

CPB

Swirl Diffuser

Description

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

Properties

The CPB type diffusers have adjustable blades. For supply air purposes, they are characteristically suitable for horizontal and vertical air throws. 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 1.2 mm thick steel sheet. The internal blades are made of black coloured plastic.

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

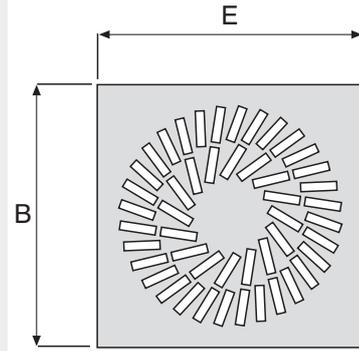
Plenum Box

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 diffusers)

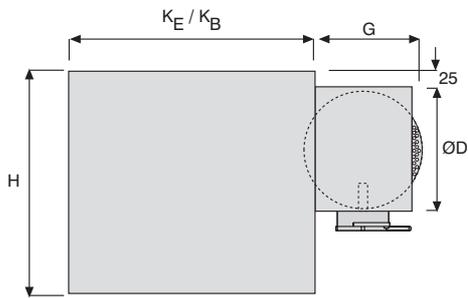
Standard Dimensions (mm)

E / B	No. of Blades	K_E / K_B	H	$\varnothing D$	G
300	10	292	270	142	125
400	16	392	320	193	150
500	36	492	370	244	175
600 (595)	24	587	420	295	200
600 (595)	48	587	420	295	200
800	72	792	520	396	250

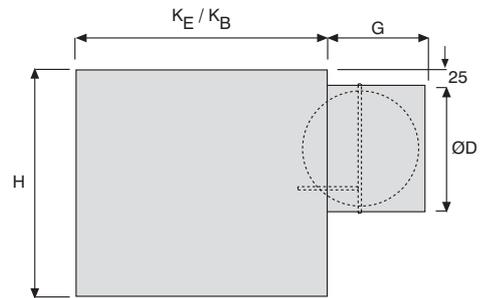


CPB.40

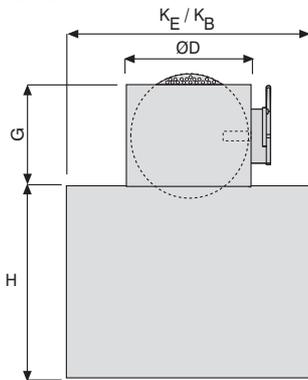
Externally operated , Side inlet



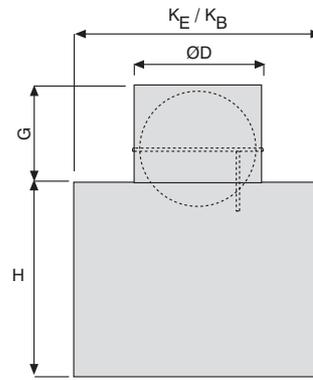
Internally operated , Side inlet



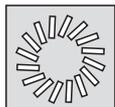
Externally operated , Top inlet



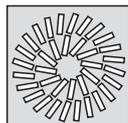
Internally operated , Top inlet



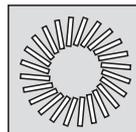
300 x 10



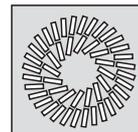
400 x 16



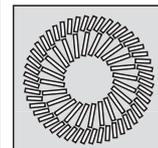
500 x 36



600 x 24



600 x 48

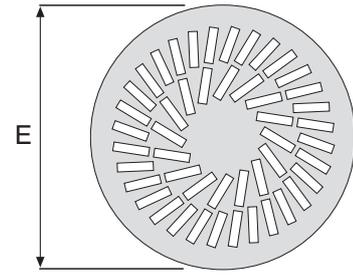


800 x 72

Dimensions (circular diffusers)

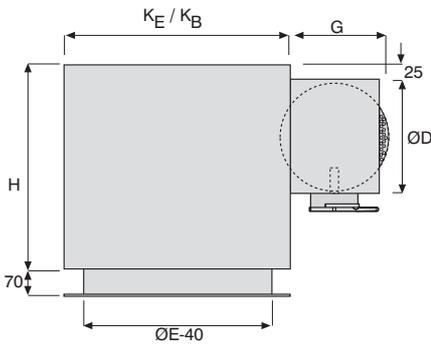
Standard Dimensions (mm)

ØE	No. of blades	K_E / K_B	H	ØD	G
300	10	330	200	142	125
400	16	430	250	193	150
500	36	530	300	244	175
600	24	630	350	295	200
600	48	630	350	295	200
800	72	830	450	396	250

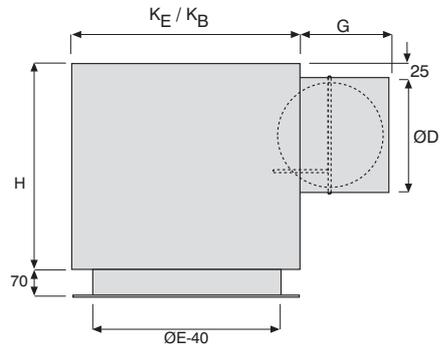


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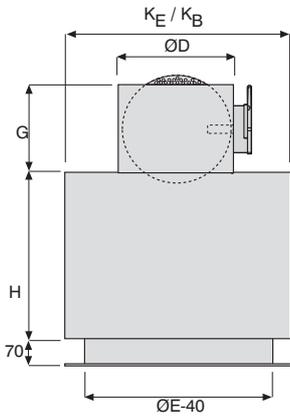
Externally operated , Side inlet



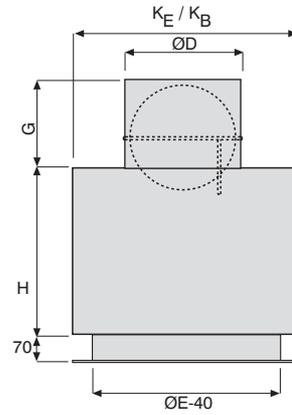
Internally operated , Side inlet



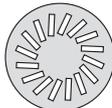
Externally operated , Top inlet



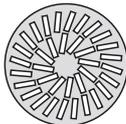
Internally operated , Top inlet



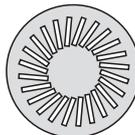
300 x 10



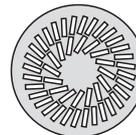
400 x 16



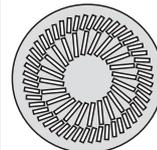
500 x 36



600 x 24

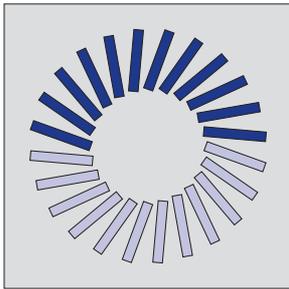
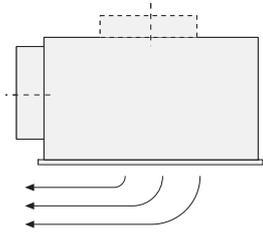


600 x 48



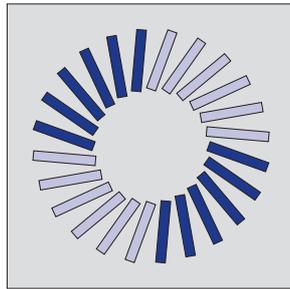
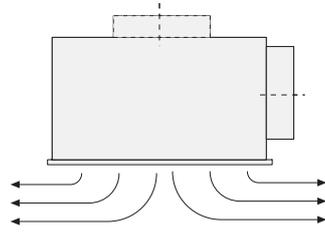
800 x 72

← One-way throw



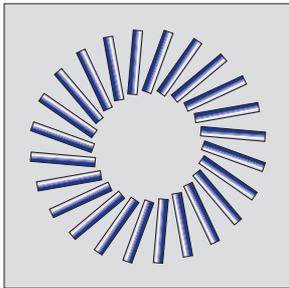
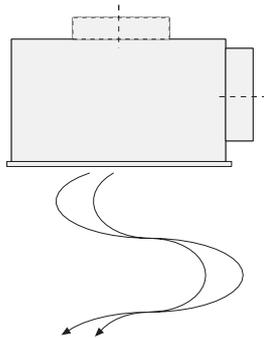
Blades set to the left
Blades set to the right

← → Çift Yönlü Üfleme



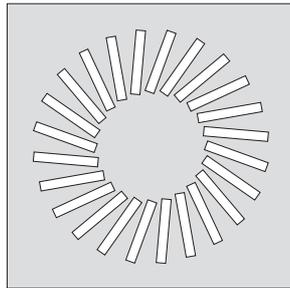
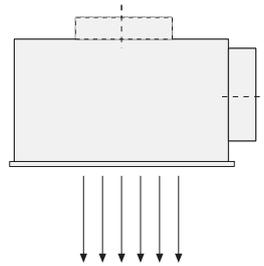
Blades set to the left
Blades set to the right

↻ Swirl throw

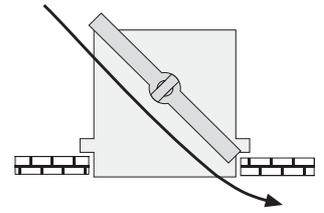


Blades set to one side

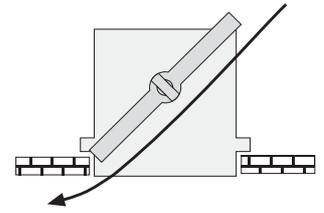
↓ Vertical throw



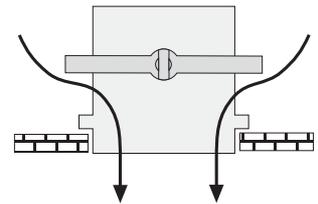
Blades set horizontally



Blades set horizontally



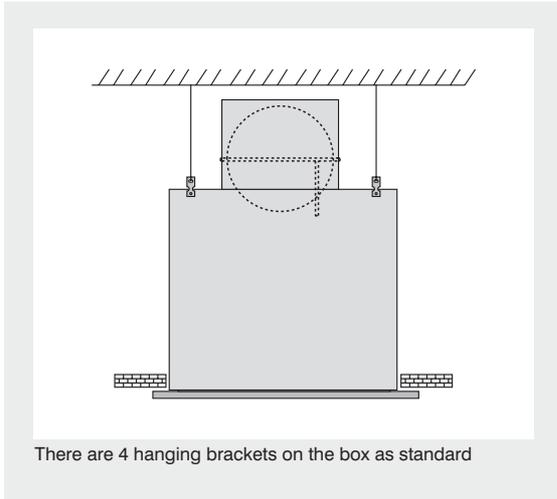
Blades set to the left



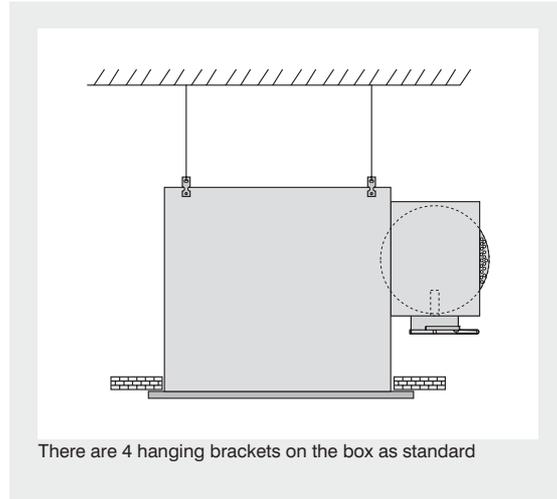
Blades set to the right

Installation

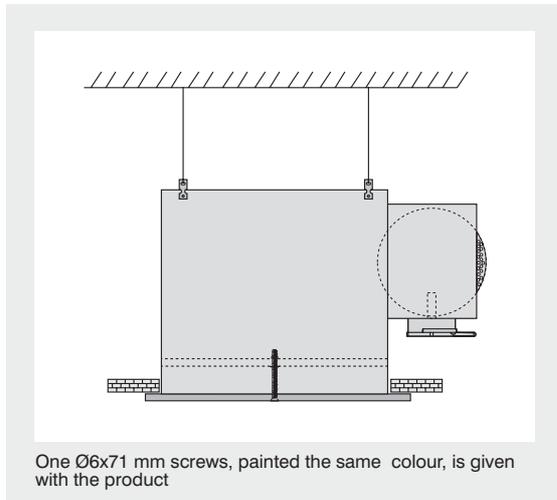
Plenum Box Installation (top inlet)



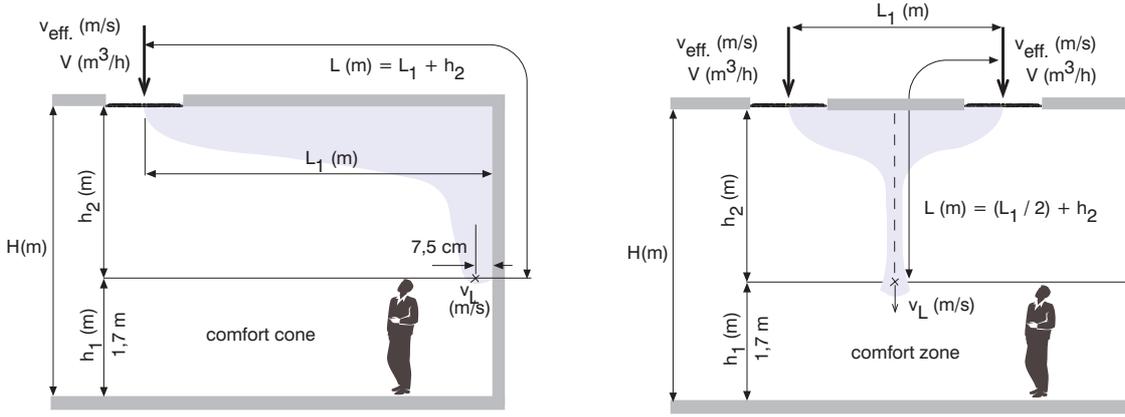
Plenum Box Installation (side inlet)



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) x no.of blades	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 x 10	70	0,65	1,80	4	<20
	100	1,00	2,60	8	<20
	130	1,35	3,20	13	22
	160	1,70	4,00	18	26
	190	2,00	4,85	25	31
400 x 16	100	0,75	2,10	2	<20
	175	1,25	3,10	8	20
	250	1,85	4,50	18	29
	325	2,40	5,90	32	37
	400	3,00	7,40	47	44
500 x 24	200	1,30	2,80	5	<20
	275	1,75	3,75	13	27
	350	2,15	4,65	25	35
	425	2,70	5,60	32	38
	500	3,00	6,80	45	44
600 x 24 (595 X 24)	300	1,50	3,80	6	20
	400	2,10	5,10	12	27
	500	2,70	6,60	21	33
	600	3,30	7,95	29	38
	700	4,00	9,60	36	43
600 x 48 (595 X 48)	350	1,65	3,75	7	20
	500	2,35	5,25	17	28
	650	2,95	6,30	28	36
	800	3,60	7,90	42	43
	950	4,20	9,70	53	44
800 x 72	600	2,50	5,35	8	21
	850	3,60	7,70	15	30
	1100	4,60	10,00	20	34
	1350	5,70	12,00	43	39
	1600	6,50	13,80	50	46

Technical Data

Temperature gradients along the throw path are read from the table below, depending on the Δt_0 , Δt_1 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

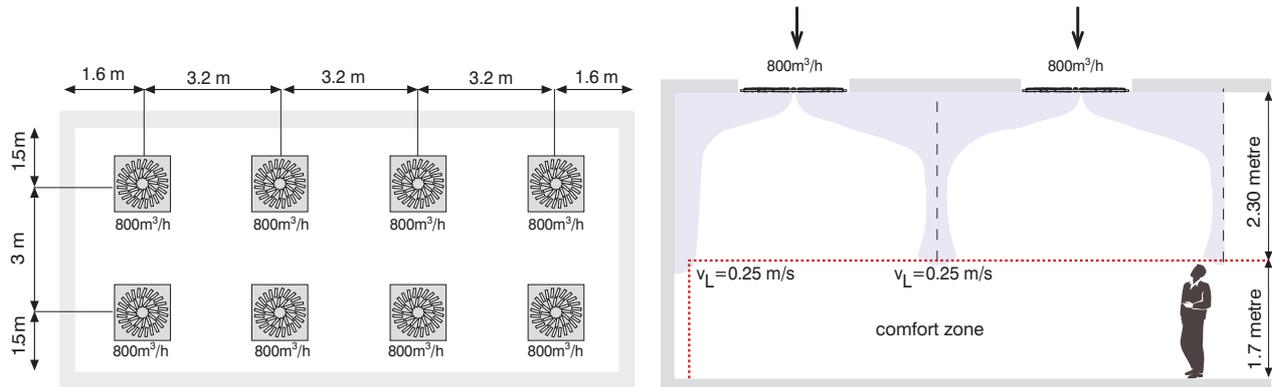
in cooling. The less the difference, the better the comfort conditions.

Temperature gradients along the throw path

Dimensions E / B (ØE) mm	Throw (L) m	Δt_0 (°C)					
		4	6	8	10	12	14
300 x 10	0,5	0,22	0,34	0,45	0,56	0,67	0,78
	1,0	0,20	0,30	0,40	0,50	0,60	0,70
	1,5	0,14	0,20	0,27	0,34	0,41	0,48
	2,0	0,11	0,16	0,21	0,27	0,32	0,37
	3,0	0,08	0,12	0,16	0,20	0,24	0,28
	4,0	0,06	0,10	0,13	0,16	0,19	0,22
	5,0	0,04	0,08	0,10	0,12	0,16	0,18
400 x 16	0,5	0,34	0,51	0,68	0,85	1,02	1,19
	1,0	0,28	0,43	0,57	0,71	0,85	0,99
	1,5	0,20	0,29	0,39	0,49	0,59	0,69
	2,0	0,15	0,22	0,30	0,37	0,44	0,52
	3,0	0,10	0,15	0,20	0,25	0,30	0,35
	4,0	0,07	0,11	0,14	0,18	0,22	0,25
	5,0	0,04	0,08	0,09	0,11	0,14	0,16
500 x 24	0,5	0,80	1,20	1,60	2,00	2,40	2,80
	1,0	0,44	0,66	0,88	1,10	1,32	1,54
	1,5	0,29	0,44	0,58	0,73	0,88	1,02
	2,0	0,21	0,32	0,42	0,53	0,64	0,74
	3,0	0,14	0,21	0,28	0,35	0,42	0,49
	4,0	0,10	0,16	0,21	0,26	0,31	0,36
	5,0	0,08	0,12	0,16	0,18	0,22	0,26
600 x 24 595 x 24	0,5	0,80	1,20	1,60	2,00	2,40	2,80
	1,0	0,37	0,56	0,74	0,93	1,11	1,30
	1,5	0,24	0,37	0,49	0,61	0,73	0,85
	2,0	0,19	0,28	0,37	0,47	0,56	0,65
	3,0	0,13	0,19	0,25	0,32	0,38	0,44
	4,0	0,09	0,14	0,18	0,23	0,28	0,32
	5,0	0,07	0,10	0,12	0,14	0,17	0,21
600 x 48 595 x 48	0,5	1,44	2,16	2,88	3,60	4,32	5,04
	1,0	1,20	1,80	2,40	3,00	3,60	4,20
	1,5	0,84	1,26	1,68	2,10	2,52	2,94
	2,0	0,64	0,96	1,28	1,60	1,92	2,24
	3,0	0,40	0,60	0,80	1,00	1,20	1,40
	4,0	0,32	0,48	0,64	0,80	0,96	1,12
	5,0	0,26	0,40	0,52	0,70	0,85	1,00
800 x 72	2,0	0,56	0,84	1,12	1,40	1,68	1,96
	2,5	0,44	0,66	0,88	1,10	1,32	1,54
	3,0	0,40	0,60	0,80	1,00	1,20	1,40
	4,0	0,28	0,42	0,56	0,70	0,84	0,98
	5,0	0,24	0,36	0,48	0,60	0,72	0,84
	6,0	0,20	0,30	0,40	0,50	0,60	0,70
	7,0	0,18	0,24	0,32	0,38	0,48	0,58

Example:

Air at 6400 m³/h, is to be supplied into a room with dimensions 12.8 x 6 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 $6400 / 8 = 800$ m³/h.
- 3) Calculation of path length to the comfort zone:
 Minimum distance: $L = 1.50 + 2.30 = 3.80$ m
 Maximum distance: $L = 1.60 + 2.30 = 3.90$ m.
- 4) From the table on page 8, the most suitable size is found as 600 x 48 mm;
 for 800 m³/h and 3.80 m throw.
- 5) From the same table with interpolation, pressure loss is read as 42 Pa
 and sound power level as 43 dB(A).
- 6) From the table on page 9; for 600x48 mm size, $\Delta t_o = 8^\circ\text{C}$, and 3.80m
 throw, Δt_L is found by interpolation as 0.19°C .

Specification Text

Air diffuser for ceiling installation. The diffuser will be manufactured from 1.2 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		CPB.00.AK.10-300 x 10-9010		
Product type	00...Circular 40...Square	E / B (ØE) mm Refer to pages 3&4	no.of blades	Indicate RAL colour code
Accessories	AA...Without blades (extract) AK...With blades(supply)			
Installation	00...Without screw holes 10...With screw holes 40...Fixing With Bridge	Standard Dimensions		Colour Code

Plenum Box Order Code

Model (Square Diffusers)		PLA.10.S B.1 1-292 x 270 x 142 x 1		
Model (Circular Diffusers)		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			

C

CPB

Swirl Diffuser

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DIN EN ISO 9001:2000

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