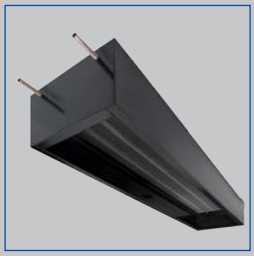
Passive chilled beams
Type PKV

PKV with frame, with perforated metal facing



PKV without perforated metal facing, RAL 9005, black

Eurovent-Zertifizierung

Tested to VDI 6022

Passive chilled beam in nominal lengths of up to 3000 mm and with a horizontal heat exchanger

Passive chilled beam with 2-pipe heat exchanger for ceiling installation, either freely suspended or above an open cell ceiling

- For room heights from 2.60 m
- Comfortable room cooling
- Water connection from the side or from the top
- 3 standard widths and heights for optimum dissipation of heat loads

Optional equipment and accessories

- Control equipment
- Aluminium frame with perforated metal facing
- Heat exchanger powder-coated black
- Powder coating in many different colours, e.g. RAL CLASSIC

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Application

Application
- Passive chilled beam of Type PKV for ceiling installation, either freely suspended or above an open cell ceiling, suitable for room heights from 2.60 m
- Passive chilled beam (no supply air) for new buildings and refurbishment projects
- Dissipation of high heat loads using a 2-pipe heat exchanger
- Energy-efficient solution since water is used for cooling

Special characteristics
- Air-water component for the dissipation of heat loads
- Horizontal heat exchanger as 2-pipe system
- Aesthetic frame and perforated metal facing for freely suspended installation in comfort zones
- Water connections at the narrow side, Ø12 mm Cu pipe, with plain tails, either straight or 90° bent upwards

Nominal sizes
- Nominal length: 1000, 1500, 2000, 2500, 3000 mm
- Nominal width: 295, 455, 575 mm
- Nominal height: 110, 200, 300 mm
- Width of heat exchanger: 280, 440, 560 mm

Description

Variants
- PKV-0: Casing and heat exchanger
- PKV-L: Including perforated metal facing
- PKV-R-L: Including frame and perforated metal facing

Construction
- PKV-0 (without frame): Powder-coated RAL 9005, black, gloss level 70 %
- PKV-L (with perforated metal facing): Powder-coated RAL 9010, pure white, gloss level 50 %
- PKV-R-L (with frame and perforated metal facing): Powder-coated RAL 9010, pure white, gloss level 50 %
- P1: Powder-coated in any other RAL colour, gloss level 70 %
- G3: Heat exchanger, powder-coated RAL 9005, black, gloss level 70 %

Attachments
- Frame
- Perforated metal facing

Useful additions
- Connecting hoses
- Control equipment consisting of control panel including a controller with integral room temperature sensor; valve and valve actuator; and lockshield
- X-AIRCONTROL control system

Materials and surfaces
- Casing and perforated metal facing made of galvanised sheet steel
- Frame (PKV-R) made of aluminium
- Heat exchanger with copper tubes and aluminium fins, and with galvanised flanges
- Casing without frame: powder-coated black (RAL 9005) as standard
- Casing with frame and/or perforated metal facing: powder-coated pure white (RAL 9010) as standard

Standards and guidelines
- Products are certified by Eurovent (no. 09.12.432) and listed on the Eurovent website
- Declaration of hygiene conformity to VDI 6022

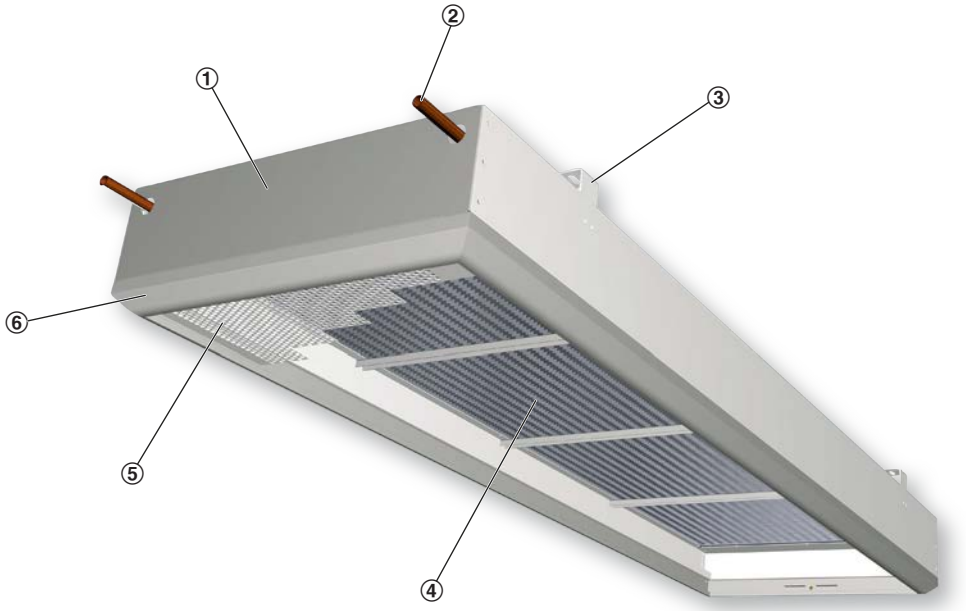
Maintenance
- No moving parts, hence low maintenance
- The heat exchanger can be vacuumed with an industrial vacuum cleaner if necessary
- VDI 6022, Part 1, applies (Hygiene requirements for ventilation and air-conditioning systems and units)

Functional description

Passive chilled beams are used to dissipate high heat loads.

Warm room air rises due to thermal buoyancy, is cooled by the heat exchanger, then slowly flows downwards again to the occupied zone.

Schematic illustration of the PKV



① Casing
② Water connections, Ø12 mm, straight (90° bent upwards as an option)
③ Hanging bracket
④ Heat exchanger
⑤ Perforated metal facing (optional)
⑥ Aluminium frame (optional)

Length	1000, 1500, 2000, 2500, 3000 mm
Height	110, 200, 300 mm
Width	295, 455, 575 mm
Width of heat exchanger	280, 440, 560 mm
Cooling capacity	Up to 1000 W
Max. operating pressure, water side	6 bar
Max. operating temperature	75 °C

The quick sizing table lists standard cooling capacities. For other operating points you may use the Easy Product Finder design software.

Quick sizing – nominal cooling capacity [W] to EN 14518

Length	Width	Height	$\Delta t_{Wm\text{-}Ref}$ = 8 K; Δt_W = 2 K		
			Distance to ceiling		
			100 mm	200 mm	300 mm
mm			W		
1000	295	110	72	76	76
		200	92	98	98
		300	110	117	117
1500		110	120	128	128
		200	162	174	175
		300	203	218	219
2000		110	182	197	198
		200	253	271	272
		300	310	330	331
2500		110	256	274	275
		200	342	364	365
		300	409	433	435
3000		110	328	349	350
		200	426	451	453
		300	504	532	534
1000	455	110	95	108	112
		200	123	142	149
		300	150	178	187
1500		110	178	213	224
		200	249	290	302
		300	304	347	361
2000		110	291	334	347
		200	377	426	441
		300	442	497	513
2500		110	392	442	457
		200	493	552	570
		300	572	638	658
3000		110	486	544	562
		200	604	674	696
		300	698	777	801
1000	575	110	111	135	139
		200	149	191	198
		300	190	242	250
1500		110	244	300	307
		200	324	384	392
		300	382	446	455
2000		110	421	443	452
		200	472	546	556
		300	543	625	637
2500		110	498	575	585
		200	610	700	713
		300	697	799	813
3000		110	612	702	797
		200	744	852	867
		300	848	970	987

This specification text describes the general properties of the product. Texts for variants can be generated with our Easy Product Finder design programme.

Description

Passive chilled beams of Type PKV, without frame for installation above open cell ceilings, or with frame for freely suspended installation, suitable for the dissipation of high heat loads.

Special characteristics
- Air-water component for the dissipation of heat loads
- Horizontal heat exchanger as 2-pipe system
- Aesthetic frame and perforated metal facing for freely suspended installation in comfort zones
- Water connections at the narrow side, Ø12 mm Cu pipe, with plain tails, either straight or 90° bent upwards

Materials and surfaces
- Casing and perforated metal facing made of galvanised sheet steel
- Frame (PKV-R) made of aluminium
- Heat exchanger with copper tubes and aluminium fins, and with galvanised flanges
- Casing without frame: powder-coated black (RAL 9005) as standard
- Casing with frame and/or perforated metal facing: powder-coated pure white (RAL 9010) as standard

Construction
- PKV-0 (without frame): Powder-coated RAL 9005, black, gloss level 70 %
- PKV-L (with perforated metal facing): Powder-coated RAL 9010, pure white, gloss level 50 %
- PKV-R-L (with frame and perforated metal facing): Powder-coated RAL 9010, pure white, gloss level 50 %
- P1: Powder-coated in any other RAL colour, gloss level 70 %
- G3: Heat exchanger, powder-coated RAL 9005, black, gloss level 70 %

Technical data
- Length: 1000, 1500, 2000, 2500, 3000 mm
- Height: 110, 200, 300 mm
- Width: 295, 455, 575 mm
- Width of heat exchanger: 280, 440, 560 mm
- Cooling capacity: up to 1000 W
- Max. operating pressure, water side: 6 bar
- Max. operating temperature: 75 °C

PKV

PKV – R – L – G – W / 2500 × 440 × 200 / P1 – RAL ... / G3 / VS

1 2 3 4 5 6 7 8 9 10 11

1 Type
PKV Passive chilled beam

2 Aluminium frame
No entry: none
R With

3 Perforated metal facing
No entry: none
L With

4 Water connection
G Pipe connection, Ø12 mm, straight
B Pipe connection, Ø12 mm, 90° bent upwards

5 Suspension
W Hanging brackets

6 Length [mm]
L
1000
1500
2000
2500
3000

7 Width [mm]
B
280
440
560

8 Height [mm]
H
110
200
300

9 Surface of casing
No entry: no frame,
RAL 9005, black
No entry: with frame and/or perforated metal facing,
RAL 9010, pure white
P1 Powder-coated, specify RAL CLASSIC colour

Gloss level
RAL 9010 50 %
RAL 9006 30 %
All other RAL colours 70 %

10 Surface of heat exchanger
No entry: untreated
G3 RAL 9005, black

11 Valves and actuators
No entry: none
VS With

Order examples

PKV-G-W/2000×455×110

Water connection	Pipe connection, Ø12 mm, straight
Suspension	Hanging brackets
Length	2000 mm
Width	455 mm
Height	110 mm

PKV-R-L-B-W/3000×575×110/P1 RAL 9016/G3/VS

Aluminium frame	With
Perforated metal facing	With
Water connection	Water connections, Ø12 mm, 90° bent upwards
Suspension	Hanging brackets
Length	3000 mm
Width	575 mm
Height	110 mm
Surface of casing	P1 RAL 9016, traffic white
Surface of heat exchanger	RAL 9005, black
Valves and actuators	With

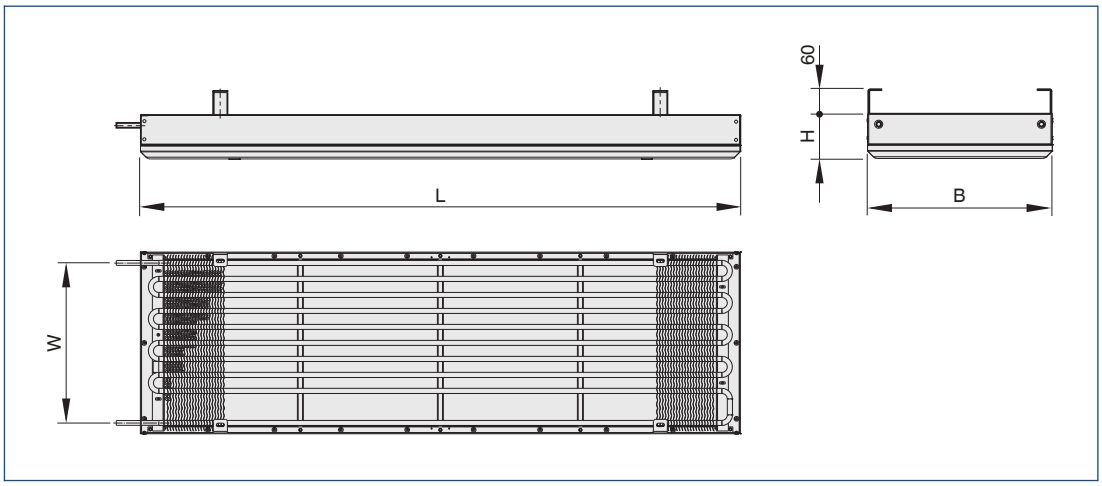
Product examples

PKV without perforated metal facing

PKV with frame, with perforated metal facing

PKV without frame, with perforated metal facing

PKV-R



Dimensions [mm]

L	100, 1500, 2000, 2500, 3000
B	295, 455, 575
W	240, 400, 520
H	110, 200, 300

Weights

Variant	B	L_N														
		1000			1500			2000			2500			3000		
		H														
		110	200	300	110	200	300	110	200	300	110	200	300	110	200	300
PKV-0	295	9	11	13	12	15	18	15	19	23	18	23	28	22	27	33
	455	11	14	16	14	18	21	18	23	26	22	27	32	26	32	37
	575	12	15	17	17	21	24	22	27	31	26	32	36	31	37	43
PKV-L	295	10	12	14	14	17	20	18	22	26	21	26	31	26	31	37
	455	12	15	17	17	21	24	22	27	30	27	32	37	32	38	43
	575	14	17	19	21	25	28	26	31	35	32	38	42	38	44	50
PKV-R-L	295	12	14	16	17	20	23	21	25	29	26	31	36	31	36	42
	455	14	17	19	20	24	27	26	31	34	32	37	42	37	43	48
	575	16	19	21	24	28	31	31	36	40	37	43	47	44	50	56
Contained water	295	0.5	0.5	0.5	0.8	0.8	0.8	1.0	1.0	1.0	1.3	1.3	1.3	1.5	1.5	1.5
	455	0.8	0.8	0.8	1.2	1.2	1.2	1.5	1.5	1.5	1.9	1.9	1.9	2.3	2.3	2.3
	575	1.0	1.0	1.0	1.5	1.5	1.5	2.0	2.0	2.0	2.5	2.5	2.5	3.0	3.0	3.0

B + H + L_N [mm]

Installation and commissioning

- Preferably for rooms with a clear height from 2.60 m
- Installation either freely suspended or above an open cell ceiling
- Installation and connections to be performed by others; fixing, connection and sealing material to be provided by others
- The beam is fitted with four hanging brackets to fix it to the ceiling using threaded rods, metal hangers or wires
- Heat exchangers are fitted with water flow and water return connections at the narrow side
- Hanging brackets can be positioned facing inwards or outwards

Nomenclature

t_{WV} [C°]
Water flow temperature – cooling/heating

t_R [C°]
Room temperature

t_{AN} [C°]
Secondary air intake temperature

Q_{tot} [W]
Thermal output – total

Q_W [W]
Thermal output – water side, cooling/heating

$\dot{V}_W$ [l/h]
Water flow rate – cooling/heating

Δt_W [K]
Temperature difference – water

Δp_W [kPa]
Water-side pressure loss

$\Delta t_{RWV} = t_{WV} - t_R$ [K]
Difference between water flow temperature and room temperature

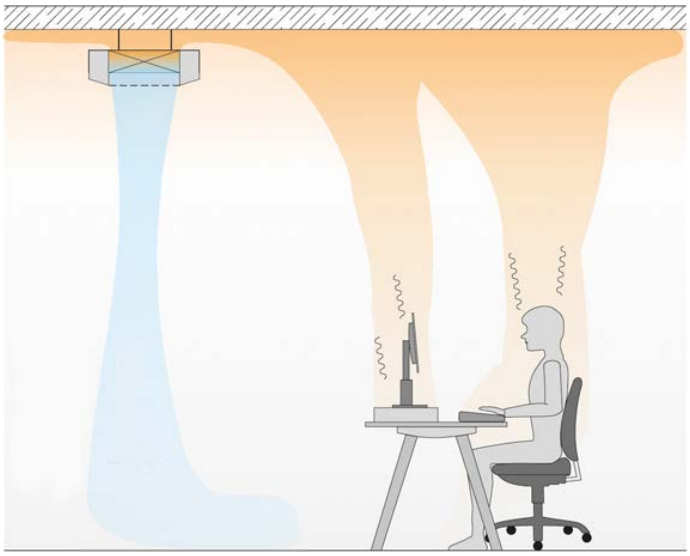
$\Delta t_{Wm\text{-}Ref}$ [K]
Difference between mean water temperature and reference temperature

L_N [mm]
Nominal length

Convection

Passive chilled beams remove the heat from the room air and transfer it via a heat exchanger to the water (transport medium). More than 90 % of the heat are transferred through convection. As the air passes over the surfaces of the heat exchanger, its temperature decreases while its density increases as a consequence, hence accelerating the downward airflow. The air flows straight down from the top to the bottom of the unit. This further increases the downward airflow (stack effect) and hence the cooling output.

Principle of operation – PKV



Heat exchanger

The maximum water-side operating pressure for all heat exchangers is 6 bar.
The maximum water flow temperature (heating circuit) for all heat exchangers is 75 °C; if flexible hoses are used, the water flow temperature should not exceed 55 °C. Units for other pressures and temperatures are available on request.
The water flow temperature (cooling circuit) should be at least 16 °C such that it does not permanently fall below the dew point. For units with a condensate drip tray the water flow temperature may be reduced to 15 °C.

Heat exchanger as 2-pipe system

Air-water systems with a 2-pipe heat exchanger may be used for either heating or cooling. In changeover mode it is possible to use all units within a water circuit exclusively for cooling in summer and exclusively for heating in winter.

Wärmeübertrager 2-Leiter-System