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**zehnder** *flatline*

**zehnder**



## **zehnder flatline**

### **Introduction**

Zehnder Flatline is a smooth, flat and lightweight panel used for heating and cooling in offices, schools and hospitals. A range of accessories including valves, flexible connections and hanging kits combined with the light weight make installation straightforward and cost effective. The options of a perforated surface for acoustic performance and anti-bacterial finish make the Zehnder Flatline a versatile and attractive product.

#### **Standard Features:**

- fully tested and compliant to EN 14037
- flat, completely smooth finish
- extremely lightweight and rigid aluminium and copper construction
- unique patented Zehnder push-fit connections to join panels together
- white powder coat finish
- 40mm insulation
- widths up to 1200mm
- panels can be connected together in lengths up to 9m for ceiling grid installations or 30m for freehanging applications
- peel-off plastic film protection

#### **Options:**

- 70° side profiles for installation into T-bar ceiling grid
- 90° side profile for freehanging installations
- anti-bacterial powder coat finish
- perforated finish for enhanced acoustic performance
- integrated cutouts for lights, grilles and ancillary fittings
- fully encapsulated insulation
- a range of flexible hoses for connecting to 15mm pipework
- internal or external threaded connections

#### **Operating Parameters:**

- max. working temperature: 90°C
- max. test pressure: 10 bar
- max. working pressure: 6 bar
- 4 fixing points per panel

#### **Product Specification ( [ ] denotes options):**

Manufactured from lightweight aluminium sheets of 1mm thickness fitted with 15mm diameter x 1mm wall thickness copper tubing. Supplied with push-fit connections for joining panels together. [15mm copper tube tails / threaded connections / flexible hoses with push-fit connectors] for connecting to pipework.

60mm side profiles with [90° angle for freehanging panels / 70° angle for ceiling grid installation].

Ceiling panel to be [perforated for acoustic performance to DIN EN ISO 354 / smooth, unperforated].

Heating output to be in accordance with En14037.

Cooling output to be in accordance with DIN 4715.

Insulation to be [foil wrapped / non-foil wrapped] 40mm factory fitted acoustic mat.  
Thermal conductivity 0.040, raw density min 30 kg/m<sup>3</sup>.






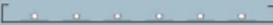


Panel finish to [standard white / anti-bacterial white] powder coat.

5 year warranty.




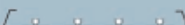



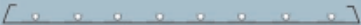
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### Profiles, Widths and Lengths

**90° angle profiles:** Ceiling panels are available with 90° angles in 7 widths for use as free hanging strips  
**Specification lengths:** 600, 1200, 1800, 2400, 3000 (others on request)

	Number of tubes	Approx. width of the panel (mm)	Specification Codes
	2	300	CF 300/2
	3	450	CF 450/3
	4	600	CF 600/4
	5	750	CF 750/5
	6	900	CF 900/6
	7	1050	CF 1050/7
	8	1200	CF 1200/8

**70° angle profiles:** Ceiling panels are available with 70° angles in 7 widths for use in ceiling grids  
**Specification lengths:** 590, 1190, 1790, 2390, 2990 (others on request)

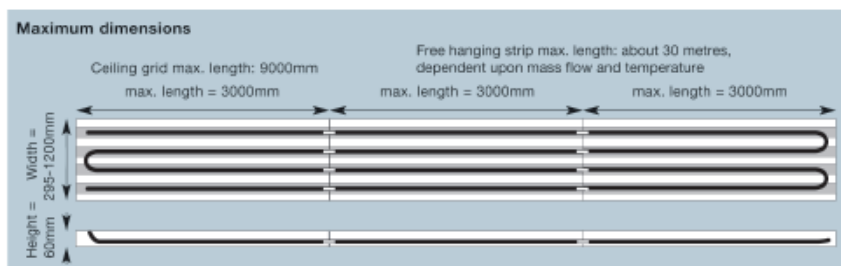
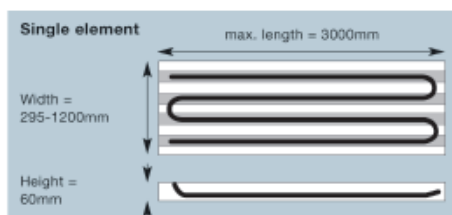
	Number of tubes	Approx. width of the panel (mm)	Specification Codes
	2	295	CF 295/2
	3	445	CF 445/3
	4	595	CF 595/4
	5	745	CF 745/5
	6	895	CF 895/6
	7	1045	CF 1045/7
	8	1195	CF 1195/8

Weights and water content								
Model code	CF	300/2	450/3	600/4	750/5	900/6	1050/7	1200/8
Model code	CF	295/2	445/3	595/4	745/5	895/6	1045/7	1195/8
Weight without water	kg/m	2,90	4,20	5,40	6,60	7,90	9,10	10,38
Insulation weight	kg/m	0,7	1	1,3	1,7	2,0	2,3	2,6
Water content	l/m	0,28	0,42	0,56	0,70	0,84	0,98	1,12

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### Panel Layouts

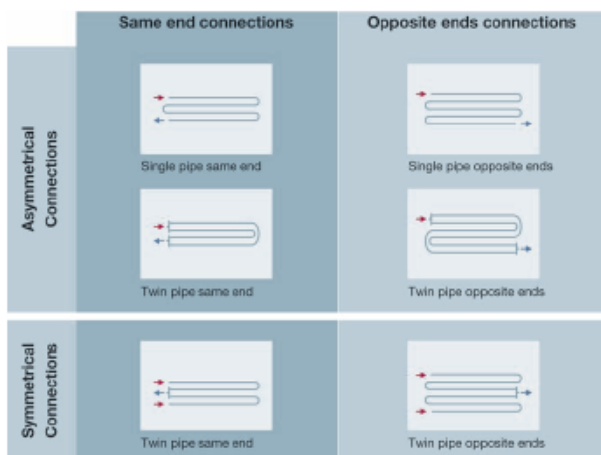
Zehnder Flatline panels have continuous 15mm diameter copper pipe coils. They are supplied with **Zehnder patented push-fit connections** and a range of flexible hoses (to order) to fit 15mm pipe-work.



### Panel Connections

Panels should be distributed throughout the room to provide an even distribution of radiant heat in accordance with the heat losses.

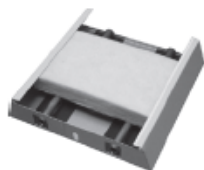
The configuration and number of pipes used for flow and return results from the mass flow necessary for the correct functioning of the panel.



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### **Panel Fixing and Connection Details**

#### **Panel Details**



Zehnder Flatline  
CF 295/2 70° angle



Zehnder Flatline  
CF 295/2 70° angle

#### **Push-Fit Connection**



#### **Standard Connection**



Copper tube 15mm or 22mm  
to connect to push-fitting

#### **Threaded Connection Option on request (extra cost)**

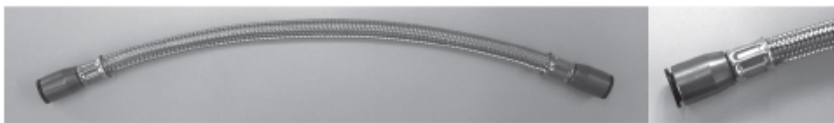


External thread 1/2" or 3/4" to  
connect with internal thread



Internal thread 1/2" or 3/4" to  
connect with external thread

#### **Connection Details**



Flexible hoses with push-fit connections (for copper tube 15mm or 22mm) are available in 500mm and 1000mm standard lengths. 250mm, 750mm, 1250mm, 1500mm and 2000mm available to order.

#### **Fixing Options**



Mounting kit for  
wooden beams  
(KN72)



Mounting kit for  
concrete ceilings  
(KN73)



Mounting kit for  
trapezoidal steel sheets  
(KN76)



Mounting kit for  
steel girders  
(KN78)

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### Outputs

#### Heating Output

The Zehnder Flatline radiant heating output has been tested to, and is fully compliant with, EN 14037 certification, which tests panels with insulation in place. Radiant output ( $\approx 70\%$ ) is proportional to the fourth power of the surface temperature in Kelvin. The Zehnder Flatline is extremely efficient in that the temperature of the radiating surface is very close to the LPHW temperature. Heat losses for spaces heated by radiant panels should be calculated in the normal way. However it should be borne in mind that with radiant heating, comfort conditions are achieved with an air temperature which is typically 3K (Kelvin) lower than conventional heating.

Heating output data							
Width	300/2	450/3	600/4	750/5	900/6	1050/7	1200/8
$\Delta T$	295/2	445/3	595/4	745/5	895/6	1045/7	1195/8
K	W/m	W/m	W/m	W/m	W/m	W/m	W/m
5	12	16	20	24	28	32	36
10	27	37	47	56	65	74	83
15	43	60	76	91	105	120	135
20	60	84	107	128	149	170	191
25	78	109	140	168	195	222	249
30	96	136	175	209	242	275	310
35	115	163	211	251	291	332	372
40	135	191	247	295	342	390	437
45	155	220	285	340	394	448	503
50	175	249	323	385	447	509	570
55	196	279	363	432	501	570	639
66.5	202	288	375	446	517	599	660
60	217	309	403	480	556	633	709
65	238	340	443	528	612	695	780
70	260	371	485	577	669	761	852

#### Cooling Output

The Zehnder Flatline radiant cooling output has been tested to, and is fully compliant with, DIN 4715 certification. Ceilings used for cooling operate on the same principles of radiation and convection as radiant heating. The warm air rises through convection and the heat is transferred to the cooling ceiling. The cooled air flows back into the room through convection. Approximately 40% of the heat absorption by the ceiling is based on convection, with 60% being heat radiated from the warm surfaces, but the relationship between radiation and convection generally depends on the type of ceiling panel and the ambient temperature of the surroundings.

Cooling output data							
Width	300/2	450/3	600/4	750/5	900/6	1050/7	1200/8
$\Delta T$	295/2	445/3	595/4	745/5	895/6	1045/7	1195/8
K	W/m	W/m	W/m	W/m	W/m	W/m	W/m
1	2	4	5	7	8	9	11
2	5	8	10	13	16	19	22
3	8	12	16	20	25	29	33
4	10	16	21	27	34	39	45
5	13	20	27	34	42	49	56
6	16	24	32	41	51	59	68
7	18	28	38	49	60	69	80
7.5	19	30	41	52	64	74	85
8	21	32	44	56	68	80	91
8.5	22	34	46	59	73	85	97
9	23	36	49	63	77	90	103
10	26	40	55	70	86	100	115
11	29	44	60	77	95	111	127
12	32	48	65	85	104	121	139
13	34	53	72	92	113	131	151
14	37	57	78	99	122	142	163