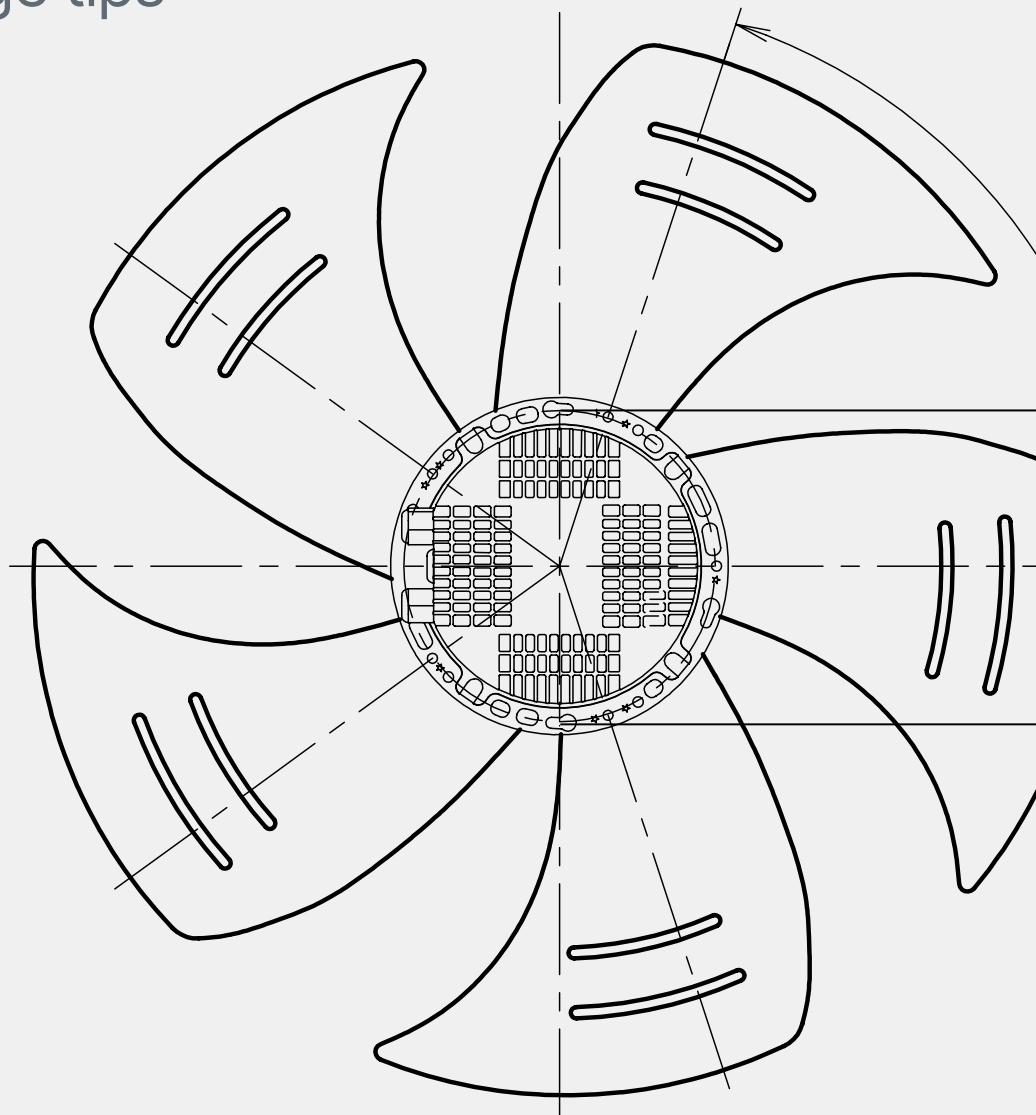




# AFL EC fan

design and usage tips



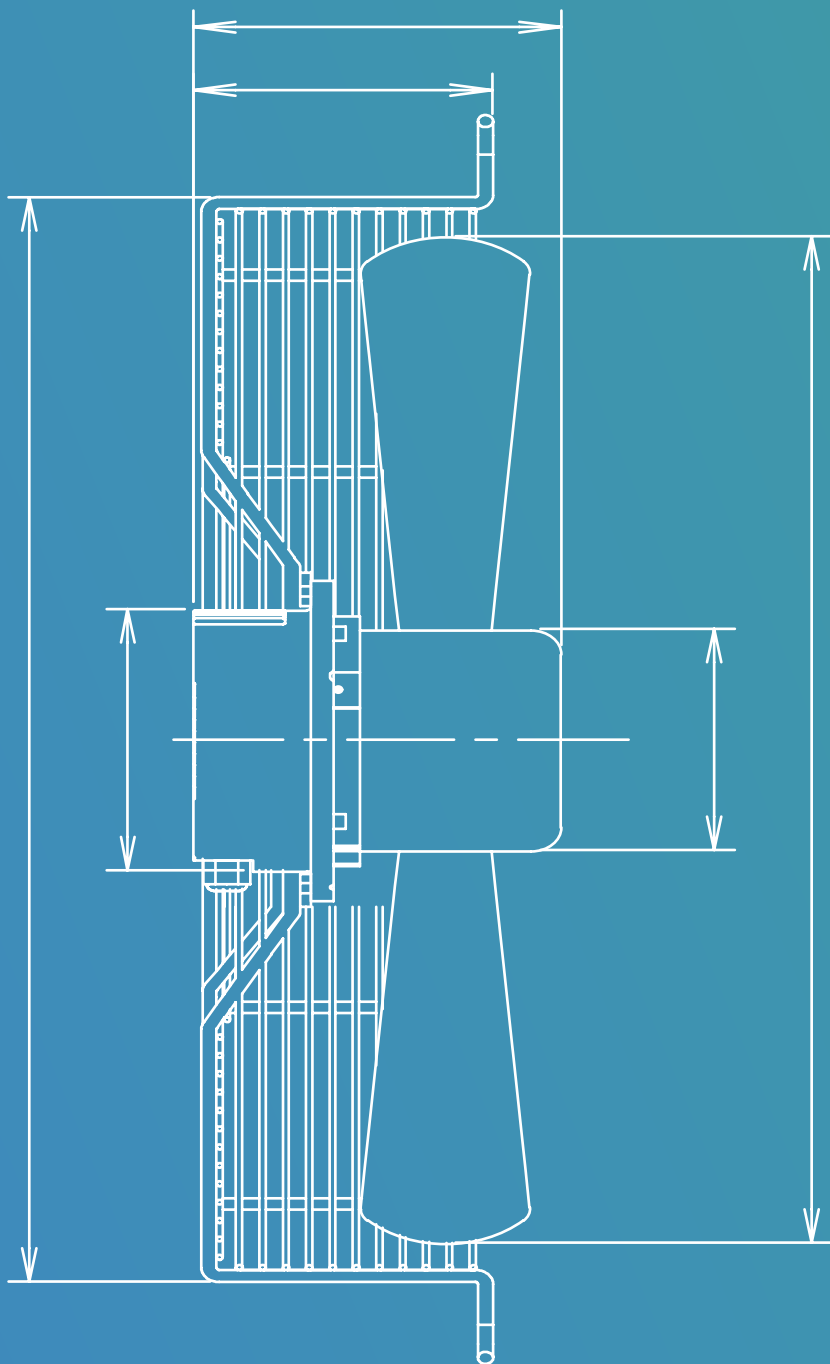
# Contents

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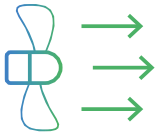
|                                     |    |
|-------------------------------------|----|
| EC Axial Fans                       | 3  |
| EC Backward Curved Centrifugal Fans | 6  |
| EC Forward Curved Centrifugal Fans  | 10 |
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01

# EC Axial Fans

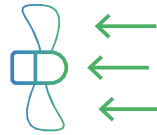


# Choose the right model to get right airflow direction



## B – blowing

Airflow direction motor → impeller

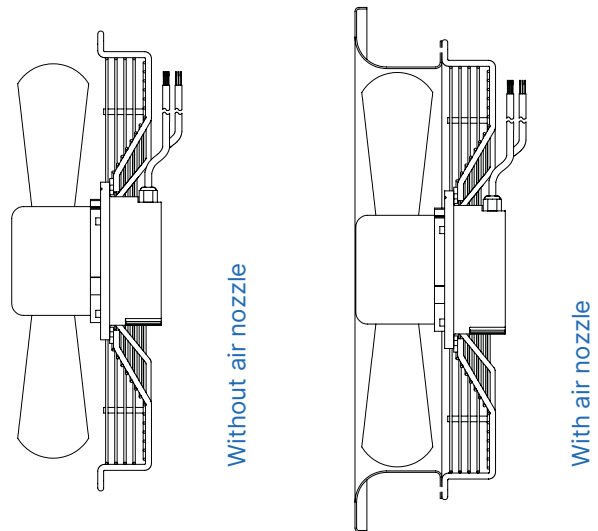


## S – suction

Airflow direction impeller → motor

## Air nozzle

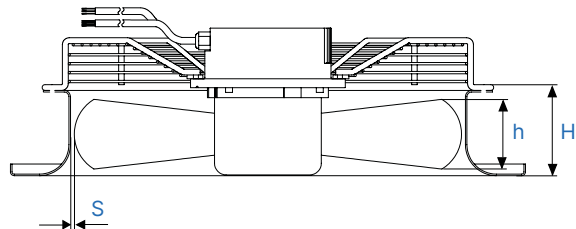
To keep optimal air performance and noise level, axial fans should be mounted with air nozzle.



## Air nozzle design

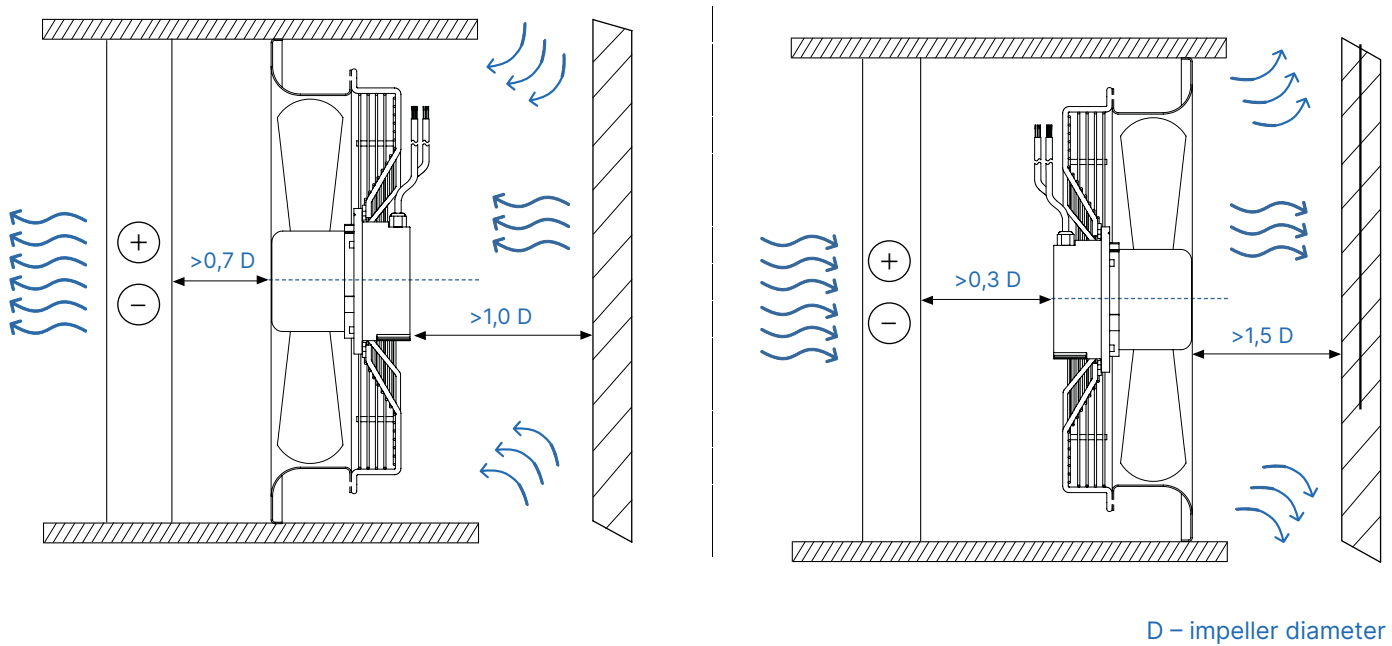
To keep optimal air performance and noise level design air nozzle according below tips.

$S = 2 - 5 \text{ mm}$   
 $H/h > 1$



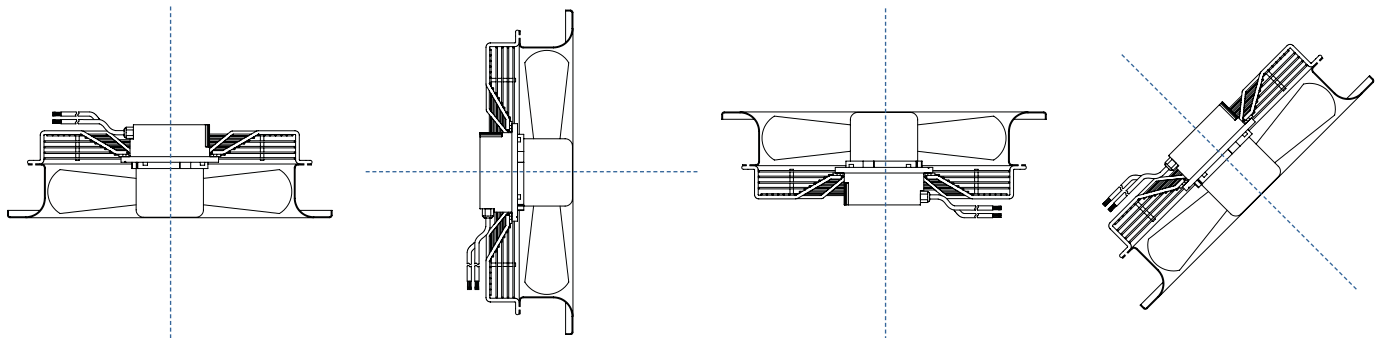
# Airflow conditions – minimum required distances

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.



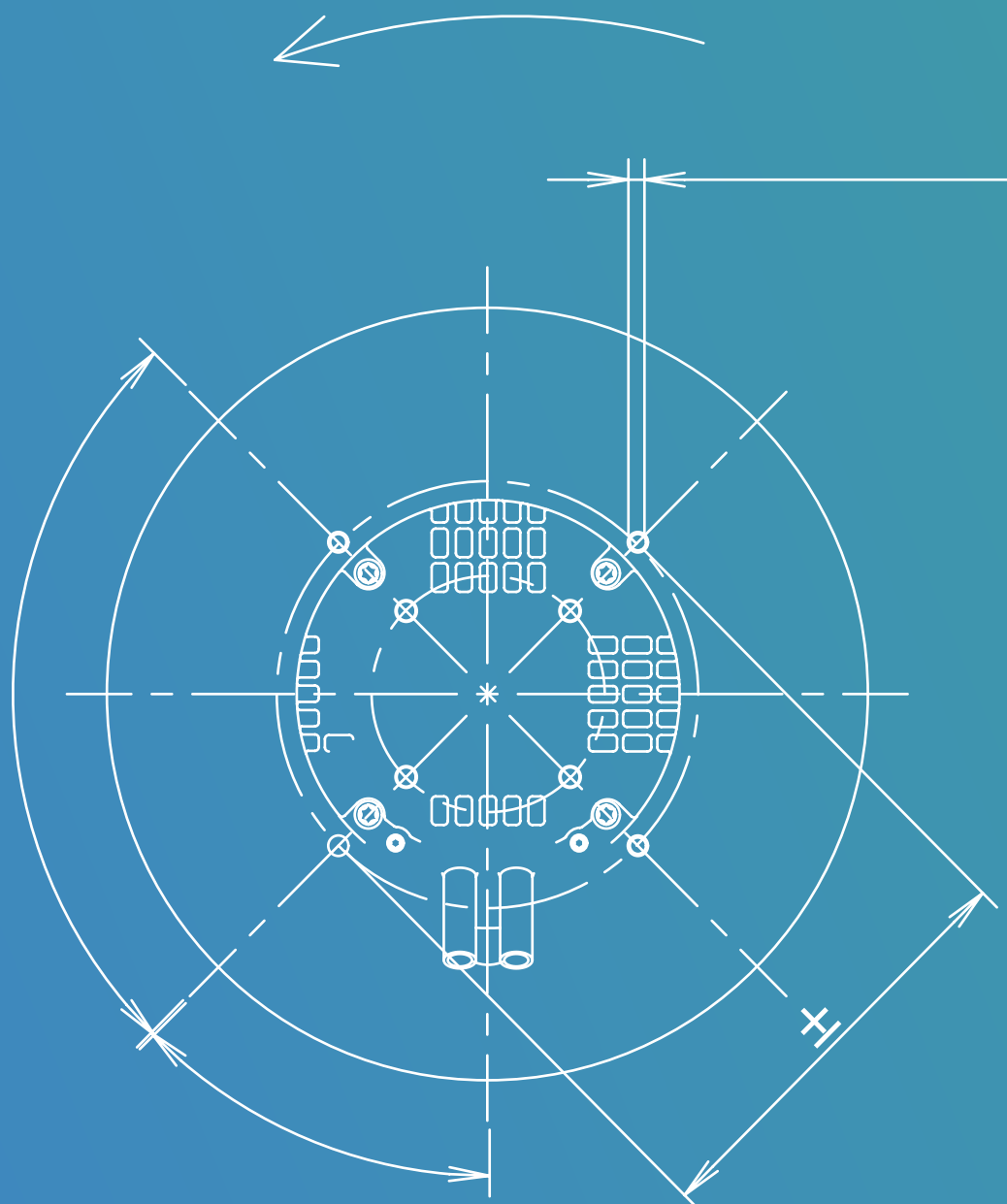
## Installation position

EC Axial fans could be mounted in any direction.



02

# EC Backward Curved Centrifugal Fans

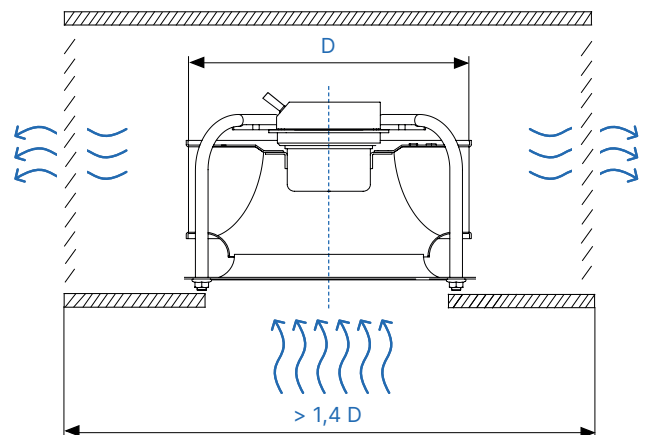
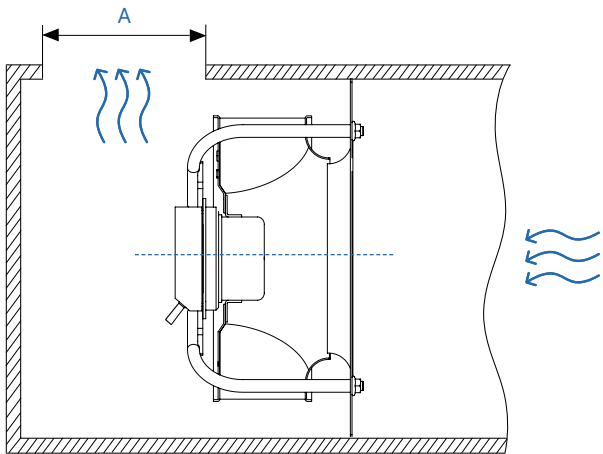
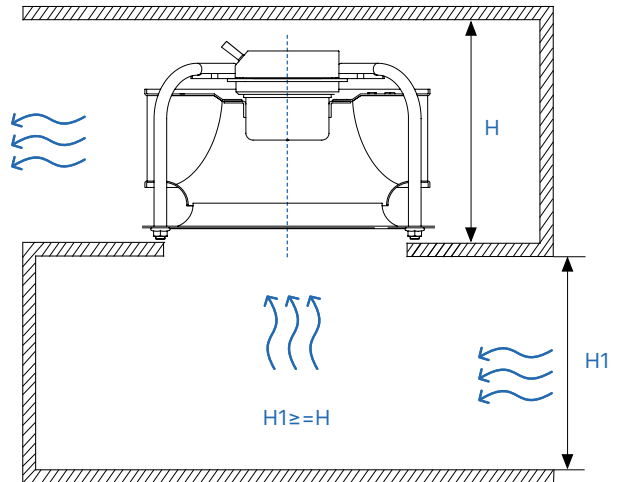
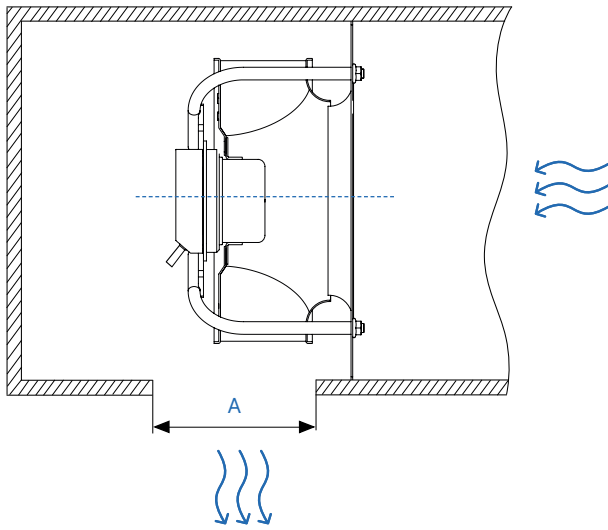
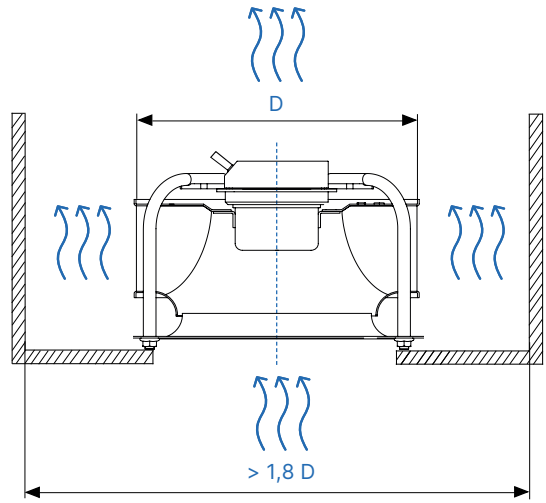
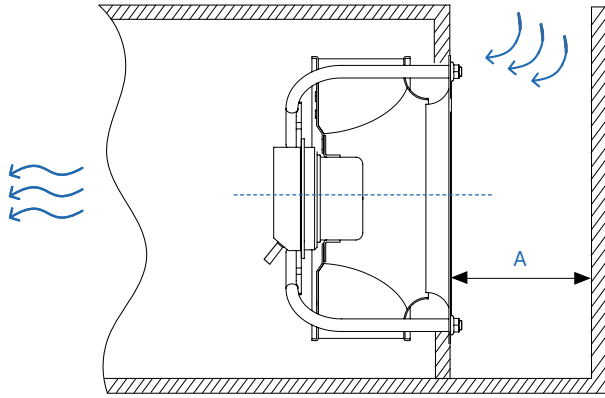


# Minimum distance

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

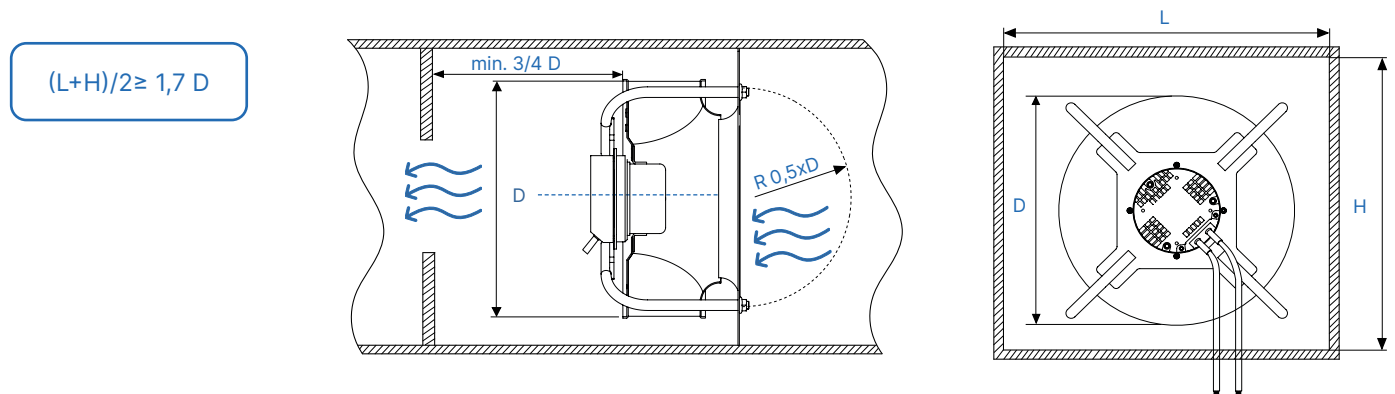


# Installation space

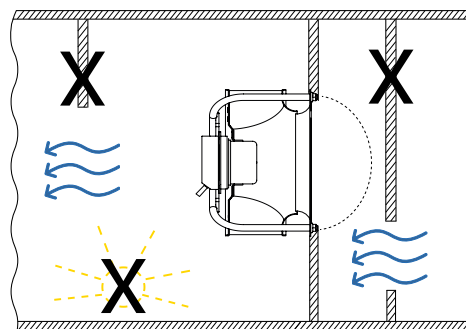
Fan performance can be reduced if the installation space is too small.

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.

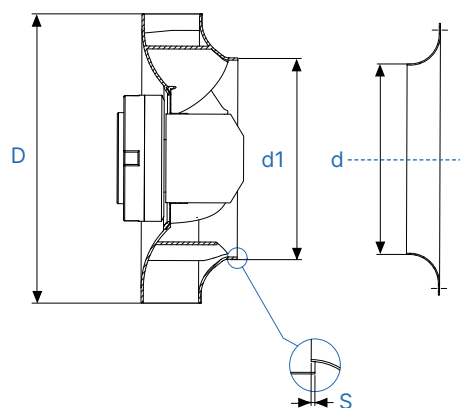
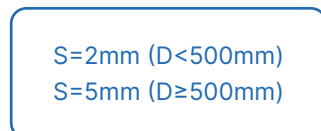


Also unnecessary obstacles should be avoided (e.g lights, electric box).



## Inlet ring

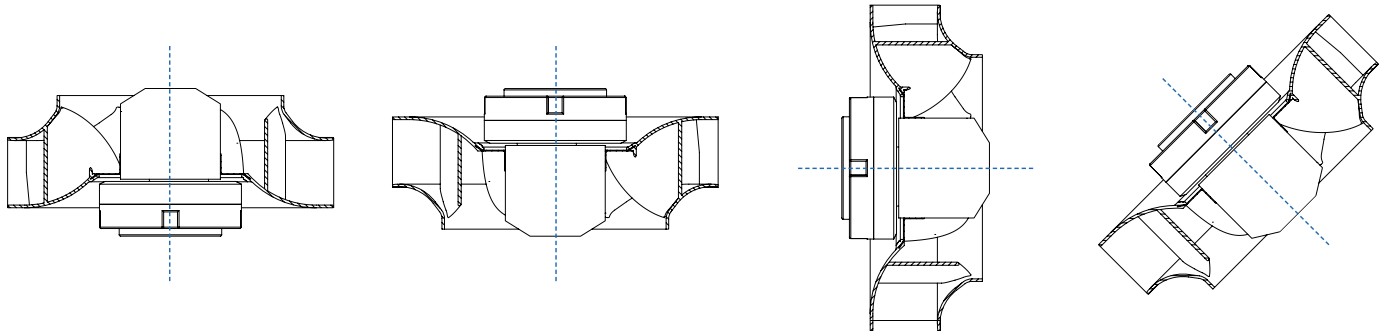
Inlet ring positioning should be fitted to the impeller inlet diameter.





# Installation position

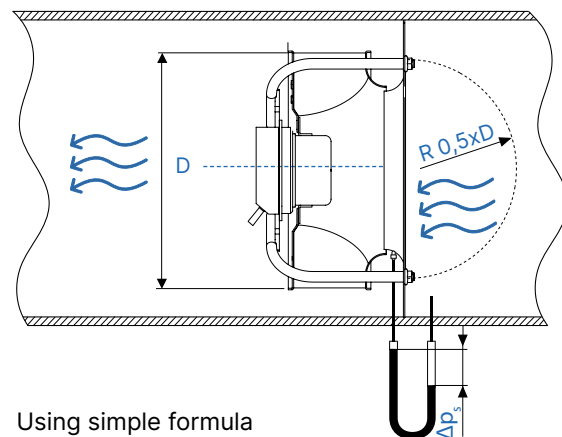
EC Backward curved centrifugal fans could be mounted in any direction.



## 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:

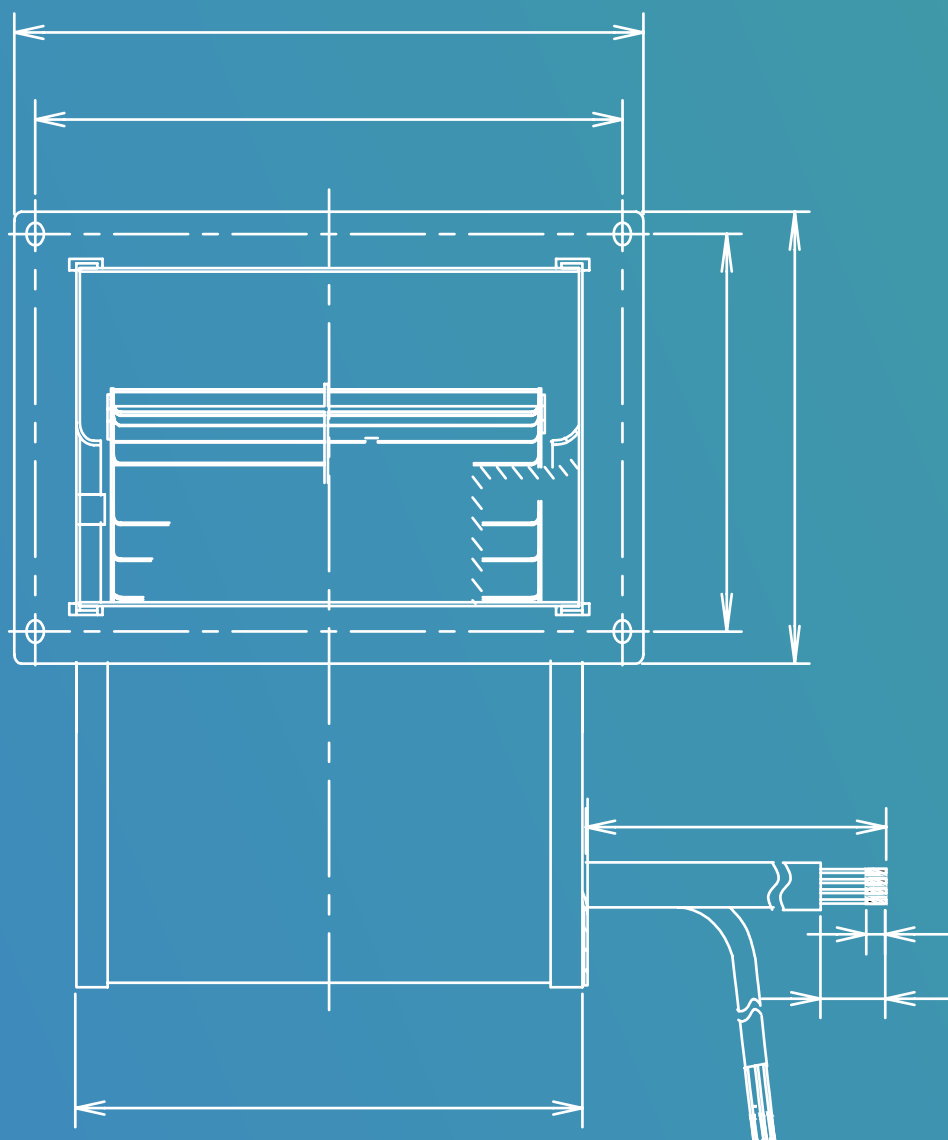
$$q_v = k \cdot \sqrt{\Delta p_s}$$

$q_v$  [m<sup>3</sup>/h] and  $\Delta p_s$  [Pa]

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

03

# EC Forward Curved Centrifugal Fans

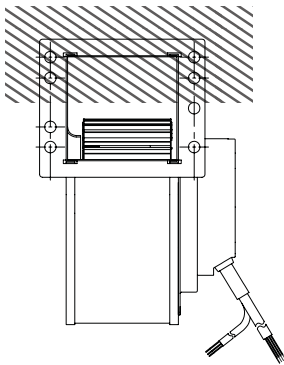
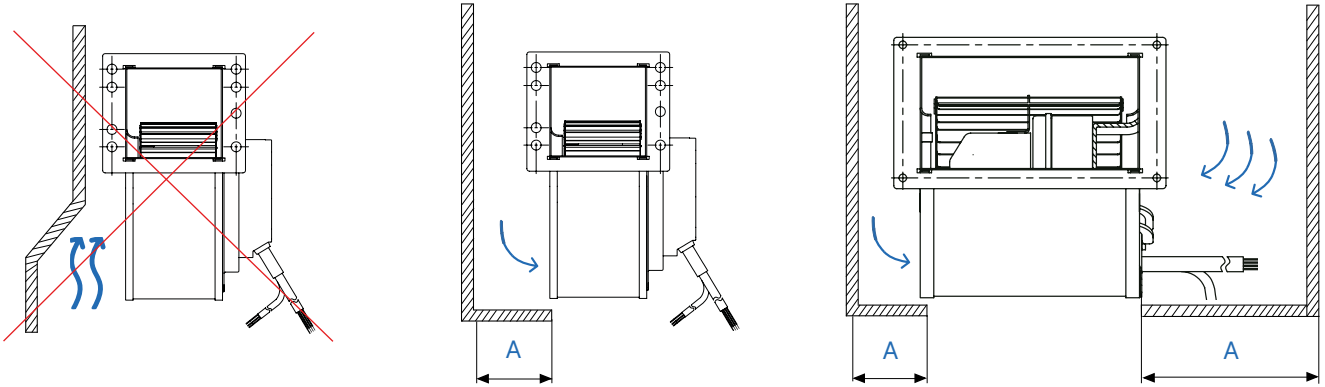


# Obstacles on inlet side

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.

$$A > 0,3 D$$

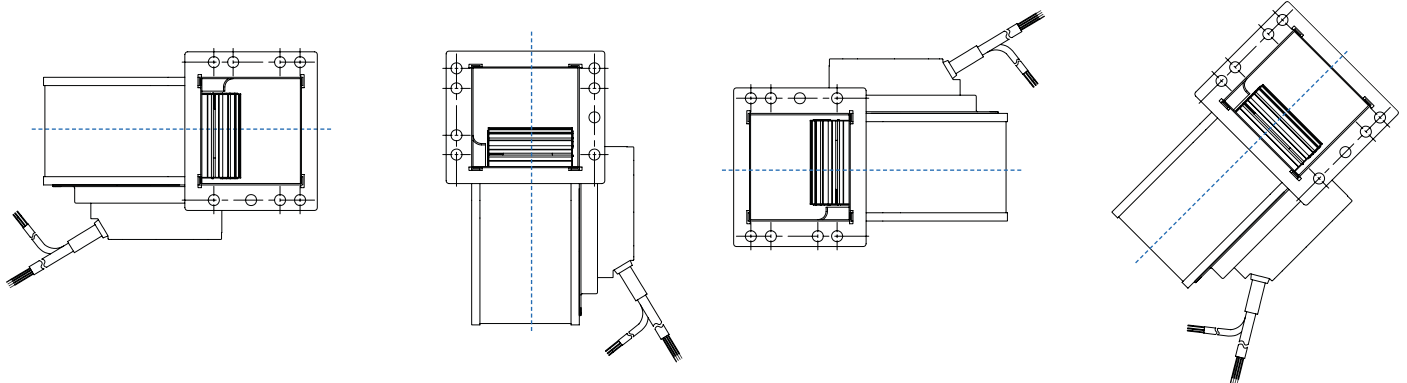
D – impeller diameter



Do not reduce or cover the outlet of the fan.

# Installation position

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

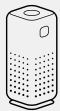


# Useful tables

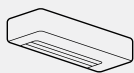
| Air flow            |       |       | Pressure |        |                      |                      | Temperature |       |        |
|---------------------|-------|-------|----------|--------|----------------------|----------------------|-------------|-------|--------|
| [m <sup>3</sup> /h] | [CFM] | [l/s] | [Pa]     | [mmHg] | [mmH <sub>2</sub> O] | [inH <sub>2</sub> O] | [°C]        | [F]   | [K]    |
| 0                   | 0     | 0     | 0        | 0,00   | 0,0                  | 0,00                 | -30         | -22   | 243,15 |
| 100                 | 59    | 28    | 5        | 0,04   | 0,5                  | 0,02                 | -27,5       | -17,5 | 245,65 |
| 200                 | 118   | 56    | 10       | 0,08   | 1,0                  | 0,04                 | -25         | -13   | 248,15 |
| 300                 | 177   | 83    | 15       | 0,11   | 1,5                  | 0,06                 | -22,5       | -8,5  | 250,65 |
| 400                 | 235   | 111   | 20       | 0,15   | 2,0                  | 0,08                 | -20         | -4    | 253,15 |
| 500                 | 294   | 139   | 25       | 0,19   | 2,5                  | 0,10                 | -17,5       | 0,5   | 255,65 |
| 600                 | 353   | 167   | 30       | 0,23   | 3,1                  | 0,12                 | -15         | 5     | 258,15 |
| 700                 | 412   | 194   | 35       | 0,26   | 3,6                  | 0,14                 | -12,5       | 9,5   | 260,65 |
| 800                 | 471   | 222   | 40       | 0,30   | 4,1                  | 0,16                 | -10         | 14    | 263,15 |
| 900                 | 530   | 250   | 45       | 0,34   | 4,6                  | 0,18                 | -7,5        | 18,5  | 265,65 |
| 1000                | 589   | 278   | 50       | 0,38   | 5,1                  | 0,20                 | -5          | 23    | 268,15 |
| 1200                | 706   | 333   | 55       | 0,41   | 5,6                  | 0,22                 | -2,5        | 27,5  | 270,65 |
| 1400                | 824   | 389   | 60       | 0,45   | 6,1                  | 0,24                 | 0           | 32    | 273,15 |
| 1600                | 942   | 444   | 65       | 0,49   | 6,6                  | 0,26                 | 2,5         | 36,5  | 275,65 |
| 1800                | 1059  | 500   | 70       | 0,53   | 7,1                  | 0,28                 | 5           | 41    | 278,15 |
| 2000                | 1177  | 555   | 75       | 0,56   | 7,6                  | 0,30                 | 7,5         | 45,5  | 280,65 |
| 2500                | 1471  | 694   | 80       | 0,60   | 8,2                  | 0,32                 | 10          | 50    | 283,15 |
| 3000                | 1766  | 833   | 85       | 0,64   | 8,7                  | 0,34                 | 12,5        | 54,5  | 285,65 |
| 3500                | 2060  | 972   | 90       | 0,68   | 9,2                  | 0,36                 | 15          | 59    | 288,15 |
| 4000                | 2354  | 1111  | 95       | 0,71   | 9,7                  | 0,38                 | 17,5        | 63,5  | 290,65 |
| 4500                | 2648  | 1250  | 100      | 0,75   | 10,2                 | 0,40                 | 20          | 68    | 293,15 |
| 5000                | 2943  | 1389  | 125      | 0,94   | 12,7                 | 0,50                 | 22,5        | 72,5  | 295,65 |
| 6000                | 3531  | 1666  | 150      | 1,13   | 15,3                 | 0,60                 | 25          | 77    | 298,15 |
| 7000                | 4120  | 1944  | 175      | 1,31   | 17,8                 | 0,70                 | 27,5        | 81,5  | 300,65 |
| 8000                | 4708  | 2222  | 200      | 1,50   | 20,4                 | 0,80                 | 30          | 86    | 303,15 |
| 9000                | 5297  | 2499  | 300      | 2,25   | 30,6                 | 1,20                 | 32,5        | 90,5  | 305,65 |
| 10000               | 5885  | 2777  | 400      | 3,00   | 40,8                 | 1,61                 | 35          | 95    | 308,15 |
| 11000               | 6474  | 3055  | 500      | 3,75   | 51,0                 | 2,01                 | 37,5        | 99,5  | 310,65 |
| 12000               | 7062  | 3332  | 600      | 4,50   | 61,2                 | 2,41                 | 40          | 104   | 313,15 |
| 13000               | 7651  | 3610  | 700      | 5,25   | 71,4                 | 2,81                 | 42,5        | 108,5 | 315,65 |
| 14000               | 8239  | 3888  | 800      | 6,00   | 81,6                 | 3,21                 | 45          | 113   | 318,15 |
| 15000               | 8828  | 4166  | 900      | 6,75   | 91,8                 | 3,61                 | 47,5        | 117,5 | 320,65 |
| 16000               | 9416  | 4443  | 1000     | 7,50   | 102,0                | 4,02                 | 50          | 122   | 323,15 |
| 17000               | 10005 | 4721  | 1100     | 8,25   | 112,2                | 4,42                 | 52,5        | 126,5 | 325,65 |
| 18000               | 10593 | 4999  | 1200     | 9,00   | 122,4                | 4,82                 | 55          | 131   | 328,15 |
| 19000               | 11182 | 5276  | 1300     | 9,75   | 132,6                | 5,22                 | 57,5        | 135,5 | 330,65 |
| 20000               | 11770 | 5554  | 1400     | 10,50  | 142,8                | 5,62                 | 60          | 140   | 333,15 |
| 21000               | 12359 | 5832  | 1500     | 11,25  | 153,0                | 6,02                 | 62,5        | 144,5 | 335,65 |
| 22000               | 12947 | 6109  | 1600     | 12,00  | 163,2                | 6,42                 | 65          | 149   | 338,15 |
| 23000               | 13536 | 6387  | 1700     | 12,75  | 173,4                | 6,83                 | 67,5        | 153,5 | 340,65 |
| 24000               | 14124 | 6665  | 1800     | 13,50  | 183,5                | 7,23                 | 70          | 158   | 343,15 |
| 25000               | 14713 | 6943  | 1900     | 14,25  | 193,7                | 7,63                 | 72,5        | 162,5 | 345,65 |
| 26000               | 15301 | 7220  | 2000     | 15,00  | 203,9                | 8,03                 | 75          | 167   | 348,15 |

## Remember

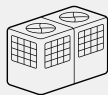
Fans are installed in the machines or ventilation devices or installation. Safety rules for final product should be maintained by the manufacturer of the final product or installation.



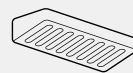
Air purifiers



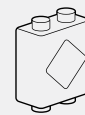
Air curtains



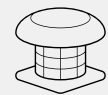
Chillers



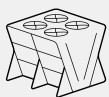
Kitchen hoods



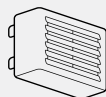
Heat recovery units



Roof fans



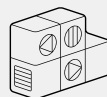
Dry coolers



Fan heaters



Heat pumps



Air handling units



Refrigeration  
condensers



Data centers