



CVA

Swirl Diffuser

Description

The CVA type diffusers are designed for ceiling applications. They can be used for heating and cooling supply air.

Properties

The CVA 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 greater than 3.80 m. with a supply air temperature difference of (-) 10°C and (+) 15°C. If the diffuser face is installed more than 300 mm below the ceiling, then Coanda effect does not take place and it is possible to have continuous throw angle adjustments between the vertical and the horizontal. However, if the diffuser face is close to the ceiling, then only a vertical or a horizontal throw setting is possible.

Materials

The diffuser body, blades and nozzle are manufactured from 1.2 mm thick steel 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. The plenum boxes are made from 0.6 mm thick galvanized steel sheets and have 4 hanging brackets on their body. Optionally, 6 mm thick acoustical foam lining can be applied to the inside of plenum box.



Horizontal throw

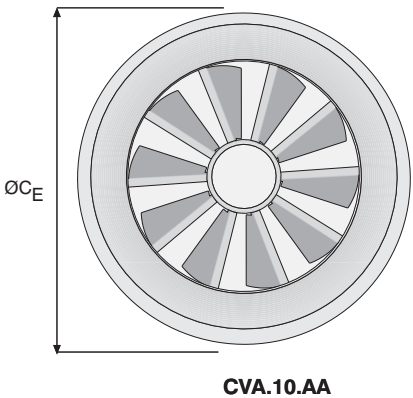
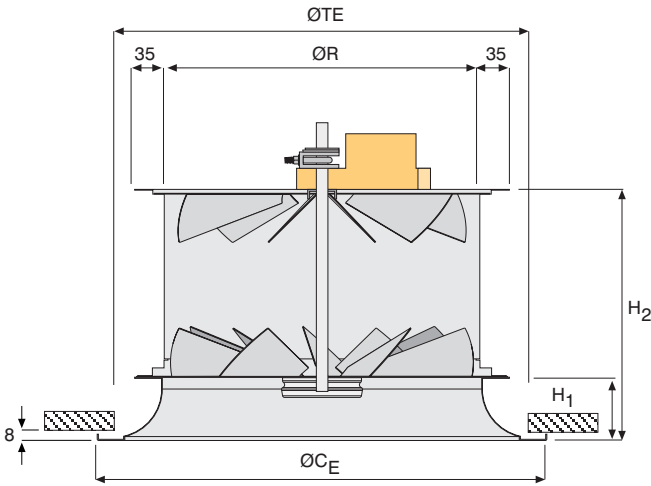


45° Throw



Vertical throw

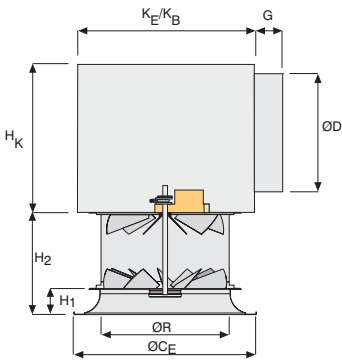
Dimensions



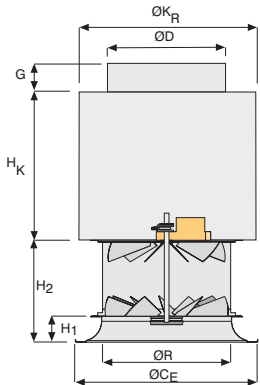
Standard Dimensions (mm)

ØR	ØCE	ØTE	K_E/K_B	ØD	H_K	$\text{ØR}/\text{ØK}_R$	H_1	H_2	G	ØR_L	*n
315	467	395	435	244	280	310	63	266	70	370	6
400	567	490	500	305	365	395	80	318	70	455	6
630	871	800	750	396	365	640	125	508	70	690	24
800	1077	1007	1000	496	430	805	160	728	70	855	24

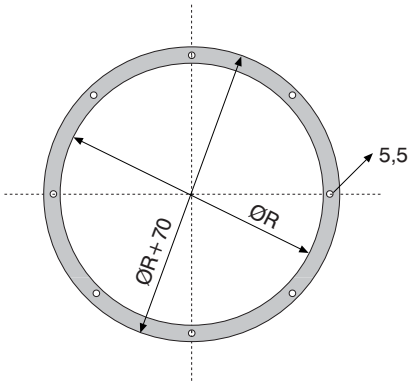
Side Inlet



Top Inlet

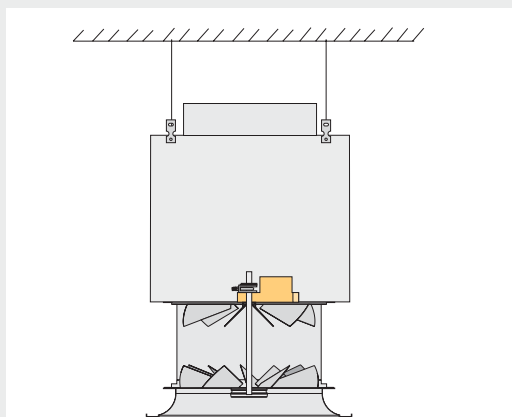


Flange



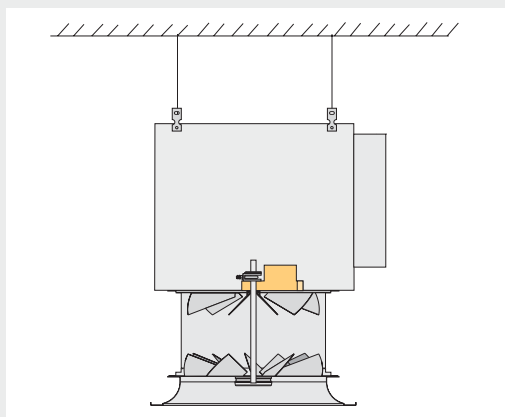
Installation

Plenum Box Installation (Top inlet)



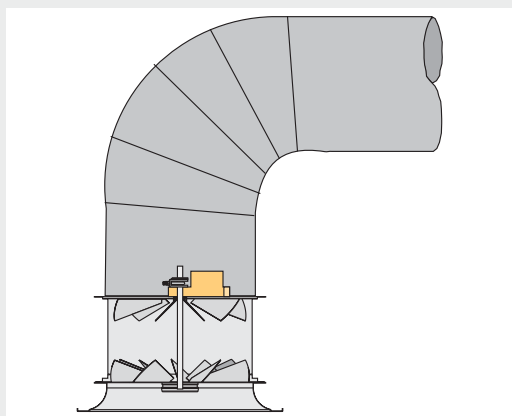
There are 4 hanging brackets on the box as standard

Plenum Box Installation (Side inlet)

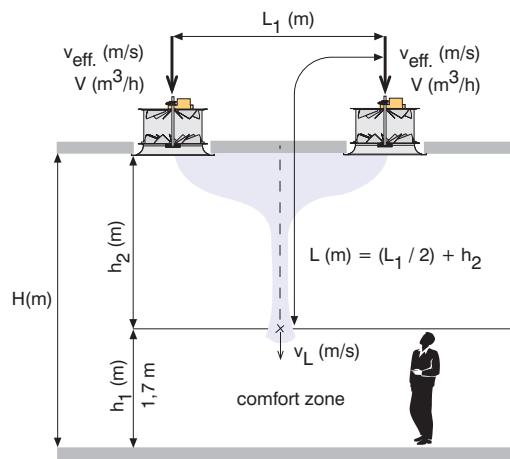
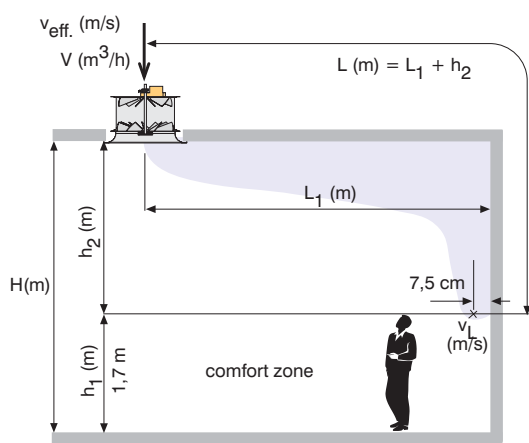


There are 4 hanging brackets on the box as standard

Direct Connection to Air Duct



Nomenclature



L_1	Distance between diffuser centres or diffuser centre and wall. (m)
h_1	Comfort zone height (m)
h_2	Distance between a diffuser and comfort zone (m)
v_{eff}	Effective outlet velocity (m/s)
v_L	Velocity of core in comfort zone
Δt_0	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).

Technical Data (heating)

45° Throw with the horizontal

45°	Size ØR (mm)	Air Flow Rate V (m³/h)	Penetration L (m)	
			$\Delta t_o = 10^\circ \text{C}$	$\Delta t_o = 15^\circ \text{C}$
315		400	1,05	0,90
		525	1,30	1,15
		650	1,60	1,35
		775	1,80	1,55
		900	2,00	1,75
400		600	1,15	1,00
		850	1,55	1,35
		1100	1,90	1,65
		1350	2,25	1,95
		1600	2,55	2,25
630		1000	1,25	1,05
		1400	1,65	1,40
		1800	2,00	1,70
		2200	2,30	2,00
		2600	2,65	2,25
800		1400	1,30	1,10
		1900	1,70	1,45
		2400	2,00	1,70
		2900	2,30	2,00
		3400	2,65	2,25

60° Throw with the horizontal

60°	Size ØR (mm)	Air Flow Rate V (m³/h)	Penetration L (m)	
			$\Delta t_o = 10^\circ \text{C}$	$\Delta t_o = 15^\circ \text{C}$
315		400	1,55	1,30
		525	2,00	1,70
		650	2,45	2,10
		775	2,90	2,50
		900	3,45	2,95
400		600	1,75	1,50
		850	2,50	2,15
		1100	3,20	2,70
		1350	3,85	3,35
		1600	4,60	3,90
630		1000	1,90	1,60
		1400	2,60	2,20
		1800	3,30	2,80
		2200	4,05	3,45
		2600	4,70	4,05
800		1400	2,05	1,75
		1900	2,70	2,30
		2400	3,45	2,95
		2900	4,15	3,55
		3400	5,00	4,20

75° Throw with the horizontal

75°	Size ØR (mm)	Air Flow Rate V (m³/h)	Penetration L (m)	
			$\Delta t_o = 10^\circ \text{C}$	$\Delta t_o = 15^\circ \text{C}$
315		400	1,75	1,50
		525	2,30	2,00
		650	2,90	2,50
		775	3,45	3,00
		900	4,05	3,55
400		600	2,00	1,75
		850	3,00	2,60
		1100	3,85	3,35
		1350	4,85	4,20
		1600	5,80	5,00
630		1000	2,15	1,80
		1400	3,00	2,60
		1800	3,90	3,40
		2200	4,85	4,20
		2600	5,80	5,00
800		1400	2,35	2,00
		1900	3,20	2,80
		2400	4,10	3,55
		2900	5,00	4,40
		3400	6,00	5,20

90° Throw with the horizontal

90°	Size ØR (mm)	Air Flow Rate V (m³/h)	Penetration L (m)	
			$\Delta t_o = 10^\circ \text{C}$	$\Delta t_o = 15^\circ \text{C}$
315		400	1,40	1,10
		525	2,00	1,60
		650	2,55	2,10
		775	3,25	2,60
		900	3,90	3,20
400		600	1,70	1,35
		850	2,60	2,15
		1100	3,65	3,05
		1350	4,70	3,85
		1600	5,85	4,80
630		1000	1,80	1,45
		1400	2,75	2,30
		1800	3,70	3,00
		2200	4,95	4,10
		2600	5,95	4,85
800		1400	2,00	1,65
		1900	3,00	2,45
		2400	4,00	3,25
		2900	5,10	4,15
		3400	6,15	5,05

Side inlet Plenum box

Size ØR (mm)	Air Flow Rate V (m³/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		
315	400	1,65	4,30	21	35
	525	2,05	5,40	36	43
	650	2,60	6,85	55	50
	775	3,15	8,15	80	56
	900	3,65	9,45	110	60
400	600	2,25	4,60	13	31
	850	3,15	6,35	27	42
	1100	4,30	8,70	45	50
	1350	5,15	10,40	68	56
	1600	6,25	12,50	94	61
630	1000	2,40	6,00	11	29
	1400	3,30	8,40	22	39
	1800	4,30	11,10	36	47
	2200	5,25	13,15	56	54
	2600	6,35	15,80	77	58
800	1400	2,85	7,10	14	32
	1900	3,85	9,50	25	42
	2400	4,80	11,70	38	49
	2900	6,00	14,70	55	54
	3400	7,15	17,50	76	59

Top inlet Plenum box

Size ØR (mm)	Air Flow Rate V (m³/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		
315	400	1,65	4,30	16	32
	525	2,05	5,40	29	40
	650	2,60	6,85	44	47
	775	3,15	8,15	63	52
	900	3,65	9,45	82	56
400	600	2,25	4,60	11	30
	850	3,15	6,35	23	40
	1100	4,30	8,70	36	47
	1350	5,15	10,40	56	54
	1600	6,25	12,50	80	58
630	1000	2,40	6,00	9	27
	1400	3,30	8,40	18	37
	1800	4,30	11,10	30	45
	2200	5,25	13,15	46	51
	2600	6,35	15,80	63	56
800	1400	2,85	7,10	9	31
	1900	3,85	9,50	18	36
	2400	4,80	11,70	28	47
	2900	6,00	14,70	40	53
	3400	7,15	17,50	55	58

Technical Data (cooling)

Direct connection to air duct

Size ØR (mm)	Air Flow Rate V (m³/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		
315	400	1,65	4,30	15	31
	525	2,05	5,40	26	40
	650	2,60	6,85	40	46
	775	3,15	8,15	55	51
	900	3,65	9,45	75	56
400	600	2,25	4,60	6	<20
	850	3,15	6,35	12	27
	1100	4,30	8,70	20	35
	1350	5,15	10,40	30	40
	1600	6,25	12,50	40	45
630	1000	2,40	6,00	5	<20
	1400	3,30	8,40	10	25
	1800	4,30	11,10	17	33
	2200	5,25	13,15	26	40
	2600	6,35	15,80	35	44
800	1400	2,85	7,10	8	25
	1900	3,85	9,50	14	35
	2400	4,80	11,70	22	42
	2900	6,00	14,70	32	48
	3400	7,15	17,50	46	53

Technical Data

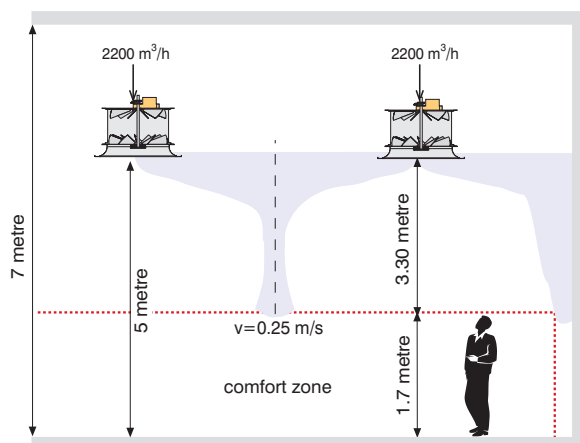
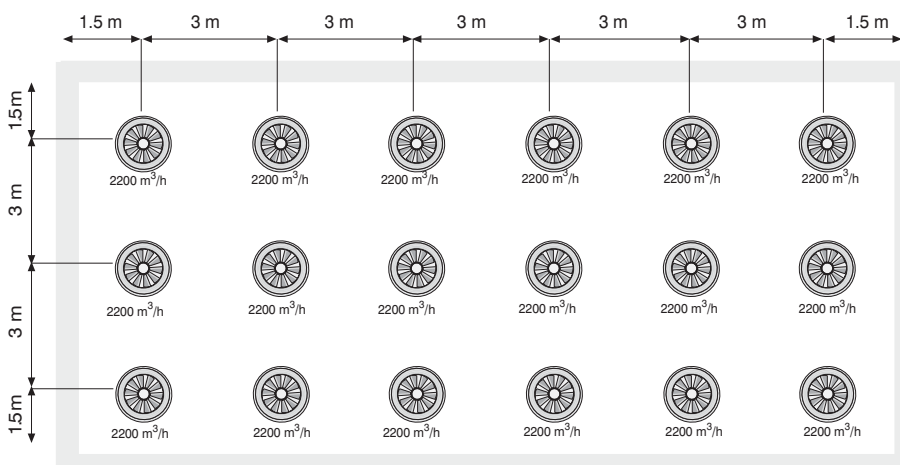
Temperature gradients along the throw path are read from the table below, depending on the Δt_o , Δt_L and throw length values. The temperature of the core at L metres from the diffuser, differs from the room temperature by the value read from the tables. The difference is plus in heating and minus in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

Temperature gradients along the throw path

Size ØR (mm)	Throw L (m)	Δt_L (°C) Values					
		Δt_o (°C)					
		4	6	8	10	12	15
315	1	0,55	0,83	1,10	1,38	1,65	2,07
	2	0,28	0,42	0,56	0,70	0,84	1,05
	3	0,19	0,28	0,38	0,47	0,57	0,64
	4	0,14	0,21	0,28	0,36	0,43	0,54
	5	0,11	0,17	0,23	0,29	0,34	0,43
	6	0,10	0,14	0,19	0,24	0,29	0,35
	7	0,08	0,12	0,16	0,21	0,25	0,31
	8	0,07	0,11	0,14	0,18	0,22	0,27
	9	0,06	0,10	0,13	0,16	0,19	0,25
	10	0,06	0,09	0,12	0,15	0,17	0,21
400	1	1,69	2,53	3,37	4,2	5,06	6,33
	2	0,85	1,28	1,70	2,13	2,55	3,19
	3	0,57	0,86	1,14	1,43	1,71	2,14
	4	0,43	0,64	0,86	1,07	1,29	1,61
	5	0,34	0,52	0,69	0,86	1,03	1,30
	6	0,29	0,43	0,58	0,72	0,86	1,08
	7	0,25	0,37	0,49	0,62	0,74	0,93
	8	0,22	0,33	0,43	0,54	0,65	0,81
	10	0,17	0,26	0,35	0,44	0,52	0,65
	12	0,05	0,07	0,10	0,12	0,15	0,18
630	2	1,15	1,72	2,30	2,87	3,45	4,31
	3	0,77	1,15	1,54	1,92	2,30	2,88
	4	0,58	0,86	1,15	1,44	1,73	2,16
	5	0,46	0,69	0,92	1,15	1,38	1,74
	6	0,38	0,58	0,77	0,96	1,15	1,45
	8	0,29	0,43	0,58	0,72	0,87	1,08
	10	0,23	0,35	0,46	0,58	0,69	0,87
	12	0,19	0,29	0,39	0,48	0,58	0,72
	14	0,17	0,25	0,33	0,41	0,50	0,62
	16	0,14	0,22	0,29	0,36	0,43	0,55
800	3	0,88	1,32	1,77	2,21	2,65	3,31
	4	0,66	0,99	1,32	1,65	1,98	2,47
	5	0,53	0,79	1,06	1,32	1,59	1,98
	6	0,44	0,66	0,88	1,10	1,32	1,65
	8	0,33	0,49	0,66	0,82	0,99	1,23
	10	0,26	0,40	0,53	0,66	0,79	0,99
	12	0,22	0,33	0,44	0,55	0,66	0,82
	14	0,19	0,28	0,38	0,47	0,56	0,71
	16	0,16	0,25	0,33	0,41	0,49	0,62
	18	0,13	0,19	0,26	0,32	0,39	0,48

Example:

Air at 39600 m³/h, is to be supplied into a room with imensions 18 x 9m, and a height of 7 m .18 diffusers will be installed 5 m above the floor and top inlet plenum boxes will be used. The supply air is 8°C below room temperature for cooling, and 12°C above for heating. 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 $39600 / 18 = 2200 \text{ m}^3/\text{h}$.
- 3) Calculation of path length to the comfort zone:

$$\text{Minimum distance: } L = 1.50 + 3.30 = 4.80 \text{ m}$$

- 4) From the table on page 7, the most suitable size is found as 800 mm; for 2200 m³/h and 4.80 m throw.
- 5) From the same table with interpolation, pressure loss is read as 25 Pa and sound power level as 43 dB(A).
- 6) From the table on page 9; for 800 mm size, $\Delta t_0 = 8^\circ\text{C}$, and 3.80 m throw, Δt_L is found by interpolation as 1.09°C .
- 7) From the tables on page 6, the max. vertical throw (penetration) is found to be 3.54m at 75° , with interpolation.
- 8) From the table on page 9; for 800 mm size, $\Delta t_0 = 12^\circ\text{C}$, and 3.54 m throw, Δt_L is found by interpolation as 2.28°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, 6-mm thick acoustic foam(according to BS 476 Part 6 & 7 Class 0)

will be installed inside the plenum box.

Order Code

Model		CVA.00.AA.00-315-9010	
Accessories	AA..Manual	ØR (mm) Refer to page 3	Indicate RAL colour code
	HA..With motor bracket		
	MA..With motor	Standard Dimensions	Colour Code

Plenum Box Order Code

Model		PLD.10.SA.01-567x 410 x 270 x 1	
Box inlet	SA..Side inlet	Please indicate if special dimensions are requested K _E / K _B x H x ØD (mm) x s (no.of inlet spigots)	
	TA..Top inlet		
Insulation	00...Without insulation	Plenum Box Dimensions	
	01...With acoustic insulation		

C

CVA

Swirl Diffuser

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