bar air pressure; TIG electro-welded tube (EN 10217-7), in controlled atmosphere, under constant monitoring of the welding quality by means of eddy current brakes (EN 10893/2) and automatic detection of imperfections. Used raw materials: cold rolled sheets annealed in controlled atmosphere (EN 10088-2).

The galvanized omega strips welded to the panels hold the correct spacing of the tubes and secure the best surface contact between the tube and the panel.

The dimensional tolerances of the panels are in accordance with standard EN 14037-1 (radiant panel length  $\pm 3,00$  mm, radiant panel width  $\pm 2,00$  mm).

The paint complies with the European Standard 76/769/EEC.

Class of reaction to fire: A1

Emission of the radiant surface:  $\epsilon = 0,96$

The **Pulsar** is supplied with an insulating layer of mineral wool (30 mm thick) protected by an aluminium sheet (25 micron thick) to be mounted on the top of the panel.

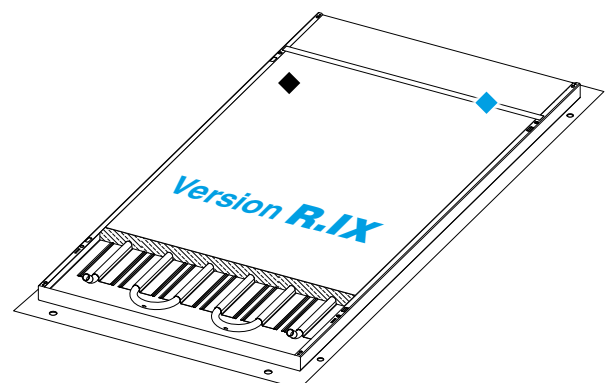
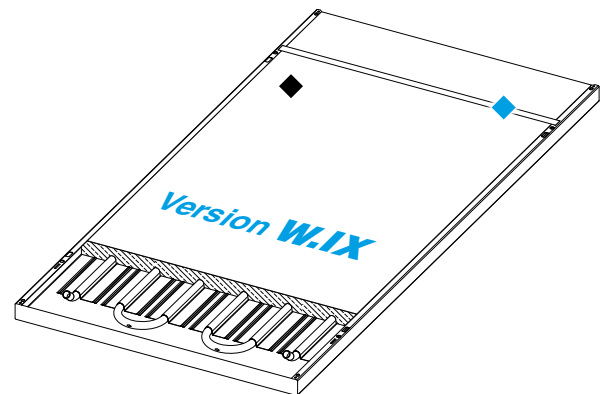
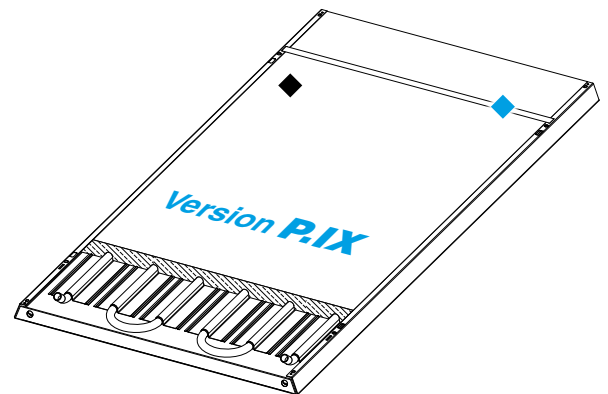
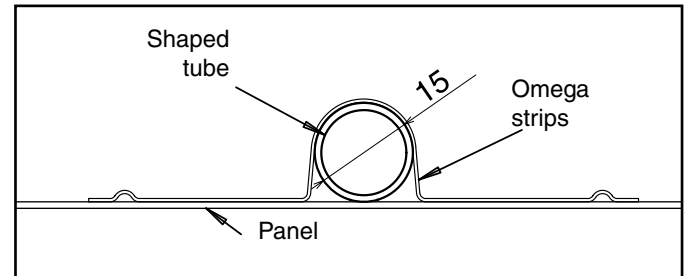
### Insulation specifications:

Class A1 according to EN 13501-1 standards

Thermal conductivity 0,037 W/mK (according to UNI CTI 7745 and UNI FA 112 standard)

Density 14 kg/m<sup>3</sup>

Thermal resistance 0,81 m<sup>2</sup>K/W



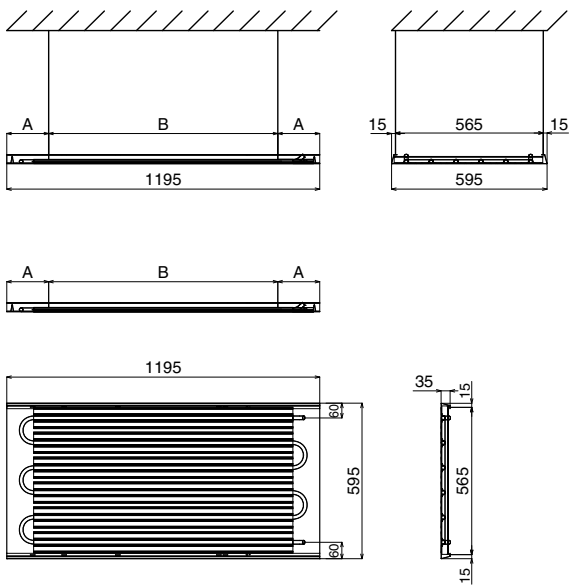
- ◆ Insulation, 30 mm thick (supplied not mounted)
- ◆ Insulation holding strip

**Pulsar P.IX installed within false ceilings**

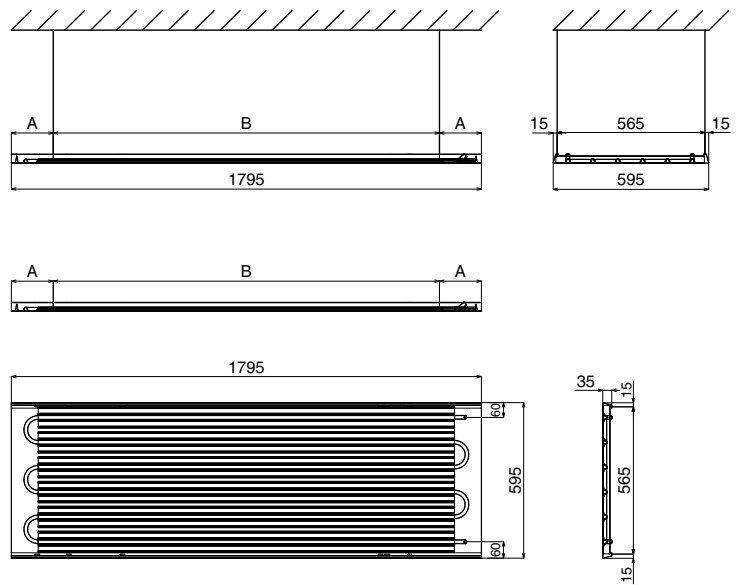
**Weights and Dimensions**

**Pulsar P STANDARD**

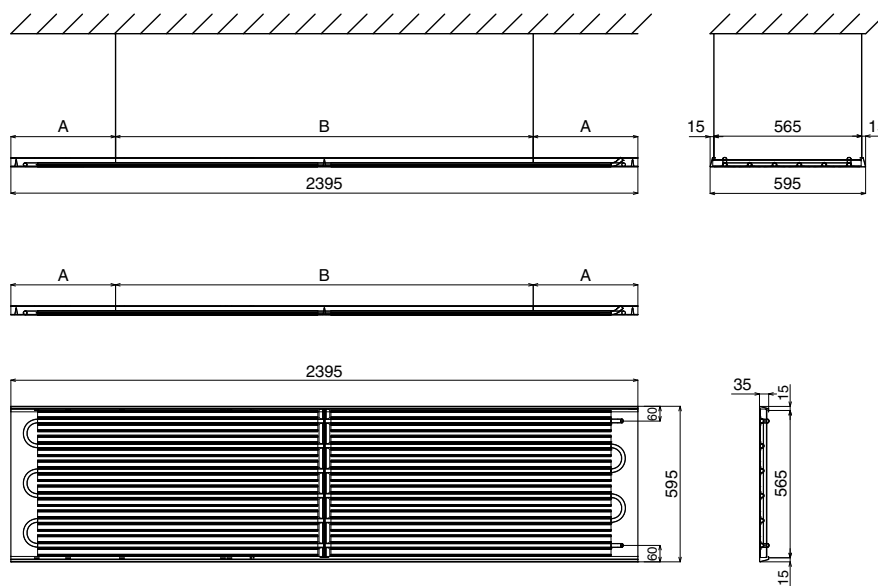
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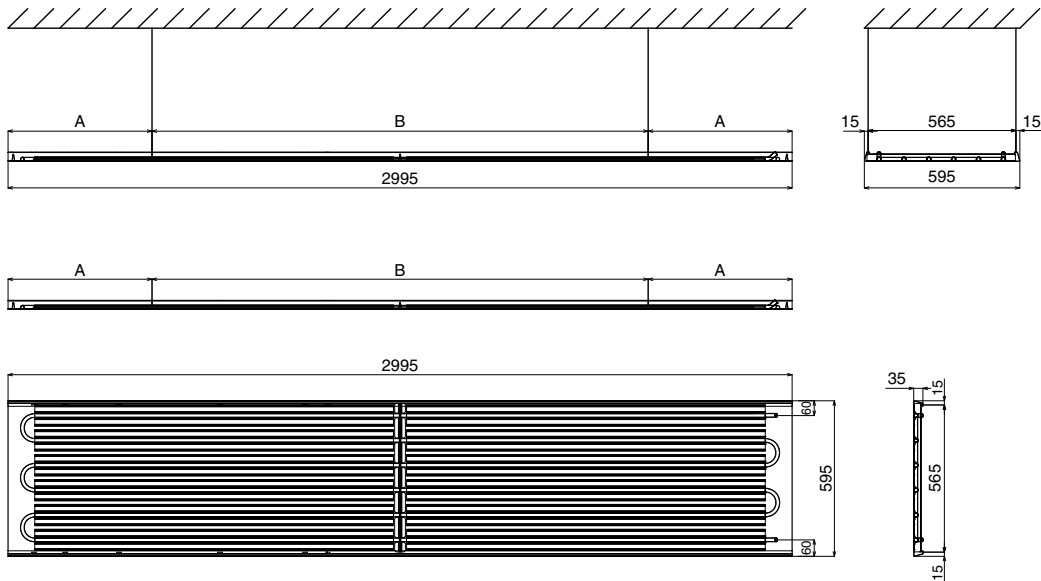
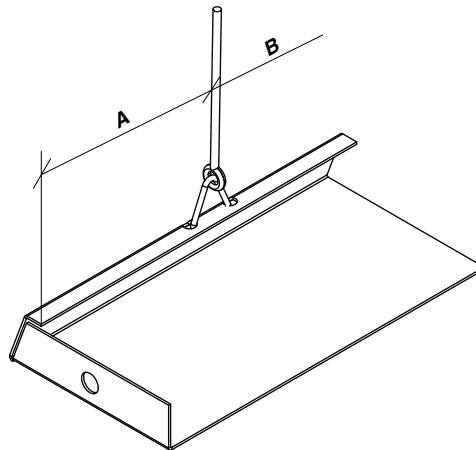


**Size 2**



**Size 3**



**Pulsar P.IX installed within false ceilings**
**Weights and Dimensions**
**Pulsar P STANDARD**
**Size 4**

**Installation with CLIP**


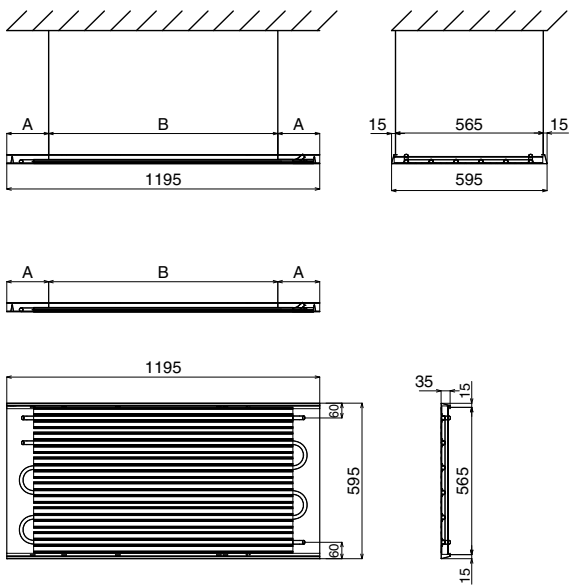
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					WITH CLIP:			
					A	B		
<b>P.IX</b>	<b>1</b>	<b>P.IX 1</b>	<b>0086001</b>	1195	145	905	12,9	1,0
	<b>2</b>	<b>P.IX 2</b>	<b>0086002</b>	1795	145	1505	19,4	1,5
	<b>3</b>	<b>P.IX 3</b>	<b>0086003</b>	2395	385	1625	25,8	2,0
	<b>4</b>	<b>P.IX 4</b>	<b>0086004</b>	2995	535	1925	32,3	2,5

*Pulsar P.IX installed within false ceilings*

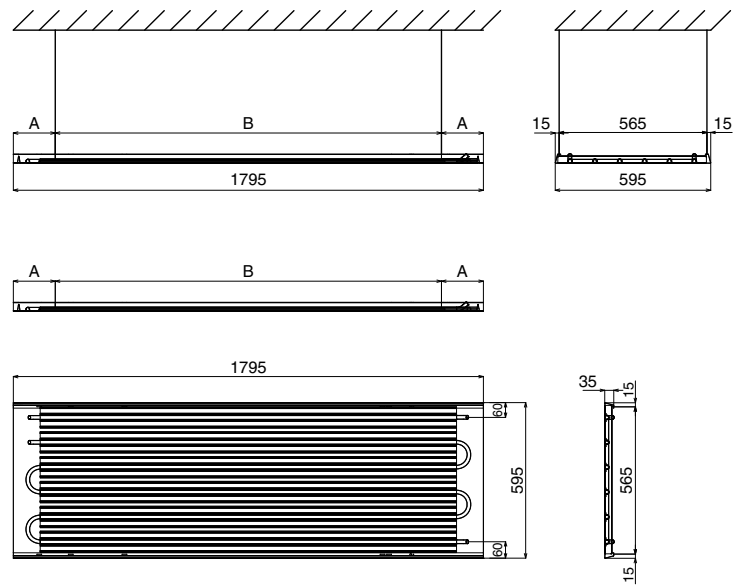
Weights and Dimensions

**Pulsar PA**

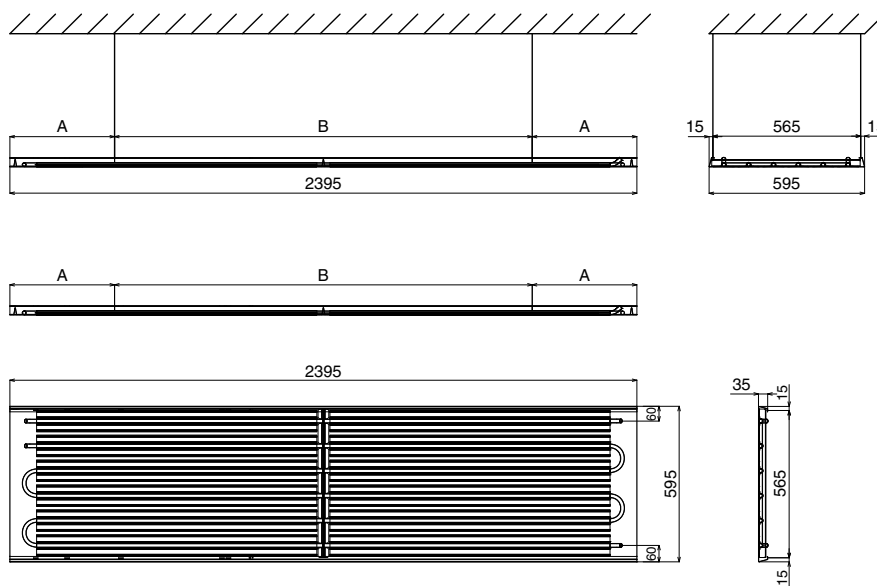
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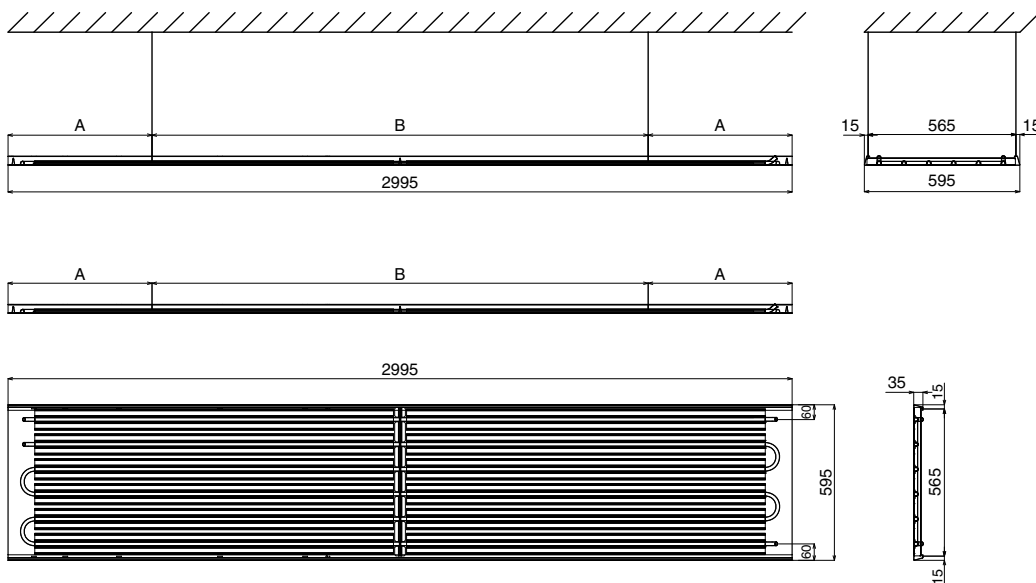
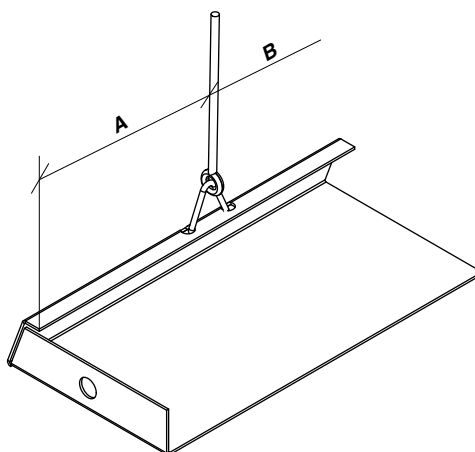
**Size 2**



**Size 3**





**Pulsar P.IX installed within false ceilings**
**Weights and Dimensions**
**Pulsar PA**
**Size 4**

**Installation with CLIP**


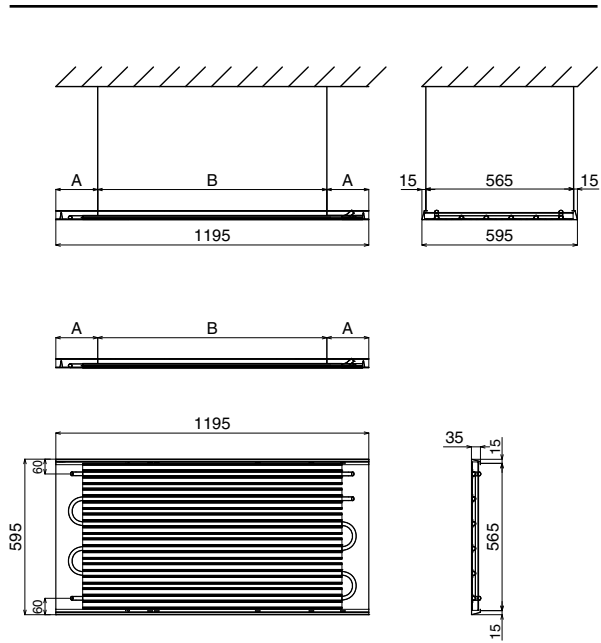
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					A	B		
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	2	PA.IX 2	0086012	1795	145	1505	19,4	1,5
	3	PA.IX 3	0086013	2395	385	1625	25,8	2,0
	4	PA.IX 4	0086014	2995	535	1925	32,3	2,5

**Pulsar P.IX installed within false ceilings**

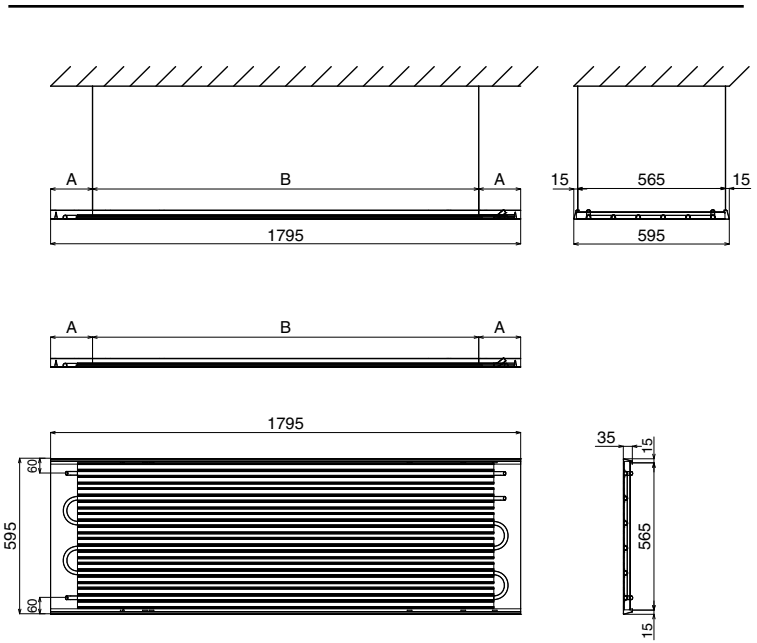
**Weights and Dimensions**

**Pulsar PB**

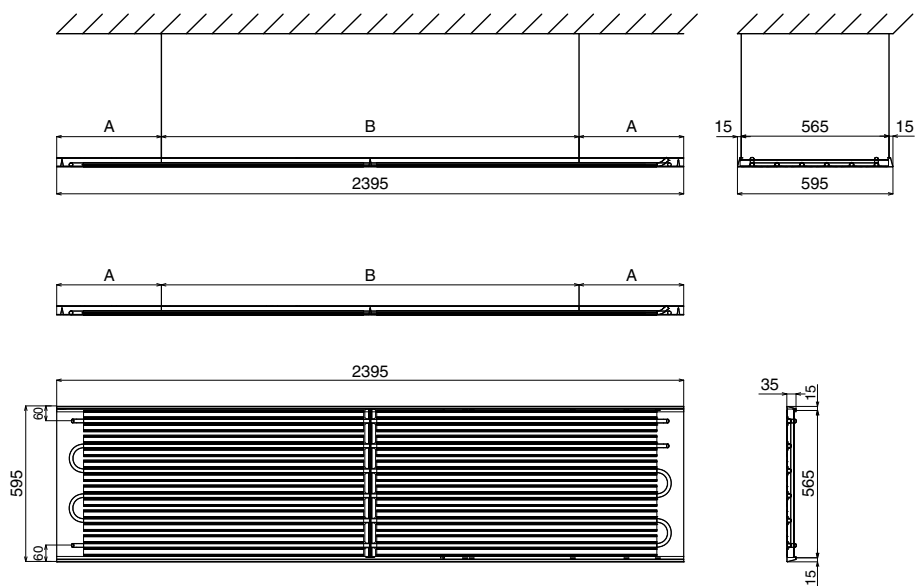
**Size 1**



**Size 2**

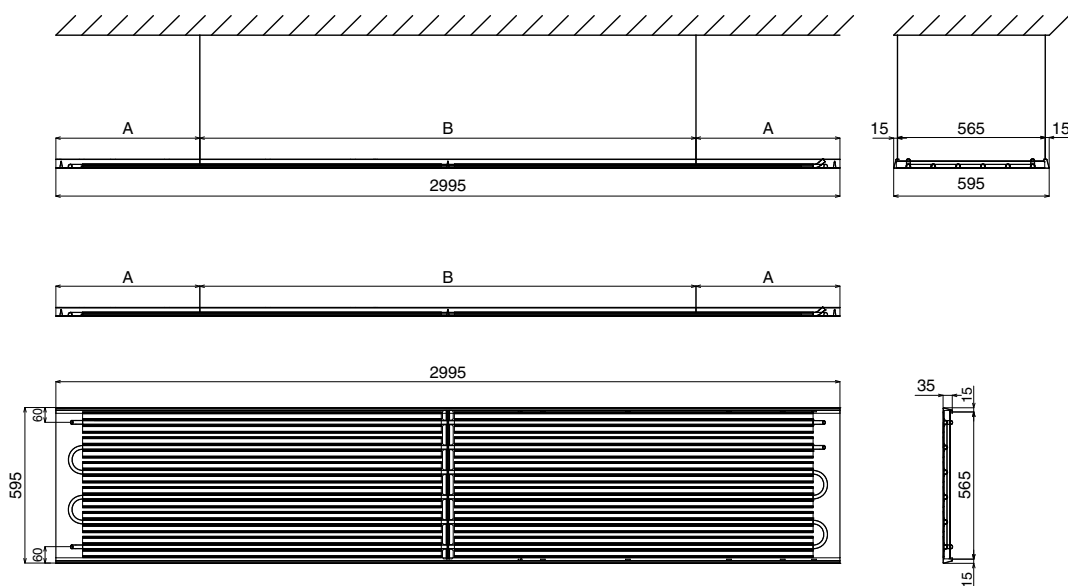
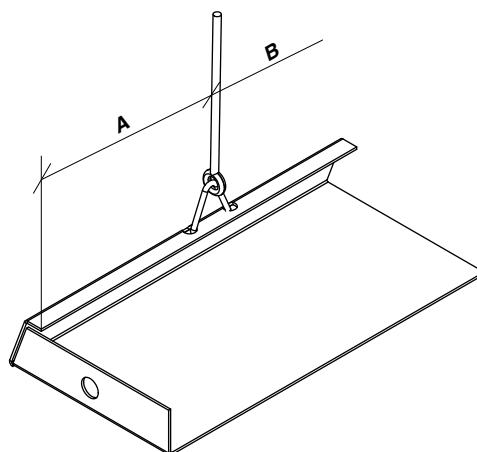


**Size 3**



## Pulsar P.IX installed within false ceilings

## Weights and Dimensions

**Pulsar PB**
**Size 4**

**Installation with CLIP**


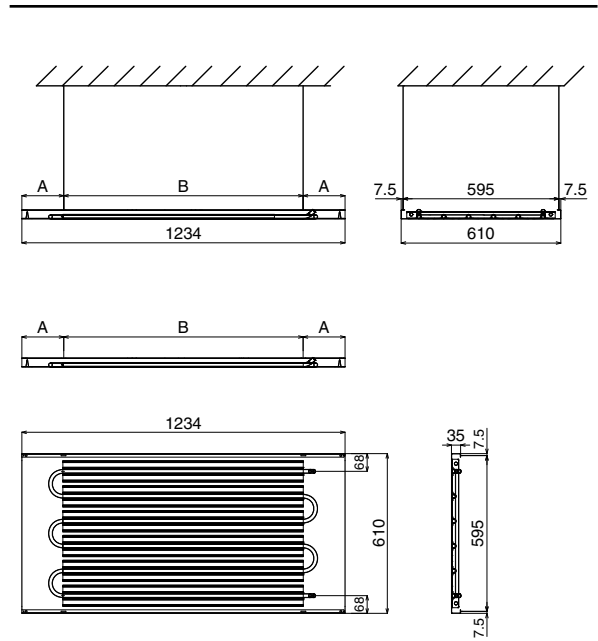
VERSION	SIZE	MODEL	CODE	LENGTH (mm)	HANGING BRACKETS (mm)		WEIGHT (kg)	WATER CONTENT (l)
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					A	B		
<b>PB.IX</b>	<b>1</b>	<b>PB.IX 1</b>	<b>0086021</b>	1195	145	905	12,9	1,0
	<b>2</b>	<b>PB.IX 2</b>	<b>0086022</b>	1795	145	1505	19,4	1,5
	<b>3</b>	<b>PB.IX 3</b>	<b>0086023</b>	2395	385	1625	25,8	2,0
	<b>4</b>	<b>PB.IX 4</b>	<b>0086024</b>	2995	535	1925	32,3	2,5

**Pulsar W.IX free hanging**

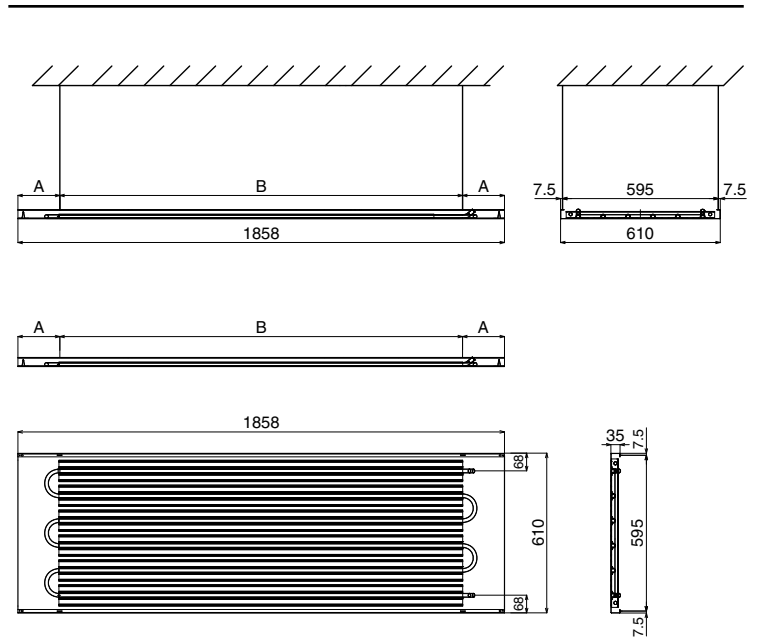
**Weights and Dimensions**

**Pulsar W STANDARD**

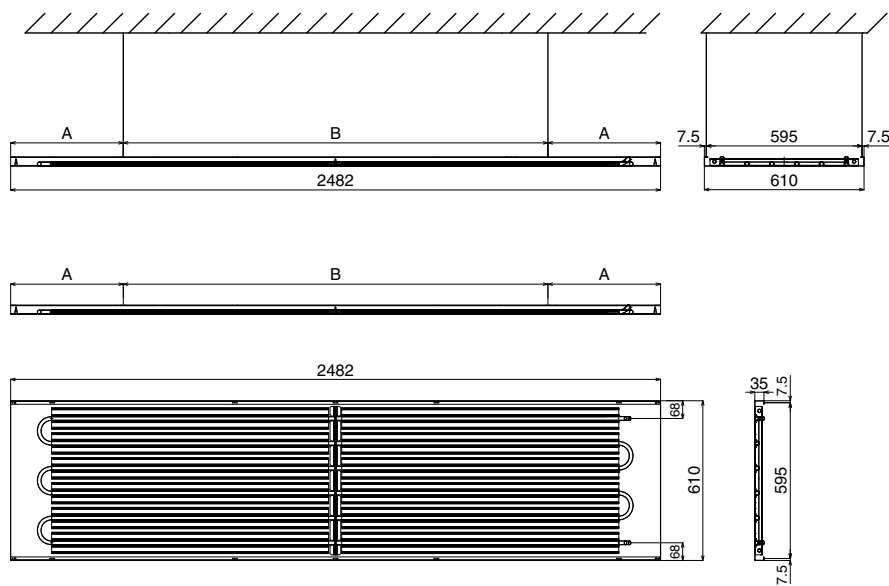
**Size 1**



**Size 2**

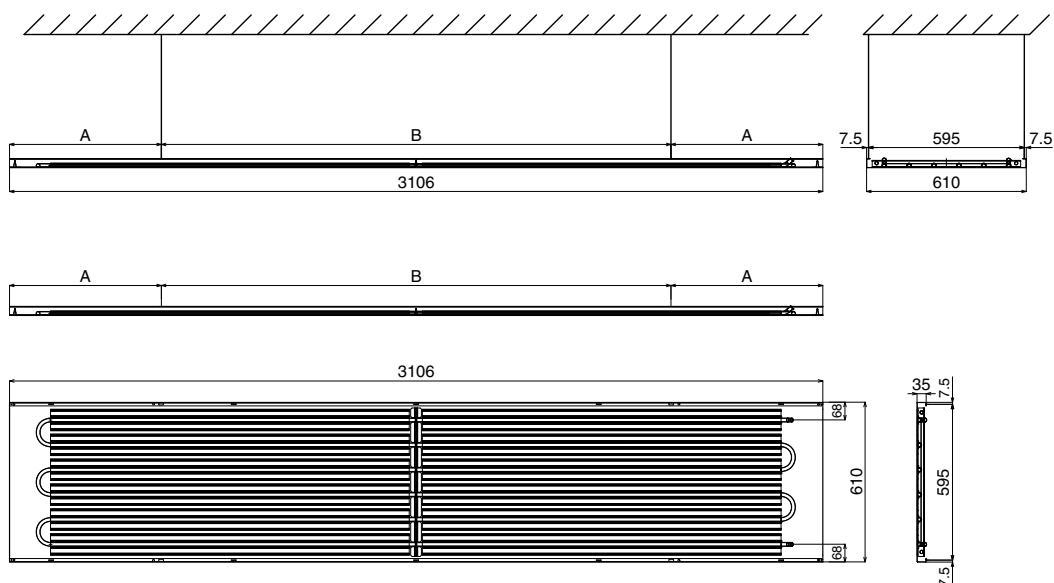
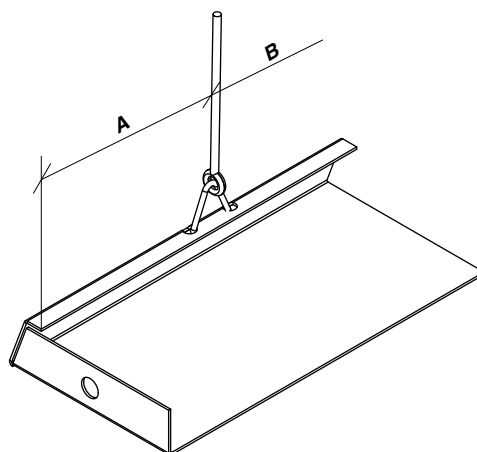


**Size 3**



## Pulsar W.IX free hanging

## Weights and Dimensions

**Pulsar W STANDARD**
**Size 4**

**Installation with CLIP**


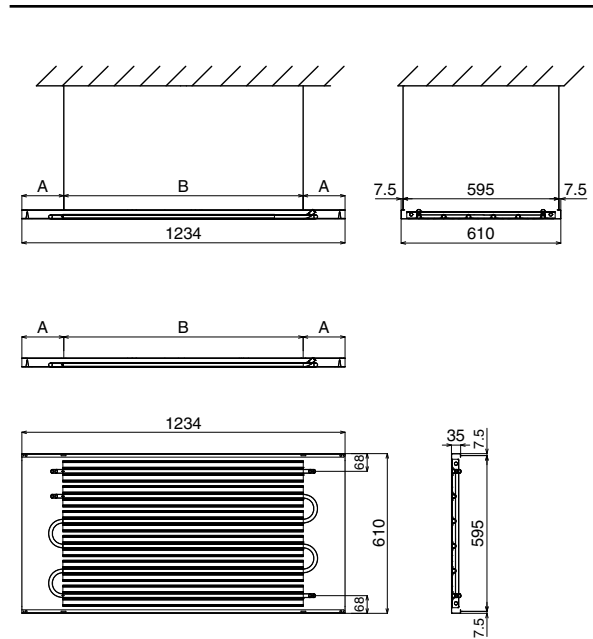
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					WITH CLIP:			
					A	B		
<b>W.IX</b>	<b>1</b>	<b>W.IX 1</b>	<b>0086251</b>	1234	197	840	12,9	1,0
	<b>2</b>	<b>W.IX 2</b>	<b>0086252</b>	1858	197	1464	19,4	1,5
	<b>3</b>	<b>W.IX 3</b>	<b>0086253</b>	2482	445	1592	25,8	2,0
	<b>4</b>	<b>W.IX 4</b>	<b>0086254</b>	3106	595	1916	32,3	2,5

Pulsar W.IX free hanging

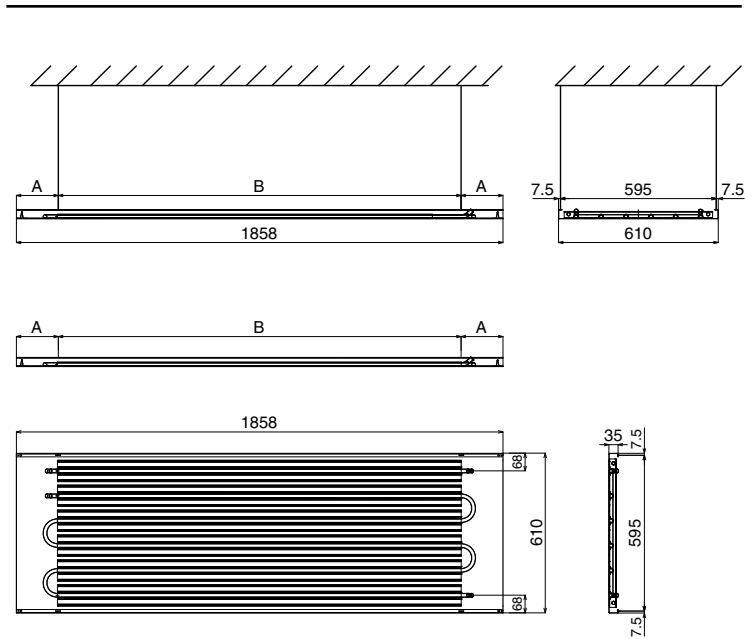
Weights and Dimensions

Pulsar WA

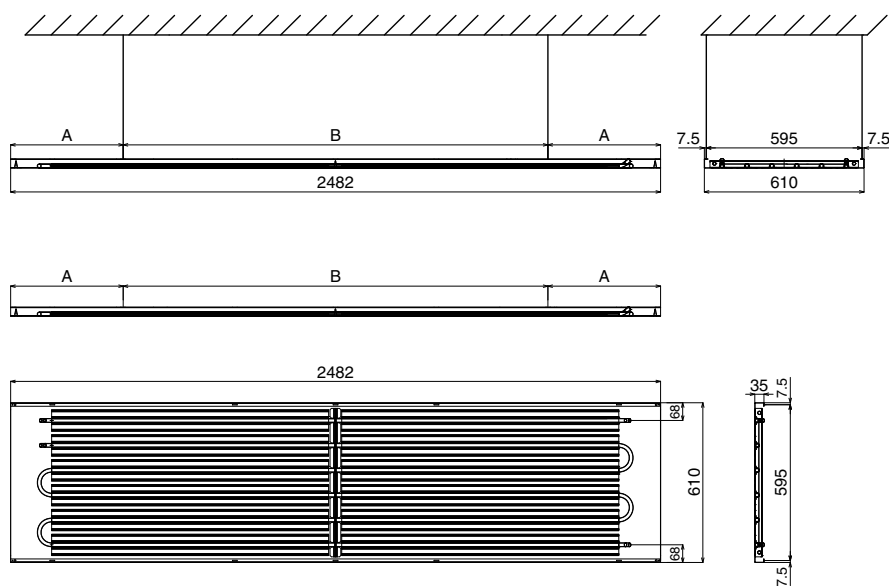
Size 1



Size 2



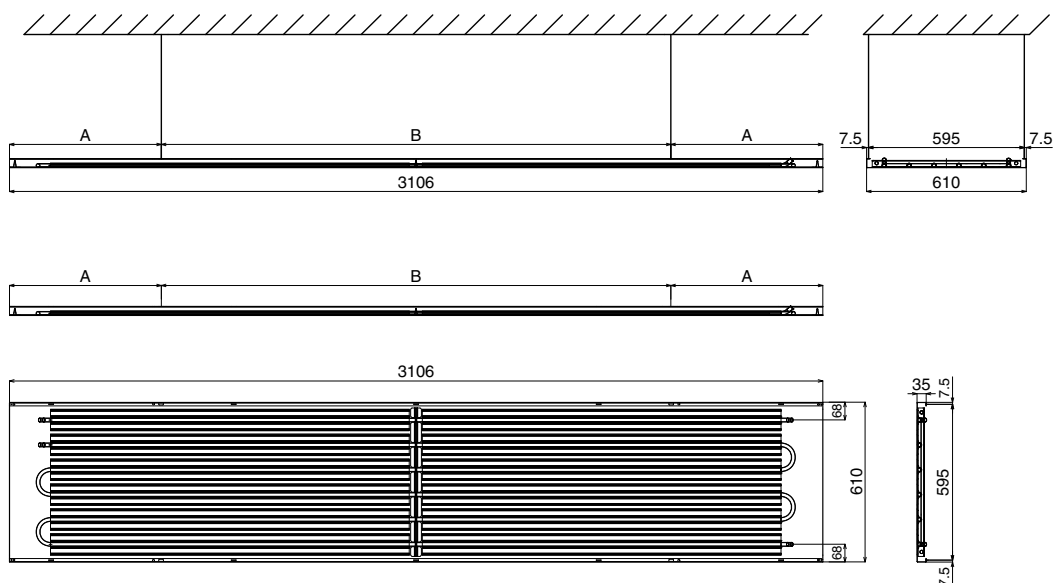
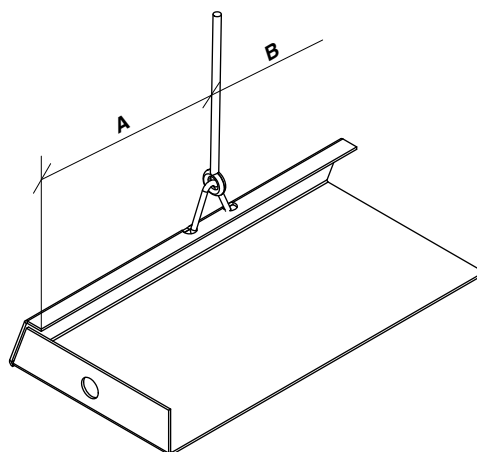
Size 3





## Pulsar W.IX free hanging

## Weights and Dimensions

**Pulsar WA**
**Size 4**

**Installation with CLIP**


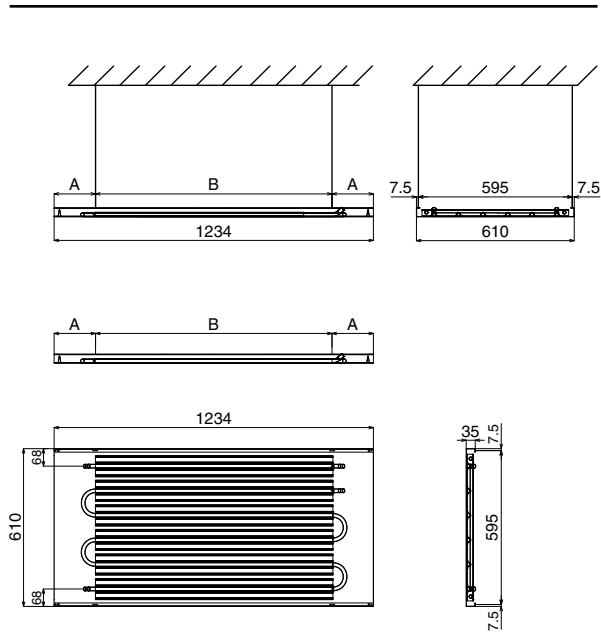
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					A	B		
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	2	WA.IX 2	0086262	1858	197	1464	19,4	1,5
	3	WA.IX 3	0086263	2482	445	1592	25,8	2,0
	4	WA.IX 4	0086264	3106	595	1916	32,3	2,5

**Pulsar W.IX free hanging**

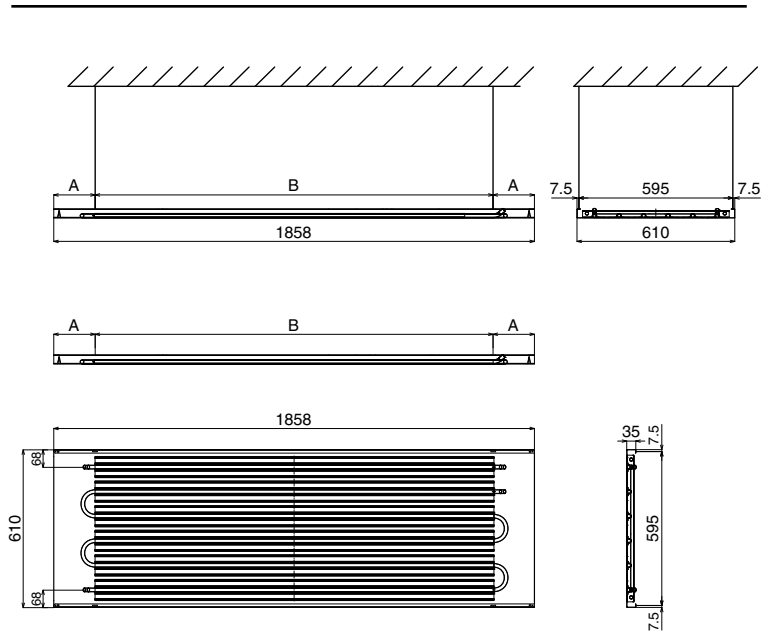
**Weights and Dimensions**

**Pulsar WB**

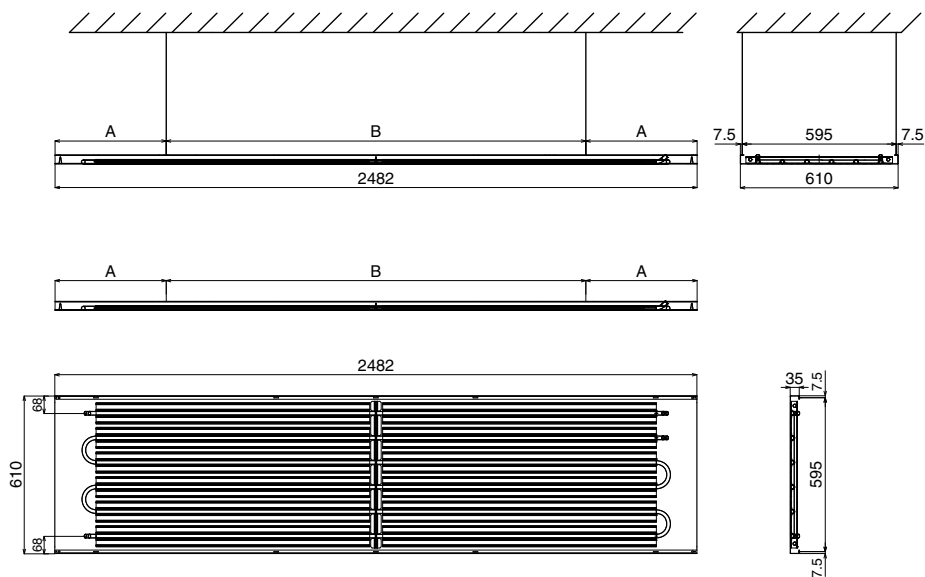
**Size 1**



**Size 2**

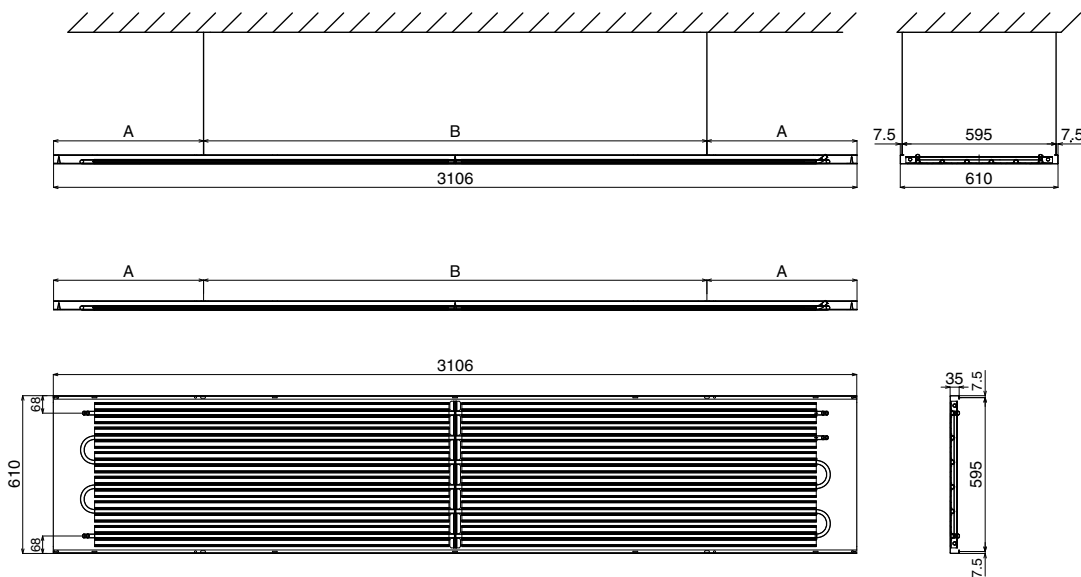
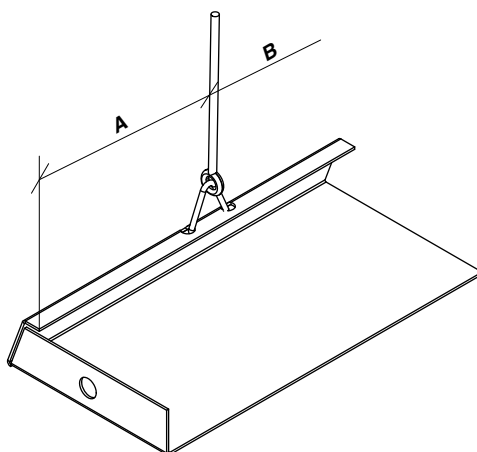


**Size 3**



## Pulsar W.IX free hanging

## Weights and Dimensions

**Pulsar WB**
**Size 4**

**Installation with CLIP**


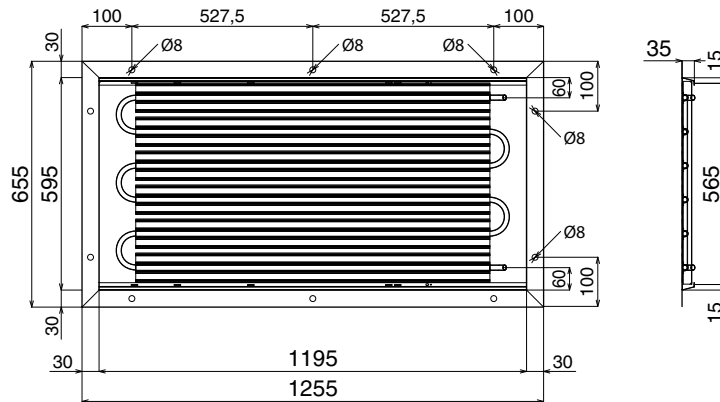
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					A	B		
WB.IX	1	WB.IX 1	0086271	1234	197	840	12,9	1,0
	2	WB.IX 2	0086272	1858	197	1464	19,4	1,5
	3	WB.IX 3	0086273	2482	445	1592	25,8	2,0
	4	WB.IX 4	0086274	3106	595	1916	32,3	2,5

**Pulsar R.IX for plasterboard ceilings**

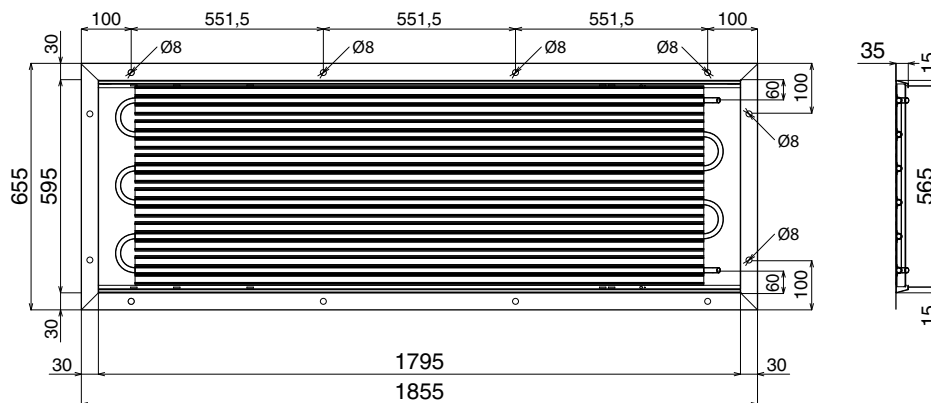
**Weights and Dimensions**

**Pulsar R STANDARD**

**Size 1**

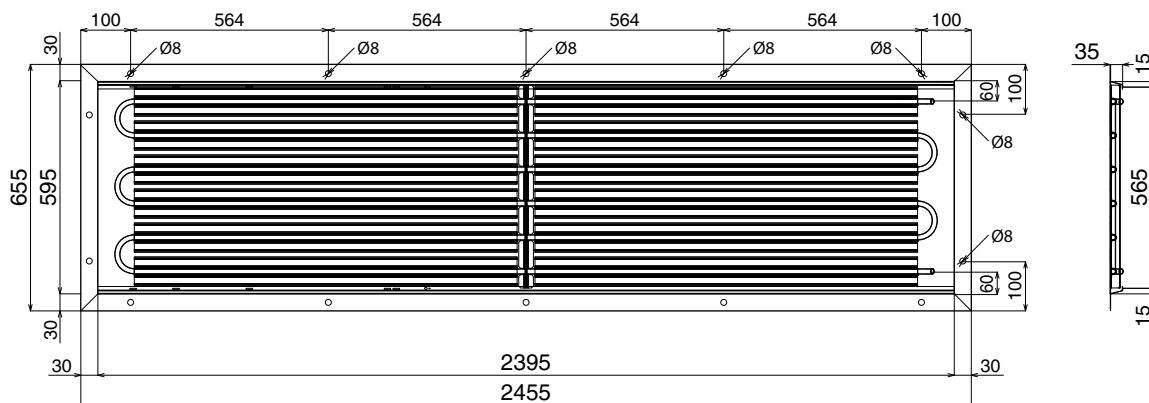
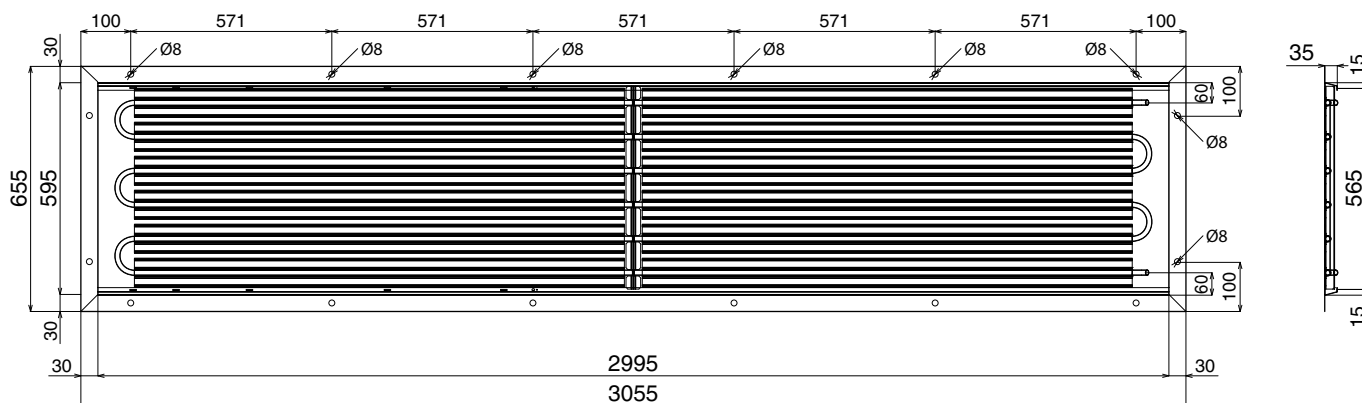


**Size 2**



## Pulsar R.IX for plasterboard ceilings

## Weights and Dimensions

**Pulsar R STANDARD**
**Size 3**

**Size 4**


VERSION	SIZE	MODEL	CODE	LENGTH (mm)	WEIGHT (kg)	WATER CONTENT (l)
<b>R.IX</b>	<b>1</b>	<b>R.IX 1</b>	<b>0086041</b>	1195	14,0	1,0
	<b>2</b>	<b>R.IX 2</b>	<b>0086042</b>	1795	21,0	1,5
	<b>3</b>	<b>R.IX 3</b>	<b>0086043</b>	2395	27,9	2,0
	<b>4</b>	<b>R.IX 4</b>	<b>0086044</b>	2995	34,9	2,5



## Emission

Characteristic curve of the **Pulsar** taken from tests carried out as per the EN 14037 standard:

$$Q = K \cdot (\Delta T_m)^n$$

**Q** = emission W/m  
**K** = heating coefficient of the unit = 3,28086 W/m  
**ΔTm** = difference between the mean water temperature and the room temperature  
**n** = heating exponent of the unit = 1,1536

The emission of the Sabiana **Pulsar** radiant panels has been certified by the laboratory at the University of Stuttgart H.L.K. applying the harmonised European Standard EN 14037, with the report number DC210 D12.2956

### Example:

Nominal emission for a meter of Pulsar panels with ΔTm = 55°C : 334 W/m

Total nominal emission of Pulsar panels with ΔTm = 55°C

<b>Pulsar 1</b>	<b>Pulsar 2</b>	<b>Pulsar 3</b>	<b>Pulsar 4</b>
W = 396	W = 596	W = 797	W = 997



## Pulsar thermal emissions in accordance with the European Standard EN 14037-1

<b>ΔTm</b>	<b>Emission</b>	<b>ΔTm</b>	<b>Emission</b>	<b>ΔTm</b>	<b>Emission</b>	<b>ΔTm</b>	<b>Emission</b>	<b>ΔTm</b>	<b>Emission</b>
°C	W/m	°C	W/m	°C	W/m	°C	W/m	°C	W/m
89	582	75	478	61	376	47	279	33	185
88	574	74	470	60	369	46	272	32	179
87	567	73	463	59	362	45	265	31	172
86	559	72	456	58	355	44	258	30	166
85	552	71	448	57	348	43	251	29	160
84	544	70	441	56	341	42	245	28	153
83	537	69	434	55	334	41	238	27	147
82	529	68	427	54	327	40	231	26	141
81	522	67	419	53	320	39	225	25	134
80	515	66	412	52	313	38	218	24	128
79	507	65	405	51	306	37	211	23	122
78	500	64	398	50	299	36	205	22	116
77	492	63	391	49	292	35	198	21	110
76	485	62	383	48	285	34	192	20	104

Δtm = difference between the average water temperature and the room temperature.



## Pulsar cooling emissions in accordance with the European Standard EN 14037-4

<b>COOLING EMISSION</b>				
$\Delta tm$	<b>With insulation</b>		<b>Without insulation</b>	
$^{\circ}C$	W/m	W/m <sup>2</sup>	W/m	W/m <sup>2</sup>
5	24	40	33	56
6	29	49	40	68
7	35	58	48	80
8	40	68	55	92
9	46	77	62	105
10	52	87	70	118
11	57	96	78	130
12	63	106	85	143
13	69	116	93	156
14	75	126	101	169
15	81	136	108	182

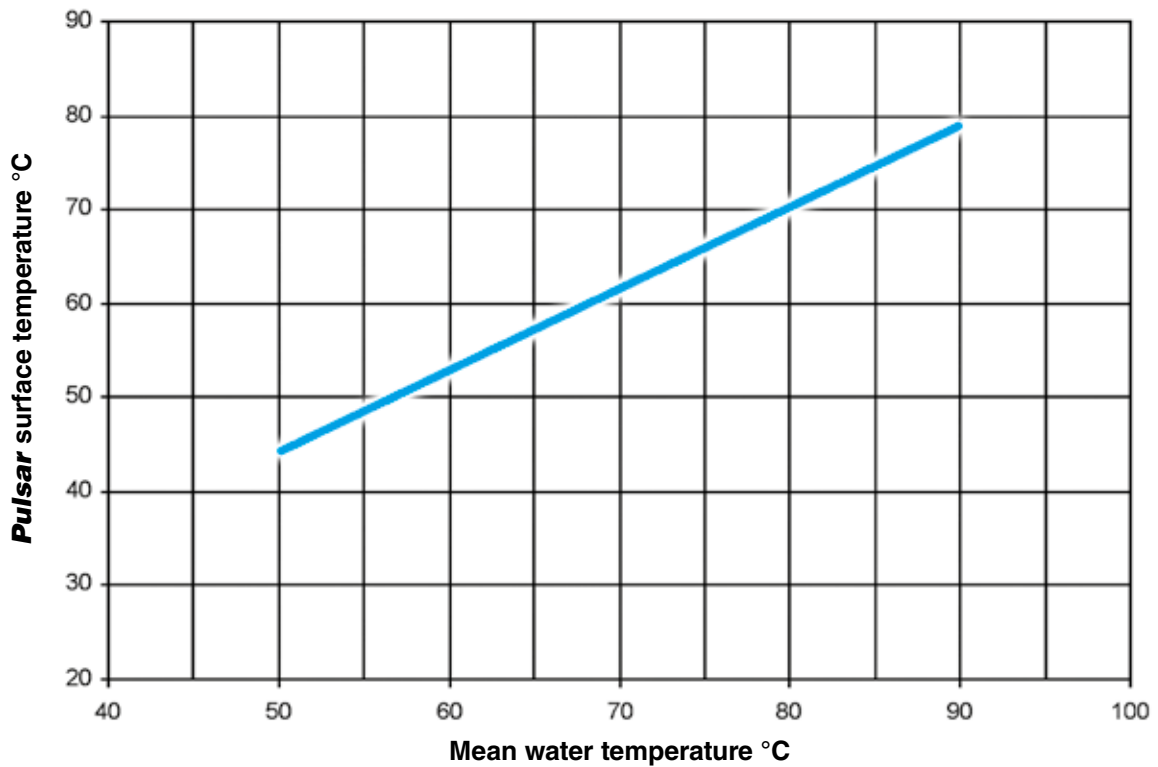
### Example:

Water temperature 17/21 $^{\circ}C$ ,  
air temperature 28 $^{\circ}C$  - 50%  
means  $\Delta tm = 9^{\circ}C$ .

The cooling emission  
of the **Pulsar** is 46 W/m.

$\Delta tm$  = difference between the average water temperature and the room temperature.

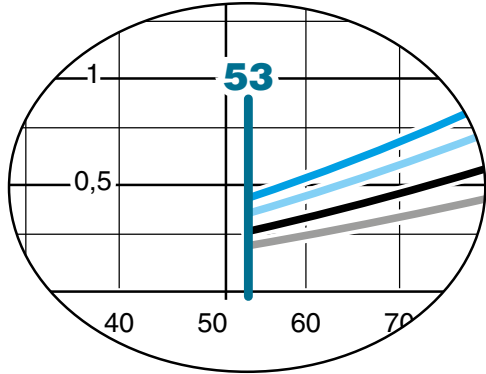
## Mean surface temperature



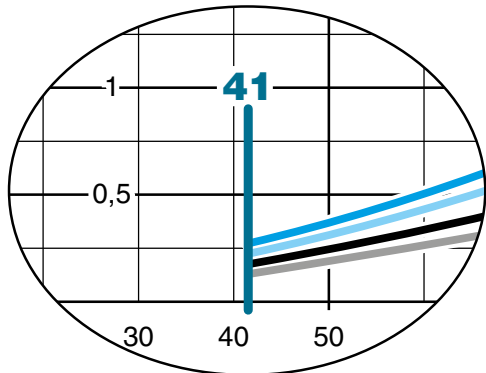
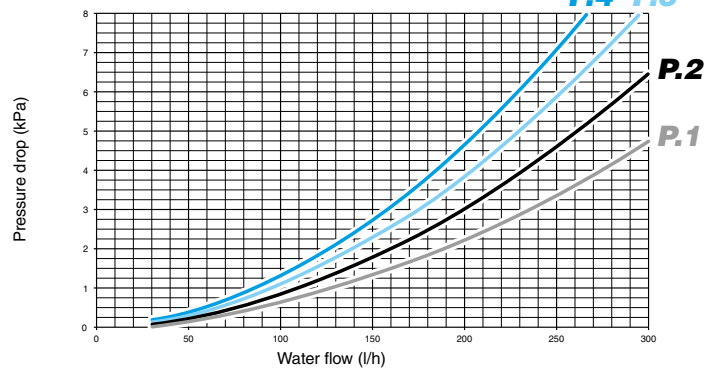
Lowest water flow to be supplied in order to obtain the correct emission.

Leaving water temperature °C	40	60	70	80
Lowest water flow l/h	53	41	36	32

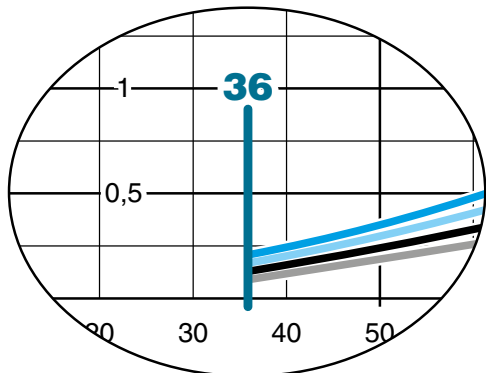
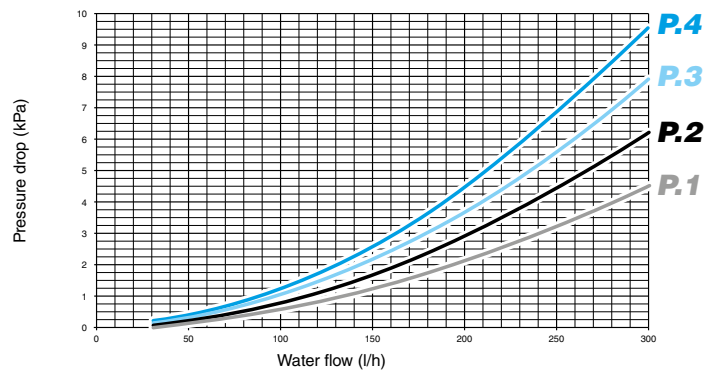
Pressure drop – Version P.IX/W.FIX/R.IX



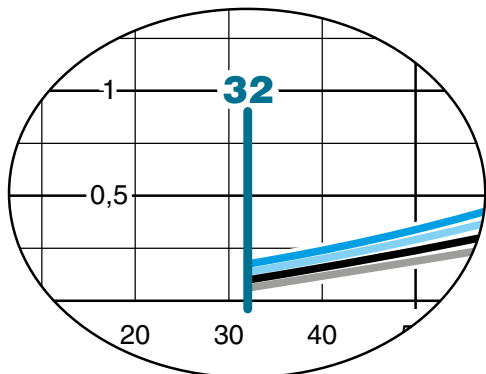
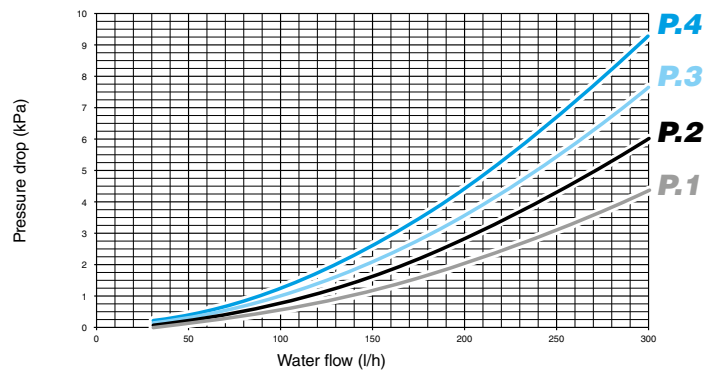
Entering water temperature = 40°C



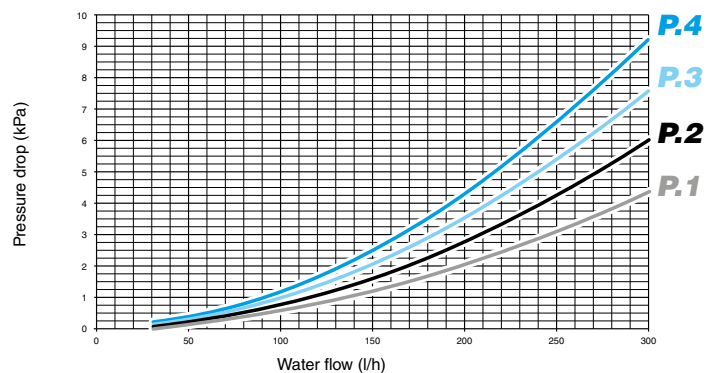
Entering water temperature = 60°C

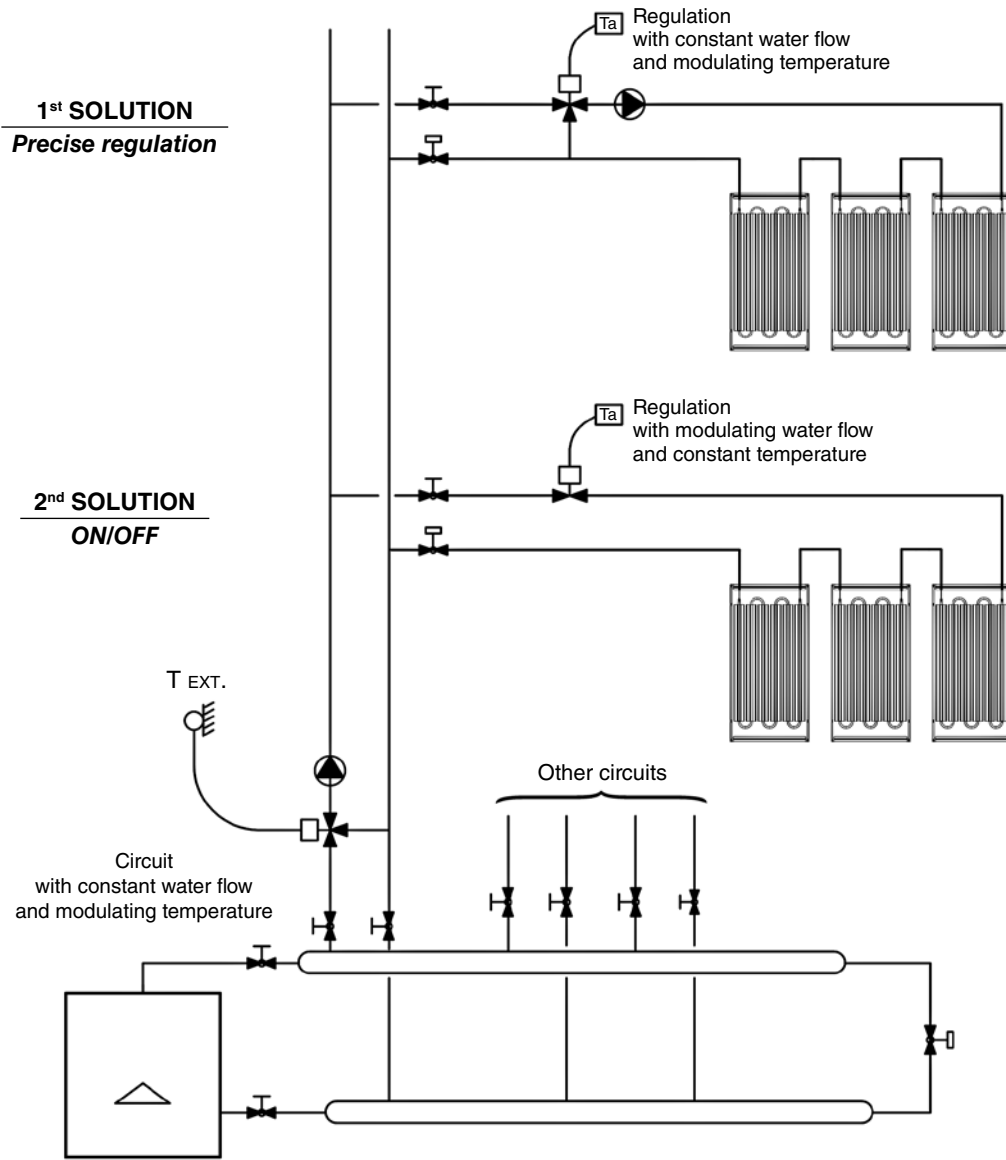


Entering water temperature = 70°C

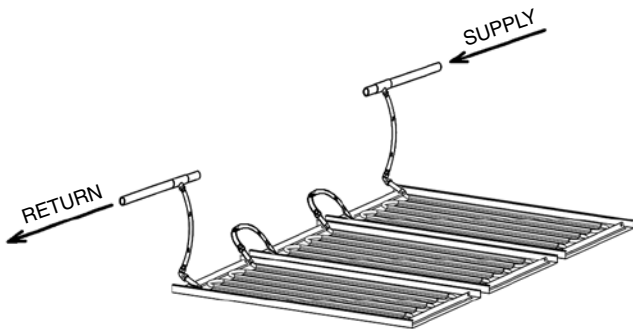


Entering water temperature = 80°C

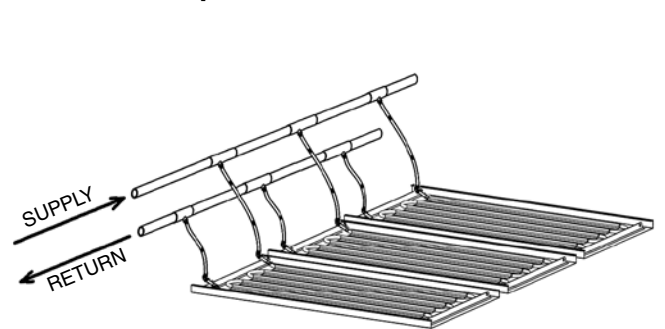




**Connection in series**



**Connection in parallel**



## Operating limits

<b>Water circuit</b>	Maximum entering water temperature: +90°C
	Maximum operating pressure: 8 bars

## Suggested lowest installation height

Maximum water temperature °C	m
50	2,5
60	2,7
70	2,9
80	3,1
90	3,3

(in m above the floor)

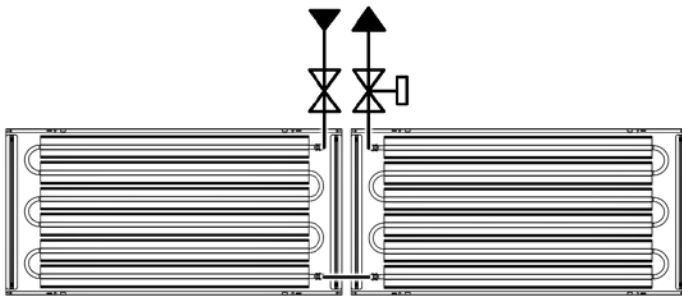
## Table of possible combinations

<b>P MODEL</b>		
Total length (m)	Composition without intermediate panel	Composition with intermediate panel (*)
1,20	P.1	–
1,80	P.2	–
2,40	P.3	–
3,00	P.4	P.1 + Panel 600 x 600 (mm) + P.1
3,60	2 x P.2	–
4,20	P.2 + P.3	P.2 + Panel 600 x 600 (mm) + P.2
4,80	2 x P.3	–
5,40	P.3 + P.4 or 3 x P.2	P.3 + Panel 600 x 600 (mm) + P.3
6,00	2 x P.4	–
6,60	2 x P.3 + 1 x P.2	P.4 + Panel 600 x 600 (mm) + P.4
7,20	3 x P.3	–
8,40	2 x P.4 + 1 x P.3	P.3 + Panel 600 x 600 (mm) + P.3 + Panel x 600 (mm) + P.3
9,00	3 x P.4	–

<b>W MODEL</b>		
Total length (m)	Composition without intermediate panel	Composition with intermediate panel (*)
1,20	W.1	–
1,80	W.2	–
2,40	W.3	–
3,00	W.4	W.1 + Panel 600 x 600 (mm) + W.1
3,60	2 x W.2	–
4,20	W.2 + W.3	W.2 + Panel 600 x 600 (mm) + W.2
4,80	2 x W.3	–
5,40	W.3 + W.4 or 3 x W.2	W.3 + Panel 600 x 600 (mm) + W.3
6,00	2 x W.4	–
6,60	2 x W.3 + 1 x W.2	W.4 + Panel 600 x 600 (mm) + W.4
7,20	3 x W.3	–
8,40	2 x W.4 + 1 x W.3	W.3 + Panel 600 x 600 (mm) + W.3 + Panel 600 x 600 (mm) + W.3
9,00	3 x W.4	–

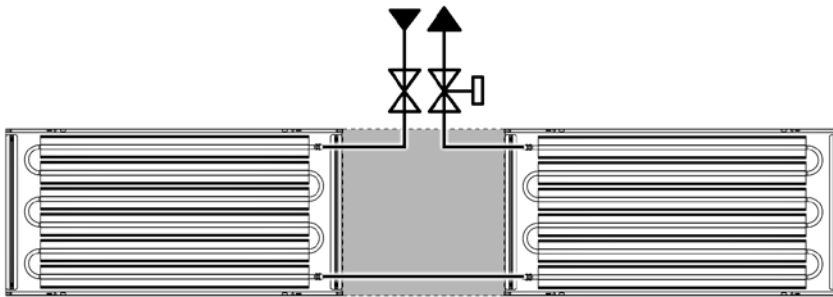
Longer length possible according to suitable  $\Delta p$

### Connection in series



**without intermediate panel**

Accessory:  
**TB-466** flexible pipe



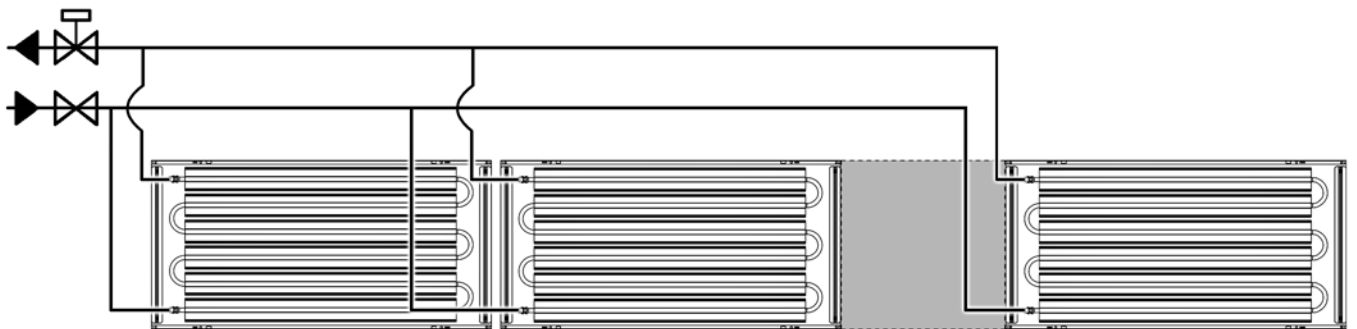
**with intermediate panel (\*)**

Accessory:  
**TC-1550** flexible pipe

### Connection in parallel

**with or without intermediate panel (\*)**

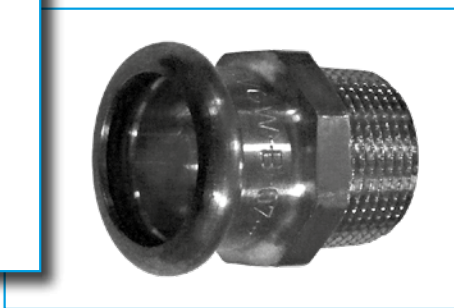
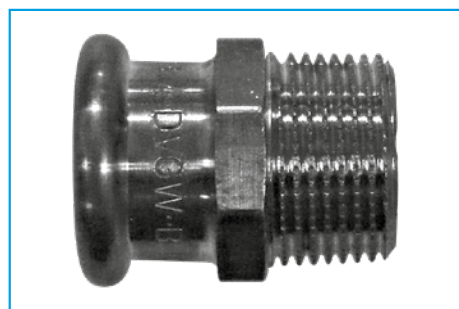
(⚠ lower water flow for panel)



(\*) This may be a false ceiling panel, a light or one of the **Pulsar** non-active aesthetic panels

**FITTINGS** (suitable for use up to 8 bars)

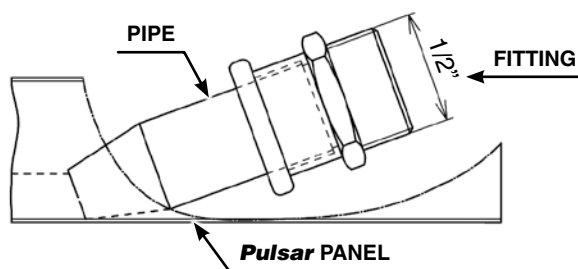
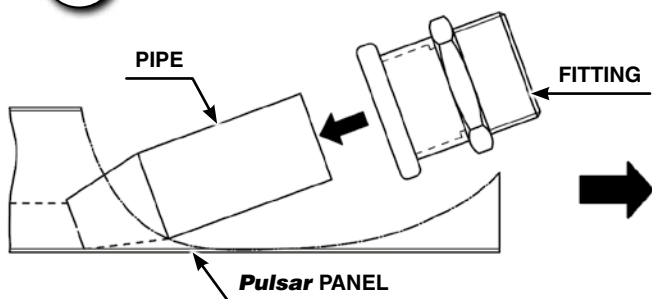
**Pressfittings (GEBERIT)**



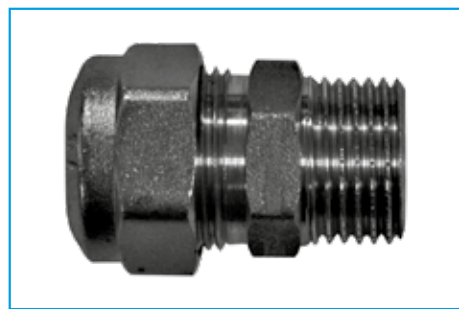
**Code 9084407**

**1**

**2**



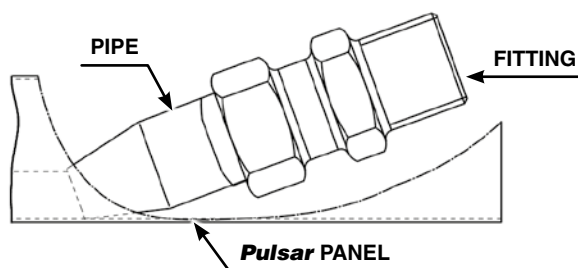
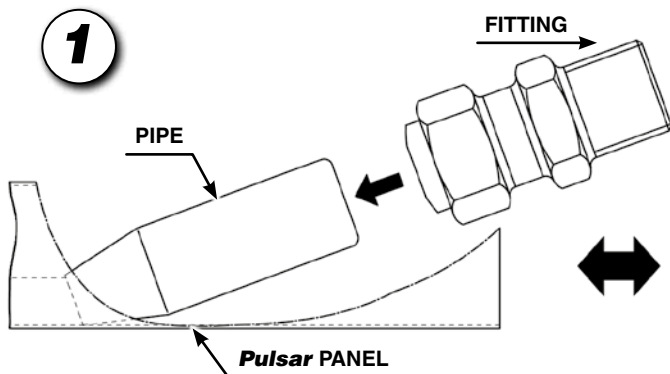
**Screw fittings (CALEFFI) – Torque: 25 Nm - Black O-ring only**



**Code 9084408**

**1**

**2**



**NOTE: two kits of fittings must be used for PA, PB, WA and WB panels (1 kit = 2 fittings).**

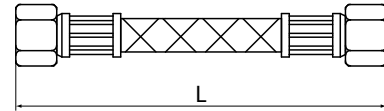


### Flexible pipe compliant with CSTB standard

- Diameter 1/2"
- Made of: EPDM rubber
- With external AISI 304 stainless steel layer
- Operation between -15°C and +90°C
- Suitable for use up to 8 bar
- Torque of 25-30 Nm

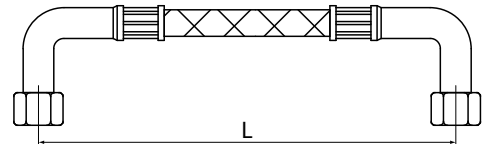
#### Straight flexible pipe – 1/2" female fittings

FLEXIBLE PIPE LENGTH (mm)	CODE	IDENTIFICATION	L (mm)
350	6084010	TA-370	375



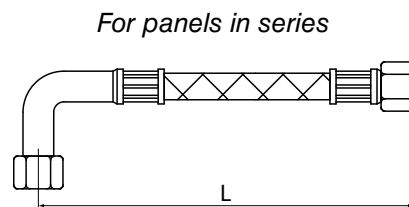
#### 90° flexible pipe – 1/2" female fittings

FLEXIBLE PIPE LENGTH (mm)	CODE	IDENTIFICATION	L (mm)
350	6084011	TB-466	485

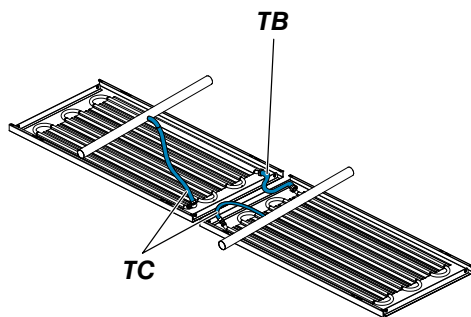


#### 90° / Straight flexible pipe – 1/2" female fittings

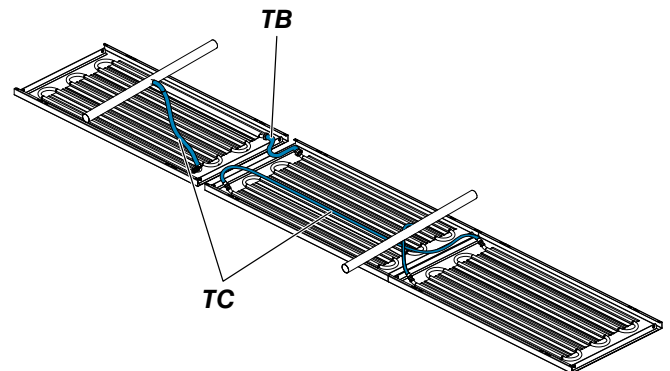
FLEXIBLE PIPE LENGTH (mm)	CODE	IDENTIFICATION	L (mm)
850	6084012	TC-950	985
1200	6084013	TC-1300	1300
1450	6084014	TC-1550	1540
2000	6084015	TC-2100	2120



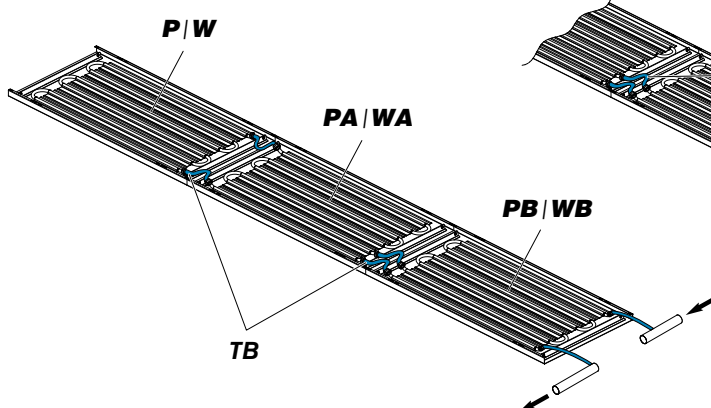
#### Assembly of 2 Standard Pulsar



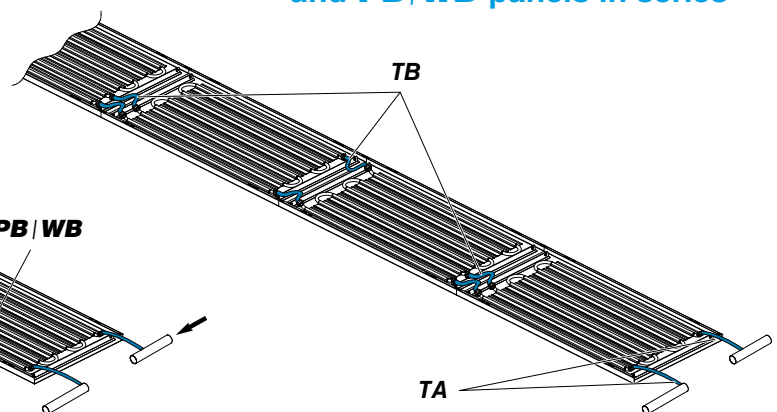
#### Assembly of 3 Standard Pulsar (for connections up to 2 m)



#### Assembly of 3 panels PA/WA and PB/WB

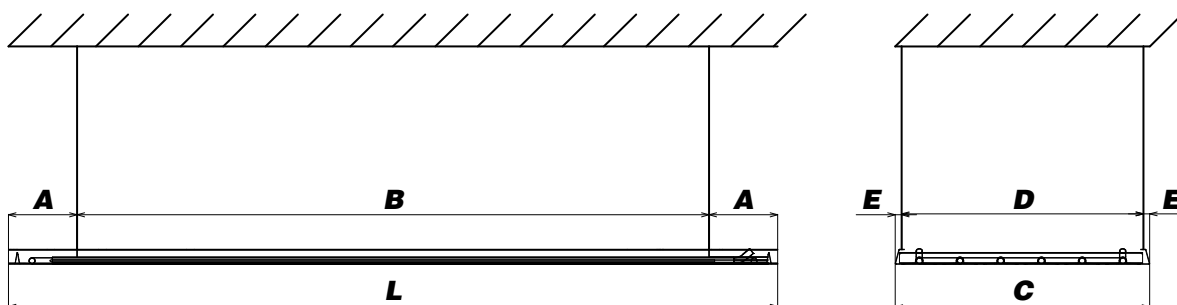


#### Assembly of several PA/WA and PB/WB panels in series



## Hanging brackets

### Versions P and W



WITH CLIP						
MODEL	L (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
P.1	1195	145	905	595	565	15
P.2	1795	145	1505	595	565	15
P.3	2395	385	1625	595	565	15
P.4	2995	535	1925	595	565	15
W.1	1234	197	840	610	595	7,5
W.2	1858	197	1464	610	595	7,5
W.3	2482	445	1592	610	595	7,5
W.4	3106	595	1916	610	595	7,5

The maximum vertical bending  $f$  of the Pulsar radiant panels between two suspension points is less than 2 mm.

## Suspension kits

### Installation with CLIP

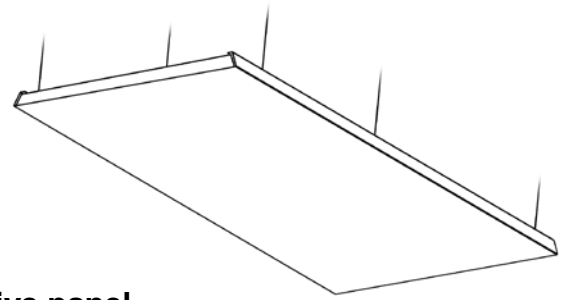
<b>KIT</b> <b>CODE</b>	<b>KIT</b> <b>CODE</b>	<b>KIT</b> <b>CODE</b>	<b>WIRE LENGTH (m)</b> <b>KIT</b> <b>CODE</b>	<b>WIRE LENGTH (m)</b> <b>KIT</b> <b>CODE</b>
KIT-A    9084411	KIT-T    9084412	KIT-TM   9084413	1        KIT-TC1 9084414	1        KIT-C1   9084416
			2        KIT-TC2 9084415	2        KIT-C2   9084417

The aesthetic panels are used when the active panels do not need to be installed and when, for aesthetic reasons or local specifications, a non-active panel has to be installed to complete a strip.

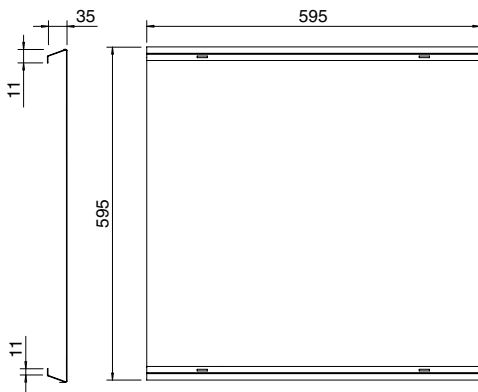
Available in 2 models:

SIZE	LENGTH (mm)	CODE
1	595	9084420
2	1195	9084421

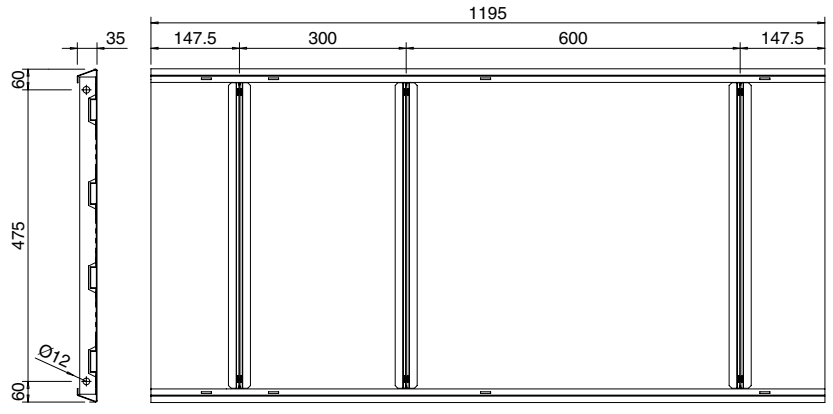
Can be cut to measure on site.



**600 non-active panel**



**1200 non-active panel**



Hanging holes on the lateral sides of the panel.

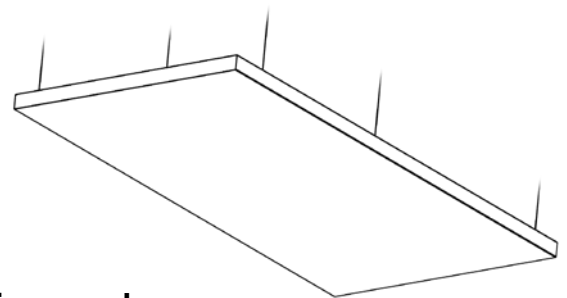
## Non-active aesthetic panel – Version W

The aesthetic panels are used when the active panels do not need to be installed and when, for aesthetic reasons or local specifications, a non-active panel has to be installed to complete a strip.

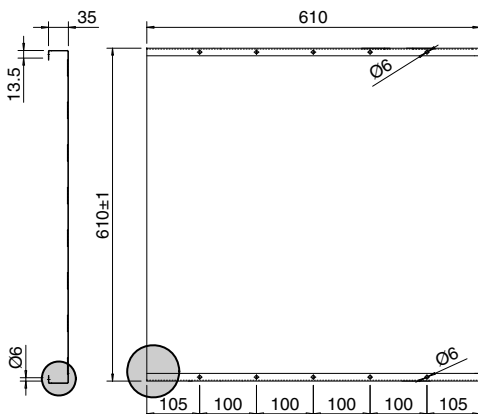
Available in 2 models:

SIZE	LENGTH (mm)	CODE
1	610	9084430
2	1234	9084431

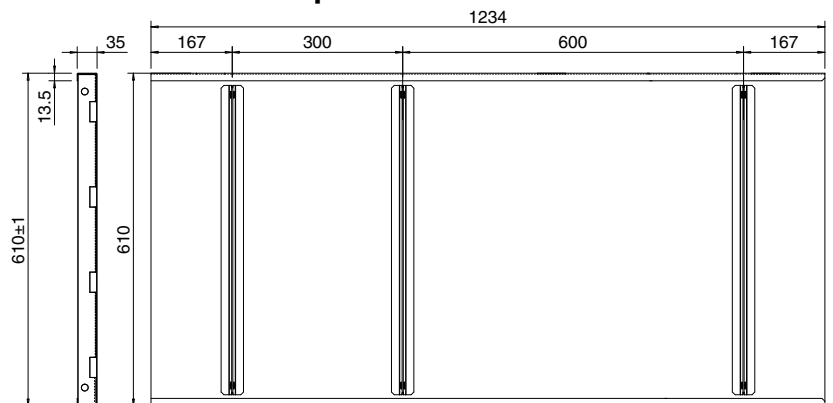
Can be cut to measure on site.



**600 non-active panel**



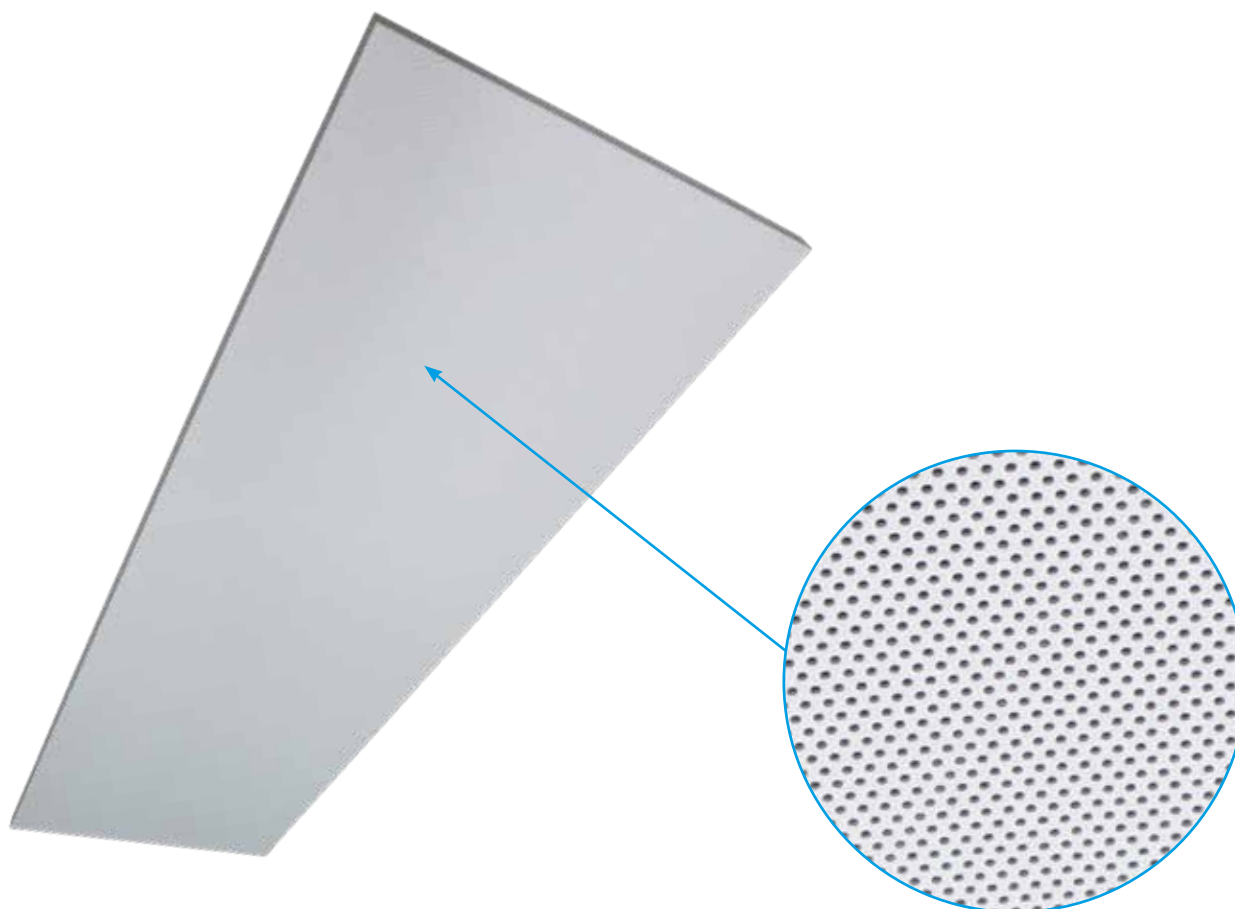
**1200 non-active panel**



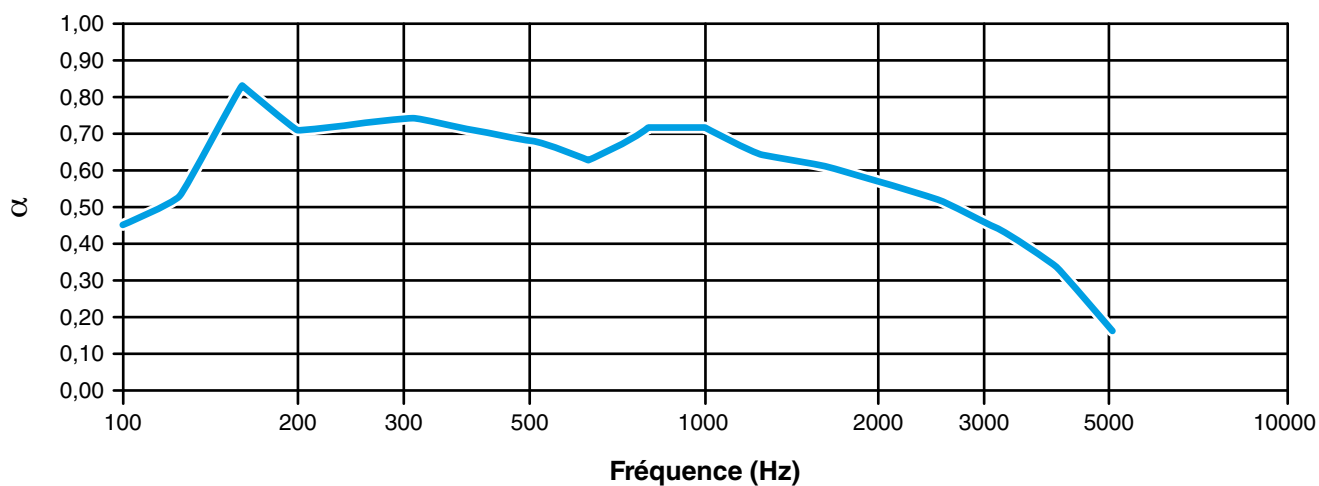
Hanging holes on the lateral sides of the panel.

Special version with perforated panel: it is supplied with extra thermal acoustic insulation, which allows the attenuation of noise reverberation in the room.

Weights and dimensions like **Standard panel**.



Sound absorption coefficient



$\alpha$  = Sound absorption coefficients





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