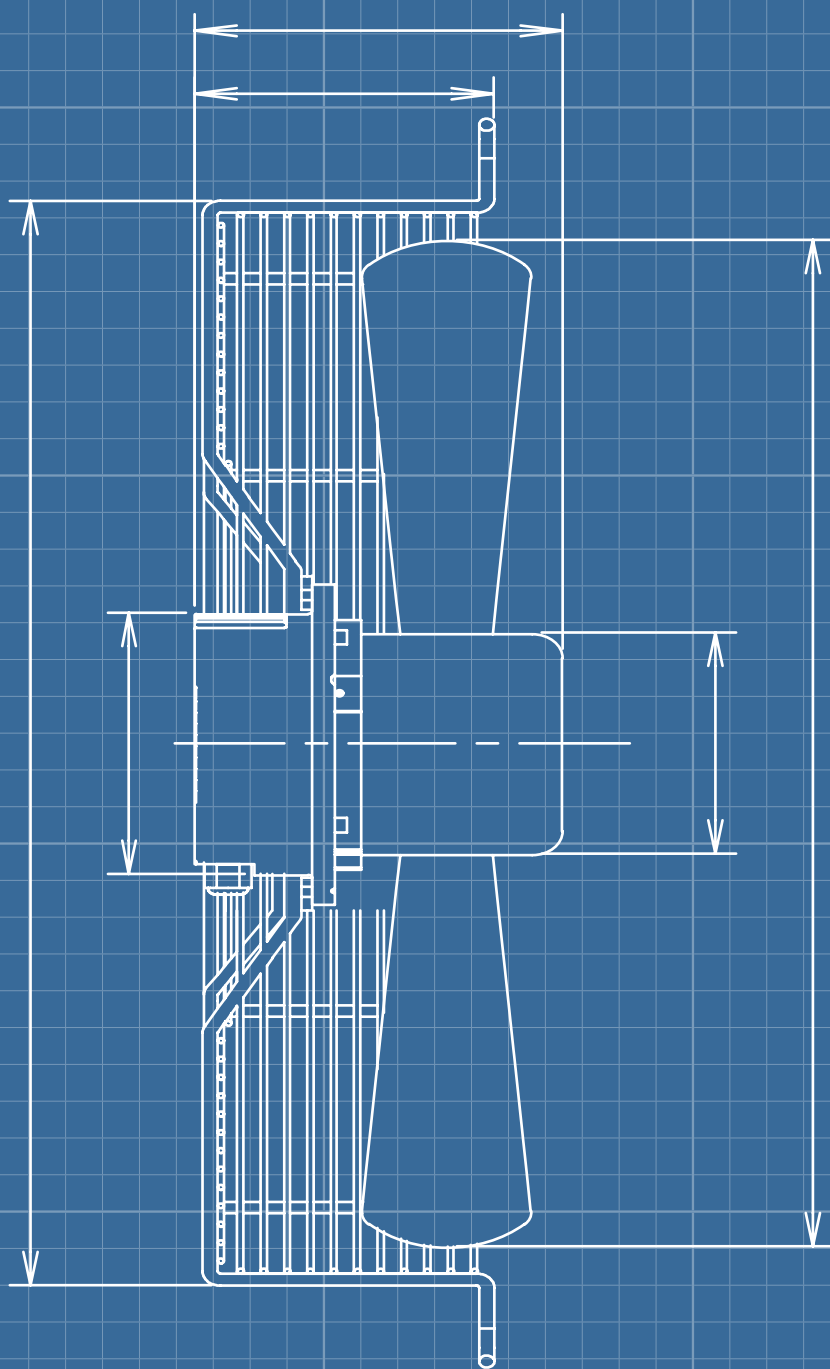


AFL EC fan

design and usage tips



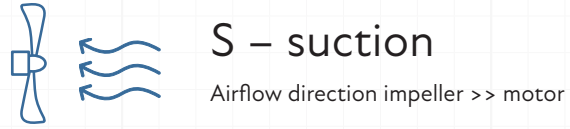
EC Axial Fans	3
EC Backward Curved Centrifugal Fans.....	6
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01

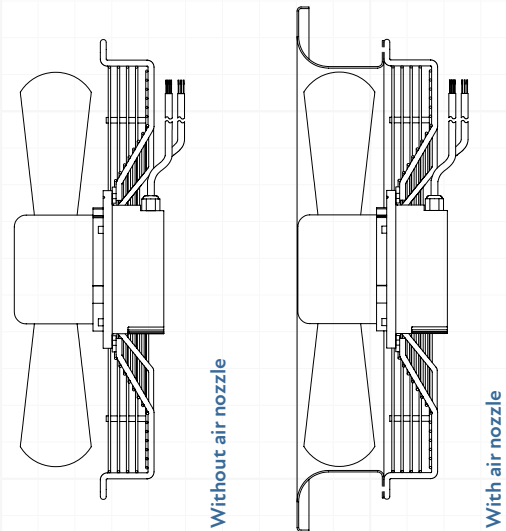
EC AXIAL FANS

■ Choose the right model to get right airflow direction



■ Air nozzle

To keep optimal air performance and noise level, axial fans should be mounted with air nozzle.

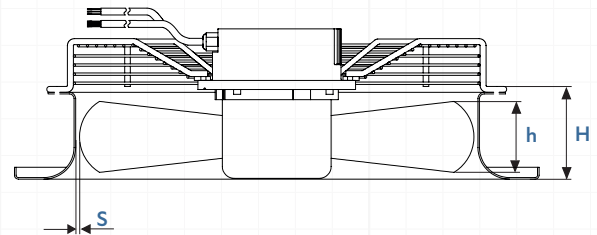


■ Air nozzle design

To keep optimal air performance and noise level design air nozzle according below tips.

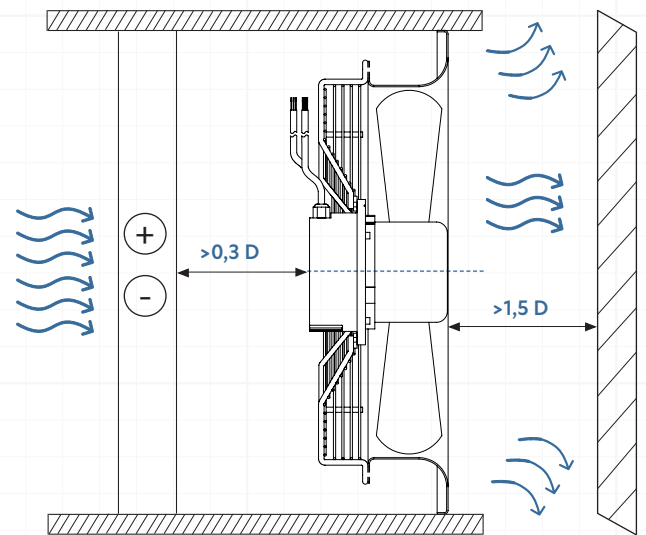
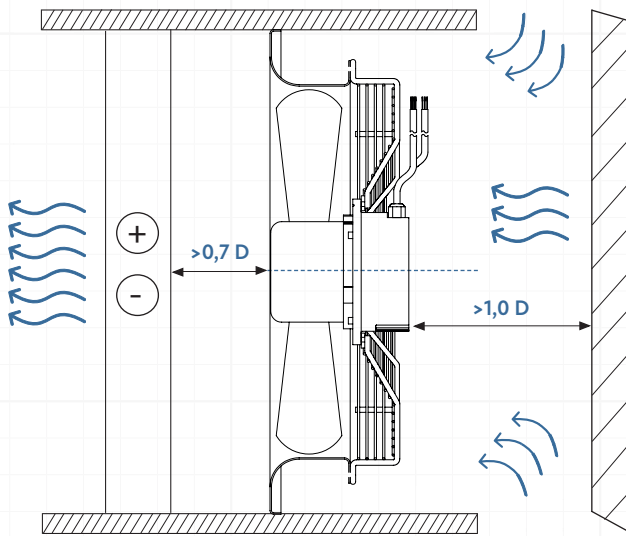
$$S = 2 - 5 \text{ mm}$$

$$H/h > 1$$



■ Airflow conditions - minimum required distances

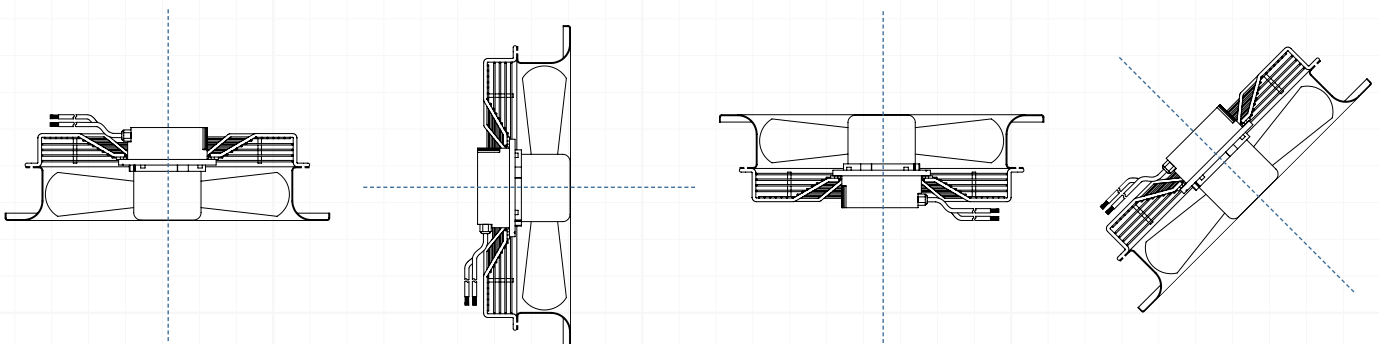
To keep maximum efficiency and airflow and also to keep equal speed distribution on unit equipment (e.g. heat exchanger) it is recommended to install fan as on pictures below.

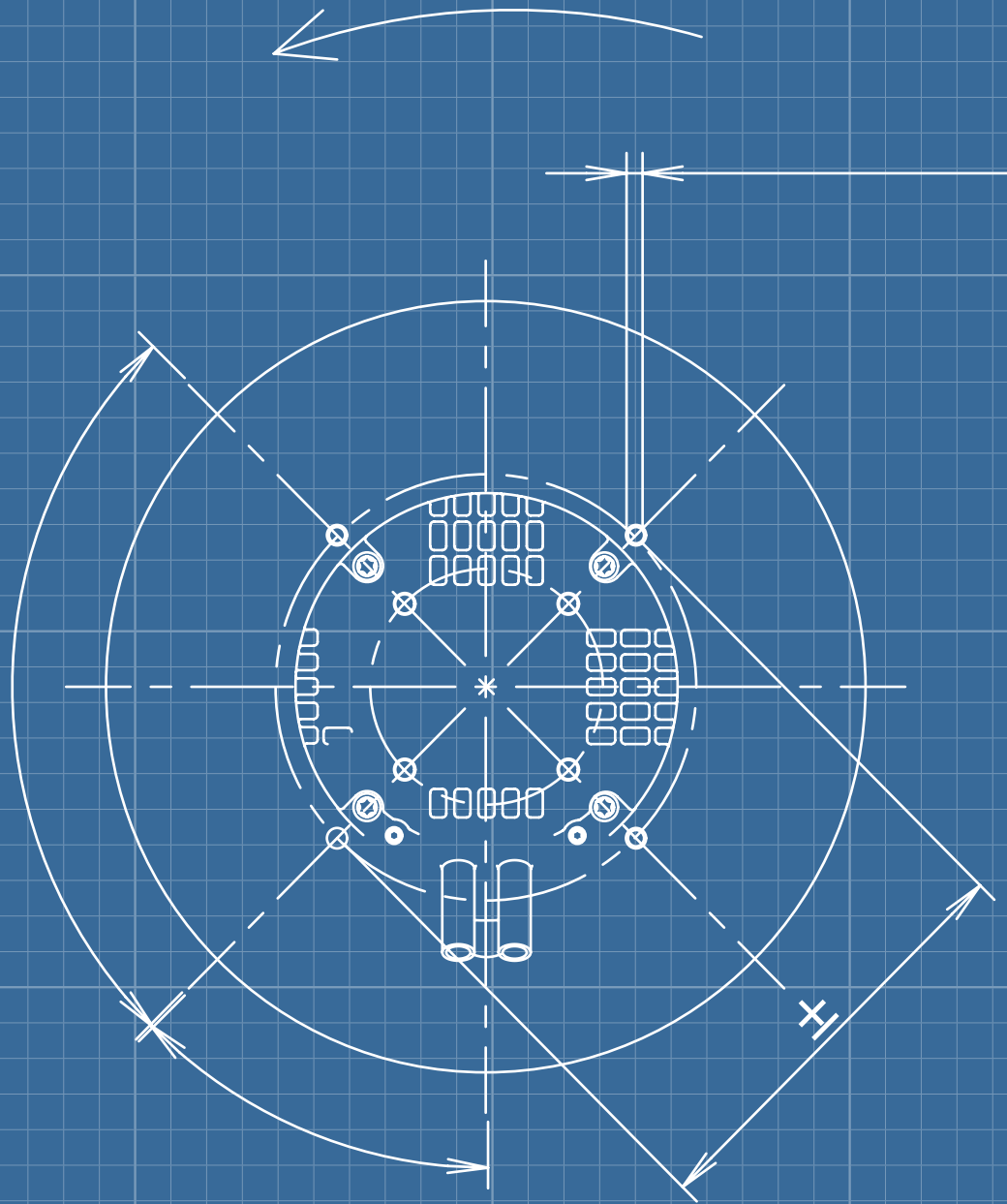


D – impeller diameter

■ Installation position

EC Axial fans could be mounted in any direction.



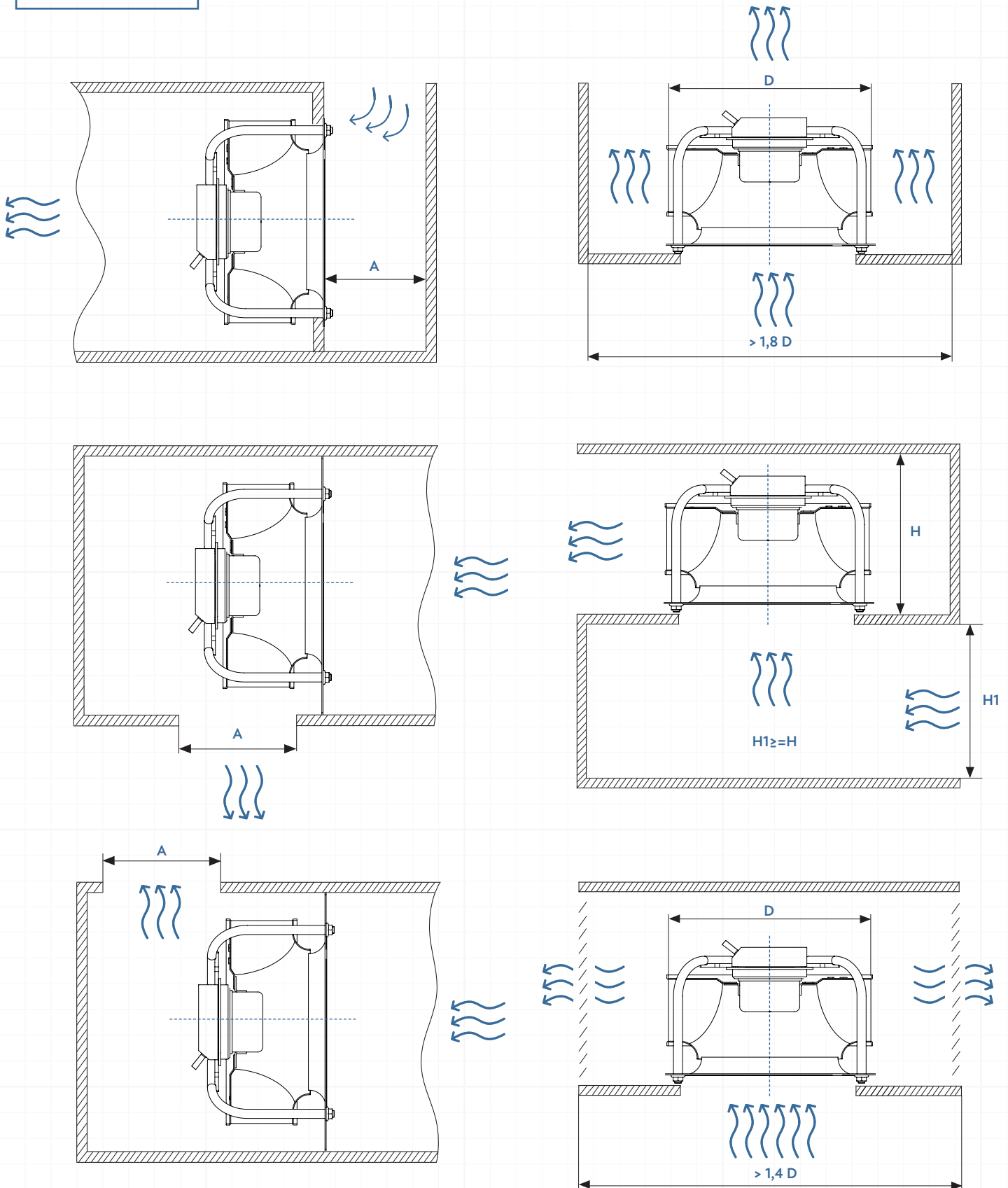


02

EC BACKWARD CURVED CENTRIFUGAL FANS

To get optimal fan performance the minimum distance on the inlet and pressure side should be kept.

$$A \geq 0,8 D$$

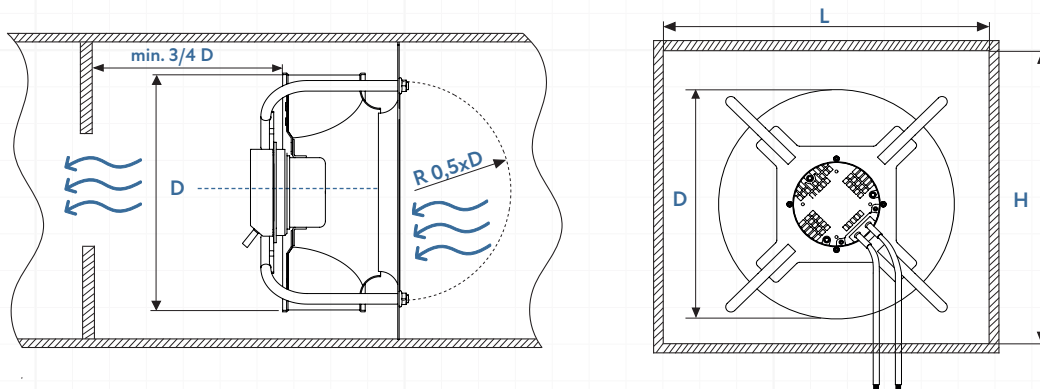


D – impeller diameter

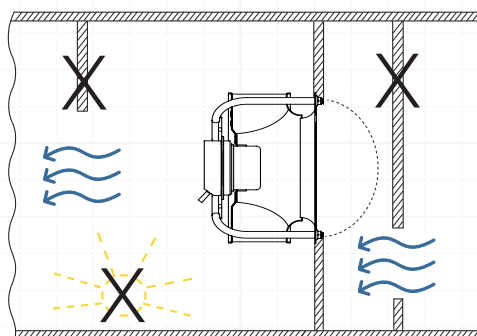
■ Installation space

Fan performance can be reduced if the installation space is too small. Losses can be ignored if the ratio of the housing sides is bigger or equal to 1,7 D. Ratio can be calculated as below.

$$(L+H)/2 \geq 1,7 D$$



Also unnecessary obstacles should be avoided (e.g lights, electric box).

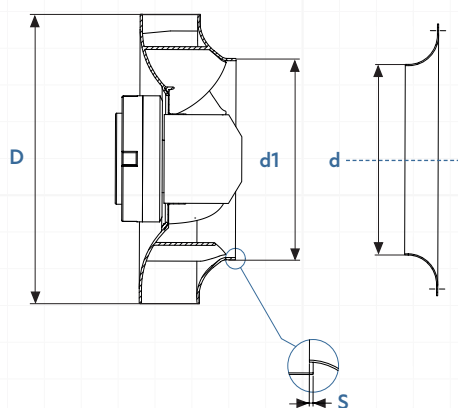


■ Inlet ring

Inlet ring positioning should be fit to the impeller inlet diameter.

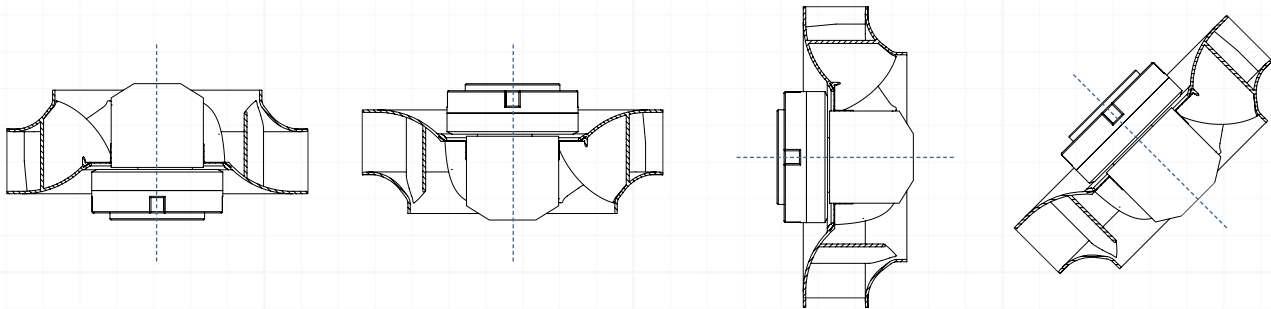
$$S=2\text{mm} \quad (D < 500\text{mm})$$

$$S=5\text{mm} \quad (D \geq 500\text{mm})$$



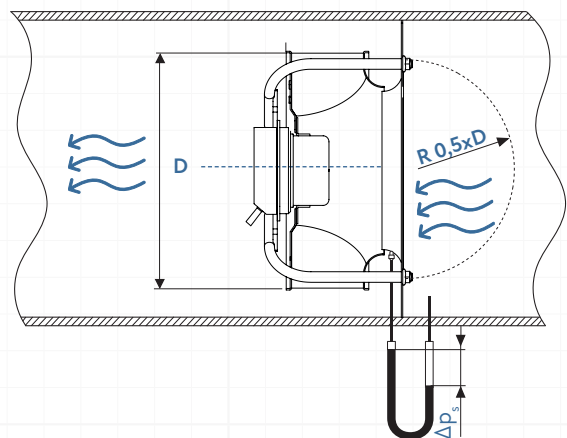
■ Installation position

EC Backward curved centrifugal fans could be mounted in any direction.



■ Determining airflow

To determine the airflow of fans with an inlet ring with a pressure connector we can measure the static pressure difference between points before the inlet ring and in the narrowest point of the inlet ring.



k-factors for AFL inlet rings

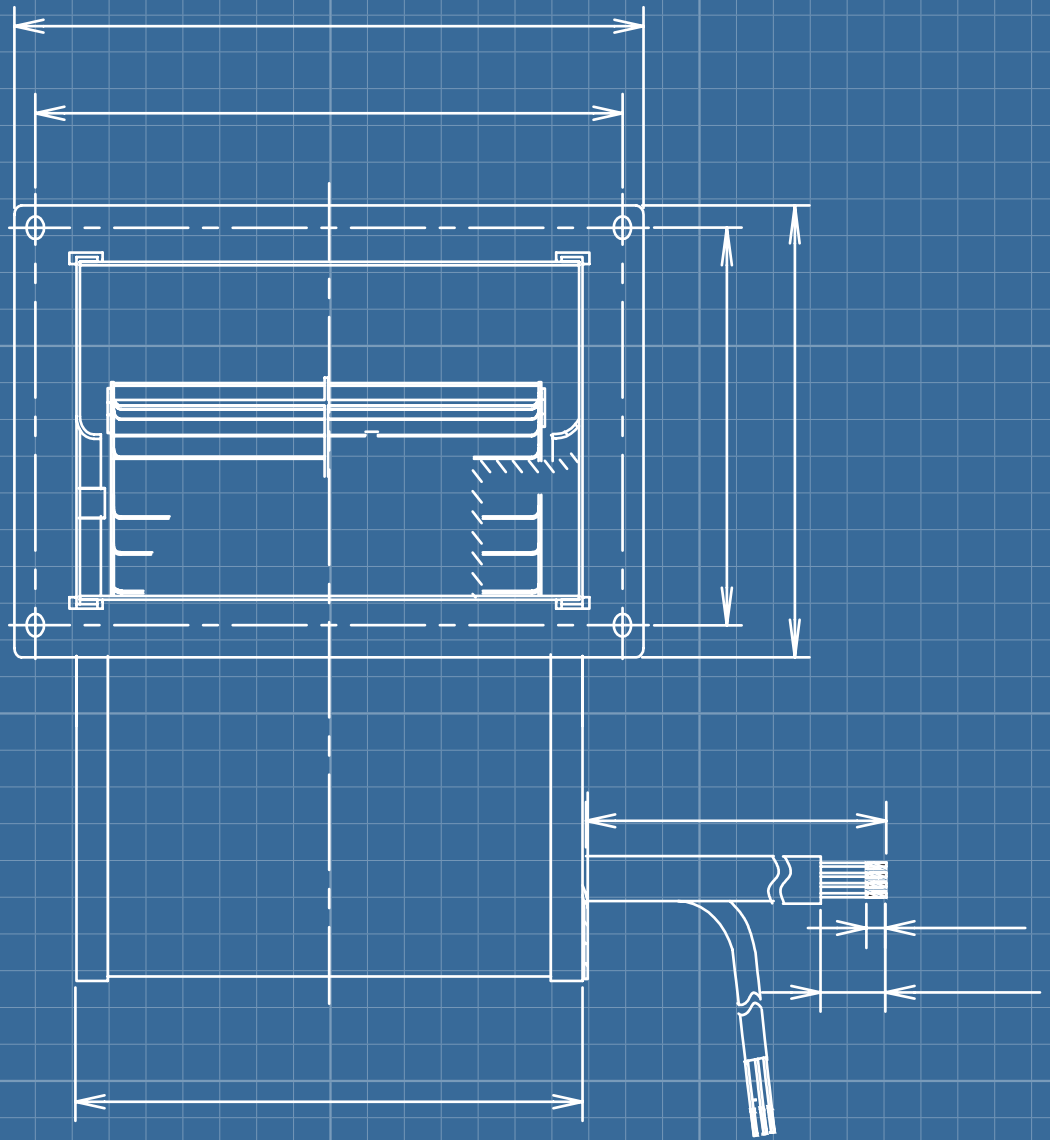
fan size	k-factor
190	32
225	56
250	59
280	71
310	92
355	117
400	188
450	193
500	250
560	363
630	437

Using simple formula we can determine air flow:

$$q_v = k \cdot \sqrt{\Delta p_s}$$

q_v [m³/h] and Δp_s [Pa]

* this air flow determination method is only suitable for approximate measurements on site.



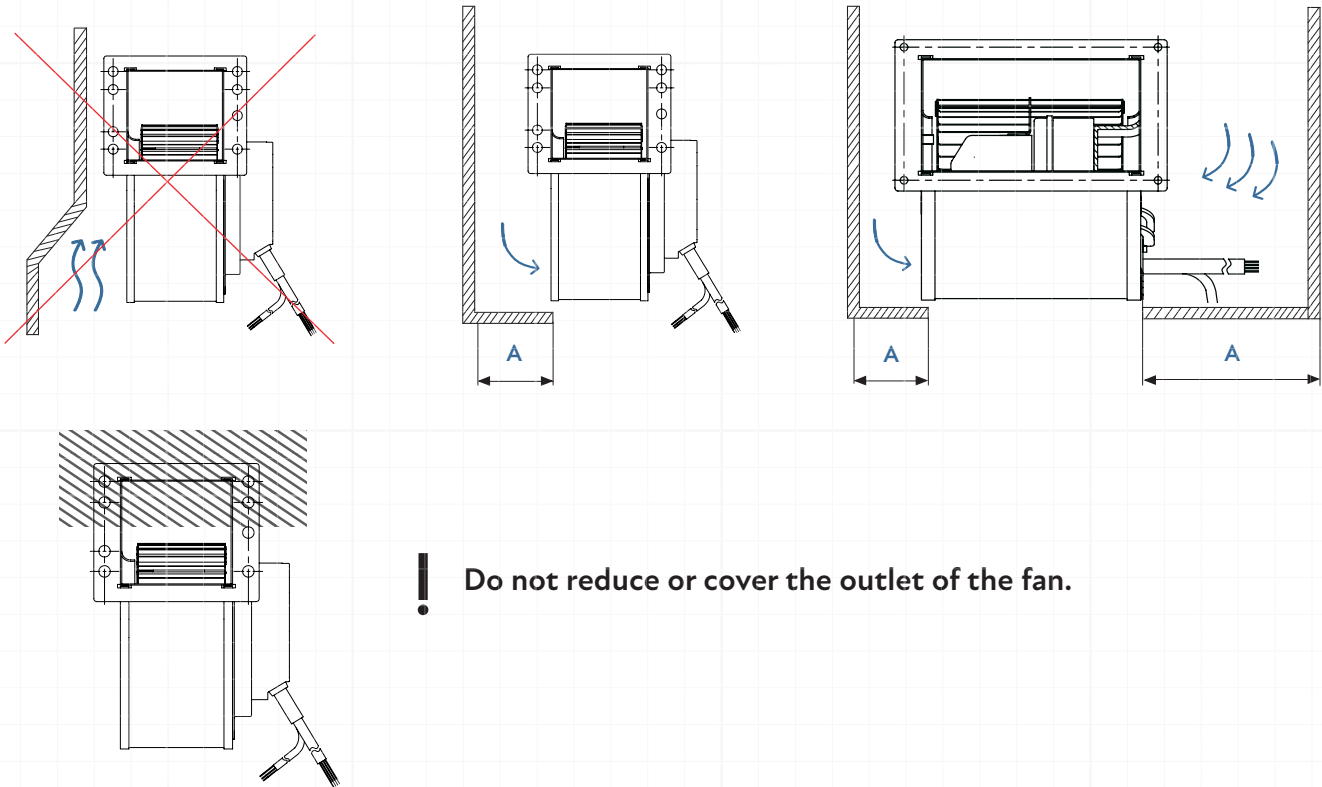
03

EC FORWARD CURVED
CENTRIFUGAL FANS

■ Obstacles on inlet side

To get optimal fan performance the minimum distance on the inlet side should be kept. Obstacles should be avoided and the inflow should be even.

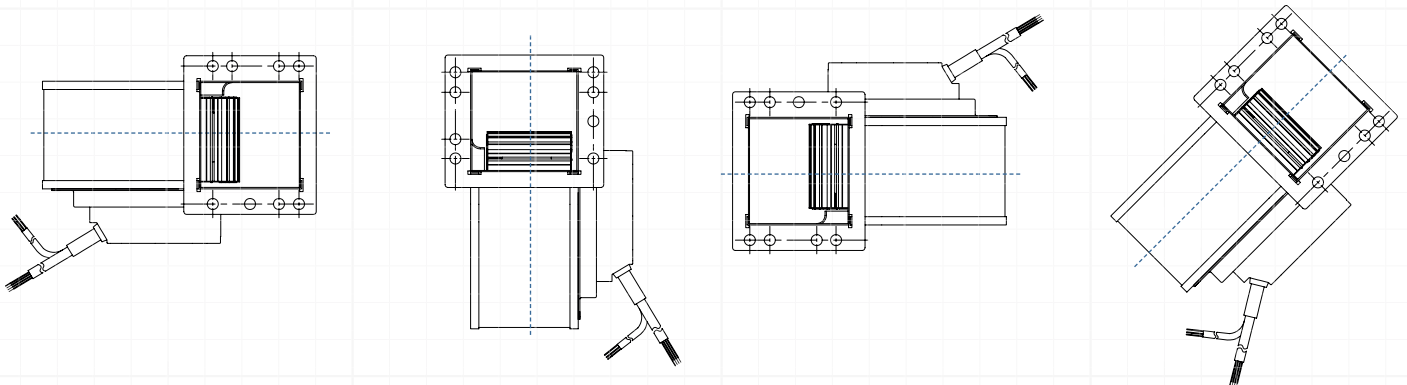
$$A > 0,3 D$$



D – impeller diameter

■ Installation position

EC Forward curved centrifugal fans could be mounted in any direction.



Useful tables

Air flow		
[m ³ /h]	[CFM]	[l/s]
0	0	0
100	59	28
200	118	56
300	177	83
400	235	111
500	294	139
600	353	167
700	412	194
800	471	222
900	530	250
1000	589	278
1200	706	333
1400	824	389
1600	942	444
1800	1059	500
2000	1177	555
2500	1471	694
3000	1766	833
3500	2060	972
4000	2354	1111
4500	2648	1250
5000	2943	1389
6000	3531	1666
7000	4120	1944
8000	4708	2222
9000	5297	2499
10000	5885	2777
11000	6474	3055
12000	7062	3332
13000	7651	3610
14000	8239	3888
15000	8828	4166
16000	9416	4443
17000	10005	4721
18000	10593	4999
19000	11182	5276
20000	11770	5554
21000	12359	5832
22000	12947	6109
23000	13536	6387
24000	14124	6665
25000	14713	6943
26000	15301	7220

Pressure			
[Pa]	[mmHg]	[mmH ₂ O]	[inH ₂ O]
0	0,00	0,0	0,00
5	0,04	0,5	0,02
10	0,08	1,0	0,04
15	0,11	1,5	0,06
20	0,15	2,0	0,08
25	0,19	2,5	0,10
30	0,23	3,1	0,12
35	0,26	3,6	0,14
40	0,30	4,1	0,16
45	0,34	4,6	0,18
50	0,38	5,1	0,20
55	0,41	5,6	0,22
60	0,45	6,1	0,24
65	0,49	6,6	0,26
70	0,53	7,1	0,28
75	0,56	7,6	0,30
80	0,60	8,2	0,32
85	0,64	8,7	0,34
90	0,68	9,2	0,36
95	0,71	9,7	0,38
100	0,75	10,2	0,40
125	0,94	12,7	0,50
150	1,13	15,3	0,60
175	1,31	17,8	0,70
200	1,50	20,4	0,80
300	2,25	30,6	1,20
400	3,00	40,8	1,61
500	3,75	51,0	2,01
600	4,50	61,2	2,41
700	5,25	71,4	2,81
800	6,00	81,6	3,21
900	6,75	91,8	3,61
1000	7,50	102,0	4,02
1100	8,25	112,2	4,42
1200	9,00	122,4	4,82
1300	9,75	132,6	5,22
1400	10,50	142,8	5,62
1500	11,25	153,0	6,02
1600	12,00	163,2	6,42
1700	12,75	173,4	6,83
1800	13,50	183,5	7,23
1900	14,25	193,7	7,63
2000	15,00	203,9	8,03

Temperature		
[°C]	[F]	[K]
-30	-22	243,15
-27,5	-17,5	245,65
-25	-13	248,15
-22,5	-8,5	250,65
-20	-4	253,15
-17,5	0,5	255,65
-15	5	258,15
-12,5	9,5	260,65
-10	14	263,15
-7,5	18,5	265,65
-5	23	268,15
-2,5	27,5	270,65
0	32	273,15
2,5	36,5	275,65
5	41	278,15
7,5	45,5	280,65
10	50	283,15
12,5	54,5	285,65
15	59	288,15
17,5	63,5	290,65
20	68	293,15
22,5	72,5	295,65
25	77	298,15
27,5	81,5	300,65
30	86	303,15
32,5	90,5	305,65
35	95	308,15
37,5	99,5	310,65
40	104	313,15
42,5	108,5	315,65
45	113	318,15
47,5	117,5	320,65
50	122	323,15
52,5	126,5	325,65
55	131	328,15
57,5	135,5	330,65
60	140	333,15
62,5	144,5	335,65
65	149	338,15
67,5	153,5	340,65
70	158	343,15
72,5	162,5	345,65
75	167	348,15



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REMEMBER

Fans are installed in the machines or ventilation devices or installation. Safety rules for final product should be maintained by the manufacturer of the final product or installation.



Dry Coolers



Fan heaters



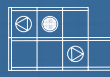
Chillers



Air curtains



Heat pumps



Air handling units



Refrigeration condensers



Hoods



Air purifiers



Roof fans



Heat recovery units



Data centers