

CPH

Swirl Diffuser

Description

The CPH type diffusers are designed for ceiling applications. They can be used for supply or extract air.

Properties

The CPH type diffusers have fixed blades. For supply air purposes, they are characteristically suitable for horizontal air throws. The blades are integral with the diffuser. These diffusers are recommended for use with ceiling heights up to 4 m., with a supply air temperature difference of (+/-) 10°C. The diffuser is produced as square or circular shape, depending on request.

Materials

The diffuser is manufactured from 1 mm thick steel sheet. The blades are formed by pressing the diffuser sheet.

Surface Treatment

The surfaces of the diffuser is first cleaned, then painted with electrostatic powder paint to 20% gloss RAL 9010 (white) as standard. Other colours are also available upon request.

Accessories

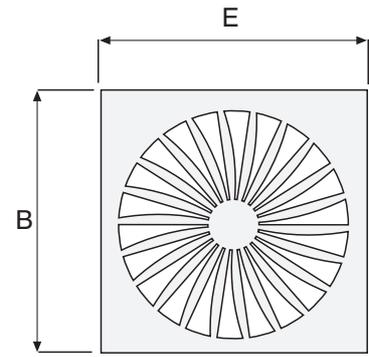
Plenum Box

The plenum box is used to achieve optimum throw characteristics. It has the inlet either at the top or at one side. Depending on request, a damper can be installed at the inlet, which can be operated internally or externally (has to be specified with the order). The plenum boxes are made from 0.6 mm thick galvanized steel sheets and have 4 hanging brackets on their body. Optionally, a 6 mm thick acoustic foam can be laid inside the plenum box.

Dimensions (Square Diffuser)

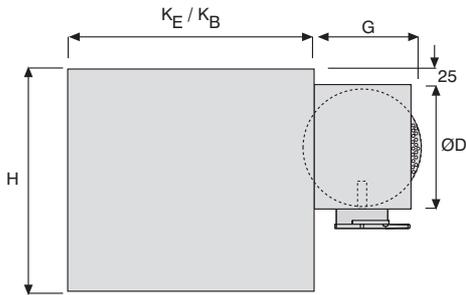
Standard Dimensions (mm)

E / B	No.off Blades	K_E / K_B	H	$\varnothing D$	G
300	12	292	300	193	150
400	12	392	350	244	175
500	16	492	370	270	175
600 (595)	20	587	400	295	200
625	20	617	400	295	200

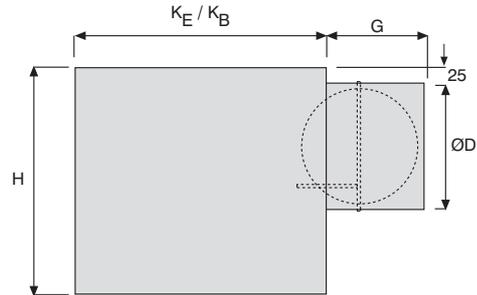


CPH.40

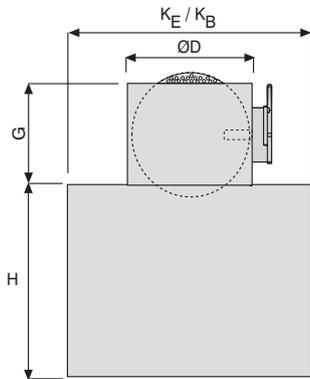
Externally operated , Side inlet



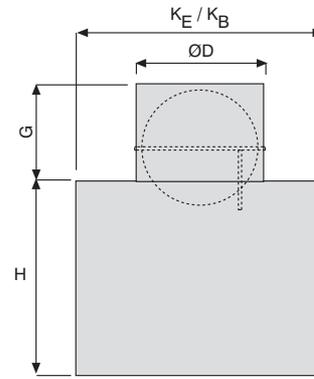
Internally operated , Side inlet



Externally operated , Top inlet



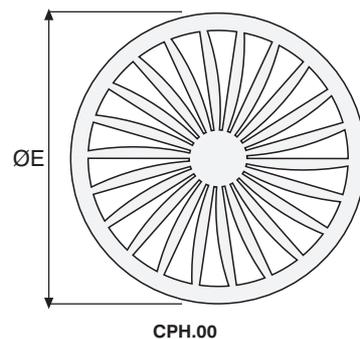
Internally operated , Top inlet



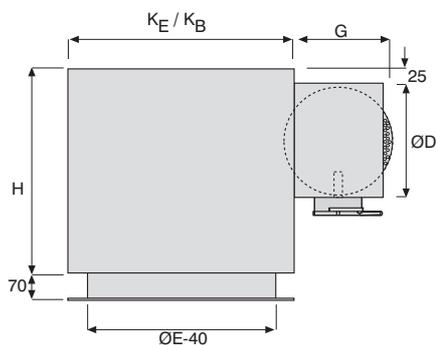
Dimensions (Circular Diffuser)

Standard Dimensions (mm)

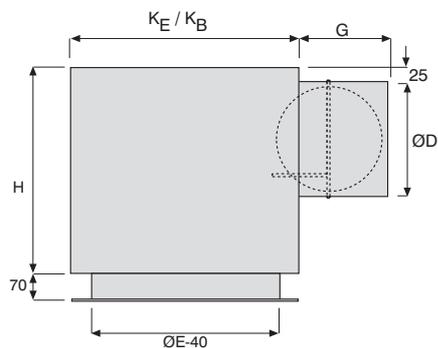
ØE	No.off Blades	K_E / K_B	H	ØD	G
300	12	292	300	193	150
400	12	392	350	244	175
500	16	492	370	270	175
595	20	587	400	295	200
625	20	617	400	295	200



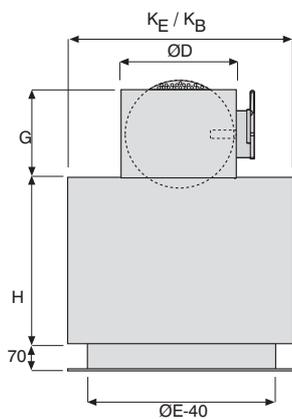
Externally operated , Side inlet



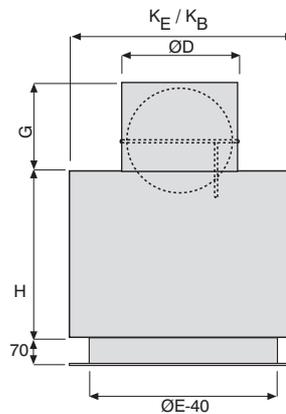
Internally operated , Side inlet



Externally operated , Top inlet

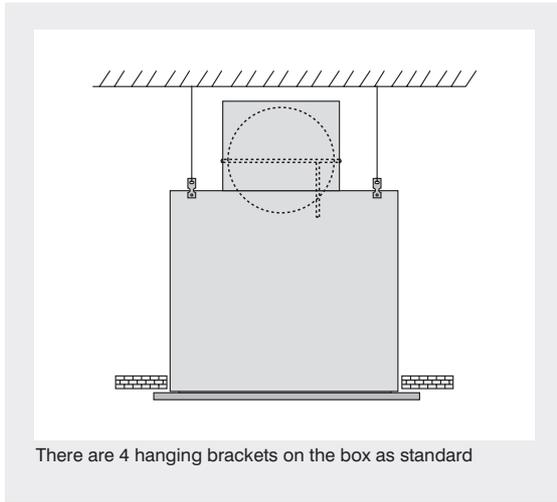


Internally operated , Top inlet

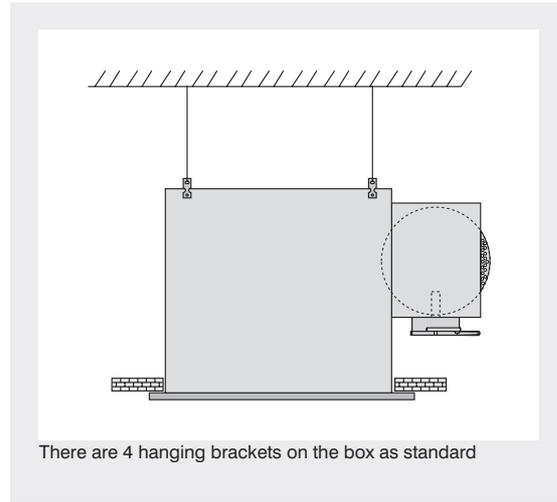


Installation

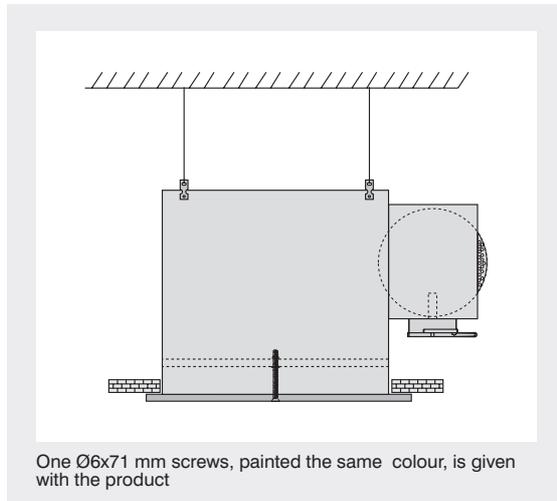
Plenum Box Installation (top inlet)



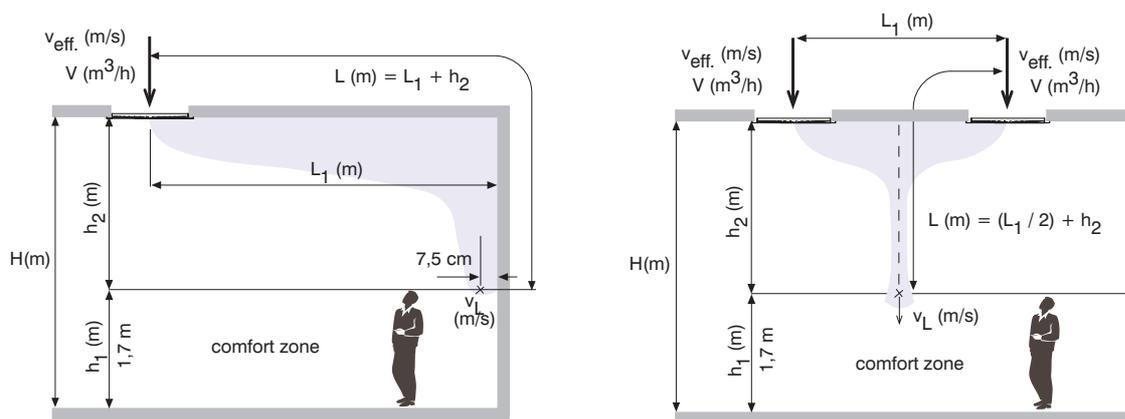
Plenum Box Installation (side inlet)



Installation with bridge



Nomenclature



L₁	Distance between diffuser centres or diffuser centre and wall. (m)
h₁	Comfort zone height (m)
h₂	Distance between a diffuser and comfort zone (m)
v_{eff.}	Effective outlet velocity (m/s)
v_L	Velocity of core in comfort zone
Δt₀	Difference between supply air and room temperature (°C)
Δt_L	Difference between core and comfort zone temperature (°C)
L	Throw distance (m)
V	Air flow rate (m ³ /h)
H	Room height (m)
S	Sound power level dB(A)

To achieve "Coanda effect", the outlet velocity must be greater than 2m/s. The general comfort conditions require that the sound power level is below 40 dB(A). The height of the comfort zone is taken as 1.70m above the floor. It is important that 0.25 m/s core velocity is not exceeded in this zone.

Note: The tables are given for installations flush with the ceiling (with Coanda effect). For installations apart from the ceiling, the values must be multiplied by 0.7.

Technical Data

Dimensions (mm) E / B (ØE)	Flow Rate V (m ³ /h)	Throw, L (m)		Pressure Loss ΔP (Pa)	Sound Power Level S (dB(A))
		v _L =0,25 m/s	v _L =0,10 m/s		
300	125	1,50	3,90	10	23
	175	2,20	5,40	18	32
	225	2,90	7,20	32	39
	275	3,40	8,60	46	45
	325	4,00	10,20	61	49
400	220	2,00	5,10	9	21
	300	2,75	7,00	17	30
	380	3,45	8,85	27	36
	460	4,35	11,20	38	42
	540	5,00	13,00	52	46
500	250	1,85	4,60	7	20
	350	2,60	6,45	15	29
	450	3,50	8,75	25	37
	550	4,35	10,90	38	42
	650	5,00	12,30	50	46
595- 600-625	360	2,30	5,80	9	24
	495	3,15	8,05	17	32
	630	3,95	10,15	27	38
	765	4,90	12,40	40	45
	900	5,75	14,50	53	49

Technical Data

Temperature gradients along the throw path are read from the table below, depending on the Δt_0 , Δt_L and throw length values. The temperature of the core at L metres from the diffuser, differs from the room temperature by the value read from the tables. The difference is plus in

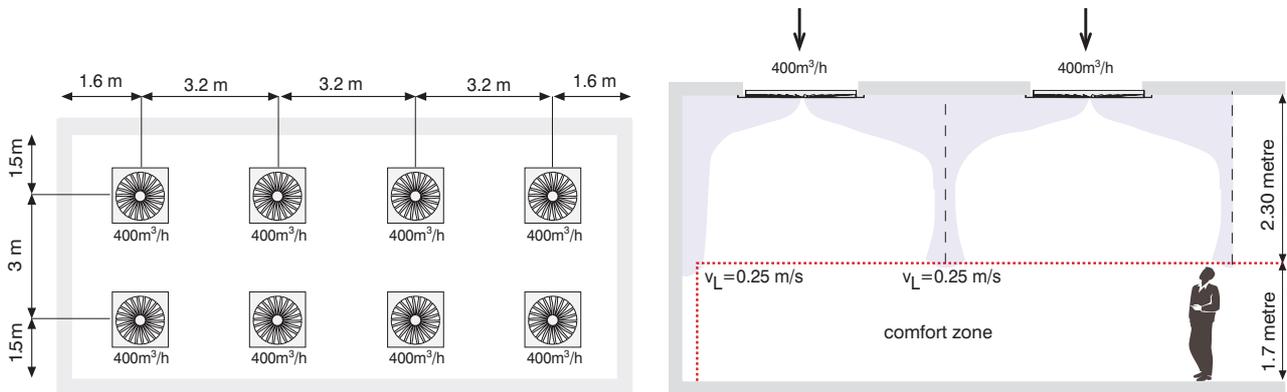
heating and minus in cooling. The less the difference, the better the comfort conditions.

Temperature gradients along the throw path

Dimensions E / B (ØE) mm	Throw (L) m	Δt_L (°C) Values					
		Δt_0 (°C)					
		4	6	8	10	12	14
300	1,5	0,43	0,64	0,86	1,07	1,28	1,50
	2	0,32	0,48	0,64	0,80	0,96	1,12
	3	0,21	0,32	0,42	0,53	0,64	0,74
	4	0,16	0,24	0,32	0,40	0,48	0,56
	5	0,13	0,19	0,26	0,32	0,38	0,45
	6	0,11	0,16	0,21	0,27	0,32	0,37
	7	0,09	0,14	0,18	0,23	0,27	0,32
	8	0,08	0,12	0,16	0,20	0,24	0,28
	9	0,07	0,11	0,14	0,18	0,21	0,25
	10	0,06	0,09	0,13	0,16	0,19	0,22
400	2	0,46	0,70	0,93	1,16	1,39	1,62
	3	0,29	0,44	0,58	0,73	0,88	1,02
	4	0,22	0,33	0,45	0,56	0,67	0,78
	5	0,18	0,27	0,36	0,45	0,53	0,62
	6	0,15	0,22	0,30	0,37	0,45	0,52
	7	0,13	0,19	0,25	0,32	0,38	0,45
	8	0,11	0,17	0,22	0,28	0,33	0,39
	9	0,10	0,15	0,20	0,25	0,30	0,35
	11	0,08	0,12	0,16	0,20	0,24	0,28
	13	0,07	0,10	0,14	0,17	0,20	0,24
500	2	0,52	0,79	1,05	1,31	1,57	1,83
	3	0,35	0,52	0,70	0,87	1,05	1,22
	4	0,26	0,39	0,52	0,66	0,79	0,92
	5	0,21	0,31	0,42	0,52	0,63	0,73
	6	0,17	0,26	0,35	0,44	0,52	0,61
	7	0,15	0,22	0,29	0,36	0,44	0,51
	8	0,13	0,20	0,26	0,33	0,39	0,46
	9	0,11	0,17	0,23	0,29	0,34	0,40
	11	0,09	0,14	0,19	0,23	0,28	0,33
	13	0,08	0,12	0,16	0,20	0,24	0,28
595-600-625	2	0,63	0,94	1,26	1,57	1,88	2,20
	3	0,41	0,62	0,82	1,03	1,24	1,44
	4	0,31	0,47	0,62	0,78	0,93	1,09
	5	0,24	0,37	0,49	0,61	0,73	0,85
	6	0,20	0,30	0,40	0,50	0,60	0,71
	7	0,17	0,26	0,35	0,43	0,52	0,61
	8	0,15	0,23	0,30	0,38	0,46	0,53
	10	0,12	0,18	0,24	0,31	0,37	0,43
	12	0,10	0,15	0,20	0,25	0,30	0,35
	14	0,09	0,13	0,17	0,21	0,26	0,30

Example:

Air at $3200 \text{ m}^3/\text{h}$, is to be supplied into a room with dimensions $12.8 \times 6 \text{ m}$, and a height of 4 m . The supply air is 8°C below room temperature and 8 diffusers will be used. Determine diffuser spacings so that the core velocity in comfort zone is below 0.25 m/s .

**Solution:**

- 1) Diffusers are placed on the ceiling plan symmetrically.
- 2) Air flow rate per diffuser is calculated as $3200 / 8 = 400 \text{ m}^3/\text{h}$.
- 3) Calculation of path length to the comfort zone:
 Minimum distance: $L = 1.50 + 2.30 = 3.80 \text{ m}$
 Maximum distance: $L = 1.60 + 2.30 = 3.90 \text{ m}$.
- 4) From the table on page 7, the most suitable size is found as 400 mm ; for $400 \text{ m}^3/\text{h}$ and 3.80 m throw.
- 5) From the same table with interpolation, pressure loss is read as 30 Pa and sound power level as 38 dB(A) .
- 6) From the table on page 8; for 400 mm size, $\Delta t_0 = 8^\circ\text{C}$, and 3.80 m throw, Δt_L is found by interpolation as 0.48°C .

Specification Text

Air diffuser for ceiling installation. The diffuser will be manufactured from 1 mm thick steel sheets, and will be painted to ordered request with electrostatic powder paint and a minimum thickness of 60µ. The plenum box will be manufactured from 0.6 mm galvanized steel sheets by seams. There will be 4 hanging brackets on the box. Optionally, the entry spigot will be equipped with a volume control damper, operated externally or internally, depending

on request. Also, optionally, 6-mm thick acoustic foam (according to BS 476 Part 6 & 7 Class 0) will be installed inside the plenum box. For high speed system applications, a perforated and galvanized steel plate will be installed in the plenum box.

Order Code

Model		CPH.00.AA.10 - 300-9010	
Product type	00...Circular 40...Square	E / B (ØE) mm Refer to pages 3 and 4	Indicate RAL colour code
Accessories	AA..Without accessories		
Installation	00...Without screw holes 10...With screw holes 40...Fixing with bridge	Standard Dimensions	Colour Code

Plenum Box Order Code

Model (Square Diffuser)		PLA.10.S B.1 1-292 x 270 x 142 x 1	
Model (Circular Diffuser)		PLB	
Installation	10...With screws 40...Fixing with bridge	Please indicate if special dimensions are requested K _E / K _B x H x ØD (mm) x s (no.of inlet spigots)	
Box Inlet	S....Side inlet T.....Top inlet		
Spigot Damper	A....Without damper B....Externally operated C....Internally operated		
Perforated Rectifier Plate	0.....Without plate 1.....With plate		
Insulation	0.....Without insulation 1.....With acoustic insulation		

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Swirl Diffuser

KES KLİMA

INDUSTRIAL AND TRADE CO.

Uzay Çağı Caddesi No:10

06370 Östim/ANKARA

Phone: +90.312.385 76 57

Fax : +90.312.354 12 31

www.kesklima.com



TÜV Rheinland Group



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