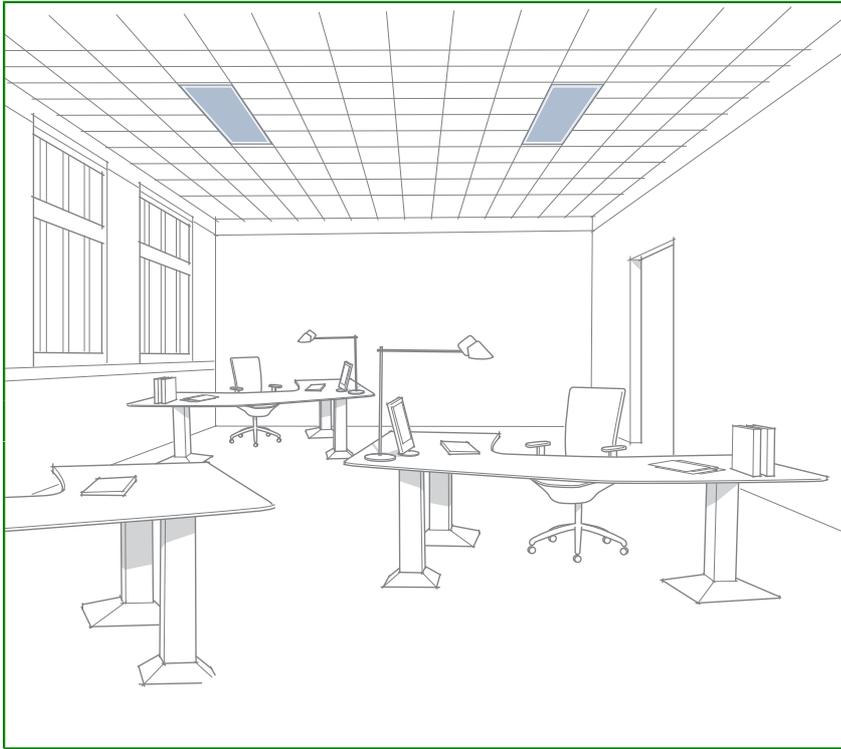


Passive chilled beams QPVA and QPBA



Functions

- Cooling
- Controls

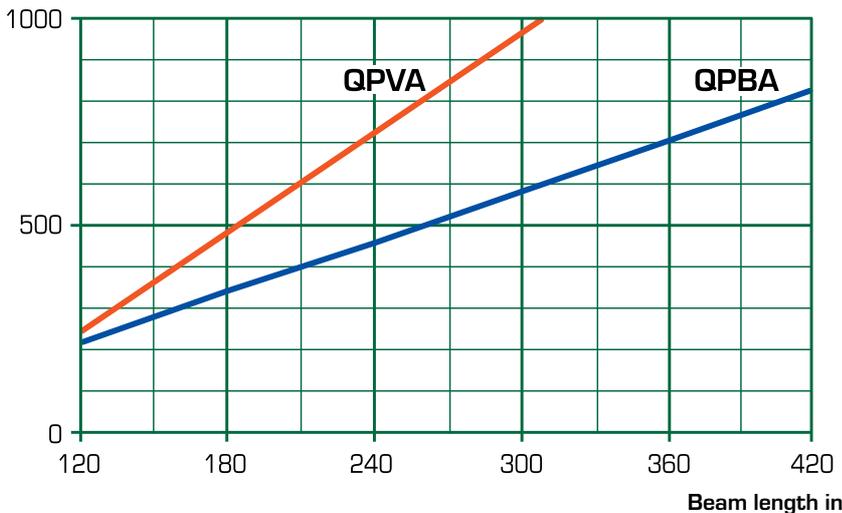


The Flexicool® QPVA and QPBA passive chilled beams provide for the cooling in a room. QPVA (width 570 mm) and QPBA (width 430 mm) are broad passive chilled beams. The passive chilled beams are either ceiling installed, in which case they lie flush with the suspended ceiling, or free space installed without ceiling.

The passive chilled beams are available in lengths 1,2 - 4,2 m at 60 cm intervals. In installations with passive chilled beams the air is supplied by means of separate supply air valves.

Quick Selection

Cooling effect in incl supply air



The diagram shows the approximate cooling effect, P_{tot} in W with water flow, $q_v = 0,05$ l/s difference between room air temperature and average water temperature = 8 °C and max sound pressure level LA10 = 30 dB(A). 1)

Product Facts

- Passive chilled beams QPBA and QPVA for ceiling installation or free space installation
- Coil and casing are easy to clean
- Adapted control and adjustment equipment and lighting available as accessories
- Quick and easy installation with suspension rods.

Product code example

430 mm wide passive chilled beam QPBA manufactured by Fläkt Woods, length 240 cm. Chilled beam QPBA-240-1 for individual installation.

Main data, range, variants and accessories

Main data for QPBA and QPVA

Cooling effect	ca 260 W/m ($\Delta t = 10^{\circ}\text{C}$)
Heights	142 mm
Widths	290, 430, 570 mm
Lengths	1,2 - 4,2 m at 10 cm intervals

The circulating room air flow through the chilled beam is determined by the temperature difference (actually density difference) in- and outside the beam, together with beam height.

Our range of passive chilled beams

QPBA

Width = 430 mm.

Height = 142 mm.

Lengths = 1,2 - 4,2 m at 10 cm intervals.

The bottom plate is perforated with 50% free area.

QPVA

Width = 570 mm.

Height = 140 mm.

Lengths = 1,2 - 4,2 m at 10 cm intervals.

The bottom plate is perforated with 50% free area.

Material and surface finish

The casing is made of galvanized steel sheet and it is powder painted in white NCS 0502-Y, gloss level 30 (corresponds to RAL 9010).

The casing is also available in other colours. When ordering, the desired colour should be specified in writing.

The cooling coil is made of copper pipe with connection 15 mm and aluminium fins. Maximum working pressure 1,6 MPa.

Placing of coil in the casing

In the standard construction, the casing length is 10 cm longer than the effective length (coil length). The coil is placed centrally. To adapt to room dimensions, or to obtain space for control and adjustment equipment or for an overhead connection of supply air and water, the beam casing can be extended from the standard length. The coil can be placed as desired on the longitudinal axis of the casing.

Variants and accessories

Purging nipple of the coil

Required if the beam constitutes a high point in the piping system. Placed in the return pipe.

Casing adapter

An adapter having the same form as the beam can be used to adjust the beam length to the desired measurement or to be placed between beams in case of series connection.

Series connection is described in the chapter "System and project design".

In the normal design, the adapter has open end walls to allow the penetration of duct and water pipes. If a solid end wall is required, this must be mentioned in the order.

The bottom plate of the adapter can easily be removed in order to make e.g. duct or pipe connections.

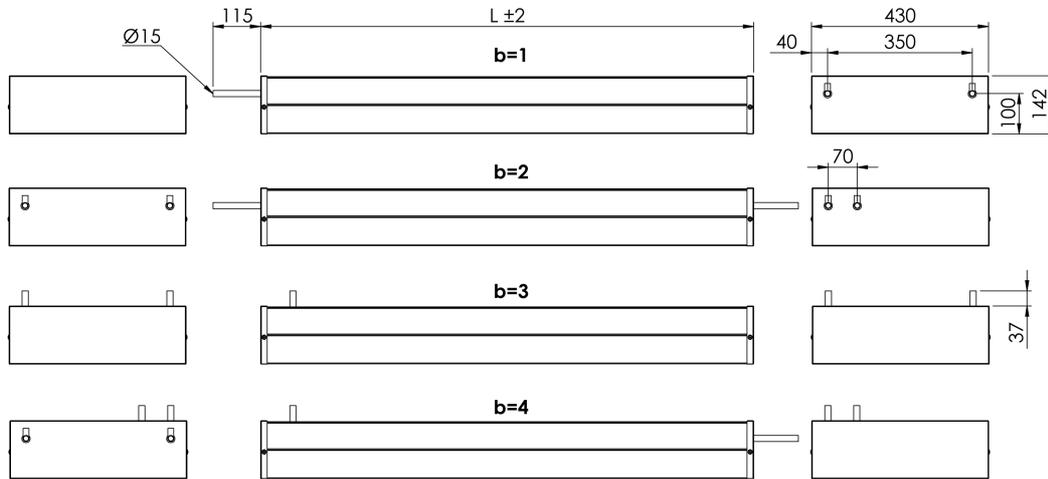
Hoses, water

Used for connection to the pipe system and in case of series connection of beams. Length = 210 mm.

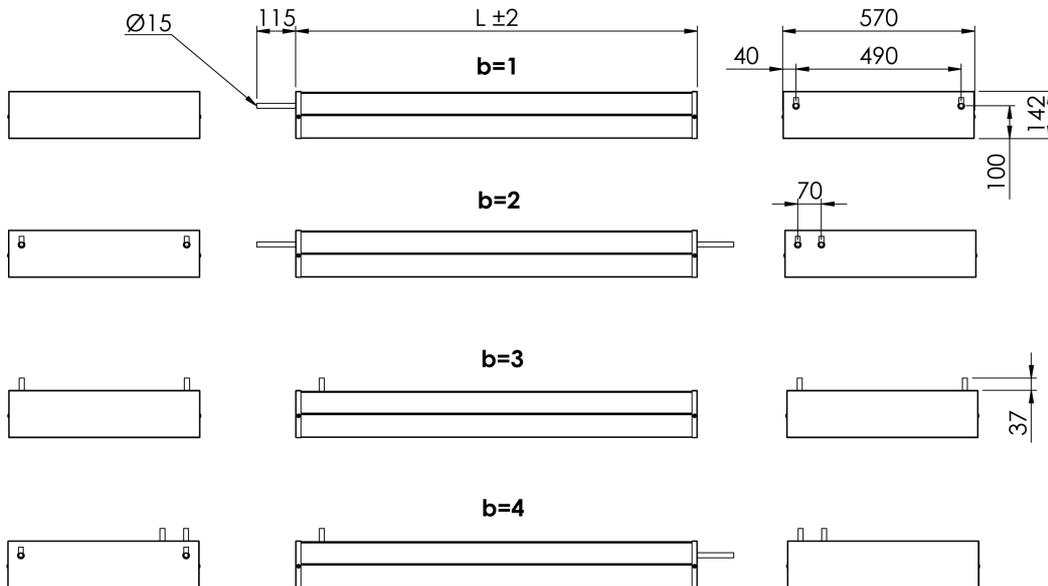
Dimensions and weights

Dimensions and weights

QPBA



QPVA



L = Nominal length-8 mm

Example: $L = 2400 - 8 = 2392$ mm

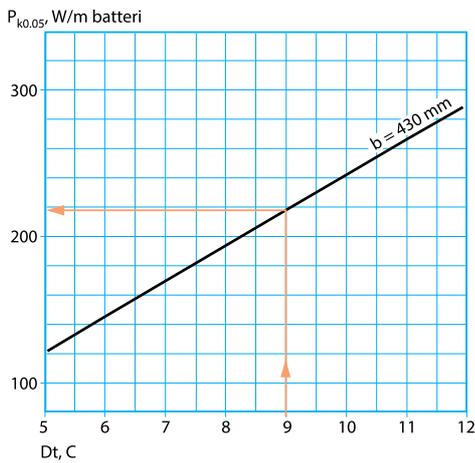
Technical data – cooling

Definitions

L	Casing length, m
L_{eff}	Effective length = coil length, m
b	Beam width, mm
Pk	Cooling effect, W or W/m L_{eff}
$Pk_{0,05}$	Cooling effect with water flow 0.05 l/s, W or W/m L_{eff}
q_w	Water flow, l/s
t_r	Room temperature, °C
Δt_w	Temperature difference between inlet and outlet water, °C
t_{mw}	Mean temperature, water, °C
Δt	Temperature difference between ($t_r - t_{mw}$) for cooling, °C
Δp_w	Pressure drop water, kPa
P_wL	Cooling effect on the water connection side/meter and beam.

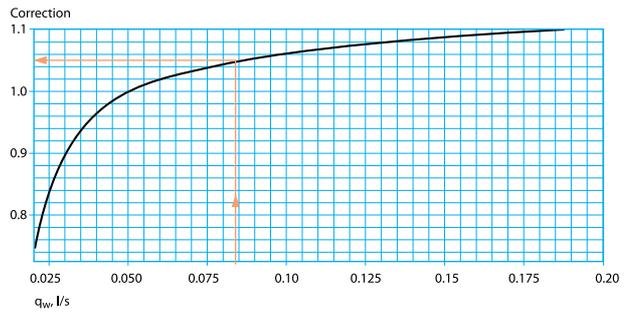
Cooling effect in W/m effective length, $Pk_{0,05}$ for chilled beam QPBA (430 mm), QP(S,D)A (290mm)

Water flow = 0,05 l/s

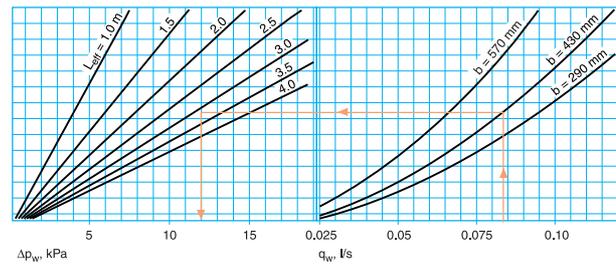


°C. The temperature difference between room air and water should in this case be increased by 1 - 2 °C. This is because in the actual conditions, the beam will produce a higher effect.

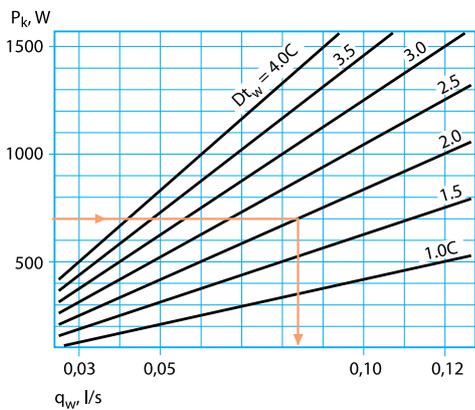
Correction of cooling effect for water flows other than 0.05 l/s



Pressure drop water, kPa



Water flow l/s



Note! The diagram is based on tests performed according to the method V (future Nordtest), which gives a very small temperature difference between the air entering the beam and the average temperature at 1.1 m above floor surface. In actual conditions with relatively concentrated heat sources, the temperature difference can be 1 - 2

Tecnical data - cooling, dimensioning example

Air velocity below chilled beam

The tabel shows the velocity below the chilled beam, at different cooling capacities. The values are valid for a room without external influences, like heating sources or other air movements that affect the velocity below the chilled beam.

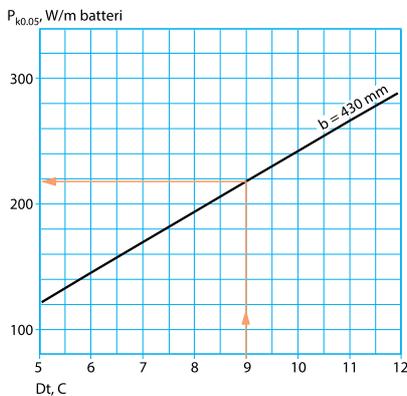
Velocities below chilled beam				
Chilled beam	Cooling cap./ active m. [W/m]	Distance below beam [m]		
QPBA	150	0.19	0.13	0.07
	200	0.25	0.18	0.09
	250	0.31	0.22	0.12
GPVA	200	0.19	0.14	0.07
	300	0.29	0.20	0.11
	400	0.39	0.27	0.14

Requirements:

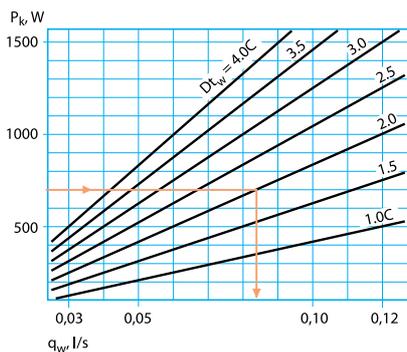
- Maximum beam length 3,6 m
- Cooling effect 700 W
- Room temperature 24°C
- Cooling medium temperature 14 - 16°C
- Construction with perforated bottom plate, QP

Result, cooling:

Temperature difference between air and water $\Delta t = 24 - (14 + 16)/2 = 9^\circ \text{C}$. The diagram "Cooling effect in W/m effective length, $P_{k0,05}$, for chilled beam QP(S, B)A" gives for wide passive beam with perforated bottom plate and water flow 0,05 l/s: $P_{k0,05} = 218 \text{ W/m}$.

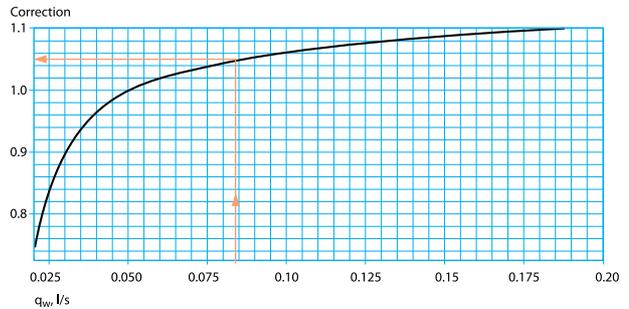


The diagram "Water flow, l/s" on page 59 results in water flow $q_w = 0,083 \text{ l/s}$ for $\Delta t_w = 2^\circ \text{C}$ and cooling effect 700 W.



Correction for water flow, on basis of the diagram

"Correction of cooling effect for water flow other than 0.05 l/s" is obtained $K = P_k / P_{k0,05} = 0,083 / 0,05 = 1,05$. The actual effect is therefore 5 % higher than the result given by the diagram, due to the higher water flow.



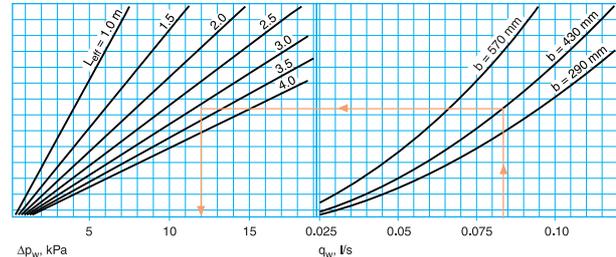
$$P_k = 1,05 \times 218 = 229 \text{ W/m}$$

$$\text{Required effective length (coil length) } L_{\text{eff}} = 700 / 229 = 3,1 \text{ m.}$$

$$\text{Casing length } L = 3,1 + 0,1 = 3,2 \text{ m.}$$

It is thus not necessary to use the maximum casing length 3.6 m.

The diagram "Pressure drop water" on page 59 gives the pressure drop of water across the coil $\Delta p_w = 12 \text{ kPa}$



Select the QPBA-320-1

If the temperature of the air flowing into the beam is 1°C above room temperature (measured at 1.1 m above floor surface), the result is $\Delta t = 25 - (14 + 16)/2 = 10^\circ \text{C}$ and not 9°C, as in the above example.

On basis of this requirement, the necessary effective length will be 2.8 m instead of 3.1 m.

Product code, product code - accessories

Product code		Accessories	
Main code		Beam attachments	QFAZ-18-a-b
Passive chilled beam, standard	QabA-ccc-d	Set with 2 pcs. One set per beam.	
Construction: beam underside (a)		For beam length (a)	
P = perforated		2 = 430 mm (QPBA)	
Beam width (b)		4 = 570 mm (QPVA)	
B = 430 mm		Surface finish (b)	
V = 570 mm		1 = unpainted	
Length, cm (ccc)		2 = painted, standard white	
120-420, with 10 cm interval		Suspension brackets	QFAZ-11-a
Construction (d)		Two pieces per beam.	
1 = for individual installation		For beam width (a)	
2 = for series connection		2 = 430 mm (QPBA)	
3 = for individual installation, upwards connection		4 = 570 mm (QPVA)	
4 = for series connection , upwards connection		Suspension rods M8, set	QFAZ-12
Note! In the standard construction, the casing is 10 cm longer than the effective length (coil length). The coil is placed centrally.		Length = 500 mm. Two sets per beam.	
Plus codes		Casing adapter	QFBZ-13-a-bbb
Overall plastic coating for the beam	QFAZ-16	The fitting piece has open end walls. The length 40 cm is used when installation beams in series.	
For protection prior to use		For beam (a)	
Purging nipple	IQAZ-32-15-0	6 = QPBA	
		7 = QPVA	
		Length, cm (bbb)	
		040, 060, 090, 120	
		Set of hoses, water (2 pcs. hoses)	QFAZ-05
		Length = 210 mm. Tightening ring coupling 15 mm.	
		Control equipment and lighting are described in a separate section of this catalogue.	